PEDAGOGY OF COMPUTER SCIENCE

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Contents

CHAPTER I
CONCEPT OF COMPUTER SCIENCE

Computer Science is the study of the hardware, software, networking and all the processes that fall under the umbrella of giving life to a machine to enable it to perform complicated tasks and actions. It is a study of computers and computational Systems.

Computer Science is the study of computers and computing concept. It includes both hardware and software as well as networking and the Internet. The hardware aspect of computer science covers the basic design of Computers and the way they work. A fundamental understanding of how a Computer "Computes" or perform calculations, provide the foundation for comprehending more advanced concepts. For example; understanding how a Computer operates in binary allows you to understand how Computers add, subtract and perform other operations. Learning about logic gates enables you to make sense of processor architecture.

The software side of Computer Science covers programming concepts as well as specific programming language. Programming concept includes functions, algorithms and source code design. Computer Science also covers compilers, operating systems and software applications. User focused aspects of Computer Science include Computer graphics and user interface design.

Since nearly all computers are now connected to the Internet, the computer science umbrella covers internet technologies as well. This includes Internet protocols, telecommunication, and networking concepts. It also involves computer science develops student's computational and critical thinking skills and shows them how to create, not simply use new technologies. This Fundamental knowledge is needed to prepare students for the 21st century, regardless of their ultimate field of study or occupation.

DEFINITIONS OF COMPUTER SCIENCE

Various definitions of Computer Science are as follows.

♦ According to **Business Dictionary**, "The study of Computing, programming and computation in correspondence with Computers work to design, test and analyze concepts."

♦ According to **Merriam Webster**, "A branch of Science that deals with the theory of computation or design of Computers."

♦ According to **Denning et al.** (1988), "Computer Science the systematic study of algorithmic processes that describe and transform information: their theory, analysis, design, efficiency, implementation and application."

♦ According to **Tucker et al.** (2003), "Computer Science is the study of Computer and algorithmic processes, including their principles, their hardware and software designs, their applications and their impact on society."

♦ According to **Newell et al.** (1967), "The study of Computers and major phenomena that surround them."

♦ According to **Wikipedia**, "Computer Science is the study of the theoretical foundations of information and computation, and of practical techniques for their implementation and application in computer systems. It is frequently described as the systematic study of algorithmic processes that create, describe and transform information".

♦ It is the scientific and practical applications and the systematic study of the feasibility, structure, expression and mechanization of the algorithms that underlie the acquisition, representation, processing, storage, communication of and access to information.

♦ The Science that deals with the theory and methods of processing information in digital computers, the design of computer hardware and software and the application of computer

AREAS OF COMPUTER SCIENCE

CSAB, formally called Computing Science accreditation board-which is made up of representatives of the association for Computing Science Machinery (ACM) and the IEEE Computer Society identifies following areas of Computer Science:

(1) **Architecture:** Methods of organizing efficient, reliable computing systems provide a central focus of this area. It includes implementation of processors, memory, communication and software interfaces as well as the design and control of large computational systems that are reliable.

(2) **Artificial Intelligence and Robotics**: The basic models of behaviour and the building of (Virtual or actual machines) to simulate animal and human behaviour are included here. Inference, deduction, batter recognition and knowledge representation are major components.

(3) **Algorithm:** Algorithm is a self-contained sequence of actions to be performed. Algorithm can perform calculation, data processing and automated reasoning tasks. An algorithm is an effective method can be expressed within a finite amount of space and time and in a well-defined formal language for calculating a function.

(4) **Data Structure**: This area deals with specific classes of problems and their efficient solutions. Data structure is a particular way of organizing data in a computer so that it can be used. This organization of data relative to different access requirements are major components.

(5) **Database and Information Retrieval:** This area is concerned with the organization of information and algorithms for the efficient access and updates of stored information. The modeling of data relationships, security and protection of information in a shared environment, and the characteristics of external storage device are included in this area.

(6) **Human-Computer Communication:** The efficient transfer of information between humans and machines is the central focus of this area. Graphics, human factors that affect efficient interaction, and the organization and display of information for effective utilization by humans are included.

(7) **Numerical and Symbolic Computation:** General methods for efficiently and accurately using Computers to solve equations from mathematical models are central to this area. The effectiveness and efficiency of various approaches to the solution of equations, and the development of high-quality mathematical software packages are important components.

(8) **Operating Systems:** This area deals with control mechanism that allows multiple

resources to be efficiently coordinated during the execution of programs. Included are appropriate services of user requests, effective strategies for resource control, and effective organization to support distributed computation.

(9)   **Programming Languages:** The fundamental questions addressed by this area involve notations for defining virtual machines that execute algorithms, the efficient translation from high-level Languages to machine codes, and the various extension mechanisms that can be provided in programming Languages.

(10)   **Software Methodology and Engineering:** The major focus of this area is the specification, design and production of large software systems. Principles of programming and software development, verification and validation of software, and the specification and production of software systems that are safe, secure, reliable and dependable are of special interest.

(11)   **Computer Graphics:** Computer graphics are pictures and films created using computers. Usually, the term refers to computer generated image data created with help from specialized graphical hardware and software. It is vast and recent area in computer science.

(12)   **Computer Networking and Communication:** Data communications refers to the transmission of digital data between two or more computers and computer network is a telecommunications network that allows computers to exchange data. This area mainly focus on study and analyze the communication process among various computing devices that are linked or networked together to exchange information and share resources.

(13)   **Computer Security and Cryptography:** Computer security is a branch of Computer technology, whose objectives includes protection of information from unauthorized access, disruption, or modification while maintaining the accessibility and usability of the system for its intended users. Cryptography is the practice and study of hiding and therefore deciphering (decryption) information. Modern Cryptography is largely related to computer science, for many encryption and decryption algorithms are based on their computational complexity.

(14)   **Computational Science:** Computational science is the field of study concerned with constructing mathematical models and quantitative analysis techniques and using computer to analyze and solve scientific problems. In practical use, it is typically the application of computer simulation and other forms of computation to problems in various scientific disciplines.

(15)   **Concurrent, parallel and distributed Systems:** Concurrency is a property of systems in which several computations are executing simultaneously, and potentially interacting with each other. A number of mathematical models have been developed for general concurrent computation including Petri nets, process calculi and the Parallel Random Access model. A distributed system extends the idea of concurrency onto multiple Computers connected through a network. Computers within the same distributed system have their own private memory, and information is often exchange among themselves to achieve a common goal.

Computer Science and Information Technology are Complementary, but they are not the same: Computer Science and information Technology are complementary subjects. Computers Science teaches a pupil how to be effective author of computational tools (i.e. software), while IT teaches how to be thoughtful user of those tools. More specifically:

♦ **Computer Science:** Computer science is a discipline that seeks to understand and explore the world around us, both natural and artificial, in computational terms. Computer Science is particularly, but by no means exclusively, concerned with the study, design and implementation of computers systems, and understanding the principles underlying these designs.

♦ **Information Technology:** IT deals with the purposeful application of computer systems to solve real world problems, including issues such as the identification of business needs, the specification and installation of hardware and software, and the evaluation of usability. It has the productive, creative and explorative use of technologies.

KEY CONCEPTS IN COMPUTER SCIENCE

A number of key concepts arise repeatedly in computing. They are grouped here under

(1) Languages, machines, and computation
(2) Data and representation
(3) Communication and coordination
(4) Abstraction and design
(5) The wider context of computing.

(1) LANGUAGES, MACHINES, AND COMPUTATION

Computers get things done by a "machine" executing a "program", written in some language.

Languages- There is a huge range of programming languages, ranging from the machine code that the hardware executes directly, to high-level programming languages such as Java or C++. In principle computation can be expressed in any language, but in practice the choice of language is often influenced by the problem to be solved. Indeed, there are many special purpose (or "domain specific") languages, such as SQL or Excel's formula language, designed for a particular class of applications. Unlike human languages, programming languages are necessarily very precise.

Algorithms - An algorithm is a precise method of solving a problem. Algorithms range from the simple (such as instructions for changing a wheel on a car) to the ingenious (such as route-finding), and cover many different application areas (for example, drawing three-dimensional graphics; solving systems of constraints, such as a school timetable; understanding images; numerical simulation, and so on). An algorithm can be expressed as a program in many different programming languages.

Machines - The most obvious "machine" is the hardware CPU, but many software layers implement virtual machines, an engine that to the layer above looks like a device for executing programs. Examples include hypervisors, the Java Virtual Machine, and programming environments such as Scratch.

Computational models- A sequential "program" execute one step at a time, but that is not the only model of computation. Others include parallel computation, and the emergent behaviour of large numbers of simple agents (e.g. the way in which flocks of very simple automata can have unexpected collective behaviour).

(2) DATA AND REPRESENTATION-

Much of the power of computers comes from their ability to store and manipulate very large quantities of data. The way in which this data is stored and manipulated can make enormous differences to the speed, robustness, and security of a computer system. This area of computing includes:

♦ How data is represented using bit patterns: including numbers, text, music, pictures.

♦ How data is stored and transmitted, including: redundancy, error checking, error correction; data compression and information theory; and encryption.

♦ How data is organized, for example, in data structures or in databases.

♦ How digital data is used to represent analogue measures, such as temperature, light intensity and sound. How analogue measures are converted to digital values and vice versa and how digital computers may be used to control other devices.

(3) COMMUNICATION AND COORDINATION.

Computers are communication devices. They enable human-to-human communication by way of machine-to-machine communication. A mobile phone computes in order to help us communicate. The design and implementation of these communications systems is a recurrent theme in computing:

♦ Many programs are reactive processes, that perform actions in response to events. The input > process > output concept is important. For example, a web server receives a request for a page from the network, and then sends back a response containing the webpage.

♦ Such processes may run forever, and may (by design) behave differently on different runs.

♦ Computers communicate and cooperate through agreed protocols, such as TCP/IP or HTTP standards. These protocols may support packet switching and routing (to get a message to its destination), authentication (proving who you are), privacy (keeping a conversation private to the participants), and anonymity.

♦ A network is a set of computers connected to share data, facilities or resources; the Internet is a particular realization of a network.

(4) ABSTRACTION AND DESIGN:

Abstraction is the main mechanism used to deal with complexity and enabling computerization. Abstraction is both presenting a simplified version through information hiding and making an analysis to identify the essence or essential features. Aspects of abstraction are:

♦ Computer hardware consists of components (black boxes) interacting through interfaces (a network cable, a CPU socket, a SATA disk interface).

♦ Computer software is built from layers of abstraction. For example, a procedure (or method, or library) implements a specification, but hides its implementation; an operating system provides facilities to programs but hides the complex implementation; a database implements SQL queries, but hides how the data is stored.

♦ Scientists, industrialists, engineers, and business people all use computers to simulate and model the real world, by abstracting away unnecessary detail and using a computer program to simulate (what they hope is) the essence of the problem.

♦ Designing and hiding a complicated implementation ("how it works") behind an interface ("what it does").

♦ Representing or modelling through visualisations, metaphors or prose the essential features without the confusion of the detail.

♦ The process of categorisation or classification that breaks down a complex system into a systematic analysis or representation.

(5) COMPUTERS AND COMPUTING ARE PART OF A WIDER CONTEXT

Computer systems have a profound impact on the society we live in, and computational thinking offers a new "lens" through which to look at ourselves and our world. The themes here are very open-ended, taking the form of questions that a thoughtful person might debate, rather than answers that a clever person might know.

♦ Intelligence and consciousness. Computer Science is about more than computers. Computer Science opens up philosophical questions such as: can a machine be intelligent? ...be conscious? ...be a person?

♦ The natural world- Computer Science gives us a way of looking at the natural world, ranging from using computers to model the living world (e.g. simulations of animal populations) to thinking of the natural world in computational terms, for example, the way DNA encodes the sequence of amino acids that make up proteins.

♦ Creativity and intellectual property. Games, music, movies, gallery installations and performing arts are all transformed by computing and online experiences would not be possible without it. Should artistic ways of working be integrated with computational thinking? Should software and other creative products be patentable? What is the role of open source software?

♦ Moral and ethical implications of using computers. For example, as our world becomes more interconnected, we should consider privacy and which information should be private and which open to scrutiny; we should question how the vulnerable or the digitally disenfranchised can be protected.

<div align="center">QUESTION</div>

SHORT ANSWER TYPE QUESTIONS

Define Computer Science.

What is Abstraction and design?

Explain the various areas of Computer Science.

LONG ANSWER TYPE QUESTIONS

Explain the concept and meaning of Computer Science.

Describe the key concepts of Computer Science.

Explain the major areas in Computer Science.

CHAPTER 2
SCOPE OF COMPUTER SCIENCE

SCOPE OF COMPUTER SCIENCE IN EDUCATION

The Scope of computer science in education is very large. It is a boon for teachers, students, planners, organizers and administrators. Moreover, different subjects are taught by Computers. People from all streams of life now use computers in their work for their won profits. Computerized tutorials and online tests help the students to give tests and evaluate results in on time. This saves a lot of time. Computers are also helpful in other activities of the school like preparing results, making time tables, in the library and far fee collection etc. This is also why the education system has made computer education a part of school curriculum.
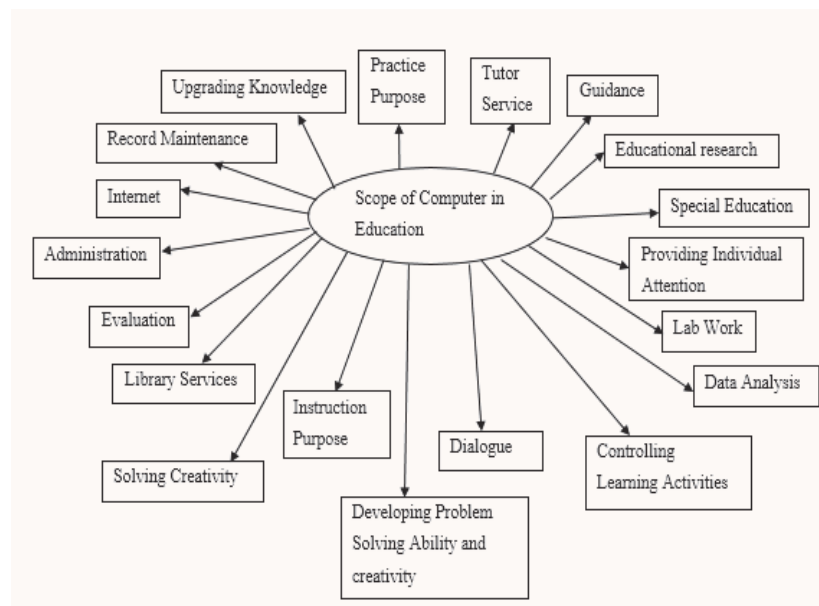
(1) **Developing Problem Solving Ability and Creativity:** There are so many programs available on problem. There are many programs available having a variety of practice for solving problems, giving new ideas, constructing and developing new concepts. Students become more creative in their educational outcomes.

(2) **Controlling Learning Activities:** Computers keep a proper control over the learning activities of each and every student. They can also help to diagnose a very large number of students and providing them feedback with no loss of time. Today most of the competitive examinations are conducted online or checked with the help of computers.

(3) **Practice Purpose**: Computer can be used for practice purpose. The student can work on computer to practice what they learn in classroom. Immediate feedback is provided to them. There are so many types of practice software's who focus on previously learned knowledge and new knowledge.

(4) **Tutor Services:** Computers has been proved to be very effective in providing tutorial services to a number of students at a time on individual basis. It has showed its capacity as a good teacher, subject expert, demonstrator and supervision. It can ask questions, answer them, solve problems, assign and check work etc. In fact computer helps at each and every steps of teaching learning process.

(5) **Guidance:** Computers are now a day's serving as sincere, resourceful and energetic affixers. They are used to guide the students educationally. Vocationally and for personal guidance also, with the help of computer, student can get guidance from any part of world through Internet.

(6) **Educational Research:** Research is an essential part of education. Today the world is changing every second. Teaching and learning conditions are changing. Research provides guidelines for new situations. Computers help to carry out the processes like data storing, processing and analysis of data.

(7) **Special Education:** There is large number of device invented in the field of education which is very helpful for special children. These students are different from normal students. So their needs are also different. Computer help in planning good education program for the handicapped children like deaf, dumb, mentally retarded children etc. according to their needs.

(8) **Providing Individual Attention:** Computers are helpful in giving individual assignment to the students and check their progress properly. They help in self-study, group study etc. There are such situations, where the students are learning without direct contact with the teacher only with the help of Computers.

(9) **Upgrading Knowledge:** It is very difficult for the persons to study books for upgrade their knowledge. Internet is an ocean of knowledge. Internet provides fast and easy access to the knowledge. Students as well as teachers can upgrade themselves in their subjects with minimum effort and time.

(10) **Record Maintenance:** In education we need to store large amount of data. Data may be student's detail, their result, progress etc. Computer can store the data in the form of files and we can retrieve the information any time very fast.

(11) **Lab work:** Students feel difficulties in their practical work in Computer Lab. Computers are helping a lot in this direction. Science and other practical subjects are being demonstrated to them. Computers store the data, analysis it and produce result very fast and accurately.

(12) **Internet:** Internet is a global collection of computers. Connect to each other. This global network links throughout of Computers at Universities, Research Institutions, Government Agencies throughout the world. With the help of Internet, you can send or receive message throughout the work within few seconds students can get the study material through E-Mail/Internet from any Institution or university which is 100 Km away from you.

(13) **Administration:** Computer is helping in administration also. The activities like making time table, organizing co-curricular activities, discipline, observation, record maintenance, arranging

information, keeping accounts and financial responsibilities etc. are being done in school-colleges on computer.

(14) **Data Analysis:** Data Analysis and lot of calculation are required in research work, which is very difficult to do manually. Computer made it very easy and fast. Students can perform complex calculations or data analysis with in second with help of computers.

(15) **Evaluation:** Computers are playing leading role in the task of evaluation of student's progress. They are preparing progress reports and maintaining records. The evaluation process is designed according to the needs of each individual and they get the result immediately.

(16) **Library Services**: Library is the center of all the knowledge for school and college students. They may face problems in finding books. They may need more books in the library. With the help of internet, the libraries of the world can be brought to their own library. Students can get their desired book just by clicking. Students can directly read magazines or books from the terminal. This type of computerized learning is called CAL (Computer Aided Learning).

(17) **Dialogue:** Dialogue is the type of interaction. Traditionally students have dialogue with their teachers. Computers are so developed that the students can talk to them and can listen to them. Thus this system helps them to have a dialogue whether the teacher is available or not. Thus increases their timing and area of work.

(18) **Information Services:** Every school has its subsystems. There is proper exchange of information among these subsystems. The on-time delivery of information makes the whole system more effective, stable and progressive. Computer provides this information services and takes the information to any part of world within seconds.

(19) **Instructions Purpose:** Computers assisted instructions are used to teach various school subjects. Computer assisted instructions takes care of each individual and continuously give feedback.

SCOPE OF COMPUTER SCIENCE IN MODERN SOCIETY

On account of absolute accuracy, marvelous speed and high storage capacity, the computers are now being used in almost all spheres of activities. They have influenced every activity of mankind particularly in the areas where calculations are done at very fast speed. These activities may be at home, place of work, business, industry, trade, commerce, research, military, medicine and health care, banking application, transportation, arts and modeling, entertainment, multi-media and sports, etc. Computers are the greatest and the most wonderful invention of modern science, have completely revolutionized life. They have become part and parcel of our lives.

(1) **In Medicine and health:** People are highly benefitted by Computers in the field of health and medicine. Computers are used for diagnosing illness, monitoring patients, curing ailments and surgery. They act as diagnostic and monitoring tools. They are widely used in ECG, CT Scan, Ultra Sound etc. They provide right type of treatment to the patients. This has shared the burden of doctors since human brain takes a lot of time to diagnosis. In diagnosis of cancer, heart and other complicated diseases, Computer plays an important role and can monitor the patient's condition.

The medical apparatus are logically computerized. Scanning instruments are attached to the patient and the attending doctors can notify the conditions of the patient and start the right treatment. The records of patients are also maintained with the help of computers. Computer with its built-in X-ray scanner is used in taking photographs of the diseased part of the patient. Such photographs help the doctors in analysis of the diseases. The doctors can keep the records of their patients, their diseases, their previous appointment, etc. along with complete personal records of the patients. Computers are also used in the hospitals for maintaining the records of equipment, bed allocation, pay roll and accounts.

(2)   **In Engineering:** Engineers are using computers for the purpose of designing. A product designed with a computer can be more productive than with pencil and paper. While designing a product with a computer, engineers create an electronic model by describing all three dimensions of the objects. Computer-Aided design (CAD) is used for designing objects with a computer. Specialized computer aided design systems are available for designing almost everything-from houses, cars and buildings to molecules and space crafts. Expertise of CAD is now needed for specialized engineering jobs. The most extensive use of CAD in recent years is development in Boeing's new 777 airplanes. Computer Aided engineering (CAE) software allows designers to specify the type of material to be used for each part. CAE enables to calculate whether the parts is compatible with rest of the design and can without and the necessary stresses and temperature. Other important scientific and engineering areas are:(1)Astrological indications (2) Archaeological predictions (3) Diagnosis (4) Monitoring and processing experimental results (5) Satellite and space flights control (6) Space technology (7) Weather forecasting and rainfall calculations (8) Electron forecasting (9) Solution of mathematical questions (10) Processing in chemical industries (11) Architectural designing (12) Seismographic calculations (13) Nuclear physics research (14) Chemical analysis (15) Processing in chemical industries (16) Solving mathematical exertions (17) Satellite Control.

(3)   **In Space Science:** The satellites are controlling in the space with the help of computer. The information is collected, analyzed and used to control the satellites. In this process the computer plays very important role for the success of space research.

(4)   **Banking:** Today the banking functions in urban, semi-urban and rural areas are computerized. Computers are being installed in branches at different countries viz. Saving bank current account, cash credit account etc. Cheques are handled by the Computers at clearing houses. Balances are automatically tallied in the accounts as receiving deposits, cash credit account, payments, calculating interests, issuing demand drafts, advancing loans etc. are now handled quickly, accurately and effectively with the help of computer. They are also used to keep the account balance of every customer up-to-date. Many banks have the ATM. This machine is used to take money out from the bank at any time. To reduce demands for handling of paper documents, banks have devised a number of computer applications that make it possible to transfer funds through communication between computers. This technique is known as EFT (Electronic Funds Transfer) Employees' records have been computerized almost in all banks.

(5)   **Telephone exchange:** Computer plays an important role in telephone exchanges. Computers are used for the preparation of telephone bills. Links with other exchanges are made possible through computer networking.

(6)   **Air-travel:** Computers are now widely used in air-travel and reservation. Computer help in safe air flight by detecting the changes in the atmospheric pressure, wind speed and direction. Computers are also being used by the travel agents for the purpose of reservation of seats in the planes. Updating of seat reservation chart is easy with the help of computers. Hence wherever a seat is reserved or cancelled the modification can be easily done.

(7)   **Military:** Now-a-days military and other defiance facilities are more modern, whether at the time of war or peace, the communication of military should be perfect. The exchange of information gives a definite direction to important decisions. If communication is computerized, then the exchange of information can be done in short time. Now-a-days missiles are used in military. It the control of the missiles, which attack land to land or land to air, is computerized the possibility of lurk from the way will be zero.

(8)   **Insurance Companies:** A large number of files relating to customer's policies are to be updated. Calculation of bonus, premium, interest is to be done on a large scale. Insurance companies have to intimate to the customers who do not pay the installments in time. Matured policies are to be paid. Manually it is very tough job to handle all these transactions. With the introduction of computers in this sector, the burden on the employees has been reduced and timely statements of accounts are made ready in no time. Computerized acknowledgement sent to the policy holders who pay premium on their policies and date of next installment-due is mentioned.

(9)   **Weather Forecasting:** On the basis of information which is given by the artificial satellites of earth, weather scientists analyze the weather. On the basis of the information they do weather forecasting with the help of computer, by collecting the old information and on the basis of this information, the changes of weather are analyzed.

(10)   **Document transmission:** E-mail is an effective method of document transmission and messages exchange. An e-mail system transmits the information shown on the computer screen to another computer thousands miles away in the same manner as it appears on the screen.

(11)   **Sports:** In most sports, computers compile statistics, sell tickets, create training programs and diets of players and athletes, and suggest game plans and strategies based on competitor post performance. Computers are used in sports to analysis the movements of sports persons and to find faults in the movements so that maximum efficiency is achieved. Computers are used by sports professionals to analysis their techniques to find their strengths and weakness. Computers are used to stimulate game and try out different games strategies.

(12)   **Legal and Law Profession:** Lawyers can keep records of their clients, cases and case history and can obtain printout of the case history of their cases. They do not have to ask the questions repeatedly from the clients. The printout of the case history tells them everything. Computer legal services such as Lexis and Westlaw allow lawyers to search quickly through huge collection of information called data bases for care information. Lawyers can create their database for cases involving special judgments and hearings. The result of hearings can be seen on the Computer

screens just seconds after the actual statement is made. Computer technology does not stay in the attorney's office. Today, one can see it right in the court room out it can be used so translate all the statements into readable text.

Computers are used to store large database of stolen cars. Law enforcement agencies such as Police departments use mobile computers, sometimes called mobile data terminals (MDT's) in the squad case. The mobile computer gives the car license number for reference and can tell the officer details like who owns the car, whether it was reported stolen or not, etc. DNA finger printing is very widely used in forensic science. For example, it can positively identify someone from traces of blood, skin or hair left at crime scene.

(13) **Entertainment:** Computers have become as essential part of entertainment industry. They are used for creating dazzling special effects in movies and video games. They are used in editing movies. They are used to create full length carton movies. They are also used in multimedia presentation. They help in composing, editing, recording and reproducing music and sound effects. The use of computers in entertainment field-movies, music, movies, presentation, sports and games-has increased over the last decades and now computers play a vital role in these fields. Computers help in improving productivity by automating time consuming repetitive and monotonous processes. They give the movies makers a lot of options by giving them the power to create the kind of special effects they want. The computers can create outer space, alien characters extinct animals and so on without the creating of their physical models. The film makers can then integrate these backgrounds and characters with real characters. Computers are used in almost all phases of movie making may it be writing scripts, creating special effects, editing, adding sound effect and so on. Computers are used as a creative tool to create music with the help of Musical Instrument Digital Interface. Using MIDE, a music composer can play various parts for the same piece of music on a MIDI keyboard. Computers also allow editing and controlling of sounds. Computer technology has given the ability to create special effects.

(14) **Writing Books:** Computer is very useful for authors of the books. The authors who used to write hundreds of hand written pages can type their work in word processors like MS-Word. In the recent in the manuscript. These diagrams were either rough sketches or had to be prepared by the artists. Now the Computer has solved all the problems of the authors. Various software programs are available for authors to help them to do their work. An author can type his complete manuscript in MS-Word. He does not require to keep care of spelling mistakes and grammatical errors. Just he has to do is to type the matter. After the work of typing is complete, he can apply spell checker on his manuscript. He can increase the size of font and manipulate the matter in various ways. He can do page setting, paragraph formatting and other text formatting in his document. MS-word has all these features to help him do various types of formatting. Even he can place print screen clipboard images in the document. If he is familiar withpage-making software like Page Maker, then he has many more tools to prepare his manuscript. Even he can place the work typed in MS-word, in Page Maker is a software developed in DTP (Desk Top Publishing).

(15) **Arts and Modeling:** Artists can use Computers to creating pictures, design and banners, etc. Architect can play their scale models on a computer and study them from various angles and perspectives. Structural problems can be solved with speed and accuracy.

(16) **Publishing Activities:** Computers are very useful for composers and desk top publishing (DTP) activities. Professional typists and composers compose speedily the work of authors, manuscripts and reports in personal Computer using various DTP programs like Page Maker, Ventura, Coral Draw, Photoshop, etc. Computer also does the figure work. The quality is maintained in publication by Computer. DTP programs have brought revolution in the publishing jobs. Composers can apply spell checker available in various programs like Page Maker, MS-Word. These programs support high resolution images. Personal Computers provide bread and butter to the composers. Work of composers has become very fast and easy. Gone are the days of traditional printing when lot of labour was involved in printing press when the printing was done using blocks.

(17) **Government Purposes:** Computer is used by government for various things that involve bulk of data such as census work, calculation of per capita income etc. Computers are also used by governments to collect, process and store vast amount-of information. As stated earlier, railway reservation, airways reservation, income tax processing etc. can take place with the help of Computers.

(18) **Traffic Control:** Computers are used in controlling traffic, traffic lightly. Television cameras are used to maintain traffic light routine.

(19) **Railway Purposes:** Railway is the largest organization which is effectively using the Computers. The records of all trains running daily or weekly in kept in Computers. A passenger can collect information about a particular train at any station linked with the Computer network. The process of reservation in Railway is not possible without the help of Computers. The operator of any counter can tell you the availability of a berth (seat) in a particular train for a particular day. For example, a passenger at Jalandhar station can get his ticket (with return ticket) reserved for Mumbai Central. There is no separate special queue for a particular train or destination. The passenger can obtain his ticket in any queue for any station. Similarly he can get his ticket cancelled if his programme of journey has been changed. All information regarding time tables of trains can be obtained at computer terminals.

(20) **Communication Purposes:** The computer is used for sending messages e.g. teleprinter, e-mail, video conferencing, chatting, internet etc. The import and export work is done on internet.

(21) **At home:** More and more homes, are now going for personal home computers, Computers are used for education and entertainment at homes. At homes, Computers are used for writing letters, thesis, e-mail, playing games, Chatting, listening to music, creating own small publication etc. Televisions, washing machine, microwave ovens, dishwashers and sewing machines also use small computers to run them effectively. In fact anything that you can dream of must be having a small or big role of computers for it.

(22) **Scientific Research:** Scientists use compilers to develop theories, to collect and analyses test data and to exchange information electronically with colleagues around the world, Researchers can access databases in distant locations. Scientist requires complex computation of very high degree of accuracy and precision.

Computers are used in every field of scientific research to store, analyses and manipulate information quickly and successfully. The powerful stimulation capableness of computer help the scientists and researchers to test the ideas. The computers and I.T. help in collaboration and

information sharing. Many people residing in different parts of the world on the same project. Scientists can also use computers to stimulate complex events such as predicting what damage earthquake is going to do and what will be its intensity. It would be impossible to explore outer space without Computers. Satellites and space probes have brought a wealth of information about our solar system and cosmos.

(23) **Business:** In the beginning of development of Computer, it was used only to solve the equations, but now it is used for different works. 80% of the work, which is done with the help of computer, comes in professional series.

In the field of business, Computer was used in beginning for the office work. Mostly office related deeds are basically designed on a decided model. This work was managed in a structured files, so the use of Computer for these type of work did not occur any problem. Different paper works which took a lot of power any time, can be done with little effort and in short time by Computer, Some uses of Computer in business are as follows-

(i) **Information of Worker's Salary:** To create description of salary etc. by Computer, comes in primary professional uses. In the description of worker's salary, all related information such as his name, designation, basic salary special bonus, income tax deduction, salary increased etc are provided to Computer for every worker. Now according to all information a worker gets his salary. The changes in fringe benefits like house rent, medical, conveyance, incentives, stored in some masks files.

(ii) **Stock and Sales Control:** Keeping records of manufactured material and the accounts of sales can be done with the help of Computers. Account of sales and stock inventory can be maintained with the help of Computer. In which storeroom how much and which material is stored, how much material received and how much material delivered for which purpose etc. all these information can be stored in a Computer. On the basis of these facts businessman can control manufacturing and can create new strategy for sales.

(iii) **Management:** Computer is also used in perfect management. Information has special place in management, with the help of Computer, new information can be gathered. So the decision which are based on true information, proved more satisfying and trusty. In the special subject of management operational research, decision is taken on the basis of scientific methods. This work analysis is done by PERT, CPM technique, Computer is useful for this work also.

(iv) **Production:** In industry outline of production, co-ordination in different departments etc. can be done by Computer. Computer is also used to operate different machines. In chemical industry and other process industry, all processes are controlled by the Computer. By this security and the quality of product also increases along with savings.

(v) **Computer Robots:** Computer Robots are generally known as Machine Man. But in reality Computer is a machine which can do revising, bearing, dangerous work for man, but there are some differences robot and automatic machines. Some dangerous works such as to lift very hot things or to maintain radioactive things can be done easily by robots. Associated with many censors and Computer controlled robot, can do many works by it won decision also. It is not compulsory that all robots. Associated with many works by it own decision also. It is not compulsory that all robots are as same as human in structure. The first robot, which was used in industry, was installed

in General Motor Company in 1961. Mostly robots are working in factories of motor cars. The two main work they do, are welding and painting.

Earlier robots were mechanical. But now Computer are being used in them. Artificial Intelligence (AI) is mostly used in robots. The working capacity and the thinking capacity of robots has increased. They are also used in atomic experiments and space missions. They are doing such works which are hard for a human being. In American space ship 'weeking-2' the main working person sent on Mars, was a robot and this session was completed successfully.

(24) **Transportation:** The use of computer in the field of transportation has made the travel more safe and convenient. With the help of computers the reservations can be made from any place. In Europe, transportation has been automated.

In earlier days the means of transportation were animals or totally mechanical. Now Computer has filled the requirement of transportation system.

QUESTIONS

SHORT QUESTIONS

    1. Discuss the role of Computer education field?

    2. Enlist the areas where we can use Computers in modern times.

LONG ANSWER

    3. Discuss the uses and impact of Computer in our society.

    4. What are the various applications of Computer with special references to Education Society.

CHAPTER 3
COMPUTER SCIENCE CURRICULUM

CURRICULUM INTRODUCTION

Curriculum includes all those activities which are utilized by the school to attain the aim of education. In the modern time, education is regarded as a dynamic process and so the aims and objectives have changed. It is not merely the course of study but it is the sum total of experiences of a pupil that he receives through various activities. It is much more than subject matter as it is traditionally conceived. Throwing light on the wider meaning of curriculum, the secondary education commission Report that," Curriculum does not mean only the academic subjects traditionally taught in the school, but it includes the totality of experiences that pupil receives through the manifold activities in the school, in the classroom, library, laboratory, workshop, playground and in the numerous informal contacts between teachers and pupils. In this sense, the whole life of the school becomes the curriculum which can touch the life of the students at all points and help in the evolution of a balanced personality." Hence, curriculum includes all the learning experiences arranged with organized by the school inside or outside the classroom.

MEANING OF CURRICULUM

The word curriculum is derived from Latin word ' Currere' which means ' Race course' or ' To run'. Thus curriculum means a course to be run for reaching a certain 'goal'. Indeed curriculum is like a race course for the pupil. As a person runs to win the race in the same way a pupil undergoes various experiences to run through the curriculum to reach the educational goals. Therefore, etymologically it is clear that the curriculum is that path or way over which a child runs to achieve the aims of education.

Hence in the wider sense curriculum signifies all those activities and learning experiences which a child undergoes in and outside the class according to his needs, attitudes and interests. But in the narrow sense, the meaning of curriculum supposed to be a list of reading material.

DEFINITIONS OF CURRICULUM

1. According to the **Cunningham** ," Curriculum is a tool in the hands of the artist to mould his material(pupil)according to his ideal (objectives)in his studio(school)."

2. According to **T. David Pratl** ," A curriculum is an organized set of formal educational outcomes."

3. According to **Johnson** ,"A curriculum is structured series of intended learning outcomes"

4. According to **L.D and L.S Crow** ,"Curriculum includes all the learner's experiences, in or outside school that are included in a programme which has been deviced to help him to develop mentally, physically, socially, emotionally ,spiritually and morally."

5. According to **Glen Hass** ,"A curriculum is all of experiences that individual learners have in programme of education whose purpose is to achieve broad goals and related specific objectives, which is planned in terms of a framework of theory and research or past and present professional practice."

6. According to **Munroe**," Curriculum embodies all he experiences, which are utilised by the school to attain the aims of education"

7. According to **Kerney and cook** ,"curriculum is complex of more less planned or controlled conditions under which students learn to behave and to behave in their various ways. In it, new behavior may be acquired, present behavior may be modified ,maintained or eliminated; and desirable behavior may become both persistent and viable."

8. According to **K. Rudyard and K. Henry** ,"curriculum in its broadest sense includes the complete school environment, involving all the courses, activities, reading and association furnished to the pupils in the school"

9. According to **T.P. Nunn** ," The curriculum should be viewed as various forms of activity that are grand expressions of the human spirit and that are of greatest and most permanent significance of the wide world."

10. According to **Froebel** ," Curriculum should be conceived as an epitome of the rounded whole of the knowledge and experience of the human race."

11. According to **H. H. Horne** ," Giving a broader view of curriculum, Horne says that it is" that with which the pupil is taught. It involves more than the acts of learning and quiet study. It involves occupations, productions, achievements exercise, activity etc. It thus is representative of motor as well as the sensory elements in the nervous system of the pupil. On the side of society, it is representative of what the race has done in its contact with its world."

12. According to **Herrick and Tyler**," Curriculum means, all the learning which is planned and guided by the school whether it is carried on in groups or individually, inside or outside the school."

13. According to **Harold Alberty** ," Curriculum may be defined as the sum total of student's activities which the school sponsors for the purpose of achieving its objectives."

14. According to **T.V. Goodrich and A.E. Folson** ," All experience in and out of school , used by the school to attain educational objectives constitute the curriculum.

15. According to M. Stratemaeyer and P. Forkner ," The curriculum is currently defined in three ways: the course and class activities in which children and youth engage, the total range of in-class and out of class experiences sponsored by the school, and the total life experience of learners.

16. In **O.I Fredrick** view: In Encyclopedia of educational research, O.I Fredrick defines modern curriculum as covering, all the wider areas of individuals and group life .it encompasses all the meaningful and desirable activities outside the school, provided that these are planned, organized and used educationally."

Thus it is clear from the above definition that curriculum is a means which gives right direction to the teachers, learners, examiners and authors. It includes learner's experiences in our outside school, attitudes, interest etc. it helps the pupils to develop mentally, physically, socially, spiritually,

emotionally as well as morally. Hence organization of learning experiences in a planned and systematic manner may be called curriculum. It is flexible varied and progressive in the sense that it tries to meet the needs of the pupils as well as demands of even changing society.

MEANING OF CURRICULUM DESIGN

A curriculum design is a framework or plan of action for preparing a course of study or set student experiences. It is deliberate process of devising, planning and selecting the elements, techniques and procedure of curriculum. Curriculum design is a method of thinking.

A curriculum design is the end result of curriculum decisions. Curriculum design has been explained in the 'Dictionary of Education' (1982) edited by P.J. Hills as, "A curriculum design is a set of abstract relationships embodied in the materials and learning activities of a course in use. It is the way that the critical variables of subject matter, pupils, teacher and milieu are brought together. Thus the progress of curriculum design is distinct from broader social process, extending over time of curriculum planning. The feasibility and educative potential of a finished curriculum design can be rationally analyses, but its transformation or synthesis is an art."

According to Willliam M. Alexander of the University of Florida, " The school curriculum has a framework or structure, commonly called "design", just as a building, dress or an automobile has. Although less tangible and hopefully less fixed, the curriculum design provides a basis for classifying and organizing the curriculum opportunities offered by the school."

CATEGORIES OF CURRICULUM DESIGN

William M.Alexander mentions five categories of curriculum approaches:

1.   **Subject Curriculum:** The traditional design for the direct instructional programme is built around subjects.

2.   **Life Activities Curriculum:** Subject matter and learning activities are classified and oragnised around persistent life activities such as communication, conservation, production and consumption of goods and services, government and education.

3.   **Needs and Interests Curriculum:** It is somewhat ' planless' curriculum based on the needs and interests of learners. This concept was first advocated by Rousseau France and Pestalozzi in Switzerland.

4.   **Core Curriculum:** It emphases the study of social problems and social values.

5.   **Job Analysis Curriculum:** Essentially this design calls for analysis of the tasks involved in a particular job and organization of instructional units around these tasks.

CATEGORIES AND TYPES OF DESIGN

1.   **Humanistic Design of curriculum:** Humanistic design of the curriculum aims at developing and understanding of human acts and social situations. In the humanities curriculum project, Lowrence Stinhouse (1975) developed a style of discussion teaching which laid great stress on the group's accepting responsibility for its work and working cooperatively.

2.   **Vocational Design of Curriculum:** The vocational design attempts to promote vocational

education to meet the industrial demands for trained manpower and to compete with industrial productivity of other nations. "Vocational training" argued Myrdal Gunnar(1962), ' like education in general, must never lead to dead ends but must help young people to move horizontally to other occupations and vertically to higher responsibilities, as future opportunities may occur."

3. **Deschooling Design of Curriculum:** Radical thinker like Ivan Illich, Everett Reimer and Paulo Freire have taken up crudgles against schools for their bias in favour of middle class and white collar attitudes and their designation of the attitudes and values associated with the poor. They charge against the curriculum being conceived in narrow middle class terms. The worst victims of compulsory schooling according to Illich are the poor. They emphasize the importance of open learning system which includes living, working, recreating and learning.

4. **Forecasting and Curriculum Design:** Curriculum design is essentially future-oriented and it is the future needs of the people that must be assessed. The world for which students must be prepared is not the world of to-day, but the world of the twenty first century. Curriculum designers are nothing unless they have th future in their bones. Curriculum lanners are connected with the present, with the past and the future. Educational planners must provide for the present generation to meet the future needs. The curriculum designer must attempt to distinguish those present trends and prospective trends that will become increasingly significant in the future.

5. **Systematic Curriculum Design:** Science tells as that living creatures or plants can develop a systematic capacity to maintain normal, internal, psychological stability and equilibrium. This systematic capacity is known as homeostasis. This implies that n organic system develops the capacity to compensate automatically for environmental changes. The systematic or homoestatsis capability of the school community comprises developing on going programmes, curriculum planning processes and evaluating them. Systematic curriculum designing has improved problem solving skills.

BENEFITS OF CURRICULUM DESIGN

Curriculum design is the core of professional training. It provides following benefits:
1. It focuses attention on goals.
2. It increases the probability of success.
3. It improves economy of time and efforts.
4. It facilitates communication and coordination of projects.
5. It reduces stress.

COMPONENTS AND SOURCES OF DESIGN

In the words of Ralph W. Tyler (1949), "No single source of information is adequate to provide a basis for wise and comprehensive decisions about the objectives of the school." It is therefore, important that needs assessment in curriculum should be made from following sources:
1. Parents
2. The community
3. Influential Individuals

4. Pressure Groups
5. Students
6. Teachers
7. Academic specialists
8. Employers
9. Ex-students
10. Drop-outs
11. Progressive Thinkers
12. Social Experts
13. Labour Organisations
14. Non-graduates and Graduates
15. Community Agencies.

CURRICULUM DESIGN DEVELOPMENT PROCESS

Curriculum design development process involves:
1. Identifying learning needs
2. Assessing the audience
3. Developing cultural diversity
4. Evaluating the learning experience
5. Facilitating the learning process
6. Selecting methods and aids
7. Selecting and tailoring content
8. Delivering the learning experience
9. Developing an action plan

PRINCIPLES OF CURRICULUM CONSTRUCTION

1. **Principle of utility:** Concept of curriculum should be beneficial for life according to personal and social point of view. It should be beneficial for both present and future, its utility part should not be ignored at any cost.

2. **Principle of relation with life:** Today schools are a small model of society and center of modern life. In this situation it is important that curriculum should be integrated and curriculum, school and society should be inter-related.

3. **Principle of activity:** The school should be thought of not a knowledge manger's place but a place where the young's are disciplined in certain form of activity.

4. **Principle of flexibility change and individual differences:** Flexibility sense that technique of curriculum by which student facilitate with study according to different interest. There should not be hardness in it, as well as there should be convertibility in curriculum which can be changed according to time, age, condition, and need.

5. **Principle of curiosity, reality and generalization:** According to this principal curiosity, reality, generalization are interconnected. In the absence on one, all two becomes impossible.

6. **Principle of Integration and correlation:** Facility of psychology has been neglected. In fact it is known that content should not be kept in different closed blocks even these should be computable. Different subjects and computer science subject and included contents in other branches of computer science should be interrelated.

7. **Principle of consensus of opinion**: It is an important principle, on the basis of which inter continence is developed between curriculum developer and curriculum user. Because in trendy state there is no coordination between curriculum developer and curriculum users. Because of different aims of both, the performance of curriculum decreases.

8. **Principle of utilization of leisure**: Subject should not be only for gaining knowledge work, but also for entertainment works in free time. By it subject will change from formal form by which subject seems bearing, obviously students will take much interest in subject**.**

9. **Principle of articulation:** According to this principles, content of primary secondary and higher classes should be articulated. There should not be any differences and gap in it. By it, unit of knowledge and default knowledge is gathered.

10. **Principle of physical and mental health:** The outline of curriculum should be such by which physical and mental health can become healthy, because education is healthy medium of mental development so obviously in its tool curriculum technique of mental, physical development is necessary.

PLACE OF COMPUTER SCIENCE IN THE SCHOOL CURRICULUM

Computer Science plays an important role in student's career development. Computers having internet facility is the most powerful device that students can use to learn new skill and more advanced version of current lessons. Technology has reached its fine way into the classrooms of the students in schools after taken struggle in all sorts from projectors till television to reach the Computer labs and to student's laptop and desktops. Along with all these students have come to know that Computer are something more important which occupy most of their work to improve their standard of learning and to prepare for future well advanced. Thus Computers have become part of life of students in schools as that of pencils and paper.

Thanks to Computers, imparting education has become easier and much more interesting than before. Computers have changed the way we work, be it any profession. Therefore, it is only natural that the role of Computers in education has been given a lot of importantly in recent years. This is also because the education system has made Computer technology is almost every sphere of life, it is important for everyone to have at least the basic knowledge of using computers.

ARGUMENTS IN FAVOR OF COMPUTER SCIENCE AS COMPULSORY SUBJECT IN SCHOOL CURRICULUM:

Computer science helps in attaining and developing following values among the students:

1. **Practical and Utilitarian Value:** There is no single sphere of life which is left by the impact of Computer. Computer has changed our daily routine. We cannot keep our-self alive without the knowledge of Computer. All of the comforts of life that we are enjoying are due to the

Computer. Computer is used in communication, transportation, medical science, engineering etc. Railway systems are computerized. Trains are being controlled by Computer. Air Traffic is totally being controlled by Computer.

2.   Develop Scientific Attitude: The knowledge of Computer trains the pupils to solve problems in a systematic and specific way of solving a problem is called 'scientific method' or problem solving method. The training in scientific method which a pupil receives by the study of computer helps in inculcating scientific attitude in him. Scientific attitude refers to open mindness, a desire for correct knowledge confidence in procedure for seeking knowledge, and suspension of judgment till it is verified.

3.   Develops disciplinary Value: Study of Computer science also inculcates disciplinary value among the students. It not only develops the mental abilities of the students but also develops their personality as a whole. It inculcates spirit of enquiry, concentration, seriousness, reasoning power. It helps them to discriminate what is right or wrong thus developing problem solving ability. Study of computer expects habit of hard work, patience, punctuality, regularity, Clarity in students. These qualities help the child to lead a disciplined life.

4.   Developing and preserving Culture: The culture of every society has its unique characteristics. Culture of any society is reflected in the form of living standards that include food, customs, traditions, art and craft, social, economic, political conditions etc. According to Dinkor (great Indian Poet), "Culture is the way of life which has been handed over to society from one generation to another in the form of accumulated customs, habits and mode of living.' the mode and style of living is different from one society to another and therefore their culture is not the same.

Since, ancient time, man has been preserving culture. But with the advancement of technology, our way of life has been changed and as a result there is change in our culture. This change in our life style is due to invention of computer. Computer has revolutionized our life style, changed our way of thinking, attitudes etc. Computers has impact on all the aspects of life. Study of computer science is not only developing culture, but also helps in preserving it and giving information, about our ancestors. It is also playing important role in multicultural exchange. Computer has become backbone of our civilization and culture. Thus to acquaint the future generation with our past culture they must have the knowledge of computer.

5.   Developing Psychological Values: Teaching of computer science is based on the fundamental principles of psychology i.e. learning by doing, learning by observing concrete. Being a practical oriented subject, it helps to satisfy basic human urges, desires, common instincts such as creativeness, self-satisfaction, constructive tendencies etc.

6.   Create International Integration: Computer is playing important role in the international integration through cultural exchange and sharing of information, e-trading, e-learning. Computer has interlinked the individuals and organizations of the world community economically, politically and socio culturally by removing the barriers of distance. So any organization or individual belonging to any part of the globe can establish itself in the foreign market. Besides these, internet has established virtual class rooms where one can share their view, transmit and exchange information.

7. Inculcate Aesthetic Sense: Computer is not a machine and computer science is not a mechanical, dull and boring subject in which students always has to interact with a machine. Beside, computers possesses other aesthetic values like truth, beauty, honesty, etc.

One can get pleasure in solving Computer problems, especially when he gets the correct output and runs the programmes. At that moment every child feels satisfaction, confidence and self-reliance. Child also develops the sense of appreciation for the speed, accuracy of the computer when it does the work, calculations etc. within fraction of seconds. Moreover day to day changes-beautiful and latest designs of color combinations, animated films, cartoons movies etc. all of these follow the, computer knowledge, in one way or the other. MS-Corel Draw, Photoshop, paintbrush are used to draw various designs of card, brochures, Clothes, flex etc. by mix and match. This can only be done with the knowledge of computer.

Various games in computer not only entertain the child but also challenge the mind of the child and produce a sense of joy and appreciation amongst the children. Development of modern communication systems such as e-mail, teleconferencing, video conferencing etc. can help us to be in touch with 'nears and dears' one living in the farthest corners of the globe.

8. Provide Vocational opportunities: Computer Science is helpful in opening vast vista of professions and vocations which a child can adopt in his future life. As all the aspects of life are influenced with the invention of computer, in the similar way all vocations demand computer literate. In these days, there are a large number of vocations for which knowledge or skill of computer is a primary requirement.

Banking, trade, medical sciences, film industry, stock market, teaching etc. require computer literate. Computer is part and parcel of these jobs. Besides these, knowledge of computer helps to be hardware engineers, programmer, computer teacher. Study of computer science has a great "bread and butter value." It is thus quite clear that to enter into any above mentioned vocational course or other occupations, an individual must have knowledge of computer and so the computer education must be included in school curriculum. In this age of technology, if we wish to prepare an individual for any vocation, it is essential that he should be given a good education in the field of computer.

9. Inculcate Moral Values: When a child learns Computer subject he follows scientific method in his pursuit of knowledge because solving the Computer programmes follows systematic approach. Thus qualities such as honesty, truthfulness, punctuality, patience, self control, self confidence, self reliance, loyalty, reality are automatically developed in the child. The habit of lawfulness, the power of discrimination between right and wrong and respect for other's point of view are some other desirable traits of character that are developed through the study of computer science.

10. Develop Social Values: Computer has also a great social importance. It has turned world society into global society. Global society has removed the barriers of distance or of other nature for bringing the individuals, groups and nations of the world in the form of single family. As a result the whole world has interaction, inter-dependence. The change in the social structure in terms of modern facilities like mode of communication, means of transport, and mode of vision (digital

cameras) is due to computers only. In order to live in such a social structure where whole world is knitted in a single unit, knowledge of computer science is essential for the give and take process, business, trade and commerce, for developing social, democratic values in the individuals for his welfare and adjustment.

11.   Development of Mental faculties: The study of computer helps in the development of mental faculties like reasoning, imagination power of memorization, observation, concentration and logical thinking. There is no other subject in the curriculum like computer that widens the mental horizon of the child. It makes student's brain active and trains the mind, resulting in the development of problem solving ability. A child has to draw a flowchart and write the program accordingly, writing a program means logical written sequence of tasks that enhances constructivism and creativity.

Every day, new knowledge is added to old knowledge. It is not important to gain knowledge but to learn to retrieve information is more important. Computer science has inculcated the information retrieval value among the students. Today, they know which knowledge is important and useful for them. Internet has brought the heap of knowledge at fingertips of the students resulting in intellectual development and mental training.

Hence, from the above discussion that a computer science subject which is so closely associated with our daily life and the world as a whole and is so valuable and important to an individual as well as to a community cannot be neglected from the school curriculum rather justifies place in school curriculum.

ARGUMENTS AGAINST COMPUTER SCIENCE AS AND COMPULSORY SUBJECT IN SCHOOL CURRICULUM:

(1)   **Easy to learn at any stage:** It is a big fallacy that children and young people have to learn computers now because otherwise they will fall behind in their future chase for professional jobs. Computers are becoming so easy to use and learn, on-line tutorials and helps are becoming so powerful that any person will be able to learn how to use computers very fast at any age. Just look at the millions of people now using computers without having had any special training before, sometimes just with some hints from other people

(2)   **Lack of Creativity:** It is possible that students get better grades in multiple-choice tests in mathematics, but is this a good or a bad sign? The necessary logical thinking exercised while using a computer may improve exactly logic-symbolic thinking. Real creativity does not happen, such as those involving handicrafts, art, humanities and social interaction. We conjecture that the development of logic-symbolic thinking forced by computers in fact hinders real creativity in non-logical, formal symbolic areas.

(3)   **Makes the child as an Adult:** Forcing a virtual setting, a formal language (when issuing or choosing commands to any software) and a logic-symbolic thinking, computers force children and teenagers to physically and mentally behave like adults. It is absolutely non-natural for a child to sit on a chair for long periods of time, if the child has no possibility of imagining, innerly fantasizing. Any undue acceleration produces some damage; in particular, early intellectual activities tend to steal from the child her childhood, necessary for a balanced development, which

should encompass physical, psychological, artistic, social and intellectual aspects.

(4) **Poor Social Interaction:** Social interaction by using social networking sites and other sites are extremely poor. Compare with a child playing ball with her playmates, or a family activity such as a conversation during a calm meal, which is a healthier, more natural and improves social relations. Note that the computer setting will only occur eventually in professional life. What do we wish to teach our children, being led to social interactions by a machine or through one's inner interest and pleasure in social life?

(5) **Lack of Discipline:** Computers develop lack of discipline. Let us make a simple comparison. When handwriting a letter or typing it with an old-fashioned typewriter, a person has to exercise a tremendous mental discipline. In fact, the possibilities for making corrections are extremely limited; a neat format is only reached through painful observation and control on how the lines are being written. Now compare with the use of a text editor. The user does not have to pay almost any attention, because she will be able to change everything, move paragraphs or phrases around, and obtain a neat print just by choosing appropriate commands or icons. She doesn't even have to pay much attention to spelling and grammar, because correctors will detect most of her mistakes and suggest corrections. The result of this lack of need for paying attention is, in our opinion, an invitation for exercising lack of discipline.

(6) **Lack of Humanistic Teaching:** Computers represent the opposite to a more humanistic teaching. This should be provided by humans, and not by machines. The first rules for a humanistic teaching is loving and respecting students. No machine can exercise such soul activities.

COMPUTER SCIENCE IS A DISCIPLINE

Education enhances pupils lives as well as their life skills. It prepares young people for a world that doesn't yet exist, involving technologies that have not yet been invented, and that present technical and ethical challenges of which we are not yet aware. To do this, education aspires primarily to teach discipline with long-term value, rather than skills with short-term value, rather than skills with short-term usefulness, although the latter are certainly useful. A 'discipline' is characterized by.

♦ A Body of Knowledge, including widely- applicable idea and concepts and a theoretical framework into which these ideas and concepts fit.

♦ A set of techniques and Methods that may be applied in the solution of problems and in the advancement of knowledge.

♦ A way of thinking and working- that provides a perspective on the world that is distinct from other disciplines.

♦ Longevity: a discipline does not 'date' quickly, although the subject advances.

♦ Independence form specific technologies, especially those that have a short shelf-life.

Computer science is a discipline with all of these characteristic (1) It encompasses foundational principles (such as the theory of computation) and widely applicable ideas and concepts (such as the use of relational models to capture structure in data) (2) It incorporates techniques and methods for solving problems and advancing knowledge (such as abstraction and logical reasoning), and

(3) a distinct way of thinking and working that sets it apart from other disciplines (Computational thinking) (4) It has longevity (most of the ideas and concept that were current- 20 or more years ago are still application today. and every core principle can be taught without relying on the use of a specific technologies.

COMPUTER SCIENCE AS A STEM DISCIPLINE

Computer Science is a quintessential STEM discipline, sharing attributes with Engineering, Mathematics, Science and Technology:

1.   It has its own theoretical foundation and mathematical underpinnings, and involves the application of Logic and reasoning.

2.   It embraces a scientific approach to measurement and experiment.

3.   It involves the designs, Construction and testing of purposeful artifacts.

4.   It requires understanding, appreciation and application of a wide range of technologies.

IMPORTANCE OF COMPUTER SCIENCE AS A DISCIPLINE

For students, especially secondary and college students need computer in their daily lives either the computer is used in school or their personal life use.

Technology has struggled to find way into the classroom in all sorts of ways, from projectors and televisions to Computer labs and student laptops. Along with improving the way students are taught, it is also vitally important that students learn to use computers to improve their own work and prepare for careers in a world where computer have become as common as the pencil and paper.

1.   Modernizing Education: Education has benefited from the inclusion of technology and computer by making it easier for students to keep up while helping teachers by improving their way of lessons planned and taught. Students who use computer learn to use word processors for work, and subsequently they learn computer jargon and strengthen grammatical skills. Students can also look up lessons on websites or through email rather than lugging heavily textbooks with them everyday.

2.   Research: Technology has made research faster easier than past. Decades ago, students through history by going to the library and thumbing through history books and encyclopedias. Today, many of those same books are available in digital format and can be accessed online. As the Internet has grown, so too has the available research options. Students can research topics in minutes rather than the houses it used to take.

3.   Efficiency: Computers make the learning processmore simple and efficient, giving students access to tools and methods of communication available or lesson plans online and also communicate directly with their teachers via email or educational platforms such as blackboard. Students can also send work to their teachers from home or anywhere else, letting them finish work outside the constraints of school house and teaching them about personal responsibility.

4.   Improving Student Performance: Students who use Computers have been shown to attend school more steadily and perform better than students who do not use Computers. Along with getting higher grades on exams, students also stated they felt more involved with their lessons and work at home, in collaborative projects with other students and on their own.

5. **Enhanced Creativity:** Computer classes allow students to put their creativity to use. Coding is essentially like learning a new language. And students can use that language to realize their own designs. Computer science classes give students the building blocks through which they make their own programs and to figure out how to make existing ones better. Teachers can make individual work a core part of their computer science's lesson plan, which encourages problem solving and independent thought.

6. **Improved Research Skills:** Computer education improves student's research skills by encouraging them to look for information on the Internet. It enables them to research various topics by seeking relevant books that could be digitally available online. The Internet also contains search options, which expose students to diverse ways of obtaining information. Students can research their topics within minutes.

7. **Influence on Career Aspirations:** Incorporating Computer education in schools can inspire students to undertake careers in technologies and enhance their understanding of how computer technology impact people's daily lives. The knowledge acquired in elementary and high school may increase their interest in computer related fields during their college education. Computer education provides students with a grounded in computer-related software and activities, such as using office suite programs coding in programming languages and creating data structure data sheets, students can apply these skills to a range of occupations later in life.

8. **Learning Job Skills:** Computer play a vital role in the modern business world and many of even the most basic jobs involve technology and computers. Teaching students how to use computers helps them prepare for any number of possible careers, and classes based on computer education can get even more specific. Many classes teach students to use office suite programs, create presentations and data sheets, and learn any number of programming languages such as C++ or Java.

9. **Practical Improvements:** Computer technology has enabled systems of obtaining and recording information much more efficient and effective, computer records are much harder to misplace than realms of paper records. Additional changes such as submission of work via email and responding to enquiries online save time and energy.

<div align="center">QUESTIONS</div>

SHORT ANSWER TYPE
1. Explain Computer as a discipline.

LONG ANSWER TYPE QUESTIONS
2. Explain place of Computer in the school curriculum.
3. Describe the importance of Computer Science as a discipline.
4. What is the significance of Computer Science in school curriculum. (GNDU. , 2016)

CHAPTER 4
CORRELATION OF COMPUTER SCIENCE

RELATIONSHIP OF COMPUTER SCIENCE WITH OTHER SCHOOL STUDENTS

The Computer is one of the most powerful and exciting invention that man has made. It is used in almost all the fields such as trade, banks, railways, shopping complex, national defense, education, air travel and reservation etc. So Computer has its impact on almost all the aspects of life. Computer software and internet are becoming part of our daily existence at an ever increasing rate. There is no limit to its uses and applications like that of the sky. Thus such important subject should not be taught in water tight compartments. Teacher should not teach computer education in isolation by divorcing it from the real life happenings. He must correlate it with other subjects, by doing so, unity of knowledge will be emphasized and student will understand connections between technology, society and the environment.

According to Ferguson, "Correlation is concerned with describing the degree of relation between variables."

The knowledge of computer science helps in teaching of science, social sciences, economics, Languages and art interesting. So while teaching Computer science teacher should relate it with other subjects or vice-versa.

Computer teacher can correlate various concept of computer education like application of computer, use of various application software use of internet, e-mail, e-commerce with most of the subjects.

RELATIONSHIP OF COMPUTER SCIENCE WITH SCIENCE

Computer Science has close relationship with science (Physics, Chemistry and Biology). Science is based on active learning. The main objective of science is to investigate natural phenomena which can be done in simulation and to formulate experiments.

PHYSICS AND CHEMISTRY:

1.   Teacher can relate launching of satellites in the space with computer science as it requires accuracy in time, accuracy in speed, right amount of fuel in rockets etc. and it cannot be done manually.

2.   Teacher can relate space technology, nuclear technology topics of physics with computer science

3.   Computer science is helpful in simulated working and designing of machine.

4.   Teacher can correlate CAD, CAM, CIM concept with various industries such as iron, steel industries etc.

BIOLOGY:

1.   Computer science can be correlated with Biophysics and Biochemistry.

2.   Computer technology is used in ECG, CAT Scan, Ultrasound, MRI.

3.   Teacher can correlate computer science with biology by telling how computer science helps in diagnosing various diseases, curing ailments and helpful in surgery.

4.   ICU is based on Computer science.

5.   Computer technology is used in medical apparatuses Blood pressure and temperature are measured by the digital instruments.

There are some Science Software's as follows:

(i)   **Problem Solving Programs:** These programs increase the critical thinking of students.

Examples: (a) Botanical Gardens

              (b) Sammy's Science House etc.

(ii)   **Drill and Practice Programs:** There are few science software that provides drill and practice components.

Examples: (a) Body Space (Body Scope program teaches about functioning of different parts of body).

              (b) Senses etc.

(iii)   **Tutorial Programs:** Most science tutorial software is limited to the high school and college levels. But now software publishers are beginning to develop the software for lower grades.

Examples: (a) Physics

              (b) The human system series 1, 2, 3 etc.

(iv)**Simulation Programs:** There are various simulation programmes which make students feel as they are actually dealing with the situations.

Examples: (a) Operation Frog

              (b) Body works.

With regard to the physical sciences various simulations become possible.

Example: Children can plot a magnetic field using a compass the complexity of the field increate, so as the complexity of task increases.

RELATIONSHIP OF COMPUTER EDUCATION WITH LANGUAGE

Language development could be enhanced in Computer environment and computer science can be taught with the language. English is very near to all the programming languages. Every programming language has its own language symbols but they become more easy, clear and meaningful when they are clearly defined and explained in simple of computer cannot be imparted. While teaching various HLL, a teacher can differentiate the symbols of language from the symbols of computer language.

Language Programs are:

(i)   **Writing Programs:** The Computer is an effective tool for motivating and reinforcing the necessary skills to improve student's writing.

Examples: (a) Talking Text option

(b) MS-Word

(c) Playwriter etc.

(ii) **Spelling Programs:** These programs ask the students to spell the names of objects they see on the screen. Object may be any type.

Examples   (a) Picture spell option

(b) Basic Spelling tricks

(c) Word spelling option

(iii) **Reading programs:** Today, the amount of information available is greater. The scope of information iswide. So there is need of reading and associated information processing skills. Many simulations, drill and practice programs and tutorial programs provide reading instruction.

Examples: (a) M.C. Gee etc.

(b) The playroom

(c) The Treehouse.

(iv) **Vocabulary Programs:** In order to make teaching effective and interesting to enhance learning, there should be element of humor. This will break the monotony of the class room. So fun filled program are more appealing than ordinary vocabulary work sheets.

Examples: (a) Word attach 3

(b) The Mind castle

(c) Word City etc.

RELATIONSHIP OF COMPUTER SCIENCE WITH SOCIAL SCIENCE

History and Geography subjects are based on the use of computer science by using information retrieval. Our life style, way of thinking, our behaviour are greatly influenced by the knowledge of computer science. Computer science has revolutionized the civilization. The computer helps in modeling the historical events, varying and their differing effects can be investigated.

Geography: There is great contribution of computer education in the study of geography. It is correlated to geography. It is correlated to geography while teaching.

1. Archeology
2. Weather forecasting
3. Locating Places
4. Solar eclipse
5. Drawing and Understanding of maps and graphs.
6. Transport, Communication networking's- satellite and internet and international trade.
7. MS-Excel and MS-PowerPoint are used for representation of data – structure of diagrams: basis, circles and flowcharts; thematic maps.
8. Computers are used for data processing and mapping.
9. Space relations satellite communication and cyber space are based on computer science.

Social Studies programs can be divided into two main categories:

I. **Computer Assisted Instructions:** With the help of computer, teacher can give instructions to students. A teacher can use either drill or practice or simulation programs depending on the purpose of instruction.

(a)	**Simulation Programs:** These computer programs challenge the mind of the students to make decisions on important issues.

Examples:	(i)	Decision- Decisions series etc.

(i)	The origin tail.

(b)	**Drill and Practice Programs:** These programs are easy to use. These are helpful in the retention of factual material. They may require minimal teacher supervision.

Examples:	(i)	Map Match, States and Capitals

(ii)	Word Discovers.

(i) **Application Programs:** Teacher can use application programs to integrate other information into the social studies program. Different application of MS-Office can be used by students.

For example: MS-Word (to write any text) MS-Excel and graphics to analyze statistical data and database programs to routine data. Word Geography is the best example of it.

RELATIONSHIP OF COMPUTER SCIENCE WITH ECONOMIC

MS-Word, MS-Excel and MS-PowerPoint can be correlated with economics while teaching the concept of analysis, calculation, interpretation and presentation of data regarding population, business, banking, production, supply etc.

(a)	**Computational Finance:** The applications for computational finance are varied, but they typically focus on investment planning and risk management. Using available statistical data, computers generates simulations that shows the outcomes of investments under various situations and the potential for gains and losses. Using this information, companies develop plans to minimize potential losses and prepare for the different scenarios that may occur.

(b)	**Economic Forecasting:** Computers are used in the creation of complex forecasting models. As in computational finance, computer simulations and models can be used to predict how markets will change. While no forecast is completely reliable, these forecasts factor a diverse away of variables in a fraction of the time a human could manually crunch the numbers.

(c)	**Online Trading and E-Commerce:** The emergence of e-commerce and online trading of goods, services and stocks has considerably changed the way we do business. Many transactions, especially those between two businesses as opposed to a business and a consumer, are now performed online, with the exchange of information and digital purchases taking place instantly. This has vastly changed the way stocks are traded, as enormous bulk trades can be made the instant prices change, and exchanges are made based on computer algorithms with preset parameters rather than based on instructions to a human trader.

(d)	**Data Presentation :** The presentation of statistical and financial data has evolved with the involvement of computers. The mountains of data, which in their raw form constitute a decidedly bland list of numbers and figures, can be visually displayed with charts and graphs. The charts convey both data and relational concepts, making the information easier to understand for anyone involved in analysis. While creating these charts required careful attention to detail for accuracy in the past, modern software automates the process, accelerating the generation of accurate and

visually dynamic presentations and charts.

(e)   **Stock Exchange:** Stock Exchange is the most important place for businessmen. Many stock exchanges use computers to conduct bids. The stockbrokers perform all trading activities electronically. They connect with the computer where brokers match the buyers with sellers. It reduces cost as no paper or special building is required to conduct these activities.

RELATIONSHIP BETWEEN COMPUTER SCIENCE AND ART

Computer is equipped with components like accuracy, neatness, harmony, symmetry. Similarly symmetry, proportion, balance, neatness and harmony are the essential components of art. So there is a close relation between art and computer science.

Advances in technology over the years have brought about a phenomenon caused by the fusion of computers and art. From web design and layout to special effects and animation, the use of computers for art and the skills needed to produce such things are in high demand. Currently one of the most popular uses of computer art is through web design for the Internet. Whether it is for personal use, non-profit organizations, government programs, or commercial use, Web pages are popping up everywhere. So to best understand this development in computer art, especially in Web design, it is important to know exactly what art is, the benefits of Web design, and the history of how art and the internet have come together. With the progressions in technology and art and the high demands thereof it can be expected to only increase in popularity.

Animation: Where once the pencil and hand-drawn images redesigned king, the animation field today also uses computers in a significant way. Students using animation working not only possess basic artistic skill sets like painting and drawing, but also computer skills as well. Animators with the most competitive advantages can use programs like Alias PowerAnimator/Maya, Kinetix 3D Studio Max, SoftImage and Lightwave.

Design: Design in general has benefited from the use of computers. Students working on Graphic designs regularly use computer programs like Adobe InDesign or Quark. From works as simple as basic ad design to ones as complex as magazine or book layout, students use computers in every phase of development. Additionally, students uses designs must also possess web design skills.

Illustration: In the past, illustrators used traditional media like pencil, pen and ink or paints to create magazine, book and comic illustrations. However, like every other art form, illustration has been hit by the computer bug as well. With digital design and illustration tools like Adobe Photoshop and Adobe Illustrator as well as Quark or Corel Draw, illustrators have more tools than ever with which to create art. Students use computers in their work in a variety of ways including digital inking of comic pages, to creating background scenery and even preserving their artistic creations in CD format.

Photography: Students using Photography in the age of computers have come to rely on computers not only to preserve their artwork but to create digital portfolios to send to clients, correct mistakes in their photos like overexposure and post their work on the web. Additionally, students can upload photos from their digital cameras directly onto their computers, allowing them

to specialize almost entirely in digital photography.

Thus we have seen close relationship between computer science and science, social studies, art, languages and economics. Both computer and these subjects have inter-dependence upon each other.

Word Processors: Word processors are programs which process textual matter and create documents. They are application software, which are used for word processing. They are most widely used for:

(1)   Typing
(2)   Editing
(3)   Formatting
(4)   Storing
(5)   Manipulating
(6)   Printing Documents (written materials such as a letter, a balance sheet, a memorandum, a text chart, a report, a book.) etc.

The word processing can be done by using a word processor. A person can type the text into the computer, instead of onto paper. Then errors can be corrected, text can be rearranged and all types of modifications can be done. It can be seen on the screen and if a person is satisfied with it, he can take out a print on paper. It is the most efficient means of generating documents electronically.

Some Popular Word Processors are:

(1)   MS Word
(2)   Soft Word
(3)   Word-Star
(4)   Word-Perfect
(5)   Word pad
(6)   Note Pad
(7)   Chi-Writer
(8)   Word Office

FEATURES OF WORD PROCESSORS:

(1)   **Formatting Features:**The typed text can be made more attractive in any form or style (bold, italics, underlined, different fonts, etc.). Size of the text can be increased or decreased. Various types of fonts can be selected. The margins of the word processor can be set in the word processors. A certain margin can be set for left, right, top and bottom to give a better look to the document.

(2)   **Object linking and embedding (OLE):** OLE is a program-integration technology that we can use to share information between programs through objects. Objects are saved entities of different typed like charts, equations, audio clips, pictures etc. Charts, pictures and drawing can be inserted in the documents.

(3)   **Scrolling:** Due to this feature the document can be viewed on the screen like through peeping form a window. The text can be viewed in four directions: up, down, left and right, It is possible to view the whole document of hundred pages by using scrolling.

(4)   **Fast Processing:** Typing in a word processor is very fast. When there is an end of line, the matter automatically jumps to the next line without pressing enter key. There is no need to retype the pages in case of errors. Text can be made copied easily.

(5)   **Spell Checking:** With the help of built in dictionary, spell check is easy in word processor. Word processors check the spellings and indicate the wrong words.

(6)   **Graphics:** Word processor provides the facility of incorporating drawings in the documents which enhances their usefulness.

(7)   **Editing:** Any type of correction, insertions, additions, deletions, modifications, etc. can be made easily as and when required.

(8)   **Printing:** Any document can be generated with various options, like printing a number of copies to pause between pages while printing or continuous printing etc.

(9)   **Publishing:** Publishing allows to print document submit documents electronically or save files to HTML for publishing on the Internet or Internet. With built in HTML support, we simply select save as HTML and all text, graphics, and tables are converted to HTML format.

(10)   **Storage Permanently**: Documents can be saved as long as desired with word processors. Text once written can be stored in the Computer for later use. The saved amount can be retrieved whenever desired.

(11)   **Mail Merge:** Mail merge facility enables us to print a large number of letters, documents, same initiation letter has to be sent to invites, only the names and addresses are to be changed. Mail merge feature actually merges main document with a data source. The main document stores the original text with data area at appropriate places. These data areas are successfully filled by the information in the data source and the merged document in printed.

(12)   **Accommodate data:** Word processor programs can accommodate a certain amount of text on a single page. When the text or matter exceeds this limit, then there is automatic pages break-up and the matter is continued on the next page when the limit exceeds.

WORD PROCESSOR IN TEACHING-LEARNING PROCESS

(1)   **Increase Learning Ability:** Word Processor increasing the learning ability of students.

(2)   **Preparation of Text:** Teachers can use word processor to prepare tests and handouts.

(3)   **Font Properties:** With the help of word processor font properties can be changed. For example, bold the nouns, pronouns, underline the verbs, colour the activities red etc.

(4)   **Use as Electronic Chalkboard:** Word processor can be used as an electronic chalkboard for projecting instructions, daily oral language activities and editing students work.

(5)   **Hyperlinks:** hyperlinks can be created in a document by typing a web address. Add instructions to the document detailing what is to be found or retrieved from the web address.

(6)   **Words and Phrases:** Word processor helps in producing higher quality work.

SPREADSHEET

A Spreadsheet is a numeric data analysis tool, which allows us to create a kind of Computerized longer. A manual Ledger is a book having rows and columns, which accountants use for keeping a record of financial transactions and for preparing financial statements. This is a tedious task and often takes a long time due to several interactions of formula calculations to come out with an acceptable and satisfactory financial statements. A spreadsheet package offers considerable ease

of performing such tasks by automating all arithmetic calculations, and making it easier to change certain numeric values and immediately seeing the effect of these changes across the worksheet (Ledger). With spreadsheet software in place, we are no longer confined to using pencils, erasers, and hand calculators for dealing with any task that requires number data analysis.

Whereas paper ledgers were tools for accountants, spreadsheets are tools for anyone who needs to record, organize, or analyze numbers as rows and columns of data.

Spreadsheet is also known as worksheet which allows to perform detailed analysis on number data. Re arranging, moving and copying a cell, inserting rows and columns, inserting cells, deleting a part of worksheet, changing column width, changing font sizes and styles, etc. are the basic works in spreadsheet program.

Examples of Commonly known Spreadsheet's are:

(i)   MS-Excel
(ii)   Lotus 1-2-3
(iii)   Multiplan
(iv)   Quattro Pro
(v)   Vesicle
(vi)   VPP
(vii)   Super calc etc.

FEATURES OF SPREADSHEET

(1)   **Fast:** Electronic spreadsheet is fast processing. It provides the query facility that makes the processing faster.

(2)   **Toolbar:** It has a drawing toolbar by using which you can create your own graph, chart and other pictures.

(3)   **Charts Creation:** Pictorial or Charts representation of data be created easily. Different types of chats can be created by a click of mouse.

(4)   **Desired Format:** The information entered in a spreadsheet can be sorted in a desired format.

(5)   **Saving and Modification:** Spreadsheet can be saved, modified and retrieved any time, according to requirement in an electronic life.

(6)   **Large Size:** Spreadsheet can be very big in size. We can enter huge amount of information in it. We can view the whole information by displaying it in parts. Similarly we can edit it by parts.

(7)   **Formatting Data:** Data entered in a spreadsheet can be formatted in several ways by using various commands.

(8)   **Shortcut Keys Creation:** We can create shortcut keys for processing the task automatically by using the keyboard Macros.

(9)   **Import or export of Information:** Information in one spreadsheet can be imported or exported to other spreadsheet.

(10)   **Linking and Embedding:** Spreadsheet has embedding and linking facility through which information stored in a spreadsheet can be transformed to other software programs such as MS Word, Word Star, Dbase, Fox. Pro, etc. Any information from these software can be loaded into the desired location of the opened spreadsheet.

(11)   **Merging:** An old spreadsheet or part of a worksheet can be merged to the new spreadsheet (Worksheet).

(12)   **Built- in Functions:** The various Built- in functions are mathematical, trigonometric, statistical, database and financial etc. Built in functions make the coloration easy and fast. These Built- in functions are standard functions of the Microsoft Excel.

(13)   **Reliable Result:** The result computed by electronic spreadsheets are reliable, excellent, efficient and accurate.

APPLICATION AREAS OF SPREADSHEET

Spreadsheet can be used by different types of people like accountants, finance professionals, computer professionals, doctors, engineers, insurance companies, advertising agencies, stock brokers, inventories and stock personnel, librarians, hotel management, hospital and data officers. The following application areas of spreadsheet are discussed as under:

(1)   **Payroll:** Payroll computer the basic pay with other allowances by deducting the taxes and other funds like provident fund, etc. All this information along with name and number of employee can be tabulated on a single spreadsheet.

(2)   **Marketing and Advertising:** Marketing makes the people aware about the product, its plus points with their buying facility. Advertising is similar to marketing, which is done through media like television, cinema, electronic board. Hence marketing and advertising of various organizations can be handled so that a list of expenditure on the marketing and advertisement can be computed.

(3)   **Business Applications:** Business application associated with worksheet are budget, portfolio analysis, annual reports, production of schedules, income statements, invoices, tax statements, loan analysis, payable and reviewable.

(4)   **Accounting:** Accounting spreadsheets are widely used to store journal entries, ledgers and trail balance sheets of company to determine the net profit or net loss. Accounting calculations and procedures are followed in all commercial and business areas. Double entry accounting system effect the credit/debit every time a transaction takes place.

(5)   **Inventory Control:** Inventory control is the handling of stock. In manufactured industry, the raw material stock, the finished goods and scrap items are maintained in such a way that the warehouse or the godown is neither over leader nor underutilized or empty.

(6)   **Sales, Production Planning and Control:** Sales means selling of the product. Sale can be promoted by pre-planning the sale in the form of sales forecasting. A list of various salesmen isprepared in sale application spreadsheet allows proper arranging of data product-wise, region-wiseor sales person-wise. Spreadsheet can be used for maintaining sales report.

Spreadsheet program proves useful in production planning and control. In the production planning and control, we control the whole raw material and plan the raw material for manufacturing. Things like availability of water, electricity and labour etc. would be linked in production planning.

ADVANTAGES OF SPREADSHEET

Advantages of Spreadsheet are as follows:

(1)   **Size Flexibility:** There is flexibility to size and resize columns.

(2)   **Research Programs:** Spreadsheet is used for data analyses in various research programs.

(3)   **Vastness:** Vast areas can be provided if required. The Large volume of data can be easily handled and manipulated.

(4)   **Reliable Results:** The results computed by electronic spreadsheets are reliable, excellent, efficient and accurate.

(5)   **Automatic recalculation:** It is helpful in recalculating automatically on updations. The formulas are automatically recalculated when data values are changed (the option value has to be set.)

(6)   **Built-in Functions**: Different built-in functions are provided so that the user finds it convenient to work. The built-in functions make the calculations easy and fast.

(7)   **Insertions and Deletions:** Various insertions and deletions can be made easy.

(8)   **Data formatting:** Data can be formatted as per requirement.

(9)   **Statistical Analysis:** Various statistical analyses such as Mean, Median, Mode can be evaluated by using spreadsheet. It is also useful for measures of variability- Mean deviation, Quartile Deviation and standard deviation, t-test, Z-test, F-test, chi-square.

(10)   **Graphical and pictorial Representation:** Pictorial representation of worksheet data is possible through graphs and charts. Graphical representation of the data can be done through spreadsheet software such as Bar diagram, Pie diagram, Histogram, Frequency polygon.

PRESENTATION SOFTWARE

Presentation software is a category of application program used to create sequences of words and pictures that tell a story or help support a speech or public presentation of information. Presentation software package used to display information in the form of a slide show. It has three major functions: an editor that allows text to be inserted and formatted, a method for inserting and manipulating graphic images, and a slide show system to display the content. Each slide in a presentation can contain tax, graphics and other information. Important examples of presentation software are Microsoft PowerPoint, CorelDraw, Macromedia Director, Apple Keynote, AdobePervasion.

Microsoft PowerPoint is very popular and commonly used software to create attractive presentations. A PowerPoint presentation is a group of slides of electronic pages on which information is written in the form of photographs, pictures, drawings, text, charts, graphs, audio and video clips in presentation. Thus it makes use of multimedia technology. It can be made colorful and attractive by adding coloured text, movie and sound clips or animated objects, presentation can also be edited and modified at any time. Hence, presentation software as a learning device is very useful for teachers in class presentations. It helps put together thoughts in a visual manner allows integrating creativity into subjects.

HOW TO DEVELOP PRESENTATION SOFTWARE:

The following points should be considered while developing presentation software.

(1)   **Separate Fonts:**Separate fonts should be used for heading and content. Headings may be of 32 point size and subheadings may be of at least 24 point size. Text should be bold. Italics may be avoided.

(2) **Contrast in text and Background:** Text and background should be always in contrast. If the background is dark, the text should be very light in colour. If the background is light, the text should be very dark in colour. For example, white colour may be used with any dark colour, black colour may be used with yellow. Do not use red and green, red and black, dark green and black, or blue and black together as background and text.

(3) **Colour Background:**Colour background is most appropriate background. It should be simple without using graphics.

(4) **Simple Animation:** Always use simple animation features for educational presentation.

(5) **Simple Slides:** Slides should be simple and should have four to eight individual lines of information.

(6) **Clarity in Graphics:** Graphics used in power presentation should have good clarity.

Features of Presentation Software

(1) **Improvement in Content:** Presentations improve the visibility of content and materials for students.

(2) **Integrating Creativity:** As it can put together thoughts in a visual manner and allows integrating creativity into subjects that would other wise be interesting and boring.

(3) **Multimedia Technology:** Presentation software can make use of multimedia technology to include photographs, drawing, charts, pictures, texts, graphs, audio and video clips.

(4) **Use of Computer:** Computer can be used as a resource to present information.

(5) **Colour and Motion:** It can be helpful in preparing black and white and coloured overhead transparencies. Colour and motion can be used to arouse, sustain and regulate attention and interest-and promote understanding.

(6) **Dynamic Presentation:** Presentation software offers tools and techniques for running and designing dynamic presentation.

(7) **Visual Displays:** It helps to create interactive, self-running, or speaker controlled displays.

(8) **Dynamic Slides:** Presentation software can be helpful in preparing and presenting slide-based presentations. Presentations offer the benefit of dynamic slides. Dynamic slides are slides that change automatically after a set time.

(9) **Updating Presentation:** Presentation can be rearranged or updated upto the last minute.

GRAPHICS

Graphics packages enable us to use a computer system for creating, editing, viewing, storing, retrieving and printing designs, drawings, pictures, graphs and anything else that cab be drawn in the traditional manner. Computer graphics are pictures and film created using computers. Usually the term refers to computer-generated image data created with help form specialized graphical hardware and software.

Computer graphics is responsible for displaying art and image data effectively and meaningfully to the user. It is also used for processing image data received from the physical world. Computer graphic development has had a significant impact on many typed of media and has revolutionized animation, movies, advertising, video games, and graphic design generally.

COMMONLY FEATURES OF GRAPHICS
DRAW DESIGNS:

This feature enables users to draw graphics objects, such as lines, circles, rectangles, arcs etc. to create diagrams and designs. Users need not to worry about drawing straight lines or exact circles. The system automatically makes the lines, circles, arcs etc. smooth and properly connected to each other. The system also allows users to move, copy, delete, rotate, tilt, flip horizontally or vertically, increase or decrease the size of the graphic objects. With all these facilities, users can draw complex designs with great ease.

In fact, Computer-aided design is an area that mainly based on this feature of graphics software. CAD systems are used by architects and engineers to create architectural drawing, product designs, landscaping plans, and many different types of engineering drawings.

PAINT DRAWING AND PICTURES

This feature enables users to create and modify drawings and pictures in the form of images. Unlike the draw features, which uses vector graphic for composing graphic objects, the paint features use raster graphics for composing graphic images. In vector graphics, the design is composed of patterns of lines, points, circles, arcs and other geometrical shapes, which can be easily represented by few geometrical parameters. In raster graphics, the image is composed of patterns of dots called pixels. That is, a painting software creates an image by turning individual screen pixels on or off- because the image is mapped on to the screen based on binary bits, this technique is called bit mapping and an Image represented in this manner is called a bit mapped image.

PRESENT GRAPHS

This feature enables users to create graphs and charts form numerical data. The numerical data to be converted into a graph or chart may be imported from another software, such as a spreadsheet or a database. Among the most popular types of graphs and charts used form graphical representation of numerical data are line graphs, bar charts and pie charts.

Drag and Drop Objects: This feature enable the users to create their overall designs and pictures much faster by allowing them to use ready-made graphic objects or images, supplied with the software. The user can select a desired object from the set of given objects, and drag it to the desired position on the drawing area, and then drop it there to add it to the overall design.

Import Objects: This feature further enables the users to create their overall designs and pictures much faster by allowing them to use not only the graphic objects or images supplied with the software, but even those graphic objects or images that are stored in files created by some other software. For example: A photograph may be scanned and the scanned image many be imported into and included in an overall picture, which the user is currently creating.

Screen Capture: This feature enables the users to take a snapshot of a screen display and to convert is into an image, which can be stored in a file and later imported into a document. This feature is very useful while writing, books or manuals, which need to include screen images as illustrations. A screen is captured as a bit-mapped image. Once stored in a file, it can be imported into any documents at any time and even manipulated with a paint program.

MIND MAPPING

INTRODUCTION TO MIND MAPPING

Mind mapping is a visual form of note taking that offers an overview of a topic and its complex information, allowing students to comprehend, create new ideas and build connections. Through the use of colors, images and words, mind mapping encourages students to begin with a central idea and expand outward to more in-depth sub-topics.

A mind map is a diagram used to visually organize information. A mind map is hierarchical and shows relationships among pieces of the whole. It is often created around a single concept, drawn as an image in the center of a blank page, to which associated representations of ideas such as images, words and parts of words are added. Major ideas are connected directly to the central concept, and other ideas branch out from those.

Mind mapping is a highly effective way of getting information in and out of your brain. Mind mapping is a creative and logical means of note-taking and note-making that literally "maps out" your ideas.

All Mind Maps have some things in common. They have a natural organizational structure that radiates from the center and use lines, symbols, words, color and images according to simple, brain-friendly concepts. Mind mapping converts a long list of monotonous information into a colorful, memorable and highly organized diagram that works in line with your brain's natural way of doing things.
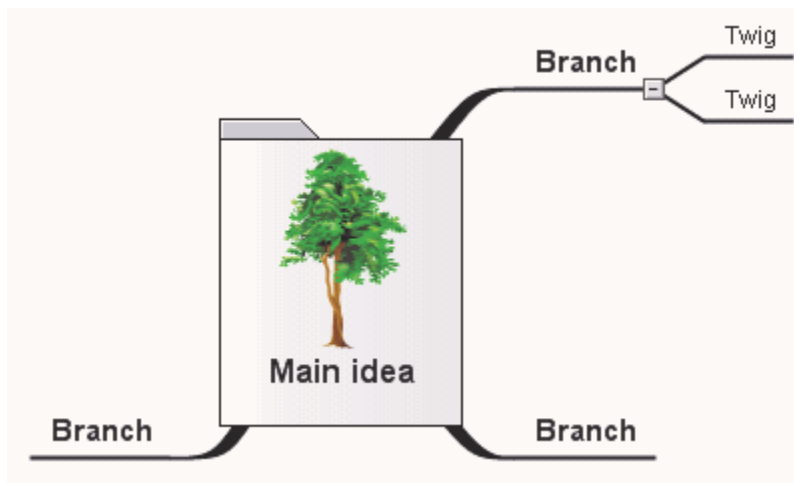
DEFINITION OF A MIND MAP

A mind map is a visual representation of hierarchical information that includes a central idea surrounded by connected branches of associated topics.

THE FIVE ESSENTIAL CHARACTERISTICS OF MIND MAPPING:

1.   The main idea, subject or focus is crystallized in a central image
2.   The main themes radiate from the central image as 'branches'
3.   The branches comprise a key image or key word drawn or printed on its associated line

4.   Topics of lesser importance are represented as 'twigs' of the relevant branch

5.   The branches form a connected nodal structure

HOW TO MAKE A MIND MAP

1.   Think of your general main theme and write that down in the center of the page. i.e. Food

2.   Figure out sub-themes of your main concept and draw branches to them from the center, beginning to look like a spider web i.e. Meats, Dairy, Breads

3.   Make sure to use very short phrases or even single words

4.   Add images to invoke thought or get the message across better

5.   Try to think of at least two main points for each sub-theme you created and create branches out to those

In other words, all mind maps begin with a main concept or idea that the rest of the map revolves around, so choosing that idea or topic is the first step. Begin by creating an image or writing a word that represents that first main idea.

From that main idea, create branches (as many as needed), that each represent a single word that relates to the main topic. It's helpful to use different colors and images to differentiate the branches and sub-topics.

Then, create sub-branches that stem from the main branches to further expand on ideas and concepts. These sub-branches will also contain words that elaborate on the topic of the branch it stems from. This helps develop and elaborate on the overall theme of the mind map. Including images and sketches can also be helpful in brainstorming and creating the sub-branch topics.

Mind maps can be created on paper but are more easily and fluidly created on a computer with mind mapping software such as Inspiration Software

Buzansuggests the following guidelines for creating mind maps:

(1)   Start in the center with an image of the topic, using at least 3 colors.

(2)   Use images, symbols, codes, and dimensions throughout your mind map.

(3)   Select key words and print using upper or lower case letters.

(4)   Each word/image is best alone and sitting on its own line.

(5)   The lines should be connected, starting from the central image. The lines become thinner as they radiate out from the center.

(6)   Make the lines the same length as the word/image they support.

(7)   Use multiple colors throughout the mind map, for visual stimulation and also for encoding or grouping.

(8)   Develop your own personal style of mind mapping.

(9)   Use emphasis and show associations in your mind map.

(10)   Keep the mind map clear by using radial hierarchy or outlines to embrace your branches.

MIND MAPS IN EDUCATION AND TEACHING WITH MIND MAPS

Mind mapping is a beneficial learning tool to help students brainstorm any topic and think creatively. Mind maps are particularly helpful in the writing process and provide students with a natural way of thinking and building thoughts on a story plot or theme.

Mind maps also provide teachers with insight into their students' thought process regarding

a specific topic. By asking students to create mind maps demonstrating their comprehension of a concept, teachers are able to understand what a student's prior knowledge was and how well the student understands the assignment or the material being taught. This is a very effective way of evaluating students' understanding.

Educators and students have been drawing concept maps and mind maps on paper for many years. Visual software applications, in particular mind mapping tools, have automated this process, making it more efficient to brainstorm concepts as ideas or branches. This allows for the creation of much larger mind maps, and the ability to easily re-organized branches by dragging and dropping them around the map. Furthermore, some mind mapping software applications integrate with MS Office, allowing students to convert their ideas into other documents such as Word or PowerPoint.
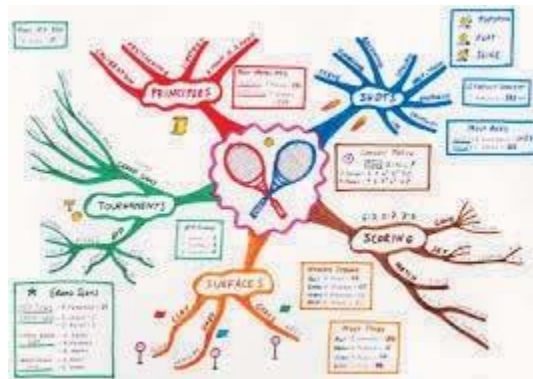
BENEFITS OF MIND MAPPING FOR STUDENTS

1.   Improved Memory & Recall

Mind maps are full of mental triggers that help your brain comprehend and store concepts more easily. You'll take less notes, need fewer revisions and still retain more facts than you would with linear notes!

2.   Free Flow of Ideas

Because you mostly use keywords, images and short phrases in mind maps, you can jot down thoughts a lot faster than usual. This free flow of ideas will help you brainstorm creative writing assignments and solve brainteasers.

3.   Structured Information

Mind maps can store and structure vast amounts of information. They display hierarchy, show relationships between single topics and enable you to see the "big picture" at a glance. This also makes them ideal for summarizing texts.

4.   Better Communication

Cloud-based mind mapping helps foster collaboration between students and allows for a more efficient communication between teachers and students. Even the most complex problem is quickly visualized and explained with a map!

5. Brainstorming sessions

6. Visualizing concepts

7. Improving critical thinking
8. Improving reading and writing skills
9. Advanced research papers or graduate projects
10. Outlining written documents
11. Storyboarding presentations
12. Note taking
13. Problem solving

TIMELINE

Timelines have become an indispensable part of the learning experience as they enable students to participate more actively in learning and acquire knowledge the easy way. In other words, timelines help students easily understand and memorize events and dates. Timeline is a graphical design having a long bar alongside labeled with dates and events labeled on points where they would have happened.

A timeline is a way of displaying a list of events in chronological order, sometimes described as a project artifact. Timelines can use any time scale, depending on the subject and data. Most timelines use a linear scale, where a unit of distance is equal to a set amount of time. This time scale is dependent on the events in the timeline. While most timelines use a linear timescale, for very large or small timespans, logarithmic timelines use a logarithmic scale to depict time.

There are different types of timelines
1. Text timelines, labeled as text
2. Number timelines, the labels are numbers, commonly line graphs
3. Interactive, clickable, zoomable

There are many methods of visualizations for timelines. Historically, timelines were static images, and generally drawn or printed on paper. Timelines relied heavily on graphic design, and the ability of the artist to visualize the data.

USES OF TIMELINE IN EDUCATION

Timelines are often used in education to help students and researchers with understanding the order or chronology of historical events and trends for a subject. When showing time on a specific scale on an axis, a timeline can be used to visualize time lapses between events, durations (such as a lifetimes or wars), and the simultaneity or overlap of spans and events.

The first week of school is an ideal time to introduce your students to timelines. You can use your classroom timeline to record upcoming holidays and school vacations. Add other cross-cultural holidays to the timeline as you learn about them. Post clippings of important world or community news stories along the timeline. Record classroom events such as appearances by special visitors or the day everybody in class got a 100 on their spelling tests! Post birthdays and important school events. Add events in community history. After a couple of months, your timeline will be crowded with highlights and memories -- from earthshaking news events to the minutia of everyday school life!

Soon students will be prepared to create their own timelines: timelines of family history or your town's history; a timeline showing when important inventions were first introduced; timelines that

document students' personal journal entries; timelines that serve as a record of important events in history from the past (the Civil War) or that record events of history in the making. The possibilities for timeline activities across the grades and the curriculum are endless. Timelines can be as simple or as sophisticated as your students' abilities.

PLOT HISTORY ON A LINE

1. Decide what the timeline will show: personal events, big political events, events related to a geographic area, randomly chosen events, and so on.

2. List the events in a sequence of earliest to latest.

3. Choose the period of time that the timeline will cover.

4. Decide what units of time to use (days, months, years, decades, centuries, etc.) to divide the timeline into segments.

5. Calculate the number of segments that the timeline will have.

6. Draw a line and divide it into the number of equal segments that are needed.

7. Label the dates on the appropriate segments, left to right

8. Decide where the dates and events would fall on the timeline and how to label them. For instance, you could write on the timeline, attach colored labels, or make a code that refers back to your chronology.

9. If the dates and events can be divided into two or three smaller categories or themes, try making parallel timelines with identical segment sizes.

GOOGLE MAPS

Google Maps is a Web-based service that provides detailed information about geographical regions and sites around the world. In addition to conventional road maps, Google Maps offers aerial and satellite views of many places. In some cities, Google Maps offers street views comprising photographs taken from vehicles.

Google Maps is a web mapping service developed by Google. It offers satellite imagery, street maps, 360° panoramic views of streets (Street View), real-time traffic conditions (Google Traffic), and route planning for traveling by foot, car, bicycle (in beta), or public transportation.

FEATURES OF GOOGLE MAPS:

Google Maps offers several services as part of the larger Web application, as follows.

1.   A route planner offers directions for drivers, bikers, walkers, and users of public transportation who want to take a trip from one specific location to another.

2.   The Google Maps application program interface (API) makes it possible for Web site administrators to embed Google Maps into a proprietary site such as a real estate guide or community service page.

3.   Google Maps for Mobile offers a location service for motorists that utilizes the Global Positioning System (GPS) location of the mobile device (if available) along with data from wireless and cellular networks.

4.   Google Street View enables users to view and navigate through horizontal and vertical panoramic street level images of various cities around the world.

5.   Supplemental services offer images of the moon, Mars, and the heavens for hobby astronomers.

ADVANTAGES OF GOOGLE MAPS

Among the vast selection of mobile applications offered by Google is Google Maps, a reliable mapping service providing location information through satellite imagery. The efficiency brought about by this online tool cannot be denied as it has the ability to check possible routes and landmarks for faster travel time. This can make your journey easier and help locate businesses, venues and private addresses that users are not familiar with. There are certain merits of Google Maps as follows:

1.   **Wealth of Information:** Google Maps provides the layout of roads, the locations of cities and towns, state boundaries, geographical features, restaurant reviews and satellite images. Google provides the Street View perspective, allowing you to see houses, storefronts and points of interest from a driver's point of view. In addition, Google Maps has indoor maps of some airports, museums and other facilities.

2.   **Signing-up to a Google account:** You have to create a Google account in order to be able to save your home and work addresses in Google Maps. This account can be used for all of Google's services, like Gmail, Drive, Calendar, Maps, and all other Web tools under Google. After you have signed up, log into your account to save your home and work addresses

3.   **Adding your home and work addresses:** Open Google Maps and click My Places. From this page, click either Set home location or Set work location and type in your complete addresses to be able to access these on every device.

4.   **Sharing your addresses with colleagues:** Many businesses deal with clients from different geographical locations and it is useful to use Google Maps to send out your business location so that they know exactly where you are. You can share your location through email and text messages or even send to a number of GPS devices for easy navigation.

5.   **Opening Google Maps on your device:** As stated, you should be signed into your Google account to access your saved places as well as your home and work addresses. Open Google Maps and click the address you would like to share. This will show the specific location of your home and work address.

6.   **Sharing your addresses in two ways:** Once you have opened Google Maps and clicked on the location you wish to share, click the link icon on the left corner of your window. This shows you two ways to send your address. Firstly, you can opt to send the address directly through the Short URL provided by hitting Send. You have options to choose where you want to send it through several mediums. Secondly, you can copy and paste the code provided just below the Second URL. Choose Paste in HTML to embed in website option and your location will appear on your company website, your personal blog or other sites you would want to share it on.

7.   **Multiple Transportation Modes:** The Google Maps website gives you directions for trips by car, bike, foot or public transportation. The service has local bus and train schedules for many cities including bus and stop numbers and transfer points. For longer trips, Google provides airline information including ticket price and carriers that serve your destination.

8.   Map Views: The Google Maps website offers several map views that you can switch between depending on your needs. In addition to switching from a normal map to satellite imagery, you can overlay terrain information on the normal map. You can also use the Street View feature to get a panoramic view of the buildings and areas surrounding a particular street, which are put together from photographs taken at street level by specially equipped cars.

9.   Directions: Enter two or more distinct locations into the Google Maps website to get driving, walking and cycling directions for the most practical routes. Depending on the location you are interested in, public transport directions also may be available. If several possible routes exist, you will see a summary of each with a rough estimate of the time that each route would take.

10.   Custom Maps: Using Google Maps, you can create a custom map for any location, adding place marks, lines and shapes to it, and save it to your Google account. You can load the saved map at any time, print it out for your reference and share a link to it with others. This makes the Google Maps website a useful tool to plan a holiday or a visit to a new city.

11.   Additional Information: Depending on the location you are interested in, Google Maps can provide additional information you might find useful, such as current traffic load, road work and road closures, photos of areas and landmarks, nearby webcams, and weather forecasts. If you search for the location of a business, Google Maps will provide you with a general rating and reviews of that business and a link to the company's website, if one exists.

12.   Accuracy: Information provided by the Google Maps website may be inaccurate or out of date. Walking and cycling directions, in particular, may suggest routes that are missing sidewalks, pedestrian paths or cycling paths. The suggested driving routes also may not be the most efficient ones available, and may not account for any specific requirements you may have, such as avoiding low clearance bridges and overpasses. Relying on Google Maps alone for any additional information you may need, such as public transit timetables, the location or opening hours of a business, road closures or traffic load, may lead to wasted time and frustration.

13.   Accessibility: The Google Maps website relies on downloading and displaying large images. Because of this, it may load slowly or not at all if you have a connection that is limited in speed. Similarly, the website may function poorly or not at all if viewed on a browser that is not fully updated or if Java is not updated.

DISADVANTAGES

1.   Limited Accuracy: Information in Google Maps may have errors. Occasionally, ambiguities and flaws in location data may produce a route that doesn't take you to the destination you expect. Google Maps does not have up-to-the-minute information on unusual conditions, such as roads damaged by weather, blocked by street fairs or altered by recent construction work. Some remote locations may not be in Google Maps.

2.   Use by Criminals: The convenience afforded by Google Maps is not lost on thieves. Street View images can spot belongings momentarily exposed through windows or open doors. Burglars have used Street View and satellite images to find affluent neighborhoods or homes that are easy to break into, or to identify parked cars that might contain expensive possessions.

3.   Offensive and Shocking Material: The extra information that Google Maps provides,

including Street View images and material from the public, sometimes has content Google has to remove. The Street View camera, for example, occasionally captures images of criminal behavior as it passes along country roads and through neighborhoods. Disturbing images and off-color and even racist public comments and references have appeared on the maps themselves

4.   Inappropriate Content: The images used on the Google Maps website could occasionally contain inappropriate content. For example, photographs taken for the Street View feature may show people in compromising positions that would not be appropriate for the general public. The pictures could also contain disturbing scenes such as car crashes. Satellite imagery taken at the wrong moment may display inappropriate words or drawings as a result of short-lived pranks. Google does, however, remove or replace these images when informed about them.

5.   Missing Information: Depending on the country and location you are interested in, you may find that entire buildings are blurred out in Street View. This is done on request because of privacy concerns, but this also severely limits the usefulness of the feature. Similarly, in the satellite view, certain areas may be displayed using older imagery or may be blurred out altogether.

WEB 2.0

Web 2.0 (pronounced web two point oh) describes World Wide Web websites that emphasize user-generated content, usability (ease of use, even by non-experts), and interoperability (this means that a website can work well with other products, systems and devices) for end users.

A Web 2.0 website may allow users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community, in contrast to the first generation of Web 1.0-era websites where people were limited to the passive viewing of content. Examples of Web 2.0 include social networking sites and social media sites (e.g., Facebook), blogs, wikis, folksonomies ("tagging" keywords on websites and links), video sharing sites (e.g., YouTube), hosted services, Web applications ("apps"), collaborative consumption platforms, and mashup applications.

FEATURES OF WEB 2.0

The key features of Web 2.0 include:

(1)   **Folksonomy** - free classification of information; allows users to collectively classify and find information (e.g. "tagging" of websites, images, videos or links)

(2)   **Rich user experience** - dynamic content that is responsive to user input (e.g., a user can "click" on an image to enlarge it or find out more information)

(3)   **User participation** - information flows two ways between site owner and site users by means of evaluation, review, and online commenting. Site users also typically create user-generated content for others to see (e.g., Wikipedia, an online encyclopedia that anyone can write articles for or edit)

(4)   **Software as a service (SaaS)** - Web 2.0 sites developed APIs to allow automated usage, such as by a Web "app" (software application) or a mashup

(5)   **Mass participation** - near-universal web access leads to differentiation of concerns, from the traditional Internet user base (who tended to be hackers and computer hobbyists) to a wider variety of users

Web 2.0 can be described in three parts:

Rich Internet application (RIA) — defines the experience brought from desktop to browser, whether it is "rich" from a graphical point of view or a usability/interactivity or features point of view.

Web-oriented architecture (WOA) — defines how Web 2.0 applications expose their functionality so that other applications can leverage and integrate the functionality providing a set of much richer applications. Examples are feeds, RSS feeds, web services, mashups.

Social Web — defines how Web 2.0 websites tends to interact much more with the end user and make the end-user an integral part of the website, either by adding her profile, adding comments on content, uploading new content, or adding user-generated content (e.g., personal digital photos).

Subject Specific use of various Software

Computer is now used in every sphere of school education subject specific use of various software are as follows:

(1)   **Word Processor:** Students can use word processor for preparing project reports, assignments, printing of a document in all the subjects.

(2)   **Presentation Software:** Students can use presentation software to make effective presentation of required content. Project reports, assignments, community work in all subjects can be made by using presentation software and it can be effectively presented to the audience. These interactive presentation and slide show apps and websites give the tools to make student's work fun, engaging and interesting.

(3)   **Spreadsheet:** Calculation work are used in various subjects. Spreadsheet help students to manage working with complex sets of numbers and save time by allowing for quick calculations. Spreadsheets have four main functions students can explore: data collection, creating graphs, plotting timelines, and recording surveys results. Spreadsheet mostly used in subjects like mathematics, accounts etc.

(4)   **Database Software:** During project works and research works, students need to save, calculate, manipulate and draw conclusion on the basis of data collected. Database is use to preserve these data in all subjects.

(5)   **Graphic Software:** Adobe Photoshop, Corel graphic softwares. Graphic software can be used to create, edit, viewing, store, retrieve and print designs, drawing pictures, graphs etc. in all subjects.

(6)   **Movie Software:** Movie software helps teacher to teach abstract topic by using some visualized movements in class for making lesson interesting to students. These movements can be taken from real scenes from any movies, websites, clips, TV-serial etc. Thus movies software helps teacher to select, crop and display scenes in class from educational movies.

(7)   **Mind Mapping Software:** Mind mapping software can be used to generate, visualize, structure and classify ideas and as an aid to studying and organizing information, solving problems, making decisions and writing. Mind mapping can be used in all subjects.

(8)   **Time line Software:** Timeline Software display a list of events in chronological order, sometimes described as a 'project artifact'. Time line is use in all subjects as all subjects has its

history. Time line is use to show the development of any topic to the students. Mostly history subject uses the Timeline software. Other subjects topic like Mathematics, history, development of nuclear bomb, change in culture with time etc. can taught by using timeline.

(9)   **Google Map:** Students of Geography, political science, history uses the Google map software very much. Latest view of any geographical area can be seen by using Google map. Geography subject uses the Google map most.

(10)   **Lexicon Software:**Science and Mathematics subject students uses the lexicon software very much. It was built specially for scientific in 1980.

(11)   **Web 2.0 Tools:** Web 2.0 tools are use by students to search, communicate, and publish their work in any subject. Web 2.0 tools includes wikis, blogs, social networking (i.e. face book), Podcasting, video sharing sites (YouTube), folksonomies, web applications, mashup applications. Latest and authentic knowledge can be given to students by using these tools. It is helpful in all subjects.

QUESTIONS

SHORT ANSWER TYPE QUESTIONS

(1)   Discuss the relation of computer with art.

(2)   Discuss the relation of computer science with economics.

(3)   What do you know about Google maps and time line?

(4)   Write a short note on mind mapping. (GNDU, 2016)

(5)   Write a short note on word processor.

(6)   Writer a short note on Graphics. (GNDU, 2016)

LONG ANSWER TYPE QUESTIONS

(1)   Explain the subject specific use of computer in relation to school subjects.

(2)   Discuss the correlation of computer science with other subjects. (GNDU, 2015)

(3)   "Computer have brought integrity among the subjects." Illustrate the statement. (GNDU, 2013)

CHAPTER 5
AIMS AND OBJECTIVE OF COMPUTER SCIENCE

AIMS OF TEACHING OF COMPUTER SCIENCE

INTRODUCTION

While starting to teach a particular subject it is essential to know why we are going to teach that subject. Until we have clear-cut aims of teaching a subject, we would not be able to proceed on the right track. Aimlessness makes the work uninteresting and results in the wastage of time, energy and other material resources both on the part of the teacher and the taught. Therefore, we must have some definite aims of teaching a subject before starting its actual teaching.

AIM

The meaning of the word 'Aim' is the "broad goals" which our education system embraces and which are accepted to obtain. The Aim of education is based on philosophical and socio-psychological aspects of society and culture. Aim is a statement showing general declaration of a purpose and it give direction to the activity which are design to achieve the aim in the future.

MEANING AND DEFINITIONS

John Dewey, "An Aim is a foreseen end that gives directions to an activity or motivates behaviour."

Education Aims are broad and also hold group for educational system, sometimes they take the form of lofty ideas "may speak of perfect condition, which make attain or not."

Example: Attainment of salvation, establishment of a classless society.

AIMS OF TEACHING COMPUTER SCIENCE

Keys of opening the entire process of teaching and learning which cannot be thought without aims. All the aspects of education that is curriculum construction, method of teaching and evaluation system, are shaped and moulded according to aims of education.

There are two types of aims of teaching computer science.

(A)　General Aims

(B)　Value Based Aims

(A) GENERAL AIMS:

These are as follows:

(i)　**Related to Daily Life:** To enable the child to understand the use of computer in solving daily life problems.

(ii)　**To understand computer programming:** To enable the child to make and understand

the computer programmes for various software development.

(iii)   **Suitable type of discipline:** To create a suitable type of discipline in the mind of the child.

(iv)   **Fulfill the needs:** To familiarize the child with the latest computer science knowledge to fulfill the existing needs of the society.

(v)   **Give Knowledge:** To give knowledge about the broad objectives of teaching computer science such as knowledge, understanding, application etc.

(vi)   **Sense of Appreciation:** To develop in the child a sense of appreciation of cultural value of computer science.

(vii)   **Prepare the Child:** To prepare the child for elementary as well as higher education in computer science, science, engineering etc.

(viii) **Develop the good habits:** To develop in the child the mental powers, like thinking, reasoning etc.

(ix)   **Develop the mental powers:** To develop in the child the mental powers, like thinking, reasoning etc.

(x)   **Develop Scientific and realistic attitude:** To develop scientific and realistic attitude towards life.

(xi)   **Give practical knowledge:** To give practical knowledge of computer science to face the day to day problems.

(xii)   **Technical Professions:** To prepare the child for technical professions such as software engineer, bankers, technicians, computer teacher etc.

(xiii) **All round and harmonious development:** To bring an all-round and harmonious development of the personality of child.

(xiv) **Develop the skills:** To develop the skills to use the modern computer devices and software.

(xv)   **Develop the Abilities:** To develop the abilities of making programs, execution programs, reasoning, use of computer parts etc.

(xvi) **Develops interest in computer science:** The aim of teaching of computer science is to develop interest in computer science.

These are the general aims of teaching computer science. Now we discuss the value based aims of teaching computer science.

VALUE BASED AIMS

(i)   **Social aim:** Man is a social animal and human life depends upon the co-operation of each other. In order to live a social life, its knowledge is needed because the give and take process, business and industry depends upon the knowledge of computer science. Study of computer science aims in the development of social virtues among the students for leading a well adjusted social life. It also aims to understand the role of computer science in the development of society and globalization.

In this way the aim of computer science has played an important role is not only understanding the progress of society but also to develop the society.

(ii)   **Practical aim:** We need knowledge of computer science in our daily routine, house, outside market etc. Teaching of computer science enables the students to make use of the knowledge of computer in daily life activities.

(iii)   **Skill aim:** Teaching of computer science aims to develop useful skills among students. Skill in clued use of hardware, maintenance of hardware, maintenance of hardware and development of software.

(iv)   **Intellectual aim:** Teaching of computer science is very important for intellectual development. The aim of programming in computer science helps use in development of mental faculties. As the student, faces a problem in programming his brain become active in solving that problems. Each problem of programming possess such a sequence which is necessary for constructive and creative process. Teaching of computer aims to develop the intellectual abilities and widens the mental horizon of the students.

(v)   **Cultural aim:** The culture of every nation or society has its unique characteristics. It has its own importance. Each nation or society reflects its culture by its living standards, rituals, artistic progress, economic, social and political aspects etc. The history of computer science presents the image of culture of different nations. Teaching of computer science aims towards sharing, preserving, promoting and transmitting culture among students.

(vi)   **Aesthetic aim:** Computer science is just like an art, music and means of gaining pleasure for those who studies and like it. One get pleasure in making programs, use of hardware, use of internet. Teaching of computer science aims to develop aesthetic sense of students and acquaint them with artistic values.

(vii)   **Disciplinary Aim:** The aim of teaching computer science is not only for development of mental abilities but also to develop their personality with some qualities like concentration, truthfulness, seriousness etc. It helps the students to make their mind disciplined and develop good qualities like regularity, punctuality etc.

(viii)   **Moral aim:** Morality is the important phase of life which is most effected by time, person, situation and place. Its aim is to develops all those qualities which a person of strong character must possess. Child develops qualities such as honesty, truthfulness, punctuality, patience, self-reliance, loyalty among students.

(ix)   **Vocational aim:** The main aim of education is to develop the children to earn their living and to make them self dependent. To achieve such aim, computer science is the most important subject than any other. Teaching of computer science aims to prepare the child for the future professions or jobs such as computer teacher, programmer, hardware engineer etc.

(x)   **Psychological aim:** Computer science is also useful for the point of view of psychological aspects. Computer science fulfilsl the psychological needs of children. The teaching of computer science follows the various laws and principles of psychology. For example: The child requires knowledge on the various principles of psychology such as learning by doing, learning through experience problem solving etc. Through its knowledge the child develops satisfies his desires creative and constructive tendencies, self satisfaction etc.

(xi)   **Scientific attitude aim:** The knowledge of computer science trains the children

in attempting the problems according to a definite distinct procedure which may be called as scientific. It makes the individual open minded, keen observer, critical thinker. It helps in removing superstitions and false beliefs.

(xii) **International aim:** Computer science not only gives the knowledge about the nation its background but also give a message of nationality. The progress in the field of computer science is neither the achievement of a single person, nation, society, caste or religion followers only nor it is the property of a particular nation. Any invention of a nation when crosses its boundaries, it reaches to its international value. These all facts reflect the international aims value of teaching computer science.

DIFFERENCE BETWEEN AIMS AND OBJECTIVES

Before we proceed further, we must briefly differentiate objectives from aims in order to avoid confusion. Aims are general and long term goals and may be common to more than one subject. While objectives are specific, immediate and attainable goals, specific to one subject precise and clearly defined, objective are more directly concerned with what specifically is being attempted over a relatively short period.

	Aims	Objectives
1	Aims are comprehensive and general.	Objectives are narrow and specific.
2	These are not definite and clear.	These are definite and clear.
3	Aims give directions.	These are end point of point of possible achievement.
4	These cannot be evaluated.	These can be easily evaluated though the expected behaviour modification.
5	These are of long term and long term planning is needed.	These are immediate and short duration planning is needed
6	Philosophy and sociology affect the aims.	Psychology is the main source of objectives.
7	These are not of much use to a teacher.	These are useful to teachers.
8	These are difficult to achieve.	These can be easily achieved.

CONCLUSION

From above discussion it is clear that aim of teaching. Computer science is to compulsory. Which is so valuable, important, psychologically based and so closely connected with day to day life, is jujstified to be included in the school curriculum.

OBJECTIVES OF TEACHING COMPUTER SCIENCE

OBJECTIVES:

Teaching and instructions are organized to achieve the educational objectives. The desired behavioural change is brought among the students to realize the educational objectives. The

teaching and instructional objectives are helpful for achieving meaningful process. The teacher has to set objectives. He can identify his instructional objectives with the help of his knowledge and understanding of educational objectives.

MEANING OF OBJECTIVE:

An objective is a statement or a form of category which suggest any kind of desired change.

According to NCERT's Evaluation &Examination Issue:

"An objective is a point or end in view of something towards which action is directed, a planned change is brought through any activity what we set out to do."

According to Robert Mager's View:

"An objective is a collection of words which describes a desired outcome of course."

MEANING OF EDUCATIONAL OBJECTIVE

The educational objectives imply the changes that we try to produce in the child. In the words of B.S. Bloom, "Educational objectives are not only the goals towards which the curriculum is shaped and towards which instruction is guided, but they also the goals that provide the detailed specification for the construction and use of evaluative techniques."

Bloom is the view that education is a tri-polar process. The Three poles are:

(1)   Educational Objectives
(2)   Learning Experiences
(3)   Change in Behaviour.
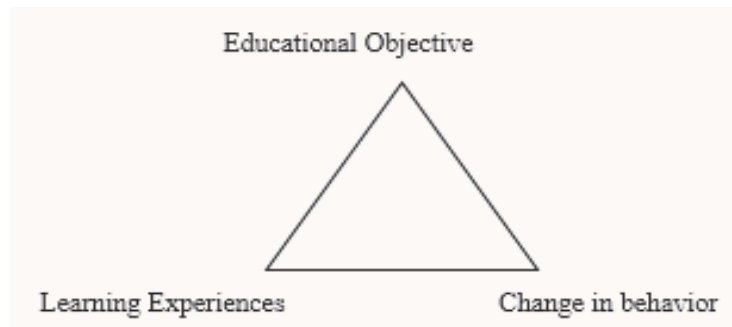
The learning experiences are provided by teaching activities to achieve educational objectives& Change of behaviour is evaluated in terms of educational objectives. Thus educational objectives are basis for teaching activities& evaluation techniques.

MEANING OF INSTRUCTIONAL OBJECTIVE

Instructional objectives are achieved in terms of change of behaviour of learners. They are related to desired learning or teaching outcomes or changes of behaviour of the learners. They may be termed as teaching-learning objectives or behavioural objectives. An instructional objectives indicates those knowledge, skills, abilities and attitudes that the teacher experts the students to acquire as a result of instructions. They are related to classroom teaching. They are the basic targets that could be easily achieved within the limited period and means.

In the words, of Robert Mager: An instructional objective may be defined as an intent communication by a statement describing a proposed change in learner.

HIERARCHY OF OBJECTIVES
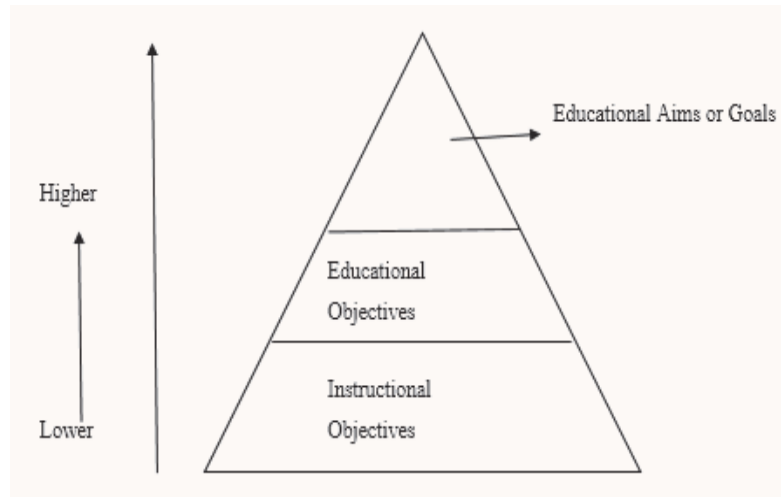
Objectives of Computer Education

The objectives of computer education are classified as:

(1)   Knowledge
(2)   Understanding
(3)   Application
(4)   Skill
(5)   Internet
(6)   Attitudes
(7)   Appreciation
(8)   Abilities

For making the objectives unambiguous and attainable they are always expressed in the behavioural terms (testable behaviours). What the student is expected to achieve is clearly known by the teacher while teaching a particular topic. We will try to keep this thing in view while describing the different objectives of teaching computer science.

Knowledge Objectives: Through computer science a student acquires the knowledge of:

(i)   Various programming languages.
(ii)   Basic of computer- meaning, characteristics, applications of, computer, etc.
(iii)   Technical terms
(iv)   Hardware and Software.
(v)   The inter-relationship among different topics of computer science.
(vi)   Internet- meaning, its uses, limitations, terminology etc.
(vii)   Setting related to computer environment such as control panel, desktop, screen saver,. date and time setting etc.

(viii) The language of computer such as symbols, binary, octal, hexadecimal, flowcharts, algorithm.

(ix)   Development of computer and its contribution to society.

Understanding Objectives: At this stage students do not have superficial knowledge rather they have in-depth knowledge. Through computer science student acquire understandings of:

(i)   Discriminate between different types of translators, languages, software etc.

(ii)   Explain internal working of computer system.

(iii) Locate ever in the different programmers.

(iv)   Interpret the results of computer output, functioning or processes etc.

(v)   Cite examples related to computer concepts like languages, operating systems, word processors, spreadsheets, database, output devices, presentation etc.

(vi)   Classify the hardware, software, languages, networks etc. into their respective categories.

(vii) Verify the facts, related to computers.

(viii) Find similarities between different types of languages.

(ix)   See relationship between various concepts of computers such as hardware and software, system software and application software.

Skill Objectives: Through the study of computer science students are expected to develop certain skills required for performing practical work. Computer science makes the students able to.

(i)   Connect various components or peripherals of a computer system at the proper place.

(ii)   Carrying out repairs of hardware.

(iii) Turn on and shut down computer system properly.

(iv)   Speed, accuracy, neatness and precision in computer work.

(v)   Handle mouse properly.

(vi)   Read correctly form the monitor.

(vii) Make various programs and execute them properly.

(viii) Type correctly form the keyboard.

(ix)   Develop different software.

(x)   Operate different type of operating systems and software like DOS, windows, Word Excel, PowerPoint etc.

(xi)   Analyze the problem related to computers.

(xii) Use various MS-office applications (MS-Word), MS-Excel, MS-PowerPoint, MS-Corel Draw etc. according to their requirements.

(xiii) Browse internet and use it as per their need such as search engines, chatting, mailing etc.

Application Objectives: Application objectives are achieved when a pupil applies the gained knowledge in solving day to day problems. The application objectives in computer science has been realized if the child can.

(i)   Develop and run programmes on computer using different HLL.

(ii)   Apply computer knowledge in solving day-to-day or daily life situations.

(iii) Give new ways of developing software.

(iv)   Use computer science in learning of other subjects and higher studies in computer itself.

(v)   Give reason if programmes do not run.

(vi)   Use various techniques like flowcharts, algorithms etc.

(vii) Use internet in retrieving information related to computer and other subjects.

Interest Objectives: Teaching computer science should arouse interests in students for.

(i)   Participating in debates and declamation on computer subject.

(ii)   Learning computer subject.

(iii) Practical work in computer laboratory.

(iv)   Reading computer literature.

(v)   Undertaking projects in computer.

(vi)   Co-curricular activities related to computer.

(vii) Hobbies related to computer, their generations etc.

(viii) Independent study on computer, internet etc.

Attitudes Objectives: Teaching of computer science must develop positive attitude among the learners. That will help them to make critical observation develop intellectual honesty, curiosity, freedom form bias and prejudice.

This objective is considered to have been achieved if a student is able to:

(i)   Intellectually honest.

(ii)   Analyze the problem.

(iii) Observe and discover solutions by collecting data.

(iv)   Think logically and critically.

(v)   Verify the results.

(vi)   Shows the originality and creativity.

(vii) Develops the curiosity to know more about the things around him.

(viii) Develops unbiased and impartial attitude in judgment.

(ix)   Develops an attitude of independent work.

(x)   Develops heuristic attitude among students.

(xi)   Express his opinions precisely, systematically and logically.

(xii) Recognize adequacy or inadequacy of data or information for solving problems.

Appreciation Objectives: To enable the students to appreciate.

(i)   To appreciate the role of computer science in daily life.

(ii)   To appreciate the recreational and amusement values of computer science.

(iii) To appreciate the importance of computer science in modern civilization.

(iv)   To appreciate the vocational value of computer science.

(v)   To appreciate the contribution of scientists and engineers in the development of computer is from abacus to various generations of computer to laptop, palmtop etc.

(vi)   To appreciate the power of computation.

(vii) To appreciate the history of computer science development.

(viii) To appreciate the role of computer science in understanding the environment.

(ix)   To appreciate the computer science facts, principles and processes.

(x)   To appreciate computer for its exactness, precision, truthfulness like qualities.

Abilities Objectives: Through teaching of computer science a student is able:

(i)   To develop the ability to sense a problem.

(ii)   To develop the ability to use computer science skills in daily life.

(iii) Use problem solving method, thus, problem solving abilities is develo9ptedc among the students.

(iv)   Apply the acquired knowledge.

(v)   To develop the ability to organize and interpret.

(vi)   To report output in a technical language.

BLOOM'S TAXONOMY OF OBJECTIVES

Bloom was the editor of the first volume of "Taxonomy of educational objectives." Producted by an American Committee of College and University examiners. Taxonomy means a system of classification and in the sense Bloom's Taxonomy presents a system of classification of the objectives in the similar way as Dewey's decimal system tends to classify a number of books in a library. Bloom's Taxonomy (classification) of learning, educational and instructional objectives into the following three domains is in a proper hierarchy:

(a)   **Cognitive domain:** In cognitive domain only those educational objectives are included which are concerned only with knowledge, recognition and recall and cater to the development of intellectual abilities and skills.

(b)   **Affective domain:** In affective domain only those educational objectives are included which are related to the domain of interests, attitudes and values and bring about desirable changes in the same. The main weakness of these objectives is that they cannot be staed in terminal behaviour because they are related only to inner feelings and emotions.

(c)   **Conative or psychomotor domain:** Conative domain helps in the development of skills. Training of physical activities is the main objective of this domain. Simpson is primarily responsible for developing this domain.

Bloom's Taxonomy (classification) of learning, educational or instructional objectives into cognitive, affective and conative domain has special importance because it is directly related to the problem of curriculum and evolution and this has proved more useful in formulating the techniques of communication, evaluation and development of the curriculum.

Educational objectives in three domains:

		Cognitive Domain	Affective Domain	Conative Domain
		Category	Category	Category
Low	1.	Knowledge	Receiving	Impulsion
	2.	Comprehension	Responding	Manipulation
	3.	Application	Valuing	Control
	4.	Analysis	Conceptualization	Co-ordination
	5.	Synthesis	Organization	Naturalization
High	6.	Evaluation	Characterization of value system	Habit formation

(I) COGNITIVE OBJECTIVES:

Dr. B.S. Bloom's has divided the cognitive objectives into six categories arranged from lowers to highest level of functioning.

(1) **Knowledge**: It is the lowest level of the objectives belonging to cognitive domain knowledge objective involves the recall of specifies and universals, the recall of method and process. or the recall of pattern, structure or setting. The teacher plans the situations for the learner to recall and recognize traditional, classifications, criteria, principles and theories. From content point of view, there are the following three levels in the knowledge.

Knowledge of specifics Knowledge of ways Knowledge of universal
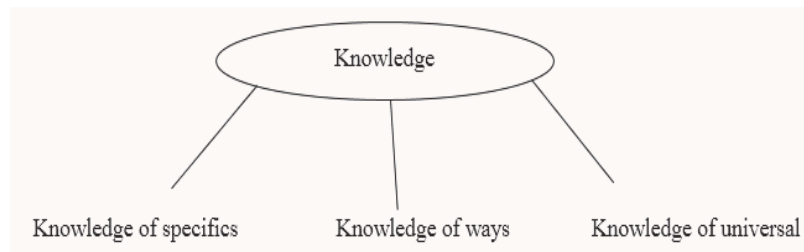
1.   Knowledge of Specifies: Knowledge of specifics means recall of specific terminology, facts and information. The knowledge of specifics are divided into:

(a) **Knowledge of terminology:** Knowledge of terminology is the knowledge of verbal and non-verbal references. It may include the definition of technical terms by giving their attributes, qualities, relationships and their parts so that the general meaning of the various terms may be acquired.

(b) **Knowledge of specific factor:** It means the knowledge of specific information such as events, dates, persons and places. In other words knowledge of specific facts is concerned with the general knowledge of specific facts and their recalling.

2.   Knowledge of ways and means of dealing with specifics: It includes the ways and means of organizing, studying, judging and criticizing. It also involves the methods of inquiry, the chronological sequences and the standards of judgment within as a field as well as patterns of organization through which the areas of fields themselves are determined and internally organized.

Bloom has divided the ways and means of dealing with specifics into five categories:

(a) **Knowledge of Conventions:** To make students conscious of correct form and message in speech and writing.

(b) **Knowledge of trends and sequences:** An understanding of the continuity and development of Indian culture as exemplified in Indian life.

(c) **Knowledge of Criteria:** Knowledge of criteria for the evaluation of recreational activities.

(d) **Knowledge of methodology:** Knowledge of methods of inquiry, techniques, and procedures employed in a particular subject field as well as those employed in investigation of particular problem.

(e)   **Knowledge of classification and categories:** It includes the knowledge of classes, sets, divisions and arrangements which are regarded as fundamental for a given specific field, purpose, argument or problem.

3.   Knowledge of universals and abstractions: It is concerned with laws, principles, generalizations, theories and structures. It has given two forms of knowledge of universals:

(a)   Knowledge of principles and generalization.

(b)   Knowledge of theories and structures.

(2)   **Comprehension:** This category indicates the lowest level of understanding. It is based upon no comprehension. Comprehension means the basic understanding of the facts, ideas, methods, processes, principles or theories etc. It is divided into three areas:

(i)   Translation

(ii)   Interpretation

(iii)   Extrapolation.

(3)   **Application:** Application refers to the ability to use learned material in new and concrete situations. This may include the application of such things as rules, methods, concepts, principles, laws and theories. Learning outcomes in this area require a higher level of understanding then those under comprehension. It has three levels.

(i)   Application of abstractions.

(ii)   Application of phenomena at concept.

(iii)   Prediction of proper effects.

(4)   **Analysis:** Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationships between parts, and recognition of the organizational principles involved. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material. It has three levels:

(i)   Analysis of elements

(ii)   Analysis of relationships

(iii)   Analysis of organized principles.

(5)   **Synthesis:** Synthesis refers to the ability to put parts together to form a new whole. This may involve the production of a unique communication (theme or speech), a plan of operations (research proposal), or a set of abstract relations (scheme for classifying information). Learning outcomes in this area stress creative behaviours, with major emphasis on the formulation of new patterns or structures. It has three levels:

(i)   Production of a unique communication.

(ii)   Production of a plan or proposed set of operations.

(iii)   Derivation of a set of abstract relations.

(6)   **Evaluation:** Evaluation is the highest level of objectives of cognitive domain. It aims to develop in the student the ability to make proper value judgment about what has been acquired by him in the form of knowledge, understanding, application, analysis and synthesis, It involves

knowledge, comprehension, application, analysis, synthesis, As a result the student is expected to take proper decision about the qualitative and quantitative value of a particular idea object, principle or theory. It has two levels.

(i)   Internal judgment of the material and methods.

(ii)   External judgment of the material and methods.

Level		Category
Low level		**Knowledge**
	(i)	**Knowledge of specifies:**
	(a)	knowledge of terminology
	(b)	knowledge of specific facts
	(ii)	**Knowledge of ways and means of dealing with specifics:**
	(a)	Knowledge of conventions
	(b)	Knowledge of trends and sequences
	(c)	Knowledge of classifications and categories
	(d)	Knowledge of criteria
	(e)	Knowledge of methodology
	(iii)	**Knowledge of universals and abstractions in a field:**
	(a)	Knowledge of principles and generalization
	(b)	Knowledge of theories and structures
	(i)	**Comprehension**
	(ii)	Translation
	(iii)	Interpretation
	(i)	Exploration
	(ii)	Application
	(iii)	Application of abstractions
		Application of phenomena or concept
		Prediction of proper effects
Medium level		**Analysis**
	(i)	Analysis of Elements
	(ii)	Analysis of relationships
	(iii)	Analysis of organizational practices
	(i)	**Synthesis**
	(ii)	Production of unique communication
	(iii)	Production of a plan or proposal set of operations
		Derivation of a set of abstract relations
High level		**Evaluation**
	(i)	Judgment in terms of Internal evidence
	(ii)	Judgment in terms of external evidence.

(II)   **Affective Domain:** Affective objectives are concerned with the interests, emotions, appreciation, attitudes, mental tendencies and values of the pupils.

Bloom, classified the objectives of affective domain as under.

(1)   **Receiving:** Receiving means pupil's will to receive. It is directly concerned with the sensitivity of the pupils which occurs in the presence of some activity or stimulus. It includes inculcation of certain interests, attitudes, values or the ideas. Following are the three sequential activities of this domain.

(i)   Awareness of the phenomenon

(ii)   Willingness to receive phenomenon

(iii)   Controlling or selected attention.

(2)   **Responding**: Receiving is pre-requisite for responding. Once a learner receiver or attends to a particular idea, event or thing he must be made to respond to it as actively as possible which is manifested in the active behaviour like obeying, answering, reading, discussing, recording, writing and reading to a stimulus. It has three levels:

(i)   Obedience for responding.

(ii)   Willingness to respond

(iii)   Satisfaction in response

(3)   **Valuing:** Valuing depends upon the responding and receiving. Valuating includes the worth of a thing, phenomenon or behaviours. Here, the learner expected to imbibe a definite value pattern towards different ideas, events and objects. This level has three types of activities:

(i)   Acceptance of a value.

(ii)   Performance for a value.

(iii)   Commitment to a value.

(4)   **Organization:** In this category of objective a student gives some order to each value. As the students successfully internalizes value, he encourages situations for which more than one value is required. It includes:

(i)   Conceptualization of a value.

(ii)   Organization of a value system.

(5)   **Characterization of a value:** It is the highest level of affective domain. All the above objectives are involved in the objectives of this category. So at this stage, learner is able to imbibe various interests, attitudes, values, value patients and value structure and ultimately he is destined to imbibe his own life style i.e. acceptance of a value system. It has two aspects.

(i)   Generalized set

(ii)   Characterization

SUMMARY OF AFFECTIVE DOMAIN OF BLOOM'S TAXONOMY

Level		Category
Low level	(1)	**Receiving**
	(i)	Awareness
	(ii)	Willingness to receive
	(iii)	Controlled or selected attention

Level		Category
	(2)	**Responding**
	(i)	obedience for responding
	(ii)	Willingness to response
	(iii)	Satisfaction in response
	(3)	**Valuing**
	(i)	Acceptance of a value
	(ii)	Preference foe a value
	(iii)	Commitment to a value
	(4)	**Organization**
	(i)	Conceptualization to a value
	(ii)	Organization of a value system
High level	(5)	**Characterization of a value**
	(i)	Generalized set
	(ii)	Characterization

(III) **Psychomotor Domain:** It is a domain of manipulation or motor skills areas. It is concerned with the training of the student's physical activities. Although it is very important domain, yet not much work has been done to define objectives in this area. The main levels of psychomotor domain an

(1) Impulsive (2) Manipulation (3) Control (4) Co-ordinary (5) Naturalization & habit formation

Meaning of Behavioural objectives

Specification of objectives in a task of teaching and learning may prove more effective and purposeful if they are translated into behavioural languages. It means that the objective must state what the learner should be able to do after the instruction is over.

Druker (1954) also advocated that, "The activities of management should be explained in terms of objectives." He emphasized the behavioural aspects of the objectives."

According to **Bloom,**" emphasis must be shifted from content to the objectives in examination system. He favored that achievement tests should be objective rather than subjective type. Each question should evaluate one specific objective."

From the above discussion, behavioural objective may be defined as the specific, concrete, delimited objective in relation to a broad general objective. After achieving a particular objective of teaching computer education, it is expected that the learner must develop behavioral changes.

NEED OR ADVANTAGES FOR WRITING OBJECTIVES IN BEHAVIOURAL TERMS

Need or importance or advantage for writing objectives in terms of behavioural terms are as follows:

(1) **Determining teaching activities:** Determining and delimited certain specific teaching activities such as selection and organization of subject matter, allocation of time.

(2) **Objective centered teaching learning:** Teaching and learning can be made objective centered.

(3) **Widened scope of objectives:** It broadens the scope of objectives.

(4) **Selection of teaching strategies:** The appropriate teaching strategies and tactics can be conveniently and smoothly selected for effective learning.

(5) **Facilitating testing:** Testing may be based on teaching. The selection of questions and problems for testing is facilitated.

(6) **Explanation of salient features of teaching material:** Some salient features of teaching material can be explained to the learners.

(7) **Integrating teaching-learning process:** Teaching and learning processes can be integrated for effective learning outcomes. Proper balance can be maintained between teaching and learning.

(8) **Evaluation of learning outcomes:** The objectives of all the aspects of learning can be evaluated. In other words, the objectives written in behavioural terms help in managing an examination for the achievement of objective relating to all aspects.

(9) **Provides feedback:** Behavioral objectives are the measuring rods. These evaluate curriculum, instructional strategies, and evaluation tools. On the basis of evaluation, these provide guidelines and feedback setting the standards of curriculum, instructional techniques and measuring an achievements.

(10) **Indicate desired behaviour:** It indicates the desired behavior of the child:

Scafold's View: According to Scafold, there are following advantages of writing objectives in behavioral terms:

(i)   Specification of objectives

(ii)   Selection of subject matter, teaching methods, A-vaids.

(iii) Teaching can be related to learning.

(iv)   Integration between learning experiences and changes in behaviour.

(v)   Selection of items of preparing test.

Methods or approaches of writing instructional objectives in behaviourial term

The writing of an objective in behavioural terms is always done in relation to the following, three things;

(1)   Nature of the objectives i.e. knowledge, application, understanding etc.

(2)   Area or domain of the behavior i.e. cognitive, affective and psychomotor.

(3)   Specific content areas in which behavioral changes are planned to be brought about i.e. applications of computer, block diagram of computer, steps to create table in MS-Word etc.

There are various methods or approaches of writing objective in behavioral terms, here we are discussing the following three approaches.

(i)   Robert Mager's approach

(ii)   Robert Miller's approach

(iii) RCEM approach.

(1)   **Robert Mager's approach:** According to Robert Mager, the instructional objectives

are best described in terms of terminal behaviour expected from the learners. He considers that the behavioural objective should be written in the following manner:

  (i)   Indentify the terminal behaviour by name.

  (ii) Describe the important conditions under which the behaviour is expected to occur.

  (iii) Specify the criteria of acceptable performance (desired terminal behaviour) by describing how will the learners must perform to be considered acceptable.

Mager made Bloom's taxonomy as the basis for writing objectives in behavioral terms. He concentrates on cognitive and effective objectives. He gives emphasis on action verbs rather than mental processes. The verbs helps in describing the outcomes of learning or terminal behaviour of the learner in a well defined way.

A LIST OF ASSOCIATED ACTION VERBS FOR THE COGNITIVE DOMAIN

Sr. no.	Objectives (Based on Bloom's taxonomy)	Associated action verbs
1	Knowledge	Define Label, list, measure, name, recall, recognize, reproduce, select, state, write, underline etc.
2	Comprehension	Change, classify, explain, distinguish, identify, illustrate, indicate, justify, judge, translate etc.
3	Application	Asses, conduct, construct, compute, discover, explain, generate, perform, solve, use etc.
4	Analysis	Analysis, associate, conclude, criticize, divide, point out, separate, etc.
5	Synthesize	Conclude, combine, discuss, generalize, integrate, organize, relate, summarise, synthesize etc.
6	Evaluation	Judge, Evaluate, verify, choose, compare, etc.

LIST OF ASSOCIATED ACTION VERBS FOR THE AFFECTIVE DOMAIN

Sr. no.	Objectives(Based on Bloom's taxonomy	Associated action verbs
1	Receiving	Accept, indentify, observe, attend, catch, follow, discover, prefer, favor, receive etc.
2	Responding	Answer, assist, select, obey, state, write, present, derive, develop, complete, list, label etc.
3	Valuing	Accept, attain, demonstrate, decide, recognize, choose, discriminate, participate, complete, prefer etc.
4	Organizing	Organize, change, associate, judge, compare, select, correlate, determine etc.
5	Characterization	Accept, decide, solve, revise, indentify, verify, demonstration, develop, judge, change, decide etc.

The action verbs of above category (Cognitive& Affective) indicate the level of teaching and learning activity. The behavioural objective may be written by combining action verb with the content.

Behavioral Objective   =   Content   +   Action Verb

Thus, first of all, teacher selects the content then action verb and then write objectives in behavioral term:

For example:

The Child will be

(i)   Able to define computer in his own words.

(ii)   Able to predict the output of the program.

(iii)   Able to write the program.

(iv)   Able to explain the block diagram of the computer.

Illustration with examples:

Example I. Subject   =   Computer Science

                 Objectives = Cognitive

                 Topic   =   Networking.

Sr. no.	Instructional Objectives	Writing in behavioural terms
1.	Knowledge	The pupils are able to define networking.
2.	Comprehension	The pupils are able to explain the term flowchart.
3.	Application	The pupils are able to draw different networking modes.
4.	Analysis	The pupils are able to analyze the different types of networking's.

Example 2: Subject =   Computer Science

                 Objectives   =   Affective Domain

                 Topic   = Output Devices

Sr. no.	Instructional Objectives	Writing in behavioral terms
1.	Receiving	The pupils confirm their knowledge about output devices.
2.	Responding	The pupils are able to discriminate various output devices.
3.	Valuing	The pupils are able to discriminate various output device.
4.	Organizing	The pupils can organize the essential characteristics of output devices.

LIMITATIONS OF ROBERT MAGER'S APPROACH

(1)   **No emphasis on mental processes:** Robert Mager's approach puts main emphasis on action verbs than mental processes or abilities.

(2)   **Long list of action verbs:** List of action verbs provided is so lengthy and unwieldy that it does not have any meaningful application to a class-room teaching.

(3)   **Overlapping of action verbs in different categories:** The list of action verbs reveals that there is overlapping of action verbs in different categories. For example: Select, analysis etc.

(4)   **Overlapping of action verbs in cognitive and affective domain:** Three is also overlapping of action verbs provided in the lists of cognitive and affective action verbs. For example: analysis, list, recognize, select, state are common in both the lists.

(5)   **No Effective:** It cannot be effectively used in writing instructional objectives in behavioural terms because instructional objectives are of three types. Knowledge, skill. attitude& interest. It can be effectively used in the development of programmed instruction.

(6)   **Neglecting psychomotor domain:** This approach is applicable only for cognitive and effective objectives. Psychomotor objectives cannot be written by Mager's approach.

(7)   **Not applicable to all human learning:** He explains learning in terms of stimulus and response (S-R) but all human learning cannot be explained by stimulus response learning.

(8)   **Not suitable for higher level objectives:** Higher level objectives cannot be written clearly with this method.

(2)   Robert Miller's Approach (1962)

Robert Miller developed his approach for meeting the requirement of writing psychomotor objectives. In his approach, he emphasized skill analysis. He described the following procedure for writing psychomotor objectives in behavioural terms:

(i)   Description of the Indicator, indication the relevant or essential activity.

(ii)   Description of the Indication or stimulus which calls for a response.

(iii)   Controlling of the object which is to be activated.

(iv)   Writing or description of the activity to be performed.

(v)   Indication of the adequacy or responses or feedback (reinforcement).

Like Mager, Miller also tried to enlist associated action verbs for the psychomotor objectives-Following are the instructional activities verb for writing the objectives in behavioural terms.

Sr. no.	Objective	Action verbs
1.	Perception	Construct, sketch
2.	Set	Design
3.	Guided responses	Fixes, Identifies
4.	Mechanism	Drills, Mends
5.	Complex overt response	Changes, connects, creates, locates.

(3)   **RCEM Approach (Regional college of education Mysore approach.):** A successful approach of writing instructional and educational objective in behavioural terms is one where all the three domains of behaviour i.e. cognitive, affective and conative or psychomotor are represented. Miller's and Mager's approach have remained unsuccessful in the task of writing all instructional objectives belonging to all the three domains of behaviour. Mager's approach covers the purpose of cognitive and affective objectives. While Miller's approach covers the psychomotor objectives. None of these two approaches cover all the domains of human behaviour.

Moreover, both of these approaches put emphasis on action verbs designating behaviour for writing a particular objective and completely neglect the mental processes or abilities of the learners in the learning process. Keeping in view their limitations, Regional College of education, Mysore innovated an approach known as RCEM approach.

FEATURES OF RCEM APPROACH

(1) **Modification of Bloom's Taxonomy:** Bloom has given sic categories of objectives but RCEM has given four categories namely knowledge, understanding, application and creativity. The other difference lies in naming bloom's comprehension category as understanding in RCEM approach.

(2) **Use of Mental processes:** It makes use of mental processes or mental abilities in place of action verbs in writing instructional objectives. The assumption of this system is that human learning can be best explained in terms of mental processes rather than behaviour.

(3) **Division into mental processes:** The four categories of RCEM has been divided into 17 mental processes or abilities. These abilities are used for writing objectives of cognitive, affective and psychomotor domain in behavioural terms.

TAXONOMY OF EDUCATIONAL OBJECTIVES IN RCEM SYSTEM

Sr. no.	Objectives	Sr. no.	Mental Process or Abilities
1.	Knowledge	1.	Recall
		2.	Recognize
2.	Understanding	1.	Seeing relationship
		2.	Cite example
		3.	Discriminate
		4.	Classify
		5.	Interpret
		6.	Verify
		7.	Generalize
3.	Application	1.	Reason out
		2.	Formulate hypothesis
		3.	Establish hypothesis
		4.	Infer
		5.	Predict
4.	Creativity	1.	Analyses
		2.	Synthesis
		3.	Evaluate

The above table shows four categories which are classified into 17 sub-categories, called mental abilities.

STEPS/PROCEDURE OF WRITING OBJECTIVES IN RCEM APPROACH'S

(1) Keep in mind the entry behaviour of the child (learner).
(2) Select the element of content/topic/learning experience to be given to the learner.

(3)   Stating teaching or learning objectives.

(4)   On the basis of entry behaviour, content and the objectives, select appropriate mental abilities for writing the objective in question.

(5)   Try to make use of seventeen frames of RCEM approach and fill in the following in view of the entry behaviour of the child and learning experiences given to him.

An outline of writing objective in behavioural terms according to RCEM approach

(1)   Knowledge Objectives:

The learner is able to recognize

The learner is able to recall

(2)   Understanding Objectives:

The learner is able to see relationship between……….and……….

The learner is able to cite example of…………

The learner is able to discriminate between…….and……

The learner is able to classify…………

The learner is able to interpret………

The leaner is able to verify…..

The learner is able to generalize…..

(3)   Application Objectives:

The learner is able to reason out………

The learner is able to formulate hypothesis for…….

The learner is able to establish hypothesis for………

The learner is able to infer about………

The learner is able to predict about………

(4)   Creativity Objectives:

The learner is able to analyze.

The learner is able to synthesize.

The learner is able to evaluate.

EXAMPLE OF WRITING OBJECTIVES BY USING RCEM APPROACH:

Subject   :   Computer Science

Topic   :   Output and Input Devices.

(1)   The learner is able to recall definition of output and input devices. (Knowledge)

(2)   (a)   The learner is able to discriminate between output and input devices. (understanding)

(b)   The learner is able to classify output and input device (understanding).

(3)   The learner is able to reason out why this device is output/input. (application)

(4)   The learner is able to evaluate output/input device and their types. (creativity)

ADVANTAGES OF RCEM APPROACH

(1)   **Specific and definite:**RCEM approach is more specific and definite than Robert Mager's or Robert Miller's approach.

(2)   **Emphasis on Learning Process:** This approach gives more importance to the learning

process than learning outcome. Thus it has shifted focus form product to process in writing objectives in behavioural terms.

(3)   **Based on Indian conditions:** RECM approach has been developed in and according to Indian conditions. Therefore, it seems to be most useful for writing objectives in behavioural terms in Indian context.

(4)   **Easy:** Writing objectives into behavioural terms is easy and useful. The learner no longer needs a long list of action verbs.

(5)   **Applicable for all three domains:** RCEM approach is applicable for all three domains namely cognitive, affective, and conative or psychomotor domain. Therefore all the educational and instructional objectives can be written in behavioural term in this system.

(6)   **No confusion and doubt:** RCEM approach does not leave any doubt and confusion in preparing criterion test items. The construction of test items is simple, convenient and objective.

(7)   **Applicable for all school teaching subjects:** The objectives all school teaching subjects can be conveniently written with the help of seventeen frames or statements proposed in this scheme by placing the elements of the content in blank space.

(8)   **List of mental processes:** This approach provides a list of seventeen mental processes or abilities associated with the instructional objectives. It explain human learning in terms of mental processes or abilities.

LIMITATIONS OF RCEM APPROACH (SYSTEM)

(1)   **Not suitable for certain objective and content areas:** The objectives concerning the development of skills, appreciation, interest and attitude in some of the subjects and content areas cannot be properly deals with this approach.

(2)   **Insufficient creative mental abilities:** In RCEM approach there are only three mental abilities in creativity objectives whereas Torrance& others have given five types of abilities in creativity domain.

(3)   **No balance:** The table of objectives clearly shows that there is no proper balance between the various mental abilities assigned to different categories. There are two mental abilities for knowledge objectives, seven for understanding objectives, five for application objective and three for creativities objectives.

(4)   **Difficulty in selecting mental process:** It is generally very difficult to select appropriate mental process for content element.

(5)   **Erroneous assumption:** The assumption that the human learning can be explained through the seventeen mental processes or abilities is erroneous. It is very difficult to explain each and every change in behaviour on account of learning or teaching through the framework of the seventeen statements provided in this approach. The list of the mental abilities cannot be too marrow as evident by the findings of Guilford who has extracted 120 mental abilities.

(6)   **Arbitrary Compiling:** The compiling of abilities within the categories seems to be quite subjective and arbitrary. It is not based on sufficient ground work.

(7)   **Not useful for cognitive objectives only:**The approach suits more to the cognitive objectives than the conative objectives. Use of a single design for cognitive, affective and conative

does not seem to be appropriate.

(8)   **No clear cut distinction:** In RCEM's approach no clear cut distinction is mode among objectives of cognitive, affective and psychomotor domain on the basis of behavioural objectives.

QUESTIONS

SHORT ANSWER TYPE QUESTIONS

(1)   Explain the difference between aims and objectives.

(2)   What are behavioural objectives?

(3)   Write the aims of computer science teaching.

(4)   Discuss the aims and objectives of teaching computer science in schools. (GNDU, 2016)

LONG ANSWER TYPE QUESTIONS

(1)   Explain the term "Writing objectives in behavioural term." What is Bloom taxonomy of cognitive domain? (GNDU, 2014)

(2)   Write the aims and objective of computer education in instructional and behavioral terms. (GNDU, 2013)

(3)   Discuss the aims and objective of computer science in behavioural terms.

(4)   Explain in detail Bloom Taxonomy of objectives.

(5)   What do you understand, by the term 'Taxonomy of educational objectives'. Discuss the cognitive domain of Bloom taxonomy. (GNDU, 2013)

CHAPTER 6
COMPUTER LABORATORY

Laboratory is a place which serves two-fold purposes. Firstly it provides safe and proper place for placing all the essential material and equipment concerning the learning activities in a subject. Secondly it gives proper facilities and opportunities for the essential practical work and lively learning experiences. In this way and lively learning experience. In this way laboratory provides a good platform for the integration of theory with practice in subject.

Computer laboratory is a place or room where computers are placed for students to conduct the practical on computer. In the computer laboratory, all those facilities are provided which are necessary for students to do practical. Practice makes a man perfect. Different apparatus and environment- is needed in the computer laboratory for the practice. In computer laboratory students gets both apparatus and environment, by which they can understand subject more deeply. So in each school, computer laboratory should be necessarily.

Laboratory method and other experimental methods can be introduced in the schools only through the establishment of a computer laboratory.

NEED AND IMPORTANCE OF COMPUTER LABORATORY

The Computer teacher has to make use of computer laboratory for doing practical and projects, running various programmes in different languages, running various programmes in different languages, displaying charts, models etc. To keep all computers and other material in a safe custody and for easy availability, it is necessary to have a separate room for computer subject. This separate room is called as computer laboratory. It creates the conducive environment for learning computer subject. Computer laboratory is needed for following purposes:

(1)   **Provide Safe and provide place:** Computer, laboratory provides safe, secure and proper place for placing all the essential costly equipment required for learning activities in computer subject.

(2)   **Developing Scientific attitude:** It helps in creating and promoting scientific attitude among the students.

(3)   **Saves Energy and time of students:** As everything is well arranged in a computer laboratory, students come and perform practice work without wasting time and energy.

(4)   **Creates self-discipline:** Students keep themselves busy in doing practical work according to their abilities, interest, need and capacity and proceed towards self-activity. Thus maintaining self-discipline.

(5)   **Developing abilities and skills of students:** Computer laboratory develop application abilities, problem solving ability and various skills like experimentation, observation etc.

(6)   **Use of various Teaching methods:** In computer subject various, teaching methods such as project method, CAI, WBI etc. are used. All these method require special room where each student can be provided with a computer and there may be face to face interaction between computer and pupil.

(7)   **Creating Interest for learning computers:** Well equipped, arranged laboratory. Creates interests in subjects in students for learning computer.

(8)   **Providing congenial Environment:** The arrangement and setting of equipment, sitting arrangements and overall environment of the laboratory provides congenial environment for performing the practical with concentration.

(9)   **Integration of theory and practice:** It provides a place for the integration of theory an practice.

(10)   **Hub for logical thinking:** Students have to write programmes, run programmes and develop software, for all this, they require a room where they can think logically. Thus computer laboratory is a hub for logical thinking.

(11)   **Effective and permanent knowledge:** The knowledge which a student gains by his own work is more clear, permanent and effective.

(12)   **Equity:** Everyone have equal access to the computers. Most labs are equipped with enough computers for each student to have a machine. This is both equitable and engaging for the students.

(13)   **Group work capability:** Having computer labs in the school is the capability to train at the same time. If there is a particular program or application which the teacher wants the students to learn and master, the whole class can be given instruction on it at the same time and work through the technological challenges in a supported group.

(14)   **Online Tools:** Many online tools can be used by teachers to make learning more fun, interesting, and easy to understand. Teachers can add flavor of any lesson, whether with additional pictures, and other educational tools. Classroom-oriented games can be found at sites such as class tools net and fun brain.

(15)   **Development of Interpersonal Skills:** Lab work or practical work carried out in pairs or small groups can help students to develop a wide range of basic team skills, effective valuable educational experience can be provided by learning with peers, supervisors, demonstrators and support staff.

(16)   **Developing sense of co-operation:** While working in computer laboratory, students develop a sense of cooperation and spirit of healthy competition.

(17)   **Satisfying the curiosity:** Computer laboratory helps in satisfying the curiosity of the students.

(18)   **Projects Completion:** The projects assigned to students can only be done in the computer laboratory.

(19)   **All time availability:** All time availability of the apparatuses are provide in computer laboratory. The students whenever need may go to laboratory and perform practical.

(20)   **Providing functional environment:** Functional environment provide by well-equipped computer lab. The physical equipment like computer, LCD projector, speaker, printers etc. provide

a work room for the pupils because activities and practical solution of the problem can be taken over there.

EQUIPMENTS HARDWARE & SOFTWARE IN COMPUTER LABORATORY

Computer Lab. is a room for practical. Computer Lab. should be properly and adequately equipped in order to give good practical experience to the students. There are a lot of equipment and material which can be placed in a computer Lab. For schools it is not possible to place all the equipment and materials in the computer laboratory due to economic problem. So the material is divided into two categories:

(a)   Essential Equipment

(b)   Desired Equipment

(A)   **Essential Equipment:** This category includes all hose equipment, material and resources which are necessary in the computer lab without which a computer lab cannot work. Computer laboratory includes both hardware and software. The essential equipment or materials of the computer laboratory are listed below:

(1)   **Infrastructure:** The first requirement for a computer laboratory is a availability of a well spaced room. It should have basic facilities like lightening, ventilation system. The power arrangement in the computer laboratory should be according to the total number of computers. The next in infrastructure is the availability of white boards, teacher table, dice, teacher chair and sufficient furniture for sitting of students. This may include stools and chairs etc. The computer laboratory room should have one or two almirahs.

(2)   **Computer system:** The next requirement for a computer laboratory is availability of sufficient number of computer systems. The number of computers depends upon the numbers of students who are going to use the lab because a single computer is desired for a single students. But this desired is not possible to have due to economic problems. So. at such situations two students may share a single situations two students may share a single computer in the computer lab. All the computer should be equipped with CDROM 8 / DVDROMs, UPS, Keyboard, mouse, speakers, monitor as minimum. In the computer lab there should be a separate computer for the computer education teacher.

(3)   **Projection Media:** The Computer laboratory should be equipped with proper projection media. A LCD projector is used as a projection media in the computer laboratory. It should be connected to teacher's computer and should be fixed properly so that no time should be wasted in order to start it. LCD projector should be always in ready position to use it.

(4)   **Software :** The another essential part of computer laboratory is the availability of all types of software to the students. The software list should be according to the curriculum of the students. The systems in the computer lab should have properly installed licensed versions of all the software which are needed for the students. The installers of all the software should be kept away from the reach of students under teacher's custody.

A few software which are almost required by all the classes are MS-Window, MS-Office, DOS, Anti Virus, Encyclopedias, etc. The other software which are according to curriculum may include

programming languages, multimedia software, designing software etc. should also be installed in the computer systems.

(5)   **Internet Facility:** Internet is the gateway of information to the outer world. Today Internet has become an essential for the teacher and the students. So a computer laboratory should not be considered as a complete computer laboratory without the availability of internet facility. A broadband connection is always preferred for the adequate speed of Internet.

(6)   **Networking:** All the computer systems should be properly networked to each other. This networking system should be attached to teacher's computer which should be properly wired and no wire should be left open in the computer laboratory.

(7)   **Teaching Aid material:** The computer lab should have adequate numbers of teaching aids which should be properly stored and displayed. This may include the charts, models, software packages, presentation etc.

(8)   **Computer library:** In the computer laboratory there, should be a small library for both teacher and students. The teacher may be able to have instant access to standard books and the students can also avail the facility of library books. The computer library should also be equipped with magazines related to the computer and computer world.

DESIRED EQUIPMENTS:

This category includes all those equipment which are not essential but the availability of those equipment is desired in order to have better functioning of education. They include:

(1)   **Bulletin Board:** A bulletin board should be placed in the computer laboratory at the appropriate place. This bulletin board can be used to display relevant cutting and pictures collected by the students. This board may also be used to display the latest information related to computer world.

(2)   **Collection corner:** A corner in the computer laboratory should be reserved for pictures, newspapers, journals, related to computer from where the students may have any kind of information whenever they desire.

(3)   **Cooling system:** A computer system generate heat, to prevent the computers from any unpredicted heat damage, it is always advised to have an air conditioning system installed in the computer laboratory. Today's modern computers do not require much cooling because they can work without any risk on normal tempering.

(4)   **Display Material:** A computer laboratory should have adequate display material in the form of pictures, diagrams. Thus may be displayed on the walls of the computer laboratory. As soon as a person enters in laboratory he should feel that he has entered into a learning room. This has a psychological effect on the learner. Thus they prepare themselves for learning.

(5)   **Separate server room:** If possible there should be separate server room. Otherwise,.one of the corner of the computer laboratory could be so arranged that it can serve as a server room.

(6)   **Setting Arrangement:** Seating arrangement should be done according to the arrangement of tables. Although tables are fixed yet chairs should be movable and easy to rearrange for a variety of purposes like teacher's lesson or group work.

DESIGN/ SETTING UP THE COMPUTER LABORATORY

For setting a computer laboratory, the quality and quantity of the equipment and material needed should be properly planned, procured and preserve.

(1)   **Planning:** Flexible planning of computer laboratory should be done. In its construction, computer engineer, architect and educationist all play an important role. Following points should be kept in mind while planning:

(i)   **Work Space:** The first step is to see available work space where students can work comfortably. Depending upon the building, type of school, number of students, computer laboratory can be set up on ground floor as well as on every floor. Due consideration should be given to ventilation, sunlight while setting a laboratory. The room should be facing north so that proper amount of sunlight and fresh air may be possible.

(ii)   **Equipment:** The list of equipment should be prepared after careful consultation of the prescribed syllabus of computer science. Equipmentinclude hardware as well as software.

(iii)   **Finance:** This is most important aspects of planning because without financial aid laboratory cannot be set up. So before ordering equipment provision of annual budget should be taken into account. Purchase should be on basis of priority. Depending upon budget, computer laboratory could be equipped with number of computer systems or with few computer systems that can serve the purpose.

(iv)   **Number of students:** Number of students studying computer subject or visiting computer laboratory also play important role in planning.

(v)   **Most frequently used software:** The list of most frequently used software should be made and consideration should be given to these software which number of students use.

(vi)   **Type of School:** Type of school (public or government), how frequently computer laboratory is used, interest and willingness of computer teacher etc. also affect the planning part.

(2)   **Designing:** After planning, next step is to prepare a rough sketch of the computer laboratory. It could be shape or shape, depending upon the space available.

(3)   **Furniture and Fitting:** As regards to furnishing and fittings of laboratory, it should be equipped is such a way as to provide for all types of class room activities like demonstration and laboratory work. Fixed type of tables may be kept along the walls lengthwise for the students. Wherever the computer system has to be placed on the table there must be provision for the cables and one detachable drawer for placing keyboard. One demonstration table for the teacher should be there. Tables, chairs, white board, projection screen, separate server room, channel railing, provision of air conditioner, shoe rack, bulletin board, should be in computer laboratory.

(4)   **Electric Supply:** Electric supply is provided at each working station (PC) from the table rather power cables should be plugged in at appropriate places. Sufficient attention should be paid to the position of switches in the laboratory. The position of switches should be under the table.

(5)   **Placing the Computers:** Next step is to place the computer along with key board and mouse at appropriate place where provision to attach UPS to individual system or more than two systems. If necessary software has been already installed, then computers are ready to use. It not whatever is the requirement of software, a teacher can install accordingly.

MANAGING A COMPUTER LABORATORY

A computer laboratory, in an educational institution is used by teachers as well as students. It is important to manage this computer laboratory together with IT professionals in order to assist students and teacher to perform different tasks with the use of Internet and computer.

(1)   In educational institutions, there are IT teachers or computer education teachers with enough knowledge on handling laptops and notebooks. PC. So they are the one who are In-charge in making sure that all the devices are properly take care off.

(2)   In an educational institution, websites that are not related to student learning are blocked and only professional IT can do this kind of complicated task.

(3)   Administrations not only need to have the solid technical knowledge and rich experience of fixing the breakdown, but also must grasp the certain management skills.

(4)   Computers are shared by the multiple users in the computer laboratory of an educational institution. Therefore, often there is security software installed in the computer laboratories. Software in a computer laboratory management system addresses day to day activities in a computer lab in an educational institution. These include user sing-in, wait listing, access control, maintenance, supervision, employee attendance tracking/reporting and license management.

(5)   Transactional data is collected and analyzed to support the operational and planning designs.

(6)   Due to high number of computers in a laboratory, many lab administrators choose to use remote administration software. Computer labs in schools often have classroom management software. This kind of software is installed to manage and control student's computer activity from the teacher's computer, to monitor or prevent web browsing and to remotely control student computers.

MAINTENANCE OF COMPUTER LABORATORY/ ESSENTIAL SAFETY MEASURES TO MAINTAIN COMPUTER EQUIPMENT

There are expensive and delicate equipment like hardware and software in a computer laboratory that have to be looked after properly. The following points should be kept in mind for the safety of the hardware and software.

(1)   **Safety of Hardware:** To protect the hardware, following precautions should be taken.

(i)   **Power Cables:** All the external wiring and power cable should not trail from the desk or table.

(ii)   **Protection from Dust:** Dust is the greatest enemy lf the computer. The best protection from dust is to cover the computer with a dust cover whenever the machine is not in use. The dust cover can be of plastic or cotton material.

(iii)   **Lock the Equipment:** Always keep the equipment under lock and key. This will avoid stealing of equipment and no one can damage the equipment.

(iv)   **Protection from liquid:** Liquid can also do harm to the hardware. So students are not allowed to take any liquid when they are working on computer in computer laboratory.

(2)   Safety of Software

(i)   **Copies of the program:** It is advisable to keep two copies of the program one is master copy and other copy can be used for the class. It somehow the program is lost or damaged, we can have another working copy form the master copy.

(ii)   **Use of Floppy:** Each working program should be on a separate floppy/CD. If the floppy/CD is damaged only one program is lost.

(iii)   **Use of Copyright Laws:** Plagiarizing is a deceptive act in which we steal someone else' software and pretends it as ours. This can be protected by copyright laws.

(iv)   **Use of antivirus utilities:** A Computer virus is a program or a set of programs that disrupts the normal functioning of a computer. To protect the computer from virus attack, antivirus utility software can be used that track the virus, eradicate it and prevent their spread.

(3)   **Safety Measures:** Computer laboratories should have various safety measures like safety from fire, electric short circuits.

(4)   **Presence of teachers:** Teacher should always be present in the laboratory when the students are working in the computer laboratory.

(5)   **Maintenance of discipline:** Proper discipline should be maintained so that the students should not create any mischief and nothing should harm to them and to the equipment.

(6)   **Awareness to Children:** Children should be made aware that computer is costly machine. It should be handled with care.

(7)   **Instructions to Students:** Beforehand, instructions should be given to the students about the functioning of the computer and rules to be followed in the computer laboratory.

Discipline in the Laboratory rules for the teachers and laboratory staff:

(1)   Teacher and the laboratory staff should not allow any student or person to enter the laboratory in their absence.

(2)   The teacher and laboratory staff themselves should produces self- example for the proper use and maintenance of the laboratory.

(3)   Teacher and laboratory staff should exercise proper control over the student working in the laboratory.

(4)   The seats of the students should be fixed. They should not be move here and there in the laboratory.

(5)   Full instruction about the conduct of the practical should be given to students before the beginning of the practical.

(6)   The teacher should have full knowledge of the practical items and requirements used by a student in his seat at the time of practical class.

(7)   All precautions to be adopted by the students during their practical should be told to the students.

(8)   The students should switch off electrical connections before leaving his place of work.

(9)   The work of the students should be under the strict control of the teacher.

(10)   The disciplinary rules and precautions to be adopted in laboratory should be exhibited.

RULES FOR THE STUDENTS IN THE LABORATORY

The students while working in the laboratory should be instructed to follow the following rules:

(1)   All computers must be handled with care.

(2)   No article should be taken outside the laboratory.

(3)   Use only those articles needed for the practical.

(4)   In case of problems, the teacher must be informed.

(5)   No haste should be done in performing practical.

(6)   Computers not in use should not be placed on the table.

(7)   Nothing should be left on the floor. If there is any obstruction it should be removed at once.

(8)   After the practical all computers must be cleaned and switched off.

(9)   In case of doubts, the teacher must be consulted.

(10)   Perfect discipline should be maintained and useless talking should be avoided whole performing practical.

REGISTERS IN COMPUTER SCIENCE LABORATORY

Following registers are generally maintained in Schools

(1)   **Stock Registers:** They are of three kinds:

(i)   **Register for Breakables:** In this register, first instance of all damageable (hardware) are entered in different categories. It may include mouse, printer, keyboard etc.

(ii)   **Register for non-breakables articles:** This contains details of items which are not liable to be consumed or broken, like software etc. Also, in this register one could enter the working and non-working models, the laboratory has, like charts, flex etc. certain other articles like pen drive etc. can be added in this register.

(iii) **Stock register for consumable items:** Consumable articles like CDs, DVDs etc. are entered in this register.

(2)   **Purchase Register:** The bills in full, of all article purchased must be entered with all the particulars such as:

•   Name of the firm.

•   Date on which the goods received.

•   Rate of each item.

- Number of articles purchased.
- Total cost of the articles.

(3) **Necessity Indicator Register:** The teacher should go on nothing down any system, article or other necessary items not in the stock but needed urgently for conducting experimentation in the laboratory. This is of great help in making annual demand and framing budget for laboratory expenditure at the end of each year.

(4) **Register for Computer Science Club:** Organization of computer science club in school is expected for organizing various activities, teacher needs different types of apparatus, equipment and material. So it is desirable to maintain a separate stock register in this, all the apparatus required for club science club can be entered. Entries of models, charts made in this register.

<div align="center">QUESTIONS</div>

SHORT ANSWER TYPE QUESTIONS
(1)   Discuss the need and importance of computer laboratory.
(2)   What are the rules of computer laboratory for the teachers and laboratory staff?
(3)   Describe the rules of computer laboratory for the students.

LONG ANSWER TYPE QUESTIONS
(1)   Define privacy and security. Discuss the planning of computer laboratory in a school.
(2)   What is the importance of computer laboratory? Draw a detailed plan of computer laboratories for a secondary school. (GNDU, 2014)
(3)   Discuss the essential equipments required for computer laboratory.
(4)   Plan and discuss a computer laboratory for high school. (GNDU, 2009)
(5)   What are the physical conditions and layout of a computer lab in an educational institute? Discuss the importance of computer lab. (GNDU, 2016)

CHAPTER 7
HARDWARE & SOFTWARE

Hardware and Software are mutually dependent. Both of them must work together in order to make computer produce some useful output. Software cannot be utilized without supporting hardware and the hardware without a set of programs to operate upon is useless. To get a particular job done on the computer, relevant software should be loaded into the hardware. Hardware is a onetime expense while software development is very expensive and is a continuing expense. Different software can be loaded on hardware to run the different jobs. Software acts as an interface between user and the hardware. It helps the user to interact with the particular hardware component.

HARDWARE

All the tangible components of the computer system are known as hardware. Tangible components which we can touch and can freely move from one place to another. In other words, Hardware refers to the physical devices of the computer system. Thus the various devices like monitor, floppy disk drive, keyboard, printer, RAM etc. constitute the hardware.

Input Devices: Input Devices are those devices from which we can input the data instructions into the computers. The data entered through the Input devices can be text, graphical image/symbol, audio, video etc. Various input devices are.

    (a)   Keyboard
    (b)   Mouse
    (c)   Joystick
    (d)   Light Pen
    (e)   Touch screen
    (f)   Track Ball
    (g)   Microphone
    (h)   Scanner
    (i)   Barcode Reader
    (j)   Capital character reader (OCR)
    (k)   Optical Mark reader (OMR)
    (l)   Magnetic Ink Character Recognition (MICR)
    (m)   Digital Cameras

Output Devices: The device that produce output result after processing of data values are called are output devices. We have different output devices for different types of outputs. Various output devices are as follows:

    (a)   Monitor
    (b)   Projector

     (c)   Speaker

     (d)   Printer

     (e)   Plotter

     (f)   Magnetic tape

Storage Devices: The programs, data and instructions entered in the computer system through the input device need to be stored in the computer system before processing starts. Also, the results produced during processing can either be intermediate on final results. Both of those results need to be stored in the computer system so that they can be provided to the other units connected to it when required. The results obtained and therefore stored in the storage unit. The storage unit has a fixed amount of memory space available in the various devices which constitutes the storage unit. Storage devices collectively provide a large amount of 'memory' space to store the instructions, data, the intermediate and the final results.

Memory: Memory is the storage area of computer where all the inputs are stored before processing and the output are stored after processing of inputs. Bits, Bytes are the units of memory. A 'Bit' is a binary represented by digit 0 or 1. A bit is the smallest unit of memory. The binary digits 0 and 1 represents the off-state and on state. The memory of a computer can be divided into two broad categories:

CENTRAL PROCESSING UNIT (CPU)

The central processing unit is also known as heart of a computer. It consists of primary storage, arithmetic, logic and control unit.

Control Unit: This unit selects, interprets and directs the execution of instructions. The control section of the CPU maintains order and directs the operation of the entire system. It does not process data but acts the central nervous system for the other data manipulating components of the computer. At the beginning of the processing, the first program instruction is selected and fed into the control section from the program storage area. There it is interpreted and then signals are sent to the other components to execute necessary instructions. Further program instruction are selected and executed one after the other until program is complete.

Arithmetic & Logic Unit (ALU): This is a place in computer where the actual execution of instructions takes place during process operations, to be more accurate all instructions are executed and all decision are made in ALU. The data and instructions stored in primary storage prior to processing are transferred as and when required. No processing takes place in primary storage. Results generated in the ALU are temporarily transferred back to primary storage until needed. After completion of processing the final results which were stored are released to an output device.

SOFTWARE

Computer software or just Software, is a collection of computer programs and related data that provide the instructions telling a computer what to do and how to do it. We can also say software refers to one or more computer programs and data held in the storage of the computers for some purposes.In other words, software is a set of programs, which is designed to perform a well-defined function. A program is a sequence of instructions written to solve a particular problem.

Software is an intangible component of the computer system. Intangible components mean those components or parts, which we can't touch physically. In other language, we can say that all those computer applications/programs which run behind the monitor screen, are known as software. Example: Microsoft window, MS-DOS, Notepad, Microsoft-Word, Window Media Player, Microsoft Excel etc.

The following points further highlight the meaning of software:

(1)   **Set of instructions:** Software is a set of instructions that directs the computer to process information that directs the computer to process information. These instructions are called programs.

(2)   **Special programs series:** Software is a series of special program to perform a particular task, stored in the computer's memory.

(3)   **Stored electronically:** Software is anything that can be stored electronically.

(4)   **Instructions for hardware:** Software provides instructions for the hardware to accomplish tasks.

(5)   **Non-touchable:** A person cannot touch software but can feel it.

(6)   **Like human mind:** Human mind tells the body to walk and run. In the same way, software tells the computer hardware what to do and how to do.

RELATIONSHIP BETWEEN HARDWARE AND SOFTWARE

Relationship between hardware and software can be understood by following points:

(1)   **Complementary:** Both hardware and software are essential for a computer to do useful job. Both are complementary to each other.

(2)   **Same hardware can be loaded with different software:** Same hardware can be loaded with different software to make a computer system perform different types of jobs.

(3)   **One time versus Continuing expense:** Expect for upgrades (like increasing the main memory and hard disk capacities, or adding speakers, modems etc.), hardware is normally a one-time expense, whereas software is a continuing expense. A person by new software to be run on the same hardware, as and when need arises or funds become available.

TYPES OF SOFTWARE

Software can be broadly classified into following three categories:

(i)   Application Software

(ii)   System Software

(iii)   Utility Software

(1)   **Application Software:** Application software is the software is designed to satisfy a particular need of a particular environment. These software are especially designed to solve the problems of one application field i.e. application software is used in one application field only.

The main features of application software are:

♦   Application software is designed by analyzing the environment and the need of the area of use.

♦   We cannot interchange the use of two-application software with each other.

♦   We cannot use application software for some other purposes expect the permitted one.

♦ Programmer design application software by using high level languages like C, C++, Java etc.

♦ The set of programs included in the application software packages are called the 'application programs' and the programmer who develop the application software are called the 'application software programmers' or 'application software developers.'

The application software can be broadly classified into following general categories

♦ Word processing software

♦ Spreadsheets

♦ Database management software

♦ Graphics, multimedia & presentation software

♦ Communication software.

(1) **Word Processing Software:** Word-processing is a term, which describes the use of hardware and software to create, edit, view, format, store, retrieve and print documents (written material, such as letters, reports, books etc.) . Word processing software typically contains features to make it easier for you to perform repetitive tasks. Some of the functions of word processing software include:

♦ Creating, editing, saving and printing documents.

♦ Copying, pasting, moving and deleting text within a document.

♦ Formatting text, such as font type, bolding, underlining or italicizing.

♦ Creating and editing tables.

♦ Inserting elements from other software, such as illustrations or photographs.

♦ Correcting spelling and grammar. Some commonly examples of word processor software is MS Word.

(2) **Spreadsheets:** A spreadsheets is an interactive computer application for organization, analysis and storage of data in tabular form. The program operates on data entered in cells of a table. Each cell may contain either numeric or text data, or the results of formulas that automatically calculate and display a value based on the contents of other cells. Spreadsheet users can adjust any stored value and observe the effects on calculated values.

Modern spreadsheet software can have multiple interacting sheets, and can display data either as text and numerals or in an graphical form. The most commonly used spreadsheet program is Microsoft Excel.

(3) **Database management software:** A database is defined as a collection of operational data to support multiple applications. By operational data, we meant that not only interrelated data is stored, also all possible relationship among the data are stored in the database. Further, the organization of data is independent of the programs and vice a versa i.e. organization of data can be changed without affecting the programs and programs can be modified without effecting the organization of data. Data in a database is structured in such a way so as to support future applications.

A database management system (DBMS) is a computer based record keeping system that contains information about an enterprise. The information maintained may be necessary to support day to day operations or in the decision making processes involved in the management

of an enterprise. A common and controlled modifying the existing data in the database, removing exciting data from the database, querying the database to answer users enquiring and generating reports of different kinds as desired by the management.Some of the most popular examples of DBMS software include Microsoft Access, Oracle, Microsoft SQL Server, MySQL and DB2.

(4) **Graphics, Multimedia and presentation software:** Graphics software refers to a program or collection of programs that enables a person to manipulated images or modes visually on the computer. These softwares enables us to use a computer system for creating, editing, viewing, storing, retrieving and printing designs, drawings, pictures, graphs and anything else that can be drawn in the traditional manner. Multimedia programs is images, sound, video, text, computer animation, multimedia authoring software is a software that crates multimedia. The presentation graphics application is another type of graphics software help user to create professional looking visual aids for the presentation.

(5) **Entertainment and Education Software:** Tutorials, games and simulations that are used to learn new software using simulation concepts are known as entertainment software. Small children can be taught by using such software and provide them with options where they can learn faster and learn by doing.

(6) **Communication Software:** Communication software is used to provide remote access to systems and exchange files and messages in text, audio and video formats between different computers and users. This includes terminal emulators, file transfer programs, chat and instant messaging programs, as well as similar functionality integrated within MUDs. The communication software is also called network, which is a group of connected computers through cables or wireless media. Novell Netware and LINUX are the examples of communication software.

System Software: System software, also known as system package, resides in the computer hardware. It is a collection of programs designed to operate, control and extend the processing capabilities of the computer itself. These programs do not solve specific problem. They are general programs written to assist human-beings in the use of computer system by performing tasks such as controlling all the operations required to move data into and out of a computer. It is specially designed for executing an application program. Software performs a variety of functions like file editing, storage management, resource accounting, I/O management, etc.

Main features of system software are:

♦ The main job of the system software is to act as an interface between the user and the computer. It makes the operation of a computer system more effective and efficient.

♦ It controls all the processing activities and make sure that the resources and the power of the computer are used in most efficient manner.

♦ System software checks the availability of different devices scan input devices that for input and sends output to output devices.

♦ System software converts the instructions from user understandable language to computer understandable language.

♦ System software keeps track of initialization of CPU time and memory by different running application.

The computer manufactures usually provide system software. The various types of computer require different types of system software programs in order to operate. The system can be broadly classified into the following categories:

(1)   Operating system

(2)   Translators

(3)   Computer languages

(1) **Operating System:** The operating system is a collection of programs that controls the operation of all the hardware components and various other resources in a computer system. A computer without an operating system is useless. It is also responsible for smooth and efficient operation of the computer. The operating system of the computer controls the CPU, Memory, I/O devices like keyboard, Mouse, Printers etc. To sum up, it acts as a resource manager, as it manages all the resources.The operating system acts as a controller of the programs. After loading the program in the memory, the operating system manages and controls the user's interaction with the I/O devices.

MAIN FUNCTIONS OF AN OPERATING SYSTEM

The main functions performed by most operating systems of today are as follows:

(1)   **Process Management:** The process management module of an OS takes care of the creation and deletion of processes, scheduling of various system resources to the different processes requesting them and providing mechanisms for synchronization and communication among processes.

(2)   **Memory Management:** It takes care of the allocation and deal location of memory space to the various programs in need of this resource.

(3)   **File Management:** File management model of OS takes care of file related activities such as organization, storing, retrieval, naming, sharing and protection of files.

(4)   **Security:** The security module of OS protects the resources and information of a computer system against destruction and unauthorized access.

(5)   **Command Interpretation:** The command interpretation module of OS takes care of interpreting user commands and directing the system resources to handle the requests. With this mode of interaction with the system, the user is usually not too concerned with the hardware details of the system.

(6)   **Error Detecting aids:** Production of dumps, traces, error messages and other debugging and error detecting aids.

(7)   **Job accounting:** Keeping track of time and resources used by various jobs and users.

TYPES OF OPERATING SYSTEMS:

(1)   Batch processing

(2)   Multi programming

(3)   Multi processing

(4)   Parallel processing

(5)   Online processing

(6)   Real time processing

COMPUTER LANGUAGES

Computer languages are of three types:

(1) Machine language

(2) Assembly language

(3) High level language.

(1) **Machine Language:** The machine language of a computer is normally written as strings of binary IS or OS. The circuitry of a computer is wired in a manner that it immediately recognizes the machine language instructions, and converts them into the electrical signals needed to execute them.

(2) **Assembly language:** Programming in machine languages is difficult and error prone. So assembly language programming, which was introduced in 1952, helped in overcoming the limitation of machine language programming. They use alphanumeric mnemonic codes such as ADD for add and SUB for subtraction etc. These alphanumeric mnemonics are translated into machine language by a computer program or translator known as assembler.

(3) **High level language:** Due to limitations of machine and assembly languages are often referred to as low-level programming languages. High level languages were designed to overcome the limitation of low level languages. Programs written in a high level language can be easily ported and executed on any computer by using translator software. High level language deal with high level coding, enabling the programmers to write instructions using English words and familiar mathematical symbols and expressions. Examples of high level languages are Fortran, COBOL, C, C++ etc.

Translators: A computer can directly execute only machine language programs, which use numbers for representing instructions and storage locations. Hence all the programs written in any other languages need to be translated to machine level prior to their execution. A translator is a computer program that performs the translation of a program written in a given programming language into a functionally equivalent program in a different ways computer language, without losing the functional or logical structure of the original code. The software are capable of translating a high level language program into a machine level program. Following are the different types of translator:

(1) **Interpreter:** An interpreter is a type of translator, which is used for translating programs written in high level languages into machine language. It takes one statement of a high level language program translates it into machine language instructions and then immediately executes the resulting machine language instructions. That is, in case of an interpreter, the translation and execution processes alternate for each statement encountered in the high-level language program.

(2) **Compilers:** A compiler is a translator program which translates a high level language program into its equivalent machine language program. A complier is so called, because it compiles a set of machine language instructions for every program instruction of a high level language. The complier program resides on the disk or any other mass storage media. When compiler is needed it is called by the computer and loaded into the RAM of the system. Since high level language instructions are macro instructions, the complier translated each high level language instruction

into a set of machine language instructions. Hence there is a one-to-many correspondence between the high level language instructions of a source program, and the machine language instruction of its equivalent object program.

(3)   **Assemblers:** An assembler of a computer system is a system software, supplied by the computer manufacturer, which translates an assembly language program into an equivalent machine language program of the computer. Since the assembler translates each assembly language instruction into an equivalent machine language instruction, there is one-to-one correspondence between the assembly language instructions of a source program and the machine language instructions of its equivalent object program.

SERVICE OR UTILITY SOFTWARE

The service or utility programs designed to help analyze, configure, optimize or maintain a computer. Service software help the user to take back up of data, scanning viruses, maintenance tools for the system, or retrieve the deleted files.

The service software has following types:

(1)   Screen Savers
(2)   Antivirus Utility
(3)   Data Compression
(4)   Disk Cleaners
(5)   Data Recovery Software
(6)   File Defragmentation
(7)   Disk Space Analyzers
(8)   File Manger
(9)   System Profilers.

(1)   **Screen Savers:** Screen Savers were desired to prevent phosphor burn-in on CRT and plasma with moving images or patterns when the computers is are not in use. Contemporary screensavers are used primarily for entertainment or security.

(2)   **Antivirus Utility:** A virus (Vital Information Resource Under Seize) is an infections stored in the boot sector area of the disk. An antivirus utility software track the virus, eradicate and prevent their spread.

(3)   **Backup Software:** Backup software makes copies off all information stored on a disk and restore either the entire disk (e.g. in an event of disk failure) or selected files (e.g. in an event of accidental deletion.)

(4)   **Data Compression:** Data compression utilities output a shorter stream or a smaller life when provided with a stream or file.

(5)   **Disk Cleaners:** Disk cleaners find files that are unnecessary to computer operation, or take up considerable amounts of space. Disk cleaner helps the user so decide what to delete when their hard disk is full.

(6)   **Data Recovery Software:** Data recovery software is required when user erase or delete a file from disk accidentally and then realize that file is still needed. The window operating systems use recycle bins to call back files that are mistakenly deleted by users.

(7)   **File Defragmentation:** A file defragmenter is a utility program that is used to defragment the files on the hard disk to speed up the working of the hard disk. It is now part of the windows 98 operating system.

(8)   **Disk Space Analyzers:** It provide a visualization of disk space usage by getting the size for each folder (including sub folders) & files in folder or drive. Showing the distribution of the used space.

(9)   **File Manger:** File manger provide a convenient method of performing routine data management, email recovery and management tasks, such as deleting, renaming, cataloging, uncataloging, moving, copying, merging, generating and modifying folders and data sets.

(10)   **System Profilers:** System profilers provide detailed information about the software installed and hardware attached to the computer.

QUESTIONS

SHORT ANSWER TYPE OF QUESTIONS

(1)   What is the relationship between Hardware and Software?

(2)   Write a short note on Application Software.

(3)   What is service or utility software.

(4)   Write a short not on System Software.

(5)   What are Output Devices.

(6)   Write a difference between Assembles and Compilers.

LONG ANSWER TYPE QUESTIONS

(1)   What is software and explain its types.

(2)   What is Hardware and explain its types.

(3)   How hardware and software works in computer processing.

(4)   What is an operating system? Discuss various types of computers on the basis of operating systems. (GNDU, 2016)

CHAPTER 8

COMPUTER NETWORK & INTERNET

Computer network is a group of computers linked together, so that can share information and resources. Internet is 'network of networks'. It can also be described as information highway. It is the world's largest network of computers. The network are related to academics, research, government and includes users of all types of profiles i.e. Corporate, individuals professionals, children, schools, institutions etc. It may be remembered that computer is not located at a single site, not controlled by any central authority. The ability to graphically access Internet-resources throughout the web is the primary reason for the primary reason for the phenomenal growth of the Internet.

In the early days, most people just used the Internet to search for information. Today's Internet is a constantly evolving tool that not only contains an amazing variety of information, but also provides new ways of accessing, interacting and connecting with people and content.

COMPUTER NETWORK

An arrangement consisting of two or more interconnected computers is called a computer network. A computer network is created when several computers are linked by data communication channels. Each computer in a network can have its own processing capabilities and can also share hardware, data files and programs.

In computer networks, networked computing devices exchange data with each other using a data link. The connections between nodes are establishing using establishing using either cable media or wireless media.

Computer networks support an enormous number of applications and services such as access to the World Wide Web, digital video, digital audio shared use of application and storage servers, printers and fax machines, and use of email and instant messaging applications as well as many others.

Characteristics of a Computer Network:

(1)   Share resources form one computer to another.

(2)   Create files and store them in one computer, access those files from the other computer (8) connected over the network.

(3) Connect a printer, scanner, or a fax machine to one computer within the network and let other computer of the network use the machine available over the network.

TYPES OF COMPUTER NETWORK

1.   Local Area Network (LAN)
2.   Metropolitan Area Network (MAN)
3.   Wide Area Network (WAN)

4.   Personal Area Network (PAN)
5.   Campus Area Network (CAN)
6.   Storage Area Network (SAN)
7.   System Area Network (SAN)
8.   Wireless Local Area Network (WLAN)

1.   Local Area Network (LAN): It is known as local area network. LAN consists of two or more computers directly linked within a small well-defined area such as a room, building or group of closely placed buildings, A LAN is very useful for sharing resources, such as data storage and printers. LAN can be built with relatively inexpensive hardware such as hubs, network adapters and Ethernet cables.

LANs are typically used for single sites where people need to share resources among themselves but not with the rest of the outside world. The smallest LAN may only use two computer's while larger LANs can accommodate thousands of computers. A LAN typically relies mostly on wired connections for increased speed and security, but wireless connections can also be part of a LAN high speed and relatively low cost are the defining characteristics of LANs.

2.   Metropolitan Area Network (MAN): A metropolitan area network, or MAN, consists of a computer network across an entire city, college campus or small region. A MAN is larger than a LAN, which is typically limited to a single building or site. Depending on the configuration, this type of network of network can cover an area from several miles to tens of miles. A MAN is often used to connect several LANs together to form a bigger network. When this type of network is specifically designed for a college campus it is sometimes referred to as a campus area network.

3.   Wide Area Network (WAN): A wide area network or WAN, occupies a very large area, such as an entire country or the entire world. A WAN can contain multiple smaller networks, such as LANs or MANs. WAN consists of two or more computers that are geographically dispersed, linked by communication facilities such as telephone system or microwave relays. This type of network is usually relays. This type of network is usually limited to be used by large corporations and government-agencies because of the high cost involved and building and maintaining them.

A WAN is a network that links separate geographical locations this network can be a public system or any of the various packet switched service provided by public telecommunication agencies. Transmission channels for WAN are generally of three types such as radio waves, microwaves and communication satellites. The hardware requirements are bridges, routers, gateways and standard interface.

The main difference between a WAN an A LAN is that a LAN is under the complete control of the owner whereas the WAN needs the involvement of another authority. LAN are capable of handling very high data transfer rates at low cost because of the small area covered.

4.   Personal Area Network (PAN): A personal area network or PAN is a computer network organized around an individual person within a single building. This could be inside a small office or residence. A typical PAN would include one or more computer, telephones, peripheral devices, video game consoles and other personal entertainment devices.

A PAN is a network that is used for communicating among computers and computer devices (includes telephones) in close proximity of around a few meters within a room. It can be used for

communicating between the devices themselves or for connecting to a larger network such as the internet, PAN's can be wired or wireless. The devices may or may not belong to the person in question. The reach of a PAN is typically a few meters.

5.   Campus Area Network (CAN): A network spanning multiple LAN's but smaller than a MAN, such as on a university or local business campus. Campus area network may link a variety of campus buildings. It is typically spread over a collection of buildings which are reasonably local to each other. It may have an internal Ethernet as well as capability of connecting to the Internet.

6.   Storage Area Network (SAN): Storage Area Networks connects servers to data storage devices through a technology like Fibre Channel. Fibre Channel is a system similar to Ethernet which handles high-performance disk storage for application on a number of professional networks.

7.   System Area Network (SAN): System Area Network is a relatively local network designed for high-speed interconnection in cluster environment (server to server), multiprocessing system (Processor to Processor) and SNAs (Storage Area Networks). Fibre channel is an example of SAN technology provides high speed switched environment in which any device on the network can connect with any other device and communicate over a dedicated high speed link

8.   WLAN (Wireless Local Area Network): WLAN is a network that links two or more devices using a wireless distribution method (often spread- spectrum) within a limited area such as home, school, computer laboratory or office building. This gives users the ability to move around within a local coverage area yet still be connected to the network. A WLAN can also provide a connection to the wider Internet.

INTERNET

Internet is an abbreviation for Inter work. It is a set computers network made up of large number of smaller network, which uses different protocols. It is a gift of information technology given to the present world. Everyone is very much anxious to know about it and its uses.

Internet is the world's largest computer network consisting of over three million computers tha support over thirty million users and in almost more than two hundred countries. It is a network of networks. It is a learning tool for a group of people with different educational background. By internet anyone can gain and enjoy instant access to the worlds most advanced research facilities and can hold video-conferences through the world.

MEANING OF INTERNET:

Internet can be defined as International network of computers i.e. it is that network which connects all the computers of the globe across international territories. It is the worlds largest computer network, the global network , the worldwide network of network, backbone and gateways, a window to the 'Information Superhighway' , scattered all over the world. It is the most complete and complex learning tool in the world. Through it we can find knowledge resources that allow us to study virtually and discipline imaginable. Not only that we can communicate quickly and effectively with others who are also interested in the same discipline.

SOME EXPERT VIEWS:

(1)   **Christian Crumlish's View:** In this book 'The internet' writer, Internet is the "World wide network of networks. The internet is a way for computers to communicate. It is not a place,

it's a way to get through to other computers."

(2) **Adrew S.Tanenbaum's View:** In his book 'Computer Network' Tanenbaum writer, "A collection of interconnected network is called an internetwork or just internet --. The Internet means a specific world wide internet that is widely used to connect universities, government offices, companies, and of late, private individuals."

(3) **Pearl Software's View:** Internet is a 'Worldwide network of computers. Several thousands of individual computer networks are inter connected to form the internet, internet provides electronic mail, telnet, file transfer services and enormous amount of information through various discussion groups and information retrieval facilities.

CONCLUSIONS :

In the light of various definitions the following conclusions can be drawn regarding the meaning of Internet.

(1) The internet is the world's largest network of computers. It is the most complete and complex learning tool in the world.

(2) A computer network is a group of computers linked together so that they can share information and resources.

(3) As the name implies, the internet is not a single network but rather a network of network.

WHO RUNS/ MAINTAINS THE INTERNET?

Internet is not governed by single individual/body/company/institution/organization or country. It is decentralized. It is not a single network but a network of networks. There is not single authoritative organization. Various volunteer organizations are responsible for different types of activities as stated below-

(1) **Internet Architecture Board (IAB):** IAB is responsible for approving standards and allocating resources. It has the responsibility of technical managing and directing the internet. It is responsible for standardizing the technology used to connect to, communicate with, and work within the internet.

(2) **Internet Engineering Task Force (IETE):** IETE responsible for discussing and investigating the operational and technical problems of internet.

(3) **Internet Networks Information Center (InterNIC):** The centre is responsible for providing registration services to internet community. It registers the Domain names and helps users to find information on the internet. The center is completely voluntary and its only goal is to promote global information exchange through the same technology used in the internet.

(4) **Expenses:** Primarily the internet was paid by those who use it. Internet as service providers began springing up. These companies pay the expensive linking costs, and then rent time of their systems to others who want access to internet. All of a sudden it was economically possible for anyone to join the internet.

(5) **Responsibility:** The people who established the network. Connections were responsible for their connection. There was no central authority or governing body who was responsible for the network as a whole. Instead, this community of individual networks was collectively responsible for the network.

(6)   **New Facilities:** New facilities are joining at a phenomenal rate, and many individual are joining internet through device provider or through familiar online services such as compu serve, Delphi, Prodigy and America online. While exact ratio of growth are impossible to determine because of the decentralized manner in which the network is managed, some educational internets put the growth at over million new uses a month.

(7)   Internet Society (ISOC)

(8)   Internet Engineering Steering Group (IESG)

(9)   Internet Research Task Force (IRTF)

(10)   World Wide Web Consortium (W3C)

(11)   Internet Corporation for Assigning names and numbers (ICANN)

TYPES OF INTERNET CONNECTIONS

In today's age, there are numerous ways to connect laptops, desktops, mobile phones, gaming consoles e-readers and tablets to the Internet. Some of the most widely used used internet connections are described below:

(1)   **Wireless:** Radio frequency bands are used in place of telephone or cable networks. One is the "always-on" connection that can be accessed from any location that fails within network coverage. Wireless connection are made possible through the use of modem, which picks up internet signals and send them to other devices.

(2)   **Mobile:** Many mobile phone and Smartphone provides offer voice plans with internet access. In this connection we plug a USB modem into our device and use mobile phone towers to access the internet.

(3)   **Hotspots:** Hotspots are sites that offer internet access over a wireless local area network by way of a router that then connects to an internet service provider. Hotspot utilize Wi-Fi technology, which allows electronic devices to connect to the internet or exchange data wirelessly through radio waves hotspot can be phone-based or free-standing, commercial or free to the public.

(4)   **Broadband:** This high-speed connections are provided through either cable or telephone companies. One of the fastest options available, broadband internet uses multiple data channels to send large quantities of information, broadband internet connections such as DSL and cable are considered high-bandwidth connections. Although many DSD connections can be considered broadband, not all broadband connections are DSL.In broadband we can make a phone call and be on the internet at the same time.

(5)   **Dial-Up:** Dial-up connection requires users to link phones line to the computer in order to access the internet. This particular type of connection-also referred to as analog-does not permit users to make or receive phone calls through their home phone service while using the internet.

(6)   **Digital Subscriber Line (DSL):** DSL uses existing wire copper telephone line connected to one's home so service is delivered at the same time as landline telephone service. Customs can still place calls while surfing the internet.

(7)   **Satellite:** In certain area where broadband connection is not offered, a satellite internet option may be available. Similar to wireless access, satellite connection utilizes a modem.

(8)   **Integrated Services Digital Network (ISDN):** ISDN allows users to send data, voice

and video content over digital telephone lines or standard telephone wires. The installation of an ISDN adapter is required at both ends of the transmission on the part of the user as well as the internet access provider.

FEATURES/ADVANTAGES/IMPORTANCE OF INTERNET:

(1)   **Source of Information:** Internet is a rich source of information, expertise and resources. It is an open no-participatory computer communication infrastructure that provides a wide range of information resources in almost all fields of knowledge. It is available to users round the clock. We can find information about-anything we can think of like news, music, sports, hobbies, entertainment, education, business, etc. Internet is considered as ocean of knowledge. It is a vast-encyclopedia containing the latest information of the old as well as the latest period.

We live in the information age, where knowledge is power. Internet is the cheapest and fastest means

(i)   of getting information

(ii)   of providing information

(iii)   of compiling information

(i)   **Getting information:** we can get information about people, products, organization, research data, electronic versions of the printed media etc. form the Internet. To make all of it more easily available to users, programmes such as the Gopher were developed to help present material in some logical fashion. The most recent and very successful attempt at presenting information over the internet is the World Wide Web (WWW).

(ii)   **Providing Information:** Most of what we want to provide could be considered global advertising. While that may sound somewhat commercial it is the best and most inexpensive way to let people know what you are, what you are doing/ have done and how; For an organization or institute, setting up a homepage is a good way to let the world know what its products and services are. In addition to advertising, the critical functions that relate to provision of information.

(a)   **Publishing:** Includes all text articles, reports, illustrated articles, abstracts, computer programs and demonstration.

(b)   **Extension:** Extension in which some of the delays associated with the printed media, may be reduced.

(c)   **Teaching:** Teaching in which the possibilities includes both distance learning and assistance for students.

(iii)   **Compiling Information:** It is possible to get specialized information from the web. For example, if we want to poll the readership for a magazine or conduct a survey to detect the pulse of a selected community, web provides you an opportunity. Using forms, e-mail. etc. You can conduct surveys discussion groups and list servers, where one can post a question and get it answered by hundreds of people who participate in these discussions.

(2)   **Employment Opportunities:** The internet provides the web of career (employment) opportunities. We can send our biodata to desired company/institutions where we wish employment on the internet. More and more companies are logging on the internet and many employment opportunities have been created.

(3)   **Business on the Internet:** Electronic commerce is the application of internet where all types of business functions like online ordering of items, making quotations, purchase orders, inventory and delivery tracking, payment of bills, exchange of business documents take place.

(4)   **Interactive Opportunities:** Instant and interactive communication is possible through internet. The internet offers a large variety in all types of information exchange namely interactive, on-line, off-line, one-to-one communication, one-to-many communications and so on. On-line is connected to the internet. Two-way or multi-channel information is possible on the internet. Internet provides the fastest, the cheapest and the reliable means of communication which includes the information sharing, retrieval and storage.

(5)   **On-line shopping:** Internet also provides the on-line shopping i.e. buying or selling on the internet. We can order goods and services on the internet such as computers, software's, books, vegetables, dress etc.

(6)   **Direct Contacts:** Direct contact between the customer and organization specially in the service industry have become possible direct reservation sale and purchase of shares, downloading of specific website regarding specific topics is easily available.

(7)   **Teacher's best weapon:** Internet is the teacher's best weapon in the crisis of student motivation. Internet provides arithmetic texts and contexts that serve to motivate students.

(8)   **Source of entertainment:** Internet also provides the wide range of entertainment like games, music and movies, etc. certain screen servers provide good quality music.

(9)   **Internet Services:** Internet services include (1) Internet Service Provider (ISP) (2) World Wide Web (WWW), (3) Web page (4) Hyper Text Markup Language (HTML) (5) Web Browser (6) Web Index (7) Search Engine (8) Web Browsing (Net Surfing) (9) Internet Protocol (IP) Address (10) Domain Name (11) E-mail (12) Uniform ResourceLocator (URL) (13) Internet Protocols including (i) Transmission Control Protocol (ii) File Transfer Protocol (FTP) (iii) Hypertext Transfer Protocol (HTTP) (iv) Telnet, Gopher (v) Wide Area Information Service (WAIS).

EDUCATIONAL USES OF INTERNET

Uses of internet in education are increasing day by day. In recent decades, many inventions have been made by the human being. Internet is one of them miracles done by us. There was a time when knowledge had to be searched a lot. But now the time has been changed. All the information and knowledge is just one click away from us. It doesn't matter whether we want to be scientist, a doctor, a businessman or lawyer, We just need to have good command on our work. And of course we can gain it through internet.

Teachers use the internet to supplement their lessons, and a number of prestigious universities have opened up free online lectures and courses to everyone. Widespread use of the internet has opened up a substantial amount of knowledge to a much broader range of people than ever before.

(1)   **Distance Learning:** As the cost of internet decreased, many universities are finding the ways to bring the benefits of classroom into a distance-learning setting. Distance teaching has been described as an industrialized form of education characterized by rationalization of process, division of labour and mass production. Internet facilities distance learning and distance teaching.

(2) **Web-based Teaching and Learning:** We-based teaching and learning call for a serious reconsideration of effectiveness, especially in the light of increased demand of education and opportunity for increased student motivation by new technologies is integrated with knowledge-based sites.

(3) **Independent Learning:** Internet provides opportunities for independent learning. Modern web-based learning and computing provides the means instruction is delivered to the students. Multi-media learning combined with CD-ROMs and workbooks attempt to explore the essential concepts of a course by using the full pedagogical power of the multimedia. Many websites have nice features such as interactive examples, animation, video, narrative and written text. These websites are designed to provide students with a 'self-help' learning resource to complement traditional text book.

(4) **Knowledge management and Content management:**The internet is affecting the twin disciplines of knowledge management and content management.

(i) **Knowledge management:** Knowledge management is the shinking process of converting information to useful knowledge.

(ii) **Content Management:** Content management is published information.

The author of a website must provide efficient content management and the visitor uses a web-site must have the mental ability for an effective knowledge management. The authors need to learn more about the contents alongside the usability of sites.

(5) **The Web-teacher:** The web-teacher who has properly learned his craft will have transferable skills and knowledge perfectly adaptable to emerging technology. The benefit of having transferable knowledge in such as valuable market place is readily apparent.

(6) **Rapid Development of on-line education:** Online education is developing too fast to track. It is predicted that there is a widespread shortage of qualified on-line teachers. However educational instructions can train and capitalize on the talent of their teachers who may have retired from traditional settings.

(7) **Moudling of abilities:** The high quality of the internet education process means the moudling of abilities to learn.

(8) **Interactivity:** On-line learning programmes offer interactivity, both in its level and mode. Interactivity enables learners and instructors to share ideas in a virtual classroom.

(9) **New Environment:** The rapid development of information, coupled with ability to exchange it more rapidly among more people than ever before is creating a new environment for education. Many universities are negotiating for their standing as the de facto source of scholarly knowledge in new environment.

Hundreds of universities of every sort have been putting some basic courses up on the web, using some pedestrian software. Students seem to think that they are okay. Community Colleges and regional universities that have slowly, organically moved into the online arena-doing their old job in a new way-have succeeded where the flashy business types and big-time private schools have not.

(10) **Study Research:** The internet contains a wealth of knowledge that is available instantly upon any search. Because of this, the internet has superseded libraries as a source for information

gathering and research. Many teachers will now ask students to visit specific websites to study forma home and online encyclopedias provide masses of knowledge on almost every topic imaginable. The variety much greater detail rather then being limited to whatever the teacher sends home.

(11) **Communication:** It used to be that students that forget work, missed a lecture or couldn't remember an assignment were out of luck until talking face to face with a teacher or a classmate. However, the internet allows instantaneous connection to your classmates and teachers. Improving communication between students and teacher allows teachers to assist students without having to greater efficiency when working on projects with their peers when everyone cannot attend or asking for classification when something is unclear.

Today the web-based course offering continuous to grow, however, much of the momentum has slowed and realizing the enormous costs of launching efficacious courses online. Programmes that are pedagogically sound but not fiscally so may not be endorsed by the administration because of financial strain to the organization. Conversely, the faculty whom it represents will not endorse programme that are fiscally sound but not pedagogically sound. The main approach is to develop or maintain programmes that are pedagogically and fiscally sound.

QUESTIONS

SHOT ANSWER TYPE QUESTIONS

(1)   Define LAN, MAN, WAN

(2)   Write a short note on Internet usage.

(3)   What is computer network and its characteristics.

(4)   Who runs and maintain internet?

(5)   Write a note on Networking? (GNDU, 2016)

LONG ANSWER TYPE QUESTIONS

(1)   What is Internet? Discuss the various types of Internet connections.

(2)   What is computer network? Explain in detail various types of networking.

(3)   What is a network? List and explain the merit and demerits of various types of networks. (GNDU, 2015)

(4)   Explain the educational uses of internet.

CHAPTER 9
C + +

C++ is an object oriented programming language that allows programmers to build large and complex applications in a useful and efficient way. It enables programmers to improve the quality of code produced, thus making reusable code easier to write. C++ is one of the universal language that is used by programmmers around the world. It is used for making real world applications. It is the key to increase productivity and improve reliability for making complex applications. It is flexible language that helps the programmer to write the bug free programs which are easier to maintain.

C++ is a strongly typed language developed by Bjarne Stroustrup in 1983 at Bell Laboratories. C++ is a hybrid language as it is possible to write programs in C++ in either C language style, Object Oriented style or both. It can be used for developing any kind of applications like interactive computer graphics, expert systems, simulation, databases, artificial intelligence, system program application and for making compliers. It can be used to write programs for MS-Windows, Linux, Macintosh, Unix etc.

CHARACTERISTICS OF C++ LANGUAGE

C++ is a popular and versatile language for developing large and complex applications. The following are the characteristics of C++ :

1.   C++ has a rich collection of standard class libraries, inbuilt functions and datatypes which helps in creating large and complex program very easily.

2.   C++ is an extension of C with object oriented features. It provides upward compatibility with C language as almost all the valid C programs are valid C++ programs.

3.   The programs written in C++ is well suited for modeling real world problems as close as possible to the users perspective.

4.   C++ provides a very efficient memory management technique. The various memory management operators available in C++ helps to save the memory and improves the efficiency of the program. These operators allocate and deallocate memory at run time. Some common memory management operators available in C++ are new, delete etc.

5.   In C++, complex data types called Abstract Data Types (ADT) can be created using classes.

6.   C++ is a portable language and programs made in it can be run on different machines.

7.   C++ compiler is easily available and it requires very less space for storage. It is very easy to load C++ compiler into your computer.

8.   Format free Input/Output statements in C++ helps the beginner to understand the Input/ Output operations very easily. For performing Input/Output operations in C++, there is no need for format specification as in case of C language.

109

9.   C++ is a flexible language . It is possible to define several functions with same name that perform different tasks. For example, the function abs () is used to calculate the absolute value of integer, float and long integer. Also, it supports declaration of variables anywhere within the program.

10.   C++ is a strongly typed language. The list of arguments of every function call are typed checked during compilation. If there is a typed mismatch between actual and formal arguments an implicit conversation is applied if possible. If an implicit type conversion is not possible or if the number of argument(s) is incorrect, a compile time error is occurred.

11.   C++ allow programmer to redefine the meaning of existing operators such as +,-,>. For example: The '+' operator can be used for adding two numbers as well as to concatenate two strings.

12.   It is easier to maintain C++ program as error can be easily located and rectified. It also provides a feature called exception handling to support error handling in your program.

13.   C++ programs can be easily extended as it is very easy to add new featuresinto the existing program.

14.   New program can be developed in lesser time as the existing code can be reused.

15.   The object oriented concepts like data hiding, encapsulation and data abstraction can easily be implemented using keywords class, private, public and protected.

16.   C++ provides a namespace control mechanism for restricting the scope of classes, functions and global objects.

STRUCTURE OF C++ PROGRAM

A program consists of different sections. Some of them are mandatory but some are optional. The optional section can be excluded from the program depending upon the requirement of the programmer.

♦   **Documentation Section** which includes the comments to tell the program's purpose. It improves the readability of the program.

♦   **Preprocessor Directives Section** includes preprocessor directives like # include, # define which is message to a C++ preprocessor.

♦   **Global Declaration Section** includes global variables which are visible throughout the program. In general, use of global variable should be avoided.

♦   **Class Section** describes information about classes present in the program

Class Declaration or Definition
Class function definition

Main Program Section from here the execution of program actually starts.

int main ()

        {

                (which include those variables that can be used in main program)

                (contains a set of statements that can be converted to machine language and

are executed in a given order)

    }

- **Subprogram Section** includes user-defined functions

Function 1
Function 2
Function n

CHARACTER SET

C++ uses the character set as building block to form the basic program elements such as variables, identifiers, escape sequences, constants, expressions etc. It consists of the uppercase and lowercase alphabets, digits, special characters and white spaces.

Alphabets: A, B, C,…   , Z

a,b,c,…............... z

Digits: 0,1,2,3,4,5,6,7,8,9

Special Symbols: * # ! & ( ) = { } [ ] ; " ' <> ? / ^ ~ \ |

All the members of the character set have different usage at different places.

TOKENS

Tokens are the various C++ program elements which are identified by the compiler. Tokens supported in C++ include keywords, variables, constants, operators etc.
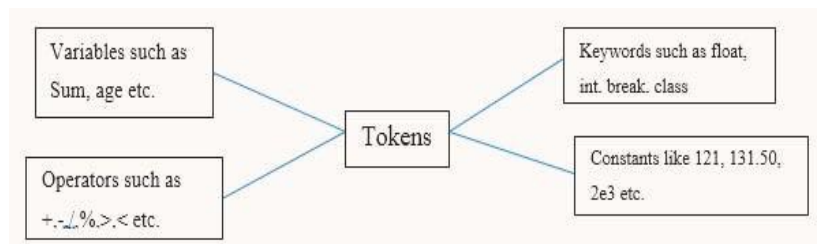
The complier scans the text in your source code and converts it into tokens during compilation. Now let us consider a program

    // Print Hello

    int main ()

        {

            Cout<< "Today I made My C++ Program";

            Return 0;

        }

The source code contains tokens such as int, main, (,), cout, <<, "Today I made My C++ Program", ;, return, 0, ; , }. The computer ignores the comment symbols // and the text that follows

it. Tokens are useful for complier to delete errors. When tokens are not arranged in a particular sequence, the complier generates error message.

KEYWORDS AND IDENTIFIERS

Keywords are reserved words that have standard predefined meaning in C++. In other words, keywords are the words whose meaning is already been defined in C++ compiler. We cannot use keywords as variable name. All C keywords are valid in C++. C++ also supports some additional keywords. Following are the list of keywords supported in C++.

auto	double	int	struct
break	else	long	switch
case	enum	register	typedef
char	extern	return	union
const	float	short	unsigned
continue	for	signed	void
default	goto	sizeof	volatile
do	if	static	while

<div align="center">C and C++ common keywords</div>

asm	private
catch	protected
class	public
delete	template
friend	this
inline	throw
new	try
operator	virtual

<div align="center">Additional C++ keywords</div>

The keywords are always written in lowercase. Since uppercase and lowercase characters are not equivalent, it is possible to use uppercase keyword as an identifiers but this is not normally done as it adds to confusion. So INT, IF, RETURN are not keywords but they are identifiers.

Identifiers are name given to various programming elements such as variables, functions, symbolic constants, arrays, classes etc. They may consist of an alphabet or an underscore (_) character. The first character must be an alphabet or an underscore(_). Both uppercase and lowercase alphabets can be used but both are distinct. The common usage favours the use of lowercase alphabets for most type of identifiers. An underscore (_) is normally used to link two words in long identifiers. Avoid identifiers that begin with underscore and double underscore because C++ compilers may use it for their own purposes internally.

Example: a, area, sum, temp, roll_number, el_al, C, INT are all valid identifiers whereas 5th, bal-account, "a", file manager are all invalid identifiers.

In the first example, the first character is digit which is against the rule which states that the first character should be a letter or an underscore.

In the second and third example, hypen(-) and double quotes ("") are illegal characters.

In the fourth example, we are having a blank space which is not allowed.

The maximum number of characters used in forming an identifiers must not exceed 31 characters to ensure portability. Some compilers allow the character length to be more than characters however only the first 31 characters are significant.

Since C++ is a case sensitive language, therefore the uppercase and lowercase characters are not equivalent. It is possible to use an uppercase keyword as an identifier but this is not normally done as it adds to confusion.

CONSTANTS

A constant is a value that doesn't change during the program execution. They are also called literals. Some of the examples of constants are 120, 4.557, 'B', 'amit' etc.

The constants can be classified as integer constants, floating point constants, character constants and string constants.
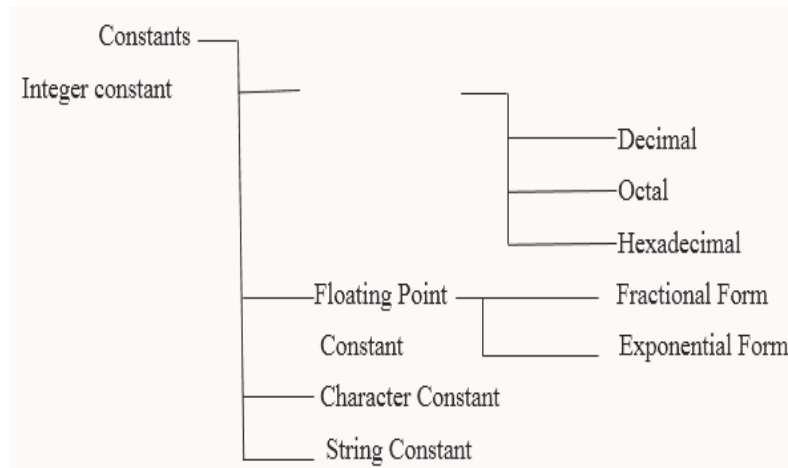
(i)   **Integer Constants:** An integer is a whole number without any decimal point. It consists of sequence of digits. An integer constant must lie within the range of integers. They can be written in three different number systems. Decimal (base 10), Octal (base 8), Hexadecimal (base 16).

(ii)   **Floating Point Constants:** Floating point constants contain decimal points or an exponent sign or both which distinguishes it from the Integer constant. It can be written in two forms Fractional and Exponential form.

    e.g. .76, -32.755, 2.3154e2 etc.

(iii) **Character Constant:** A character constant is enclosed in single quotes (' ') which includes alphabet, digit or a special symbol. Character constants are managed internally as integer values which can be determined using ASCII table.

e.g. : The character constant 'A' is internally represented as ASCII value 65 by the compiler.

Every character constant has a unique ASCII value.

(iv) **String constant:** A string constant is a collection of consecutive characters enclosed in double quotes (" "). The characters may include alphabets, number, escape sequence, blank space.

e.g. :"278", "Orange", "ankur" , " ", " the answer is := ", "121-11-67-0"

Here the " " represent an empty string.

VARIABLES

A variable is a symbolic name given to a location in the computer's memory where a value can be stored which can be used in the program. The value of a variable may change during the program execution but a given instance only one value can be stored in it. Every variable must have a name and data type associated with it.

If a, b, c are defined as three variables in a program, then

a= 20; will store the value 20 in the memory location named as a

b= 5; will store the value 5 in the memory location named as b

c= a-b; will retrieves the value stored in a and b and subtract b from a and result is stored in memory location named as c

a   b   c

| 20 | 5 | 15 | Representation in Memory

DATA TYPES

A variable in a program occupies some space in computer's memory where some value is stored. A value to be stored may be integer, floating point number, a character or a string etc. But now the question arises that how much memory is allocated to these values and what is the range of values that can be stored I it as different types of values don't occupy same space in memory. So, to store these values, we require different data types depending on the needs of the application. C++ supports different data types which are divided into three classes.

Keyword	Discription
char	Single character
short	Short integer number
int	Integer number
long	Long integer number
float	Floating point number
double	double precision floating point number
long double	Long double precision floating point number
unsigned char	char with no sign
unsigned int	int. with no sign
unsigned long	Long int. with no sign

OPERATORS

An operator is special symbol that specifies what operation is performed on one or more operands where an operand can be a variable, constant or expression. An operation is an action (s) performed on one or more operands that evaluates mathematical expressions or change the data.

In C + + the operator can be either unary, binary or ternary. If an operator operates on single operand then it is termed as an unary operator. If an operator operates on two operands, it is called binary operator. The operator that works with three operands is called ternary operator.

C + + provides a rich set of operators. Some of C + + operators are inherited from C language while many other new operators are introduced in it.

Operations inherited form C	Additional C + + operators
Arithmetic operators (+, -, *, / etc.)	Stream input/output operator >> , <<
Relational operators (<, >, <=, >= etc.)	Scope resolution operator (: :)
Logical operators (&&, || etc.)	Line feed operator (endl)
Bitwise operators (&, ^, | etc.)	Field width operator (setw)
Assignment operators (=, += etc.)	Memory Allocation operator (new)
Unary operators (++, --, - etc.)	Memory deallocation operator (delete)
Conditional operator (? :)	Pointer to member operator (. *, - > *)
	Pointer to member declarator(: : *)

OPERATORS IN C+ +

(1) **Arithmetic Operators:** Arithmetic operations are used for mathematical calculations. The arithmetic operators are binary operators that work on any built-in data types. There are five arithmetic operators available in C+ + which include addition (+), subtraction (-), multiplication (*), division (/) and modulus (%) operators. The modulus operator tells us what would the remainder after integer division performed on a particular expression. The rest of the operators have same meaning as they have in mathematics.

(2) **Relational Operators:** Relational operators are used to check relation between two operands. In other words, the operators used to make comparisons between two operands are called Relational operators. Relational operators are binary operators and hence require two operands. The result of a relational operation is a bool can value that can only be **true** (non-zero) or **false** (zero) according to the result of the comparison.

Following are the list of relational operators:

Operator symbol	Operation performed	Use	Result
<	Less than	expr1<expr2	True if expr1 is less than expr2 else false
<=	less than or equal to	expr1<=ecpr2	True if expr1 is less than or equal to expr2 else false

Operator symbol	Operation performed	Use	Result
>	Greater than	expr1>expr2	True if expr1 is greater than expr2 else false
>=	Greater than or equal to	expr1>=expr2	True if expr1 is greater than or equal to expr2 else false
= =	Equal to	expr1= =expr2	True if expr1 is equal to expr2 else false
! =	Not equal to	expr1!+expr2	True if expr1 is not equal to expr2 else false

Eg.if **i=2, f=3.5** and **c= 'w'** where **i** is integer type variable, **j** is a floating point type variable and **c** is a character type variable

So,   **(i + f) > + 5** Will give result true and return value 1.

f> 3   Will interpret it to be true and result is 1.

c > + 5* (i + f)   Will interpret it to be false and result is 0.

i = = 2   will interpret it to true.

Amongst the relational operators <, < =, >, >= fall in one precedence group and = =, != fall into another. The firs group has higher precedence over the second.

Also, The arithmetic operators have higher precedence over the relational operators.

(3)   **Logical operators:** Logical operators are used to combine one or more relational expressions that results in formation of complex expression known as logical expression. The logical operators evalue the result of logical expression in terms of Boolean values that can only be true (non-zero) or false (zero) according to the result of the logical expression.

Operator	**Operation performed**
&&	Logical AND
||	Logical OR
!	Logical NOT

The Logical AND (&&) operator evaluates to true only if both its operands evaluates to true.

The logical OR (\|\|) operator evaluates to true only if either of its operands evaluates to true.

The logical NOT (!) operator takes a single operand and evaluates to TRUE if the operand is False and evaluates to FALSE if the operand is TRUE.

(4)   **Assignment operators:** The assignment operator (=) is the most commonly used binary operator in C+ +. It evaluates the operand on right hand side and then assigns the resulting value to a valuable on the left hand side. The right operand can be a variable, constant, function call or expression. The general form of representing assignment operator is

Variable = expression / constant/ function call

e.g.

a= 3; // constant

x = y+ 10; // expression

In the first case, a constant value 3 is stored in the memory location allocated to variable. In the second case, the value of expression y + 10 is evaluated and then stored in memory allocated to variable x.

Assignment operator haw two type

(i)   Simple assignment operator

(ii)   Shorthand assignment operator

(5)   Conditional Operator (? :)

Conditional operator (? :) is the only ternary operator available in C+ + which operates on three operands. The conditional operator together with operands form a conditional expression which takes the following farm.

<div align="center">expr1?expr2:expr3</div>

Here expr1 is a test condition which is evaluated first. If it is true then expr2 is evaluated and this becomes the value of conditional expression, However if it is false then expr3 is evaluated and this becomes the value of conditional expression. The value of conditional expression can be assigned to another variable.

(6)   **Bitwise Operator:** C+ + provides an extensive bit manipulation operators for programmers who want to communicate directly with the hardware. These operators are used for testing bits or shifting them either right to **left** or left to right. Bitwise operators are used to manipulate the bits of integral operands such as **char, short, int**and **long** in both signed and unsigned form. It may not be applied to float and double. The unsigned integer are normally used with bitwise operators.

The bitwise operators are

Operator	Meaning
&	Bitwise AND
|	Bitwise OR
^	Bitwise Exclusive OR
~	Bitwise One's complement
<<	Shift left
>>	Shift right

The bitwise **AND (&),** bitwise **OR** (|) and bitwise **Exclusive OR (^)** are three logical bitwise operators, These are binary operators which compare the two operands bit by bit. The operands used must be of the same data type.

A	B	a & b	a | b	a^b
0	0	0	0	0
0	1	0	1	1
1	0	0	1	1
1	1	1	1	0

Here **a** and **b** are corresponding bits of two operands.

Bitwise AND (&) operator sets each bit in the result to **1** if corresponding bits in both operands is **1.** This operator is mostly used to check whether a particular bit of the operand is **1 (ON)** or **0 (OFF).** It is also used to set any bit of an operand to 0.

Bitwise OR (|) operator set each bits in the result to **1** if the corresponding bits in either or both of the operands is **1.** It is frequently used to put **1 (ON)** into a particular bit of an operand.

Bitwise Exclusive operator (^) sets each bit in the result to **1** if the corresponding bits in two operands are different. It is frequently used to set a bit to **1 (ON)** or **0 (OFF).**

Unary Operators

The operators that act upon a single operand to produce a new value are known as unary operators. Types of unary operators are:

(i)   Unary Minus (-)

(ii)   Increment operator(++) and decrement operator(- -)

(iii)   Sizeof operator

(iv)   Address operator (&) and pointer operator (*)

(v)   Cast operator (TYPE)

(vi)   Comma operator (,)

Unary Minus (-)

In this operator, a minus sign precedes an operand to negate its value. Here operand can by any integer or floating point value.

If   **a=10** then   **-a=-10**

and   **a=-10**   then   **-a=-(-10) = 10**

Thus unary minus (-) operator reverses the sign of an operand. The positive operand is changed to negative and vice versa.

Some examples are -

-85; -0.3; -(a +b);-4(x +y);

Increment operator (+ +) and decrement operator (- -)

In certain situations there is need to increase or decrease a variable by I continuously for some time. So, C + + provides an Increment operator (+ +) and a decrement operator (- -) to increase and decrease the value of the operand by I respectively. If **I** is a variable then + +**I** is equivalent to **i = i +I** which means that value of a variable is increased by **1**. Similarly, **I - -** is equivalent **i=i-1** which on execution decreases the value of variable by 1.

There are two way of representing increment and decrement operators.

(a)   as a prefix i.e. operator precedes the variable. Eg. + +**i ; - - j ;**

(b)   as a postfix i.e. operator follows the variable, Eg. **I - - ; f + + ;**

In case of prefix increment operator (**Eg. + + i),** the value of the variable will be first incremented first then incremented value will be used in the expression in which it appears.

In case of postfix increment operator **(Eg. I + +),** the current value of the variable is used in the expression in which it appears and then its value is incremented by 1.

In order to understand the difference between prefix and postfix increment operator, let us consider an example. Suppose an integer variable **I** holds a value **10**, then on executing statement.

j = I + + ;

results in **j = 10** and **I = 11.** Since, it is a postfix increment operator so value of i(10) is first assigned to j and then it is incremented by 1 (i.e. 10+1 = 11). so the above statement is equivalent

to following two statements executed one after the other.

$$j = i++; \quad \Longrightarrow \quad \begin{array}{l} j = i; (10) \\ i = i+1; (11) \end{array}$$

If instead of the above statement, we have a statement $j = + + i$; then it result in **j=11** and **I = 11.** Since, it is a prefix increment operator so value of I is first incremented by 1 (i.e. 10+1+11) and then it is assigned to j (11), so the statement $j = + + I$ is equivalent to

$$j = ++i; \quad \Longrightarrow \quad \begin{array}{l} i = i+1; (11) \\ j = i; \quad (11) \end{array}$$
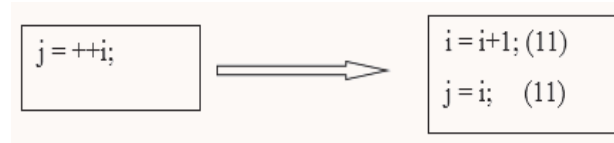
In the similar way, the postfix and the prefix decrement operator works. The only difference is that the value of the variable is decremented by 1.

sizeof OPERATOR

A **sizeof**operator is a unary operator that returns the number of bytes required to store a variable or a data type. This operator always precedes its operand. Here operand may be a variable name or basic or user defined data type etc. The syntax of using size of operator is

sizeof (data_type or variable)

Let us consider the variables **a, b, c** of **int, float, double**data types respectively.

sizeof (a) ;   //   return 2
sizeof (b) ; //   return 4
sizeof (c) ;   //   return 8
sizeof (int) ;//   returns 2
sizeof (float) ;   //   returns 4

Thus, **sizeof**operator tells us the number of bytes occupied by a variable or its data type. This operator is very useful when transferring a program from one computer to another as number of bytes allocated to various data types may vary from computer to computer having different

C+ + Streams:

C + + provides a new technique for handling I/O operations through a mechanism known as streams. A stream refers to the flow of data. The flow of data in a stream may be from an Input device (Keyboard, disk file etc.) to a program in main memory or from a program to any output device (monitor, printer etc.) Streams can be classified in two category:

(1)   Output stream
(2)   Input stream

Output Using Cout

The cout is used to display a variable, constant or expression onto the standard output device i.e. monitor.
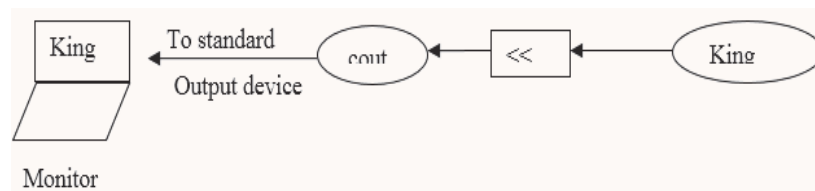
In C + +, the standard output stream is represented using pre-defined object **cout**(see-out), so as to perform standard output operation. The cout stream is used in conjunction with bitwise left shift operator (<<) for performing standard output operations.

The syntax for the standard output stream operation is

predefined object Insertion or put to operator

     Cout   <<   data   ;   //Data flow in the direction of arrow

Where **data** can be a variable, expression, user-defined datatypes or a constant. In the cout statement, **cout**is followed by the insertion or put to operator (<<) and then followed with data items which are to be displayed. The operator (<<) is called the insertion or **put to** operator as it inserts the data that follows it into the **cout**stream which further directs the contents to the display screen.

The whole process of outputting using cout is shown below

Monitor

Input using CIN

The cin is used to input a number, a character or a string of characters form a standard Input device i.e. keyboard.

The standard input stream in C + + is represented using pre-defined object **cin**(see-in) so as to perform standard input operations. The cin stream is used in conjunction with bitwise right shift operator (>>) for performing standard input operations.

One syntax for the standard input stream operation is

Predefined object Extraction or get from operator

     cin   >> variable ; // Data flow in the direction of arrow

Where **variable** can be of any basic or user defined data type. In the cin statement, **cin**is followed by the extraction or get from operator (>>) and then followed with variable into which the input data is to be stored. The operator (>>) is called extraction or get form operator as it extracts the data from standard input stream **cin**connected to standard input device (keyboard) and sends the data into the variable that follows it.

The whole process of inputting using cin is shown below:

Keyboard
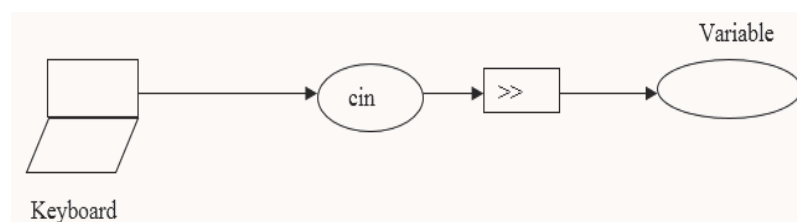
DECISION CONTROL STATEMENTS

The decision control statement alter the normal sequential execution of the statements of the program depending upon the test condition to be carried out at a particular point in the program. The decision to be taken regarding where the control should transfer depends upon the outcome of test condition. The following are the decision control statements supported by C + +.

(a)   if statement   (b)   if-else statement

(c)   switch statement   (d)   goto statement

if, if-else statements are bidirectional conditional control statement, **switch** statement is a add directional control statement and **goto** statement is an unconditional control statement.

if STATEMENT

The **if**statement is the most simple and powerful decision control statement which is used of control the sequence of execution of statement. It is used to execute a statement or block of statement only if the condition is TRUE. The general form is

```
if (condition)
{
        statement (s) ;
}
```

if-else STATEMENT

In case of **if** statement, the block of statement are executed only when the condition is **TRUE** otherwise the control is transferred to the next statement following the **if** block, But if some specific statements are to be executed in both the cases (either condition is TRUE or FALSE) then **if-else** statement is used.

The **if-else** statement allows the programmer to execute a block of statements following the **If** keyword when the condition is **TRUE** and execute a different block of statements following the else keyword when condition is **FALSE.**

The **if** statement consists of keyword **if** followed by a statement or a block of statements,.then a keyword **else** by another statement or a block or statements.

```
if (condition)
{
        statement 1;
        statement 2;
}
else
{
        statement 3;
        statement 4;
}
```

NESTED if-else STATEMENT

In the **if-else** statement, the body of **if** block and **else** block consists of a set of statement(s). It is also possible that an entire **if-else** statement can occur either within the body of if statement or/

and in the body of **else** statement. This is known as **Nested if-else** statement.

The different way for representing **nested if-else** statements are

if (condition1)	if (condition1)	if (condition1)
{	{	statement1;
if (condition2)	if(condition2)	else
statement1;	statemet1;	{
else	else	if (condition2)
statement2;	statement2;	statement2;
}	}	else
else	else	statement3;
statement 3;	{	}
	if (condition3)	
	statement3;	
	else	
	statement4;	
	}	

In the above representations, we observe that nested **if-else** statement is used when a problem involves multiple test conditions and different actions are taken depending upon the test conditions.

LOOP

There may be a situation, when you need to execute a block of code several number of times. In general statements are executed sequentially ; the first statement in a function is executed first, followed by second and so on.

Programming language provide various control structures that allow for more complicated execution paths.

A Loop structure allows us to execute a statement or group of statement multiple times and following is the general form of a loop statement in most of the programming languages:

C + + programming language provides the following types of loop to handle looping requirements.

Loop Type	Details
While Loop	Repeats a statement or group of statements while a given condition is true. It tests the condition before executing the loop body.
for Loop	Execute a sequence of statements multiple times and abbreviates the code that manages the loop variable.
do-while Loop	Like a while statement, except that it tests the condition at the end of the loop body.
Nested Loop	you can use one or more loop inside any another while, for or do…..while Loop

(1)   **While Loop:** The while Loop is used to carry out looking operations. It is mostly used

in those cases where the programmer doesn't know in advance how many times a loop will be executed. The general form of writing while Loop is:

while (condition)	While (condition)
statement ;	&
(A) For single statement	statement 1 ;
	statement 2 ;
	.
	:
	}
	(J) For multiple statement

DO-WHILE LOOP

The **do-while** loop is similar to the **while** loop except that its test condition is evaluated at the end of the loop instead at the beginning as in the case of **while** loop. So in case of **do-while,** the body of the loop always executed atleast onceeven if the test condition evaluates to false during the first iteration (pass). If the test-condition evaluates to TRUE, the body of the loop is executed and its keeps on executing until the test condition is FALSE and then control transfer to the next executable statement following the **do-while** loop.

The general form of using **do-while** loop

do

{

   statement ;

   statement ;

} while (condition) ;

statement ;

for Loop

It is used in those situations when the programmer known in advance the number of times a statements will be executed. It contains the information about a loop control elements all at one place while in other loops they are scattered over the program and are difficult to understand.

The syntax of for Loop is

for (initialization; condition; increment/ decrement)

{

   statement (s) ;

}

Nested for Loop: We can have a for loop in the body of other for loop. There is no restriction on the level of nesting of loop but one should take care while nesting levels otherwise unexpected results may arise.

APPLICATION OF LOOPS

The **while** and **do-while** loops are advisable to be used where the number of iterations and not known in advance and **for** loop is normally used when the number of iterations are known is

advance.

The **While** loop is useful in locating the end of word, sentence, line, counting blanks and finding the end of file when reading the disk file.

The **do-while** loop is used where the set of statements are to be performed atleast once. This loop is very useful in data validation where the user is prompted to enter information from the keyboard again and again until he enters the required data.

A great degree of flexibility can be provided using **for** loop because multiple initialization as well as increment/decrement expressions can occur in for loop.

THE BREAK STATEMENT

The **break** statement terminates the execution of the loop in which it is defined and the control is transferred immediately to the next executable statement after the loop. The break statement is normally used with while, do-while, for or a switch statement. It is mostly used to execution early form the loop by skipping the remaining statements of loop or switch control structures. It is simply written as

break ;

THE continue STATEMENT

Like the break statement, the continue statement also skips the remaining statements of the body of the loop where it is defined but instead of terminating the loop, the control is transferred to the beginning of the loop for next iteration. The loop continues until the test condition of the loop becomes false.

The continue statement when used in the **While** and **do-while** loops caused the test condition to be evaluated immediately after it. But in case of **for** loop, the increment/decrement expression evaluates immediately after the continue statement and then the test condition is evaluated.

It is simply written as   **continue ;**

The Switch Statement

The switch statement is a multi-way decision making statement which selects one of several alternatives based on the value of single variable or expression. The switch statement is mainly used to replace multiple if-else-if statement. The if-else-if statement causes performance degradation as several conditions need to be evaluated before a particular condition is satisfied.

Its syntax is

```
switch (expression)
{
case   constant1    :        statement (s) ; [break    ;]
case   constant2    :        statement (s) ; [break    ;]
…………………………………………………………………
case  constant      :        statement (s) ; [break    ;]
default      :        statement (s)
}
```

FUNCTIONS

A function is a self contained block of statements that performs a specific task. A function groups a number of repeated statements of a program into a single unit and is identified by a name known as a function name. A programmer can invoke a function at different places in a program whenever it is needed instead of writing the same set of instructions again and again. For example: We might use the factorial of a number at different places in the program.

In this program, the same set of instructions for calculating factorial or a number are placed in a function **fact** ( ). This function is then called from the **main ( )** program at different place whenever factorial of a number is to be calculated for different values. Thus instead of writing the same set of instructions again and again, we just write these set of instructions only once in a function fact( ) and call it whenever required. Thus, it reduces the overall size of the program, avoids repetitions and makes the program designing easier and faster.

ADVANTAGES OF FUNCTIONS

The following are the advantages of functions:

(1)   Functions support modular programming in which a large program is divided into smaller self contained parts, each of which has a unique identifiable purpose. This helps in making the program easier to write, understand, debug and maintain.

(2)   Functions result in reducing the overall size of the program as repetitive set of instructions are written only once in the function. Thus instead of writing, debugging and compiling the same set of instructions again and again, the same code can be reused.

(3)   Designing large and complex programs become very easy and fast using functions. This is because different persons can be involved in making different functions which can be later combined to make the complete program. Thus it results in reduction of time and cost.

(4)   Different data sets can be transferred to the function each time it is invoked, thus it helps to save a lot of memory space by allowing same set of statements to be used for different sets of data.

(5)   The use of functions enable the programmer to build a customized library of frequently used functions known as library file which can be accessed by different programmers. This results in reducing the cost of writing, debugging, testing and size of a program.

(6)   Functions promote portability since functions written are independent of system dependent features.

(7)   In C + +, a function can call itself again, this is known as recursion. Using recursion many calculations can be done very easily. For example, calculating factorial of a number using recursion.

Classification of Functions

Functions can broadly be classified in two categories:

(a)   Library Functions or In-built functions

(b)   User defined functions

LIBRARY FUNCTIONS

There are certain set of general purpose operations which are quite frequently used by many programmes in their programs. For example- To calculate the square root of a number, to calculate power of a number an many more. Making functions for performing these operations in every program is an unnecessary and a time consuming job. So, these general purpose operation are programmed and stored in C + + library so that they can be called through any program in the form of functions. These functions are called library functions or built-in functions.

The library functions are predefined and precompiled functions which are designed to perform some specific tasks. Before using library functions in the program, it is necessary to include corresponding header files using **#include** directive. The header files contain the information (function prototypes) about library functions and the actual coding (function definitions) is available in that library can be invoked in the program.

User defined functions:

Functions which are defined specifically by the user to meet his requirements are called user-defined functions. Every C + + program contains atleast one function. The function which is present in every C + + program is main ( ) which is a user defined function. This is the function from where the program's execution begins. The library functions and user defined functions are normally used in the main ( ) function.

Every function in C + + consists of following components.

(a)   Function definition
(b)   Function declaration or function prototype
(c)   Function call

QUESTIONS

SHORT ANSWER TYPE QUESTIONS

(1)   What do you mean by OOP?
(2)   What is the difference between conventional programming approach and objects oriented programming approach.
(3)   What are functions in C + +?
(4)   Explain Loop in C + +?
(5)   Explain the advantages of Functions in C + +.
(6)   What are constants and variables in C + +?
(7)   Describe relational operator.

LONG ANSWER TYPE QUESTIONS

(1)   What is OOP and describe the basic components of OOPs.
(2)   What are function in C + + and explain types of functions and advantages of function in C + +.
(3)   Explain in detail Loop statement and decision control statements.
(4)   What is operator in C + + and discuss all its types in detail.

CHAPTER 10
MS-WORD / WORD PROCESSOR

MS-WORD

Microsoft word is a powerful word processing program that you can use to create a letters, memos, resumes, envelops, labels and other project reports. MS-Word allows you to easily combine texts, spreadsheets, and graphics into a single application. It can also use Word to create your Web Pages. MS-Word is a collection of menus, toolbar and buttons. Microsoft Word is a member of Microsoft Office. It provides various formatting facility to make an attractive document. It also provide auto correct facilities that checks the spelling and grammatical mistakes in the document. It facilitates inserting and using objects.

MS-Word file is saved with the extension of **.Doc**

FEATURES OF MS-WORD

1. **Modify:** Word processor provides the facility to modify the data. One part of the text you can move from one location to another location with the help of the option.
2. **Print preview & Printing:** Print preview gives you the view that will appears the hard copy paper when printed. It also shows you all the exact positions and margins. In Word-Processor you can also take the printout of your documents with various options like page range, number of copies etc.
3. **Search and Replace:** Moving directly to specified words of parts of words without a document and replacing them with different words or word portions.
4. **Headers and Footers:** Headers and Footer is used for creating standard balance of text that will automatically appear at the top or bottom of each page on the document.
5. **Treasures:** This feature of word processor providing inbuilt dictionary. We can use this dictionary like a original dictionary.
6. **Automobile Spelling Checker:** This software can automatically check the spelling and grammar. Suppose you can type the data in this software but by mistake you type a wrong sentence then it gives red underline in a wrong sentenced Green line show for grammatical mistake.
7. **Styles:** Different types of font style and size of the font are available. According to own requirement you can also use Bold, Italic, underline and Double underline the text.
8. **Protect Document:** With the help of this software you can protect your document. No body can change your document.

COMPONENTS OF WORD DOCUMENT

Microsoft word provides graphical user interface (GUI) environment, which is user friendly and easy to understand. The following components are shown on the screen:

1.   Title bar: Title bar shows the name of the current document with MS-Word icon and situated on the left hand side of the document window. On the right hand side three buttons are present: Minimize, Restore Down, Close.

FIGURE 221. Restore button

Minimize Button: Click this button to shrink the current window.

Maximize Button: Click this button to enlarge the window to fill the entire screen.

Restore Button: This button only appears when a window is maximized.

Click it to restore the maximized window to its original size.

Close Button: This button closes the current window.

2.   Menu bar: Menu Bar contains the various commands under the various topics to perform some special tasks. It is located below the title bar.

3.   Tool Bars: A toolbar is a group of graphical shortcut buttons for executing menu options/commands in easier and faster way. Normally they show below the Menu bar but yo can be placed anywhere. Some important toolbars are:

(a)   Standard Tool Bar: This tool bar consists of regularly used commands like creating a new document; Open a document, such as printing and saving your document.

(b)   Formatting Tool Bar: This tool bar is basically used for formatting the document like changing the font face, font styles, font size of text; you can also change alignment of paragraph.

(c)   Drawing Tool Bar: This tool bar consists of Clip Arts, Word Art, Basic Shapes, Lines and Shades etc.

4.   Work Area: It is a working area in a word file.

5.   Ruler bar: It shows the measurement of the document page and provides margins, tabs and indents for the document text.

6.   Scrollbars: There are two types of scrollbars – Horizontal and vertical. These are used to scroll over the document page in the left, right, up and down.

7.   Status Bar: It shows the current status of the current document file. It also displays the information likes current section or page number, total number of pages, current line or number etc.

DIFFERENT VIEWS OF WORD DOCUMENT

In MS-Word you can work with a document in several ways depending on the requirement. You can choose different layout styles from View Menu. MS-Word provides the following options to view a document in different styles:-

1.   Normal: In Normal View you can view only the Horizontal ruler. It does not display the

margin areas of the page and you cannot see the headers and footers. To view your document in Normal Click View Select Normal.

2. **Web Layout:** In Web Layout you can also view Horizontal ruler. There is no page break displayed on the page in the web layout view. The whole document looks as if it were a single page. To view your document in Web Layout Click View select Web Layout.

3. **Print Layout:** In Print Layout view you can see both horizontal as well as vertical ruler. It also shows the top, bottom, left and right margins as well as the text you have typed in the header or the footer section. To view your document in Print Layout Click View Select Print Layout.

4. **Outline:** In Outline view you cannot see horizontal or vertical ruler bar. In this view, there is an additional toolbar that enables you to open and close headings to reveal more or less detail and to promote or demote headings to change their position in the outline hierarchy. To view your document in Outline Click the Outline in View Menu.

5. **Full Screen:** In Full Screen view title bar, menu bar, toolbar, format bar in the MS-Word window are temporarily hidden and your document enlarges to cover the entire desktop. To view your document in Full Screen Click the Full Screen in View Menu.

6. **Document Map:** In Document Map window divides into two parts – document pane and document text. In documents pane all the headings and subheadings will appear. You can click on a heading to more immediately to that section of your document. Document text will appear the document text window.

7. **Header and Footer:** In MS-Word you can design attractive page layouts with suitable header and footers. This header and footers can contain page numbers, date time and other relevant information regarding the document. This can be done easily with the use of header and footers feature Headers are positioned at the top of the page and footers are placed at the bottom of the page.

(i)   Click on View Menu Header and Footer

(ii)   When you are finished adding headers and footer, click the Close Button on the toolbar.

CREATING NEW DOCUMENT / OPENING / SAVING / CLOSING

1.   Click File Menu

2.   Click New Option

3.   Select the Blank Document
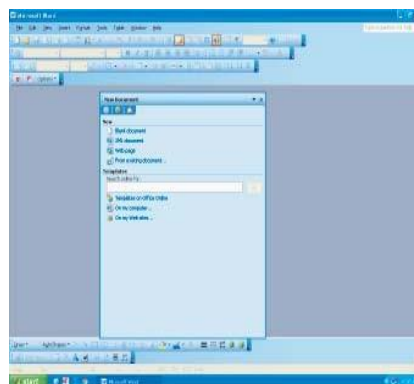
4.   A blank document will appear with the cursor positioned at starting point, from where you can start typing your text.
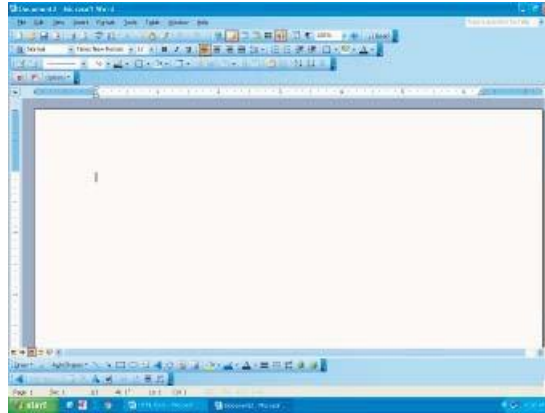
Opening a document:
1.   Click File Menu
2.   Click Open Option
3.   Then the Open dialog box will appear
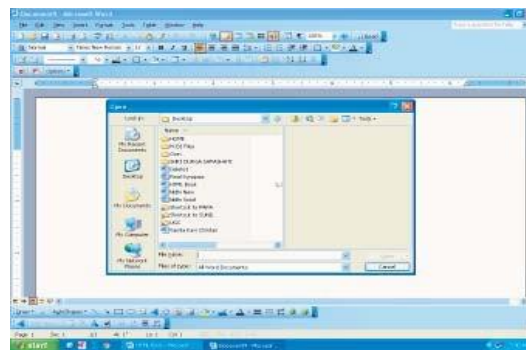
Saving a document:
1.   Click File Menu
2.   Click Save

With the help of saving command you can save modified data. If you are saving your document first times then it prompts to name the document. You can also save your current document with another name. Press File Menu? Save As.
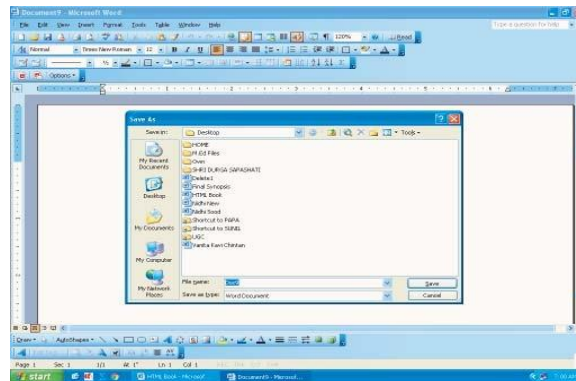
Closing a Document:
1.   Click on File Menu
2.   Click Close

EDITING EXISTING DOCUMENT UNDO / REDO

You can always undo your last action by clicking the Undo button on the standard toolbar or selecting Edit – Undo. Click the Redo button on the standard toolbar or select Edit – Redo to erase the undo action.

CUT AND PASTE

To move text, select it first and then click the Standard toolbar's Cut button. The original text disappears from the document, and is temporarily stored in your computer's clipboard. To place the text elsewhere, click in the new location and then click the Standard toolbar's Paste button. You can also cut and paste by selecting Cut and Paste from the Edit menu.

DRAG AND DROP

Another easy way to move text to a nearby location is to drag and drop it. After selecting the text, point and click the middle of the highlighted area, hold down the mouse button, and drag the text to a new location.

COPY AND PASTE

Select a block of text, and then click the Standard toolbar's Copy button. The original text remains in the document, and a copy goes onto the clipboard. Move the insertions point to the new location and then click the Paste button. You can also copy and paste by selecting Copy and Paste from.

SELECTING TEXT

You can select the text by dragging the mouse, or hold down the Shift key on the keyboard while using the arrow buttons to highlight the text.

DESELECT TEXT

Use the backspace and delete keys on the keyboard to delete the text. Backspace key will delete text to the left of the cursor and delete will erase text to the right. To delete a large selection of text, highlight it using any of the methods outlined above and press the delete key.

CREATING TABLES IN DOCUMENT

MS-Word provides you a table feature. If you want to insert information in a toolbar form, then Click Table Menu – insert – table. When you choose this option a dialog box will appear. You can specify the number of rows and columns in the dialog box. You can draw the table by using Table and Border toolbar. You can change width, height, Line style and Line Width of the table. You can also use merging and sorting option.

INSERTING PICTURES IN DOCUMENT

To insert pictures in the document click on Insert Menu – Picture it has following options.

1.   Clip Art: It is used insert picture from the clip Art Gallery of MS-Office. It contains various categories of pictures like Business, Household, Industry and Cartoons.

2.   Word Art: It is used to insert Text, Graphics of different inbuilt styles in the document. It provides various formatting options.

3.   Auto shapes: It is used to insert various shapes in the document like lines, arrows, ovals, rectangles, stars, cubes etc.

4.   Inserting Tex Box: Text box is rectangular shaped box which floats over the document page and used to write text. To insert text box click on Text Box tool of Drawing Toolbar or click on Insert Menu – Text Box.

KEYBOARD SHORTCUTS

Action	Keyboard Shortcut
New File	**CTRL + N**
Open a File	**CTRL + O**
Close a File	**CTRL + W**
Save As	**F12**
Save	**CTRL + S or SHIFT + F12**
Print View	**CTRL + F12**
Print	**CTRL + P**
Show / Hide Paragraph symbols	**CTRL + ***
Spelling and Grammar	**F7**
Help	**F1**
Find	**CTRL + F**

Replace	**CTRL + H**
Go To	**CTRL + G**
Select all – entire document	**CTRL + A**
Go to starting line	**HOME**
Go to end line	**END**
Go to starting the document	**CTRL + HOME**
Select from cursor to end of line	**SHIFT + HOME**
Select from cursor to end of line	**SHIFT + END**
Font Size increase of Decrease	**CTRL + [or CTRL +]**

SPELL CHECK

MS-Word provides you with yet another feature to check the spellings and grammar as and when you type something in the document. The spelling mistakes are underlined with a zigzag red line (not printed if print-out is taken without correcting) and the grammatical mistakes are underline with a green line (also not shown in printout. Not only does WORD lets you know where have you been mistaken, but it also helps you to rectify these errors. The powerful spelling and grammar check feature makes it possible.

1.   Checking the Spellings and Grammar Automatically

While typing in a document (say, Order form), as shown in figure, you can side by side rectify errors as follows:-

(i)   Right click on an underlined word (red / green for spelling / grammar respectively)

(ii)   A Menu appears, as shown in figure, out of which you can select an option; the description of which follows:-

First of all, the possible right word(s) are displayed as options in the menu, out of which one can be selected and the word under consideration (misspelled one) will be replaced by the one which is selected.

On selecting **'Ignore All'** option from the menu, WORD will ignore this mistake in all the occurrences of it in this document.

'Add' option will add' this word to your custom Dictionary (built in) and after that it'll be treated as a correct word.

'Autocorrect' will display a proposed list of words out of which one can be (only one of them is to be selected) added to the autocorrect list and assigned an automatic replacement for the word under consideration for all times to come.

'Spelling' option will display the spelling dialog box for further options (to be discussed shortly).

Using the Spelling and Grammar Dialog Box

You can check your entire document (or part(s) of it) for spellings and grammar as follow:-

(i)   Select Tool > Spellings and Grammar or Press F7

A Spelling and Grammar dialog box is displayed with creation options.

(ii)   The misspelled word is selected and also a list of suggestions for the intended correct word is shown. If you find the correct word among these, you can click and select that word from the list and then click.

(a)   **Change** in order to replace this occurrence of the selected word in the document.

(b)   **Change All,** to replace all the occurrences of this word in the document with the selected word.

(c)   **Ignore**, if you wish that WORD should not treat this word as error.

(d)   **Ignore All**, to ignore all the occurrences of the selected word for checking in the complete document.

(e)   **Add**, if you wish to add this word to WORD's dictionary for further references.

(f)   **Autocorrect**, if you wish that WORD should always replace this word wherever encountered in future, with the corrected one that you selected from the list.

(iii)   After WORD has finished the checking for grammar and spellings in the complete document (or the selected range of the document), it displays an information that the spelling and grammar check is complete.

MAIL MERGE

MS-WORD has a powerful facility that lets you prepare a blueprint for a document that is to be sent to a number of people. That is you can handle such a situation in which a common text (a B'day invitation, say) is to be used for no. of copies of a document, but each copy differs in some specific text(s) values (as the names of the invitee, his/her address etc.) IN such a case, instead of typing the letter(s) / documents) separately for each person which is quite cumbersome, you can use the mail merge facility. In the mail merge, you are required to crate two documents: a main document – that contains the common text (as, the B'day invitation) and a data source document – that contains the list of variable information (i.e. names and addresses for the invitees). In the main document, while typing, you are required to insert place markers (fields), wherever the document will be placed in the respective place. The data values from the data source document will be placed

in the respective place markers at the time of merging for each set of data values taken from the data source.
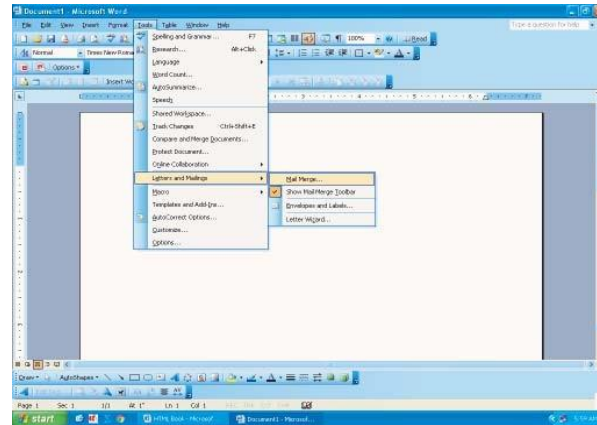
To use mail merge, you have been provided with a merger helper. The process is carried out in three steps as under:-

Step 1:

1.   Open a document and select Mail Merge from the Tools Menu *i.e.* **Tools > Letters and Mailing > Mail Wizard**. The Mail Merge helper dialog box appears as shown in figure.
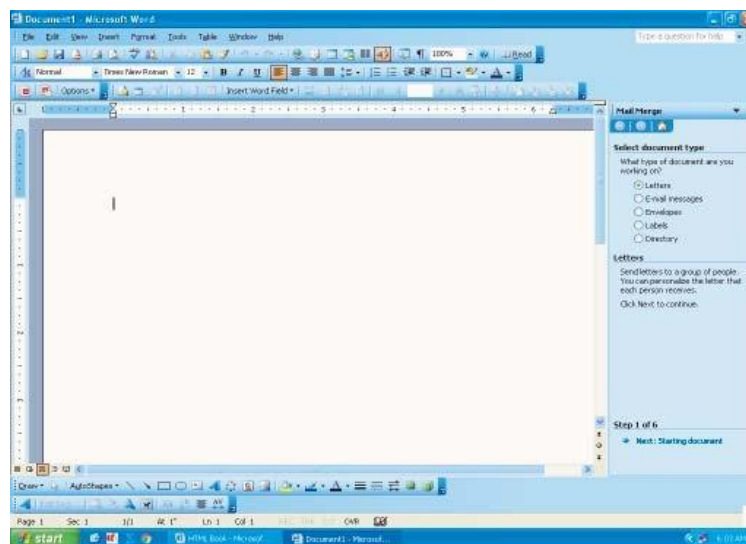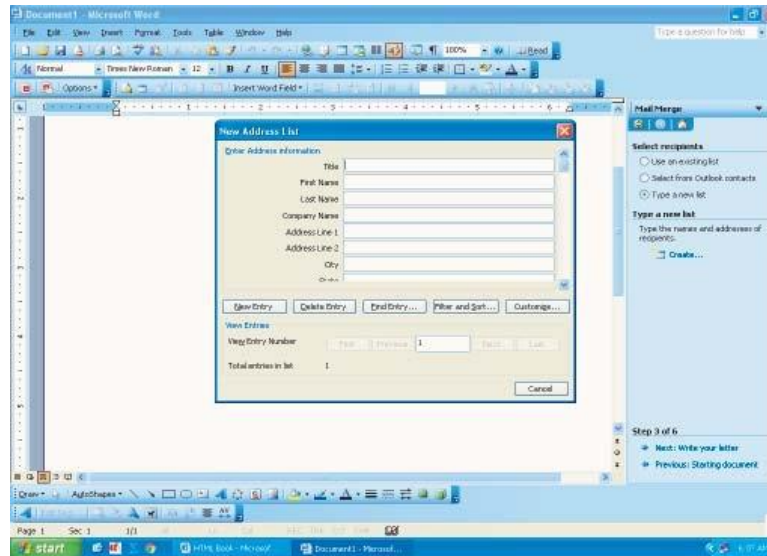

Click the 'Starting document' from the bottom **steps 1 to 6.** A recipient list will appear at the right and mail merge box.

Step 2:

1.   Select the recipient type from the following three.

(i)   Use an existing list.

(ii)   Select the outlook contact.

Type a new list.

Choose the 'Type a new list' option.

2.   Click the 'create' link. It will show a 'New Address List' window.

3.   (i)   From the displayed list of proposed field names, you can optionally choose the fields.

(ii)   Enter the information in the fields displayed. To switch between the fields, use tab key (to move to next field) or Shit + Tab key (to move to the previous field).

(iii)   After entering the data for first record, click on New entry button to enter another record.

(iv)   When all the record have been added to the data source, click **close.**
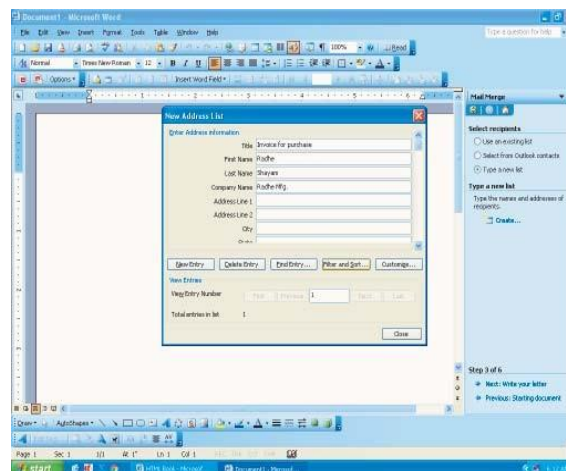
4.   A 'Save address list' dialog box will appear on window. It will ask you a file name. Enter a new file / database name and click on 'save' button.
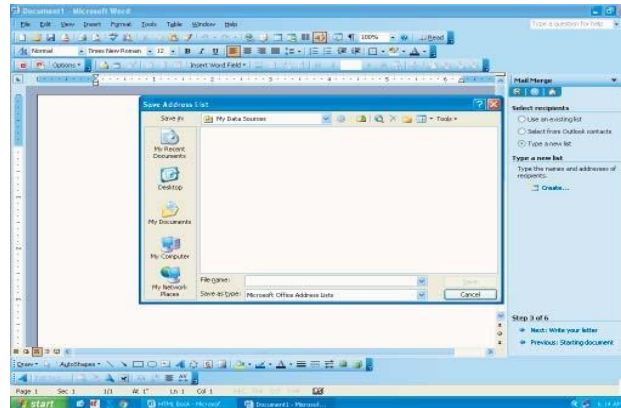

5.   After saving the data source document, Word displays another dialog box that informs you that the data source you created contains no documents and you can add new record to it. To add new records, click 'Edit Data Source' button A 'Data Form' dialog box is prepared as shown in figure.
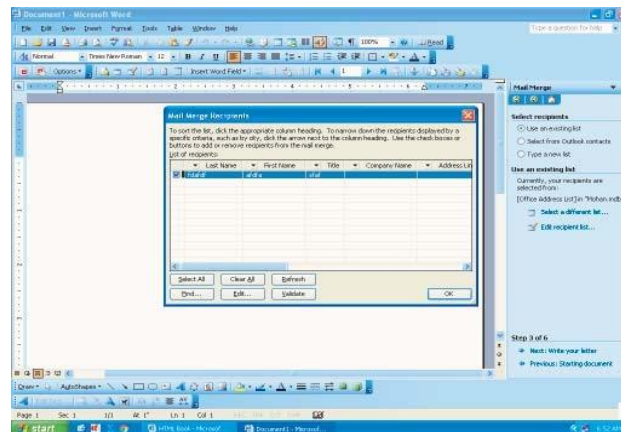
Step 3:

1.   Click on the next step 'Write your letter'. A new document will be shown for writing a new letter. Write your letter and click on next step 'Complete the merge'.

2.   Click on the 'Merge to Printer' if you wish to directly print the merged documents.

3.   Choose 'Merge' from the Mail Merge helper (Tools > Mail Merge > Merge which will display a dialog box. Enter the relevant criteria for merging within this dialog box and click on the 'Merge button. Figure shows the 'Merge' dialog box so displayed.
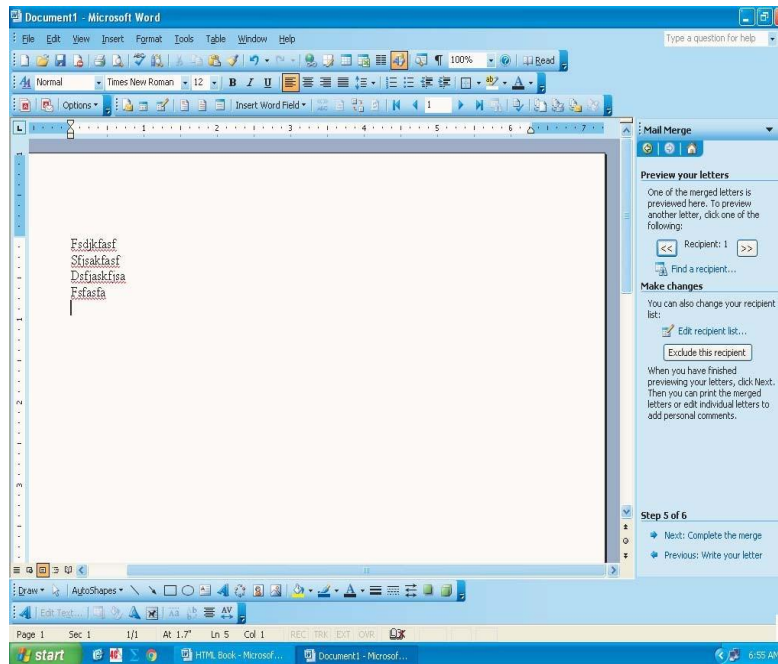
The data so merged with the main document is sent to a new document, which can be saved / edited and used. The document corresponding to each record in the data source is displayed on a separate page within this new document.

QUESTIONS

SHORT ANSWER TYPE QUESTIONS

    (1)   Describe the MS-Word and its various features.

    (2)   How can you start MS-Word? Write steps.

    (3)   Define the taskbar, typing area, spelling & grammar status.

    (4)   Explain different views in word document.

    (5)   How can you create tables in MS-word? Write steps.

    (6)   What is mail-merge.

    (7)   What are various features of MS-word windows. (GNDU, 2016)

LONG-ANSWER TYPE QUESTION

    (1)   What is MS-Word and write components of word document.

    (2)   How spell checking facility helps in making our document error-free.

    (3)   Write a note on mail merge.

CHAPTER 11

MS-EXCEL / SPREADSHEET

INTRODUCTION

Microsoft Excel, the spread sheet program of Microsoft office. If you want to maintain list of information and summary of the reports, you can use the Microsoft excel rather than Microsoft access. A worksheet or spreadsheet is an electronic sheet that is used to store the different type of information by you. There is no need of paper sheet, ledger, pencil, pen, eraser, calculator etc. The worksheet or spread sheet is used yearly or monthly budget planning, prepare annual reports on for scientific calculation create bills and control inventory and in other. "Any grid or array of numbers / text in rows and columns to write down numbers and calculate then easily".

DEFINITION

Microsoft Excel is an electronic spreadsheet. You can use it to organize your data into rows and columns. You can also use it to perform mathematical calculations quickly.

FEATURES OF MICROSOFT EXCEL

Microsoft excel has number of features which are beneficial for use in daily life, some common and very important feature of Microsoft Excel are as:-

The result computed by Excel is reliable, excellent, efficient and accurate.

(i)   You an format the information in the work sheet in several ways by using the various format commands.

(ii)   Excel work sheet or spread sheet work like on electronic file where you can save, modify and retrieve the electronic file any time according to your requirement.

(iii)   It is fact processing electronic sheet.

(iv) You can Import and Export the information from one worksheet to other worksheet.

(v)   An old work sheet or part of a worksheet can be merged to the new worksheet.

(vi)   You can set date, time anywhere on the worksheet in the desired format.

(vii)   It also has a drawing toolbar by using which you can create your own graph chart and other, pictures.

(viii) You can create shortcut keys for processing the task automatically by use the keyboard.

(ix)   To help predict the future value if there is a change in the cell contents.

(x)   More formatting options for charts and new chart types such as bubble, pie, bar, pyramid, cone and cylinder.

(xi)   To combine a series of action to automate your work.

(xii)   There is a new share workbook features which lets multiple users open a worksheet on a network and edit it simultaneously.

(xiii) You can create formulas using row and column instead of range reference.

(xv) Other features are page break preview that permits you to have page break dragging them.

ORGANISATION OF EXCEL SCREEN
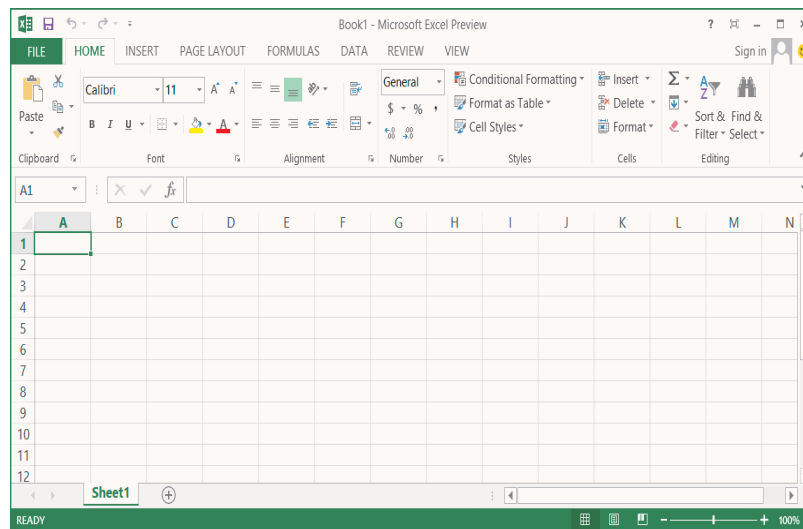
1.   Work Sheet: The new worksheet contains 16 sheets. Microsoft excel has more sheets, A single workbook file can contain as many as 255 sheet named sheet 1 through sheet 255.

2.   Title Bar: Title bar has title name of the worksheet opened with the Microsoft excel logo and description. Title bar that the top bar of excel window has three buttons in right corners. First button is the minimize button, second button is the maximize button or restore button and third button is the close button. When you click this button excel will be automatically closed and you will move to the desktop.

3.   Menu Bar: The Menu bar is the bar that displays the number of menus on it. This bar is next to the title bar. Menus displayed on Menu bar are file, edit, view, insert, format, tools, data, windows and help. Menu is clicked to display different commands in operation.

4.   Tool Bar: The next bar below the menu is the tool bar area. Tool bar is a collection of tools or icons displayed a long bar that can moved to make more convenient for you to use each icon represents a common command or task. There are two tool bar standard tool bar and formatted tool bar, you open a worksheet and can also display other tool bar this area clicking various tool option by using the tool bar command from the view menu, select the tool command and view menu tool bar dialogue box with displayed.

5.   Formula bar: The next line below the tool bar is called formula used for displaying information address the formula entered in current cell and numbers, text entered in the cell.

6.   Status bar: The last bar of the excel screen is called the status line or status bar displayed the name of the command and indication about the operation program copy the cells, option saving of file and display the same keys such as caps lock, scroll lock, tool key and num lock.

7. **Worked area:** Above the sheet bar and below the formula bar occupied by the excel sheet is a work sheet area or spreadsheet space or work shop area is used to enter text as well as numeric information you can also enter for this area and display the calculated result in place formulas graphics like chart, graph, clipart or any other picture in this area can also be displayed.

8. **Rows and Columns:** A worksheet has number of rows and columns. There are mainly 9 columns and 18 rows at a time on the screen in the workplace area. A full worksheet contain 16,384 rows and 256 columns a worksheet has length of more than 7 meters and breadth more than 100 meters worksheet has more than 255 sheets.

9. **Active cell, cell pointer and cell address:** The intersection of a row column creates a rectangular area that is called a cell e.g.: intersection of column B and row 4 in a cell. In a cell data is stored. Cell is the smallest part of the worksheet. The cell that lightened thick boarders around it is called active cell. When worksheet opens the cell it has delayed has the row 1 and column A. It is active cell or current cell. User can enter formation in the active cell. User can make any cell active by using the cursor arrived from keyboard or by the mouse pointer.

CONTROL KEYS OR CELL MOVEMENT KEYS

Item Name	Description
Curser	Move cell up, right, down or left one column
Tab	Move one cell to the right
Enter	Move one cell to down
Shift+Tab	Move one cell to left
Home	Move to the first column in the current row.
Ctrl+Home	Move to cell A1
Ctrl+End	Move to the last cell used in the worksheet
End+Arrow key	Move the end of the worksheet in the direction of arrow
Page up	Moves up one screen
Page down	Moves down one screen
Alt+Page up	Moves one screen width to the left
Alt+Page down	Moves one screen width to the right
Ctrl+Page up	Moves to the following work sheet
Ctrl+Page down	Moves to the proceeding work sheet
F5	Go to a specified cell address
F2	To edit a cell

STARTING THE MS-EXCEL APPLICATION

To start Microsoft excel, to the following:-

A pop-up menu will be open.

Move your mouse up to programs.

A sub-menu will appears.

Move your mouse to Microsoft excel.

When Excel is highlighted, click once with your left mouse button.

1.   The Microsoft Excel Window

On the right is a new window in Excel. This is an Excel workbook. Notice in the bottom left sheet 1, sheet 2 and sheet 3 – these are three separate worksheets where you can place your data. The worksheet is a grid of rows and columns.

The ROWS are numbered and run across the worksheet in the example row 9 is selected. There are 65,000+ rows to use.

The COLUMNS are alphabetic and run down the worksheet. Here, column C is highlighted. You have 256 columns A-Z, AA-AZ etc.

The CELLS are where a column meets a row. Each cell is labeled with a letter and number specifying the column and row. Here cell C9 is shown.
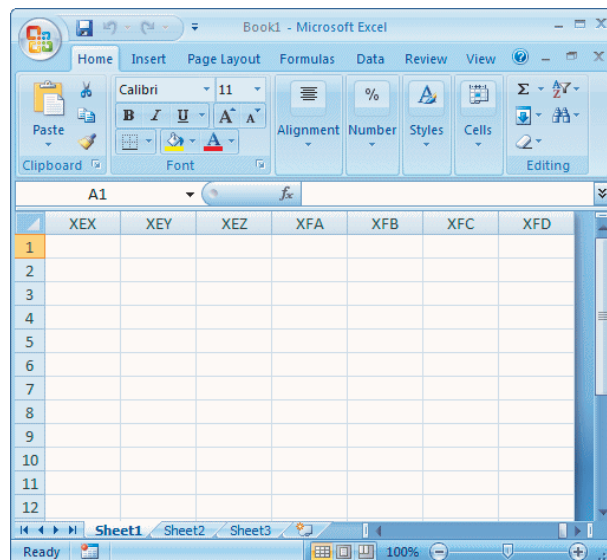
At the top of the screen are the common formatting items (size, font, color, alignment, bold…) A the top bottom you may see the drawing tools found in all MS applications.

The Formula Bar is where you can enter, edit and view formulas (much more on this later).

2.   Moving Quickly Around the Microsoft Excel Worksheet

You can move about the worksheet in many ways. You can:

Click cells with the mouse.

Use the arrow keys to move.

Use the tab key (and Shift-Tab) to move right and left one column.

Page Down or Page Up to move up or down a page.

Home and End move to the top or bottom of your worksheet (the end is your last piece of

entered data-not the bottom of the worksheet.

Ctrl-G allows you to go to specific location such cell D15.

3.   Selecting Cells

When you point to a cell, or move to it, it is selected. When selected, the data you have entered in that cell becomes visible in the formula bar at the top of the screen.

To select a block of cells, you can use the mouse to drag over the cells. Start with the first cell and drag to the last in the block.

Note: The first cell stays white – the remainder change colour to indicate that they are highlighted.

4.   Entering Data

There are three things you can enter in a cell:

**Value** – A numeric piece of data that can be used in calculations.

Label – words/numbers NOT used in calculations. These have no numeric value.

Formula – More on these later, but these are entered to have Excel perform a calculation.

To enter data you just select a cell and type in your information! As you enter data you will notice that the Excel aligns the data for you – values to the right and words to the left.

To enter a value (number) e.g. 123 in a cell, select the cell and type 123. Either move away or press enter.

To enter a label (words) in a cell, select the cell and type the words. Move away or press Enter.
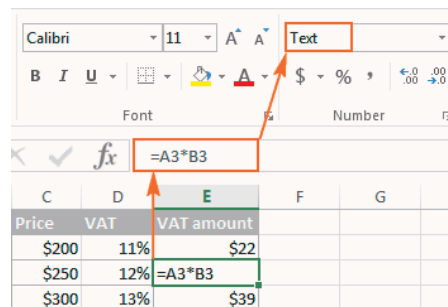
If you want a label that is a number, e.g. 1985, enter it as '1985. When you do this Excel will treat it as a label and indicate this with a small green triangle in the upper left corner of the cell and an "error box" on the left. Clicking the exclamation point will tell you why it flagged the cell and some options to correct it if you need to.

5.   Editing a Cell

If you have data in a cell and wish to edit that data you can:

Click in the cell, choose the formula bar at the top and edit normally.

Click in the cell, and retype the data.

Click twice in the cell and edit in the cell itself (the change also occurs in the formula bar).

Click the cell, press F2 and edit.

If you click a cell and then use the arrows, it moves the cursor and your selection. Only after clicking twice or pressing F2 do the arrow keys (left and right) work to move in your data.

6.   Changing a Cell Entry

Selecting a cell and type new data always replaces the old data.

To delete data, select a cell and press the *Delete* key.

To format a cell entry, select the cell (or cells) and use your normal formatting items in your menu at the top. This allows fonts, sizes, styles and basic alignment, as well as a few set numeric formats (percent, dollars, columns).

Formatting options

Choose format from the menu, chose cells and them pick the appropriate format options from the box.

Here you can specify the way numbers look, the alignment in the cell, borders, fonts and patterns.

To wrap text (two or more lines in one box) you would highlight your cell, choose the format cells option, choose Alignment and then click Wrap text.

7.   Saving a File

A good rule to follow is "Save early, save often". As in all other MS Applications Save is under File. Make sure that you know the location of the file when you save it.

You can also press Ctrl+S, or click the disk icon to save your work.

8.   Closing Microsoft Excel

After you're finished and have saved your work, "X" out Excel or choose File-Edit.

9.   Adjusting the Columns Width

Sometimes you may wish to change the width of your columns (or the height of our rows). You can do this on individual columns or rows, or on a group of selected columns or rows.

First you must select the column(s) or row(s) that you wish to adjust. To select a column, click on the Letter at the top of the column. To select a group of columns, drag over the column letters.

Once selected, place the cursor between the letters of any two of the selected columns. The cursor should change to a double arrowhead. Notice in the picture it is between the two letters at the top of the column.

Once you get the double-headed arrow, click and drag to change the column width. Every selected column will change to the same width. This also works with row height.

10.   Making Numeric Entries

From lesson one you saw that numbers can be entered directly into cells. Highlight the cell, enter your value.

11.   Performing Mathematical Calculations

Any arithmetic calculation can be performed in Excel as well as many mathematical once as well.

The *first rule* is:

Every Calculation must begin with an equals sign

The *second rule* is:

Location, Location, Location

In a calculation you do not use values - you use the location of the cell(s) that you are using

in your calculation. On the right is an example. The values 15 and 20 as entered into cell A3. (Uppercase is not necessary) you can see the formula = A1 + A3 is entered bar at the top? You can see the result in Cell A3. The formula bar always shows the formula that was used.

If you have a number to calculate that IS NOT in the spreadsheet, for instance at tax rate, you can enter it in the formula directly (or manually).

12.   The AutoSum Icon

Although formulas can be long, there are often shortcuts for common operations. For example, if you wanted to add up a list of 10 numbers found in cells A1 through A10 you could type = A1+A2+A3+A4….+A10.
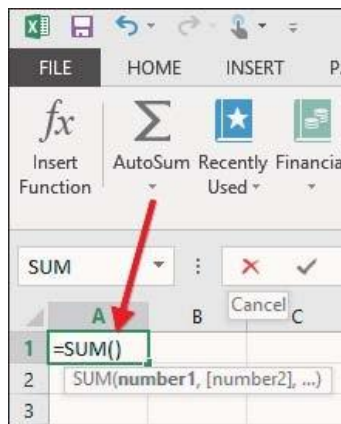
A shortcut would be used to use the formula = SUM(A1:A10). You could do this several ways:

Type the formula = sum(a1:a10)

Or you could type = SUM(A1:A10)

And then highlight the cells A1-A10 by dragging over them.

Or you could click in A11 and then click the Autosum button.

It is important to note that A1:A10 means the range of cells from A1 to A10 inclusive of both ends.

13.   Automatic Calculation

By default, Excel always has automatic calculation turned on. That means any of the you make a change, all the calculations are performed again. This is a powerful structure because any cell VALUE that changes will result in a new value in all related calculations. In our above example, changing any number in A1 through A10 will result in a new total in A11.

14.   Formatting Numbers

The value of a number in a cell is a numeric value. It will NEVER have units and you cannot add units in the cell. However, you can format it to display differently. The value doesn't change, but the display does.

On the right is a simple spreadsheet with the same number formatted in different ways. Every cell has the exact same value – they are being displayed differently in each case.

In cell C2 the 2000 is displayed as $ by clicking the $ sign.

In C3 it is displayed with the comma icon.

In C5 it is displayed with % icon.

In all cases, the value is 2000.

15.   Cell Addressing and calculation Copying

Cell addressing refers to how cells are used in calculations. There are three types of cell addressing:

(i)   relative addresses

(ii)   absolute addresses

(iii)   mixed addresses

These have to do with what happens when calculations are copied. When a cell with a calculation is copies, the formula is copies into the new cell. However, the formula may be changed. For example, if cell A3 says = A1 + A2 and it is copies into cell B3, Excel copies the formula relative to its old location. In other words when copies in B3 it now says = B1+B2. Another way of thinking of this is that A3 says "add the two cells above me". It says the same thing in B3 – add the two cells above me.

When copying left or right, the column letters change in calculations.

When copying up to down, the row numbers change in calculations.

This is called relative addressing – the formulas are relative to their location. This is the default in Excel.

Sometimes, you do not want formulas to change when you copy them. For example if we had a tax rate in Cell E5 and were using it to calculate many numbers, when the formulas were copied, the E5 would change relative to the new cell locations. You can see that this would not work very well.

To specify that a cell location does not change, known as absolute addressing you put a $ before the number and letter. So any calculation that used E5 would use E instead.

Finally you can put a $ before either the column or row. If the $ is before the columns the column will never change when the formula is copied. If the $ is before the row number, the row won't change when the formula is copied. This is mixed addressing spreadsheets. Let's do a simple example. In column A we will put 10 numbers. In column B we will put a formula to multiply each by 7% for the sales tax. Finally, in column C we will put the total price of the item after tax. On the next page you will see the spreadsheet with its formulas showing.

Enter the formula in B2=A2*7%

Drag from B2 down to B11. Choose Edit – Fill – Down (or press Ctrl-D)

You can also type in the formula in B2. After typing it you will see a small black square in the lower right corner of the Cell B2. Drag it down to B11 and it will fill all the box.

Note: You can also drag right, up, or left and fill in those directions.

16.   Deleting Columns / Rows & Inserting Columns / Rows

If you find that you have an extra column/row, or need to insert an extra one it is only in Excel.

Click on the column letter / row number that you wish to delete. Use the right mouse button and click it to reveal the menu. Insert and Delete are there. The nice part about this is that Excel automatically adjusts any formulas that were affected by these operations. If a formula is based on

the row or column that you deleted, this will cause problems but you probably wouldn't be deleting columns that were used in other calculations.

If you need to insert or delete multiple columns/rows, highlights multiple and then right click.
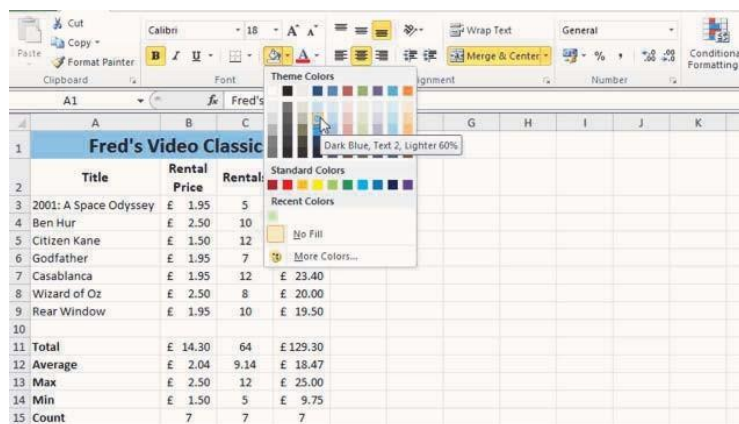
17. Miscellaneous formatting

Creating Borders

(i)   Highlight the Cell(s) that you wish to put borders around.

(ii)   Click the appropriate border style.

Adding Background Colour

(i)   Highlight the cell(s) which you wish to add a background.

(ii)   Click the appropriate color from the paint bucket.

MERGE AND CENTER

Sometimes you may want to center a title over two columns in continuation to about example, put the words Allegheny Country over column B and C.

(i)   Type your label in the left column.

(ii)   Highlight the cells that you wish to Merge and Center. In this case B1 and C1

(iii)   Click the Merge and Center icon or choose format Cells – Alignment and click the merge and center button.

18. Reference Operations

Quick review:

(i)   calculation always begin with an equals sign.

(ii)   Location is key – use the location of cells, not the values in them.

(iii)   Unless otherwise specified, all addresses in calculations use relative references and will therefore change automatically when copies, filled or moved.

(iv)   To specify a range of cells in a function (such as SUM) use a colon between the first and last cell addresses.

The colon is called a reference operator – it refers to all the cells in a range.

= SUM (A10:A20) all the cells between A10 and A20.

The colon is also a reference operator – it refers to only the cells listed around the commas.

= SUM (A1, A3, A5, and A7) only cells A1, A3, A5, and A7
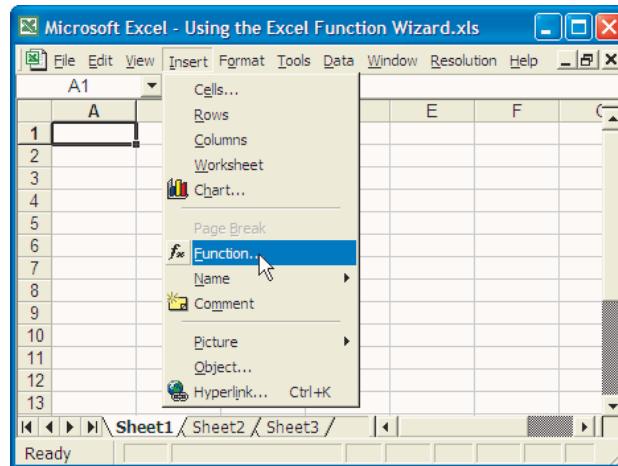
19.   Functions

Excel is jam-packed with functions to perform a variety of mathematical trigonometric, financial, text, logical, add operations. Just about ANYTHING you can think to do with numbers or dollars is in there.

Function differ from calculations in that they have a name (such as SUM) followed by a list of parameters in parentheses. Here are the rules for entering functions.

(i)   Use an equal sign to begin a formula.

(ii)   Specify the function name.

(iii)   Enclose arguments within parentheses.

(iv)   Use a comma to separate arguments.

Typing a Function

If you know the function name, you can type it in a cell. Make sure that you follow the rules above!

If you don't know the name, you can us the Function wizard (f) and look up the function followed by entering the parameters. The function wizard is a great way to use what functions are out there, although many are specialized and somewhat confusing to use. Chances are that if you don't know that a function does, you don't need it in the spreadsheet.

Following are some sample functions with their parameters.

Calculating an Average   = AVERAGE (A1:A19) OR = AVERAGE (A1, A4, A6)

Find the arithmetic mean of the reference

Calculating Min   = MIN (B2:C15)

Find the lowest value in a reference. Note: a range can be block, not just a column/row.

Calculating Count   = COUNT(C1:C14)

Counts the number of non-blank entries in a reference.

Conditional Count   = Countif(A1:B10,">50")

Counts only cells in the reference that have value greater than 50

Filling Cells Automatically

Excel has ways to make your life easier as you set up spreadsheets. It can automatically fill rows when it recognizes a pattern or if it knows a sequence.

For example, in order to number 100 consecutive cells you could start typing 1, 2, 3, 4… and go all the way up to 100. Or, you could start the pattern by entering 1 and 2 then highlight the 1 and the 2, grab the "fill" handle and drag down. It will continue the pattern for you until you let go of the mouse.

It also knows days and months. Start by typing any month name (e.g. January) be cell A1. Grab the fill handle and pull it down to get the months in order.

You can do the same for Days of the week – even the shortened versions work (Mon, Tue).

21.   Printing

Printing in Excel is like most MS applications – File Print, However since spreadsheet may be very wide, you might not get what you expect. Excel will try to print all the data in your worksheet from A1 to the last cell used.

You should always specify what you want to print and do a print preview before printing from Excel.

Specifying what to print

(i)   Highlight the area that you wish to print.

(ii)   Choose File – Print Area – Set Print Area

(iii)   Choose File – Print Preview

22.   Creating a Chart

One of the more common things to do with data in a worksheet is to create a chart from it. Excel makes thins task easy with the Chart Wizard. Before getting into the steps for making a chart let's look at some of the chart types available in Excel.

23.   Chart Type

On the right is a partial list of the chart types available in Excel. The first 6 (column – area) are probably the most commonly used chart types. In Science or Math what you would graph an X-Y relationship you ALWAYS use an (Scatter) plot. Here what the others can be used for

Column and Bar:

Present few data over a nominal (e.g. countries, testing conditions, …..) or interval scale (e.g. time); useful for comparisons of data.

If you have larger data sets: Use line charts.

Line and Area

To display long data rows

To interpolate between data points

To extrapolate beyond known data values (forecast)

To compare different graphs.

To find and compare trends (changes over time).

Line graphs may consist of line or curved segments.

Lines: use straight lines to connect "real" data points

Curves: Use curves to represent functional relations between data points or to interpolate data.

Pie

Convey approximate proportional relationships (relative amounts) at a point in time.

Compare part of a whole at a given point in time.
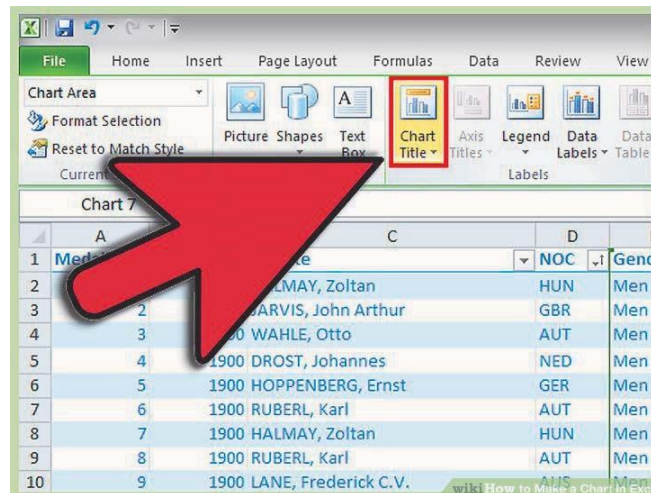
Exploded: emphasize a small proportion of parts

Scatter

Show measurements over time (one dimensional scatterplot)

Convey an overall impression of the relation between two variables (Two dimensional scatterplot)

Making the chart

Now that you know what type of chart to use (at lease some idea) you are ready to create your chart.

(i)   On your worksheet highlight the data that you wish to chart including any titles. Do this by dragging over the data.

(ii)   Click the chart wizard icon.

(iii)   Choose your chart type. You will see that there are many "sub-types" for each main type of chart. Here you see that for a line chart you can have solid lines, lines with points, 3-D lines. Each sub-type has a brief description in the text below the pictures. You can even "Press and Hold to View Sample".

(iv)   When you've selected your chart type and sub-type, press Next.

(v)   You can name your series if you need to, otherwise, click Next.

(vi)   Your chart options appears next. Here you can label your chart for the data, of a data table. Each option is under the tab at the top. You should at the very least title the chart and axes. ClickNext.

(vii)   Finally decide whether to have it appear as a separate worksheet or in the current worksheet. Click Finish.

Changing the Size/Position of a Chart and Printing

Once created you can pick it up and move it around the worksheet (assuming you had it IN the worksheet instead of a new worksheet). To do this, click anywhere inside the chart ara and drag to a new location.

You can resize by dragging the corners. If you intend to print the chart in the worksheet, click away from the chart somewhere in the worksheet and do a Print Preview (File – Print Preview). This will tell you if the chart is actually on page 1 or if it overlaps the pages. When you close the Print Preview, dotted lines stay on your worksheet showing you where the page boundaries were. You should adjust your chart so that it is completely inside the page boundaries before printing.

25. Protecting data

Microsoft Excel provides several layers of protection to control who can access and change your data.

Worksheet protection you can protect elements on a worksheet – such as cells with formulas – from all user access, or you can grant individual users access to the pages you specify.

Workbook-level protection you can apply protection to workbook elements and can protect a workbook file from viewing and changes.

1.   Turning on Workbook Protection

From the tools menu choose Protection then Protect Workbook Check structure (protects the structure of a workbook so that sheets can't be deleted, moved, hidden, unhidden, or renamed and new sheets can't be inserted) or Windows (protects a workbook's windows from being moved, resized, hidden, unhidden or closed) or both.

Type a password if needed.

Click OK

2.   Disabling Worksheet Protection

From the Tools menu choose Protection then unprotect workbook

Type the password if necessary

Click OK

3.   Turning on Worksheet Protection

Click the worksheet to be protected

From the Tools menu choose Protection then Protect Sheet

From the Tools menu choose Protection then Protect Sheet

Protect worksheet and contents of locked cells should be checked, check any desired check boxes in the Allow all users ….. list box

Click OK

4.   Disabling Worksheet Protection

Click the worksheet to be unprotected

From the Tools menu choose Protection the

5.   Unprotecting Cell(s)

To allow users to make specific changes to selected cells of a protected worksheet, workbook, unprotect cells to allow editing.

Highlight the cell(s) you want to unprotect

Right click the highlighted cell(s) and choose Format Cells

Click the Protection tab

Uncheck Locked

Click OK

6.   Giving specific Users Access to Protected Ranges

On the Tools menu, point to Protection and then click Allow users to Edit Ranges (This command is available only when the worksheet is not protected)

Click New

In the Title box, type a title for the range you're granting access to.

In the Refers to Cells box type an equal sign (=) and then type a reference or select the range.

In the Range password box, type a password to access the range

The password is optional; if you don't supply a password, any user will be able to edit the cells.

Click Permissions and then click Add.

Type in usernames of those to whom you want to grant access. Separate multiple names with a semicolon.

Click OK twice and if prompted retype the password.

Repeat the previous steps for each range for which you're granting access.

To retain a separate record of the ranges and users select the Paste permissions Information into a new workbook check box in the Allow Users to Edit Ranges dialog box.

Protect the worksheet: Click Protect Sheet in the Allow users to Edit Ranges dialog box.

In the Protect sheet dialog box, make sure the Protect worksheet and contents of locked cells check box in selected, type a password for the worksheet, click OK, and retype the password to confirm.

7.   Hiding Columns / Rows

Disable worksheet protection if necessary

Highlight the column(s)/row(s) you want to hide

Right click the highlighted columns or rows and click Hide

8.   Unhiding column(s)/row(s)

Disable worksheet protection if necessary

Highlight the column(s)/row(s) either side of the hidden columns or rows.

Right click the highlighted columns or rows and click unhide

9.   Hiding Formulas

Disable worksheet protection if necessary

Select the formula you want to hide

Right click and choose Format cells

Click the Protection Tab

Check Hidden

Click OK

From the Tools Menu choose Protection then Protect Sheet

Click OK

10.   Unhiding Formulas

Disable worksheet protection if necessary

Select the formula you want to unhide

Right click and choose Format cells

Click the Protection Tab

Uncheck Hidden

Click OK

11.   Hiding Worksheets

Disable worksheet protection if necessary

Select the worksheet(s) to hide

From the Format Menu choose Sheet then Hide

12.   Unhiding Worksheets

Disable worksheet protection if necessary

From the Format menu choose Sheet then unhide

Click the worksheet you want to unhide

Click OK

13.   Protecting a Workbook from Viewing or Editing

On the File menu, click Save As

On the Tools menu, click General Options.

Do either or both of the following:

(a)   If you want users to enter a password before they can view the workbook, type a password in the Password to open box, and then click OK.

(b)   If you want users to enter a password before they can save changes to the workbook, type a password in the Password to modify box, and then click OK.

When prompted, retype your passwords to confirm them.

Click Save

If prompted, click Yes to replace the existing workbook.

14.   Removing a Password from a Workbook

On the File menu, click Save As

On the Tools menu, click General options.

In the Password to open or Password to modify box, or both boxes, double-click the asterisks and then press the DELETE key.

Click OK and then click Save

Click Yes to replace the existing workbook.

QUESTIONS

SHORT ANSWER TYPE QUESTIONS

(1)   Define the Microsoft Excel and Worksheet.

(2)   Explain the components of MS- Excel.

(3)   Explain the method of creating and saving workbook?

LONG ANSWER TYPE QUESTIONS

    (1)   What is MS-Excel and explain its features in detail?

    (2)   What do you mean by cell addressing. Discuss various cell addressing techniques.

    (3)   Discuss the various functions used in MS-Excel and explain its working.

    (4)   How to create a chart in MS-excel and explain various types of charts.

CHAPTER 12

MS-POWERPOINT / PRESENTATION

INTRODUCTION

Microsoft power point forms part of the Microsoft office suite. It is a presentation packing that allows you to produce on-screen computer presentation, overhead projection, transparencies, posters and web pages. PowerPoint allows you to manipulate text and graphical elements with great creative flexibility. It also provides a set of pre-designed templates which make it possible for even the most non-artistic user to product professional layouts.

MEANING OF PRESENTATIONS

Pre-designed templates to produce quick results

Use multimedia tools to enhance the presentation

Add graphics, sound, video clips

Animate text of objects

Use transition effects, colour schemes to add emphasize

Add graphs, tables and diagrams very easily

Create automatic slide shows, time rehearsals.

Ability to create speaker notes, handouts, outlines from the one PowerPoint file.

It will save presentations as HTML Web pages easily so that presentations can be posted on the Web for others to view.

PowerPoint is ideal for producing full screen computer presentations to enhance lectures, demonstrations of displays. You may choose to use the package to produce posters, leaflets, booklets or other textual or graphical designs such as tutorials (onscreen or printed), information sheets or publicity materials.

OPENING POWERPOINT

For open the MS-PowerPoint Select Start > Programs > Microsoft PowerPoint.

155
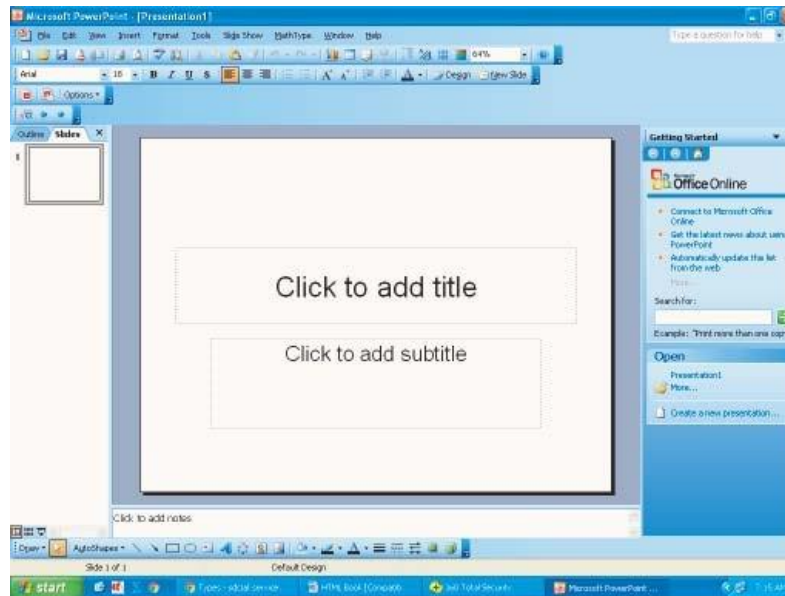
The screen has three working areas. This view is known as Normal View.

On the left are tabs that alternate between an outline of your slide text (Outline tab) at your slides displayed as thumbnails (Slides tab).

In the centre of the screen is the workplace which displays a large view of the current slide; and at the bottom is the notes pane where notes can be entered about the current slide.

The task pane appears at the right of the screen.

The New Presentation Task Pane

When you first open PowerPoint the Getting started pane appears on the right and a new presentation opens automatically. Use the drop-down arrow to select different options for creating a presentation.

Choose New Presentation

The Task Pane appears on the right, showing the methods of creating a presentation. This pane will also appear if you choose File | New. If the task pane is not visible, select View > Task Pane. Initially the options available relate to how you want to start the presentation.

For help with the content of your presentation using a template choose From AutoContent Wizard.

If you already have ideas for your content but need help with a design or colour scheme, choose from Design Template.

If you know your content and colour design or wish to create a poster, choose Blank Presentation.

Best Method to Start a Presentation

If the following choices are not visible, click the arrow on the Task Pane and select New Presentation.

1.   Blank Presentation

This starts an empty presentation devoid of any design or sample text. This may be the most appropriate starting point if you wish to produce a poster.

New from Existing Presentation
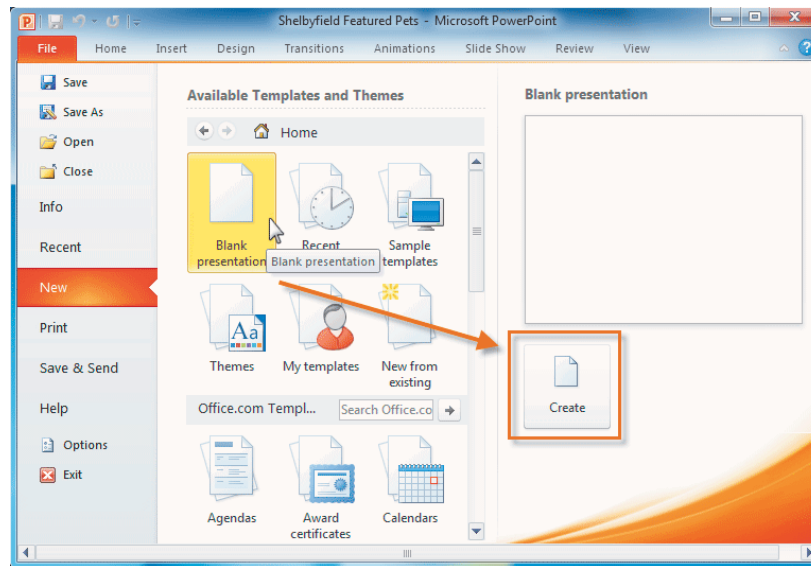
Create a copy from an existing presentation so that you can make design and content changes to it for a new presentation, without altering the original.

AUTO CONTENT WIZARD

Select from the New Presentation menu on the Task Pane.

Using the wizard can save time by providing a set of slides with relevant text already to place. This text is generic and you will want to replace it with something more meaningful to your exact requirements but it nevertheless guides you in structuring the presentation and will help you organize your ideas.
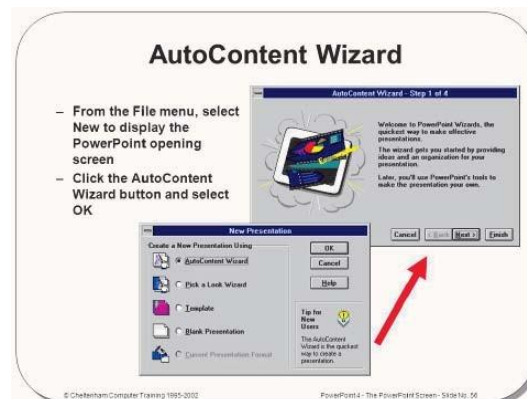
Click Next>

Select a type of presentation and select Next >.

Work through the options, customizing the presentation.

Note: you can click the Finish button at anytime in the Wizard.

Since the presentation has been created with the wizard, the slides will have demonstration text and topics in the content. You can of course overwrite any of that topics with your own points.

Always remember to regularly save your work especially if the presentation contents several slides. PowerPoint files are saved with a .ppt extension.

NAVIGATION

When working with a presentation consisting of more than one slide, you will not to move between the different slides.

1.   Via Scrollbar

At the right side of the slide pane is a scrollbar. This consists of a single up arrow, single down arrow and double up and down arrows as well as the scrollbar button itself. Clicking on the double arrows will more you one slide backwards or forwards through your presentation. Clicking on the single arrows will move you up and down the slide that is on view at the moment.

Note: if you can see the entire slide, the single arrows will also move you to the next or previous slide; they only move you up/down on the present slide if you have zoomed in and cannot see the entire slide at once.

If you click on the scrollbar button, a pop-up will appear telling you which slide you are viewing. For example, Slide 3 of 5. The title of the slide will also be displaying you move this button it will show you the descriptions of the previous or following slides. Releasing the button when it indicates the slide you want, will take you directly to the slide.

2.   Keyboard Shortcuts

You might find the following keyboard shortcuts useful when navigating through your slides:

Page Up   Move to the previous slide

Page Down Move to the next slide

Home   Move to the first slide

End   Move to the last slide

3.   The outline / Thumbnail Pane

This is positioned at the left of the screen and shows the whole presentation in one of two ways.

Outline:

When the Outline tab is selected the titles and main text from each slide are shown. The slide that is currently shown in detail in the slide pane is highlighted in the Outline list. In the Outline pane you can edit titles and body text, rearrange text within a slide and move entire slides from one position to another simply by dragging and dropping.

You can use the pane to navigate through a presentation by clicking on the different slides.

Thumbnail

When the slides tab is selected small thumbnails of all the slides in the presentation as shown.

This is useful if your slides have no text that would be displayed with the outline tab. Again you can navigate through your presentation by clicking on a thumbnail, or re-arrange your slides by clicking and dragging.

The Views

PowerPoint features four main ways of viewing your presentation, plus a range of main views which you use to control common elements. Three of these views can be accessed via either the Views buttons at the bottom left corner of the PowerPoint window, or from the View dropdown menu.

1.   Normal View

This is the default view. When you open PowerPoint, you will be place in this view. It allows you to see the slides you have created. It is within this view that you will of the new slides, amend existing slides add objects, images and so forth.

To return to this view, click the Normal View button or select View > Normal.

2. Slide Sorter View

Click **Slide Sorter** button on *View* tab of the ribbon
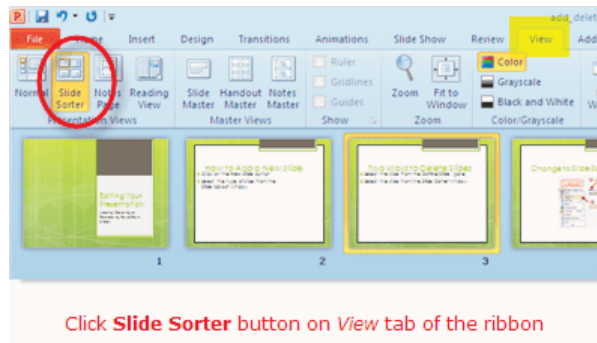
To use this view, click the Slide Sorter View button or select View > Slide Sorter.

The slide sorter allows you to see miniature representations of your slides all at tool. You will be able to see the slides, their graphical and textual content and any serial transitions or timings you have applied to them.

3.   Re-ordering Slides

This can be done either in the Outline/Thumbnail pane in Normal View, or is to Slide Sorter View:

Click on the slide you wish to move (it will become highlighted.

Drag it to gap after the slide you wish it to precede.

For example, to move slide 9 so that it appears between slides 3 and; click on the slide, drag and drop it between slides 3 &. All slides will be re-numbered according to any changes you make. It is from within this view that you can copy, move or drag slides.

You can move multiple slides by holding down the Ctrl key whilst clicking all slides for inclusion in the selection.

4.   Copying Slides

In slide sorter view and within the Slide tap in Normal View, you can copy slide if you wish to

include duplicate slides.

Click on slide 3, to select it.

Click on the Copy button.

or select Edit | Copy

Click in the gap between slides 7 and 8, where you want the slide to appear and before the first slide / after the last slide).

Click the Paste button.

or select Edit | Paste.

You can copy multiple slides by holding down the Ctrl key whilst clicking all slides for inclusion in the selection.

5.   Deleting Slides

To delete slides in Slide sorter view, select any slide(s) you wish to remove from your presentation and press the Delete key on your keyboard. In Normal View select File | Delete Slide to delete the current slide.

You can delete multiple slides from the Outline / thumbnail pane by holding down the Ctrl key whilst clicking all slides for inclusion in the selection.

6.   Notes Page View

In Notes page view there is a small pane at the bottom of the screen, where you can enter notes to accompany the slide. Unless you are only adding only a short note, you may find it easier to work in Notes Page View.
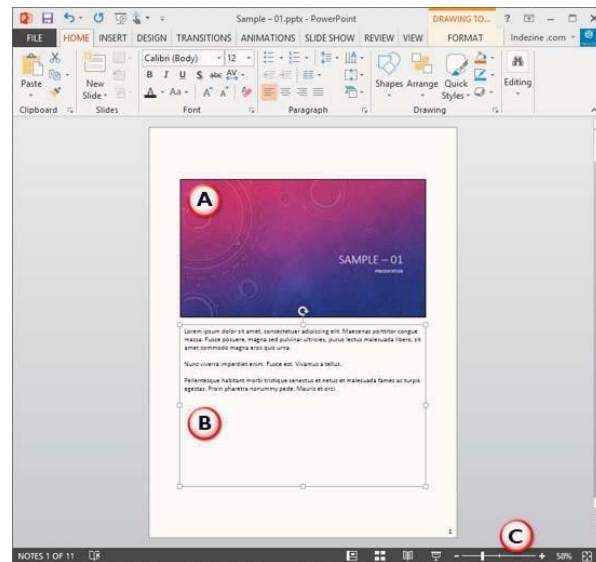
To use this view, select View | Notes Page.

This view presents you with a representation on the current slide with space beneath to add notes. You might use this to include your script within the PowerPoint file and as you can print out the notes pages, you can have a paper version of the slides, annotated with the script.

The Notes Page View prompts you to click to add text, and you can see exactly where the text will appear. You can format the text using the usual text formatting options and you can use the zoom button to magnify each page if required.

7. Slide Show View

The slide show view will show your slides one by one on the full screen of window.
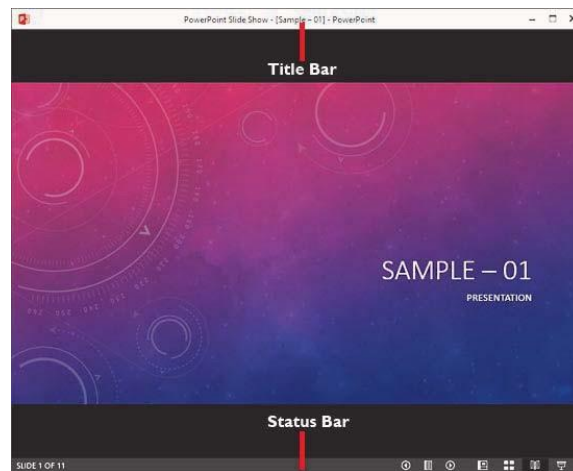
To start slide show view you can use a short cut key F5. It will automatically run your presentation on the screen.

To view this view, select View | Slide Show

Design Templates

This option displays a list of design terr plates and you can choose a pre-formatted style for your slides. These templates have already taken into consideration such issues in appropriate font size, colour schemes and background graphics.

They automatically format everything in the presentation, giving each slide a consistent look. Start PowerPoint if not already open.

Select the From Design Template option from the New Presentation Task Pane. (If a different task pane or no task pane is showing use File | New to display the New Presentation Task Pane.

The list of templates available to you will appear in the task bar. When the mouse is positioned over a design the name of the template will appear.

1.   Applying a Design

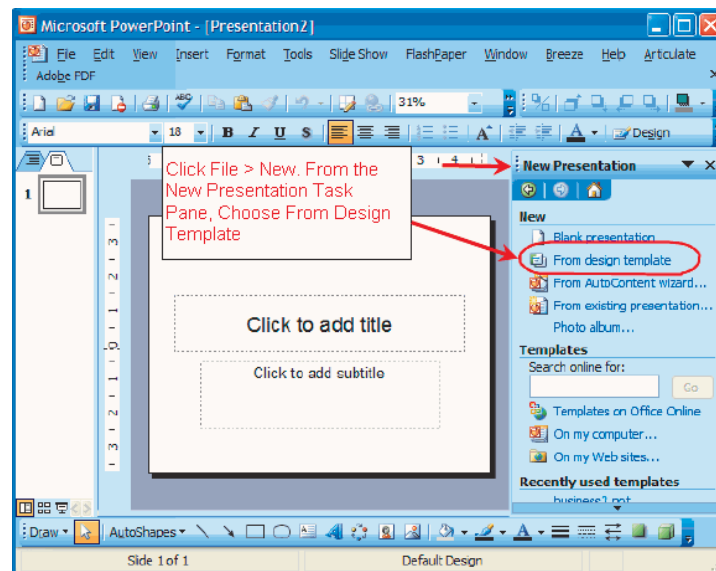Click on a design will apply it to all the slides in a presentation. You can each change to a different design by choosing another from the list. You can also modify the design in a number of ways.

When you position the mouse over a design, a bar with a downward arrow appeared on the design. Clicking on this allows you further choice as to how you apply the design. You can if you wish apply the design to only some of the slides.

Click on the Blends design from the list. The templates will be loaded and you can begin working on your presentation.

2.   Changing to another Design

Choose an alternative design from the Slide Design Task Pane.

If this Task Pane is not showing, either click the slide Design button (top right) to use the Format / Slide Design menu to display it.

3.   Modifying a Design

Designs can be modified in a variety of ways. Fonts and alignments can be modified using the Slide Masters (see section 11.1). The colour scheme of a design can be modified by selecting Color Schemes in the Slide Design Task Pane. A selection of alternative colour schemes is offered. By using the down arrow attached to each scheme you can choose which slides to apply the new colours to. If you wish you can customize the colours further by selecting Edit colour schemes a the bottom of the Task Pane.

Creating a New Slide

When you start a new presentation the first slide layout is for a title. If you do not want this you can change it to another layout by using the slide Layout Task Pane, this task pane is not shown, use Format | Slide Layout to display it or choose Slide Layout from the drop down menu on the Task Pane.

1.   Choosing an Slide Layout

The Slide Layout Task Pane allows you to choose a layout type (auto layout to the current slide. It contains a series of thumb-nail illustrations of different layouts. It can scroll through the list of layouts. When you have found the layout closest to your requirements click the OK button. Your selected layout will be applied to the current slide. You can, of course, modify this layout if it does not meet your exact requirement.

2.   Slide Objects

PowerPoint treats every element you wish to add to your presentation as an object. Each object has a set of properties which you can alter or define. These include size, colour, outline colour,

texture and certain animation effects. Objects also have positioned on the slide and can be moved, deleted, copies, rotated or combined with other objects. The types of objects you are most likely to encounter are:

Text
Clip art
Image
Organization charts
Diagrams
Graphs
Drawing
Multi-media elements

Formatting Slide Objects

Objects can be formatted in a variety of ways. See specific sections for more details. In general, an object can be formatted by either:

Using the Formal Menu

or

Right clicking on the object and selecting format "Name of Object" see sections 20 and 21 for more information about objects.

Deleting Slide Objects

Click on the object to select it. If the object is a text box, click on the text box border (you will see a dotted border).

Press the Delete key

Working with text

1.   **Using Auto-layout Text boxes**

If you choose an auto-layout that includes a textual element you can be presented with a blank slide containing a text box. Simply click inside the box and begin typing.

Select Title Slide from the Slide Layout Task Pane (if not already chosen).

Place your mouse pointer on the Click to add title text box, click the left mouse button to select it and type Computer Software Presentation.

Select the Click to add subtitle text box and type.

Adding Text

If you wish to include additional text:
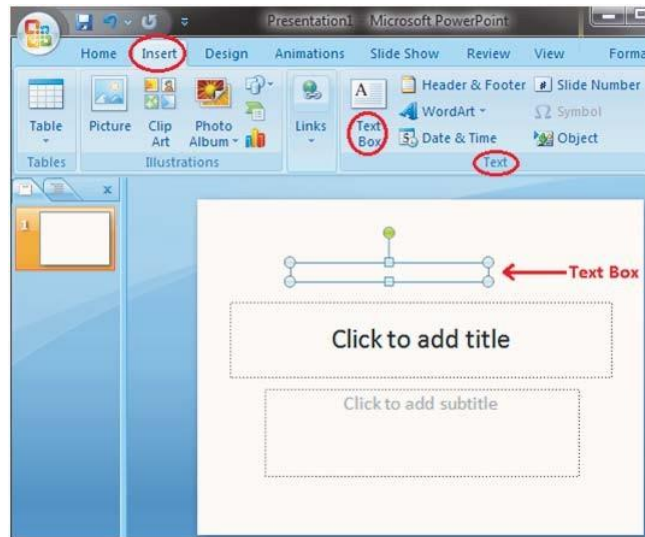
Click the Insert Text Box button from the drawing toolbar at the bottom of the screen (if the drawing toolbar is not shown, use the View / Toolbars menu and check Drawing.

Or select Insert | Text Box from the dropdown menu.

Click on the slide where you wish the text to appear. A small box will appear with a flashing insertion cursor.

Type this is a text box and then click anywhere on the slide.

Formatting

You can change the appearance of any text in your presentation. To do this, you must first select the text by highlighting it. Click and drag over the text you wish to alter.
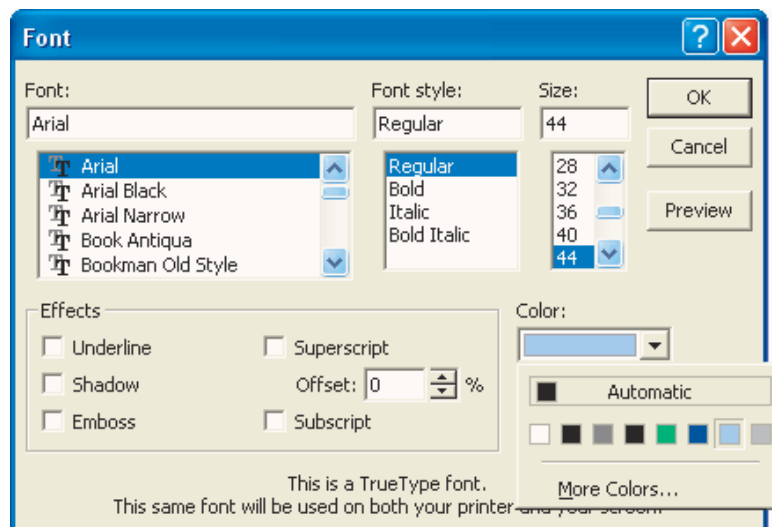
1.   Select the new font from the font drop down list – the selected test will be changed to that

font.

2.   Select the new size from the point size drop down list

Or

Click on either the increase font size or decrease side button in the toolbar. The more times you click, the bigger or smaller the selected text will become.

You can make the selected text Bold, Italic or Underlined or you may apply a shadow.

1.   Click on the appropriate button to apply that format.

You will notice that the button you clicked to apply the format will appear to be pressed – this shows that the chosen style has been applied.

Alignment

These buttons allow you to specify text alignment. You can align blocks of test to the left (with a ragged right edge) the right (with a ragged left edge) or fully justified (with straight edges on both the left and right sides).

Colour

PowerPoint allows you to specify a colour for any text character. Normally you would colour words or sentences, however it is also possible to colour individual characters and thereby produce some interesting effects.

1.   To colour text, select it and choose a colour by clicking on the down-arrow beside the Font colour button on the Toolbar (usually located at the bottom of the screen).

Adding Additional Slides

There are various ways of adding new slides to your presentations.

Adding a completely new slide

Select insert | New Slide

Or click on the New Slide button on the toolbar (top right)

A slide with the same layout as the current slide will be inserted after the current slide.

Use the Slide layout task pane to choose a layout style

Choose the Title and text layout

Type a title of your choice

Type a bulleted list.

Duplicating the Current Slide

Another method of adding new slides is to duplicate the current slide. This is particularly useful if you want to mimic a simple animation – the second slide might differ from the first only very slightly and when you move from one to the next in an onscreen display the effect will be to introduce only the differences between the two slides.

On the current slide, select Insert | Duplicate Slide.

Deleting the Current Slide

Slides can be deleted in a number of ways, either by pressing the delete key in Slide Sorter View or by selecting Edit | Delete slide.

Clip Art

Microsoft Office comes supplied with a wide range of pre-drawn pictures which you can import

to your presentation. If you are using a standalone computer you may find that not all the clip art has been installed or that you are asked the insert the Microsoft Office CD-ROM on which the images have been stored. If you are using PowerPoint on the Networked PC service, you will find that the ClipArt is readily available.
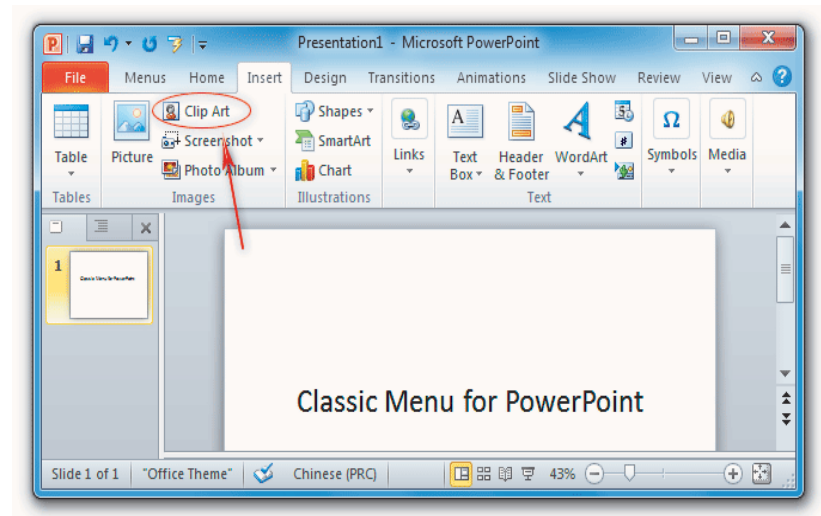
Clip Art Auto Layout

Insert a new slide

Select one of the Clip Art and text Auto Layouts from the Slide Layout Task Pane these are shown under content layouts (scroll down).

Add a title and / or a bulleted list

Double click on the clip art section to take you to the Clip Art.

Each picture in the Clip gallery is associated with keywords that you can use to watch for images. To search for a picture, enter a search word in the Search text field.

QUESTIONS

SHORT ANSWER TYPE QUESTIONS

(1)   What do you understand by MS-PowerPoint presentation?

(2)   What are the elements of PowerPoint?

(3)   How to crate and save a new presentation slide in PowerPoint.

LONG ANSWER TYPE QUESTIONS

(1)   What is slide view? Explain various views of slides in MS-PowerPoint?

(2)   Explain the various components of PowerPoint slides.

CHAPTER 13
MS-ACCESS

INTRODUCTION

MS-ACCESS is a relational Data Base Management System (RDBMS) that is used by millions of people to store and maintain high volume of information. Access is used to create and modify database tables, data entry forms, reports and queries that are the features of RDBMS. The information is Access database is stored in tables. A table consists of rows and columns. Each row is considered as a record and each column called a field. A record is a collection of related fields. Each column contains a discrete element of information. The data is stored in the created tables. Once the data is stored in tables, any type of queries can be performed, reports can be created and data entry forms can be designed.

COMPONENTS OF ACCESS

(1) **Database Window:** Database window is used to store all the objects in a single file. The extension name of this file is MDB. The primary navigation tool in Access is the Database Window.

(2) **Tables:** Data base is a collection of information. This information in Access data base is stored in tables. Table contains rows and columns. Each row in table is called a record. Each column in a table contains a discrete element of information, known as filed. A field may be any piece of information like student name, roll no., employees name, quantity, rate etc.

The following table example helps to illustrate records, fields and other data base concepts.

Employee Table

The first row contains field names. The remaining rows contain records having different data values.

(3) **Forms:** In Access forms are designed to display the data or query in the convenient format. These forms are also used to add the records and edit the records. For example, one can create a form that contains student names and address ignoring the other fields of tables. A form lets you focus on the information you need without cluttering up the screen or printed output with unwanted text.

(4) **Queries:** The role of query is to retrieve necessary information for a specific purpose. One can use queries to display information from multiple tables. Queries extract and display information as per user's requirement. For example a query can be created to find the merit position in different classes from the result declared by the university.

(5) **Reports:** A report is the organized document that you will print from your data. A report includes different parts or details about your database, it could include data from a single table, it

could also get data from various tables, queries forms or data calculated from other data coming from different tables or forms.

(6)   Page: Page in the Database window of access are an alternative to form and report objects and can be used similarly to build data-driven applications. The difference is that data access pages do not require Access to run once completed. Rather, they can be added to websites using Front Page or another web development tool. They can then be used by anyone with a web browser.

(7)   Macros: A macro is a way of automating routine tasks, so you can have the computer perform them for you rather than having to slug through them yourself.

(8)   Modules: Modules in Access are collections of Visual Basic for Application (VBA) statements and procedures, giving you a powerful means of working with your data.

DATA TYPES

Different data types are as under:-

Data Type	Description
Text	A character string with a maximum length of 255 characters.
Memo	A character string with a maximum length of 64,000 characters. Usually used for descriptions of items (i.e. describing a truck would probably require more than 255 characters). A memo field cannot be used as a primary key.
Number	Various types of numbers. There are many different subtypes to select from in Field Size. They are Double (15 places, 8 bytes), Single (7 places, 4 bytes), Long Integer (-2.1 to + 2.1) billion, 4 bytes, no decimals), Integer (-32 to + 32 thousand, 2 bytes, no decimals) and Bytes (Values (0 to 255, 1 Byte, no decimals).
AutoNumber	Access will automatically generate a number for this field. Usually used as a unique identifier for primary key purposes.
Yes/No	Used to store logical results from True or False results
Date/Time	Used for storing dates and times. The format can be changed in the Format box.
Currency	Used for storing numbers (not necessarily in a dollar format) can hold 15 places to the left of the decimal and four places to the right, takes up 4 bytes.
OLE Object	Used for OLE complaint applications (i.e. linking a portion of a spreadsheet to the table)
Hyperlink	Used for storing web addresses.
L o o k u p Wizard	This field will allow you to choose a value from another table or from several using a list box or a Combo box.

Creating a Database: To create a database in MS-Access, click on File →New →Blank Database. It shows the following dialog box to save the database because all the objects (table,

query etc.) will be created using a database.
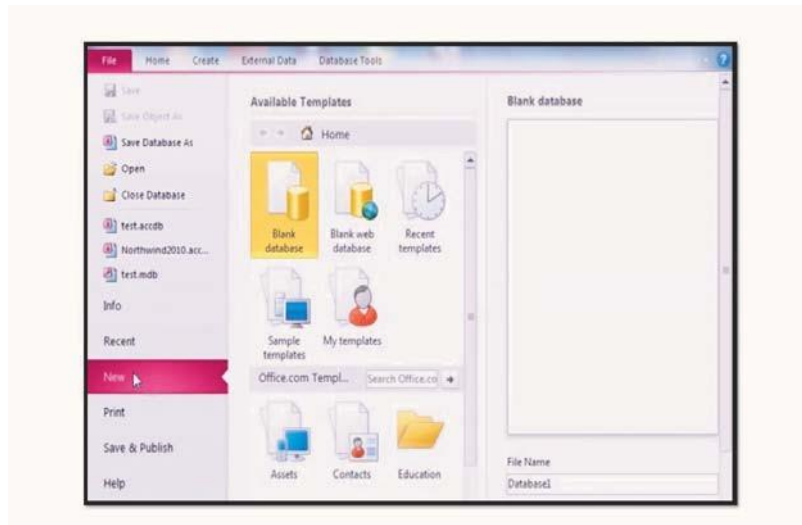
*Fig.*File New Database

Here you save the database by giving file name and clicking on the Create button. The extension name of the database file will be .Mdb.

You can create the table in Access by using:

Design View

Wizard

By entering Data

Here we create the table by using the Design View. For that purpose click on the option Create Table in Design View. It shows the following screen.

Now enter the field names as per your requirement. A field name can contain any character,

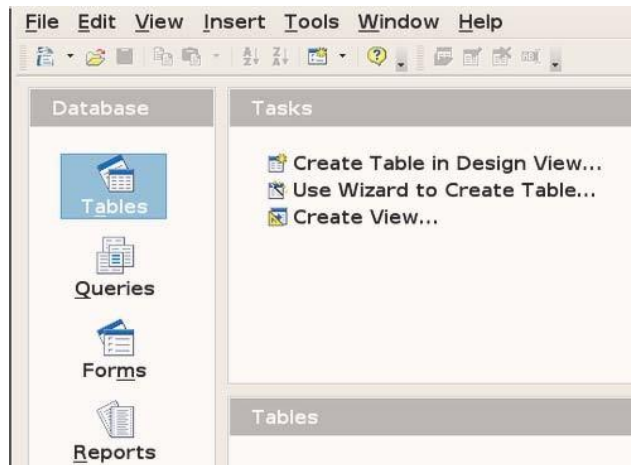number, except period (.), square brackets, exclamation sign. Now press **Ctrl+S** or **Save** from **File** Menu Item. Type table name in the **Save As** dialog box and Click on **OK**. It shows a dialog box which asks for whether to create a primary key or not. Click on **Yes** to add primary key. It will add ID as field name with data type as Auto Number. The table is created.

LIST OF ITEMS ON THE SCREEN

Item Name	Description
Field Name	Name of the field, can have spaces.
Data Type	Type of data that is to be stored. Can be things like text, numbers, data / time, memo etc.
Description	A description of the field. This is optional and will show in the status bar when the user is in that field on a form or in the datasheet view.
Primary key	Sets the field to be a primary key (ensures that no two records contain the same value for that field.
Field Size	Allows you to set the size of the field (i.e. limit text entries to 10 characters.
Format	Format in which to display the values for the field to the users (i.e. show a postal code with the space in the middle.
Decimal Places	Set the number of decimal places to show for a numeric field.
Input Mask	Restrict the data that the user can enter. Used to ensure correct data entry i.e. for a postal code, you want to make sure that the first character entered is a letter and not a number.
Caption	If you want a different name to appear for the column header in the datasheet view or the label in form view (i.e. originally call field "emp#" but you want the labels to say "Employee Number").
Default Value	A value to be entered in to the table if the user does not enter one.
Validation Rule	Can be used to validate the information the user enters. (i.e. make sure the value is always less then 100).
Validation Text	Allows you to set the message that appears if the validation rule fails. If nothing is entered for this value, Access will display a default message.
We are creating	Products data base with following specification:
Field Name	Description Data Type Other Information
Product Name	Name of the product Text Field size of 30
Category	Category product falls in Text Field size of 20

Item Name	Description		
Distributor	Company where we buy the Product	Text	Field size of 20
Cost Price	Price we buy product for	Currency	
Markup	Amount we increase the price price from cost	Number	Field Size of Single

We want the Product Name to be our primary key as we will never have a product with the exact same name as another. To se the Product name as the primary key:

Place the mouse on the selection box beside Product Name (looks like a gray stub) and the mouse will change to a. When it changes, click the mouse button.

Click the Primary Key button.

Now that we have all the fields entered in the table, we have to save the table. To save the table:

Chick the save or select *File, Save* from the menu.

Click on **OK** button.

Close the Table

To close the table, click the ⊠ button or select *File, Close* from the menu.

Entering Values in a Table

In the Access main window, you should see an entry called "Products" under the Table section. To enter values in the table, click the table name (Products) and click the **Open** button. The datasheet view will open. It looks like a spreadsheet-like format.

Each now represents one record and each column represents the specific field. Here is a list of keys for entering values:-

Key	Description
Tab	Moves to the next field to the right. If you are in the last field for the record, when the Tab key is pressed, it will move you to the next record below.
Shift Tab	Moves to the nest field to the left. If you are in the first field for the record, it will move you to the next record above the current record.
Arrow keys	Moves in the direction of the key pressed.

Select File / Close to close the table.

CREATING QUERIES

A query is a request you present to the database, and the database displays it to you. The whole purpose of creating a query lies on how you formulate it. Select queries can contain any of the following:-

Field from one or more tables or existing queries.

Calculated fields.

Hidden fields, useful for sorting and filtering selected data.

These are three main ways by which you can create a query in Microsoft Access. The Query offers the simplest approach where in a step by step process you define the query and the database will display its answer. You can create the query by using **Design view or by using wizard**. The best way to build a query is by using the Design View. Once you get familiar with queries, you will find out this is just a group of words called a statement you formulate. This approach is the most complex because you need to define structure of a query statement, but it provides more control.

The purpose of a query is to isolate data, this is done for various reasons. For example when a user is performing data entry such as hiring contractors, for this various information is typed into the database. Later on, if he want a specific list of contractors based on their job functions, he might ask to isolate a list of contractors who are specific contractors. This is the role of queries.

Creating a Query

We can create on a table as well as another query. First of all we open the table on which we want to create a query. For this select **File > Open** to the open the Database. Then Select the database from the list of files. Select the table(s) that you want for query purpose. You can create query either by selecting:

Create query in Design view

Create query by using Wizard

Fig. *Creating Query*

We are going to use the Design View to create a query. Double click the Design View in the list.

Then we will pick the type of query. Now we will select which table(s) are going to be a part of the query. The Show Table window will appear.

This window lists the possible tables and queries to select from to build the query. You only

have the one table. Click the Products name in the Table Tab area and click the Add button.
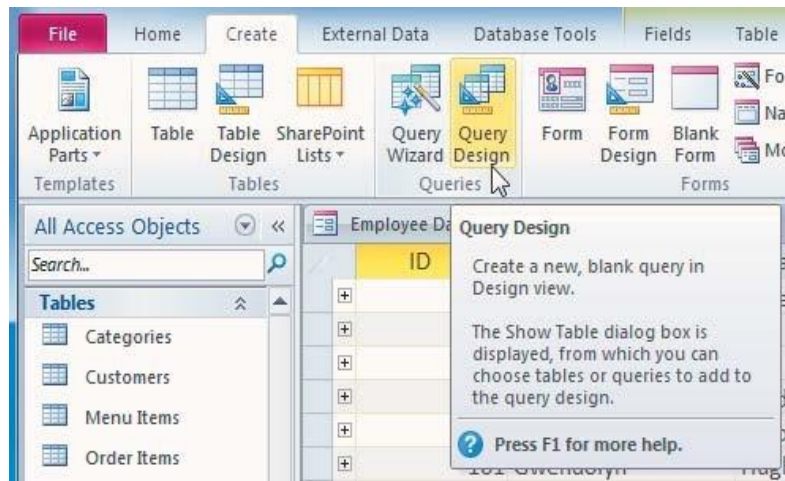
Fig. *Selecting a Query*

This adds the table to the query. Click the **Close** button. You will now see the Products table in the **Select Query** window.

Selecting the Fields

You now have to choose which fields you want in the query. There are two ways:

(a)   Drop-down list box.
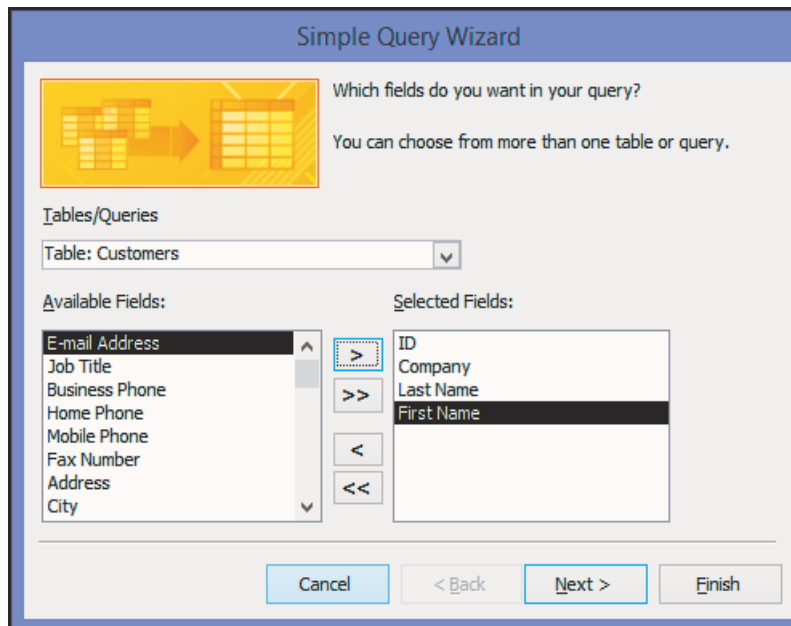
Fig. *Selecting the Fields*

In the first blank column, click once in the Field row. If it is already showing something written in it, a small down arrow will appear by to the right of the white box. Click the Down arrow. This will list the fields that can be selected.

(b)   Click and drag from Table box

In the select query, you can see the Products table. In this box, it lists all the fields in the Product table that can be selected for the query. To select the field, click and hold the left mouse button on the Category field in the Product table box. While holding the mouse button down, drag the mouse on top of a blank column and release the mouse button.

RUNNING THE QUERY

Even though we have not entered any criteria, we can execute the query. To run the query, click the Run button or select Query, Run from the menu. To remove the sorting, click the down arrow in the Sort box and select (not sorted).

Showing a Field – When you select a field to have in the query, it shows in the dynast when the query is run. But, there may be an instance where you may want a field in your query but not to show up in the query. For example, let us say that someone wants a list of products that cost us more than $1 but they do not need to know the prices for the product. In this case, you would include the ProductName and CostName, with CostPrice having a criteria of greater than one. If you click the Show box under the CostPrice column, this would prevent the price from being displayed in the dynaset, but you would only get the products that are more than one dollar showing because of the criteria for CostPrice.

Removing a field from the query

To remove the Category field, use one of the following:

(i)   Move the mouse pointer to the top of the Category column. The mouse pointer will turn to a ↓. When it switches to the down arrow, click the mouse button once and the column will become highlighted. Press the **Delete** key on the keyboard or click the Cut button on the toolbar.

(ii)   Click once anywhere in the Category column and select Edit, Delete Column from the menu.

SQL View

The main advantage that Access has is the graphical user interface for creating queries. The SQL code for the query is automatically generated in the background.

If you want to see the SQL code that is generated by the query, first open the query then select View, SQL View from the menu. This will show you the SQL code. You can make modifications in this window if you know SQL. But, as soon as you make any changes, you cannot go back to the Design View.

To return to the Design View, select View, Design View from the menu.

Save the Query – To save the query select File / Save option.
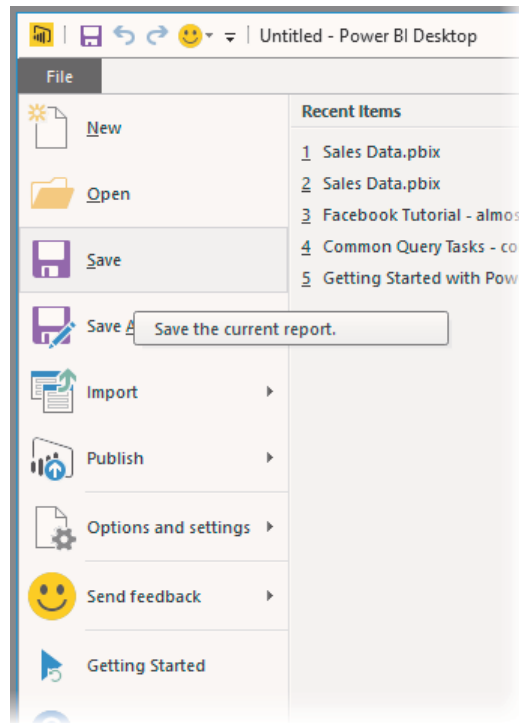
Specific Criteria for Query: The criteria may be based on text values or numbers.

HANDLING NUMBER QUERIES

There are many different ways that we can deal with numbers. The most common ones are when we are looking for values less than something or values that are greater than something. For example, find all products that have CostPrice less than 80 cents.

(i)   Once in the Design View, delete the "Pop" criteria for Category by highlighting the Criteria box and pressing the Delete key on the key board.

(ii)   In the Criteria box under the CostPrice column, enter in "<9".

(iii)   Run the query by clicking the Run button or select Query, Run from the Quick menu.

On the status bar of the dynaset window, it will say how many records fit the criteria. There are 20 records in our table, but from this query we just run, we only see 10, so we know the query worked. Also, if you quickly scan down the CostPrice category, you should notice that all the values are greater than 90 cents.

To return to the Design window, click the Design button or select view, Design View from the menu.

Let's try another one. Now we are looking for all the products that cost between 2 and 5 dollars.

(i)   Once in the Design View, delete "<9" criteria for CostPrice by highlighting the Criteira box and pressing the Delete key on the keyboard.

(ii)   In the Criteria box in the CostPrice column, enter in "between 2 an 5".

(iii)   Run the query by clicking the Run button or select Query, Run from the Quick menu.

On the status bar of the dynaset window, it will say how many records fit the criteria. There are 20 records in our table, but from this query we just run, we only see 10, so we know the query worked. Also, if you quickly scan down the CostPrice category, you should notice that all the values are greater than 90 cents.

To return to the Design window, click the Design button or select View, Design view from the menu.

Handling Text Queries: Take the example for all entries that end with the letter '$'. For this, we want to look at all entries where there are no characters before or many characters before the '*s' on the end.

(i)   From the Design View, delete the "Pop" criteria for Category by highlighting the Criteria box and pressing the **Delete** key on the keyboard.

(ii)   In the Criteria box in the ProductName column, enter in "*s" (without quotations).

(iii)   Press the down arrow key on the keyboard. The "*s" turns to "Like *s". Access does this for you automatically. It converts it into the way that it needs to run the query.

(iv)   Run the query by clicking the Run button or select Query, Run from the menu.

To return to the Design window click the Design button or select View, Design View from the menu.

Queries Based on Advanced Criteria: It is based on more than one conditions.

Query based on OR condition:

The OR condition allows us to select different sets of criteria for the same field. For example, we are looking for all products that have the letter 'p' or the letter 'k' anywhere in the text.

(a)   If you haven't done so already, delete any criteria that is there already.

(b)   In the criteria box it the ProductName column, enter in "*p* or *k*" (without quotations).

(c)   Press the down arrow key on the keyboard. The phrase turns to like "*p*" Or like "*k*". Access does this for you automatically. It converts it into the way that it needs to run the query.

(d)   Run the query by clicking the Run button or select Query, Run from the menu.

Query based on AND condition

The AND condition allows you to set the criteria for the query based on multiple fields. For example look for all products that are in the Cookies category and more than $3.00.

(i)   If you haven't done so already, delete any criteria that is there already.

(ii)   In the criteria box under the Category column, enter in "cookies" (without quotations).

(iii)   In the Criteria box under the CostPrice column, enter in ">3" (without quotations).

(iv)   Run the query by clicking the Run button or select Query, Run from the menu.

To return to the Design window, click the Design button or select View, Design View from the menu. You can also have an AND within the criteria for one field. For example to find all the products that have the letter 'o' and the letter 'e' in them.

In the Criteria box in the ProductName column, enter in "*e* and *o*" (without quotations). Run the query by clicking the Run button or select Query, Run from the menu.

To return to the Design window, click the Design button or select View, Design View from the

menu.

Query `based on Calculation

A calculation query allows you to perform arithmetic and string calculation on the field in the query.

In the criteria box specify the expression by using required operation along with field names and click OK.

Then run the query by clicking the Run button or select Query, Run from the menu.

Printing a query

For printing a query, select the File / Print menu option. Query can be printed as a word document or as a mail merge.

WORKING WITH FORMS

Forms provide a way to present the information contained in a table or query so that you can view and update it. You can create forms to display, edit or output your table or query information almost in any layout. From are based on the dates contained in either tables or queries. Forms allow you to build your own unique views of your information rather than having to use the standard format presented by tables and queries. Forms can be designed either by using Form Wizards or by using design toolbox. Form may contain as many as five sections:

Form Header   Page Header   Detail   Page Footer
Form Footer   Creating the Form

Form can be created in several ways. These can be created directly in Design View or by using one of the Wizards.

Creating a form in Design View

For creating a new form, click the Forms tab in the main window and click the New button.
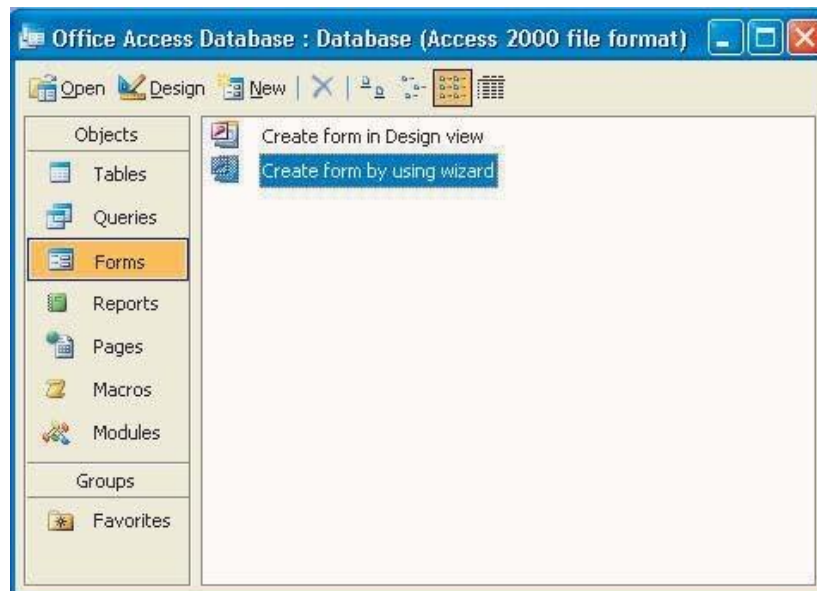
The New Form Window will appear as follows:
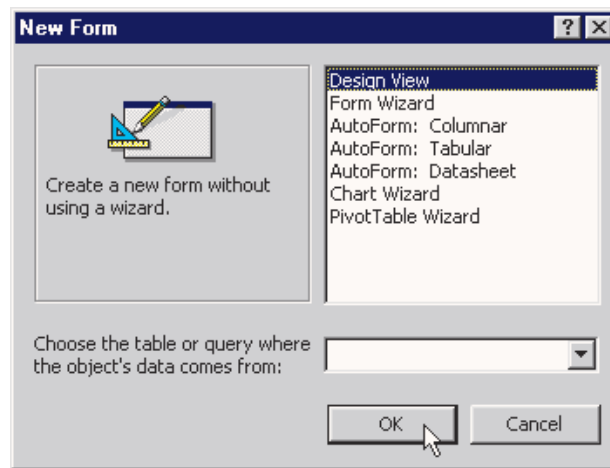
To use the Design view. Click the Design View, in the list. Click the down arrow and select "Product" from the list. Click on **OK** button.

Form Screen: It is depicted as below:-
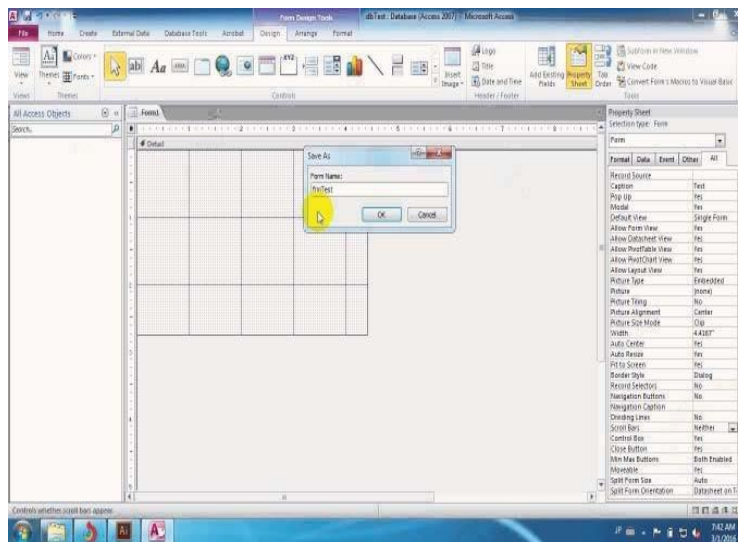
Objects will be placed in the work area. The toolbar below the menu shows list of different options to select from. The Toolbar is a display of the different types of objects that can be placed on the background.

s

To add a Label Object

A label object is equivalent to a title. It is a static object, so it does not change as on ego from one record to the next.

Addition a title on the form

1.   In the Toolbox, click the Label button, The mouse printer will change to 'A'
2.   Click once near the top of the form. A blinking cursor will appear.
3.   Type title of your choice.
4.   Press the **Enter** key or click once anywhere else on the form.

To Add a Text (Control) Object

These types of fields are the ones that change depending on which record you are on. They can handle data from the table itself or can contain calculations in them. There are two different ways we can use Text objects.

The Toolbox Button

In the Toolbox, click the Text Box button. The mouse pointer will change to ⁺ab

Click once on the working screen and drag.

Move the mouse pointer on top of the white 'Unbound' box. When the pointer changes to 1 click the left mouse button once.

Type in "Product Code" and press the **Enter** Key.

In figure the white box represents the information that is stored in that field in the table. Now save the form. The screen will show us all the different products we have, as we go from one record to the next. Using this method one can manually modify both the Text Object and the Label Object.

View the Form

The Form View shows the actual information that is stored in the tables.

To switch to the form view, click the View button on the far left of the toobar.

The Form View for the form should be displayed.
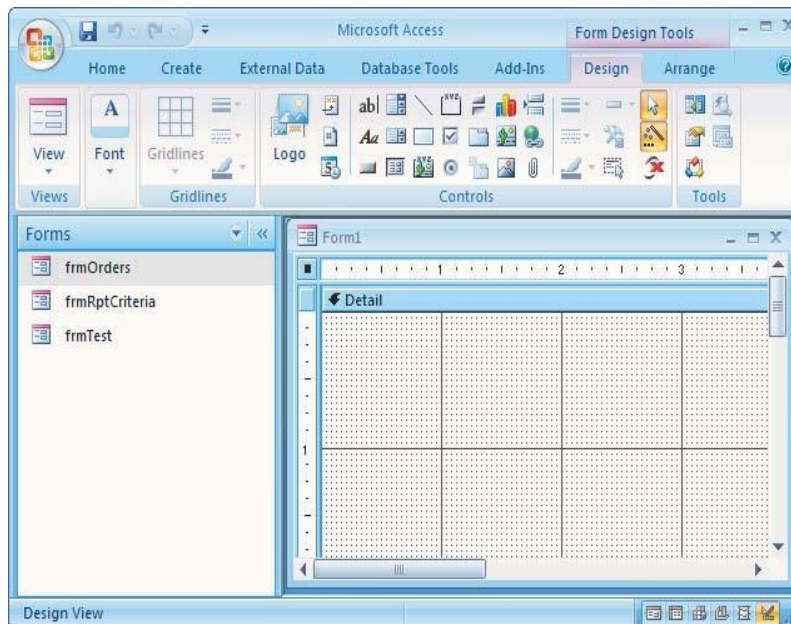
The Field List box

(i)   If the Field List box is not visible, click the Field List box button on the toolbar.

(ii)   The Field List box should be visible and list the fields in the Products table.

(iii)   Move the mouse pointer on top of Productcode in the Field List box.

(iv) Click and hold the mouse button on ProductName. While holding the button down, drag the mouse pointer below the other field that we created.

(v)   Release the mouse button.

MOVING IN THE FORM VIEW

Following are the different ways to move around in the Form View.

Item Name	Description
Ctrl-Home	To move to First record in the table.
Ctrl-End	To move to Last record in the table.
Page Up	To move to Previous record in the table.
Page Down	To move to Net record in the table.
Tab	To move to Go to the next field to the right.
Shift-Tab	To move to Go to the next field to the left.
Arrow Key	Goes to the field in which ever direction you press. If you are in the last field on form, by pressing the down or right arrow will go to next record.
Home	To move to First field on the form.
End	To move to Last field on the form.

FORM SAVING

From File menu click the Save button. The Save As window appears as follows:-
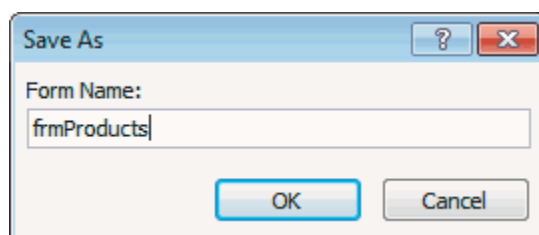
Type in file name and click OK.

Selecting Objects

After selecting an object, you can perform whatever action on it.

To select multiple fields at one time, hold the *SHIFT* key down on the keyboard as you click the fields you want to select. If you select a field that you did not mean to, just click the field one more time while holding the shift key down.

Resizing Objects

There will be instances where the size of the object will not be big enough. This could be where the product code is longer than the object box or changing the font size to something larger than the box is currently sized for. For resizing an object follow the steps:

Select the object (e.g. click on Product code)

After selecting the object, there should be a series of boxes on the sides and corners of the object. These are called Resizing Boxes. Place the mouse on one of the boxes.

The mouse pointer will change to a double headed arrow. Once it changes, click and hold the mouse button down.

Alongwith holding the mouse button down, drag the mouse in the direction the object is to be resized.

Moving Objects

To get the better look some times, we want to move the objects ground.

Move a Label Object

Select title

Move the mouse pointer anywhere on top of the box until the mouse pointer turns into a hand printer.

Once the mouse pointer changes, click and hold the mouse button.

While holding the mouse button down, drag the mouse in the direction the object is to be moved. As you drag the mouse around, a rectangle will follow the mouse. Position this rectangle where the object is to be moved.

Release the mouse button.

Move Text Object

Select the Productcode object. After doing this, you will see the normal resizing boxes as mentioned previously. But, if you look in the upper left corner of the objects, you should see larger boxes. We will use these boxes to move the objects independent of one another.

Move the mouse pointer on the big box for the Text Object until the mouse pointer turns into a pointed finger pointer.

Once the mouse pointer changes, click and hold the mouse button.

Holding the mouse button down, drag the mouse in the direction the object is to be moved. As you drag the mouse around, a rectangle will follow the mouse. Position this rectangle where the object is to be moved.

Release the mouse button.

Changing the Font and Alignment of an Object

There is a wide variety, it will be more likely that you do not want the same boring font for everything.

To change the font of an object, select the object and use one of the options on the toolbar. List of some of the different options:
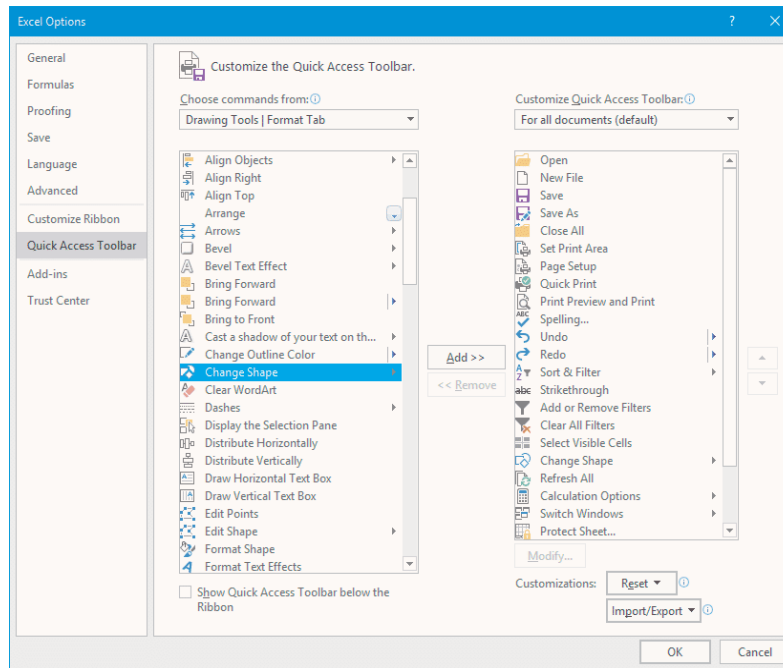
Fig._Options for font and alignment of an object_

Move an Object

To remove an object:

Select the object

Press the Delete key on the keyboard or click the Cut button.

Creating the Form using Design view:

To create a new form, click the Forms tab in the main window and click the New button.

Click the Design view in the list

Click the down arrow and select "Products" from the list.

Click the OK button.

Save the form

Click the Save button or select _File, Save_ from the menu.

The Save As window appears. Type filename of your choice.

Click the OK button

Creating a Title

In the Toolbox, click the button. The mouse pointer will change to ⁺A.

Click once near the top of the form. A blinking cursor will appear.

Type in title name.

Press the Return key or click once anywhere else on the form.

Changing the Font

If the Label Object is not selected on it.

Click the down arrow on the Font Type box on the toolbar.

Scroll through the list and click on required font.

Changing the Size

Select the label object.

Click the down arrow on the Font size box on the toolbar.

Scroll through the list and click 14.

Underline the Title

If the Label Object is not selected, click on it.

Click the Underline button on the toolbar.

Save the Form

Click the Save button or select *File, Save* from the menu.

To add picture object: To add a picture, follow the following steps:

Click New button, it will display New Form Dialog box. Select table and pick Form Wizard then OK.

Put picture along with others in the selected Fields box and click <Next>.

Click Tabular option then <Next>

Click Finish button. It will display new form.

Select the required picture then press <Ctrl+s>.

Subforms

Sub forms are required to design for multiple forms based on different tables or queries on the same page. The procedure to create sub forms is as under:-

Click on forms tab in the Database window.

Pick the A-Form form and click Design.

Click the subform /sub report tool on the toolbox and drag an area below the displayed A-form as shown below:

Click on the source object row of the properties box and click on specific tables.
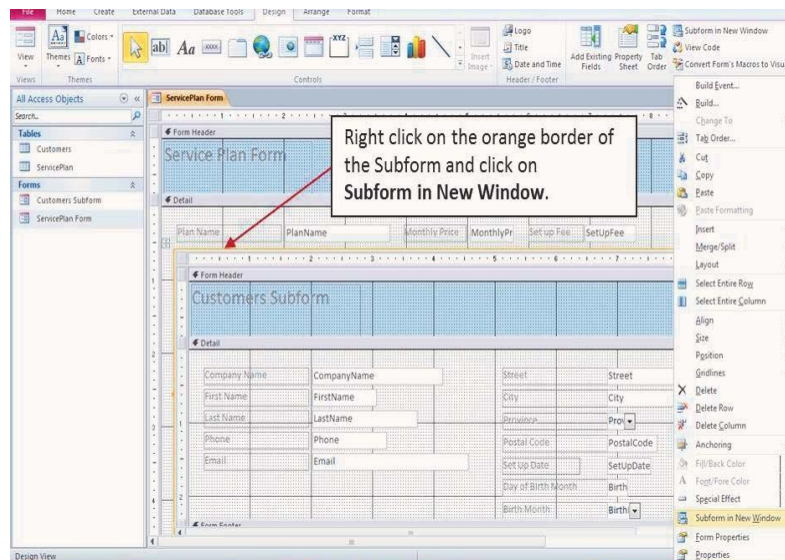
Click form view to see the resulting form.

Use File/Save as to save this form under new name.

QUESTIONS

SHORT ANSWER TYPE QUESTIONS

    (1)   Discuss the data types in MS-Access.

    (2)   Discuss the steps to create a table.

    (3)   What is sub forms?

    (4)   Write different ways to move in the forms view.

LONG ANSWER TYPE QUESTIONS

    (1)   What is MS-Access and various component of MS-Access.

    (2)   What is query? How we can handle the number queries and text queries?

    (3)   How can we create form ad improve the appearance of a form in MS-Access.

CHAPTER 14
WEBSITE CREATION

INTRODUCTION OF HTML

HTML stands for Hypertext Markup Language, and it is the most widely used language to write Web Pages. HTML forms the bases of the WWW.HTML is used to define how pages on websites should appear and how text and graphics should be laid out.

Hypertext refers to the way in which Web pages (HTML documents) are linked together. Thus, the link available on a webpage is called Hypertext. Markup Language which means we use HTML to simply "Mark-up" a text document with tags that tell a Web browser how to structure it to display.

Originally, HTML was developed with the intent of defining the structure of documents like headings, paragraphs, lists and so forth to facilitate the sharing of scientific information between researchers. Now, HMTL is being widely used to format web pages with the help of different tags available in HTML language.

HTML (HYPER TEXT MARKUP LANGUAGE)

Actually, HTML document is a plain text file that contains text and nothing else.

When a browser opens an HTML file, the browser will look for HTML codes in the text and use them to change the layout, insert images, or create links to other pages.

HTML documents are just text files they can be written even in the simplest text editor.

HTML is designed to specify logical organization of a document, with important hypertext extensions. It is not designed to be the language of WYSIWYG (What You See Is What You Get) word processor such as word or word perfect. This choice was made because the same HTML document may be viewed by many different "browsers", of very different abilities.

HTML instructions divide the text of a document into blocs called elements. These can be divided into two broad categories-those that define how the Body of the document is to be displayed by the browser and those that define information, 'about' the document such as the title or relationships to other documents.

FEATURES OF HTML

(1)   Instructions to Web Browser: A HTML file is a file that contains small mark up tags which are instructions for a web browser (Internet explorer Or Netscape Navigator Gold) "How to display the information on web pages"?

(2)   Web Pages: It is a program that contains the HTML information which is called a web page and well defined set of these web pages is called a website.

185

(3)   Use any text editor: The HTML file must have ".HTML" extension in DOS and ".HTML" extension windows. The HTML file can be created using any text editor, NOTEPAD, MS WORD, WORD PAD, MS DOST text editor or any other editor, but mostly we use NOTEPAD text editor.

(4)   Provide Static Information: HTML provide static information on website that we cannot change the data or upload data or get results.

(5)   Directly connected with other websites: HTML pages can be connected directly in other website software like front page 2000, dream weaver, flash etc.

(6)   Use of uniform resource locator: HTML provides URLS that help retrieve web pages from computer connected to the internet.

(7)   Tabular Representation of Data: Various tables can be framed by using HTML.

(8)   Use of various colors and sizes: In HTML user can use various colors for their good representation of data and also can use different size font.

(9)   Hyper linking: HTML provides tags that enable end user to access the other resources of information just by clicking on the hyperlink.

TYPES OF TAGS

Tags are used in HTML documents. Tags provide instruction to browser for specific action. Mostly tags starts from <and end with>. Starting and closing tags of HTML are: <HTML> and </HTML>. Tags are two types.

(1)   Container Tag: Container Tag is used twice in a document. In this one tag is used for starting the Container Tag and another is used for closing the Container Tag. Test is written in between these two Tags. That's why it is also called Pair Tag or Companion Tag.

Example: <Body>

                              ………..

                              ………..

                              </Body>

In the example <Body> Tag is the starting Tag and </Body> Tag is the ending Tag. Slash (/) symbol represents the Closing Tag.

(2)   Empty Tag: That Tag where no closing tag is used are called Empty Tag. It is a Solo Tag. That's why it is also called singular tag. Example:

                              ………...

                              ………...

 tag represent "Break". The closing tag is not used in it. Other examples are:

          <LI>

          <DD>

          <DT>

Tags used in HTML:

Following   are   the   some   major   tags   used   in   the   HTML:

Tag	Description

<HEAD>	This tag indicates the header information for the web page.
<HTML>	This tag indicate starting of HTML Program
<BODY>	This indicates the main text section of the document.
<TITLE>	This is the title to be displayed on browser window.
<SCRIPT>	This is used to insert dynamic non-HTML code in the web page. Such as JavaScript code.
<TEXT AREA>	This is used to insert a multilane textbox in the page.
<FRAME>	This is used for split the document window into frames.
<A>	This is used for inserting an hyperlink.
<IMG>	This is used to insert an image.
<APPLE>	This is used to insert a JAVA APPLET in the page.
<FORM>	This is used to insert a FORM that can send information over the internet.
<INPUT>	Used to insert elements such as Text fields and Radio buttons.
<SELECT>	Used to insert a dropdown select element.

STRUCTURE OF HTML DOCUMENT

The complete document is written between <HTML> and </HTML> tags. The tags <Head>, <Body>, <Title> etc. are written between these.

The Structure of HTML Document is as follows:-

```
<HTML>
</HTML>
………….
………….
</HEAD>
<BODY>
………….
………….
</BODY>
</HTML>
```

<HTML> …</HTML>

Encloses the entire HTML document. This tag tells the browser that it is reading an HTML document and to display as such. Without that tag your information will display as source code on the client's browser.

An HTML document is divided into a HEAD and BODY.

<HEAD> … </HEAD>

HEAD SECTION

The HEAD of an HTML document is where information such as the document's title, can be placed. The <head> element can include a title for the document, scripts, styles, meta information, and more. The heading section is indicated by the <HTML>…</HTML> tags.

All data in the head section of an HTML document is considered "meta-data", meaning "data about data". The information in this section is not normally displayed directly.

The following elements can go inside the <head> element:

 <title>

 <style>

 <base>

 <link>

 <script>

 <noscript>

BODY SECTION

The BODY of an HTML document is where all the information you wish to view must appear. The body section is where the web document text, graphics, and other elements are placed. The body section is indicated by <BODY> and </BODY> tags.

HTML body section supported all the contains such as text, hyperlinks, images, Special Character, lists, tables, frames, forms, etc. It's most powerful section and important section to display web page. The text must be carefully marked up, paragraphs must begin with the <p> marker and the end of each paragraph must be clearly marked using the HTML tag </p>.

CREATING A WEB PAGE

Here we will describe how to create a Web Page. Home Page is the First Page of the Website. In this various types of Links are available. With these links, the relationship among other pages are established. To create a Web Document, Notepad Text Editor is used and it is saved by .html extension.

Notepad is opened by the following two methods:

1. Start → Programs → Accessories → Notepad

2. Notepad can also be opened by typing notepad in Run Dialogue box.

looking at the web page

Following steps are used for Viewing the Web Page by using Internet Explorer:

(i) Click on Start → Programs → Internet Explorer or Double lick on the Internet Explorer icon on the desktop.

(ii) Internet Explorer Window will open.

 iii) From File Menu click on open.

(iv) Click on Browse and open the first.html file.

(v) Internet Explorer shows the following Message
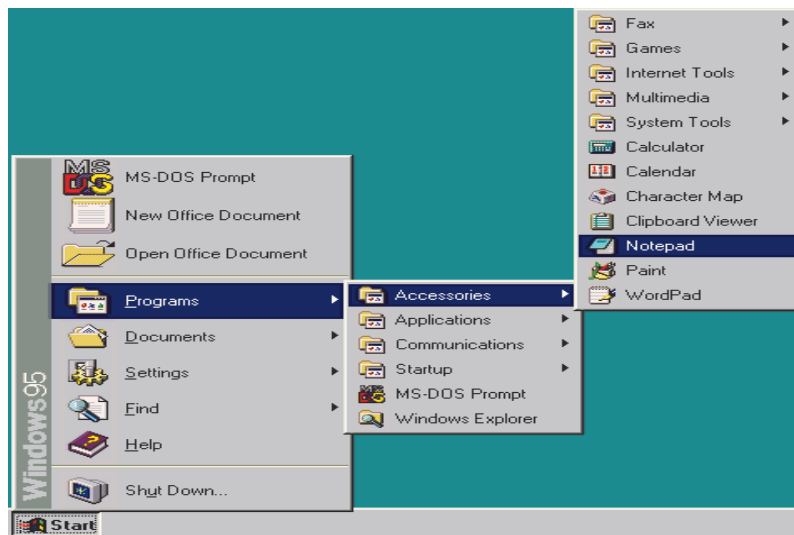
Fig. *To Open a Notepad*
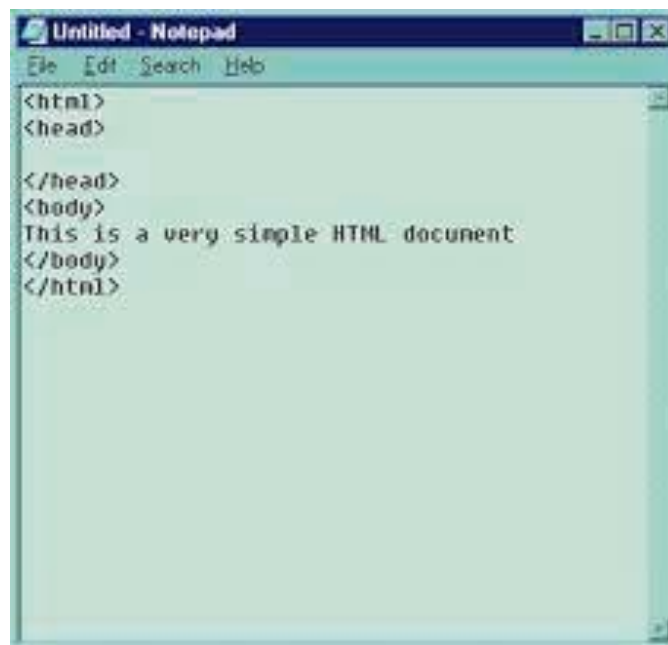
Fig. *HTML document in Notepad*

HTML TAGS

(1)   **Head Tag**: Head Tag is a tag in which Header information is present. The Title of Document is written in Head Tag. This is a Container Tag. This Tag starts with <Head> Tag and ends with </Head> Tag.

(2)   **Title Tag**: This is a Tag in which the Title of Web Page is written. This is used between the <Head> and </Head> Tag. In this <Title> Tag and </Title> Tag are used.

(3)   **Body Tag**: This is a Tag which is used to display the whole material of the Web Page. That whole material is enclosed in <Body> and </Body> Tag. This is also a Container Tag.

(4)   **Heading Tag**: Heading Tag is used to set the Heading. Heading has total 6 Levels All the letters of Heading in a given Level have same Font. The Levels are numbered as Heading 1 to heading 6. The Font size goes on decreasing as we move from Heading 1 to Heading 6.

The Heading in Level 1 is expressed by Tab <H1> and </H1> and Level 2 is expressed as <H2> to </H6> is the lowest Level.

Example: Different headings and alignments:
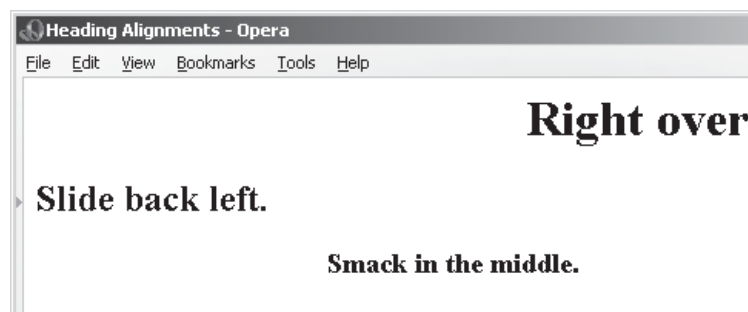
Fig. *Different headings and Alignments in HTML documents*

(5)   **Paragraph Tag**: It is the basic composition of HTML. It started with <P> and close with </P>.

To get to next line leaving one line blank, <P> Tag is used. <P> Tag leaves a space between the previous line and the new line. It starts with <P> Tag and ends with </P>
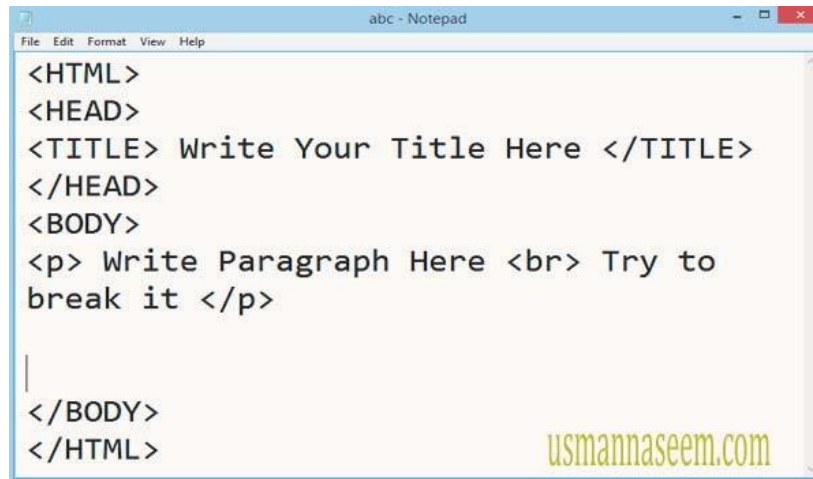
Example: Showing paragraph tag.
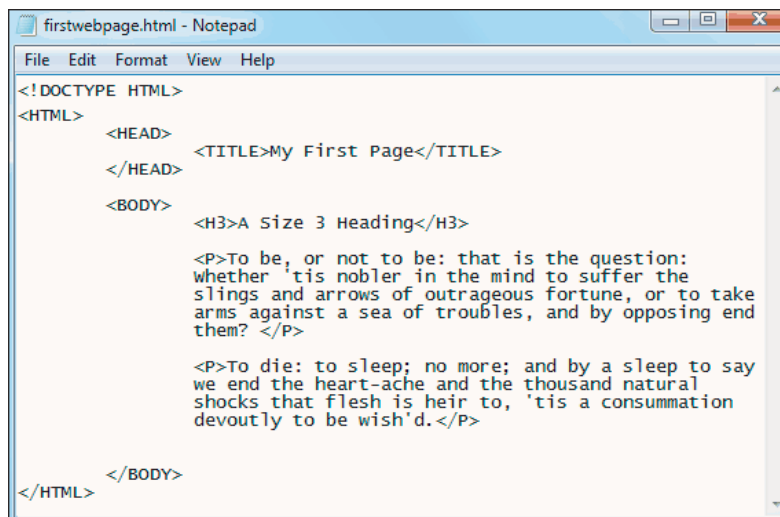
Fig. Using paragraph tag

(6)   **Line Break**: Line Break is an Empty Tag because it does not contain Ending Tag. Line Break is used to Start the Text from the new line. In this Tag the Text jumps to new line. This Tag does not provide empty space between the previous line and a new line.
 Tag is used for line break.

Example: Using line break tag.

Fig. Using break tag

CHANGING FONT

Font is the predefined style and size of the Text. Font is a Container Tag. For changing Font <Font> and </Font> Tag is used. Font has three characteristics:

(i)   **Style:** Font style is changed by three methods: Bold, Italics and Underline for Bold <B> …….. </B> Tag, for italics <I> ….. </I> Tag and the Underline <U> ……… </U> Tags are used.

(ii)   **Font Size:** It is used to set the Font size. Font size can be changed from 1 to 7.

Color: This is used to set the Color of the Font.

Example: Using font, color, size.
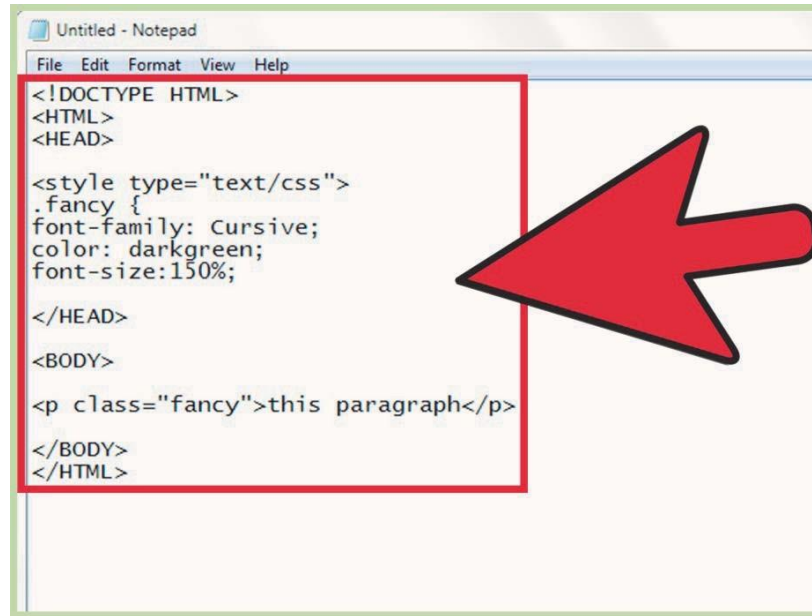
Fig. Using font, color and size

MARQUEE:

Marquee: To make the Text Dynamic, Marquee Tag is used. This is one of the Container Tags.

Example:
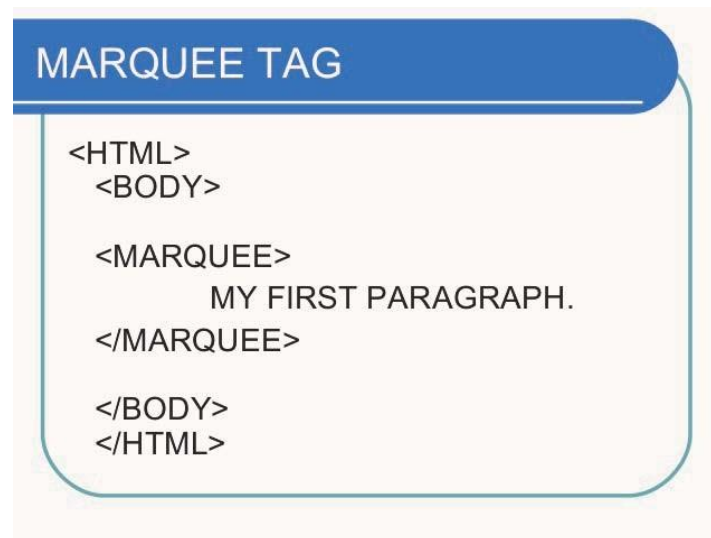
Fig. Use of Marquee Tag

LIST

Lists are the combination of various Elements. In HTML three types of Lists are used which are as follows:

(1)   Ordered List: For putting serial numbers to each item, an Ordered List is used. Due to putting of these number it is also known as Numbered list. In this following Attributes are used:

Type = "a" Lower case letters are used.

Type = "A" Upper case letters are used.

Type = "i" Lower case Roman Numbers are used.

Type = "I" Upper case Roman Numbers are used.

Type = "1" Arabic Numbers are used.

For ordered List <OL> = </OL> Tags are used.

(2)   Unordered list: Those lists where Bullet sign is used before each item of the List is called Unordered List. For this <UL> ………… </UL> Tags are used. This List is described between <UL> and </UL>.

After <UL> Tag, type List Item <LI> and write the name of the item. After that close the List with Closing Tag <UL>

(3)   Definition List: It is used for defining a word. Definition List starts with <DL> and ends with </DL> tag, Two Tags are used which are;

(i)   <DT> Definition Term: Before the word to be defined <DT> Tag is used.

(ii)   <DD> Definition Data: For writing definition of word, <DD> Tag is used.

```
1   <!DOCTYPE html>
2   <html>
3   <body>
4
5   <dl>
6   <lh>
7   Type the title for the list.
8   </lh>
9   <dt> Type the term you'd like to define. </dt>
10  <dd> Type the item's definition you'd like to use. </dd>
11  <dt>Milk</dt>
12  <dd>White cold drink</dd>
13  <dt>Coffee</dt>
14  <dd>Black hot drink</dd>
15
16
```

Fig. Definition Lists

(4)   Nested List: By Nested List we mean the List present within another List one lsit is declared within another List, It is called Nested List. No different Tags is used for nested tag.

```
1    <!DOCTYPE html>
2    <html>
3    <body>
4
5    <h4>A nested List:</h4>
6    <ul>
7      <li>Coffee</li>
8      <li>Tea
9        <ul>
10       <li>Black tea</li>
11       <li>Green tea</li>
12       </ul>
13    </li>
14
15
```

Fig. *Nested Lists*

DIFFERENT METHODS FOR CREATING A WEBSITE

Building a website is a great way to share your ideas and thoughts with the world. Building a website for your organization is crucial to your future success. As such, it's vital that you explore every avenue when building your site. This, of course, starts off with deciding how to build your website. There are many different ways you can go about creating a website for your business and what's good for the goose is not good for the gander. There are different methods for creating a website, which are as follows:

WORD PRESS OR SIMILAR CMS

A CMS is a content management system and regardless of which type you choose. It will provide you with a simple way to construct your website without having to know a lot about websites or website building. Essentially, these are generally standard templates where the coding on the back end is already done. These templates are essentially "fill in the blanks" so all you have to do is manage the content within the system. In other words, fill in the blanks with the content and your website is all ready to launch.

2. ADOBE DREAMWEAVER

If you have a fair grasp of HTML and CSS, Adobe Dreamweaver provides you an easy way to make complex websites. This simply means that you have more creative control over the design and construction of your site without having to own expensive web design and coding programs that professionals use. Adobe Dreamweaver is what's known as a WYSIWY web editor. This stands for "What you see is what you get" since it's a visually based design system that allows you an easier way to create your website. What you see and do is what your viewers will see. Dreamweaver converts your designs into standards complaint code, which simply means it will work and work effectively.

3. HIRING A WEB DESIGNER

By far the most costly option, but also the easiest, this simply means you outsource the job to a professional web designer. of course, you will have to pay and you will have to do your homework

to find a web designer that you can work with, but in the end, you can customize your website as little or as much as you desire-it just depends on how much you want to pay. Keep in mind you are only paying for the design here. You will also have to pay to have the website hosted, to have content created (or do it yourself) and manage the website going forward. The more you outsource these tasks, the more "hands off" you become.

4. FREE WEBSITE BUILDER

Finally, free website builders allow you a simple way to design, build, launch and manage your website for free. These builders are generally "drag and drop" control panels which means you have a number of options on the left which you simply pick from and then drag them over onto our site with your mouse and drop them where you want them to go. Then, you simply fill in the content and launch your site. For example, if you choose a test box from the left and then "drag and drop" it in the middle of the page, you simply then write the test in the box.

HAND CODING

Hand coding a website is another way to make a website, yes to does give you the most control over you website out of all the ways of creating a website. However it is also the hardest way to make a website and would involve a huge learning curve and take up a lot of your time. In most situation you will be able to make your website without having to hand code any of it.

WEEBLY

Weebly is entirely Web-based in nature and aimed at novices. It's also completely free to get started. If you create a Weebly site, you can host it on Weebly's own servers, so there's no need to learn much about hosting and domain registration. Despite this apparent simplicity, it's possible to create surprisingly modern and attractive sites using Weebly. It's easy to add modern features like social networking integration and most of the Weebly templates are mobile-friendly too.

THE WEB SITE DESIGN AND DEVELOPMENT PROCESS

There are numerous steps in the website design and development process. From gathering initial information to the creation of your web site and finally to maintenance, to keep your website up to date and current. The exact process will vary slightly from designer to designer, but the basics are the same.

1. Information Gathering
2. Planning
3. Design
4. Development
5. Testing and Delivery
6. Maintenance

(1)   Information Gathering: The first step in designing a successful website is to gather information. Many things need to be taken into consideration when the look and feel of your site is created. It involves a good understanding of you – what your business goals and dreams are, and how the web can be utilized to help you achieve those goals.

(2)   Planning: Using the information gathered from phase one, it is time to put together a plan for your website. This is the point where a site map is developed. The site map is a list of all

main topic areas of the site, as well as sub-topics, if applicable, and is essential to developing a consistent, easy to understand navigational system. The end-user of the website must be kept in mind when designing your site. These are, after all, the people who will be learning about your service or buying your product. A good user interface creates an easy to navigate website, and is the basis for this.

During the planning phase, your web designer will also help you decide what technologies should be implemented. Elements such as what CMS (content management system) such as Word Press to incorporate, will any contact forms be needed etc. are discussed when planning your web site.

(3)   Design: It is also important to incorporate elements such as the company logo or colors to help strengthen the identity of your company on the web site. Your web designer will crate one of more prototype designs for your web site. In this phase, communication between both you and your designer is crucial to ensure that the final website will match your needs and taste. It is important that you work closely with your designer, exchanging ideas, until you arrive at the final design for your website.

(4)   Development: The developmental stage is the point where the website itself is created. This is typically done by first developing the home page, followed by a "shell" for the interior pages. The shell serves as a template for the content pages of your site. Once the shell has been created, your designer will take your content and distribute it throughout the site, in the appropriate areas. Elements such as the CMS (content management system) like Word Press, interactive contact forms, or ecommerce shopping carts are implemented and made functional during this phase, as well.

(5)   Testing and Delivery: At this point, your web designer will attend to the final details and test your website. They will test things such as the complete functionality of forms or other scripts, as well last testing for last minute compatibility issues, ensuring that your website is optimized to be viewed properly in the most recent browser versions.

Once you give your web designer final approval, it is time to deliver the site. An FTP (File Transfer Protocol) program is used to upload the website files to your server. Some web designers offer domain name registration and web hosting services as well, or have recommendations as to where you can host your site. Once these accounts have been setup, and your website uploaded to the server, the site should be put through one last run-through. This is just precautionary, to confirm that all files have been uploaded correctly, and that the site continues to be fully functional.

(6)   Maintenance: Websites will need quite frequent updates to keep them fresh and relevant. In such a case, we need to do analysis again, and all the other life-cycle steps will be repeated. Many designers offer maintenance packages at reduced rates, based on how often you anticipate making changes or additions to your web site.

Editor used to create HTML Programs:

You have many choices of software to use to create and edit HTML pages. They fall into three general categories:

1.   Plain text editor

2.   HTML text editor
3.   WYSIWYG editor

For these lessons you will be using Notepad as a plain text editor and FrontPage (PP) or FrontPage Express (FPX) as a WYSIWYG editor. FPX is not a particularly good editor. In fact, it is quite annoying. But since it comes with Internet Explorer versions 4 & 5, it is widely available and free to classroom and individuals! FPX is not available on Win2000 and WinXP due to software conflicts.

1. Plain Text editor:

A basic text editor like Notepad works just fine for HTML coding. You do not have to have fancy or expensive software to write HTML documents, though such can make your work easier in many ways. Many professional web authors still use Notepad or some other basic text tool for most of their work and use advanced tools only for complex tasks.

Figure 5.12

Advantage:

Cheap

Total control of the coding

Disadvantage:

Code can be hard to read.

To see the effect of your code, you must save your work, switch to a browser and open the page.

You must remember the code for tags and the choices for attributes and values.

2. HTML text editor:

Text-based HTML editing programs, like Allaire's HomeSite, pictured at right, have features that Notepad does not. Such a program can colour-code the tags and automatically indent and space lines to make the code easier to read. A preview or browse feature displays the page that you are working on in your browser before you actually save any changes. Buttons and assistants can create the HTML code for you and show you all the attributes for each tag and the choices for the values of each attribute.

Such features let you concentrate on what you want to say, instead of having to think about the proper code and its spelling.

ADVANTAGE:
1. Easier to read code – color, indentions, spacing
2. Don't have to remember all the code attributes / values – button and wizards.
3. Preview window – don't have to save and switch to a browswer.
4. Spell check.
5. Error checking to catch code mistakes.

DISADVANTAGE:
1. Cost
2. Cannot edit the page directly from a Preview (unless there is a Design view also).
3. Can be hard to find the spot in the source code to edit.

3. WYSIWYG EDITOR:

A WYSIWYG editor, like Microsoft FrontPage pictured at the right, goes even further. It lets you type and format directly on the page, like in a word processor. The editor manages the code out of your sight.

You can still dig down to the actual HTML code to fix problems or to use new methods and scripts that the editor cannot handle.
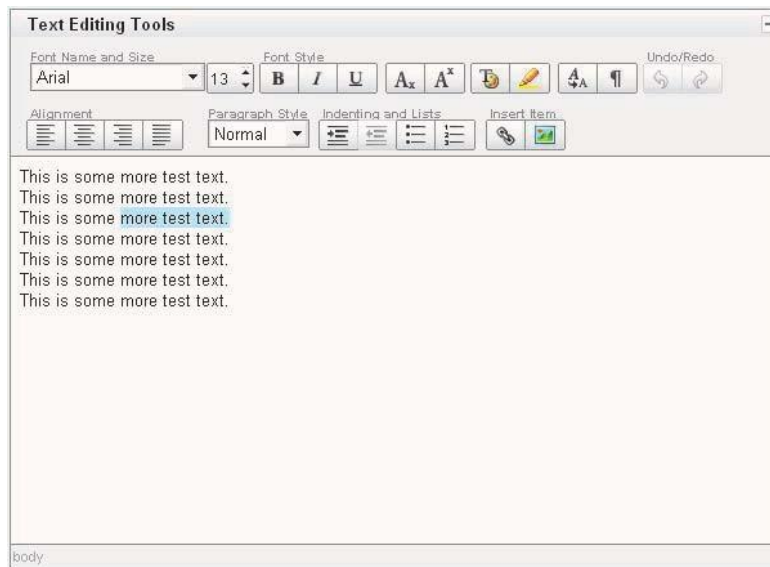
***Fig.** 5.14*

ADVANTAGE:
1. Can edit directly on the page, like a word processor
2. Don't have to remember all the code attributes / values can use buttons & wizards.

DISADVANTAGE:
1. Cost!
2. You may need to get into the code yourself anyway to repair what the editor has done.

3. Some programs erase code that they do not understand.
4. The program may not know about the latest HTML objects.

QUESTIONS:

SHORT ANSWER TYPE QUESTIONS

(1) Difference between HTML and HTTP and syntax of creation of a web page. (GNDU, 2016)
(2) What do you mean by HTML?
(3) What is the basic structure of HTML.
(4) Differentiate between webpage, website and portal. (GNDU, 2015)

LONG ANSWER TYPE QUESTION

(1) What is HTML and explain various tags used in HTML.
(2) Describe the various methods of creating a website.
(3) Explain the website designed developmental process.

CHAPTER 15
MULTIMEDIA

CONCEPT OF MULTIMEDIA

Multimedia has been a part of our lives for a long time without knowing about it. Every time you watch a television commercial or the music videos on satellite television on news casts, you are experiencing multimedia. The only thing new is that multimedia has become practical, affordable and interactive. More and more research work on this new technology of sounds, animation and text, is making it better and better with every passing day. It is one of the most realistic way of working even for people having no knowledge of computers.

Multimedia is interactive, non-linear media in comparison to broadcast television. In addition it may provide a user with several meaningful paths. Thus, it is the interaction between user and information that makes it a very powerful media for activities that require the process of communication information, such as education and training, reference material, business, presentations, manuals, multimedia, databases, geographic information system, advertising and documentaries.

Multimedia refers to the application in which text, graphics, animation, audio and video effects are integrated to provide a completely interactive interface through a computer system. In an interactive environment, user gives input through a variety of input devices(i.e. mouse, microphone, scanner, keyboard etc.) and takes output also through a variety of output devices (i.e. monitor, speaker, printer etc.) . Main uses of multimedia applications are in video games, computer based trainings, virtual realities.

Definition of Multimedia

Multimedia comes from the word "multi" and " media" . "Media" means many and "media" means hardware or software used for communicating. Multimedia means able to communicate in more than one way for better interaction. In other words, the execution of text, sounds, graphics and animation is multimedia. Some examples of hardware are shown in figure :
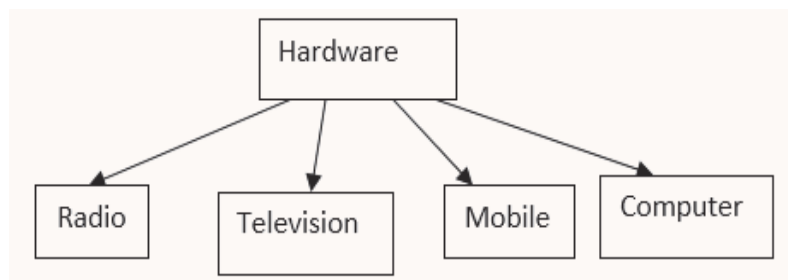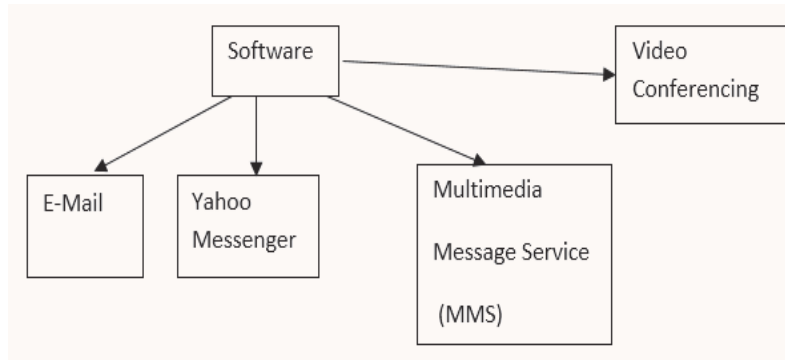
Multimedia is the presentation of information in an attractive and interactive manner by using a combination of text audio, video graphics and animation. Multimedia is computerized method of presenting information by combining text, audio, video, graphics and animation.

CHARACTERISTICS OF A MULTIMEDIA SYSTEM
1. A multimedia system has four basic characteristics:
2. Multimedia system must be **computer controlled**.
3. Multimedia systems are **integrated.**
4. The information they handle must be represented **digitally.**
5. The interface to the final presentation of media is usually **interactive**.

DESIRABLE FEATURES FOR A MULTIMEDIA SYSTEM
The following features a desirable (if not a prerequisite) for a multimedia System:
1. **Very High Processing Power-** needed to deal with large data processing and real time delivery of media.
2. **Multimedia Capable File System-** needed to deliver real-time media- e.g. Video/Audio Streaming, Special Hardware/Software needed e.g. RAID technology.
3. **Data Representations/File Formats that support Multimedia-** Data representation/ file formats should be easy to handle yet allow for compression/decompression in real time
4. **Efficient and High I/O-** input and output to the file subsystem needs to be efficiently and fast. Needs to allow for real-time recording as well as playback of data e.g. Direct recording systems
5. **Special Operating System-** to allow to file system and process data efficiently and quickly. Needs to support direct transfer to disk, real time scheduling, fast interrupt processing, I/O streaming etc.
6. **Storage and Memory-** large storage units and large memory. Large catches also required and frequently of level 2 and 3 hierarchy for efficient management.
7. **Network Support**- Client-server systems common as distributed systems common.
8. **Software Tools-** user friendly tools needed to handle media, design and develop applications, deliver media.

HARDWARE AND SOFTWARE USED IN MULTIMEDIA

To prepare a good project of multimedia at quality level, we have need of some basic hardware and software for this purpose and these are:

Hardware Requirement

Software Requirement

Creative Mind

Organization

HARDWARE REQUIREMENTS

The hardware requirements to setup a Multimedia program are:

♦ Graphics Card

♦ Sound Card

♦ CD-ROM Drive

♦ 512 MB RAM

♦ 80 GB Hard Disk

♦ SVG Display

♦ Speaker

♦ Microphones

♦ Keyboard

♦ Mouse

SOFTWARE REQUIREMENTS

To produce a media element various types of software are available in the market, such as media player, sound recorder, win amp, Xing player, wave studio, Corel drawer Photoshop, 3D Studio etc.

CREATIVE MIND

Before beginning a multimedia project, we must first to develop a sense of its scope and context. Let the project take shape in our head, as we think through the various methods available to get our message across to our viewer. The evolution of multimedia is evident when we look at some of the first multimedia project done on computer and compare them today's titles.

ORGANIZATION

It is essential that we develop an organized outsize and plant that rationally detail the skill, time, budget, tools and resources we will need for a project. There should be in place before we start to render graphics, sounds and other components, and they should continue to b monitored throughout the project.

USE OF MULTIMEDIA IN EDUCATION

In education, multimedia is used to produce computer based training causes (popularly called CBT's) and reference books like encyclopedia etc. A CBT lets the students and teacher go through

a series of presentation, text about a particular a topic and associated illustrations in various information formats. Education is an informal term used to describe combining education with entertainment, especially multimedia entertainment.

Multimedia in school is perhaps the most widely needy destination. Many schools are using this multimedia application in their school for the purpose of teaching the students. In school, the computer is become essential part of education as teaching the basic of reading, writing and arithmetic. Multimedia for learning takes many forms through showing the cartoon on particular subject. Multimedia for reading skill grow through word recognition a mouse clicks on any word play in back. The computer read the story aloud, some time spelling words individually.

An interesting uses of multimedia in school involve the students themselves. Student put together interactive magazines and newsletter they make original art using image-editing tools.

Many computer games with the focus on the education are available. A simple example in this reference is an educational games which plays various rhymes for little kids. In addition to play rhymes, the child can paint the pictures, increase and reduce the size of the object etc.

Similarly many other educational packages, which provide a lot of detailed information are also available. Microsoft as many such CD's based multimedia in addition to play provide some sort of learning computer.

Multimedia in the classroom could include power point presentation that are created by the teacher, commercial software that is use for reference or instruction, or activities that directly engaged the student in using multimedia to construct and convey knowledge.

NEED OF MULTIMEDIA IN CLASSROOM

Multimedia activities encourage students to work in groups, express their knowledge in multiple ways, solve problems, revise their own work, and construct knowledge. The advantages of integrating multimedia in the classroom are many. Through participation in multimedia activities, students can learn:

♦ Real-world skills related to technology
♦ The value of team work
♦ Effective collaboration techniques
♦ The impact and importance of different media
♦ Techniques for synthesizing and analyzing complex content
♦ The importance of research, planning and organization skills.
♦ The significance of a presentation and speaking skills.
♦ How to express their ideas creatively

ADVANTAGES AND DISADVANTAGES OF USING MULTIMEDIA

Obviously multimedia application look attractive and very, useful in real world but they demand a sophisticated computer system and completely trained users to take full advantage of such applications. Therefore, multimedia applications can have following advantages and disadvantages:

ADVANTAGES:

1. Multimedia application allow the computer user to communicate with computer system in a variety of ways (speaking, writing, moving objects etc).
2. Multimedia applications give a real world impression while using a computer.
3. One can communicate with people in remote locations just like all sitting in a single drawing room.
4. You do not need to convert data into computer acceptable form. Data is acceptable in the form of voice, moving pictures and images etc.
5. Students and trainees find it easy to understand what is being taught to them.
6. Disable 1persons can also use computer systems.
7. Computer system can be connected to other machines and electronic devices.
8. Naturally people get attraction toward computer learning.
9. Usage of computer products increases in business environment.

DISADVANTAGES:

1. Overall cost of computer system increases. Computer user must be well trained to make full advantage of multimedia applications.
2. Sometimes overall performance of computer slows down.
3. A proper maintenance must without which problems occur frequently.
4. Sometimes if any of the attached device gets out of order, all the system stops it working.
5. Remote connections must be reliable and fast.

CHAPTER 16
COMPUTER TEACHER

INTRODUCTION

Teachers are great sources of knowledge, prosperity and enlightenment to which anyone can be benefited for whole life. They serve as the real light in everyone's life as they help students to make their ways in the life. They are the God gifted people in everyone's life who lead us towards success without any selfishness. Really, we can call them as builders of the dazzling future of our nation through education.

Teacher plays very essential role in the field of education who teaches students very nicely to be a person of good moral and behaviour. They make students academically superb and always encourage to do better in the life. They equip students with lots of knowledge, skills and positive attitudes so that students can never feel lost and go ahead. They help students to get sure about their goals of education through clear vision and ideas. Without teachers in the life one cannot grow mentally, socially and intellectually.

In this regard Dr. Radhakrishnan emphasizes the role of teacher in the following words," The teacher place in society is of vital importance. He acts as the pivot for transmission of intellectual traditions and technical skill from generation to generation, and helps to keep the lamp of civilization burning. He not only guides the individual, but also, so to say, the destiny of nation. Teachers have therefore to realize their special responsibility to the society. On the other hand it is incumbent on the society to pay due regard to the teaching profession and to ensure that the teacher is kept above want and given the status which will command respect from his student."

The success or failure of a computer course rests mainly with the teacher. He may be provided with all the possible facilities in terms of laboratory, equipments. Given an ideal syllabus and sufficient time for teaching of computer science but he is not likely to achieve success unless he is enthusiastic about his work, knows the subject and really knows how to teach computer. On the other hand a keen and well informed teacher who loves his subject and believes in its value will succeed inspite of difficulties and handicaps.

The computer science is different in nature, so the work of computer teacher is more than teacher of other subject in comparison. Computer science is fulfilled with unlimited minute facts and by which study can be interesting only by the intelligence and capacity of teacher. The computer teacher should gather detailed information about his students such as- their interest, needs, mental level, skills, experiences etc. to make the computer teaching effective.

TEACHER DEFINITIONS OF COMPUTER

According to **Dr. Zakirs Hussain**," The teacher is indeed, the architect of our future."

According to **Rabindra Nath Tagore**," A teacher can never truly teach unless he is still learning himself."

According to **A. S. Neill**," A good teacher does not draw out, he gives out and what he gives out is love. And by love I mean approval, or if you like, friendliness, good nature. A good teacher not only understands the child, he approves of the child."

According to **Vivekananda**," The true teacher is he who can immediately come down to the level of the students and transfer his soul to the students soul and see through and understand through his mind. Such a teacher can really teach and none else.'

NEED AND IMPORTANCE OF THE TEACHER

A teacher is more likely a gardener who tends to tends to each plant, examines water and sees that the plant may take its own nourishment. The teacher should be a guide, helper and a friend. The teacher must study the child, must know the effect of environment on the child, and should know the laws of learning for which a study of psychology is necessary.

The teacher is an integral part of the process of education. He is the person who imparts education to the students. He teachers the pupil/students the subject matter that is prescribed in the curriculum. His job is a difficult one. He has to look after the student in a classroom as well as outside the classroom. A part from the classroom activities, he has to look after extra- curricular activities. If the teacher taught relationship is good, the teaching is effective.

The need and importance of the teacher discussed by various eminent educationists are as follows:

According to the Jawaharlal Nehru,"A teacher has to help in the transmitting of higher values to his pupils, though his personality and through the goods of culture which are his instruments. A teacher has to help the bud into full bloom and not to make paper flower to satisfy his whom. The growth of a morally autonomous personality is the aim and end of his Endeavour."

According to the Dr.SarvapalliRadha Krishnan," Teacher should be filled with a modernist attitude, with progressive, with a forward looking direction. Unless they themselves have it, they cannot make their students forward looking."

The teacher is one who always holds the key position in the process of teaching and learning.

ESSENTIAL QUALIFICATIONS FOR A COMPUTER TEACHER

Computer is a dynamic subject and it has to equally important aspects i.e. theoretical and practical. The computer teacher has to teach his students both the theory and practical. For each of these aspects the teacher must bear some qualifications. The bodies related to education in India have layed down certain norms for this. The qualification of the teacher depends on the class to which the teacher is going to teach. Thus the qualifications of a computer teacher can be classified into following categories:

Primary or Elementary Teacher: The elementary teacher who teaches the elementary classes. For such student, the basic knowledge is required. A teacher must have ETT equivalent qualification and a certificate course or a diploma in computer.

High School Teacher: In this category, a teacher teaches to the higher classes. B.Ed course or any equivalent courses made for this. The teacher should have studied the computer as a subject up to graduation level and computer methodology in his B.Ed course**.**

Senior secondary teacher: A teacher teaching to the senior secondary classes falls under this category. Master in computer and Bachelor in education are the required qualification for the teacher to teach senior secondary classes. Master in computer has many formal degrees namely MCA, MSC (IT), MSC(CS), M.Tech. Any one of these can be taken for being master in computer**.**

College lecturer: A college lecturer has many stages in his job. The minimum qualification to be college lecturer in master in computer. This minimum qualification can be extended to clearance of UGC-NET (CA) examination for permanency in the job. A doctorate in computer is desired at this job.

Teacher educator: A teacher educator is one who teaches in an education college. The minimum qualification laid down by NCTE is master in computer and M.Ed. Master in computer can be any degree namely MCA, MSC (IT), MSC (CS). A UGC-NET clearance is essential for a permanent job. The doctorate in education or computer science is also desired in this category.

Computer instructor in education: It is also a category in which the teacher teaches to the student in the education college. Such type of teacher teach additional computer subject to the students, which is different from computer methodology. For teaching additional computer subject, teacher works as a computer instructor in education in college. Computer instructor should bear a post graduate diploma in computer education for this job or the minimum qualification required for the instructor is the graduation in computer.

QUALITIES OF A COMPUTER TEACHER

Teachers have the very important responsibility of shaping the lives of young, impressionable children. With this responsibility comes great pride and joy. Therefore all teachers should strive for what can be considered to be a "good teacher." A good teacher can be defined as someone who always pushes students to want to do their best while at the same time trying to make learning interesting as well as creative. A positive or negative influence from a teacher early on in life can have a great effect on the life of a child. Any person to be a successful teacher must have certain qualities in him and to be a teacher of a particular subject like computer, he or she has to bear certain special qualities in him or her. The qualities of a good teacher may be divided into two categories:

1.　　General Qualities
2.　　Special Qualities

General Qualities: These are the abilities that are required in every teacher to be a successful teacher. The teacher has to play a leading role in education. Much is expected from a teacher. The qualities of a teacher may be summarized as follows:

1. **Thorough Knowledge of the subject**: If a teacher has a thorough knowledge of his subject it gives him confidence in his teaching. If a teacher is not clear about certain facts or rules. He will be afraid lest he should be caught somewhere. Suppose a student asks a question and the teacher is not able to give a satisfactory answer. They will no longer listen to him attentively. He may have some problems of indiscipline as well.

2. **Knowledge of Methods of teaching**: Only having good knowledge of computer science is not sufficient. The teacher should be able to communicate his knowledge to the pupils. For that, the teacher must be well conversant with the various methods of teaching the subject. He should have professional training. He must know the latest methods and techniques of teaching. As far as possible, the teacher should be trained, particularly in case of secondary school teacher.

There are two equally important aspects of any true profession, viz, significant knowledge and effective technique. One cannot be efficiently professional if there is any serious weakness in either of the two.

3. **Interest in the Subject:** The computer science teacher must have a love for his subject. Such love and interest in subject would help him to create a similar love and interest for computer science in his students.

4. **Love for the students:** A teacher must love his students. Unless the teacher likes them, they will not like him. Like or dislike, is a reciprocal process. If the students do not like the teacher, the students will not like his subject. So the first essential before a teacher is to establish rapport with the students. He should understand them, their abilities, interests, achievements etc.

5. **Knowledge of Educational Psychology:** The teacher must have knowledge of child psychology. It is then possible for him to know the psycho-physical requirements of his students and organize his teaching accordingly. Mathematical facts are to be told, these are to be properly exposed and made understandable.

6. **Impressive personality:** The teacher should possess an impressive personality. He should have a through command on the subject and should be able to present it in such a manner that students grasp what he says or does in the classroom.

7. **Capacity to inspire confidence in his students:** The teacher of computer science should have the capacity to inspire confidence in his students. This can be done only by example and devotion to duty and certain other qualities. If the teacher can inspire confidence in his students, he can very safely carry them along with himself.

8. **Awareness of Aims:** The teacher must be clear about the aims and objectives of teaching of computer science at various stages. Such knowledge helps him in carrying out his job thoroughly.

9. **Originality:** The quality of originality is a must for every teacher and so in the case with a computer science teacher. This helps the teacher to devise ways and means for imparting knowledge effectively and properly. His approach should be original and he should not depend on any particular text-book or help-book.

10. **Knowledge of application of computer science:** The teacher should have a good knowledge of the application of computer science in other subjects, vocations, real life etc. Such a knowledge is quite helpful in making the teaching meaningful and interesting.

11. **Capacity of analysis and comprehensive description:** While teaching a subject a teacher is required to give minute details to explain things to his students. For giving such details

teacher should possess the capacity of analysis. A computer science teacher should also possess computer science skills, problem solving skills etc.

12. **Up-to-date Knowledge of the Subject**: A teacher must keep his knowledge up to date. He should study computer science journals and other useful books on the subject. He should attend refresher courses, workshops, seminars etc. on the subject. He may do professional research work. He may join various computer science organisation, visit good schools and hold discussions with reputed teachers of the subject.

13. **Studiousness**: The teacher is expected to be studious. Studiousness is essential to keep ones knowledge up-to-date.

14. **Presence of Mind**: Presence of mind is the basic requirement of any teacher. Unless he possess this quality he will not be able to solve the difficulties that beset his path in the teaching of his subject in the classroom.

15. **Friend, Philosopher and Guide**: A computer teacher is not just to teach computer. He has to interact with students and work for betterment of students. So he must be such that students do not get afraid from him. For this he must act as a friend, a philosopher and guide. He must always be ready to take his students to right direction.

16. **Habit of self-study:** RabinderNath Tagore has once said, "A teacher can never truly unless he is still learning himself. A lamp can never light another lamp unless it continuous to burn its own flame". The teacher has to be a learner. He can make his students a good learner if he himself is a good one.

17. **A good human being**: A teacher as a human must have best qualities of a human being. After all he has to act as a model for his students. He has to maintain better human relations with others. The teacher must have a good attitude toward nature, society, country and even for animals on this earth. He must have satisfactory relations with parents and members of community.

18. **Good Counselor:** The students have always certain problems. They may be related to their educational, social or personal life. The teacher has to act as a counselor whenever his students are in trouble. After it is the duty of teacher to take his students out of all type of troubles.

19. **Mentally Healthy:** Classroom teaching is work of mind and mental work, can be done successfully. If there is sound mind. For this the mental health of a teacher must be good. After all it is the mind that works after all the activities of a teacher.

20. **Co- operative in Nature:** A teacher must be co-operative in nature. He has to co-operate with students, school and society.

21. **Progressive and Dynamic Outlook:** The world is changing every second. It is progressing in all to direction. The teacher must be in correspondence with this change. This can only happen if he himself has such vision.

22. **Physically Healthy:** The teacher has to do a lot of work in the field of education. The person is one and works are many. Also it is said that sound mind lives in a sound body. To do the work of a successful teacher the teacher must have a sound body, so that he may

perform all his work efficiently.

23. **Social Qualities:** The teacher act as a bridge between the students and the society. Sometimes he takes the students to society and other time he brings the society to school. The teacher must bear certain social qualities in him such as respect, patience, democratic, attitude, hard-work.

24. **Democratic Attitude:** India is a democratic country. The whole world is moving towards internationalism. The world is uniting in every field. The teacher has the responsibility to lead his students towards democracy. There is no place for narrow mindedness in today's world. This can only happen if the teacher himself has democratic outlook.

25. **Sympathetic, Affectionate and Impartial Behaviour:** The teacher must have sympathetic attitude towards his students. He/She has to deal with emotions of students, understand their feelings and shape them in proper directions. A teacher must behave equally to all the students. He/She has to place all the students on same level. All the students are equal for him. So he must be impartial.

26. **Qualities of leadership:** A teacher is a leader of his class. He has to take his students to new horizon. For this the teacher must have such qualities which a successful leader has. The students are nation builders and teacher is student's builder. So the teacher is leader of the leaders of tomorrow.

27. **Disciplined:** A teacher must always be on his shoulders. It is said because he is always being watched by his students whether he is in class, school or locality. Whatever a teacher does, students try to copy it. So qualities like disciplined can be developed in students if a teacher himself is disciplined.

28. **Better Administrator:** Besides classroom teaching, a teacher has to perform lot of duties in his/her school. These are related to administrator and management. The teacher has to look after the administrator and act as a manager of resources for his teaching, students and school. So any teacher must have the qualities of a good administrator and a manager.

29. **Integrated and effective personality:** A teacher act as a mirror to his students. The students try to behave like his teacher. The personality features of a teacher can guide a student in development of their personalities. It is teacher personality that effects mostly the personality of students. They start to develop the personality characteristics in themselves what they see in their teacher.

30. **Punctual and Regular:** Students learn a lot of from his/her teacher behavior. The teacher has duty it to develop qualities like punctuality and regularity in his students. This he/she can only do if he/she himself/herself is punctual and regular, if he/she comes in school daily and in time, if he does his all work at proper time. Thus the students will learn such qualities indirectly from his teacher.

31. **Love and Respect for his profession:** Any person can never do this work perfectly if he has no respect and love for his work. So as it with the teacher, A good teacher must love his profession and have respect for it. He/She should not compare teaching with other profession in aspects like money, time and status as teaching job is above all other

professions. There is no profession in this world which can be equated with teaching. Teaching has supreme place and best things are never compared with things which have lower status than it. Diamond is a form of carbon, hardest element on earth but it is not compared with other elements for its qualities not even with other forms of carbon because diamond is on top.

32. **Adequate expression of power:** Teaching in itself is the expression of ideas to the students. Whatever a teacher is going to teach must be settled in the mind of students. This can only be done if the teacher expresses correctly all that what is in his mind and in reaches in students mind in same shape as it was in teacher mind. The expression can be verbal, written, nonverbal etc.

33. **Good sense of Humour:** Humour makes the student more active and helps in commanding their attention. A little smile of teacher can motivate his students. The students love such a teacher who as sense of humourous smiling face. A wise teacher once remarked," I consider a day's teaching is wasted if do not at all have a hearty laugh."

34. **Self-Analysis:** The teacher must do self-analysis in order to assess his abilities and capacities. The analysis with reveal certain faults that must go if children are to be properly handled. It will also produce a desire for the attainment of qualities that will have a healthy influence on the children. Rhyburn has rightly said "Self- analysis on the part of teacher in his initiation into the profession and should be regarded as a necessary equipment of a teacher."

35. **Confident:** The teacher must have confidence in her/his capacities abilities to solve the problems that he faces. Her/his confidence on herself/himself must reflect in her/his voice, face and ay of working. With lack of confidence a teacher can never perform her/his duties effectively.

36. **Latest General knowledge:** A teacher must be itself a knowledge bomb. It must be exploded on the students and knowledge must be up to date. For this purpose, the teacher has to remain in contact with the latest sources of knowledge. Books are the best friends of teacher and internet is the fastest friend to help him/her for this purpose.

Specific Qualities

The teacher has to guide his/her students. The teacher is expected to be expert person. So beside having only general qualities, computer teacher is expected to have some special qualities. There are the qualities which will make him/her a successful computer science teacher. The special qualities of a computer science teacher are listed below:

1. **Good Organizer of Computer activities**: A computer science teacher b a good organizer of computer activities. These activities are also called co-curricular activities in computer. The teacher may organize a function, festival, fair related to computer. He/she can organize a computer club, library etc. He/she can opt a project or can guide a project work. All this can be done successfully if he is a good organizer of all these activities.

2. **Scientific Attitude:** A Person who is going to teach such a subject must be scientific in nature i.e. He/she must have scientific attitude. He/she should be able to analyses everything

scientifically and work accordingly. This is because he/she has to act as model for students. A Computer education teacher can only inculcate scientific outlook in his/her students if she/he himself/herself if has that quality

3. **Knowledge of aims and objectives of teaching computer:** The teacher should have proper knowledge of aims and objectives of teaching computer education .He/She should know what are those changes which he/she has to bring in his student at the end of a particular time period . This particular time period can be one day, a week, a month or year.

4. **Well skilled :** Computer education is a subject of skills and abilities. To be an effective teacher, he/she should be skilled in certain qualities .He/she should have good drawing and sketching. The computer education teacher should be well sound in computation and calculation work. He/she should be skilled in application of computer in all the aspects of life.

5. **Mastery over computer:** A Computer education teacher cannot teach computer science unless he/she knows 'what really computer is'. He/she should have sound academic back ground in computer. All the basic and education teacher. He/she should have latest information and knowledge related to computer. The level of academic qualification depends upon the level of student whom he/she is going to teach.

6. **Good Planner:** It is said that good starting of work is equal to half the work done. Similarly good planning ensures the successfully completion of task. A teacher has to do a lot of activities. To perform these activities successfully he/she has to plane each and every activity. Only a good planner can play perfectly and can make his/her work successful. The computer education teacher has to plan his/her daily lesson plans, monthly plan and yearly plan .Similarly he/she has to plan unit test ,terms and tests, annual tests and other co-curricular activities like computer competitions ,festivals etc. This can be affectively done if he/she is a good planner.

7. **A good Researcher:** Computer education is a dynamic subject. It is changing day by day. Similarly needs of student are also changing day by day. What can be best thing to present students will satisfy their new needs can only be understood by research work. This research work is the duty of teacher. By doing research the computer education teacher can find the solution of problem faced by him/her and by his/her student.

8. **Professionally educated:** Any person cannot be teach computer education and every does not have all the qualities in him/her. There are certain qualities which can be developed. This can be done by giving him/her professional education to related in computer education. This education include both theoretical and practical knowledge. A fully professionally educated teacher can truly teach computer education successfully. This professional education can be like B.Ed., M.Ed. etc.

9. **Creative and original in ideas:** Computer education teacher should be creative H/She should prefer to own original ideas. This creativity and originality helps the teacher to correlate computer with other subject area of works experience and to daily life of student. This will help him/her and his/her students not to be just depend upon the books only.

The creativity and originality of the teacher is ultimately transferred into the student. This creativity also helps to inspire and guide gifted student for becoming future to computer professionals.

10. **Full of technical knowledge**: The computer education teacher must know about various fixing devices, techniques of teaching of computer. He /She must also be capable of using these devices and techniques according to the availability of the resources and demand of student.

11. **Good evaluator:** The computer education teacher must know how much his students have learnt. This can be only checked if student is evaluated. The question arises 'How to evaluate?' , 'What are different ways to evaluate?'. Computer education teacher should have sound knowledge of various evaluation techniques like objective type test, short answer type test and essay type test etc. computer education should be capable to interpret the result of evaluation correctly to the student.

PROFESSIONAL GROWTH

Computer has come to say in the life of modern man. The application of computer in the personal life of the individual, in his self-development, in the employment market and in the field of education is to-day an accepted fact. Computer is a dynamic subject which is changing every second. It is basically on the development of technology is changing day by day. New inventions are there in both hardware and software field. A computer teacher must be in contact with what latest is going in computer field. Computer education teacher must know the latest development in hardware and software. He/ She should be capable of explaining every new thing to the students. For this purpose, the growth is essential in the teaching profession. It is very essential to be a up to date for a computer education teacher. The computer world is changing at the fastest rate. So the task is most challenging for the computer education teachers, they must grow in their profession of teaching.

The computer education teacher has many ways for this professional growth. Teacher can have some formal degree or research programme to have promotion in the job. The another way of professional growth is to grow in knowledge. There are various sources to get the latest knowledge of computer such as: Newspaper, Books, Journals, Internet and Magazines etc.

The professional growth of a computer teacher helps in increasing his job status, knowledge, earning, practical skills, respect and many more things. Professional growth is very much desired for a computer teacher. A certificate holder should go for diploma, a diploma holder go for a Master degree and the Master degree holder should opt a research study in computer to be in touch with the latest in computer.

CODE OF CONDUCT FOR ETHICAL COMPUTER TEACHING

Computer has become a part of human life. It is taking a place of family member in the house. It is very important to derive maximum benefits from it and take care of it also. One should not consider it a lifeless machine only. One should have a sense for respect for the computer as a

carpenter has for his tools, blacksmith or goldsmith has for their tools, a driver for his taxi. One cannot have maximum benefit from it if he is not following certain code of conduct and ethical values. These ethical values help in maintaining our computer for long time and getting its services. A few code of conduct are given below:

1. Treat as a computer system as a living being.
2. Keep the area dust free, neat and clean nearby computer system.
3. Use the various devices such as keyboard, mouse etc.
4. Never try to misuse the privileges given to you on any computer system.
5. Do not change the original and basic settings of computer belonging to other person without his permission.
6. Do not try to hack or break passwords of others and never try to enter in restricted regions in computer.
7. Any visible hardware and software problems should be bring in knowledge of system administrator.
8. Always use the original software not the pirated one.
9. Never try to period the software.
10. Never attach or detach any peripheral without the permission of the computer owner.
11. Do not delay any files about which you do not have knowledge or rights.
12. Do not demoralized any ignorant or illiterate person in computer. Try to help him in understanding various computer aspects.
13. Always use your original work in computer for your education. Do not use copied work.
14. Do not use the external storage devices like floppy, CD's, DVD's or pen drive etc. without scanning for the virus.
15. Do not open illicit sites on the internet. They may bring virus on your computer and can cause serious problems to data and system.
16. Never try to break privacy of owner of computer.
17. Properly switch on and shut down on the computer systems.

CHAPTER 17

VIDEO TECHNOLOGY

INTRODUCTION

The effective **Use of Technology** in Education has changed the face of education and it has created more educational opportunities. Both teachers and students have benefited from various educational technologies, teachers have learned how to integrate technology in their classrooms and students are getting more interested in learning with technology. The **use of technology in education** has removed educational boundaries, both students and teachers can collaborate in real time using advanced educational technologies.

Technology has helped in the growth of mobile learning and long distance learning. The use of internet technology has enabled teachers to reach students across boarders and also students from developing countries have used internet technology to subscribe for advanced educational courses. Many universities and colleges have embraced online education by creating virtual classrooms. Online education is flexible and affordable, students can attend classrooms during their free time, and they can also have a chance to interact with other students virtually.

VIDEO TECHNOLOGY

Video technology has included VHS tapes and DVDs, as well as on-demand and synchronous methods with digital video via server or web-based options such as streamed video from YouTube, Teacher Tube, Skype, Adobe Connect, and webcams. Telecommuting can connect with speakers and other experts. Interactive digital video games are being used at K-12 and higher education institutions.

DVD

DVD (an abbreviation of "digital video disc" or "digital versatile disc") is a digital optical disc storage format invented and developed by Panasonic, Philips, Sony, and Toshiba in 1995. The medium can store any kind of digital data and is widely used for software and other computer files as well as video programs watched using DVD players. DVDs offer higher storage capacity than compact discs while having the same dimensions.

Prerecorded DVDs are mass-produced using molding machines that physically stamp data onto the DVD. Such discs are a form of DVD-ROM because data can only be read and not written or erased. Blank recordable DVD discs (DVD-R and DVD+R) can be recorded once using a DVD recorder and then function as a DVD-ROM. Rewritable DVDs (DVD-RW, DVD+RW, and DVD-RAM) can be recorded and erased many times.

DVDs are used in DVD-Video consumer digital video format and in DVD-Audio consumer

digital audio format as well as for authoring DVD discs written in a special AVCHD format to hold high definition material (often in conjunction with AVCHD format camcorders). DVDs containing other types of information may be referred to as DVD data discs.

VIDEO GAME

A video game is an electronic game that involves interaction with a user interface to generate visual feedback on a video device such as a TV screen or computer monitor. The word video in video game traditionally referred to a raster display device, but as of the 2000s, it implies any type of display device that can produce two- or three-dimensional images. Some theorists categorize video games as an art form, but this designation is controversial.

Video Conference:

A video conference is a live, visual connection between two or more people residing in separate locations for the purpose of communication. At its simplest, video conferencing provides transmission of static images and text between two locations. At its most sophisticated, it provides transmission of full-motion video images and high-quality audio between multiple locations.

USE OF VIDEO TECHNOLOGY IN EDUCATION

Easy Accessibility: Video technology provides easy accessibility and retrieval of the material of our own choice.

Video Technology Unlocks Educational Boundaries: Video technology supports Virtual or Online Learning. Unlike physical classrooms, online learning is flexible and students from different geographical locations can attend the same class with no need of traveling from those locations. Advancement in virtual technology has supported face-to-face communication between students and teachers in the virtual world. In this case, students can easily ask their remote based educators' questions using virtual communication tools like **SKYPE**. Online education is a new wave in our education environment and it has made many educational courses and material accessible to anyone in the world. Many colleges and universities are blending their educational systems with online learning tools, this helps students of these institutions learn from anywhere.

Video Technology Simplifies Access to Educational Resources: Video technology helps students gain access to open educational resources. These resources are kept under the public domain and are freely available to anyone over the world-Wide-Web. These educational resources include electronic books (e-books), pod-casts, digital libraries, educational games, educational videos and instructions, tutorials and much more. Teachers have embraced video hosting platforms like Youtube, to upload recorded lectures, so that students who missed lectures can access them from anywhere. Also the use of cell phones for educational purposes, helps students and teachers access educational information using Edtech Apps . Teachers are also using lesson videos and clips online to learn how other educators are using technology in classroom and education, these techniques and approaches uploaded by other educators promote self training and they help many teachers when it comes to integrating technology in their own classrooms. Website like TeacherTube**, Youtube,** 02 Learn, are providing free online lessons and videos to students, these videos have been created and

uploaded by teachers and experienced educators.

Video Technology Motivates Students: The use of computer based instructions makes students feel in control of what they learn. Students find it easy to learn with technology because computers are patient compared to humans. Teachers publish educational instructions on classroom blogs or they assign research work via email, and this gives a student time to study on their own and have no fear of making mistakes during the process of learning. Also the use of Gamification educational technologies has increased students interest in learning, teachers use educational puzzles and video games to teach students how to solve different academic challenges, this all process makes students love to learn.

Video Technology Improves Students Writing and Learning Skills: The use of computers in the classroom has helped many students learn how to write well composed sentences and paragraphs. Computers have word processing applications which students use to take notes in the classroom, these word processing applications have built-in dictionaries which help students auto-correct spelling errors and also correct their grammar in a sentence. Also students using English teaching software and mobile applications like BUSUU. Many students have used BUSUU APP to learn different languages online and they can also get access to grammar guides provided by experienced publishers. Teachers encourage their students to create personal blogs using free blog publishing services like BLOGGER & WORDPRESS, students use these blogs to express themselves and share with friends, this process helps students learn how to write creative blog posts.

Video Technology makes subjects easy to learn: Different types of video educational software are designed to help students learn various subjects easier. Many students complain that learning Math is difficult, so some of them have decided to use educational Math software like Braining Camp. Students can use Braining Camp to apply their Math knowledge and skills to solve different math equations. BrainingCamp.com makes learning math very interesting. Also students use math learning games to learn new skills of solving math equations. Websites like IXL. COM, learninggamesforkids.com, help students of different grades to learn simple math basics.

Promotes Individual Learning: Video technological tools like cell phones and internet give students an opportunity to learn by themselves. Many students prefer teaching themselves and discovering content by themselves, this process allows them to test various options to solve a given task at school. Students use interactive educational games and software to develop different academic skills. For example; Art and design students can use Photoshop software to learn different design and editing skills, the process of learning how to use Photoshop is tricky, but the more mistakes and trials a student makes, the better they become at using Photoshop. Also the **use of cell phones** as educational tools encourages students to download educational podcasts which they can listen to while at home.

Supports Differentiated Instructions: Teachers can use video technology to cater for each and every student's needs in the classroom or outside of the classroom. The use of classroom assessment software and performance tracking programs helps teachers plan for each student basing on their performance and learning capabilities. Teachers can be in position to classify students

and know their weakness and strength as far as education is concerned. Teachers can use mobile applications like PollEverywhere.com to get student's response on any topic or subject. Social collaboration tools like Piazza.com can help teachers create virtual classroom and assign research work or answer student's questions from anywhere.

Increases Collaboration between Teachers and Students: The use of advanced communication technologies in education helps teachers reach their students easily and it also helps students reach their teachers or fellow students in real-time. Teachers can use mobile texting applications like Remind101.com to text students about an upcoming test or to assign them research topics. Educational social networks like ePals.com connect students with experienced educators; social bookmarking sites like Pinterest.com help students collaborate and follow creative teachers and educators from around the world. This flexibility in interaction and communication between teachers and students helps shy students improve on their grades.

Prepares Students for Tomorrows Technological Jobs: As the world develops, every job in the future will require applicants to have some technical skills. So the use of technology in education prepares our children for tomorrows advanced working conditions. Students use computers in the classroom to develop creative applications which can be used on cell phones or tablets for educational purposes. The advantages of knowing how to use a computer are limitless, so the more time a student spends using various technological tools at school, the more experienced and creative they become. According to research, the most popular jobs today will be of no value in the next 5-10 years, because technology will automate most of these tasks, so it is better to equip our children with technical skills so that they create their own jobs.

Increases Students Innovation and Creativity: Many teachers have discovered that integrating technology in their classroom increases student's engagement in the classroom. So now they put up technological competitions where students can make small educational technologies like robots, smart-pens, mobile applications and much more. These technological competitions in schools have increased the level of creativity and innovation among students. Technology teaches students how to solve challenges and get ready for more difficult tasks in life.

Freedom of sequence: The learners can follow any sequence in slow notion so that they may understand it better and learn at their own pace. They also have the option of fast forward, to leave part of the material which they do not want to view.

Provision of repetition: Video technology provides the facility for repetition to achieve mastery in learning course material.

Feedback: Video technology can provide immediate feedback.

Two-way system: Video text is a two-way interactive communication system. It can be used for general and specific information. It answers student querries and thus satisfies their curiosity.

Wider information: It allows the home television to function like a computer terminal. Thus it has the advantage of using the television at home. It provides wider access to information.

Better control: Video text provides the students more flexibility and better control over their learning.

Individualised Instruction: Video technology allows students to interact with material at their own pace and at their own choice.

CHAPTER 18
EVALUATION

CONCEPT OF EVALUATION

In every walk of life the process of evaluation takes place in one or the other form. If the evaluation process is eliminated from human life then perhaps the aim of life may be lost. It is only through evaluation that one can discriminate between good and bad. The whole cycle of social development revolves around the evaluation process. In education how much a child has succeeded in his aims, can only be determined through evaluation. Thus there is close relationship between evaluation and aims.

Evaluation is the process of determining the worth of a process or a product. In evaluation the process is concerned with providing learning experiences in order to increase the capabilities to perform certain functions. The products of learning are the increased capabilities of the learner. Evaluation should provide data for improvement of teaching as well as an insight for enhancement of learning on the part of the learner and it should be a continuous process. As the quality of learning outcome (product) is determined by the teaching learning process which precedes it, evaluation should begin at the process stage so that it could be modified or even terminated.

Evaluation plays an enormous role in teaching-learning process. It helps teachers and learner to improve teaching and learning. Evaluation is a continuous process and periodic exercise. It helps in forming the values of judgment, educational status, or achievement of student. Evaluation is one form or the other is inevitable in teaching-learning, as in all fields of activity of education judgments need to be made. In learning, it contributes to formulation of objectives, designing of learning experiences and assessment of learner performance, Besides this, it is very useful to bring improvement in teaching and curriculum. It provides accountability to the society, parents and to the education system. Evaluation is very important requirement for the education system. It fulfills various purposes in systems of education like quality control in education, selection/entrance to a higher grade or tertiary level. It also helps one to take decisions about success in specific future activities and provides guidance to further studies and occupation. Some of the educationists view evaluation virtually synonymous with that learning appraisal, but evaluation has an expanded role. It plays an effective role in questioning or challenging the objectives. A simple representation explaining the role of evaluation in the teaching-learning process is shown below:

Evaluation has its four different aspects namely,
(i) Objectives
(ii) Learning experiences
(iii) Learner appraisal
(iv) Relationship between the three

DEFINITION

The term evaluation conveys several meanings in education and psychology. Different authors have different notions of evaluation.

Encyclopedia of Education Research: To measure means to observe or determine the magnitude of variate; evaluation means assessment or appraisal.

James M. Bradfield: Evaluation is the assignment of symbols to phenomenon, in order to characterize the worth or value of phenomenon, usually with reference to some other social, cultural or scientific standards.

Gronlund and Linn: Evaluation is a systematic process of collecting, analysing and interpreting information to determine the extent to which pupils are achieving instructional objectives.

C.E.Beeby: Evaluation is the systematic collection and interpretation of evidence leading as a part of process to a judgment of value with a view to action.

OBJECTIVES OF CONDUCTING EVALUATION

Evaluation can be conducted for a variety of purposes depending upon its purpose. In an educational setting, the purpose of evaluation is to assess the outcomes in education in accordance with the goals of education. The basic goals of evaluation of an educational institution can be elaborated as follows:

1.   **Achievement of the students:** The students who come to the school come with an objective of developing their skills, knowledge and their personalities. The evaluations are conducting with a view to ascertain whether after joining the school, the students have any acceleration in the development of their skills, knowledge or personalities. In other words, evaluation tells up to what extent the learner has learned.

2.   **Personality Development:** Personality includes the development of inner abilities as well as manners in which the person presents himself. It relates to the development of concepts, the thinking process, the alertness, the analytical abilities, the thoughtfulness, the behaviour, etc. Evaluation tells us weather the students' personality has developed in the desired direction or not. If so, to what extent and with what inputs provided by the school.

3.   **Efficiency of teachers and School:** as discussed earlier, evaluations also show the teacher effectiveness and efficiency which ultimately leads to institutional performance. If a majority of students is found to be not performing well, it can be presumed that the teachers have to change their teaching strategies and instructional methods. Institution would also review its overall planning and implementation of the curriculum to improve their performance.

4.   **Diagnostic Purpose:** Evaluations assist in understanding the specific problems of a particular individual case, so that these specific problems could be handled by teacher or by the institution as a whole.

5.   **Evaluation by Incentives:** In case the evaluation shows that performance of the institution is good, it works as incentive and motivation for students as well as for the staff**.**

6.   **Evaluation and Prognosis:** Evaluations are directly related to prognosis. On the basis of what is happening in the present, the future of the institution can be visualized. This kind of forecasting helps the institutions in taking remedial measures wherever needed.

7. **Uniformity of Standard:** If the evaluation of different institutions are conducted by an external authority, the performance of the institution could be compared because the institutions are evaluated against certain pre-defined criteria and norms. With the help of evaluation, groups and teams can be constituted according to their achievements and abilities and these different types of groups can be taught adopting varying strategies suitable for the students of each group.

8. **Educational and vocational guidance:** At certain level, students have to opt for certain subjects, as they may like to go to higher studies in technical or professional fields or to some vocational courses. Evaluation helps in determining the capabilities of individuals opting for such subjects.

9. **Selection in Competitive examination:** Those who perform well in competitive examinations are recruited to various posts. Scholarships are also provided to those students who perform well in the examinations. Evaluations help in identifying such students.

10. **Evaluation and Management:** Evaluation helps in improving managerial functions. According to the results of students, the management can think of a more logical distribution of functional and human resources, various activities can be re-planned for better achievements.

11. **Evaluation and Decisions:** Evaluation are also related to decision-making. They helps in reviewing the promotional policies, recruitments, retaining of teachers, in-service, training, etc.

STEPS INVOLVED IN EVALUATION

1. **Identifying and defining General Objectives**: In the evaluation process first step is to determine what is to evaluate, i.e. to set down educational objectives. What kind of abilities and skills should be developed when pupils studies. The process of identifying and defining educational objectives is a complex one. While starting the objectives, we can successfully focus our attention on the product i.e. the pupil's behavior, at the end of a course of study and state it in terms of his knowledge, understanding, skill, application, attitudes, interests, appreciation, etc.

2. **Identifying and defining specific objectives:** What type of learning outcomes is expected from a student after ha has undergone the teaching learning process is the first and foremost concern of the teacher. This possible only when teacher identifies and defines the objectives in terms of behavioural changes i.e. learning outcomes. These specific objectives will useful in planning and organizing the learning activities, and in planning and organizing evaluation procedure too. Thus specific objectives determine two things; one the various types of learning situations to be provided by the class teacher to his pupils and second, the method to be employed to evaluate both- the objectives and the learning experiences.

3. **Selecting Teaching Points:** The next step is to selecting teaching points through which the objectives can be realized. Once the objectives are set up, the next step is to decide the content(curriculum, syllabus, course) to help in the realization of objectives. For the teacher, the objectives and courses of school subjects are ready at hand. His job is to analyses the content of the courses of school subjects are ready at hand. His job is to analyse the content of the subject matter into teaching points and to find out what specific objectives can be adequately realized through the introduction of those teaching points.

4.   Planning suitable Learning Activities: In the fourth step, the teacher will have to plan the learning activities to be provided to the pupils and, at the same time, bear two things in mind- the objectives as well as teaching points. The teacher gets the objectives and content readymade and free to select the learning activities. He may employ analysis-synthetic method; he may utilize the indo-deductive reasoning; experimental method; demonstration method; lecture method and so on. One thing he has to remember is that he should select only such activities that will make it possible to realize his objectives.

5.   Evaluating: At the fifth step, the teacher observes and measures the changes in the behavior of his pupils through testing. While testing, he will keep in mind three things- objectives, teaching points, learning activities, but his focus will be on the attainment of objectives. This he cannot do without enlisting the teaching points and planning learning activities of his pupils. Here the teacher will construct a test by making the maximum use of the teaching points already introduced in the class and learning experiences already acquired by his pupils. He may plan for an oral tests or written test; he may administer an essay type test or an objective type of test; or he may arrange a practical test.

6.   Using the results as feedback: The last, but not the least, important step in the evaluation process is the use of results as feedback. If the teacher, after testing his pupils, finds that the objectives have not been realized to a great extent, he will use the results in reconsidering the objectives and in organizing the learning activities. He will retrace his steps to find out the drawbacks in the objectives or in the learning activities he has provided for his students. This is known as feedback. Whatever results the teacher gets after testing his pupils should be utilized for the betterment of the students.

CHARACTERISTICS OF EVALUATION

1.   Systematic Process: Evaluation implies a systematic process which omits the casual uncontrolled observation of pupils.

2.   Continuous Process: Evaluation is a continuous process . in an idle situation the teaching learning process on the hand and the evaluation procedure on the other hand, go together. It is certainly a wrong belief that the evaluation procedure follows the teaching-learning process.

3.   Comprehensiveness: True evaluation is always comprehensive. It covers all the aspects of personality physical, mental, social, aesthetic etc. In fact it aims at the development of all these aspects of personality in harmony with each other.

4.   Not confined to classroom: Evaluation is not confined to classrooms, but it takes place outside the classroom as well. Social service, cooperation and other the outdoor such aspects of life are better judged outside the class room in the outdoor activities.

5.   Emphasis on Broad Personality Changes and Major Objectives : Evaluation emphasis on the broad personality changes and major objectives of an educational programme. Therefore, it includes not only subject-matter achievement but also attitudes, interests and ideals, ways of thinking, work habits and personal and social adaptability.

6.   Improvement in Educational Process: Evaluation is for the improvement of educational

process as a whole. It judges the effectiveness of the objectives and the learning experiences and serves as a guide to both pupils and the teachers.

7.   Involvement of all agencies of Education: Evaluation is not the monopoly of teachers alone. It is done by the teachers, the students, the parents and other members of th society connected with the education of the child. The rating of the social aspect is done by the parents, other members of the society and social agencies of which the students are members. Sometimes students evaluate their work themselves as well. This known as self-evaluation. For the physical development, the periodic evaluation is done by the Health Department as well.

**8.   Need and Importance of Evaluation

9.   Assessment of personality of the pupils: Assessment of the personality of the pupils in the most important purpose of the evaluation, i.e. their achievements, skills, interests, aptitudes, attitudes, intelligence, their physical, emotional, social and moral development.

10.   Award Scholarships: Scholarships may be given to the suitable and brilliant students on the basis of examination and intelligence tests. The government of india selects some students for the award of national scholarships on the basis of achievement and intelligence tests. State Government also award scholarships on the basis of such kind of tests.

11.   Influence Learning: Examination provide opportunities to the pupils to revise the courses, remember the subject matter, organize the material learnt while answering the questions, apply the knowledge and practice it again and again.

12.   Bring Improvement in Curriculum and Textbooks: Evaluation helps in making the improvement in the curriculum and text-books.

13.   Report Progress: Evaluation enables us to send progress reports to parents or guardians of students. The results provide an index by which the society can also assure itself about the successes and failures. The student also comes to know where he stands. Evaluation may be used for the improvement of public relations.

14.   Classification of Students: Evaluation helps in the classification of students into various categories. We have students who are of superior intelligence, average intelligence and below intelligence. Students having the same I.Q. and achievement nay be grouped together and constitute a class. This will ensure the uniform progress and avoid educational wastage.

15.   Provide Guidance: Evaluation helps in recognizing individual differences and other aspects of personality. On the basis of examination and other techniques of evaluation, educational and vocational guidance can be given to the students.

16.   Assess Success in Teaching: Through evaluation, teacher can assess the success of his teaching. He can continue with the methods which have led towards the success of his students in examination and modify those methods which have resulted in the failure of his students.

17.   Data for Research: Evaluation provides a lot of data for research purposes. O the basis of this research, various ways and means are being discovered for bringing reforms in the system of examination and other spheres of education.

18.   Improvement in Teaching-Learning Process: Evaluation implies the objective-based instructions and a continuous assessment of the progress of students. This leads to the improvement

in teaching and learning which contributes to the total development of the students.

DIFFERENCE BETWEEN EVALUATION AND EXAMINATION

Generally, examination and evaluation are used as synonyms and mutually interchangeable. But the fact is that they carry different functional meaning that they cannot be replaced by another. The difference between evaluation and examination is as follows.

Examination	Evaluation
1. It is a narrow concept.	1. It is a wider and comprehensive concept.
2. It only aims to determine the achievement of child in particular subject in a specific period e.g. annual, half yearly, monthly etc.	2. It is a continuous process and aims to determine the achievement of children in overall activities.
3. It gives quantitative data or information.	3. It gives quantitative as well as qualitative or information.
4. It is used for classification and promotion of children only.	4. It is used for classification, diagnosis, prediction and guidance to the children.
5. It is less reliable and valid than evaluation	5. It is move reliable and valid.
6. It is mainly oral, written and practical i.e. quantitative techniques.	6. It involves the use of various tools and techniques of evaluation i.e. both quantitative and qualitative techniques.
7. Examination confines to the memorization of knowledge only.	7. It does not confines to memorization.
8. It is informative	8. It is formative
9. It can examine cognitive domain only.	9. It can evaluate all the three domains.
10. It does not improve curriculum, methods etc.	10. It improves curriculum, method etc.

DIFFERENCE BETWEEN EVALUATION AND MEASUREMENT

Difference between evaluation and measurement are as follows:

Evaluation	Measurement
1. Evaluation is wider and more inclusive concept.	1. It is narrow and less inclusive concept than evaluation.
2. It is quantitative and qualitative process.	2. It is quantitative numerical only.
3. It is a continuous process.	3. It is a part of the evaluation process.
4. Emphasis is laid upon broad personality changes and major objectives of an educational programme.	4. Emphasis is upon single aspect of subject matter/achievement.
5. It interprets, explains and analyses the data provided and diagnosis.	5. It merely provides data needed for evaluation.

Evaluation	Measurement
6. It is a lengthy process.	6. It is not a lengthy process.
7. It is helpful in making significant prediction and diagnosis.	7. It is not helpful in prediction and diagnosis.
8. If given both numerical and descriptive results regarding change in pupil's behavior.	8. It gives only numerical results regarding change in pupil's behavior.
9. Remedial teaching is possible	9. Remedial teaching is not possible.
10. It is laborious and time consuming process.	10. It is not more laborious.
11. Comparative study is possible(Individual & group comparison)	11. Comparative study is not possible.
12. Objectives of all the three domains can be evaluated.	12. Only the objectives of cognitive domain can be measured.
13. The teaching learning process can be improved and modified.	13. Teaching-learning process can not be improved and modified.

TYPES OF EVALUATION

Evaluation can be classified into different categories in many ways. Some important classifications are as follows:

TYPES OF EVALUATION

According To function	According to Approaches	According to Nature of Reference/ Interpretation
1. Placement 2. Formative 3. Diagnostic 4. Summative	1. Formative 2. Summative	1. Norm-referenced 2. Criterion-referenced

PLACEMENT EVALUATION

Placement evaluation is designed to place the right person in the right place. It ensures the entry performance of the pupil. The future success of the instructional process depends on the success of placement evaluation. Placement evaluation aims at evaluating the pupil's entry behavior in a sequence of instruction. In other words the main goal of such evaluation is to determine the level or position of the child in the instructional sequence.

We have a planned scheme of instruction for classroom which is supposed to bring a change in pupil's behavior in an orderly manner. Then we prepare or place the students for planned instruction for their better prospects. When a pupil is to undertake a new instruction, it is essential to know the answer of the following questions:

* Does the pupil possess required knowledge and skills for the instruction?
* Whether the pupil has already mastered some of the instructional objectives or not?

* Whether the mode of instruction is suitable to pupil's interests, work habits and personal characteristics.

We get the answer to all the probable questions by using variety of tests, self report inventories, observational techniques, case study, attitude test and achievement tests. Sometimes past experiences, which inspire for present learning also lead to the further placement in a better position or admission. This type of evaluation is helpful for admission of pupils into a new course of instruction.

Examples: Aptitude test, Self-reporting Techniques, Medical Entrance Test, observational Techniques, Engineering or Agriculture Entrance Test

FORMATIVE EVALUATION

Formative evaluation is used to monitor the learning progress of student during the period of instruction. Its main objective is to provide continuous feedback to both teacher and student concerning learning success and failures while instruction is in process. Feedback to students provides reinforcement of successful learning and identifies the specific learning errors that need correction. Feedback to teacher provides information for modifying instruction and for prescribing group and individual remedial work.

Formative evaluation helps a teacher to ascertain the pupil-progress from time to time. At the end of a topic or unit or segment or a chapter the teacher can evaluate the learning outcomes basing on which he can modify his methods, techniques and devices of teaching to provide better learning experiences. The teacher can even modify the instructional objectives, if necessary. The teacher can know which aspects of the learning task were mastered and which aspects were poorly or not at all mastered by pupils. Formative evaluation helps the teacher to assess the relevance and appropriateness of the learning experiences provided and to assess instantly how far the goals are being fulfilled. Thus, it aims at improvement of instruction. Formative evaluation also provides feedback to pupils. The pupils comes to know his learning progress from time to time. Thus, formative evaluation motivates the pupils for better learning. As such, it helps the teacher to take appropriate remedial measures. " The idea of generating informative to be used for revising educational practices is the core concept of formative evaluation."

Formative evaluation is generally concerned with the internal agent of evaluation, like participation of the learner in the learning process. The functions of formative evaluation are:

Helps the teacher to assess the relevance and appropriateness of the learning experiences provided and to assess instantly how far the goals are being fulfilled aims at improvement of instruction

Provides feedback to pupils.

Helps pupil to know his learning progress from time to time. That is, the pupil knows what he has learnt well and what he still needs to learn.

Provides first-aid treatment.

Motivates the pupils for better learning.

Helps the teacher to take appropriate remedial measures

It does not take much time to be constructed.

It helps in modification of instructional strategies including method of teaching, immediately.

Ii is an integral part of the learning process.

Examples: Monthly Tests, Class Tests, Periodical Assessment, Teacher's observation, etc.

DIAGNOSTIC EVALUATION:

It is concerned with identifying the learning difficulties or weakness of pupils during instruction. It tries to locate or discover the specific area of weakness of a pupil in a given course of instruction and also tries to provide remedial measure. N.E. Gronlund says," Formative evaluation provides first-aid treatment for simple learning problems whereas diagnostic evaluation searches for the underlying causes of those problems that do not respond to first-aid treatment.

When the teacher finds that inspite of the use of various alternative methods, techniques and corrective prescriptions the child still faces learning difficulties, he takes recourses to a detailed diagnosis through specifically designed tests called ' Diagnostic Tests" . Diagnostic can be made by employing observational techniques, too. In case of necessity the services of psychological and medical specialists can be utilized for diagnosing serious learning handicaps.

SUMMATIVE EVALUATION:

Summative evaluation is done at the end of a course of instruction to know to what extent the objectives previously fixed have been accomplished. In other words, it is the evaluation of pupil's achievement at the end of a course. The main objective of the summative evaluation is to assign grades to the pupils. It indicates the degree to which the students have mastered the course content. It helps to judge the appropriateness of instructional objectives. Summative evaluation is generally the work of standardized tests.

The functions of summative evaluation are:

Crediting: Crediting is concerned with collecting evidence that a learner has achieved some instructional goals in contents in respect to a defined curricular programme.

Certifying: Certifying is concerned with giving evidence that the learner is able to perform a job according to the previously determined standards.

Promoting: It is concerned with promoting pupils to next higher class.

Selecting: Selecting the pupils for different courses after completion of a particular course structure.

Characteristics of Summative Evaluation

It is terminal in nature as it comes at the end of a course of instruction for a programme.

It is judgmental in character in the sense that it judges the achievement of pupils.

It views evaluation 'as a product', because its chief concern is to point out the levels of attainment.

It can not be based on teachers observations only.

It does not pin-point difficulties faced by the learner.

Its result can be used for placement or grading purpose.

It reinforces learning of the students who has learnt an area.

It may or may not motivate a learner. Sometimes, it may have negative effect.

Examples: Traditional School and University Examination, Teacher-made Tests, Standardized

Tests, Practical and Oral Tests, Rating scale etc.

THE DIFFERENCE BETWEEN FORMATIVE AND SUMMATIVE EVALUATION

Formative Evaluation	Summative Evaluation
1. Formative evaluation refers to the assessment or worth of the instructional programme which is going on and can still be modified.	1. Summative evaluation refers to the assessment of worthwhileness of the instructional programme which has already been compared.
2. It is an integral part of the teaching learning process.	2. It views evaluation as a product.
3. It is employed during the course of instruction	3. It is employed at the end of a course of instruction.
4. Formative evaluation is developmental in character its purpose is to improve students learning and instruction.	4. It is terminal in character because it is undertaken at the end of a course of instruction.
5. It views evaluation as a process.	5. It views evaluation as a product.
6. It is generally concerned with the integral agent of evaluation.	6. It is generally associated with external agent of evaluation.
7. Its result are made immediately known to the learners.	7. Its results can be used for placement or grading purposes.
8. It aims at improvement of learning and instruction.	8. It judges the efficacy of learning and instruction at the end of a course of instruction.
	9. It simply assess the outcomes, it has little to do with the teaching process.
9. It provides feedback to both the learner and teacher.	10. It provides information about a student's achievement and his position at the end of the course.
10. It provides continuous information about a student's progress.	
	11. It tests a large number of skills.
11. It tests a few skills.	12. It is not regular and continuous process.
12. It is regular and continuous process.	13. Its chief function is assigning grades, certifying or crediting.
13. Its chief function is to monitor learning progress.	14. It is generally a standardized test.
14. It is generally a teacher made test.	15. The test items are prepared from the entire course.
15. The test items are prepared from a limited area.	

TYPES OF TEST ITEMS

Examination plays a very important role in education. It measures the achievement of students after specified learning experiences. It also stimulates learning in the right direction. Examination is a powerful educational tool that serve at least four functions.

First, examinations help us to evaluate students and assess whether they are learning what you are expecting them to learn. Second, well-designed tests serve to motivate and help students structure their academic efforts. Third tests can help us to understand how successfully you are presenting the material. Fourth, examination can reinforce learning by providing students with indicators of what topics or skills they have not yet mastered and should concentrate on.

The following types of tests/examinations can be used by the teachers/ educators to test the knowledge of the learners

1. Essay Type Tests
2. Objective Type Test
3. Short Answer Type Tests
1. **Essay Type Test Items:**

Essay type test items are still commonly used tools of evaluation, despite the increasingly wider applicability of the short answer and objective type questions. There are certain outcomes of learning (e.g. organizing, summarizing, integrating ideas and expressing in one's own way) which cannot be satisfactorily measured through objective types test items.

An essay type questions may give full freedom to the students to write any number of pages. The required response may vary in length. An essay type question requires the pupil to plan his own answer and to explain it in his own words. The pupil exercises considerable freedom to select, organize and present his ideas. Essay type tests provide a better indication of pupil's real achievement in learning. The answers provide a clue to nature and quality of the pupil's thought process. That is, we can assess how pupil presents his ideas (whether his manner of presentation is coherent, logical and systematic) and how he concludes. In other words, the answer of the pupil reveals the structure, dynamic and functioning of pupils' mental life. The essay questions are generally thought to be the traditional type of questions which demand lengthy answers. They are not amenable to objective scoring as they give scope for halo-effect, inter-examiner variability and intra-examiner variability in scoring.

ADVANTAGES OF ESSAY TYPE TEST ITEMS

(i) **Utilisation of Higher Mental Faculties**: Higher mental faculties are to be involved while giving answers to the essay type questions. Memory, recall and reasoning power etc. all are involved. It is not easy to write an essay. All the higher mental faculties must be fully developed. Only then, one can have the capacity to write an essay.

(ii) **Practicability:** The main characteristic of an essay type test items is that:

(a) Questions can be framed very easily.

(b) It is easier to administer such tests. A lot of students can be tested at one time.

(c) Even the answer books can be evaluated with much ease.

(iii) **Measure Language and Style:** These tests measure language and style of writing of the students. The students have freedom to express that gained knowledge in the language and style of their own. So essay type tests, in a way, are the reflection of the personality of the child/pupil.

(iv) **Freedom of Expression:** In essay type tests, students have freedom of expression to answer their questions in a way they like. They can make use of their language and style. This freedom of expression enables the child to know his capabilities, potentialities and interests.

(v)   **Attitude:** When students write answer to the topics of controversial issues, their attitudes also come to the known.

(vi)   **Encourage Creative Thinking:** Essay type tests encourage creative thinking. The evaluation can evaluate the capacity of the students in marshalling of the facts and presenting the same on paper.

(vii)   **Evaluate individual Qualities:** Essay type tests evaluate the individual qualities of the child like originality, power of imagination, organization and power of making decisions etc.

(viii)   **Economy:** Essay type tests are economical. A lot of time and money is saved.

(ix)   **Development of Power of Concentration:** In order to Marshall facts and presenting them in a logical form requires a lot of concentration. So essay type tests develop the power of concentration among the students.

LIMITATIONS OF ESSAY TYPE TESTS:

(i)   **Not Reliable:** Essay type examination is not reliable usually the score of individual on them changed from time to time and from administration to administration. They give us inconsistent results.

(ii)   **Not Valid:** Essay type examinations are not valid. They do not measure properly what they ought to measure. Thus they do not serve the very purpose of the test.

(iii)   **Not comprehensive:** They are not comprehensive. It means they are not sufficiently long so as to cover the whole area to be tested. They do not test the achievement of the students in all chapters of a given course of study. They merely measure the achievement of part out of given course.

(iv)   **Subjective in nature**: They are subjective both in items and scoring. Usually all items give different meaning to different examinees and hence, the answer vary and their scoring also varies. The same examiner may award, different marks on the same answers of same individual at different times. Different examiners give different marks on the same answer at different times or at the same time.

(v)   **Less Discriminating Power:** Essay type examination is not a discriminating tool. It fails to distinguish between dull and bright students.

(vi)   **Irrelevant Answers:** Many irrelevant facts are added to the answer of essay type questions.

(vii)   **Variability in marks:** Examiner generally assigns marks on different answer in the answer book of the student on the basis of first attempted question.

(viii)   **Encourage Cramming:** Such tests encourage selective reading and cramming

OBJECTIVE TYPE TESTS

The success of an evaluation scheme depends upon the suitability of its tools. In this connection the essay type examination as a tool have miserably failed in realizing the set objectives. Essay type tests do not fulfill the criteria of a good test. In view of their weakness and limitations, new type tests called objective type tests have come into practice.

Objective type test are comparatively more reliable, valid, objective and comprehensive than the essay type examination. They can be easily scored and properly interpreted.

Objective type items are used when we want to test students' knowledge and understanding of

facts and relationship in computer science. These include completion, true/false, multiple choice. These type of examination contain questions or items, which are answered by a single word or by ticking, circling, crossing or underlying the one of the choice already given.

What is objective question? An objective question is one which is free from any subjective bias either from the tester or the markers. There can only be one right or objective answer to an objective question. Objective questions can take various forms, but invariably they require brief answers with little or no writing. A simple tick or a quick written answer may be enough. Objective type of items can be divided into following categories:

1.   Recall Type Tests:

These test items are also called supply type items. These include simple recall type and completion type test items. In simple recall test pupils asked simple question to test their factual knowledge. Pupil's answer these questions on the basis of their memory and previous knowledge or experiences. The answers of the questions are not suggested but are to be recalled and supplied by the pupil.

Example: Which part of computer system control processing of computer? (Single word)

What is the full form of RAM? (Single Phrase)

ADVANTAGES:

i.   This test items needs very brief answer, does not result in bringing boredom and fatigue.

ii.   It is easy to construct.

iii.   It almost eliminates guessing as a factor in unreliability and thus minimizes one of the most common criticism of objective tests.

iv.   These items are sufficiently reliable and highly valid.

v.   The familiarity of facts and naturalness is measured

vi.   It can serve the diagnostic purpose.

vii.   Quite comprehensive in covering the syllabus and testing of the realization of the stipulated objectives.

viii.   The scoring and interpretation of the responses of the students do not pose any problem.

DISADVANTAGES:

i.   Such questions test only the factual things and memory. The powers of understansing, reasoning, application, interpretation etc. cannot be tested through these questions.

ii.   Preparation of such items demands great skill and experience on the part of the paper setter.

iii.   It is costly in terms and labour for its preparation.

iv.   Administration of such tests may also create so many disciplinary and administrative problems. The mode of responses of questions may also drift the students to wards picking up unfair means.

v.   If not properly constructed, scoring can be subjective.

COMPLETION TYPE TEST ITEMS

The completion test may be defined as a series of sentences in which certain important words or phrases have been omitted and blanks submitted for the pupil to fill in. A sentence may contain a

simple blank, or it may contain two or more blanks. The sentences in the test may be disconnected, or they may be organized into a paragraph.

Example: 1. Input devices sends data to the

2 Keyboard is device used with computer.

ADVANTAGES:

i.   Completion type items are easy to construct.

ii.   Such types of items are popular and widely used. The pupils are quite familiar with such items.

iii.   There is no scope of guess work and as such they are more reliable.

iv.   Such items can measure both knowledge and comprehension of the subject matter, while simple recall type items can measure the knowledge aspect only.

LIMITATIONS

i.   Such items cannot measure higher levels of objective like application, analysis, synthesis or evaluation.

ii.   Such items fail to test the reasoning power, power to explain discriminate, illustrate or estimate.

iii.   These questions are mostly based on memory.

iv.   Scoring is a bit laborious as the blanks are scattered here and there.

RECOGNITION TYPE OR TRUE/FALSE TYPE TEST

This is a type of test in which two answers are given. One is correct or other is wrong. The examinee is to sort out the correct answer. The examinee has to tell whether it is true or false by writing True or False (T/F). Yes/No, Correct/Incorrect, Right/Wrong or marking or x at the given place.

Examples: Keyword is an input Device ? Yes/No

 Printer is an Output Device ? Correct/Incorrect

ADVANTAGES:

i.   Such items easy to construct.

ii.   It can be easily administered and scored.

iii.   It measures pupil's understanding of the content or concept.

iv.   The pupils are familiar with such items and such items are quite popular.

v.   True/false items provides a simple and direct means of measuring essential outcomes.

vi.   All the important learning outcomes can be tested equally well with true/false items like other objective type items.

vii.   Such items can be used to measure:

-       The pupil's ability to identify correct statements and principles

-       The pupil's ability to distinguish fact from opinion.

-       The pupil's ability to recognise cause and effect relationship.

Limitations

i.   As there are only two alternatives so it encourages guessing. A pupil who blindly answers all the items as 'true' or 'false' in a True-False test may score about 50% . Thus, such tests have low

reliability.

ii.　Many of the learning outcomes measured by true-false items can be measured more efficiently by other items.

iii.　It is difficult to construct such tests when the material seems to be controversial.

iv.　They cannot be employed to test higher learning outcomes or to test the higher mental processes.

v.　A true-false item is likely to be low in reliability when the number of items are less.

MULTIPLE CHOICE TESTS

A multiple-choice test is made up of items each of which presents four or more responses, only one of which is correct or definitely better than others. Each item may be in the form of a direct question, an incomplete statement, or a word or phrase. This form of test is to be distinguished from the multiple-response type, which requires that two or more responses be made to a single item.

of all the form of objective type test items, Multiple choice type test items are considered to be the best, as they make examinees to think. According to E.F. Lindquist and L.J.Cronbachit is superior to other type of tests for testing judgment.

A multiple choice-item consists of three parts- a stem, a key and a number of distracters. The key and the distracters. The key and the distracters together are often referred to as options. The stem can be either a direct question or an incomplete statement; the key is the correct answer and the distracters are plausible but incorrect answers. The testee is asked to choose one of the alternatives for his answer. Such tests require the testee to discriminate among the alternatives. They can measure the degree of understanding, the ability to infer, judge and apply.

Example: Speaker is an

(a)　Input Device (b) Application Software

(b)　Output Device (d) System Software

ADVANTAGES OF MULTIPLE CHOICE ITEMS

1.　Multiple choice questions are preferred to other types of objective-type items because such items provoke thinking and create interest in pupils.

2.　Administration and scoring of these items are simple and easy.

3.　They can measure leaning outcomes with respect to factual recall, ability to apply understanding, ability to interpret data, ability to reason, ability to exercise judgement, ability to justify methods, etc.

4.　They can be scored entirely objectively, quickly and accurately by macjines, clerks and even students themselves.

5.　They are relatively efficient. T/F and matching items are slightly more efficient, while the essay questions are far less efficient.

6.　Compared to T/F items, MC items have a relatively small susceptibility to score variations due to guessing.

7.　They usually provide greater test reliability per item that the T/F items do.

8.　They are easier to respond to and are better liked by students than T/F items. Students feel they are less ambiguous then T/F items.

9.   They are less vague than completion-type items.

10.   Guessing can be minimized by increasing the number of responses to four or five.

11.   They can be conveniently used for numerous subject matter areas.

LIMITATIONS OF MULTIPLE CHOICE ITEMS

1.   They are very difficult to construct. Teachers cannot always think of plausible distractors. More skill and more time are required.

2.   There is a tendency for teachers to write MC items demanding only factual recall.

3.   They require more time for students to respond to.

4.   They are not well-adapted for measuring the ability to organize and present ideas.

5.   They require more spacve per item.

MATCHING TESTS

A matching test consists of two columns or two series. The items of the column or series for which a match is required are called 'permises' and the items of the columns or series from which matching is selected are known as 'responses'. Thus each item of the premises column (or series) is to be matched with an item given in response column (or series) on some logic or basis. To minimize guessing, the number of answers given in the right hand may be kept on eor more or less than the number of questions on the first column.

Example: Match the answers from column B with the questions in column A and write the suitable number in the space provided in B.

 Column A Column B

(1)   Keyboard (a) Secondary Storage Device

(2)   RAM (b)Application Software

(3)   Floppy (c) Input Device

(4)   MS-Word (d)Random Access Memory

ADVANTAGES

1.   Matching tests require relatively little reading time, many questions can be asked in a limited period of testing time.

2.   They afford us an opportunity to have a large sampling of the content, which ultimately increases the reliability of the test.

3.   Like T/F or Multiple Choice items, matching tests are amenable to matching scoring. Even with hand-scoring, they can be scored more easily than the essay or short-answer test.

4.   The matching tests can be constructed relatively easily and quickly.

5.   Assess the knowledge of students regarding events, dates, terms, definitions, places etc. Particularly useful in History, Geography, Science and Grammar etc.

6.   Very much useful in lower classes.

7.   Students become interested for this test and are very curious to respond it.

8.   A matching exercise can better measure 'the ability, to identify the relationship between two things.'

LIMITATIONS

1. Matching tests are limited to the measurement of factual information based on memory. Thus measures more of memory less of understanding.

2. In the matching tests there is likelihood of the presence of irrevelant clues to the correct answer.

3. It is also difficult to analyse and evaluate the matching type items.

4. While preparing such item, one faces the difficulty of finding homogenous materials that are significant from the view point of learning outcomes.

CLASSIFICATION TYPE

In classification type of items, some words, phrases, terms, names, objects, facts etc. are given; one of which is not related to the others. The examinee has to make the odd out i.e. to select that one.

Example: In the following item some words are given, of which one does not belong to others. Select it and write down in the space provided at the right hand side.

(i) Keyboard, Scanner, Plotter, Mouse Ans…….

(ii) Monitor, Joystick, Printer, Speakers Ans……

(iii) MS-Word, Compiler, MS-Powerpoint, MS-Excel Ans……

ADVANTAGES OF OBJECTIVE TYPE TESTS:

1. Examiner is bound with a chain, hence partiality is impossible.
2. Objectivity is man, no scope for subjectivity.
3. Time consumption is not a problem hence test is absolutely economical.
4. No need to go in detail, only brief and definite answers are required.
5. Time saver for examiner paper setter and students.
6. No comment is required only tick marks is needed.
7. Helpful for making score quick and easy.
8. Away from chance factor.
9. Two students equal in knowledge get equal marks.
10. Helpful in providing guidance for further teaching programme.
11. Self satisfaction to pupils after looking marks.
12. Only knowledge is tested not the language.
13. Objective type tests are highly reliable and valid.
14. These tests do not depend on the teacher whims and fancy.
15. Written work of the students is reduced to a minimum.
16. These are easy to construct.
17. No scope for guess work.
18. Objective type test serve the diagnostic purpose.
19. The students do not feel boredom and fatigue because such kind of questions need vry brief answers.
20. These questions are set from all parts of the course and thus they measure the achievement of the whole subject matter.

DISADVANTAGES

1.   Objective type questions test only the factual knowledge and memory.
2.   Such items cannot be employed to test higher mental processes.
3.   There is no possibility of a student showing his language grasp over the subject matter of computer science.
4.   The students may guess the answer for some types of objective test items.
5.   There is no freedom of expression for he students.
6.   The test items demand more strain on the part of the teacher in preparing more number of test items.
7.   These do not develop higher thinking abilities like synthesis, analysis etc.
8.   These items required lengthy papers thus they need more investment for printing.
9.   The students have less written work, thus certain abilities like expression, language, style, spellings, pronunciation, creative critical analyses cannot be tested.
10.   Preparation of a good objective type test is very difficult and is very much time consuming.

SHORT ANSWER TYPE EXAMINATION

The modern trend is to include more short answer questions in the question papers in order to improve their reliability, validity and sampling capacity. Short answer questions generally require exact answers and although taking many forms, they share the following distinctive features.

i.   They usually take less than five minutes to read and answer, many take less than a minute.
ii.   Short answer questions permit larger sampling of content.
iii.   They tend towards greater objectivity in scoring.
iv.   More reliable and valid than essay questions.
v.   The answer is supplied by the pupil, not pre-selected as in objective questions.
vi.   Precise and specific as to the scope and length of answers.

Examples: Q1. What is computer?

Q2. Give five characteristics of Word Processor?

Q3. What is keyboard?

ADVANTAGES

1.   Objectivity and scoring can be better ensured in short answer type questions in comparison to ling answer question.
2.   Besides, the question-setter can ask a number of such questions as compared to long-answer type question within the same time limit. Thus, there can be a greater coverage of content.
3.   They are more reliable than the long-answer type-questions.
4.   There is less chance of guessing by the students.
5.   Preparation and administration are easy
6.   It is a compromise between the essay and the objective forms of test items.

DEMERITS

There is no such significant demerits of the short answer type test items. Handwriting, Language, expression and the way of organization of answer may affect the scores.

CHAPTER 19
CONTINUOUS COMPREHENSIVE EVALUATION

CONTINUOUS COMPREHENSIVE EVALUATION (CCE)

Education aims at making children capable of becoming responsible, productive and useful members of society. Knowledge, skills and attitudes are built through learning experiences and opportunities created for learners in school. It is in the classroom that learners can analyse and evaluate their experiences, learn to doubt, to question to investigate and to think independently.

For the holistic development of the child, evaluation should be comprehensive in nature i.e. it should include both scholastic and co-scholastic areas. It should help in realizing the goals of education. Such type of evaluation is continuous and reveals the strengths and weaknesses of learners. Hence, it brings improvement in the quality of achievement of all learners at elementary and secondary level.

Keeping in this mind, Continuous and Comprehensive Evaluation (CCE) system was introduced by the Central Board of Secondary Education (CBSE) in India to assess all aspects of a student's development on a continuous basis throughout the year. The assessment covers both scholastic subjects as well as co-scholastic areas such as performance in sports, art, music, dance, drama, and other cultural activities and social qualities.

The National Policy on Education (1986) and the Program of Action (1992) followed by the National Curriculum Framework of School Education (1986 and 2000) reiterated the need of the developing the personal and social qualities in learners. They stressed the point that the evaluation should be comprehensive in nature, where in all learning experiences pertaining to scholastic, co-scholastic personal and social qualities are assessed. The comprehensive evaluation necessitates the assessment of cognitive abilities (summative assessment as well as the assessment of health habits, work habits, cleanliness, co-operation and other social and personal qualities through simple and manageable means of tools. The comprehensive evaluation not only helps in checking all the standards of performance in both scholastic and co-scholastic areas, but also helps in checking all the standards of performance in both scholastic and co-scholastic in areas, but also helps in decision making regarding various aspects of teaching-learning process, promoting the students, increasing quality, efficiency and accountability.

Assessment of performance is an integral part of any process of learning and teaching. As a part of sound educational strategy, examination should be employed to bring about qualitative improvement in education." (The NPE, 1986)

MEANING OF CONTINUOUS AND COMPREHENSIVE EVALUTION

CCE refers Continuous & Comprehensive Evaluation, a system of school based assessment

that covers all the aspects of a student's development. It was designed to reduce the student stress related to board exams, and to introduce a uniform and comprehensive pattern for student evaluation across the country. It emphasizes on two broad objectives: (a) Continuity in Evaluation and (b) Assessment of broad based learning.

Continuous and Comprehensive Evaluation is an extension of the broader conception of evaluation. Continuous and Comprehensive Evaluation (CCE) refers to a system of school based evaluation of a student that covers all aspects of a student development. CCE provide accommodation for individual differences. It aims at fostering individual ability of children and helps them to realize their potentialities. It is a developmental process of student which emphasize on two fold objectives-continuity in evaluation and assessment of broad based learning and behavioural outcomes. Continuous evaluation helps in providing remedies and enriched instructions for realizing the objectives of education in the optimum growth and development of various aspects of child personality.

Continuous: The term 'Continuous' implies that evaluation is not a period of time rather spread over the entire span of academic session. It means regular assessment of every student. It is more a process than an event. Such assessment would help to diagnose learning gaps and pave the way for remedial measures. It includes regularity of assessment, frequency of unit testing, diagnosis of learning gaps, use of corrective measures, retesting and feedback of evidence to teachers and students for their self evaluation. It means evaluation of diverse aspects of learners' growth and development is 'built into the total teaching learning process and spread over the entire span of the academic session

Comprehensive: The second term 'comprehensive' acknowledges to the fact that learning can be both formal and informal; it can occur through several facets of activities and therefore the learning profile of the learners needs to be assessed in different contexts of learning both formal and informal. It means the scheme attempts to cover both the scholastic and the co-scholastic aspects of the students' growth and development. Thus it endorses the expression of learning through a variety of activities and hence their assessments through multiple tools of assessment. In short, it is intended to scan the entire learning map of the each student. Return type of evaluation cannot assess abilities, attitudes and aptitudes. A variety of tools and techniques are required for accessing a learner's development in areas of learning like:

1. Knowledge
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating

CCE have been introduced by CBSE for school students. As per this pattern there would be lesser examination and more assessments. All types of achievements of the students i.e. scholastic and non-scholastic are evaluated continuously for the whole session by a variety of internal tests which are spread over the whole year. These tests are weekly, fortnightly or monthly tests.

Assessment is on the basis of work done by the learners in the classroom and outside the classroom in the form of homework, assignments, debates, declamation, quizzes, dramatics etc.

OBJECTIVES OF CCE

Evaluation as an Integral Part: To make evaluation an integral part of teaching-learning process.

Development of Skills: To help to develop cognitive, psychomotor and effective skills.

De-emphasize Rote Memorization: To lay emphasis on thought process and de-emphasize rote memorization

Regular diagnosis and remedial instructions: To use evaluation for improvement of students achievement and teaching-learning strategies on the basis of regular diagnosis followed by remedial instructions. The continuous feedback provides direction to students, teachers, and parents.

Quality control Device: To use evaluation as a quality control device to maintain desired standard of performance by providing remedial and enriched instructions.

Learner centered activity: To make the process of teaching and learning a learner centered activity.

Determine Effectiveness of Program : To determine social utility, desirability or effectiveness of a program and take appropriate decisions about the learner, the process of learning and the learning environment

Harmonious development: To develop all the aspects of child's growth.

FEATURES OR CHARACTERISTICS OF CCE

Continuous: The 'continuous' aspect of CCE takes care of 'continual' and 'periodicity' aspect of evaluation.

Continual: Continual means assessment of students in the beginning of instructions and assessment during the instructional process done informally using multiple techniques of evaluation.

Periodicity: Periodicity means assessment of performance done frequently at the end of unit/ term.

Comprehensive: The 'comprehensive' component of CCE takes care of assessment of all round development of the child's personality. It includes assessment in scholastic (subject specific areas) as well as co-scholastic aspects (life skills, attitudes & values and other co-curricular activities) of the pupils by using various tools and techniques of assessment.

Scholastic aspects include curricular area or subjects specific areas,whereas Co-scholastic aspects include Life skills, co-curricular activities, attitudes and values.

Scholastic areas: Assessment in Scholastic aspect is done informally and formally using multiple techniques of evaluation continually and periodically. The diagnostic evaluation takes place at the end of unit/term test.

Co-Scholastic Areas: Assessment in Co-Scholastic areas is done using multiple techniques on the basis of identified criteria, while assessment in life skills is done on the basis of Indicators of Assessment and Checklist

Harmonious Development: It motivates learners for systematic learning and harmonious development.

Need Based: It caters to the needs of the learner.

ADVANTAGES AND FUNCTIONS OF CCE

Organize effective teaching strategies: It helps the teacher to organize effective teaching strategies.

Provide immediate feedback: Immediate feedback is provided to teachers as well as to students. An individual learner's strengths and weakness are diagnosed and learner's knowledge and skills are improved accordingly. It also provides immediate feedback to the teachers so that he can then decide whether there is need for more discussion on a particular unit or concept or may take remedial measures of instructions in which more emphasis is required.

Motivation: It motivates learning in a friendly environment. It helps to develop good study habits, to correct errors, and to direct activities of students towards the achievement of desired goals.

Identifies areas of aptitude and interest: CCE identifies areas of aptitude and interests of the students.

Predicting Future Success of Students: Students are prepared for life. On the basis of reports of the progress of students in scholastic and Co-Scholastic areas, CCE helps in predicting the future success of the learner. It also helps in making decisions with regard to the choice of subjects, courses and careers.

Holistic assessment: It makes a holistic assessment of learner's whole personality-assessment of scholastic as well as co-scholastic abilities and achievements.

Afford more time to teachers and students: It affords more time to teachers for transaction of curriculum. Students will also have more time at their disposal for the development of interests, hobbies and personality.

Enhances the quality of teaching learning process: CCE enhances the quality of teaching learning process in the school. The emphasis is now on learning rather than on teaching. It ensures that every child acquires not only the knowledge and skills but also the ability to apply these competencies in real life situations.

Reduces stress and anxiety: It reduces stress and anxiety during examination.

Reduces drop-out: It will reduce drop-out as there is no fear of examination.

COMPONENTS OF CCE

For holistic assessment both scholastic and Co-Scholastic aspects should be considered in Continuous and Comprehensive Evaluation. So CCE comprises of two components- Scholastic and Co-Scholastic.

Scholastic Assessment:

This is done to know what a child has learnt over a period of time. Comprehensive profile for each learner has to be maintained.

It Includes:

1. Academic- Languages, Math, Science, Social Science

2. Work experience

3. Physical and Health Education

4. Art Education

Objectives of Scholastic Assessment:

The objectives of the Scholastic domain are:

1. To bring desirable behaviour in terms of the learner's knowledge, understanding, evaluation and the ability to apply it in an unknown conditions.

2. To improve the teaching learning process.

Types of Scholastic Assessment:

Scholastic assessment can be Formative and Summative.
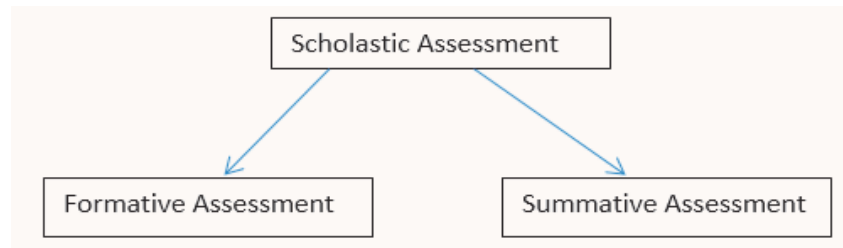
FORMATIVE ASSESSMENT

Formative assessment is a tool used by the teacher to continuously monitor student progress in a non-threatening, supportive environment. It includes regular descriptive feedback, a chance for the student to reflect on the performance, take advice and improve upon it. It involves students' being an essential part of assessment from designing criteria to assessing self or peers. If used effectively it can improve student performance tremendously while raising the self-esteem of the child and reducing the work load of the teacher.

FEATURES OF FORMATIVE ASSESSMENT:

1. It is remedial and diagnostic.

2. It gives effective feedback to both students and teachers.

3. It builds on students' prior knowledge and experience in designing what is taught.

4. It recognizes the profound influence assessment has on the motivation and self-esteem of students, both of which are crucial influences on learning.

5. It provides the platform for the active involvement of students in their own learning.

6. It enables teachers to adjust teaching to take account of the results of assessment

7. It identifies the need for students to be able to assess themselves and understand how to improve it.

SUMMATIVE ASSESSMENT

Summative assessment is carried out at the end of term. It provides feedback on learning to teachers and parents. It measures how much a student has gained from the course. It is usually a graded test, i.e., it is marked according to a scale or set of grades.

FEATURES OF SUMMATIVE ASSESSMENT:
- It assesses students' knowledge gained.
- It is carried out at the end of the course.
- It provides the feedback to teachers and students.

CO-SCHOLASTIC ASSESSMENT:

It deals with affective domain of the learner's personality through development of the skills, attitudes and values and outdoor activities.

Co-Scholastic Areas (Part II):

Life skills: Life skills acquired via teaching direct experience for adaptive and positive behavior. These make the students able to deal effectively with the challenges and demands of everyday life. These develop the physical, emotional, mental well-being of individuals. There are a large number of life skills. But in CCE manual of CBSE, only ten life skills are considered under the headings-Thinking skills, Social skills and Emotional skills.

- Thinking skills
- Self-Awareness
- Problem Solving
- Decision Making
- Critical Thinking
- Creative Thinking
- Social skills
- Interpersonal Relationships
- Effective Communication
- Empathy
- Emotional skills
- Managing Emotions
- Dealing with stress

ATTITUDES:

Attitudes are generally positive or negative views of an attitude object (person, place, thing or event). Attitudes are judgments. An attitude is a hypothetical construct that represents an individual's degree of like or dislike for person, place, thing or event. Students will be assessed with respect to their attitudes towards school-mates, teachers and school programmes.

- Attitude towards
- Teachers
- Schoolmates
- School programmes and environment
- Value Systems

♦ Co-curricular Activities A:

♦ Out the following activities students have to choose any two

ACTIVITIES A: (ANY TWO)

♦ Literary and creative skills

♦ Scientific skills

♦ Aesthetic and performing arts

♦ Clubs (eco , health and wellness and others)

B. HEALTH AND PHYSICAL EDUCATION

Sound mind resides in a sound body. To achieve this, health and physical education should be integral part of the curriculum

Out the following activities students have to choose any two

(i) Sports\indigenous sports

(ii) NCC\NSS

(iii) Swimming

(iv) Gymnastics

(v) Scouting & Guiding

(vi) Yoga

(vii) First aid

(viii) Gardening

TOOLS AND TECHNIQUES OF CCE

The learner is evaluated continuously in CCE. The data and information regarding a learner is maintained. The quality of data and information helps in classifying a learner on the bases of his achievement. There are number of tools and techniques are used for collecting the data and information of students. A list of tools and techniques (given in CCE Manual of CBSE) that can be used in CCE are shown in the table given below:

Scholastic Assessment (Part I)		
Formative Assessment (Flexible Timing)		**Summative Assessment (Written, End of Term)**
Tools	**Techniques**	• Objective Type
Questions	Examination	• Short Answer
Observation Schedule	Assignments	• Long Answer
Interview Schedule	Quizzes and competition	
Checklist	Projects	
Rating Scale	Debates	
Anecdotal Records	Elocution	
Document Analysis	Group Discussions	
Tests and Inventories	Club Activities	
Portfolio Analysis	Experiments	
	Research	

TECHNIQUES USED IN CCE

1 EXAMINATION:

Examination refers to a system where students are tested at the end a define period of suction. Examination related with cognitive measurement. It is the act of giving a test to the students (as by questions) to determine what they have learnt.

Three type of examination are in vogue to measure the scholastic achievements of pupils:

1. EASSY TYPE

2. OBJECTIVE TYPE

3. SHORT ANSWER TYPE

II ASSIGNMENTS:

According to Oxford Dictionay," Assignment is a task or piece of work that somebody is given to do, usuallyas a part of their job or studies."Assignments are task assigned to students by their teachers based on the prescribed syllabus. These can be given either before the lesson or after the lesson. These can be completed as class work or homework. These are open ended structured. Students have to submit the assignment within the stipulated time.

ADVANTAGE:

Assignments provide students and opportunity to search for information, construct their own ideas, and articulate the same ideas through spoken, written and visual expressions

Assignments assets a wide range of objectives and content of learning thus realize the aims of teaching

These provides students and opportunities to relate and synthesize within and outside school learning while example

These increase the knowledge and improve the availabilities and skills of the students

These encourage the students to do independent work.

Assignments arouses interest of the pupils hand hence motivates the student to study

Assignment aim at providing direction and guides' to pupils activates

III QUIZZES AND COMPETITIONS:

Quizzes and competitions is a form of assessment. It occupies important place in assessing the knowledge of the child to remove monotonous environment of routine class room teaching. Sometime teacher organist quizzes where the student attempt to answer the questions correctly. It is unique tools to develop intellectual efficiency of the students. Question regarding various issues or on a particular theme are put to a group of students.

Characteristics:

1. Quizzes should include question that require usually a short objectives answer. Quizzes should not include question which require lengthy answers or descriptions.

2. Quizzes should include questions that require mental calculation. Students may use paper and pen to do some rough calculations, but most of the calculations have to be done mentally.

3. Quizzes should involve a large number of questions to be answered by the students in a relatively short period of time.

4. Quizzes should assess the knowledge, understanding, and capabilities of the learners. These

should not assess ability to express the ideas.

5. Quizzes should be free from personal bias of the assessor of a quiz; otherwise it will affect scores of participants.

6. It is preferred quiz that has to be administered should be in a written form.

7. Questions in quizzes should be well worded and in simple language.

8. Large number of question in quizzes must ensure that the question cover more topics.

MERITS:

1. Quizzes evaluate the knowledge, understanding and mental skills of the students.

2. It is a joyful activity because students participate voluntarily.

3. Besides assessing the knowledge of the students, it helps incalcating social values such as cooperation, sharing, responsibility, collaboration and team work in group events.

4. Large number of question from the given topics can be asked in short period of time. Students have to spend less time in answering questions as compared to examinations involving essay type questions.

5. Quizzes eliminates the element of subjectivity i.e. personal bias of the assessor and thus objective.

6. As scoring is instantaneous, so it provides immediate feedback to students.

7. Students who do not participate in quizzes can also gain knowledge by listening the correct answers from the participant.

8. Quiz competition develops reading habits among the students.

9. Various instincts of the child like curiosity, self-assertion are satisfied through quizzes.

IV. PROJECTS:

Dictionary meaning of project is the planned work. Project is a piece of work that is designed to find information about something, to produce something new, or to improve something existing. In educational context, project is a piece of work involving careful study.These are undertaken over a period of time and involve collection and analysis of data Projects are useful in theme-based learning. According to Stevenson," A project is a problematic act carried to completion in its natural setting."

MERITS:

Projects are based on learning by doing principle of psychology. Provide opportunities to explore, work with one's hand, observe, collect data, analyze, organize and interpret data and draw generalization.

Projects provide an opportunity to work in groups and in real life situations. They help to develop a positive attitude towards group work, co- operation, sharing and learning from each other.

They setup a challenge to solve the problem. Thus stimulates creative thinking.

Students develop the habits of hard work, self-dependent, self-reliant, sense of responsibility arriving at independent decision.

DEBATES

Debates is defined as a formal contest of argumentation in which two opposing teams defend and attack a given theme both teams try to oppose the other team's conclusion. It involves two or more students how present their arguments intent on persuading each other. It is a structured from of discussion or argument. Same topic is seen from a different point of view. It is an art of putting one's arguments forcefully and convincing that he is right. Debates include a topic and Speakers-One speaker represents Yes and other No. Success of debate depends upon how much speakers have put effort in selecting, preparing and presenting the subject matter

According to Edward W. Howe ," The sounder your argument, the more satisfaction you get out of it. "

According to Michel de Montaigne, " He who establishes his argument by noise and command shows that his reason is weak."

CHARACTERISTICS:

1. Debates should reflect the learning process.

2. Proper guidelines for presentation must be provided to students so that they explore ideas and arguments in a non-threatening environment.

3. Topic of the debate must have educational value. It should be topic of current news and affairs.

4. Topic should be neither too difficult nor too easy. It should be according to the student's mental level.

Merits:

1. Student becomes self-confident debates removes nervousness and shyness.

2. Debates encourage students to study more and more, thus develops reading habit among students.

3. Students can learn from each other. They gain knowledge and opinions.

4. Debates improve thinking, processing, expression, organizational and communication skills of the students.

5. It is an effective method of acquiring knowledge.

6. Student who participates in debates acquire elements of a good arguments that help in the development of abilities to speak confidently.

ELOCUTION:

Elocution may be defined as communication skill through speech and eloquent gesture. Elocution refers to a person's manner speaking aloud in public. It is one's capacity in communicating with others with the use of exact speech and gestures. In elocution students decide the topic themselves which they are going to speak on. They must select a topic of current news and affairs. This is because most people are updated with current news and affairs are willing to pay attention to current topics. There are several factors which are adjudged during elocution. It is a culmination of voice quality, speech content and the delivery standards. Students must be advised to keep in mind that the introductory and concluding words in a speech are very important. The beginning of the speech of utmost importance as that is the time when your one impactful sentence can grab the attention of audience. Humor is an art and light funny speeches are always preferred over serious

factual ones. However, it depends from competition to competition, what kind of atopic one wants to talk on.

MERITS:

1. It helps in developing reading habit among students .

2. It builds confidence in students.

3. It brings improvements in clarity of speech and knowledge. It builds vocabulary, inculcates public speaking qualities, strengthens language skills, listening and reading skills and helps students to face interviews and group discussions.

4. It also encourages the feeling of healthy competition.

5. Elocutions encourage children to go on stage and have their speech. So it removes stage fear from the minds of the students.

GROUP DISCUSSION:

As a technique of evaluation, it is organized (intentionally, purposefully) by teacher within a small group (8-10) of students on a given topic for a limited time (15-20 minutes). It is a modern method of assessing students' personality. As the name suggest it refers to a discussion among a group of persons who express their views freely on topic of current issue with in the stipulated time limit with in that period, the abilities of the members of the group are measured. The collective sharing of all available information, thought and insight is known as group discussion topic is given to judge public speaking talent.

MERITS:

1. It stimulates convergent and divergent thinking. Students generate multiple ideas, insights and opinions about a problem which help in looking at the problem from every possible angle and then dealing with it accordingly.

2. It provides training in development of oral expression. It improves linguistic ability of the students. It provides chance to students to expose their ideas.

3. It expands academic as well as general knowledge. It helps to gain more knowledge by getting other opinion.

4. One of the main advantages of group discussion is that each student is critically analyzed. It help in assessing students key attributes like interpersonal skills, leadership qualities, public skills ability to communicate and others.

5. It helps to the student to gain confidence in their abilities and enable them to present their ideas in a more systematic manner in front of large audience. It helps one to get out fear while taking with groups.

6. It develops feeing of cooperation among group members it facilitates team work.

CLUB ACTIVITIES:

School clubs organizes various co-curricular activities, which are known as club activities. Club activities provide excellent opportunities to student to come out of the monotonous and rigid classroom environment. Learning takes place in an informal and stress free environment. Club activities form the backbone of co-curricular activities in different subjects. These activities are organized by different clubs such as Science club, Mathematics club, Social Science club etc. In

these activities, students choose the activities in their own, pursue and discuss in a free and relaxed atmosphere.

MERITS:

1. These activities have great educational potential. All classroom teaching is theoretical. Practical knowledge can be imparted through co-curricular activities.

2. Social cooperation is organized as one of the important demand of citizenship it is difficult to teach through various school subjects. By participating in group activities, student learns good manners and develop sense of cooperation, sharing responsibility. They develop group spirit, 'We '- feeling, belongingness, unity and ability to be cooperative.

3. These activities supplement the curricular work.

4. Students can utilize the leisure time in a fruitful manner.

5. Clubs are helpful in organizing exhibitions, fairs, tours debates, declamations etc.

TOOLS OF CCE

1. **Questions-** Questions are the most commonly used tool for getting the information about the children with regard to their knowledge, abilities attitude, difficulties. Question as a tool primarily used in examinations.

2. **Observation**- It is the oldest and most commonly used tool for collecting information about a student. Observation refers to systematic method analyzing and recording the overt behaviour of an individual in controlled or uncontrolled conditions. It can be done natural setting or outside the class.

 ADVANTAGES OF OBSERVATIONS:

1. There is no need of laboratory and costly apparatus for recognizing and identifying the various aspects of student personality development during observation.

2. Observations helps in recognizing and identifying the various aspects of students personality development. It also recognizes the minute and hidden facts.

3. Observation helps in identifying the student's performance and knowledge.

4. It is flexible and can be used in gathering information in many situations. It can be applied to observe the behavior of individuals as well as group. It is more reliable and objective.

TESTS AND INVENTORIES

Test may be taken through paper-pen, oral, clinical, medical, skill based etc. Test may measure cognitive, affective or conative domain. Test is a tool whereas examination is a technique according to manual of CCE for teachers. In CCE, test refers to psychological, academic/achievement, diagnostic test, oral test. Inventories are a list of learner's traits with a varying degree of response categories. Technically students have to assess on each trait or criterion by making given responses.

According to Oxford Dictionary of Psychology, "Inventory refers to any list or schedule of items. Test designed to measure interest attitudes, personality, traits, preferences and psychological attributes are called inventions."

Tests are of two types- Written Test and Oral Test

1.   Written examinations are used to test content or skills. Beside the knowledge, written expression is also assessed.

2.   Oral test are best suited to assess the depth of learning. Oral tests being individual tests require more time than group written tests. These are used for testing those skills which are not tested by essay type test.

CHECKLIST:

Checklist is a list of things or traits or factors of learner to which teacher checks whether they are present or absent. Checklists are often used for observing performance in order to keep track of a student's progress or work over time. It is a tool for data recording and documentation. Checklist consists of a list of items to be checked. Items are prepared and used by teacher for assessing the child. Checklist is used where answer is in either 'Yes' or 'No'. The response to check list items are a matter of facts, not of judgment

According to Wrightsone, Justman and Robbins, " Check list may be defined as a prepared list of items that may relate to a person, procedure, institution, building or similar objects."

ADVANTAGES OF CHECKLIST:

1. The response to check list items may serve as basis for bringing improvement in all the educational aspects such as curriculum, methods of teaching and evaluation tools.

2. It is quick and easy to implement.

3. It is helpful in knowing the strengths and weakness of students.

RATING SCALE:

A rating scale is a set of categories designed to elicit information about a quantitative or a qualitative attribute. Rating refers to judgment of one person by another person. Rating scales record the judgments of a learner which are usually expressed on a scale of values. Rating scale is another important tool to evaluate the personality characteristics of the learners such as honesty, leadership, cooperativeness, industriousness etc. Rating scale is used wherever learner behavior is likely to be in a continuum- from excellent to bad or from satisfactory to unsatisfactory.

According to Ruth Strang, "rating is directed observations."

According to Wrightsone, Justman et al. , " A Rating scale consist of a set of characteristics or qualities to be judge and some type of scale for indicating the degree to which, each attribute is present."

Advantages:

1.   Rating scales can be used with students who are too young read and evaluate their actions.

2.   They are helpful in discovering the needs of the students.

3.   They are helpful in gathering information about students which can be used for writing reports , giving guidance and in research work

4.   Rating can be used with rates who have minimum training.

5.   Rating can be done in short period of time.

ANECDOTAL RECORDS:

Observation can be recorded or unrecorded. Recorded observation is called anecdotal record or

anecdotes. Anecdotal record drives its origin from the word 'anecdotes' which means brief events and episodes. Some significant episode/ event in life of the student is recorded that shows his conduct, thinking, skills and capabilities revealing significant features and characteristics about his/ her personality. An Anecdotal record is the record of the pupil's behavior and personality observed by the teacher. Anecdotal records are used to record specific observations of individual student behaviours, skills and attitudes in natural settings.

According to Strang , "Anecdotal record is a specified form of incidental observation. It is description of the child' s conduct and personality in terms of frequent, brief concrete observations of the pupil made and recorded by the teacher."

According to Rath, "An anecdotal record is a report of a significant episode in the life of a student."

Sometimes multiple episodes or anecdotes are recorded for arriving at a conclusion.

Advantages:

1.   Anecdotal record provides description of personality of an individual learner.
2.   These help in understanding the learner.
3.   These help in knowing the learner's interest and changes in his attitude.
4.   These motivate the teachers to know about the learner.
5.   These are helpful for providing guidance.

Document Analysis:

Document analysis means to analyze or evaluate the documents i.e assignments, projects in science, geography, mathematics, languages etc. In CCE, teacher may use this technique for analyzing any document of learner which contains information about learning process or product. Students are assessed on the basis of documents. This technique helps in evaluating answers to essay type questions. It helps in judging the skill of expression and organization of thoughts.

PORTFOLIO:

It is the collection of evidences that provide an excellent way to measure the growth of student work over a period of time. It could be day-to-day work or selection of the learner's best piece of work. Portfolio assessment or analysis is a joint process for teacher and student. Portfolio analysis emphasizes evaluation of students' progress, processes and performance over time. Portfolio assessment can range from portfolios that demonstrate the student's best work to an "expand student record" that holds a full representation of the student's work, from computer programme to essays on literature.

ADVANTAGES OF PORTFOLIO:

1.   It provides a cumulative record of strengths and weakness of a student.
2.   It gives the evidence of growth and development of a skill or competence in an area over a period of time.
3.   It is used to view learning and development longitudinally.
4.   It enables a student to demonstrate his/her learning and progress to others.
5.   Student becomes an active participant in the learning and assessment process.
6.   Teachers can also utilize the record to judge student performance.

7.   Multiple components of the curriculum can be assessed.

8.   It is economical in terms of student time and effort as no separate assessment administration time is required.

9.   It is useful at all levels and can be used for diagnostic and prescriptive purposes as well.

CHAPTER 20

METHODS OF TEACHING

After deciding,'Why to teach' and 'what to teach'. 'How to teach' is a really difficult problem for the teacher. How the pupil will learn effectively depends upon the method of teaching a particular teacher adopts. In which way the subject matter and learning experiences, to be imparted, should be given to the pupils. So that the desired aims and objectives to be achieved properly. Methods of teaching have an intimate relationship with teaching and instructional objectives. So the main aim of teaching is to bring about socially desirable behavioral changes in the children. Though teaching is an art. Methods are the way or mode to understand and practice the art. So it is essential that every teacher should be acquainted with different methods of teaching computer science.

The word 'method' has been derived from Latin word, which means "Mode" or "Way". Therefore here it mean, method of delivering knowledge and transmitting computer science skills by a teacher to his pupils and their comprehension and application by them in the process of learning computer science.

In a very restricted sense, it means "What to teach?" and "how to teach mathematics?" or "how to approach it?" Hence; "The process of interpreting the world of knowledge to pupils' mind is called the method of teaching." It is just a way to teach. The following figure can make it more clear:

METHOD OF TEACHING

The world of knowledge includes; the knowledge, interest, attitude, skill etc. i.e. all the three domains- cognitive, affective and psychomotor. Another approach to define a method of teaching may be as follows:

The way is Method

Present   position/   Terminal   position/

Situation of the child Situation of the child

According to Brondy(1963), " Method refers to the formal structure of the sequence of acts commonly denoted by instruction. The word/term method covers both strategies and techniques of teaching and involves the choice of what is to be taught."

Now which method should be used to teach computer science, depends upon the abilities and interests of the teacher. But while selecting the method, the teacher should always keep in his mind the aims of teaching computer science. These aims include the mental, social and moral development of the child. This development is only possible, when methods of teaching are appropriate and effective. A teacher who does not use suitable method to teach the subject matter according to the requirements of the children, is not supposed to be a good teacher. Generally, children like that method which makes the subject matter more clear and easily understandable.

However, it is important to note that amethod should not become an end in itself but should be used as a means to achieve the determined aims and objectives of teaching methods according to his own abilities, interests and experiences.Following points may be consider while selecting a method:

♦ What to teach?
♦ Why to teach?
♦ Whom to Teach?
♦ How to teach? i.e. what are the various methods?
♦ What are the problems in using these methods?
♦ How can we remove those problems?
♦ Which method is the best?

CLASSIFICATION OF METHODS

Generally, methods of teaching computer science can be classified in

Child-centered methods

Teacher-centered methods

CHILD-CENTERED METHOD:

In child centered methods, the child occupies a central position in the classroom. The whole teaching-learning process is geared to the needs, interests, capabilities and requirements of the child. These are based on psychological principles. The purpose is to develop abilities, skills and discovery attitude amongst the students. These includes: Project, Laboratory, problem solving, Heuristic, Discussion method etc.

TEACHER CENTERED METHODS:

In these methods, the teacher occupies a central position in the classroom. In these methods focus is given on telling, memorization and recalling information. The children are just passive recipients and they are in the background of educational process of knowledge. These includes: Lecture, Historical and Lecture cum Demonstration method.

VARIOUS METHODS OF TEACHING COMPUTER SCIENCE

According to Valtaire and Spancer," Every method has some goodness in it, no method is all good. Children should be told as little as possible and induced to discover as much as possible."

Various methods of teaching computer science are as follows:

Lecture Method

Lecture cum demonstration method

Laboratory method

Project Method

Problem solving Method

CAI

Web based instructions

LECTURE METHOD

This is a teacher centered method. In this method the teacher is an active participant and child is

a passive learner. This is not a psychological method. In this method the teacher speaks or delivers a lecture on a particular topic and the children listen. It is one way traffic because the teacher gives ideas and the children receives them. This is the method of imparting information through a speech. It is an oldest method of teaching given by Idealism philosophy. This is one man's show because the children remain passive throughout the process.

Lecture is another name for a speech and when you are speaking continuously to a class or an audience, you are considered to be lecturing. It is a method of depicting everything in words. Lecture method is more useful at higher level classes. In this method it is difficult to know te extent to which the student has been able to learn. It is useful in relating some of the historical and mathematical incidents.

STEPS IN LECTURE METHOD:

It is very important for a teacher, that, how to use this method to the teaching of computer science? What is the shape or form of this method. The teacher prepares his lesson at home and delivers the same in the class. The students sit silently, listen attentively and try to catch the point. So, there are three steps in the process of lecture method-

Planning by the teacher

Presentation by the Teacher

Receiving by the learner.

It is clear from the above steps. That there is no place of pupils's activities. The teacher is active only and the pupil remains a passive learner. He listens the lecture of the teacher. The process of lecture may be shown as follows-

It is convenient method for the teacher. The teacher is always active. The flow of thought is maintained and the teacher tells about many new things. More information can be given in a short period because it is easy, brief and attractive for teachers. The communication set of lecture can be shown s follows:

It is clear from the communication set of lecture that there is no direct communication between the students. It is only teacher who communicates. The feedback channel is also very poor in lecture method. The teacher does not come to know about the extent of success of his communication.

ADVANTAGES OF LECTURE METHOD

The lecture method has a few advantages that has kept it as the standard approach to teaching for so long. Below is a list, followed by some descriptions of each of these.

1. Teacher control: Because the lecture is delivered by one authoritative figure – a teacher, professor, or instructor of some other kind – that person has full reign of the direction of the lesson and the tone of the classroom. They alone are able to shape the course, and so lectures remain highly consistent when it comes to what kind of information is delivered, and how it's delivered.

2. New material: Lectures are literally just long-winded explanations of information, deemed important by the lecturer. As such, students can absorb large quantities of new material.

3. Effortless: The lecture method makes the learning process mostly effortless on the part of the students, who need only pay attention during the lecture and take notes where they see fit. Because so little input is required from students, it's the most clear, straightforward, and uncomplicated way to expose students to large quantities of information – as explained above – and

in a way that is controlled and time sensitive. Students just need to know how to take good notes

4. Covering Ground Faster: An instructor has a lot of material that she is required to teach and not so much time to cover it. The lecture method allows the teacher to decide what material to teach and ensures that it is explained to students in the way she desires within the allotted time. Other methods of teaching that give more autonomy to the students require more class time. For example, learning material through group research may take a long time depending on how fast students can learn and work. A group lecture, on the other hand, covers the same material in a shorter time since time is only dependent on how long it takes the teacher to explain the concepts she plans to teach.

5. The Quality of Material: Part of the teacher lecture method is that the teacher is in control of what material the students will learn. Therefore, the teacher could share with the students her own knowledge on things that may not be written in published material. On the other hand, a self-discovery learning method that involves the students researching a specific topic of information on their own cannot ensure that they will discover key information.

6. Instructing large group: The lecture is a convenient method for instructing large groups. If necessary, we can use a public address system to ensure that all students can hear us. The lecture is sometimes the only efficient method to use if student-to-faculty ratio is high.

7. Habit of Concentration: This method develops the habit of concentration and patience among students as they have to sit quietly and patiently to listen the lecture of a teacher.

8. Time saving: It saves the time as large quantum of knowledge and informationcan be imparted to students quickly. Lengthy syllabus can be covered in a short span of time. In this method there is no demonstration, no student activity and no project work. So there is enough scope for finishing the prescribed syllabus in the stipulated period.

9. Inspirational Value: Good lectures may motivate, inspire students for logical thinking and creativity.

10. Economical Method: It is an economical method with respect to time, energy and money. A large number of students are taught at a time with single presentation. No laboratory, apparatus and aids are required for this method.

11. Useful for Factual Information: It is useful to give fact based knowledge and historical development of computer.

DISADVANTAGES OF LECTURE METHOD

1. One-Way: People who are against the lecture method see it as a one-way street. Professors dictate information to students, who have little to no opportunity to provide their own personal input, or protest the information being delivered. What if the professor is wrong, or what if the student disagrees with the professor on a fundamental ideology in their lecture? Well, the student just has to sit down and take it; sometimes, the student will even be forced to agree with the lecture if they want a passing grade. If the lecture is on a sensitive topic, over which there is much conflicting discourse, you can imagine the problems this might cause.

2. Passive: Not only do people see the lecture method as a biased, one-way road, but they also see it as a wholly passive experience for students. This isn't just harmful because of the

ways we described above. Not being actively engaged in a discussion over certain material can make the material itself seem worthless to a student. After all, the point of an education isn't to be programmed to think a certain way, according to your instructor's lectures, but to critically analyze the information being provided and learn how to apply it in different contexts. If a student has no place to opportunity the course material with the person delivering the lecture, they will receive only a shallow understanding of the subject being discussed. Simply put, they might even be bored by the material because they will have no opportunity to learn how the subject applies to them on a personal level.

3.   **Strong speaker expectations:** The lecture method can be disadvantageous to the professor, as well. Not all academics can be expected to have the same level of public speaking skill. What if a teacher is a genius in his or her field, knows the material from every angle, and is enthusiastic about the subject… but has trouble speaking in front of large groups? The quality of a professor's course should not suffer because they are unable to prepare a decent lecture. Just as being lectured to might not be the learning method of choice for many students, being the one that is expected to do the lecturing might not be the best way for every instructor to present their course material. But because the range of academic teaching methods are so limited, they are usually expected to do exactly that, potentially losing the elements of their lesson plan that makes it so strong.

4.   **Unstimulating:** It is very difficult for a student to sit for a long time and listen to a teacher drone on about a topic: Kids today are used to television screen changing every half a second and therefore have a difficult time staying focused during a lecture session. Newer learning methods involve hands on learning, where students can manipulate objects as well as work in groups to learn the lesson's objectives in a stimulating way.

5.   **Not Develop All Skills**: The lecture does not lead to maximum achievement in certain types of learning. Speech skills, cooperative group thinking, and motor skills, for example, are difficult to teach with the lecture method. Students can develop such skills well only through practice. Moreover, the formal lecture alone is generally not appropriate for presenting material above the comprehension level of the cognitive domain. Because it allows for little or no student verbal participation, the formal lecture may also be inefficient for comprehension-level lessons in which concepts and principles are developed.

6.   **Teacher Dominated:** In this method, students sit idly and listen to the lecture of the teacher. Teacher is most active than student. Teacher presentation is more emphasized.

7.   **Non-Scientific Method:** Students sit on their seats and the packets of information is poured in the minds of the students. In such a situation scientific attitude cannot be developed among the pupils.

8.   **Undemocratic :** It is an authoritarian and undemocratic method where students totally dependent on teacher. They cannot challenge or question the verdict of the teacher.

9.   **Not useful for all topics:** Certain topics in computer science like MS Word, MS Powerpoint etc cannot be teach through alone lecture method. These topics require some demonstration.

10. **Not emphasis on learning by doing**: There is no provision for any type of practical work where students can get the opportunities to develop their mental faculties. The aim of computer science strikes out when practically nothing is done.

11. **Not useful for lower classes**: this method is not useful for lower classes.

12. **Memory Based**: It lays too much stress on rote memory. Laboratory work is neglected so there is no room for learning by doing.

HOW TO MAKE LECTURE EFFECTIVE AND INTERESTING:

To make teaching-learning more effective and interesting, a computer science teacher should keep the following points in his mind-

The analysis of the topics/ contents should be done properly and should be presented in a systematic and logical manner.

Where and whenever required, the teacher should use chalkboard.

Teacher should present appropriate examples to make teaching- learning process more effective and interesting.

The language of lecture should be simple, clear and appropriate.

Teaching points, definitions and other important information should be written on chalk-board.

In order to keep the child active, question should be put up to the students from time to time.

While preparing lecture, the previous knowledge of the child should be given due importance.

The voice of the speaker/lecture should be clear and effective but the speed of delivering lecture should be slow.

At the end of lecture, summary of the lecture should be presented and students should be asked to note down the points.

To make the lecture more interesting teacher should use proper audio-visual aids.

If a lecture is properly planned and prepared, it may be helpful in inspiring, stimulating and motivating learners. One of the procedures for preparing a lecture may be as follows-

LECTURE CUM DEMONSTRATION METHOD

Computer science is a practical subject, it can never be teach theoretically without demonstration. Lecture cum demonstration method paid attention to the readiness of students to get the knowledge of subject matter. Students gives active support during demonstration by the computer teacher. In this method shortcoming/limitations of lecture method are removed. This method can prove to be one of the best methods if the demonstrations are well planned and effective. This method is based on the maxims of teaching proceed from concrete to abstract and simple to complex.

While demonstrating the subject matter, the teacher go on asking questions to the students to test their knowledge about the subject matter. The students are also able to ask questions regarding the subject matter which demonstrates by the teacher to get their doubts and difficulties removed. Lecture cum demonstration method is required to inculcate various skills like observation, experimentation and practical experiences. In demonstration method, teacher really teaches. For example, teacher demonstrates each and every step of creating slides in MS-PowerPoint along with explanation.

CRITERIA OF A GOOD DEMONSTRATION:

(1)**Suitable Arrangement:** Teacher must be sure that each and every thig is clearly visible to the students during demonstration. Teacher can use multimedia in case of big size of class so that each student observe the demonstration.

(2)**Appropriate Demonstration apparatus:** Demonstration apparatus should be as large as possible such as the size of the screen of the monitor.

(3)**Appropriate Arrangement:** Before the demonstration starts everything should be placed in order. Unnecessary things should not be on table at the time of demonstration.

(4)**Adequate Light:** Attention must be paid to adequate lightening of the background. The demonstration should be well lighted.

(5)**Rehearsal By Teacher:** Teacher must plan and rehearse the demonstration beforehand to make the demonstration effective.

(6)**Based on mental Ability**: The standard and mental ability of the students must be conformed during demonstration. Very difficult demonstration of long duration and less educational value can be avoided if possible.

(7)**Based on Aims and Objectives:** The teacher must be well aware of the aims and objectives of the demonstration which is going to show to the students.

(8)**Use of Chalkboard:** Teacher must make use of chalkboard for writing steps of demonstration, drawing dialog boxes and results of demonstration.

(9)**Active Participation of Students**: The teacher may actively involve students in the demonstration.

STEPS OF DEMONSTRATION METHOD

Following are the steps to be followed during demonstration:

1.**Planning and Preparation:** While planning a demonstration the following points should be kept in mind:

(i)**Subject matter:** The subject matter should be thoroughly prepared. If the teacher knows it, even then he should go through the subject matter.

(ii)**Lesson Planning:** The teacher should plan how to introduce the lesson, the way to present it, types of questions to be asked in experimentation and recapitulation.

(iii)**Rehearsal of Experiment:** The demonstration should be rehearsed well in advance as it provides confidence to the teacher too. In this way, his lesson will go on smoothly and systematically.

(iv)**Collection and arrangement of apparatus:** The apparatus should be properly arranged on the demonstration table. Only such materials should be kept on the table as are required for the demonstration.

2.**Introduction of Lesson:** The lesson may be introduced on the following basis:

(i) Student's personal experience or incident.

(ii)Student's environment

(iii) Telling story

(iv) A simple and interesting experiment

3.**Presentation of Subject Matter:**

(i) The teacher must study the subject matter on broad basis taking into consideration the interest and experience of students.

(ii) While demonstration is going on, questions should also be asked which help the students to understand the underlying principles.

(iii) The teacher should try to illustrate the facts and principles.

(iv) Language used by teacher should be simple and clear.

4. Experimentation:

(i) Demonstration should be properly spaced and striking, clear and convincing.

(ii) The demonstration table should have only apparatus related to the lesson.

(iii) All the apparatus should not be displayed at once.

5. **Chalkboard Work:** Chalkboard is best aid in a demonstration lesson. Teacher makes use of blackboard for:

(i) Writing steps (for example, steps of creating table MS-Word)

(ii) Writing programme

(iii) Writing output

(iv) Drawing dialog boxes

6. **Copying and Supervision:** Students should be asked to copy the blackboard work including diagrams and output of the program. The teacher should properly check whether students are copying the blackboard summary correctly or not. He could do this by going to the seats of the students.

Errors in a demonstration Lessons:

(1) The demonstration may not to be visible to all.

(2) The set up of apparatus may not be at a good height.

(3) The lighting and ventilation may not be adequate.

(4) The pace(speed) of demonstration may not be accurate, either to fast or too slow.

(5) The apparatus may not be ready to use.

(6) Students are not involved.

(7) The purpose of demonstration may not be clear.

(8) The teacher may arrive at the generalization himself without getting it done by the students.

(9) The students may not be given sufficient time to record data.

(10) The apparatus may not be arranged in proper order and the teacher may flounder while performing the experiment.

MERITS OF DEMONSTRATION METHOD:

(1) **Economical**: This method is economical as it helps in economizing sources. Some computer system and its parts are too expensive for general use thus demonstrating the programme to be whole class becomes an economical exercise.

(2) **Psychological Method:** Demonstration method is psychological as the students are shown concrete things. They have not to enter into false imagination.

(3) **Based on activities:** Although demonstration is undertaken by the teacher only yet students are kept engaged in various activities like asking questions, drawing dialog boxes, observing, taking

notes and sometimes involving actual performance of practical.

(4) **Retention of Knowledge:** In demonstration method, knowledge obtained by observing the demonstration becomes quite clear and can be remembered for a long time.

(5) **Useful for everyone:** It can be used successful for all types of students i.e. average, below-average and above-average.

(6) **Dynamic Learning:** In demonstration method, everything ia in the form of solid in front of students. They get chance to develop their own conscious by which learning remains more dynamic.

(7) **Helpful to promote useful discussion**: This method can be promote relevant and useful discussion in the classroom and also provide opportunity to question and to review.

(8) **More efficient method:** Demonstration method is more efficient than laboratory method as a teacher is more competent to handle apparatus than students.

(9) **Helpful for teachers:** This method is useful and helpful for the teachers also as he can be in position to explain each and every step and to ensure that all the students see and interpret all the work in uniform manner.

(10) **Save time and effort:** This method saves the teacher's time and effort as it is easier to perform one experiment than to supervise 45 experiments.

DEMERITS OF DEMONSTRATION METHOD:

(1) **No place for Practice:** In demonstration method, there is no place for learning by practice.

(2) **Not Child-Centered:** As the teacher does the experiments and the students do not get chance of performing the experiments individually.

(3) **Lack of Experienced Teacher:** Sometimes due to lack of experienced teacher, demonstration cannot be made effective.

(4) **No development of Laboratory skills**: This method fails to develop laboratory skills in the students. As a result no practical ability is developed among the students.

(5) **Ignore Individual differences:** there is no place for individual differences in demonstration method. Slow learners and intelligent are taught with the same speed.

(6) **Visibility:** Visibility is main problem for a teacher because all the students may not be able to see the details and results of a demonstration.

(7) **Not useful for developing scientific attitude:** This method does not help the students for inculcation of scientific attitude.

(8) **Problem of Indiscipline:** Some time students may get into mischief, thereby creating a problem of indiscipline.

(9) **Speed of the demonstration:** Either too fast or too slow speed of demonstration sometimes may create trouble in understanding what is going on.

PROBLEM SOLVING METHOD

The child is curious by nature. He wants to find out solutions of many problems which sometimes are puzzling even to the adults. Nevertheless, he must be helped to stisfy his curiosty, whenever possible, by solving various problems. We must teach the pupils how to think so that they are able to

transfer these techniques to a vast number of varied problematic situations. Life is full of problems and the successful man in life is he, who is fully equipped with adequate knowledge and reasoning power to tackle these problems. The solution of these problems enables him to have a mastery over his environment. Whenever there is some obstruction in the teaching-learning situation, we say that there is some problems. It is difficulty that is clearly present and recognized by the learner. It may be a purely mental difficulty or it may be physical and involve the manipulation of data. The children recognize it as a challenge.

This method is also known as problem-method. In this method an opportunity is provided to the pupils to analyzing and solving a problem. The teacher presents a problem, which is faced by pupil on the basis of previous stock of his knowledge it challenges the intellect of the students.

DEFINITIONS OF PROBLEM SOLVING

According to **Gagne**," Problem Solving is a set of events in which Human being was rules to achieve some goals."

According to **Risk**," Problem Solving may be defined as a process of raising a problem in the minds of students in such a way as to stimulate purposeful reflective thinking in arrivingat a rational solution."

According to **Ausubel**," problem Solving involves concept formation and discovery learing".

According to **Woodworth and Marquis**,"Problem solving behavior occurs in novel or difficult situations in which a solution is not obtainable by the habitual methods of applying concepts and principles, derived from past experience in very similar situations.

Problem solving involves sensing, accepting and defining a problem, considering the relation which exists among the elements of the situations identifying data and information, pursuing the plan of action to a tentative answer through trial and error, testing the result accepting the result and acting on it.

CHARACTERISTIC OF A PROBLEM:

A problem should have following characteristic:

The problem should be meaningful, interesting and practical.

It should be well defined.

It should be challenging so that the powers of thinking and reasoning can be developed.

It should be according to the mental and physical level of the child.

It should develop computer science skills.

As much as possible the problem should be related with the daily life of the child.

It should have some educational value.

It should have correlation with other study subjects also.

It should be related with previous knowledge of the student.

It should develop scientific attitude amongst the children

It should develop imagination and critical and imagination powers.

The problem should be relevant and according to the needs of the students, preferably the same be connected with their syllabus

The problem may not be a burden for the children. They may enjoy the procedure of problem

solving.

CHARACTERISTICS OF PROBLEM SOLVERS

Davis, P. Ausubil, identified factors which influence problem solving. According to him, Problem Solvers:

♦   Are able to relate additional content information with the problem they are working on.
♦   They focus more on the problem on hand than other aspects.
♦   They are more persistent and self confident.
♦   They are objective in their approach to solve problems.
♦   Steps in Problem Solving Method
♦   Selection and formation of problem
♦   Presentation of the problem
♦   Formulation of Hypothesis
♦   Collection of relevant data and information
♦   Analysis and organization of data
♦   Drawing conclusions
♦   Testing of conclusions

1.   Selection and Formulation of Problem: The nature of problem should be made very clear to the pupils. The pupils should feel the necessity of finding out the solution of the problem which is selected and formulated. The selection of the problem should be done by the teacher and child both.

2.   Presentation of the Problem: After selecting and formulating a problem, teacher should present the problem well before the students. The teacher should also make it clear that how this problem can be solved and how the related data and information can be collected to get the solution of the problem.

3.   Formulation of Hypothesis: Formulation of hypothesis means; preparation of a list of possible reasons of the occurrence of the problem. Formulation of hypothesis develops thinking and reasoning powers of the child. It should be kept in mind that formulated hypothesis must be testable.

4.   Collection of relevant data and information: The child should be stimulated to collect data and information in a systematic and scientific manner. The teacher can suggest many points regarding collection of data to the students. He can ask them to refer books and literature.

5.   Analysis and Organization of Data: On the basis of collected data and information, the students should be asked to put it in a systematic and scientific way. After that the formulated hypothesis are tested. Various statistical techniques are used to analysis and organize the data.

6.   Drawing Conclusions: After analysising and organizing the data, conclusions are drawn. The selection and rejection of hypothesis is made on the basis of data. Care should be taken that judgments are made only when sufficient data is collected. Discussions and conclusions should be arranged collectively or individually with each child.

7.   Testing of Conclusions: No conclusions should be accepted without being properly verified. The students must be asked to be critical while testing conclusions. Thus the correctness of the conclusions is proved by applying them in new or different situations.

MERITS OF PROBLEM SOLVING METHOD

1.   **Learning by doing**: Problem solving method is based on an important principle of psychology i.e. learning by doing.

2.   **Development of skills:** This method develops many skills of identifying a problem, formulating hypotheses, conducting an experiment and coming to conclusions which are very useful for future life.

3.   **Development of desirable habits:** It makes the students self-dependent, self-reliant and self-confident as they have to depend upon themselves for the solution of the problems.

4.   **Scientific Attitude Development:** It develops scientific attitude among the students by making them truthful and honest: for they learn to arrive at their own decision after collecting of data and administration.

5.   **Retention of knowledge:** The knowledge gained through this method is retained for a much longer time since they learn by self-activity.

6.   **Maintenance of Discipline:** It helps in the maintenance of discipline. The students remain busy in finding out the answers to their own problem.

7.   **Develop habit of Diligence:** Through this method, students develop habit of diligence and good study habits

8.   **Social Values Development:** It provides the opportunities to students to work together. So, they solve the problems through joint efforts. Various social values as fellow-feeling, cooperation, tolerance are developed among students.

9.   **Reduce the work of Teacher:** Since the students carry out all their work themselves at their own pace, the teacher has no worry about assigning or checking the home-task.

10.   **Prepare for life:** Problem solving strategy conforms to life. It prepares the students to meet the problems of life. It helps to learn how to act in a new situation.

DEMERITS OF PROBLEM SOLVING METHOD

1.   **More emphasis on practical work:** Too much stress is laid on practical work and students form a wrong idea about computer subject. They believe that computer subject is to be studied in a laboratory

2.   **Time Consuming:** It is long and slow process and makes it impracticable for prescribed syllabus to be covered within a specific period.

3.   **Costly**: It is costly method as it demands well equipped laboratories and higly qualified and trained personnel.

4.   **Stressful**: This method put more emphasis on mental activity like thinking and reasoning. There is less physical activity.

5.   **Lack of Text Books**: No text books are available for this method so it demands extra work on the part of teacher who is already over-burden.

6.   **Lack of Trained Teachers:** It pre-suppose a gifted and creative teacher to guide the students, which is generally not available in te schools.

7.   **Not suitable for small children:** Small children do not possess sufficient back ground information. They fail to participate in discussions. They may not properly understand and organize the material.

PROJECT METHOD

Project method was advocated by Kilpatrick, an American educationist. This method is based on pragmatic philosophy. This method consists chiefly of building a comprehensive unit around an activity which may be carried on in the school or outside. The central idea behind this method is, "what is to be taught should have a direct relationship with actual happenings in life." i.e. the education should be related to life situation. It involves a variety of activities. All the students work co-operatively in this method.

DEFINITIONS OF PROJECT

1. **According to Kilpatrick-** " A project is a whole-hearted purposeful activity proceeding in a social environment."

2. **According to Stevensons, "** A project is a problematic act carried to completion in its natural settings."

3. **According to Ballard**," A project is a bit of real life that has been imported into school."

It is clear from above definition that a project is a purposeful and problematic activity which is achieved in natural, real and social environment. In this method the problem is presented in a practical and real sense. Teaching is not divided into water-tight compartments. All subjects are treated as one and there is natural correlation**.**

Characteristics of Project

Followings are the certain characteristics of Project Method:

(1)   Project is an independent process.

(2)   A project is an act related to actual life activities

(3)   It is always completed in a social environment and natural setting

(4)   It is such act which is most interesting and absorbing.

(5)   It is that activity which is undertaken to solve an emerging or felt problem or to realize some useful and purposeful objectives.

(6)   It is carried on in a natural environment and there is very little scope of formalities in it.

(7)   The project is not thrust on the students by the teacher, but it is jointly selected by the two on the basis of the tastes and interests of the students.

(8)   Project is organized in the school, but its area of operations beyond the four walls of the school.

PRINCIPLES OF PROJECT METHOD

Project method involves the following principles:

(i) **Principle of Freedom to work:** The learning situations are realistic and related to their interests.

(ii) **Principle of Utility:** The problem of study is related with life situation of the learners

(iii) **Principle of Readiness:** The learner is active in finding out the solutions of the problems

(iv) **Principle of Learning by Doing:** Learner has to perform certain tasks so that they can learn by doing.

(v) **Principle of socialization:** It develops the feeling of co-operation and group work.

Types of Projects:

(1)   Individual Projects

(2)   Group projects

(1)   **Individual Projects:** This project is carried out by a single individual.

(2)   **Group Projects:** Group projects are also known as social projects. These projects are completed by the students in groups. Certain social attitudes are developed in the students when they work in groups. They come in contact with the members of the community at large and come to know about the many facts of community.

According to **Kilpatrick** there are four types of projects:

STEPS IN THE PROJECT METHOD:

Following steps are involved in project method:

(1)   **Creating or Providing the Situation:** A situation is providing or created to the students which they are studying in classroom, participating in co-curricular activities and going on excursion sop that they can think over in choosing some project. The situation provided to the learner is related to his own life.

(2)   **Choosing a Project:** When many situations provided the students areexpected to pick up one of them. Following points should be kept in mind while selecting a project:

♦   A project should be such that it meets some acutely felt needs of the students.

♦   It should be appropriate from educational point of view.

♦   Students should be actively involved in the selection of a project.

♦   The teacher can give certain suggestions but the final say will be that of the students.

♦   A project should be for the general good. It should not be an fined for only a segment of the students.

(3)   **Planning of the Project:** After the project has been selected it is to be put into practice. All the activities that are necessary for the execution of the project should be considered and finalized before hand. It is better to have a discussion among students and teacher. All should be encouraged and motivated to participate in the discussion. All the children should be asked to write the plan in a proper manner. The teacher should also assign duties and distribute the work among the children according to their interests.

(4)   **Execution of the Project:** After planning comes the stage of execution. This step is the backbone of project method. Here the students are expected to perform the duties assigned to them. It is the duty of the teacher to guide them properly so that they do not fritter away their energy in out of context activities. The teacher should himself actively participate in the execution of the project. The teacher should be fall of patience and tact. He can motivate the students to work whole heartedly.

(5)   **Evaluation of the project:** When project is completed the teacher and the children should evaluate it jointly discussed whether the objectives of the project have been achieved or not. The children discuss their work and rectify their doubts and mistakes. Thus the whole project is reviewed by the children under the guidance of teacher.

(6)   **Recording of the Project:** Recording is also an important step of a project. In the absence of this step, all the impressions gained during the execution of the project will be obliterated from

the mind. The students must make a record about the achievement they have made due to their efforts, what material they had experienced etc. Success will give them satisfaction and pride, while failures will serve the purpose of a warning for the projects to be carried out in future.

MERITS OF PROJECT METHOD:

(1)   Project method is based on principle of activity, reality, effect etc.

(2)   Project method is a psychological method. It is based on various psychological laws and principles.

(3)   This method provides enough opportunity for meeting the varying interests and abilities of the students.

(4)   Project method is child centered rather than subject centered.

(5)   Project method is quite practical and applied method of learning computer science.

(6)   Project method is based on the principle of learning by doing.

(7)   The project method provides opportunity for the co-ordination and integrations of the body and mind and thus proves quite helpful in the balanced development of their physical mental abilities.

(8)   The students remains very active throughout the execution of the project.

(9)   This method develops discovery attitude in the students.

(10)   Thee knowledge is gained direactly through the efforts of the individual, it's retained in the memory for a longer period of time.

(11)   Project method develops self confidence and self discipline.

(12)   Project method encourages problem solving attitude instead of rote cramming

DEMERITS OF PROJECT METHOD:

(1)   Project method is too much time consuming method. It takes a lot of time to plan and execute a single project.

(2)   Project method is a method of incidental learning. Here students learn only what thy require in relation to the completion of the project. So it is not helpful in providing systematic and adequate learning.

(3)   By using this method it is very difficult to complete the whole syllabus in a specified time.

(4)   In the project method, students expects too much from the teacher for its successful implementation of project. In this way teacher is expected to be a walking encyclopedia capable of imparting every type of knowledge for helping in every sort of activities related with the project.

(5)   In the project method, the teaching and learning become disorganized, irregular and discontinuous.

(6)   Text books and written learning material on project method are not available.

(7)   The teacherstudents ratio is very high and there is an acute shortage of properly trained teachers in the project method.

(8)   In this method the teacher has to work as a careful guide during the planning, executing, evaluating and recording the project.

COMPUTER ASSISTED INSTRUCTIONS (CAI)

Computer and technology has been used to streamline many educational tasks. There are different types of educational computer use but every use of computer in the classroom is not considered as CAI. The educational use of computers that are considered to be CAI, are those cases, in which either the instruction is presented through a computer programme to a passive student or the computer is the platform for an interactive and personalized learning environment.

Computer assisted instruction is relatively a new and developed concept than teaching machine and programmed learning oriented instructional technology. A self-learning technique, usually offline/online, involving interaction of the student with programmed instructional materials. Computer-assisted instruction (CAI) is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place. It uses a combination of text, graphics, sound and video in enhancing the learning process. The computer has many purposes in the classroom, and it can be utilized to help a student in all areas of the curriculum. CAI refers to the use of the computer as a tool to facilitate and improve instruction. CAI programs use tutorials, drill and practice, simulation, and problem solving approaches to present topics, and they test the student's understanding.

In the broad sense, CAI may follow different paths to the same end. CAI can be used either in isolation, bearing the whole responsibility for conveying instruction to students, or in combination with conventional i.e. face to face teaching methods. Research shows that the combination of conventional and CAI instruction has been most effective in raising student achievement scores.

DEFINITIONS OF CAI

There are various definitions of computer assisted instruction method are given below:

1. According to **Cotton**," CAI can be a powerful and engaging tool for learning. An interactive, self-instructional programme can stimulate real situations, provide feedback tailored to the learner's response, and offer a "safe" environment for the learner to make mistakes.

2. According to **Fletcher Flinn**," There are currently a number of research opportunities on the internet. A recent meta-analysis of the efficiency of computer assisted instruction showed it to be an effective educational technique."

3. According to **Pridemore and Klein**," Computer assisted instruction is effective in part because of the availability of immediate feedback."

4. According to **Brothen**," Computer and internet sites provide the opportunity for students to actively participate in research."

Hence, CAI is the use of computers to present drills, practices, exercises and tutorial sequence to the students, and sometimes to engage the students in dialogue about the substance of the instruction. CAI implies the situation, in which the learner, generally is engaged in two-way interaction with the computer via terminal. Here the role of the computer can be as a teaching aid or it can be more student-centered. In this situation, the computer acts as a teacher.

CHARACTERISTICS OF CAI

CAI is an interaction between a student and computer device, which has useful instructional material as software, for helping the individual learners to achieve the desired objectives, with his own pace and abilities at his command. As a technique of teaching, CAI has the following

characteristics:

1.   **Two way instruction:** CAI is an instructional technique based on the two way instruction of a learner and a computer, with the objective of human learning and retension.

2.   **Individual Instruction**: It is an individualized instructional technique, using the computer which is dependent upon the responses of the student.

3.   **Time Sharing:** Through CAI, instruction can be given to a number of students simultaneously. Here, the computer can switch from student to student so rapidly that to each student it appears that he alone is using the computer, even if all students respond to the computer at the same instant, the delay in computer output from student to student is only a fraction of a second. This aspect of computer functioning is called' Time Sharing".

4.   **Stored instructional programme:** Computer- assisted instruction is an instructional technique in which the computer must actually instruct the student, and the computer contains a stored instructional programme designed to inform, guide and test the student until a profile level of efficiency is retained.

5.   **Student's responses:** Computer-assisted instruction is an instruction technique in which the computer is based

(i) to control the presentation of stimulation to a student.

(ii) to accept and evaluate the student's responses, and

(iii)   to present further stimuli based on that interaction calculated to shape student responses in the desired manner. The student uses a terminal directed by a computer that may be in the same room or some distance away. The terminal is generally equipped with information display and the student response devices.

(7) **Realization of Objectives:** CAI helps in realization of computer science instructional objectives.

BASIC ASSUMPTIONS OF CAI:

(1)   **Auto recording of data:** In CAI, each learner's performance, during the course and on the test, is automatically recorded, and can be feedback to the teacher for promptly evaluation of the learner's performance. He can also use the data in designing the best teaching strategy for the learners in future.

(2)   **Variety of programmes:** CAI can be used in all types of teaching learning programmes. Any lesson in any subject can be programmed for CAI, provided that the lesson material can be represented in words, pictures and experiments to be presented to the students.

(3)   **Individualized Instructions:** A learner can learn at his own pace and speed, receive immediate and personalized feedback i.e. completely individualized instructions.

(4)   **Capacity:** CAI can be arranged for 400 students simultaneously. It can cope with the problem of quality and quantity in education.

ROLE OF TEACHER IN CAI

The introduction of CAI in the field of education has changed the role of teacher in the instructional process. Following points present the role of teacher in CAI:

(1)   **New Role:** Due to CAI, the role of teacher has changed from his conventional assignment

of delivering lectures, to a guide and problem solver, but still he has an important role to play in it. Here the teacher is called as 'computer manager' or 'computer resource person'. He will be the overall incharge of the computer system and will coordinate the entire work in this regard.

(2)   **Use of new Tools**: In CAI, the teacher has the chance to use new tools which will enhance his individual satisfaction.

(3)   **Increase Efficiency:** The use of CAI will increase the efficiency of the teacher.

(4)   **Modern:** It will make the teacher modern in nature. He will be able to give information to the students according to the new world and environment.

(5)   **Creative worker:** CAI will save the labour and time of the teacher will be able to devote this time to more creative work.

(6)   **Produce Graphs and tables:** The teacher will be able in a position to produce elaborate graphs and tables, because CAI can compute accurately and rapidly amounts of data.

(7)   Frequent Evaluation: Evaluation will be prompt and accurate, CAI is flexible system of instructions. With its help, teacher can very promptly evaluate the performance of his students.

ADVANTAGES OF CAI:

The basic tenants of CAI offer the following advantages over other systems of instruction

(1)   **One-to-one Instruction:** CAI provides one to one interaction with students as well as an instantaneous response to the answers elicited and allows students to proceed at their own pace.

(2)   **Relief to Teachers:** It frees teacher time from some classroom tasks as it is useful in subjects that require drill and practice. So, teacher can devote more time to individual students.

(3)   **Individualized learning:** In CAI each student is free to work at his own pace, totally unaffected by the performance of any other students. Self-direct study helps in improving skills or achieving objectives of teaching and learning.

(4)   **Structured Information:** Information is presented in structured form which proves useful in the study of subjects where there is hierarchy of facts and rules.

(5)   **Immediate Feedback:** CAI provide immediate feedback. The feedback may be remedial in nature or it may direct the students to a certain path, depending on its response.

(6)   **Wide range of Experiences:** CAI offers a wide range of experiences that are otherwise not available to the student. It provides multimedia audio as well as visual inputs. Simulating techniques enables the students to understand concepts clearly and directly.

(7)   **Active Participation:** Students actively participated in CAI which contrasts with the more passive role in reading a book or attending a lecture.

(8)   **Reporting System:** CAI utilizes a reporting system that provides the student with clear picture of his progress. Thus, students can identify the subject area, in which they have improved and which they need improve.

(9)   **Number of Options:** Learners can be provided any number of options in multiple-choice questions. Also a series of responses may be provided, which are some better than others, with each response providing feedback on each of the options.

(10)   **Less Time**: It reduces the time taken to comprehend difficult concepts by enabling students to manipulate concepts direactly and explore the results of such manipulation.

(11)   **Useful for Slow-Learners:** Privacy helps the slow learner and shy to learn easily.

(12)   **Helpful for Disables:** Various disabilities can be partially overcome through different forms of technology and concentrated reinforced learning can often be more easily facilitated through a computer programme than from an instructor.

(13)   **Useful for Diagnoses:** A computer programme can be used diagnostically, and once a student's problem has been identified, it can then focus on the problem area.

(14)   **Decision-Making and reasoning:** CAI can enhance reasoning and decision-making ability.

(15)   Easy accessible: Students can access the computers at any place e.g. in hostel rooms, in the tutorial rooms or at another place in the country. Discovery of laptop has made it more easy.

LIMITATIONS OF CAI:

(1)   **Maintenance Problem:** CAI is very costly affair. It poses a great problem with regard to the effective maintenance of its learning system.

(2)   **Lack of Emotional Climate:** In CAI, there is lack of warmth and emotional climate which is usually created by a teacher in the classroom.

(3)   **Lack of Manual Skills:** CAI cannot develop manual skills such as handling of apparatus, working with a machine, etc. Though simulation allows execution of chemical and biological experiments, hands-on-experience is missing.

(4)   **No solution of psychological or Educational Problems:** CAI programmes do not themselves solve psychological or educational problems. They can only demonstrate that problem has solved or not.

(5)   **Non-Human Quality:** CAI will 'dehumanize' man. It produce a non-human quality into educational programmes.

(6)   **Creates Indiscipline**: Being auto-instructional, CAI may lead to indiscipline, truancy, carelessness and wastage of time on the part of some students.

(7)   **Highly Expensive:** There are real cost associated with the development of CAI systems. It is expensive in terms of staff time to devise and programme of effective CAI.

(8)   **Not Achieving Affective Objectives:** CAI cannot achieve affective objectives. It is only good for cognitive and psychomotor objectives.

(9)   **Software Development Difficulty:** Courseware can be bought as a fully developed package from a software company, but the programme provided this way, may not suit the particular needs of the individual class or curriculum.

(10)   Boring and Repetitiveness: Instruction in CAI tends to be boring and repetitive, with tests and questions following the same pattern for every course.

WEB BASED INSTRUCTIONS

Web-based instruction (WBI) is a hypermedia-based instructional program which utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported. It is a method where you can use the Web as a source students can access to recover any information that would be useful to them. Not only can you use the Web

to help distribute information - you can also place the information in a form that goes beyond text and takes advantage of the media that will help students understand better and to which they can relate more easily

WBI can be used to meet the needs of a more diverse student group. Typical classes consist of students with varying abilities and previous knowledge, and WBI can help a teacher address these differences. WBI also allows students to work a pace that is more comfortable - some students work faster than their peers while others may wish to take longer. In addition, the use of WBI provides the opportunity for multiple grade levels to be accommodated in the same classroom at the same time.

DEFINITIONS OF WEB BASED INSTRUCTIONS

Accoeding to **Khan** (1997),"WBI is the application of a repertoire of cognitively oriented instructional strategies implemented within a constructivist and collaborative learning environment, utilizing the attributes and resources of the World Wide Web. It is an innovative approach to delivering instruction to a remote audience, using the Web as the medium"

According to Smith and Ragan (1993), " Instruction is the delivery of information and activities that facilitate learner's attainment of intended, specific learning goals and he medium is the physical mean by which the instructional message is communicated."

According to Khan (1997), "WBI is the application of a repertoire of cognitively oriented instructional strategies implemented within a constructivist and collaborative learning environment, utilizing the attributes and resources of the World Wide Web.

FEATURES OF WEB BASED INSTRUCTIONS

(1)   **Availability:** It is mainly real time, 24 hours and 7 days a week, anywhere and anytime.

(2)   **Learner Centered:** It is mainly centered across the learner, personalized to the individual and customized to any institution.

(3)   **Network-assisted: It** is network-assisted and offer you to learn in the matter of fly or assembling learning experiences on the fly.

(4)   **Constructing knowledge:** WBI have provided students with a wide variety of teaching/ learning alternatives that have expanded the educational process beyond the traditional classroom.

(5)   **Active Learner:** Students have the potential of discussing, problem solving, querying their own peers as well as knowledgeable adults in a particular field. Hence they are active learner.

(6)   **Dynamic Content:** In WBI the nature of content is dynamic as compared to the static texts published on a certain date.

(7)   **Cooperative Learning:** WBI offers a new sensibility and means of social interaction engineered towards learning. With WBI, cooperative learning extends beyond one classroom to potentially every classroom that is connected to the Internet.

WEB BASED INSTRUCTION STRATEGIES

Teaching strategies that utilize the web can be classified according to several categories. These categories are as follows:

1.   **Mentoring, Questioning, Supporting a Partner**: Mentors may review student work and provide critique or scaffold process, experts can be " asked" or " interviewed" online, student

may partner with and help one another succeed; Multi directional faculty, student to student, faculty to student; help to have e-mail, synchronous cameras for mentor/ mentee to discuss, chat rooms with white boards, or digital drop boxes for file sharing and written critiques. The cognitive apprenticeship/ reciprocal teaching approaches described on the web site may help inform the design of mentor activities.

2.   **Conversing, Discussing:** Related and comparing perspectives with other students and classrooms; students could be tasked with reading a common book and discussing perspectives, helpful to have access to e-mail, listservs, discussion boards, or chat software. An international online, open access journal inviting diverse opinions of academic s, practitioners and students.

3.   **Debating:** Students defined a position on some issue, typically involves preliminary research online and in libraries- collecting evidence to support one or more perspectives, instructor may want to develop a web site that show cases controversies or experts with opinions and theories to promote discussion; debate can be held in class or online with tools such as e-mail and discussion boards. Students team are given a 'perspective' to defined, access relevant web resources, then debate an issue presented in a case study.

4.   **Impersonating, Role Playing:** Interacting with others who impersonate someone; impersonating someone yourself; preparing a document, play, or other work from the perspective of another person (eg. President); role play communication (E-mail, discussion boards, chat) or synchronous communication (i.e. Symposium, Live net cams). Students teams are assigned to represent a country, then prepare a position paper for their country regarding a global topic, discuss perspectives with other 'country' teams. The cooperactive learning and global based learning models described on the website may help inform the design of role play activities.

5.   **Sharing Data Analyzing:** Collecting information locally and sharing it with others remotely; making use of data collected globally to analyze trends and issues; execellent for marketing, business, mathematics, statics, and others, helps to have e-mail, listservs, spreadsheets, and data analysis software. " Globe students make environmental observations at or near their schools and report their data through the internet. Scientists are Globe data in their research and provide feedback to the students to enrich their science education."

6.   **Developing a New product or Artifact:** Working on a common project with others locally or distant with the ultimate goal of producing some artifact (eg. Web pages, article); sharing resources; exchanging documents and working files, can be round-robin with students creating different acts of a play, parts of a design etc; helps to have web page editors or students, e-mail and other communication tools, digital drop boxes for file sharing, server space to post projects online, tools that allow for voting on or attaching comments to student's work for the purpose of recognizing best or improving weak artifacts.

7.   **Exploring Real World Cases or Problems**: Students explore real cases or use web data to practice decision making, can use virtual simulations with students testing personal hypothesis or designs; a cycle of student prediction, testing, reflection and revision can support rapid conceptual change about complex course concepts; to develop it helps to have web-page editors, photo editors, perhaps video editors and knowledge of video streaming for Internet.

8. **Accessing Tutorials with exercises, Quizzes, Questions, Online, Drill and Practice:** Students review content material online, then access interactive exercises to practice or apply the material presented; helps to have software for creating virtual exercises, knowledge of multimedia development programs(eg. Flash) and mechanisms for placing them on the web (eg. Java). The audio-tutorial, guided design and personalized system of instruction models described on the web site may help inform the design of tutorial and practice activities.

COMMUNICATION TECHNOLOGIES USED IN WBI

As WBI is conducted through electronic components like computers, Internet, it has two types of communication technologies used

1. Synchronous Instruction
2. Asynchronous Instruction

1. **Synchronous Instruction:** Synchronous instruction requires the simultaneous participation of all students and instructors. It is often referred to as "real-time" instruction and involves tools such as chat rooms, Web conferencing, and virtual worlds. Although online synchronous instruction eliminates place-bound constraints and allows for direct and immediate interaction among participants, it does not eliminate time-bound constraints. This is particularly evident in instruction that crosses numerous time zones.

2. **Asynchronous Instruction:** Asynchronous instruction lets people learn at anytime. Asynchronous instruction does not require the simultaneous participation of all students and instructors. It refers to "not at the same time". It allows the participant to complete the WBI at his own pace. It utilizes tools such as threaded discussion, listservs, and voiceboards. Although online asynchronous instruction is neither time-bound nor place-bound, solid interaction among students in this type of environment does take time to develop.

MERITS OF WEB BASED INSTRUCTION

1. **Better Performance**: In WBI environment students generally performed better than those in face-to-face courses. WBI provides improved instructional materials in form of image-rich content photographs, maps, diagrams and charts.

2. **Flexibility:** The instructions are available 24x7. Learners are not bound to physically attend classes. They can also pause learning sessions at their convenience.

3. **Requirement of Basics of Technology :** WBI does not demand any type of the igh technology. Basic internet access, audio and video capabilities are common requirements.

4. **Development of Essential Skills:** WBI develop confidence among students. It also helps to develops the essential skills and competencies needed in the 21st century, in particular to ensure that learners have the digital literacy skills required in their discipline, profession or career.

5. **Individual Differences:** WBI is multifaceted i.e. covering a large range of approaches and methods. Although everyone on the web can receive the same content in the same way yet the program can also be customized for different learning needs or different groups of people. Thus providing wider choice of educational programmes to learners.

6. **Self-paced:** It is self-paced and learning is done at the learner's pace. The content can be

repeated until the learner understand it.

7.   **Reduce Teacher's task:** WBI reduces repetitive teaching task as the instructions are presented in the form of web pages. Learner an view the instruction any number of times with same format.

8.   **Teacher as facilitator:** The role of teacher is transformed from the teaching of knowledge to that of a facilitator of learning.

9.   **Free from personal bias:** It opens the door and equalizes the learning opportunities for everyone in classroom as there is lack of personal bias- age, race, ethnicity etc.

10.   **Interactive:** WBI allows more effective interaction between students and the instructor.

11.   **Resourceful:** WBI acts as a resource for the identification, evaluation and integration of a variety of information

12.   **Flexible learning style:** Web based Instructions acts as a resource for the identification, evaluation and integration of a variety of information.

13.   **As a medium:** WBI acts as a medium of collaboration, conversation, discussions, exchange and communication of information. It also acts as a medium for participating in simulated experiences, apprenticeships and cognitive partnerships.

DEMERITS OF WBI

1.   **Connectivity problem:** There is a possibility a student's Internet connection can drop at any moment for various reasons. Sometimes connection drop exactly at the time start of the activity. In those cases, students may have to open second browser windows and remember to reload pages occasionally.

2.   **Lack of Emotional Climate:** Warmth, emotional touch, sympathy which is established in teacher pupil interaction, absent in WBi. It fails to appreciate the emotions of students.

3.   **Bandwidth:** Sometimes the web is slow compated to other media which seriously hinders the teaching learning process.

4.   **Not suitable in our schools:** WBI As An Instructional Strategy Cannot Be Accommodated I Our Schools. If We Use It Our Educational Institutions Than We Have To Change Timetable Schedules, Curriculum, And Examination System.

THE ROLE OF THE TEACHER IN WEB BASED INSTRUCTION METHOD

♦   • The teacher must be a guide in the use of the tools, that means to assure the correct usage of each one of these resources.

♦   • As the technology advances everyday the teacher has to catch up to the current technology that is the master piece in this method.

♦   • It is necessary for the teacher to choose the best programs, platforms, and other tools for the correct students' skills development and entertainment as well due to this method it is a essential part.

WHY TO USE IT? THERE ARE SOME REASONS TO USE THIS METHOD SUCH AS:

♦   • enhancing student learning;

♦   • spending more time with students working in small groups or one-on-one;

♦   • reducing repetitive teaching tasks;

♦   • reducing paper flow and management, and; • providing improved instructional materials.

HOW TO USE IT?

     • Working in digital learning platforms such as: Edmodo, Richmore, Cambridge,etc.

     • Posting in forums and wikis for example SimplyDiscuss, BBPress, WikiSpaces.

     • Using digital media: Photography, videos, music, e-books, etc.

     • Applying the collaborative work through Google Drive.

Inductive Method

Inductive method of teaching and learning is based on induction. It leads from concrete to abstract, particular to general and from examples to general rule. This is a method of development in which the child is made or led to discover truth for himself. It is based on induction which means proving a universal truth by showing that if it is true for a particular case and is further true for a reasonably adequate number of cases, it is true for all such cases. Inductive method is more useful in lessons where principles, rules, definitions, generalizations and casual connections between facts are to be established. A formula or generalization is thus arrived at through a convincing process of reasoning and solving of problems. After a number of concrete cases have been understood, the students successfully attempts the generalization.

This method is psychological in nature. The children follow the subject matter with great interest and understanding. The children can understand the whole process in detail. This motivating and stimulating method of teaching computer science. This method develops scientific attitude amongst the children.

MERITS OF INDUCTIVE METHOD

1.   **Early Understanding:** It helps understanding. It is easy to understand a computer science concept established through a number of simple examples. Any doubts about the " how and why" of a formula are clarified in the very beginning.

2.   **Logical Method:** It is based on actual observation, it is logical method.

3.   **Participation of students:** It gives the opportunity of active participation to students in the discovery of formula.

4.   **Based on Experimentation:** Students learn the facts by actual observation, thinking and experimentation.

5.   **Reduces Homework:** It curbs the tendency to learn things by rote and also reduces homework.

6.   **Suits the nature of child:** As it gives freedom from doubts and helps in understanding, it suits the child.

7.   **Interesting Learning Process:** In this process of learning teachers and students do not get tried as it is interesting process of learning.

8.   **Retention of Knowledge:** The knowledge gained by this method is permanent and leaves a mark on the brain of the child.

9.   **Quick and Error-Free Method:** As mental power is developed by this, students can solve the problem quickly and without error. This method inspires the students to do at their own.

DRAWBACKS OF INDUCTIVE METHOD

1.   **Limited in Range**: It is limited in range. It contains the process of discovering the

formula with the help of a sufficient number of cases but "what Next?" is not provided in it. The discovery of a formula does not complete the study of the topic. A lot of supplementary work and practice is needed to fix the topic in the mid of learning.

2.   **Not Absolutely Conclusive:** Inductive reasoning is not absolutely conclusive. Three or four cases are picked up to generalize an probability which can of course, be increased and made move valid by increasing the number of cases.

3.   **Time consuming and Laborious:** It is likely to be more laborious .

4.   **Useless for Advance Stage:** At the advanced stage, it is not so useful as some of the unnecessary details and explanations may make teaching dull and boring.

5.   **Unsurety of Accuracy:** The rules obtained by this process are correct upto limit.

6.   **Qualified Teachers Required:** Only limited number of qualified teachers can experiment and formulate the rules by this method.

7.   **Unfit in Present Educational System:** This method cannot be applied in present educational system.

DEDUCTIVE METHOD

It is the opposite of inductive method. Deductive logic is used in this method. Here the learner proceeds from general to particular, abstract to concrete and formula to examples. A pre-constructed formula is told to the students and they are asked to solve the relevant problems with the help of that formula. The formula is accepted by the learners as a pre-established and well-established truth. This method is used for teaching computer science in higher classes. This method is based on deduction. In this method help

PROCEDURE

Immediately after announcing the topic for the day the teacher gives the relevant formula. To explain further the application of the formula to solve problems, he solves a number of problems on the blackboard. The students come to understand, now the formula can be used or applied. Then few problems are given to students and they solve them on the same lines, and memorize the formulae for further use.

MERITS OF DEDUCTIVE METHOD

1.   **Short and Time Saving-** It is short and time saving. The solving of problems by pre-determined formulae takes little time. Authors and teachers therefore give it preference over others.

2.   **Glorifies Memory:** It glorifies memory as students have to memorise a considerable number of formulae.

3.   **Advantageous Method:** At the practice and revision stage, this method is adequate and advantageous.

4.   **Can be combined with Inductive Method**: It can be combined with the inductive method to remove the incompleteness and inadequacy of the latter.

5.   **Enhances speed and efficiency:** It enhances speed and efficiency in solving problems.

DEMERITS OF DEDUCTIVE METHOD

1.   **Difficult for Beginner:** It is very difficult for a beginner to understand an abstract

formula if it is not preceded by a number of concrete instances.

2.   **Blind Memorization:** Memory becomes more important than understanding and intelligence and that is educationally unsound.

3.   **Formula for every Work:** Pure deductive work requires a formula for every type of problems and an extensive use of this method will demand blind memorization of a large number of formulae.

4.   **Unnecessary Burden:** It will thus cause an unnecessary and heavy burden on the brain. It may even result in brain fag.

5.   **Loss in Case of Forgetting Formula:** If the pupil forgets the memorized formula, which is very likely to happen in case of blind cramming, he is at a loss and cannot recollect and reconstruct the formula easily.

6.   **Less Participation by Students:** The students cannot become active learners.

7.   **Not Suitable Method:** It is not suitable for the development of thinking, reasoning and discovery.

CHAPTER 21

ROLE OF ICT IN TEACHER EDUCATION

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Information and communications technology (ICT) is an extended term for information technology (IT) which stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

The term *ICT* is also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system. There are large economic incentives (huge cost savings due to elimination of the telephone network) to merge the telephone network with the computer network system using a single unified system of cabling, signal distribution and management.

However, ICT has no universal definition, as "the concepts, methods and applications involved in ICT are constantly evolving on an almost daily basis." The broadness of ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form, e.g. personal computers, digital television, email, robots. For clarity, Zuppo provided an ICT hierarchy where all levels of the hierarchy "contain some degree of commonality in that they are related to technologies that facilitate the transfer of information and various types of electronically mediated communications

ICT IN TEACHER EDUCATION

Although teachers consult each other more frequently, the teacher eventually decides on the educational practice in his/her classroom. He/she is responsible and has the opportunity, as long as the results are satisfactory, to teach in the way he/she pleases. However, in practice due to some constraints on the part of the teacher, the teacher educators rely on the traditional 'chalk and talk' lecture method.

The teacher training institutes are providing the teachers of the future and NCTE assumes that teachers are the key figures in arranging learning process. The institutes, therefore, have to anticipate new developments and prepare prospective teachers for their future role. Teacher training institutes therefore have to shift their focus from dealing with present education to that of 'Future education'. Accordingly, teachers' professional development in the use and application of technology must be given the priority and resources it deserves, while still maintaining a constructive critical eye on its costs and methodologies.

A component of ICT in some form or the other, and to different extents, is now an integral part

of the teacher education curriculum for all students, either at the diploma level (i.e. D.Ed.) or at the degree level (i.e. B.Ed.). Even Masters degree programs in education leading to M.Ed. degree have also started introducing a component of ICT in the curriculum.

At the degree level an entire paper on ICT titled" Educational technology and ICT" is offered to the students. So most of the teacher training institutions are equipped with an 'Educational Technology Laboratory' and a 'computer lab' with some or all of the following minimum items of essential ICT hardware and software as required by NCTE guidelines and regulations:

- ♦ TV
- ♦ CD/VCD Player
- ♦ AM Radio-cum-cassette recorder
- ♦ Audio/Video cassettes
- ♦ Overhead Projector
- ♦ Projection Screen
- ♦ Public Address System
- ♦ DVD/VCD Player
- ♦ Audio System
- ♦ Camera (Film and/or Digital)
- ♦ Multimedia PC system with Monitors, Hard Disk Drives.
- ♦ Floppy Drives, UPS, Printer
- ♦ Windows operating system software
- ♦ MS office suite, including Word, Excel, PowerPoint
- ♦ Some items of supporting software including Antivirus Software
- ♦ Some educational software pertaining to school subjects on CDs
- ♦ Scanner
- ♦ Laser Printer
- ♦ Networking
- ♦ Dial-up Internet access
- ♦ CD writer
- ♦ LCD projector

Having all these tools and techniques at our disposal, it is but natural to expect that training in ICT would be most effective. However the situation is different. The general trend in that we prefer the methods that are easy and require the least amount of preparation on our part. The NCTE has been providing resource support and making necessary changes in the curricula relevant to the changing conditions. Prof. A.N. Maheswari has rightly said," Teacher Education in India has been following the same road for over one hundred and fifty years and that road has reached dead-end from several points of view". The need of the hour is to open up the dead end road of education and design and engineer a new road.

The recent developments in ICT require that teachers be ICT literate and are able to integrate use of ICT in classroom teaching-learning activities.

NEED TO USE ICT IN TEACHER EDUCATION

The classroom is now changing its look from the traditional one i. e. from one way to two way communication. Now teachers as well as students participate in classroom discussion. Now Education is based on child centric education. So the teacher should prepare to cope up with different technology for using them in the classroom for making teaching learning interested. For effective implementation of certain student centric methodologies such as project-based learning which puts the students in the role of active researches and technology becomes the appropriate tool. ICT has enabled better and swifter communication; presentation of ideas more effective and relevant way. It is an effective tool for information acquiring-thus students are encouraged to look for information from multiple sources and they are now more informed then before. So for this reason ICT is very much necessary for Teacher Education.

Recent Trends in Teacher Education

Based on various changing needs of our society now emphasis is also given to the various educational theory and educational practices. According to these theories and practices changes are also undergo in teacher education also. It is natural that teacher education must include new technology. Teachers should also know the right attitudes and values, besides being proficient in skills related to teaching. As we know the minimum requirement of any training programme is that it should help the trainee to acquire the basic skills and competencies of a good teacher. Now-a-days new trends in teacher education are Inter-disciplinary Approach, Correspondence courses, orientation courses etc. Simulated Teaching, Micro Teaching, Programmed Instruction, Team Teaching are also used in teacher education. Now-a-day Action Research also implemented in Teacher Education. ICT acts as the gateway to the world of information and helps teachers to be updated. It creates awareness of innovative trends in instructional methodologies, evaluation mechanism etc. for professional development.

DIFFERENT STRATEGIES FOR APPLYING ICT IN TEACHER EDUCATION

♦ Providing adequate infrastructure and technical support.
♦ Applying ICT in all subjects.
♦ Applying new Pre-service teacher Education curriculum.
♦ By using application software, using multimedia, Internet e-mail, communities, understanding system software.

ROLE OF ICT IN TEACHER EDUCATION

1. ICT helps teachers in both pre-service and in-Service teachers training.
2. ICT helps teachers to interact with students. It helps them in preparation their teaching, provide feedback.
3. ICT also helps teachers to access with institutions and Universities, NCERT, NAAC NCTE and UGC etc.
4. It also helps in effective use of ICT software and hardware for teaching – learning process.

5.   It helps in improve Teaching skill, helps in innovative Teaching. It helps in effectiveness of classroom.

6.   It also helps in improving professional Development and Educational management as well as enhances Active Learning of teacher Trainees. It is now replacing the ancient technology. As we know now-a days students are always have competitive mind. So teacher must have the knowledge of the subject. This can be done through ICT.

7.   ICT helps teachers in preparation for teaching. In order to introduce ICT in pre-service teacher education different methods and strategies are applied. Different tools are used such as word processing, Database, Spreadsheet etc. Various technology based plans are used to help the teachers for their practice teaching.

8.   ICT prepares teacher for the use of their skills in the real classroom situation and also make students for their future occupation and social life.

9.   ICT used as an „assisting tool" for example while making assignments, communicating, collecting data & documentation, and conducting research. Typically, ICT is used independently from the subject matter.

10.   ICT as a medium for teaching and learning. It is a tool for teaching and learning itself, the medium through which teachers can teach and learners can learn. It appears in many different forms, such as drill and practice exercises, in simulations and educational networks.

11.   ICT as a popular tool for organisation and management in Institutions. Teachers must provide technological support to learn using motion picture, animation, simulation training which helped student teachers to give model presentation. If the teacher is highly equipped with technology, the student will also be equipped with technology.

12.   It removes the traditional method of teaching and prepare teacher to apply modern method of teaching.

13.   ICT is plays an important role in student evaluation.

14.   ICT is store house of educational institution because all educational information can safely store through ICT.

15.   ICT helps Teacher to communicate properly with their students. So ICT bridge the gap between teacher and students.

16.   ICT helps Teacher to pass information to students within a very little time.

17.   ICT helps Teacher to design educational environment.

18.   ICT helps Teacher to identify creative child in educational institute.

19.   ICT helps Teacher to motivate students and growing interest in learning.

20.   ICT helps Teacher for organizational preconditions (vision, policy and culture).

21.   It is also helps Teacher for their personnel support (knowledge, attitude, skills).

22.   ICT helpful for technical preconditions (infrastructure).

23.   ICT helpful for designed learning situations which are needed for both vocational education and the training of future teachers (in the teacher training institutes).

24.   Teacher training institutes can develop their curriculum using ICT.

25.   With the help of ICT Teacher training institutes can develop communication network.

26.   Teachers learn most from their own networks (learning from others) with the help of ICT.

27.   REDESIGNING TEACHER EDUCATION:

28.   The following are some suggestive ideas that can be introduced in teacher education programs for increasing the ICT expertise of Pre-service teachers.

29.   ICT in "General Papers"

30.   Both instruction about ICT and use of ICT can be made in general papers in a teacher education program. For example,

31.   All written assignment must be appropriately desktop published.

32.   Use of web based references may be allowed and encouraged.

33.   Seminars or presentations by students must make use of multimedia.

34.   Students must be encouraged to submit some or all of their assignment as E-mail attachments.

35.   ICT in "Methodology Papers"

36.   In addition to the above mentioned approaches, a few more examples can be given.

37.   Lesson plan should be based on ICT.

38.   Blue print and question paper preparation can be documented using computers.

39.   The analysis and interpretation of the achievement test can be done using computer.

40.   Field Experiences and Project Work

41.   Students should report their field experiences and project work in a CD form.

CONCLUSION

Teaching occupies an honorable position in the society. ICT helps the teacher to update the new knowledge, skills to use the new digital tools and resources. By using and acquire the knowledge of ICT, student teacher will become effective teachers. ICT is one of the major factors for producing the rapid changes in our society. It can change the nature of education and roles of students and teacher in teaching learning process. Teachers in India now started using technology in the class room. Laptops, LCD projector, Desktop, EDUCOM, Smart classes, Memory sticks are becoming the common media for teacher education institutions. So we should use information & communication Technology in Teacher Education in 21st Century as because now teachers only can create a bright future for students.

CHAPTER 22

TECHNIQUES OF TEACHING

BRAIN STORMING TECHNIQUES

It is completely permissive style of teaching strategy. It is based upon an assumption that a student can learn better in a group rather than in individual study. It is a problem oriented strategy of teaching.

OBJECTIVES:

♦   To make the students participative.

♦   To collect new and innovative ideas about some issue.

♦   To encourage students to be creative and thoughtful.

♦   To develop communication skills among students.

ROLE OF TEACHER

♦   The teacher has an important role play in organizing brain-storming sessions. He should explain the purpose of organizing such sessions as well as the procedure.

♦   During such sessions. He should play a role of motivator and facilitator.

♦   He should ensure that no single person dominates the session and all the students get opportunity to give their views. Those who are shy of speaking should be particularly encouraged.

♦   The teacher should have the skills to moderate the discussions and direct the discussions so that they take place with a clear focus on the issue discussed and the objectives of the discussion.

♦   He should summarize the whole discussion at the conclusion of the session and highlight what has been the general consensus.

STRUCTURE-

The higher order cognitive and affective objectives in which learners are assigned a problem and they are asked to discuss any idea which come to their mind. The group is encouraged to provide even unusual suggestions. They have to analyze and evaluate the workability of their own suggestions of a problem.

Osborn's Brain Storming Steps- He has suggested the following steps for this strategy of teaching:

1.   Plan all phases of the problem and think about the sub problem which may emerge.

2.   Select sub-problems which are to be solved.

3.   Think up about the data or evidences which may helpful in solving the problem.

4.   Select the problem sources of data and collect most relevant data.

5.   Decide the possible ideas through 'free-wheeling with suspended judgement' as hints to

the solution of the problem.

6. Select ideas most likely to lead to the solution.
7. Consider the possible ways to test these ideas.
8. These ideas are tested in terms of relevance, adequacy and sufficiency.
9. Imaging all possible contingencies and ways of meeting them.
10. Take decision about the final solutions of the problem.

ADVANTAGES:

It has the following advantages-

1. It has both psychological and educational basis of teaching.
2. It is more creative strategy of teaching and encourages for the original ideas.
3. It provides more ideas of good quality.
4. It creates the situation for more independent thinking among learners.
5. It supports the discovery strategy of teaching.
6. Students find solution to their specific problems through collecting and collating ideas.
7. Brain storming helps in developing social skills.
8. Students can express their feelings as well as learns to appreciate ideas of others.
9. Such sessions provide individual views and thinking on specific issues that are socially useful

DISADVANTAGES:

♦ • Some students may try to dominate the sessions.
♦ • Children with low confidence may not put forth their ideas even when their ideas are good.
♦ • Students who do not have communication skills feel neglected**.**

SYMPOSIUM TECHNIQUE

Symposium technique is also one of the techniques of higher learning. It also an instructional technique which is used to achieve higher cognitive and affective objectives.

Meaning and Definition of symposium Technique

The word 'Symposium' has several dictionary meanings. Firstly, Plato has used this term for 'good dialogue' to present views towards GOD. Another meaning of the term is the intellectual recreation of the enjoyment.

The recent meaning of the term is a meeting of person to discuss a problem or theme. The view on a theme are presented in a sequence. The specific aspect of a theme is presented by an expert of the theme. The definition of the term symposium is as follows:

" The symposium technique/forum serves as an excellent device for informing an audience, crystalizing opinion and general preparing the listeners for arriving at decision, policies, value judgment or understanding."

The main purpose of the symposium is to provide the understanding to the students or listener on theme or problem specifically to develop certain values and feelings.

Objectives of Symposium

The following are main objectives of the symposium technique:
1.   To identify and understand two various aspects of theme and problems.
2.   To develop the ability to decisions and judgement regard a problem.
3.   To develop the values and feeling regarding a problem.
4.   To enable the listeners to form policies regarding a theme or problem.

MECHANISM OF SYMPOSIUM TECHNIQUE

The symposium is a type of discussion, in which two or more speakers, talks from ten to twenty minutes, develop individual approaches or solutions to a problem or present aspects of a policy, process, or programme. The speeches are followed by questions or comments from the audience, as in the panel-forum. The speeches may be persuasive, argumentation, informative or evocative. Each speech proceeds without interruption. The chairman of the symposium introduces the topic, suggests something of its importance, sometimes indicates the general approaches. The symposium forum serves an excellent device for informing an audience, crystallizing opinion, and in general preparing the listeners for arriving at decision, policies, value judgment or understanding.

Since there is no need for symposium interaction other than careful listening(unless the symposium members are to discuss the topic after the delivery of the speeches) all members of the performing group can sit in a straight line behind a table or an adjoining chairs, with the chairman in the middle or to one side of the speakers. Or if the symposium is to present two conflicting points of view, the seating arrangement can separate the speakers on the platform in order to indicate difference in opinion or in order to reserve peace.

PRECAUTIONS FOR SYMPOSIUM

Three conditions are used in symposium technique:
1.   The moderator should be sure to prepare the speakers or see that they are prepared. They should know the rules of procedure, sequence of speaking and way in which the forum will be conducted and they should be aware of the ideas and back ground of the other performance. Like panelist, they might benefit from a brief warm-up.
2.   The chairman or who so ever is responsible for preparing the agenda, should not attempt to stack the cards by omitting or ignoring vital phases of the problem as he selects or delegates his speakers. It is not good to face up to an inadvertent misinterpretation or omission. To distort or omit an important point of view deliberately is to invite disaster.
3.   The chairman in all the forum situations must plan very carefully for the questioning period that followers the prepared speeches, unless he wishes to risk boredom.

SCOPE FOR THE USE OF SYMPOSIUM TECHNIQUE

The symposium technique used to realize the higher cognitive and affective objectives. The following are the main topics on which symposium technique is used:
1.   Use of computer for education
2.   Scope of distance education in our education.
3.   Use of essay and objective type tests
4.   Semester System in education
5.   Aims and Objectives of computer science

6.   Quality control of educational research
7.   Use of micro teaching in teaching of computer science
8.   Use of action research in classroom teaching
9.   Use of team teaching in the schools
10.   Scope of computer science in our education

The nature of the topic should be such that the audience should be interested in the theme.

CHARACTERISTICS OF SYMPOSIUM TECHNIQUE

The symposium technique has the following main characteristics:

1.   It provides the broad understanding of a topic or a problem.
2.   The opportunity is provided to the listeners to take decision about the problem.
3.   It is used for higher classes to specific themes and problems
4.   It develops the feeling of cooperation and adjustment
5.   The objectives as synthesis and evaluation (creativity) are achieved by employing the symposium technique.

LIMITATIONS OF SYMPOSIUM TECHNIQUE

This technique suffers from the following limitations

1.   The chairman has no control over the speakers as they have full freedom to prepare the theme for discussion. He can present any aspect of the theme or problem.

2.   There is a probability of repetition of the conduct because every speaker prepares as a whole. The different aspects of theme are not prepared separately. It creates difficulty of understanding to the listeners.

3.   The different aspect of theme are presented simultaneously. Therefore the listeners are able to understand the theme correctly.

4.   The listener remain passive in the symposium because they are not given opportunities to seek clarification and pit questions.

5.   The discussion and presentation of theme is not summarized at the end. The participants take decision according to their own. Hence mature persons can make use of this technique.

6.   This technique is employed to achieve the higher objectives of cognitive domain but affective objectives are not emphasized properly.

TEAM TEACHING

It is a strategy of teaching in which several teachers, at least more than one participates in the teaching program. It is a collaboration arrangement of experts and specialists deliberately made for doing quality teaching in this process more than one teachers work together. They together plan for teaching, carry out teaching and evaluate the progress of the students. How the class is organized is entirely an open question. Depending upon the objectives to be achieved, it may be a large class, all students gathering at one place, or it may be a set of small groups of students formed on the basis of their special needs, or it may even be individual students formed if there is the need for intensive individual guidance. The underlying idea of team teaching is to make efficient use of staff, space and equipment. In the words of Haden and King" It is a philosophy of learning designed to vitalize

the curriculum, develop more confident and competent teachers, and individualize instruction.

The idea has been in the air in our country and has been discussed in several educational needs. But, in practice it has not existed at any level. In the united state America, team teaching is as reality at several educational institutions such as Auburn Maine, Evanston, Fort Wayne (Indiana) , High Springs (Fla.), University of Wisconsin, Racine (Wis.) Plainview (N.Y.), Melbourne (Fla.) etc. Robert Anderson, David Beggs, J.T. Shaplin, Medill Bair, Ethel Bears, Harold Spears have been some of the leaders in this movement.

The strategy of team teaching suggests that the team constituted for this purpose may consists of teachers either from the same field or from some closely related fields. These teams may work with students either classwise or studentwise, students being drawn from various levels of education. In the USA the team teaching consists of not only the clerical assistants, technical assistants and media persons. In the USA, team teaching began at the high school level and currently it is in practice in middle and elementary school also.

Team teaching involves a group of instructors working purposefully, regularly, and cooperatively to help a group of students of any age learn. Teachers together set goals for a course, design a syllabus, prepare individual lesson plans, teach students, and evaluate the results. They share insights, argue with one another, and perhaps even challenge students to decide which approach is better.

Teams can be single-discipline, interdisciplinary, or school-within-a-school teams that meet with a common set of students over an extended period of time. New teachers may be paired with veteran teachers. Innovations are encouraged, and modifications in class size, location, and time are permitted. Different personalities, voices, values, and approaches spark interest, keep attention, and prevent boredom.

The team-teaching approach allows for more interaction between teachers and students. Faculty evaluate students on their achievement of the learning goals; students evaluate faculty members on their teaching proficiency. Emphasis is on student and faculty growth, balancing initiative and shared responsibility, specialization and broadening horizons, the clear and interesting presentation of content and student development, democratic participation and common expectations, and cognitive, affective, and behavioral outcomes. This combination of analysis, synthesis, critical thinking, and practical applications can be done on all levels of education, from kindergarten through graduate school.

DEFINITIONS OF TEAM TEACHING:

Spanish defines it as " Team teaching is a type of instructional organization involving teaching personnel and the students assigned to them in which two or more teachers are given reponsiblity, looking together, for all or a significant part of the instruction for some group students."

According to David Warwick " It is a form of organization in which individual teachers decide to pool resources, interest and expertise in order to device and implement a scheme of work suitable to the needs for their pupils and facilities for their school."

GUIDING PRINCIPLES OF TEAM TEACHING

The following are the important principles:

1) Size and composition: The size and composition of the group for teach teaching should be appropriate in terms of learning experiences and purposes of the group. The size of the group may vary according to the purpose or the goal of team teaching. The concept of fixed size class is becoming obsolete.

2) Time factor: Time should be allotted keeping into consideration the importance of the subject. In team teaching arrangement a fairly fluid time table is essential.

3) Learning environment: Learning environment should be provided by making arrangement of laboratory, good library, workshops, listening and viewing rooms.

4) Duties assigned to teachers should be appropriate: Team teaching requires proper distribution to duties to the members of the team. The duties should be assigned on the basis of interest, qualification and personality characteristics of the individual member. Selection of members of team should be made very carefully.

5) Level of instruction: The level of team teaching must be appropriate to each learner within the group. The initial behaviour of the learners should be properly assessed.

6) Supervision: The nature and extent of the supervision of the group's activities depend on the purpose of the group.

IMPORTANCE OF TEAM TEACHING:

1. Low cost: One can get an efficient form of learning in very low cost; as such no new resources are required to start team teaching.

2. Support to teachers: Many a times, teachers are overburdened with the fact that they have to complete the curriculum by the end of the term, even if they have creative ideas to teach students they do not have enough time to plan and impart the same to the students. Moreover it can also happen that teachers have ideas but need guidance to develop the skill and impart the same to the students. Team teaching eliminates such problems and other problems of similar kind. When teachers collaborate they could play on their strengths and weaknesses and together as a team can make a successful way to teach and learn.

3. Closer integration of staff: Very often teachers in schools and colleges lack bonding and friendship among themselves. Even worse a competitive environment is seen among the teachers. The main motive of educational institutes is to impart value to students and work as a whole for being efficient knowledge imparters. Envy or competition among teachers can have negative impact on the institute and on the student's mind. With team teaching, teachers are bound to bond, as frequent discussions and planning make them develop a good relation. A happy staff can effectively inculcate the vision of institute

4. Variety of ideas: When teachers come together their teaching style, ideas and expertise come together, if planned perfectly, the mixture of best ideas and styles will put forth many ways out of a single topic. It thus helps in better learning

5. Better involvement of students: A new method is always appealing; students might wonder what new thing they are going to learn. A team of teacher will have various ways and ideas to put forth, which make the students, put on their thinking cap and question 'why' for all things. They

will come up with various questions, queries and ideas. A dynamic discussion session will increase student's involvement and thus helps in bringing out the best in students

6. Mental simulation to students: In traditional lecture only one teacher is teaching, the ideas, thoughts are only one way. Often students are forced to accept whatever taught and they do not bother to think the other way around. Team teaching helps them question the theories and facts. When the students are totally involved it brings out the creativity and the habit of questioning things.

7. Breaks traditional lecture boredom: Let's be very honest, in lectures we are often distracted, either chatting with our friends, or checking our phones. Or maybe jotting down notes, in all the mentioned cases we are giving divided attention. An interactive session, debates, help of visual aids and the like evokes interests among students. Team teaching exactly does that.

8. Better bonding between student and teacher: Humans bond when they interact, it is as simple as that. The bonding is increased when teachers often ask questions and listens to what students have to say. People when heard and appreciated will ultimately be more engaged.

9. Provokes participation / interaction: Teachers will often find students who rarely participate in any activity and are aloof, mostly students with shy personality will not speak much in class. But during team teaching variety of ideas are put forth. A perfectly planned lecture will provoke even the most notorious and most aloof people to be engaged. Team teaching helps teachers deal with students of all personalities well and get better engagement

10. Imparts the lesson of team management: When students see the way teachers work in team, they indirectly get the lesson of team management and importance of working in a team. Everyone in their career will need to work in teams. Students get to see how teachers capitalize on each of their strengths how they respect each others ideas and how as a whole they put the best picture forward. Indirectly, team teaching is helping reduce the extra lecture of team management.

11. Develops interpersonal skills and logic of students: Students interaction and logic is improved drastically as they learn to question things and learn how to communicate their ideas effectively. While in case of a debate, students get to learn how to respect the contradicting ideas, accept them and also tell their own thoughts in return.

12. Teachers can give individual attention: When a teacher is teaching solely, he or she cannot give attention to the students who has problem learning. The main focus is to make the whole group of student understand at a same time. But we all know that all students are different and everyone has their own learning pace. In team teaching if one teacher is speaking the other one can solve the queries student raises, without disturbing the whole class.

13. Staff development: There is no limit to learn, provided if one wishes to, team teaching gives teachers an opportunity to learn and grow themselves. Teachers also get a chance to brush up their skills, work up to their fullest potential and along with that their creativity, motivation and team management skills get a solid boast too.

14. Long term knowledge retention: With a dynamic and interactive session students are engaged and they learn better. The knowledge retention is much higher than the traditional learning approach

CHARACTERISTICS OF TEAM TEACHING

The team teaching has following special characteristics:

1.   Cooperative planning makes curriculum and teaching both realistic and useful.

2.   Students and teachers both are highly motivated and have greater identification with teaching-learning.

3.   The benefit of expert knowledge is made available to students.

4.   Presentation followed by students discussion groups develop leadership qualities in students and improves communication

5.   Working together is itself an essential quality, an important skill which teachers and the students develop by undertaking team teaching.

6.   Pooled thinking and knowledge going into planning identification of objectives, instructional procedure and evaluation techniques contribute to effective teaching-learning.

7.   Discussions and interactions lead to better insight and development of reflective thinking.

8.   Promotes self-reliance in the students.

PROCEDURE OF TEAM TEACHING

The team teaching is organized according to objectives in the teaching-learning process. A systematic procedure is followed through following steps.

1.   **Planning Objectives:** In order to prepare a plan of team teaching, the following objectives are remembered.

(i)   To determine the objectives of team teaching.

(ii)   To write the objectives of team teaching in behavioural terms.

(iii)   To identify entering behaviours of pupils.

(iv)   To decide the topics for teaching.

(v)   To prepare an outline for teaching a topic

(vi)   To assign duties to the teachers looking at the interests of the pupils and their skills.

(vii)   To determine the level of the instructions

(viii)   To create learning environment and teaching material.

 A comprehensive plan of team teaching is prepared keeping in mind the above activities.

2.   **Organization:** Besides these objectives, the difficulties of the pupils and their needs are also kept in mind. Following activities are performed while organizing team teaching.

(i)   Teacher asks some initial questions to decide the level of the instruction. Only then he can set the level of instruction.

(ii)   Keeping in view the knowledge of the language, the communication technique is selected.

(iii)   The teacher deliver lead lesson while the other members of the team listen to it. They note down the important points specifically which are difficult for the pupils to understand.

(iv)   Then another teacher of the team delivers the lectures and clarifies the various elements.

(v)   Pupils' activities are reinforced. The teacher encourages the pupils.

(vi)   The pupils are asked to perform certain tasks in the class during these lectures.

3.   **Evaluation of the results:** In this step, the evaluation occurs with the reference to the

achievement of objectives on the basis of the performance of the pupils. It is examined weather the objective shave been achieved or not. The following activities are performed in this step:

(i)   Decision is taken regarding the achievement of the objectives and performances by the pupils.

(ii)   Necessary modifications are introduced in the planning and organization phase on the basis of evaluation.

(iii)   For evaluation oral, written questions and practical methods are performed. Each question evaluate some objectives.

(iv)   The short coming and problems of the pupils are diagnosed and remedied.

The result of the evaluation phase functions reinforcement in the pupils and the teachers. Various institutions adopt the process of team teaching according to their own resources and objectives.

NECESSARY SKILLS REQUIRED IN THE TEAM OF TEACHERS:

1. A team of teachers with various set of skills prospective and expertise.

2. Vision and sense of direction.

3. Ability to coordinate internally.

4. Excellent team planning.

5. Friendly nature and ability to keep the environment conductive.

TIPS TO MAKE TEAM TEACHING EFFECTIVE:

1. Openness of mind- Teachers and students must be open to change and must embrace this new form of learning.

2. An effective strategy is necessary which requires undivided attention and time, willingness to make the leaning effective. Strategy should involve coverage of course syllabus, activities and quizzes to be carried out, flow of lecture and documenting and developing database of the same.

3. Regular meetings and follow up.

4. Rotation of roles to enhance learning and reduce boredom.

5. Effective way to assess students performance.

6. Respecting others idea.

7. Training to new teachers who are new to the concept of team teaching.

SIMULATION TECHNIQUE

Simulation techniques are based on the premise that contrived reality provides an ideal setting for learning. These techniques simulate reality. It is an artificial condensed representation of reality. Simulation games are most structured situations. Simulation employs role playing to help the learner to develop an empathic understanding of emotional situations.

Simulation games can be used to solve complex problems confronting the groups and the society. Like socio-drama the simulation games is another approach to problem solving. But, it involves a complex situation necessitating the resolution of several problems at the situation develops. A through postgame discussion is arranged after the game is over.

Objectives- The main objective is to develop the social skill for playing the role of a teacher in

the classroom. It is used to achieve the psychomotor objectives.

Structure- It is a dramatic strategy. The student-teacher has to playing role of student and teacher. The student-teacher has to teach a small lesson to his own colleagues, assuming tham as secondary class students. They have to act as students. Every pupil has to teach a lesson in a rotation. The teaching is followed by discussion and suggestions which are given for the modification and improvement in behavior.

Principles: It is based upon the following principles:

1.   Learning by doing
2.   Principle of immediate reinforcement
3.   Rehearsal before the actual tasks
4.   Social skills through group work

Steps in Simulation Teaching

1.   Preparation: In the first step the outline of the teaching is prepared
2.   The second step provides the directions to the role to act as teacher, student and the observer.
3.   In the third step pupil teacher has to decide the topic to be taught and the social skill is to be developed or practice.
4.   The fourth steps determine the techniques to be used for observing the teaching-behaviour.
5.   In the fifth step pupil teacher has to practice. The teacher behavior is recorded by the observer of this teaching.
6.   In the last step teaching is followed by discussion and suggestions for the modification of behavior.

Advantages:

1.   It provides an opportunity for rehearsal prior to actual classroom teaching.
2.   The pupil-teacher understands his own teaching activities through analysis, synthesis and evaluation of his own activities.
3.   It is useful for developing social skills.
4.   It provides immediate reinforcement for the modification of is behavior.

LIMITATIONS:

1.   The learner situations are more artificial and pupil-teacher fails to present its real form.
2.   It cannot be used for developing specific teaching skills.

SUGGESTIONS:

1.   The pupil-teacher should be well acquainted with the strategy.
2.   The supervisor should remain present in teaching and discussion.
3.   It should be participated before sending pupil-teachers to actual classroom teaching.
4.   The supervisor should encourage the teaching acts of the pupil-teachers.

BUZZ SESSIONS

Buzz sessions are short participative sessions that are deliberately built into a lecture or larger group exercise in order to stimulate discussion and provide student feedback. In such sessions,

small sub-groups of two to four persons spend a short period (generally no more than five minutes) intensively discussing a topic or topics suggested by the teacher. Each sub-group then reports back on its deliberations to the group as a whole, or sometimes combines with another sub-group in order to share their findings and discuss the implications.

A very short discussion on a narrow topic that involves simultaneous small group work (usually in pairs) and stimulates contribution from each member of the participant group. Buzz group discussion is a method in which small groups of 2-3 participants discuss a specific question or issue in order to come up with many ideas in a short time.• Since the small groups produce buzzing sound while discussing, this method is known as buzz group.

A BUZZ SESSION MAY BE ORGANIZED

♦ with a large number of participants and as an activity within a workshop or conference.
♦ with an experienced facilitator who is able to easily adjust the flow of the activities, if needed.
♦ tap into the knowledge and experience of each participant.
♦ energize the group or as an icebreaker.
♦ identify needs/solicit quick feedback on a narrow topic.
♦ support generation of a large number of ideas.
♦ generate group-level questions for speakers.

HOW TO USE IT

♦ Carefully consider the outcomes you seek from a buzz session. Here are some examples of how to use a buzz session effectively:
♦ Follow a presentation with a buzz session. Ask audience members to talk for five to ten minutes to the person next to them about how key points in the presentation relate to their own experiences. This dialogue will bring out new perspectives and may also reduce questions, or lead to more informed questions, from the audience.
♦ Structure a buzz session so that two to three participants take turns interviewing each other. The facilitator(s) may instruct participants to allow each to talk for three to five minutes without interruption and then have a five minute discussion as a group.
♦ Use a buzz session as an icebreaker at the start of a workshop with a brief one to two minute discussion on a narrow topic of common interest or expectation.-focus on core issues.

MERITS

(1)　It Constitute an excellent method of introducing variety into a lecture, thus helping to maintain student attention.

(2)　It can be used to achieve a wide range of objectives, both cognitive and non-cognitive.

(3)　It Encourage students to become actively involved in a lesson.

(4)　It Allow feedback to take place.

DEMERITS

(1)　Buzz sessions are most useful in a supportive role as part of a larger lesson as they are not, by themselves, intended for use as a front-line method of teaching basic facts and principles.

(2)　Buzz sessions need careful control, as the word 'buzz' signals.

SEMINAR

Teaching is a continumm from conditioning to indoctrination, organized from memory level to reflective level. Our teaching is confined up to memory level even at college and university level. As the development of higher and affective abilities is essential at the higher stage of education, several techniques have been evolved with human interaction as underlying pedagogical principles, viz, a discussion, seminar, debate, panel discussion, role playing, brain storming etc.

MEANING AND DEFINITION OF SEMINAR

As an instructional technique seminar involves generating a situation for a group to have guided interaction among members on theme generally presented to the group by one or more members. The person who presents theme that should have studied it thoroughly beforehand. This would mean selection of relevant material. The collected material is put in the form of paper circulated among the participants in advance or before the paper reading. It provides the structure of the theme, to facilitate its communication.

Thus, seminar is an instructional technique of higher learning which involves paper reading on a theme and followed by the group discussion to clarify the complex aspects of the theme.

OBJECTIVES OF SEMINAR TECHNIQUES

1.   **Cognitive Objective:** Seminar creates the learning situations ao that the following higher cognitive objectives may be realized:

(i)   To develop the higher cognitive abilities: analysis, synthesis and evaluation as compared to the situations involving human interaction.

(ii)   To develop the ability of responding in this manner would involve higher cognitive actions; valuing, organizing and characterization of quick comprehension of the situation, examination, of it against the knowledge he possesses and construction of his reactions to the situation.

(iii)   To develop the ability to keen observation experiences, felings and to present them effectively.

(iv)   To develop the ability to seek clarification and defend the ideas of others effectively.

2.   **Affective Objectives:** The following higher aspect of affective domain are developed by employing the instructional technique;

(i)   To develop the feeling of tolerance the opposite ideas of others.

(ii)   To develop the feelings of cooperation with other colleagues and respect of the ideas and feelings of others.

(iii)   To develop the emotional stability among the participants of the seminar.

(iv)   To acquire the good manners of putting questions and answering the questions of others effectively.

The human interaction under this technique develops the good manners and skills among the participants.

ROLES OF SEMINAR TECHNIQUE

The following roles are performed by seminar:

1.   **Role of the Organizer:** It is the responsibility of an organizer to plan and prepare the whole programme of the seminar. He decides the topic or theme of the seminar and assigns the different aspects of theme to different persons who have to play the role of speakers. The data, time

and place are decided by him. He also suggests the name of convener of the seminar. He prepares total schedule of the seminar.

2.   **Role of President:** The participants propose the name of president. In the name of chairman, the person must be well-acquainted with the theme of seminar. Virtually the seminar's activities are conducted by the president. He directs the whole programme. He encourages the participants to take part in discussion. He keeps the discussion on the theme of seminar. In certain situations he also takes part in the discussion. He provides the opportunities to each participant. At the end he has to summarize the discussion and may present his viewpoint on the theme. He has to give thanks to the speakers., participants, guests and observers.

3.   **Role of speakers:** The organizer assigns topics to the speakers. They prepare papers. Cyclostyled copies of the papers are prepared and distributed among the participants before the commencement of the seminar, so that participants should also prepare themselves on the theme. It encourages the discussion to last long. The speakers should be ready to defend the questions. They should have the tolerance of criticism in others.

4.   **Role of Participants:** The participants of the seminars should be well-acquainted with the theme. They should appreciate the performances of the speakers. They should be able to seek clarification and put questions. They should place their own ideas regarding the theme on the basis of their experiences. They should address the president for seeking clarification. They should not put question directly to the speakers. There are 25 to 40 participants in the seminar.

5.   **Role of observers:** Some guests and observers are also invited and allowed to observe the activities of the seminar. Generally, they are not permitted to participate in the discussion. They may be allowed to present their observations with the permission of the chairman at the end to discussion.

PROCEDURE OF THE SEMINAR

1.   **Preparation:** As an instructional technique seminar involves creating a situation for a group to have guided interaction among themselves on a theme which is generally presented to the group by one or more members. The person who presents the theme should have studied it thoroughly beforehand. This would means selection of relevant material and its organization. Generally, this organized material put in the form of a paper which is circulated among members in advance. The paper helps to structure the theme, facilitates its communication, and focuses the scope for discussion. After the theme is presented it is discussed by the group. During the discussion participants and (i) seek clarification of the theme presented, (ii) make observations in the light of their knowledge and experience regarding the theme, and (iii) raise issues relating to the theme for further analysis and evaluation.

2.   **Proceedings:** Proceedings of the seminar will be guided by a chairman who may be knowledgeable about the theme. His role would be to keep the discussion on track, stimulate maximum participation and consolidate at appropriate stages the view-point expressed. As an instructional technique seminar seeks to provide for maximal interaction among the members. Sufficient time should be allowed for the discussion session. If this necessities cutting down the time for presentation, it could be done since the main purpose of the presentation is to initiate the discussion.

3.   **Interaction:** The interaction in a seminar can be lined to the field of forces in machines. Different viewpoints or options expressed will represent forces in varied directions. However, unlike physical forces which when acting in opposite directions, at times, result in zero, the different view-points or even opposite opinions will induce further thinking among participants. It is this stimulation for further thinking that is the net instructional value of the seminar. When there is an agreement of ideas among individual members, these may be considered as forces acting in the same direction and thereby having a reinforcing affect on the individual's view of the theme. He is either led to further analysis and evaluation of his view points, or helped in validating and thus strengthening them in either cases the individual is benefited.

ADVANTAGES OF THE SEMINAR

1.   As an instructional technique seminar has the potential to develop several abilities in students.

2.   Different higher cognitive abilities like, analytical and critical thinking synthesizing and evaluating th ideas will due to the process stimulation of thinking brought about through interaction.

3.   Certain affective attributes represent the norms of behavior for the group in the seminar situations. These norms are the same as these of a democratic society. Deliberate efforts to adhere theses are made during the course of seminar discussions. The adherence to these group norms gradually inculcates the affective attributes in the participants.

4.   Certain affective attributes like tolerance for other's vies, openers to ideas, cooperation with others, emotional stability and respect for other's feeling will be inculcated among the participants during the course of such sessions.

5.   Concomitant effect of seminar as instructional technique will be the development of better learning habits. While preparing for presentation and participating in the discussion learners will get induced to pursue independent study, engage in post-seminar dissuasions covering the theme discussed as well as related ones, develop critical outlook to any idea thereby leading the learner to self-initiated learning which will be more permanent in nature.

6.   Seminar has great instructional value as it makes the instruction learner-centered and provides for learning through enquiry which is based on a very natural characteristics of inquisitiveness in humans.

7.   This natural way of learning through seminar establishes an important place for this technique at all level of instruction. From the practice, however, one may notice that it is mainly confined to higher education.

SEMINAR AT LOWER LEVELS:

Seminar technique demands maturity in terms of language, social and emotional make up and the facility to deal with abstractions. Since the students at lower levels of education do not possess the maturity of this extent, it is generally considered that seminar is less feasible to the adopted as an instructional technique at these levels. Such a demarcation of feasibility regarding the use of seminar stems from the rigid notion about the nature of theme to be discussed therein. It is generally considered that seminar should have an abstract theme to be presented and discussed. Although there is nothing against the suitability of such themes for seminars confining only to cover there is more of historicity of the technique rather than its demands about the nature of the theme. In

fact, the value of seminar should be seen in terms of the basic mechanism of the involvement of learners. Here the learners are expected to present to others their ideas or experiences. It is this interaction on the ideas or experiences, however, high or low, concrete or abstract they may be in nature, that should be aimed at through this technique. Seeing seminar in this perspective, it is feasible to utilize it effectively even at lower levels of instruction. At these levels the theme for seminar could be even simple and concrete experiences which could be narrated to follow children who in turn could discuss them in the light of their own. Instruction on such themes would involve behaviours like questioning, making observations, evaluating the theme by comparing it with their own experiences.

TYPES OF SEMINAR

1.   **Mini Seminar:** A seminar organized to discuss a topic in class is known as mini-seminar. Its purpose is to train the students for organizing the seminar and play different roles. It is simulated situation for the students. Such seminars be organized before the main seminar.

2.   **Main Seminar:** Such seminars are organized at departmental level or institutional level on a major theme. All the students and staff members take part in such seminars. These are organized weekly or monthly in departments. Generally specific themes are selected for main seminar.

3.   **National Seminar:** A national seminar is organized by an association or organization at national level. The experts are invited on the theme of the seminar. The secretary of the seminar prepares the schedule theme, time dates, days and venue. NCERT organizes such seminar at national level, on educational themes such as Educational Technology, Population Education, Trends of Education, Distance education, Quality control at educational research in India etc.

4.   **International Seminar:** Generally such seminars are organized by UNESCO and other international organization. The topic or theme of seminar is very broad, e.g. students unrest or activism, Innovations in teacher-education and Examination reforms. A nation can also organize such seminars or international theme.

LIMITATION OF SEMINAR TECHNIQUE

1.   A seminar cannot be organized on all the content of a subject-matter. Some topics are highly structured. A theme of a seminar should be such on which discussion maybe held.

2.   Seminar cannot be used for all levels of education. It can be used for higher level of education. The members of seminar should have social and emotional maturity. Thus, it cannot be used for lower level of education.

3.   When a seminar is being organized, the persons who speak too much dominate the discussion of the seminar and do not provide opportunities to others to take part in the discussion. It means the discussion confines only few persons rather than whole group.

4.   During the discussion groups are formed on anti-ideas and favorable ideas on the theme. Both try to win over the other. The purpose of the seminar is not served. The chairman should discourage this type of groupism.

5.   If the two groups already exist among the participants, they generally try to oppose ever for the constructive or relevant ideas of the opposite group. The opposition is made for the sake of opposition. The instructional situations of such discussion is not conducive for learning.

DEBATES

A debate is a form of literary discussion rich in arguments in which one or more students present their views for and against a particular topic. They are given an opportunity to rebut the opposite side. The debater takes only one view of the problem and defends it by his own arguments. He speaks to win the arguments over that of his opponent by logic, trickery or words. He is required to convince the audience and the opponents by the force of his own arguments. He has to present his case with confidence and in an interesting manner.

ADVANTAGES OR IMPORTANCE OF DEBATES

1. **Linguistic Importance (Value):** Debates, discussion, declamations and symposia increase the linguistic ability of the speaker, as he widens his scope of knowledge, enriches his vocabulary and gets training in different styles of oral expression. Incidentally, he improves his pronunciation, intonation and oral expression.

2. **Organizational importance:** Literary activities like debates, discussions, declamations and symposia train the pupils in the art of selecting material and organization of ideas, speaking effectively and convincing with the advance arguments.

3. **Emotional Importance:** Debates, discussions, declamations and in the training of emotions. They have a cathartic effect on the emotions of children, as they purge out the pent up emotional energy.

4. **Intellectual Importance:** It helps in clear, logical, vigorous and original thinking. They provide the best means for self-expression. They get training in argumentation, discussion and oratory. They help in maintaining self-confidence, resisting against stage fear and nervousness, mustering courage on the stage and maintaining presence of mind.

5. **Vocational Importance:** It has vocational importance. Training in discussion, argumentation and oratory is important in later life especially in certain vocations like teaching, pleading and public leadership. Effective speaking is the first qualification of the pupil leader.

6. **Instinctive Importance:** Various instincts like instinct of self-assertion, instinct of curiosity, instinct of gregariousness find worthy outlet of expression and are sublimated through debates.

7. **Convincing Importance:** The debater has to convince the audience about the correctness of his views. Formal debating is a skillful and difficult art, and those who are successful in mastering, it acquire a powerful instrument for influencing and guiding the action of their fellows.

8. **Disciplinary importance**: Debates impart the training of hearing others also. The pupils learn how to listen patiently even to adversaries and how to analyse the contents of a speech.

STEPS FOR ORGANIZING DEBATES

1. **Selection of Topic:** Computer science teacher should make a judicious selection of interesting and useful topic. The topic should emerge out from the courses of study prescribed for the debaters. The more relevant the topic for the debate is to the prescribed course, the more it should be encouraged. The topic for debate must be an interesting one, capable of stimulating thoughts. It should give rise to controversial arguments.

2. **Proper Planning:** Debates must be properly planned. The date, time and place for the debate should be notified. The topic must be announced well in advance. The number of speakers

and the time given to each speaker should be specified. The technical points such as how to open the debate, how to conclude and how to judge should be well attended to. The teacher should ensure that students are fully prepared. Unless the students have sufficient background of the topic, little can be accomplished. Judge must be appointed.

3.   **Encourage Maximum Participation:** The teacher in-charge must encourage maximum participation in a debate.

4.   **Teacher's Guidance:** All debates must be guided by the teacher. The speakers must be guided regarding references and source material. They should be guided during the preparation in the selection of material and presenting of arguments for or against. They must be trained to reply the arguments of their opponents instantaneously. They must be discouraged in cramming up written drafts or speeches. Instead they must be helped to add points and to elaborate the same. They must be guided as how to open and conclude the debate. The language should be flowery, briskly, clear and effective. Humour and light ridicule is the sauce of such speeches. The true spirit of debating should be developed among the students. No opponent should be insulted.

5.   **Concluding the Debate:** The number of speakers, time allotted and the opener of the debate may be written on the blackboard so that it is visible to all. So far as the actual conduct of the debate goes on, responsibility is shared by the chairpersons delegating much of it to the debater. The chairperson keeps the debate away from rambling. Debate should be conducted with integrity. It should be properly concluded.

6.   **Follow-up and Evaluation:** The debate is then followed-up and evaluated in its right perspective. The criteria for evaluation may be fixed up in clear terms such as:

(a)   Did the speakers stick to the topic?

(b)   Were the speakers objective in their arguments?

(c)   Was there a shortage of facts and valid evidence?

(d)   Will the debate lead to a greater maturity of the debaters n future debate?

POINTS TO BE CONSIDERED

1.   **True Spirit:** The true spirit of debating must be inculcated. The main objective should be to speak effectively and not to insult the opponents and create antagonistic attitude among the students.

2.   **Maximum participation**: As many students as possible should be encouraged to participate in the debates.

3.   **Interesting and relevant topics**: The topics of the debates must be interesting and from the prescribed syllabus.

4.   **Objectivity:** The debators must be objective in their arguments.

5.   **Discussion:** After the debate, the rest of the class should be encouraged to ask questions from the debators or engage in a brief discussion with them.

CHAPTER 23
LESSON PLANNING

LESSON PLANNING

A **lesson plan** is a teacher's detailed description of the course of instruction or "learning trajectory" for a lesson. A daily lesson plan is developed by a teacher to guide class learning. Details will vary depending on the preference of the teacher, subject being covered, and the needs of the students. There may be requirements mandated by the school system regarding the plan. A lesson plan is the teacher's guide for running a particular lesson, and it includes the goal (what the students are supposed to learn), how the goal will be reached (the method, procedure) and a way of measuring how well the goal was reached (test, worksheet, homework etc.)

DEVELOPMENT

While there are many formats for a lesson plan, most lesson plans contain some or all of these elements, typically in this order:

♦ *Title* of the lesson
♦ *Time* required to complete the lesson
♦ List of required *materials*
♦ List of *objectives*, which may be *behavioral objectives* (what the student can *do* at lesson completion) or *knowledge objectives* (what the student *knows* at lesson completion)
♦ The *set* (or lead-in, or bridge-in) that focuses students on the lesson›s skills or concepts— these include showing pictures or models, asking leading questions, or reviewing previous lessons
♦ An *instructional component* that describes the sequence of events that make up the lesson, including the teacher›s instructional input and, where appropriate, guided practice by students to consolidate new skills and ideas
♦ *Independent practice* that allows students to extend skills or knowledge on their own
♦ A *summary*, where the teacher wraps up the discussion and answers questions
♦ An *evaluation* component, a test for mastery of the instructed skills or concepts—such as a set of questions to answer or a set of instructions to follow
♦ A *risk assessment* where the lesson›s risks and the steps taken to minimize them are documented
♦ An *analysis* component the teacher uses to reflect on the lesson itself—such as what worked and what needs improving
♦ A *continuity* component reviews and reflects on content from the previous lesson.

HERBARTIAN APPROACH JOHN FEDRICK HERBERT (1776-1841)

1. Preparation/Instruction: It pertains to preparing and motivating children to the lesson content by linking it to the previous knowledge of the student, by arousing curiosity of the children and by making an appeal to their senses. This prepares the child's mind to receive new knowledge. "To know where the pupils are and where they should try to be are the two essentials of good teaching." Lessons may be started in the following manner:

a. Two or three interesting but relevant questions

b. Showing a picture/s, a chart or a model

c. A situation Statement of Aim: Announcement of the focus of the lesson in a clear, concise statement such as "Today, we shall study the..."

2. Presentation/Development: The actual lesson commences here. This step should involve a good deal of activity on the part of the students. The teacher will take the aid of various devices, e.g., questions, illustrations, explanation, expositions, demonstration and sensory aids, etc. Information and knowledge can be given, explained, revealed or suggested. The following principles should be kept in mind.

a. **Principle of selection and division:** This subject matter should be divided into different sections. The teacher should also decide as to how much he is to tell and how much the pupils are to find out for themselves.

b. **Principle of successive sequence:** The teacher should ensure that the succeeding as well as preceding knowledge is clear to the students.

c. **Principle of absorption and integration:** In the end separation of the parts must be followed by their combination to promote understanding of the whole.

3. Association comparison: It is always desirable that new ideas or knowledge be associated to daily life situations by citing suitable examples and by drawing comparisons with the related concepts. This step is important when we are establishing principles or generalizing definitions.

4. Generalizing: This concept is concerned with the systematizing of the knowledge learned. Comparison and contrast lead to generalization. An effort should be made to ensure that students draw the conclusions themselves. It should result in student's own thinking, reflection and experience.

5. Application: It requires a good deal of mental activity to think and apply the principles learn to new situations. Knowledge, when it is put to use and verified, becomes clear and a part of the student's mental make-up.

6. Recapitulation: Last step of the lesson plan, the teacher tries to ascertain whether the students have understood or grasped the subject matter or not. This is used for assessing/evaluating the effectiveness of the lesson by asking students questions on the contents of the lesson or by giving short objectives to test the student's level of understanding; for example, to label different parts on a diagram, etc.

A WELL-DEVELOPED LESSON PLAN

A well-developed lesson plan reflects the interests and needs of students. It incorporates best practices for the educational field. The lesson plan correlates with the teacher's philosophy of

education, which is what the teacher feels is the purpose of educating the students.

Secondary English program lesson plans, for example, usually center around four topics. They are literary theme, elements of language and composition, literary history, and literary genre. A broad, thematic lesson plan is preferable, because it allows a teacher to create various research, writing, speaking, and reading assignments. It helps an instructor teach different literature genres and incorporate videotapes, films, and television programs. Also, it facilitates teaching literature and English together. Similarly, history lesson plans focus on content (historical accuracy and background information), analytic thinking, scaffolding, and the practicality of lesson structure and meeting of educational goals. School requirements and a teacher's personal tastes, in that order, determine the exact requirements for a lesson plan.

Unit plans follow much the same format as a lesson plan, but cover an entire unit of work, which may span several days or weeks. Modern constructivist teaching styles may not require individual lesson plans. The unit plan may include specific objectives and timelines, but lesson plans can be more fluid as they adapt to student needs and learning styles.

Unit Planning is the proper selection of learning activities which presents a complete picture. Unit planning is a systematic arrangement of subject matter. Samford "A unit plan is one which involves a series of learning experiences that are linked to achieve the aims composed by methodology and contents". Dictionary of Education:"A unit is an organization of various activities, experiences and types of learning around a central problem or purpose developed cooperatively by a group of pupils under a teacher leadership involving planning, execution of plans and evaluation of results".

CRITERIA OF A GOOD UNIT PLAN

1. Needs, capabilities, interest of the learner should be considered.
2. Prepared on the sound psychological knowledge of the learner.
3. Provide a new learning experience; systematic but flexible.
4. Sustain the attention of the learner till the end.
5. Related to social and Physical environment of the learner.
6. Development of learner's personality.

It is important to note that lesson planning is a thinking process, not the filling in of a lesson plan template. Lesson plan envisaged s a blue print, guide map for action, a comprehensive chart of classroom teaching-learning activities, an elastic but systematic approach for the teaching of concepts, skills and attitudes.

SETTING OBJECTIVES

The first thing a teacher does is to create an objective, a statement of purpose for the whole lesson. An objective statement itself should answer what students will be able to do by the end of the lesson. Harry Wong states that, "Each [objective] must begin with a verb that states the action to be taken to show accomplishment. The most important word to use in an assignment is a verb, because verbs state how to demonstrate if accomplishment has taken place or not. The objective

drives the whole lesson, it is the reason the lesson exists. Care is taken when creating the objective for each day's lesson, as it will determine the activities the students engage in. The teacher also ensures that lesson plan goals are compatible with the developmental level of the students. The teacher ensures as well that their student achievement expectations are reasonable.

TYPES OF ASSIGNMENTS

The instructor must decide whether class assignments are whole-class, small groups, workshops, independent work, peer learning, or contractual:

♦ **Whole-class**—the teacher lectures to the class as a whole and has the class collectively participate in classroom discussions.

♦ **Small groups**—students work on assignments in groups of three or four.

♦ **Workshops**—students perform various tasks simultaneously. Workshop activities must be tailored to the lesson plan.

♦ **Independent work**—students complete assignments individually.

♦ **Peer learning**—students work together, face to face, so they can learn from one another.

♦ **Contractual work**—teacher and student establish an agreement that the student must perform a certain amount of work by a deadline.

These assignment categories (e.g. peer learning, independent, small groups) can also be used to guide the instructor's choice of assessment measures that can provide information about student and class comprehension of the material. As discussed by Biggs (1999), there are additional questions an instructor can consider when choosing which type of assignment would provide the most benefit to students. These include:

♦ What level of learning do the students need to attain before choosing assignments with varying difficulty levels?

♦ What is the amount of time the instructor wants the students to use to complete the assignment?

♦ How much time and effort does the instructor have to provide student grading and feedback?

♦ What is the purpose of the assignment? (e.g. to track student learning; to provide students with time to practice concepts; to practice incidental skills such as group process or independent research)

♦ How does the assignment fit with the rest of the lesson plan? Does the assignment test content knowledge or does it require application in a new context?

♦ Does the lesson plan fit a particular framework? For example, a Common Core Lesson Plan.

EFFECTIVE LESSON PLANNING, DELIVERY TECHNIQUES AND CLASSROOM MANAGEMENT SUGGESTIONS

Good lesson planning is essential to the process of teaching and learning. A teacher who is prepared is well on his/her way to a successful instructional experience. The development of interesting lessons takes a great deal of time and effort. As a new teacher you must be committed to spending the necessary time in this endeavor.

It is also important to realize that the best planned lesson is worthless if interesting delivery procedures, along with good classroom management techniques, are not in evidence. There is a large body of research available pertaining to lesson development and delivery and the significance of classroom management. They are skills that must be researched, structured to your individual style, implemented in a teacher/learning situation, and constantly evaluated and revamped when necessary. Consistency is of the utmost importance in the implementation of a classroom management plan.

All teachers should understand that they are not an island unto themselves. The educational philosophy of the district and the uniqueness of their schools should be the guiding force behind what takes place in the classroom. The school's code of discipline, which should be fair, responsible and meaningful, must be reflected in every teacher's classroom management efforts.

SUGGESTED PRACTICES

- Establish a positive classroom environment
  - Make the classroom a pleasant, friendly place
  - Accept individual differences
  - Learning activities should be cooperative and supportive
  - Create a non-threatening learning environment
  - Organize physical space; eliminate situations that my be dangerous or disruptive
  - Establish classroom rules and procedures and consistently reinforce them
- Begin lessons by giving clear instructions
  - State desired quality of work
  - Have students paraphrase directions
  - Ensure that everyone is paying attention
  - Ensure that all distractions have been removed
  - Describe expectations, activities and evaluation procedures
  - Start with a highly motivating activity
  - Build lesson upon prior student knowledge
- Maintain student attention
  - Use random selection in calling upon students
  - Vary who you call on and how you call on them
  - Ask questions before calling on a student; wait at least five seconds for a response
  - Be animated; show enthusiasm and interest
  - Reinforce student efforts with praise
  - Vary instructional methods
  - Provide work of appropriate difficulty
  - Demonstrate and model the types of responses or tasks you want students to perform
  - Provide guided practice for students; monitor responses and deliver immediate corrective feedback

- ◆ Use appropriate pacing
  - ◆ Be aware of your teaching tempo
  - ◆ Watch for cues that children are becoming confused, bored or restless; sometimes lesson have to be shortened
- ◆ Provide suitable seatwork
  - ◆ Seatwork should be diagnostic and prescriptive
  - ◆ Develop procedures for seeking assistance; have a "help" signal
  - ◆ Develop procedures for what to do when finished
  - ◆ Move around to monitor seatwork
  - ◆ Vary methods of practice
- ◆ Evaluate what has taken place in your lesson
  - ◆ Summarize the lesson and focus on positive gains made by students; use surprise reinforcers as a direct result of their good behavior
  - ◆ Determine if the lesson was successful; were goals accomplished?
- ◆ Make a smooth transition into next subject
  - ◆ Have materials ready for next lesson
  - ◆ Maintain attention of students until you have given clear instructions for the ext activity- Do not do tasks that can be done by students (i.e. passing out paper or collecting assignments); use monitors
  - ◆ Move around and attend to individual needs
  - ◆ Provide simple, step-by-step instructions
  - ◆ Utilize a freeze and listen signal, when necessary
- ◆ Develop positive teacher/student relationships
  - ◆ Set a good example; be a positive role model
  - ◆ Create an exciting learning environment for all students
  - ◆ Reward good behavior; create special activities that children will enjoy doing
  - ◆ Correct misbehaviors; have consequences of disruptive behavior; communicate them to children
  - ◆ Handling disruptions
  - ◆ Keep is short and simple
  - ◆ Use a warning system
  - ◆ Defer disruptive behavior proactively (eye contact, close space between you and student, use head/hand gestures)
  - ◆ Help students be successful
  - ◆ Use planned ignoring (and teach other student to also ignore)

Keeping in mind the time dimension we can define planning as "Setting objectives for a given time period, formulating various courses of action to achieve them and then selecting the best possible alternative from the different courses of actions".

FEATURES/NATURE/CHARACTERISTIC OF LESSON PLANNING

1. **Planning contributes to Objectives:** Planning starts with the determination of objectives. We cannot think of planning in absence of objective. After setting up of the objectives, planning decides the methods, procedures and steps to be taken for achievement of set objectives. Planners also help and bring changes in the plan if things are not moving in the direction of objectives.

2. **Planning is Primary function :** Planning is the primary or first function to be performed by every teacher. No other function can be executed by the teacher without performing planning function because objectives are set up in planning and other functions depend on the objectives only.

3. **Pervasive:** Planning is required at all levels of the teaching. It is not a function restricted to top level teachers only but planning is done by teacher at every level. Formation of major plan and framing of overall methodology is the task of class teacher whereas pupil teacher form plan for their respective lessons and make plans to support the overall objectives and to carry on day to day activities.

4. **Planning is futuristic/Forward looking:** Planning always means looking ahead or planning is a futuristic function. Planning is never done for the past. All the teacher try to make predictions and assumptions for future and these predictions are made on the basis of past experiences of the teacher and with the regular and intelligent scanning of the general environment.

5. **Planning is continuous:** Planning is a never ending or continuous process because after making plans also one has to be in touch with the changes in changing environment and in the selection of one best way. So, after making plans also planners keep making changes in the plans according to the requirement of the company.

6. **Planning involves decision making:** The planning function is needed only when different alternatives are available and we have to select most suitable alternative. We cannot imagine planning in absence of choice because in planning function teacher evaluate various alternatives and select the most appropriate. But if there is one alternative available then there is no requirement of planning.

7. **Planning is a mental exercise:** It is mental exercise. Planning is a mental process which requires higher thinking. In planning assumptions and predictions regarding future are made by scanning the environment properly. This activity requires higher level of intelligence. Secondly, in planning various alternatives are evaluated and the most suitable is selected which again requires higher level of intelligence. So, it is right to call planning an intellectual process.

IMPORTANCE/SIGNIFICANCE OF PLANNING

1. **Planning provides Direction:** Planning is concerned with predetermined course of action. It provides the directions to the efforts of teachers. Planning makes clear what teacher have to do, how to do, etc. By stating in advance how work has to be done, planning provides direction for action. Teachers know in advance in which direction they have to work. This leads to Unity of Direction also. If there were no planning, teacherss would be working in different directions and organisation would not be able to achieve its desired goal.

2. **Planning Reduces the risk of uncertainties:** Classroom have to face many uncertainties and unexpected situations every day. Planning helps the teacher to face the uncertainty because planners try to foresee the future by making some assumptions regarding future keeping in mind their past experiences and scanning of classroom environments. The plans are made to overcome such uncertainties. The plans also include unexpected risks such as disturbances or some other calamities in the classroom. The resources are kept aside in the plan to meet such uncertainties.

3. **Planning reduces over lapping and wasteful activities:** The lesson plans are made keeping in mind the requirements of the classroom. The lesson plans are derived from main unit plan. As a result there will be co-ordination in different lessons. On the other hand, if the teachers following course of action according to plan then there will be integration in the activities. Plans ensure clarity of thoughts and action and work can be carried out smoothly.

4. **Planning Promotes innovative ideas:** Planning requires high thinking and it is an intellectual process. So, there is a great scope of finding better ideas, better methods and procedures to perform a particular job. Planning process forces teachers to think differently and assume the future conditions. So, it makes the teachers innovative and creative.

5. **Planning Facilitates Decision Making:** Planning helps the teachers to take various decisions. As in planning goals are set in advance and predictions are made for future. These predictions and goals help the teacher to take fast decisions.

6. **Planning establishes standard for controlling:** Controlling means comparison between planned and actual output and if there is variation between both then find out the reasons for such deviations and taking measures to match the actual output with the planned. But in case there is no planned output then teacher will have no base to compare whether the actual output is adequate or not.

7. **Focuses attention on objectives of the lesson:** Planning function begins with the setting up of the objectives, procedures, methods and rules, etc. which are made in planning to achieve these objectives only. When teachers follow the plan they are leading towards the achievement of objectives. Through planning, efforts of all the teachers are directed towards the achievement of lesson goals and objectives.

LIMITATIONS OF PLANNING:

1. **Planning leads to rigidity:** Once plans are made to decide the future course of action the teacher may not be in a position to change them. Following predefined plan when circumstances are changed may not bring positive results for students. This kind of rigidity in plan may create difficulty.

2. **Planning may not work in dynamic environment:** Classroom environment is very dynamic as there are continuously changes taking place in behavior of students and other environmental settings. It becomes very difficult to forecast these future changes. Plans may fail if the changes are very frequent. The environment consists of number of segments and it becomes very difficult for a teacher to assess future changes in the environment.

3. **It reduces creativity:** With the planning the teachers of the classroom start working rigidly and they become the blind followers of the plan only. The teachers do not take any initiative to

make changes in the plan according to the changes prevailing in the classroom environment. They stop giving suggestions and new ideas to bring improvement in working because the guidelines for working are given in planning only.

4. **It is a time consuming process:** Planning process is a time-consuming process because it takes long time to evaluate the alternatives and select the best one. Lot of time is needed in developing planning premises. So, because of this, the action gets delayed. And whenever there is a need for prompt and immediate decision then we have to avoid planning.

5. **Planning does not guarantee success:** Sometimes teachers have false sense of security that plans have worked successfully in past so these will be working in future also. There is a tendency in teachers to rely on pretested plans. It is not true that if a plan has worked successfully in past, it will bring success in future also as there are so many unknown factors which may lead to failure of plan in future. Planning only provides a base for analysing future. It is not a solution for future course of action.

6. Lack of accuracy: In planning we are always thinking in advance and planning is concerned with future only and future is always uncertain. In planning many assumptions are made to decide about future course of action. But these assumptions are not 100% accurate and if these assumptions do not hold true in present situation or in future condition then whole planning will fail.

PLANNING PROCESS:

1. **Setting up of the objectives:** In planning function teacher begins with setting up of objectives because all the strategies, procedures and methods are framed for achieving objectives only. The teachers set up very clearly the objectives of the lesson keeping in mind the goals of the subject and the physical and behavioural environment of the class. Teachers prefer to set up goals which can be achieved quickly and in specific limit of time.

2. **Developing premises:** Premises refer to making assumptions regarding future. Premises are the base on which plans are made. It is a kind of forecast made keeping in view existing plans and any past information about various strategies. There should be total agreement on all the assumptions. The assumptions are made on the basis of forecasting. Forecast is the technique of gathering information.

3. **Listing the various alternatives for achieving the objectives:** After setting up of objectives the teachers make a list of alternatives through which the lesson can achieve its objectives as there can be many ways to achieve the objective and teachers must know all the ways to reach the objectives.

4. **Evaluation of different alternatives:** After making the list of various alternatives along with the assumptions supporting them, the teacher starts evaluating each and every alternative and notes down the positive and negative aspects of every alternative. After this the teacher starts eliminating the alternatives with more of negative aspect and the one with the maximum positive aspect and with most feasible assumption is selected as best alternative. Alternatives are evaluated in the light of their feasibility.

5. **Selecting an alternative:** The best alternative is selected but as such there is no mathematical formula to select the best alternative. Sometimes instead of selecting one alternative, a combination of different alternatives can also be selected. The most ideal plan is most feasible, effective and with least negative consequences. After preparing the main plan, the teacher has to make number of small plans to support the main plan. These plans are related to performance of routine jobs in the classroom. These are derived from the major plan. So, they are also known as derivative plans. These plans are must for accomplishing the objective of main plan.

6. **Implement the plan:** The teachers prepare or draft the main and supportive plans on paper but there is no use of these plans unless and until these are put in action. For implementing the plans or putting the plans into action, the teachers start communicating the plans to the classroom. After implementing the plan to students and taking their support the teachers start allocating the resources according to the specification of the plans.

7. **Follow-up:** Planning is a continuous process so the teacher's job does not get over simply by putting the plan into action. The teachers monitor the plan carefully while it is implemented. The monitoring of plan is very important because it helps to verify whether the conditions and predictions assumed in plan are holding true in present situation or not. If these are not coming true then immediately changes are made in the plan.

5 Step Lesson Plan Template

Anticipatory Set	• Engage students. • Connect with prior learning. • Explain what students will learn. • Explain what students will do. • Connect to future learning.
Introduction of New Material	• Provide direct instruction of content. • Model new skills. • Check for understanding.
Guided Practice	• Facilitate student work.
Independent Practice	• Assign independent classwork or homework.
Closure	• Have students briefly summarize their learning.

Whether you're working on your teaching credential or being reviewed by an administrator you will often need to write out a lesson plan during your teaching career. When you do, make sure it includes the eight essential components of a strong, effective lesson plan and you'll be on your

way to achieving every teacher's goal: measurable student learning.

Here you will find the eight essential steps to include in your lesson plan. They are the objective and goals, the anticipatory set, direct instruction, guided practice, closure, independent practice, required materials and equipment, assessment and follow-up. Each of these eight components will make up one perfect lesson plan. Here you will learn a little more about each of them and how you can implement each section into your lesson.

STEPS TO PREPARE AN EXCITING AND EFFECTIVE LESSON PLAN.

A well planned lesson can be described with two words: exciting and effective. In fact these two adjectives are interlinked as any lesson that is exciting for students will have some educational value and will be effective. This is because learning should essentially be associated with positive motivation, excitement and passion. So whatever is taught with these qualities in mind will stay with students for longer and will help them develop lifelong skills and attain knowledge.

However, there are a few traps that even experienced teachers often fall into. You want to cover the material you are expected to and giving it too much focus you forget about the fact that the lesson should be fun and exciting for your students to retain the knowledge and develop skills. The opposite is that you are trying too much to make your lessons fun without adequately planning the learning process for your students. Yes, they will still learn something by having fun but not necessarily that what you want them to learn. Therefore, you need to be careful when balancing your lesson planning to make sure they have fun and actually learn what you expect them to.

The following steps will help you organise the way you plan your lessons so that they are both appealing and effective.

STEP 1 – CHOOSE REALISTIC LEARNING GOALS

Before you begin planning you need to know what specific skills and knowledge you want your students to develop during one single lesson or unit. Making two separate lists helps to have a clear picture what you are trying to achieve, and it is also necessary as skills and knowledge are two completely different things. Teachers often focus too much on knowledge forgetting about developing skills which in a long term are more important than knowing mere facts. So don't plan too much as it may be impossible to achieve. It's much better to plan less and cover it adequately allowing your students enough time to digest and absorb new information their own way.

STEP 2 – PICK EXCITING TOPICS OR LEARNING CONTEXTS

Even if you have a curriculum to cover that tells you what specific topics to teach and they do not seem super interesting, try to find something unique and fascinating about them. There is always a way to make even the most boring topic appealing to your students. The best way to do so is to look for some meaningful connections between the topic and your students' current interests. For example, a specific historical character might have had some unusual hobbies, little secrets, pets, toys or favourite songs that can seem funny or maybe even disgusting, repulsive or controversial. This might be a great starting point to build your lesson on.

STEP 3 – KNOW YOUR STUDENTS' NEEDS AND TALENTS

This is an absolute must which will help you choose your learning goals, topics and teaching approaches adequately. You need to know well what your students are good at, what skills they

need to develop, what fascinates them the most, and what their preferred learning styles are. Their special requirements related to disabilities, delays and special talents should be taken into consideration when you plan your lessons. Remember that you need to prepare your lessons with all your students in mind and that your main goal should be to meet their needs and offer them enabling environments to learn their preferred way.

STEP 4 – USE A RANGE OF TEACHING APPROACHES AND METHODS

Choosing various methods of delivery will not only make your lessons more dynamic, but it will also facilitate the learning process as this way you are more likely to appeal to individual students' preferences. One of the most effective and preferred approaches in modern teaching are experiential/hands-on learning, multi-sensory learning, collaborative learning, entrepreneurial education and project-based learning just to name a few. Introducing movement, music, discussions, brainstorming sessions, multimedia, projects or team work will help you cater for different learning styles, offer equal opportunities to all your students, and enable them to learn through their talents.

STEP 5 – SELECT APPEALING RESOURCES

Whether you teach pre-school children or school students, they all are very tactile. This means they learn by touching and manipulating things and objects. So make sure you provide enough opportunities for your students to actually have their hands on various interesting objects and resources to facilitate the learning process. Accompanying your lessons with various audio-visual materials will additionally help your students make sense of what you are trying to teach them. Always choose good quality resources that come from reliable sources, and make sure they are safe for your students to use, touch, smell or work with. Also, using authentic and multi-cultural resources will add extra educational value to your lessons.

STEP 6 – FAIR ASSESSMENT

Assessment is a very important part of your planning, and I don't mean testing here. Checking your students' understanding at the end of the lesson may not be the best idea if you hadn't observed them during the whole session and adjusted your teaching accordingly. In the end, your students' understanding will be as good as your delivery. A reflective teacher uses observation skills during the entire session to make sure if their planning needs changes. This is necessary as it may turn out that your session is too difficult or too easy for your students, requires more or less time to cover, that your students may have interesting suggestions that need to be taken into consideration immediately, etc. So, it is wise to think about the assessment as an ongoing observation rather than just a single test. If you need to introduce tests or similar forms of assessment, you may as well do so but make sure it is not the only method you use.

STEP 7 – EVALUATION

Each single lesson is a chance for the teacher to improve their teaching practice. For this reason it is good to make a habit of analysing your lessons and finding out how your students responded to certain activities, resources or methods you have used. It always helps when you try to identify the most effective tools that are worth using and those that may need modification.

STRATEGIES FOR EFFECTIVE LESSON PLANNING

A lesson plan is the instructor's roadmap of what students need to learn and how it will be done effectively during the class time. Before you plan your lesson, you will first need to identify the learning objectives for the class meeting. Often, you can design appropriate learning activities and develop strategies to obtain feedback on student learning. A successful lesson plan addresses and integrates these three key components:

♦ Objectives for student learning
♦ Teaching/learning activities
♦ Strategies to check student understanding

Specifying concrete objectives for student learning will help you determine the kinds of teaching and learning activities, you will use in class, while those activities will define how you will check whether the learning objectives have been accomplished (see Fig.1).
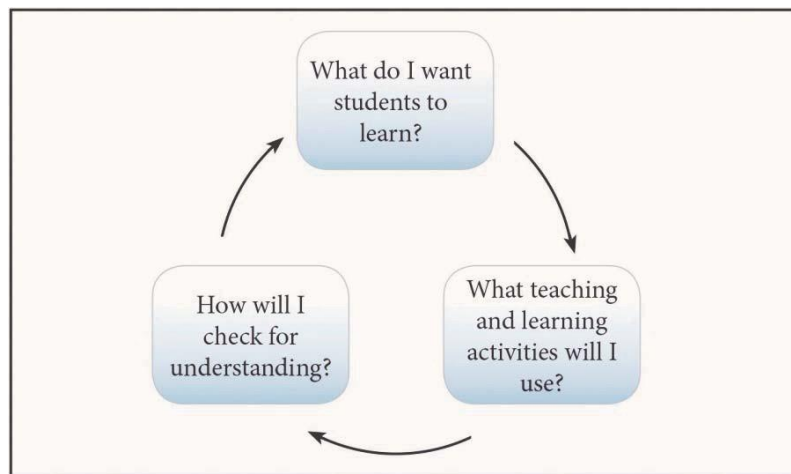
Fig. 1. Key Components of Lesson Plan Design (L. Dee Fink, 2005)

Lesson plan as needed. Having additional examples or alternative activities will also allow you to be flexible. A realistic timeline will reflect your flexibility and readiness to adapt to the specific classroom environment. Here are some strategies for creating a realistic timeline:

Estimate how much time each of the activities will take, then plan some extra time for each

When you prepare your lesson plan, next to each activity indicate how much time you expect it will take

Plan a few minutes at the end of class to answer any remaining questions and to sum up key points

Plan an extra activity or discussion question in case you have time left

Be flexible – be ready to adjust your lesson plan to students' need sand focus on what seems to be more productive rather than sticking to your original plan

PRESENTING THE LESSON PLAN

Letting your students know what they will be learning and doing in class will help keep them more engaged and on track. You can share your lesson plan by writing a brief agenda on the board or telling students explicitly what they will be learning and doing in class. You can outline on the board or on a hand out the learning objectives for the class. Providing a meaningful organization of the class time can help students not only remember better, but also follow your presentation and understand the rationale behind in-class activities. Having a clearly visible agenda (e.g., on the board) will also help you and students stay on track.

REFLECTING ON YOUR LESSON PLAN

A lesson plan may not work as well as you had expected due to a number of extraneous circumstances. You should not get discouraged –it happens to even the most experienced teachers! Take a few minutes after each class to reflect on what worked well and why, and what you could haved one differently. Identifying successful and less successful organization of class time and activities would make it easier to adjust to the contingencies of the classroom. For additional feedback on planning and managing classtime, you can use the following resources: student feedback, peer observation, viewing a video tape of your teaching, and consultation with a staff member at CRLT (see also," Improving Your Teaching : Obtaining Feedback" and "Early Feedback Form"

What are instructional objectives?

Instructional objectives are specific, measurable, short-term, observable student behaviors.

An objective is a description of a performance you want learners to be able to exhib it before you consider them competent.

An objective describes an intended result of instruction, rather than the process of instruction itself

♦ Why have objective ?
♦ To provide direction to instruction.
♦ To provide guidelines for assessment.
♦ To convey instructional intent to others**.**

TYPES OF OBJECTIVES

1. **Cognitive**: understandings, awareness, insights (e.g.," List and explain..."). This includes information recall, conceptual understanding, and problem -solving.

2. **Psychomotor**: special skills (e.g., "dissect a frog so that the following organs are clearly displayed..."; "take a replicable blood pressure reading by appropriately using as phygmomanometer").

3. **Affective**: attitudes, appreciations, relationships.

Tips for writing objectives

How specific and detailed should objectives be?

It depends on what they are used for! Objectives for sequencing a unit plan will be more general than for specifying a lesson plan.

Don't make writing objectives tedious, trivial, time-consuming, or mechanical. Keep them simple, unambiguous, and clearly focused as a guide to learning.

The purpose of objectives is not to restrict spontaneity or constrain the vision of education in the discipline ; but to ensure that learning is focused clearly enough that both students and teacher know what is going on.

Express them in terms of student performance, behavior, and achievement, not teacher activity.

Three components of an instructional objective:

Identify the type of activity in which competence is required (e.g.," Dissect...").

Specify the criteria or standards by which competence in the activity will be assessed (e.g. ,"a frog so that the following organs are clearly displayed...").

List any conditions or circumstances required for students to meet the objective (e.g.,"...given two class periods working with the materials at your lab station").

In writing objectives, answer the question:
- "What should the participants be able to do?"
- Objectives must be clear and attainable.
- Focus on knowledge/skill acquisition or reinforcement.
- A recommended wording format is: "At the completion of this activity, participants should be able to..." This phrase is followed by a specific performance verb and the desired learning outcome.

**Words or phrases such as know, think, appreciate, learn, comprehend, remember, perceive, understand, beaware of, be familiar with, have knowledge of, grasp the significance, are NOT measurable and should be avoided.

Writing Objectives for Lesson Plans Using Bloom's Taxonomy and Associated Action or Performance Verbs

Learning level	Associated action verbs
Knowledge	define, describe, state, list, name, write, recall, recognize, label, underline, select, reproduce, outline, match
Comprehension	identify, justify, select, indicate, illustrate, represent, name, formulate, explain, judge, contrast, classify
Application	predict, select, assess, explain, choose, find, show, demonstrate, construct, compute, use, perform
Analysis	analyze, identify, conclude, differentiate, select, separate, compare, contrast, justify, resolve, break down, criticize
Synthesis	combine, restate, summarize, precise, argue, discuss, organize, derive, select, relate, generalize, conclude
Evaluation	judge, evaluate, determine, recognize, support, defend, attack, criticize, identify, avoid, select, choose

PARTS OF A PERFORMANCE OBJECTIVE

Objective: The students will be able to tell and record time on a digital clock and analog clock to the hour and half hour by writing the times in a story.

The students will be able to	**tell and record** time on a digital clock and analog clock to the hour and half hour	by writing the times correctly in a story.

Audience: Standard introduction for an objective. Hint: Focus on what the students must do not the teacher.		**Behavior/Action Verb** that is measurable and can be assessed. What is the learner to do?		Condition to be met by the students in order to demonstrate that the objective has been achieved. Hint: Describes the circumstances, situation or setting.
		Content- description of the subject matter to be learned.		
	Hint: Must specify observable and measurable behaviors.			

OBJECTIVES COULD INCLUDE MORE CRITERIA OR PARTS

A-Audience: The who. "The student will be able to…"

B-Behavior: What a learner is expected to be able to do or the product or result of the doing. The behavior or product should be observable.

C-Condition: The important conditions under which the performance is to occur.

D-Degree: The criterion of acceptable performance. How well the learner must perform in order for the performance to be considered acceptable.

Micro-Teaching:

A Scaled-down, Simulated Practice Teaching Technique

"Microteaching is defined as a system of controlled practice hat makes it possible to concentrate on specified teaching ehavior and to practice teaching under controlled conditions."
- D.W. Allen & A.W. Eve (1968)

The modern age is leading towards the concept that the teachers are not born , but they can be made .The responsibility of producing competent teachers goes to the training institutions .Educational technology has played the key role in this job. Now the teacher's behavior can be modified. In order to modify teacher's behavior the technique can be effectively used.

Getting in front of students is a trying experience for a budding teacher. One may earnestly try to prepare him or herself: read books about teaching methods, attend lectures and take courses on communication skill. Yet, in theory everything seems much simpler than in practice. The complexity of a teaching situation can be overwhelming. To deal effectively with it, teachers must not only have a good knowledge of the subject in hand, but also some communication skills such as ability to observe, supervise, lead a discussion and pose questions. Furthermore, a teacher should be aware of how students perceive him or her. This perception is sometimes quite different from the teacher's self-image. It is difficult to self assess one's own abilities and we benefit from colleagues' feed back to recognize our strength and identify areas for possible improvement. Evaluation of teaching by students is becoming a common practice, and a constructive feedback could be an effective way to improve one's rating as a teacher. Even the experienced educators may sometimes reflect about strengths and weaknesses of their teaching style

WHAT IS MICROTEACHING

Microteaching is a scaled-down, simulated teaching encounter designed for the training of both pre-service or in-service teachers. Its purpose is to provide teachers with the opportunity for the safe practice of an enlarged cluster of teaching skills while learning how to develop simple, single-concept lessons in any teaching subject. Microteaching helps teachers improve both content and methods of teaching and develop specific teaching skills such as questioning, the use of examples and simple artifacts to make lessons more interesting, effective reinforcement techniques, and introducing and closing lessons effectively. Immediate, focused feedback and encouragement, combined with the opportunity to practice the suggested improvements in the same training session, are the foundations of the microteaching protocol.

THE HISTORY OF MICROTEACHING

The history of microteaching goes back to the early and mid 1960′s, when Dwight Allen and his colleagues from the Stanford University developed a training program aimed to improve verbal and nonverbal aspects of teacher's speech and general performance. The Stanford model consisted of a three-step (teach, review and reflect, re-teach) approach using actual students as an authentic audience. The model was first applied to teaching science, but later it was introduced to language teaching. A very similar model called Instructional Skills Workshop (ISW) was developed in Canada during the early 1970′s as a training support program for college and institute faculty. Both models were designed to enhance teaching and promote open collegial discussion about teaching performance.

In the last few years, microteaching as a professional development tool is increasingly spreading in the field of teacher education.

IMPORTANCE OF MICRO-TEACHING PROGRAM IN TEACHER EDUCATION PROGRAM

Microteaching is an excellent way to build up skills and confidence, to experience a range of lecturing/tutoring styles and to learn and practice giving constructive feedback. Microteaching gives instructors an opportunity to safely put themselves "under the microscope" of a small group audience, but also to observe and comment on other people's performances. As a tool for teacher preparation, microteaching trains teaching behaviors and skills in small group settings aided by video-recordings. In a protected environment of friends and colleagues, teachers can try out a short piece of what they usually do with their students, and receive a well-intended collegial feedback. A microteaching session is a chance to adopt new teaching and learning strategies and, through assuming the student role, to get an insight into students' needs and expectations. It is a good time to learn from others and enrich one's own repertoire of teaching methods. Microteaching is an organized method of practice teaching which involves a small group of preceptors/instructors who observe each other teach, provide feedback and discuss with one another the strengths of their presentations and potential areas for improvement

Microteaching is so called since it is analogous to putting the teacher under a microscope so to say while he is teaching so that all faults in teaching methodology are brought into perspective for

the observers to give a constructive feedback. It eliminates some of the complexities of learning to teach in the classroom situation such as the pressure of length of the lecture, the scope and content of the matter to be conveyed, the need to teach for a relatively long duration of time (usually an hour) and the need to face large numbers of students, some of whom are hostile temperamentally.

Microteaching also provides skilled supervision with an opportunity to get a constructive feedback. To go back to the analogy of the swimmer, while classroom teaching is like learning to swim at the deeper end of the pool, microteaching is an opportunity to practice at the shallower and less risky side.

Micro teaching makes the teacher education program ,more purposeful ,goal oriented and helps to decide common objectives for the program. It provides individualized training with more realistic evidence to students. Which enables them to develop competency in using specific teaching skills in view of their unique needs.

It provides a democratic type of behavior among faculty members and student-teachers. It provides a facility of supervision which is not critical on threatening type, but is of a helpful and suggestive type, which equip them for transition to school teaching. It is a system of controlled practice that makes it possible to concentrate on specific teaching behavior and to practice teaching under controlled conditions.

This way Micro teaching is a teacher education technique which allows teachers to apply clearly defined teaching skills to carefully prepared lessons in planned series to five to ten minutes encounters with a small group of real students ,often with an opportunity to observe the result on video-tape.

ASSUMPTIONS OF MICRO TEACHING

♦ Micro teaching can reduce the complexities of education. It simplifies the study of inter-action between the teacher and the students

♦ It can develop teaching skills. It provides an opportunity of integration of theory and practice. Specific skills can be developed

♦ It is completely an individualized training programme. It is a successful technique for individual training . It facilitates continuity in the training of the teachers

♦ It is real teaching. Micro-teaching technique is useful for both pre-service and in-service teachers

♦ It can control the practice by feedback. . Self evaluation is possible by tape recorder or video tape

♦ Feedback can be provided by various means, such as criticism by a teacher, preparing video film of the lesson, etc. There is provision of immediate and effective feedback

♦ Its objectives can be written more clearly and specifically

♦ Its use helps in the research work related to class-room teaching

COMPONENTS OF MICRO TEACHING

The involvement of the following component in micro teaching is necessary. In the absence of any component the success of this technique is doubtful.

1. **Micro-teaching Situations**. It consists of size of the class, length of the content and teaching method etc. There are 5 to 10 students in the class and the teaching period ranges from 5 to 20 minutes. The content is presented in a unit.

2. **Teaching skill**. The development of teaching-skills of the student's teachers is provided in the training programme such as lecturing skill, skill of black-board writing, skill of asking questions etc.

3. **Student Teacher .**The student who. gets the training of a teacher is called student- teacher .During training his various capacities are developed in him, such as capacity of class management, capability of maintaining discipline and capacity of organizing various program of the school etc

4. **Feed-back Devices**. Providing feedback is essential to bring changes in the behavior of the students. Feedback can be provided through videotape feed-back questionnaires

5. **Micro Teaching Laboratory**. Necessary facilities to feedback can be gathers in microteaching laboratory.

PHASES OF MICRO-TEACHING

 Generally the micro-teaching is structured in three phases.

1.   Phase one—Knowledge Acquisition Phase.

It is also known as modeling phase. Student-teacher is kept in conditions where observes model teacher who presents the teaching behavior to be learned. Inclusion of modeling in micro-teaching before actual practice is a pragmatic approach which foster the skill learning by student-teachers, as learning by observation is said to occur through informative function of modeling.

2.   Phase two-Skill Acquisition phase

 It is also known as practicing phase. Student-teacher are given opportunity in real classroom situations, but scaled down, to practice the same behavior or skill.

3.   Phase three-Transfer Phase

It is also known as feedback phase. Student-teachers are reinforced for those instances of desired behavior they have acquired and have provision for feed-back for developing the desired behavior or skill up to the mark.

OPERATIONS IN MICRO-TEACHING

 1. Analysis of a skill in behavior terms i.e. .objectives of the skill be clear.

2. A demonstration of the skill on video tape or films or in normal classroom teaching.

3. Trainee plans a short lesson in the subject of his interest in which he can use the skill

4. Trainee teaches the lesson to a small group of students (5-10) which is observed directly or video taped or audio taped.

5. Feedback is provided to trainee or discussing and analyzing his performance with the help of supervisor. If the skill has been used effectively, trainee is reinforced and if there is any drawback the skill would have been exercised by giving suggestions to him

6. Feedback or supervisor's remarks develop insight in the trainee. He replants the lesson to use the skill more efficiently.

7. Revised lesson is re-taught to different but comparable groups.

8. Feedback is again provided on re-taught lesson which is annualized with the help of the supervisor.

STANDARD PROCEDURE OF MICRO-TEACHING

The following steps are recommended for a successful micro-teaching session – eaching among teacher-educators and student teachers

Step one – Orientation- Theoretical background, merits and demerits of micro-teaching may be arranged.

Step Two- Discussion of Teaching Skills.-Concept of teaching skills should be cleared. At least, five teaching skills should be selected and explained at length with the help of handbooks developed by competent authorities. One skill at a time may be discussed before practice.

Step Three- Presentation of Model Lesson – Model lesson of corresponding skills is demonstrated by the trained teacher educator in selected subjects to the student teacher.

Step Four.-Presentation of Micro lesson plan.-Student-teacher selects one topic or unit for micro-lesson and prepare the lesson plan logically.

Guidelines for Presentation

♦ **Structure presentation:** Give an introduction to the topic, mention the key points and summarize the topic at the end of the presentation

♦ **Encourage audience participation:** Ask questions and create ways for interaction with the audience

♦ **Translate enthusiasm for the topic:** Grab the audience's attention at the beginning of the topic by opening with quotes/ important statistics/ clinical findings etc., pause and emphasize important points

♦ **Use props:** OHPs, PowerPoint or the board can be used to organize your presentation, include illustrations and emphasize the main points

♦ **Practice presentation prior to the workshop:** Practice in front of the mirror or a colleague , practice aloud and notice your body language, gestures and facial expressions, rehearse your presentation to fit in the 5 minute slot

♦ **Review the microteaching feedback form:** The criteria peers will be using in their feedback will help to perfect delivery technique. Keep the voice loud and clear, maintain eye contact with the audience, pace an unhurried presentation

THE PRESENTATION

Participants of the microteaching session prepare a 'microlesson' for 5 minutes to be addressed to a 'micro-class' comprising of a small group of peers and a facilitator.

To plan a 5 minute lesson of your choice, present it before a small group of peers who will role play the students in your class and then give you feedback on your presentation with the intention of improving your presentation and teaching skills
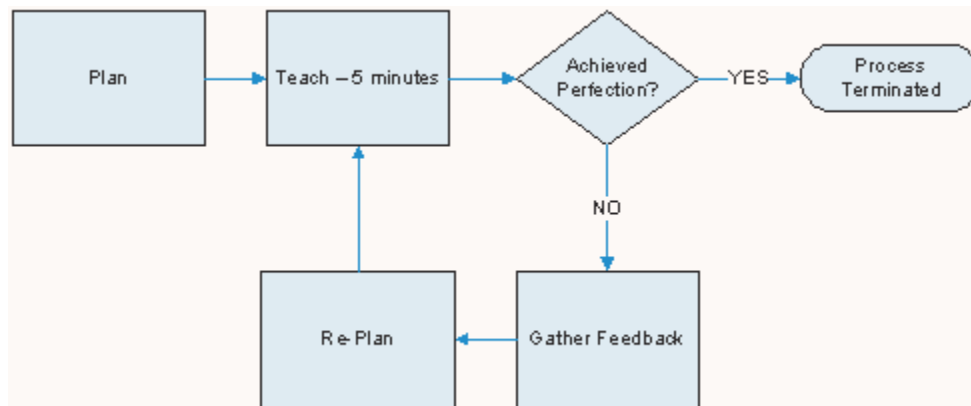
And so on… At the end of the session, the student-teacher will have:
♦ Reflected on how best he/her can teach
♦ Perceived he/her strengths
♦ Enhanced he/her understanding of various effective teaching styles c
♦ Identified areas for improvement
♦ Improved he/her ability to provide and receive effective feedback

The components of the microteaching cycle are shown in Figure. The Microteaching cycle starts with planning. In order to reduce the complexities involved in teaching, the student teacher is asked to plan a "micro lesson" i.e a short lesson for 5-10 minutes which he will teach in front of a "micro-class" i.e. a group consisting 5–10 students, a supervisor and peers if necessary. There is scope for projection of model teaching skills if required to help the teacher prepare for his session. The student teacher is asked to teach concentrating one or few of the teaching skills enumerated earlier. His teaching is evaluated by the students, peers and the supervisor using checklists to help them. Video recording can be done if facilities permit. At the- end of the 5 or 10 minutes session as planned, the teacher is given a feedback on the deficiencies noticed in his teaching methodology. Feedback can be aided by playing back the video recording. Using the feedback to help himself, the teacher is asked to re-plan his lesson keeping the comments in view and ret each immediately the same lesson to another group. Such repeated cycles of teaching, feedback and re-teaching help the teacher to improve his teaching skills one at a time. Several such sequences can be planned at the departmental level. Colleagues and postgraduate students can act as peer evaluators for this purpose. It is important, however, that the cycle is used purely for helping the teacher and not as a tool for making a value judgment of his teaching capacity by his superiors.

Step Five.- Micro-teaching setting.-To set up micro-teaching following variables should be taken into considerations.-
A. Time ; 36minutes.
B. Number of students ; 8—10.
C .Supervisor s; one or two
D. Teaching technique of feedback by superior video or audio or supervisor himself
Step six-Simulated conditions- Peers should act as pupils. Microteaching is conducted in the

training college itself.

Step Seven- Practice of teaching skills.- At least five skills may be practiced by a student teacher at one time. Any of the five may be selected from the following list of teaching skills.-

♦ Probing questions.
♦ Stimulus Variation.
♦ Reinforcement.
♦ Silence and nonverbal cues.
♦ Illustrating with examples.
♦ Encouraging student's participation.
♦ Explaining.
♦ Effective use of black-board.
♦ Set induction.
♦ Closure.

STEP EIGHT-OBSERVATION OF TEACHING SKILL-IS DONE BY PEERS AND SUPERVISORS

For the purpose of providing feedback to the student -teacher , the felicitator can use the following criteria (in the form of observation schedule)

♦ **Duration of presentation** - It should be Approx. 10 minutes .The Start time…….Finish time……..and the .Total duration…......... minutes be noted down
♦ **Comprehensibility** – The felicitator should observe whether -
♦ The presentation was be given in comprehensible language
♦ The presentation is sufficiently comprehensible. Comprehensibility should be improved
♦ **Visualization** – – The felicitator should see whether the presentation was accompanied by selected elements of visualization ,or the following forms of visualization have been used:
- Slides
- handouts for the participants
- pin board
- flipchart
- white/black board
- He/she should see whether the visual elements assist the understanding, the visual elements needs improvement.

Density of information – The felicitator should see whether the density of information should be high. However, it must not overtax the learner. The density of information seems to demand too much of the learner. He/she should see whether the

CHARACTERISTICS OF A GOOD QUALITY PRESENTATION.

♦ The felicitator should tick Yes or No when assessing)Whether the presentation comprehensible?
♦ The felicitator should tick Yes or No when assessing)**Whether Is the presentation stimulating**-
♦ visualization is clear and well-structured

♦   includes graphic elements and optical stimuli-
♦   easily legible writing
♦   colors help to focus on the important aspects
♦   comprehensible visualization
♦   affectionate layout
♦   eye contact-
♦   speaker varies his position
♦   participants are encouraged to contribute-
♦   use of humor to create a relaxed atmosphere
♦   presented with commitment-
♦   friendly/respectful behavior

Step nine – Immediate feedback is given to student –teachers. Tallies and ratings by peer groups and supervisors may be used for interpretation and feed-back about the performance of student-teacher.

THE FEEDBACK

Under the guidance of the professional supervisor, the presenter is first asked to present a self feed back of his mini lesson. With this new information taken into account, the supervisory team member who volunteered to be the speaker summarizes the comments generated during the analysis session. This part of the session is intended to provide positive reinforcement and constructive criticism. The presenter is encouraged to interact freely with the team so that all comments are clarified to his/her satisfaction.

The way in which feedback is given and received contributes to the learning process. Feedback should be honest and direct, constructive, focusing on the ways the presenter can improve, and containing personal observations.

The following is a series of suggestions on how to give and receive feedback in a microteaching workshop.

PROVIDING FEEDBACK

When you are giving feedback, try to develop the skill to give an effective feedback:

♦   **Be respectful, give a specific but detailed comment, start on a positive note,** do not be judgmental, maintain collegiality, listen and speak in turn, so that everyone can hear all the comments, complete the Microteaching Feedback Form

♦   **Be descriptive and specific, rather than evaluative.** For example: you would avoid starting the sentences with "you", it is better to start with "I", so you can say: "I understood the model, after you showed us the diagram".

♦   **Begin and end with strengths of the presentation.** If you start off with negative criticism, the person receiving the feedback might not even hear the positive part, which will come later.

♦   **Be specific rather than general.** For example: rather than saying "You weren't clear in your explanations", tell the presenter where he/she was vague, and describe why you had trouble understanding him/her. Similarly, instead of saying: "I thought you did an excellent job!", list the specific things that he/she did well.

♦ **Describe something the person can act upon**. Making a comment on the vocal quality of someone whose voice is naturally high-pitched is only likely to discourage him/her. However, if the person's voice had a squeaky quality because he/she was nervous, you might say: "You might want to breath more deeply, to relax yourself, and that will help to lower the pitch of your voice as well".

♦ **Choose one or two things the person can concentrate on.** If the people are overwhelmed with too many suggestions, they are likely to become frustrated. When giving feedback, call attention to those areas that need the most improvement.

♦ **Avoid conclusions about motives or feelings**. For example: rather than saying: "You don't seem very enthusiastic about the lesson", you can say "Varying your rate and volume of speaking would give you a more animated style".

RECEIVING FEEDBACK

When receiving feedback, try to listen to feedback given during the session: Listen to and acknowledge the positive feedback that so as to focus on the strengths and work on the weaknesses

♦ **Be open to what you are hearing**. Being told that you need to improve yourself is not always easy, but as we have pointed out, it is an important part of the learning process. Although, you might feel hurt in response to criticism, try not to let those feelings dissuade you from using the feedback to your best advantage

♦ **Not to respond to each point, rather listen quietly,** hearing what other's experiences were during their review, asking only for clarification. The only time to interfere with what is being said is if you need to state that you are overloaded with too much feedback.

♦ **Ask for specific examples if you need to**. If the critique you are receiving is vague or unfocused, ask the person to give you several specific examples of the point he/she is trying to make

♦ **Take notes, if possible.** If you can, take notes as you are hearing the other people's comment. Than you will have a record to refer to, and you might discover that the comments that seemed to be the harshest were actually the most useful.

♦ **Judge the feedback by the person, who is giving it**. You do not have to agree with every comment. Ask other people if they agree with the person's critique

STEP TEN.-DISCUSSION AND ANALYSIS

While the presenter goes to another room to view the videotape, the supervisory team discusses and analyses the presentation. Patterns of teaching with evidence to support them are presented. The discussion should focus on the identification of recurrent behaviors of the presenter in the act of teaching. A few patterns are chosen for further discussions with the presenter. Only those patterns are selected which seem possible to alter and those which through emphasis or omission would greatly improve the teacher's presentation. Objectives of the lesson plan are also examined to determine if they were met. It is understood that flexible teaching sometimes includes the modification and omission of objectives. Suggestions for improvement and alternative methods for presenting the lesson are formulated. Finally, a member of the supervisory team volunteers to be the speaker in giving the collected group feedback.-Complete cycle of a micro-lesson by a trainee

will take about 35 minutes to be completed.
- ♦ Precautions in micro-teaching application
- ♦ Clarity of objectives is a must.
- ♦ Micro-lesson plan should be prepared for one skill only at a time.
- ♦ Delivering model lessons is essential.
- ♦ Before teaching the student-teacher must prepare his micro-lesson plan.
- ♦ Substantial suggestions should also accompany criticism in order to improve the teaching skill of the student-teachers.

ADVANTAGES OF MICRO-TEACHING

Microteaching has several advantages. It focuses on sharpening and developing specific teaching skills and eliminating errors. It enables understanding of behaviours important in classroom teaching. It increases the confidence of the learner teacher. It is a vehicle of continuous training applicable at all stages not only to teachers at the beginning of their career but also for more senior teachers. It enables projection of model instructional skills. It provides expert supervision and a constructive feedback and above all if provides for repeated practice without adverse consequences to the teacher or his students.

A microteaching session is much more comfortable than real classroom situations, because it eliminates pressure resulting from the length of the lecture, the scope and content of the matter to be conveyed, and the need to face large numbers of students, some of whom may be inattentive or even hostile. Another advantage of microteaching is that it provides skilled supervisors who can give support, lead the session in a proper direction and share some insights from the pedagogic sciences.

The techniques of micro teaching are a new experiment in the field of education. It has the following advantages
- ♦ It promotes analysis of behavior of the teacher It is an effective way of instilling confidence in the teacher in planning and implementation of the lesson plan
- ♦ It helps create a conducive ambience in the classroom .It can be used in the college. The pupil teacher needs not to go to any school for the training of teaching skills.
- ♦ It focuses on honing teaching skills through participation and observation The number of students as well as duration of teaching is less.
- ♦ It empowers teachers with diverse teaching methods The content is divided into smaller units which makes the teaching easier.
- ♦ The problem of indiscipline can also be controlled. The other class- mates of pupil teacher can also supervise the task of teaching.
- ♦ There is a provision of immediate feedback.
- ♦ Only one teaching skill is considered at a time. There is a facility of re-planning, re-teaching and re-evaluation.
- ♦ There are occasions of comparing two or more teaching behaviors of the pupil teachers.

LIMITATIONS OF MICRO-TEACHING

Lack of adequate and in-depth awareness of the purpose of microteaching has led to criticisms that microteaching produces homogenized standard robots with set smiles and procedures. It is said to be (wrongly) a form of play acting in unnatural surroundings and it is feared that the acquired skills may not be internalized. However, these criticisms lack substance. A lot depends on the motivation of the teacher to improve himself and the ability of the observer to give a good feedback. Repeated experiments abroad have shown that over a period of time microteaching produces remarkable improvement in teaching skills.

The arrangement of micro teaching laboratory is very expensive in small training colleges. Video, tape recorder and other devices are required in making the lesson effective. It is not possible for all training colleges to make such arrangements.

This technique is not complete in itself. It is useful only if it is used along with other techniques, such as inter action analysis method and stimulated teaching method.The teachers also need the training of this method.

Skills of Micro teaching Techniques

1. Introduction Skill
2. Skill of Questioning
3. Skill of Black-board Writing
4. Skill of Explanation
5. Skill of Stimulus Variation
6. Skill of Achieving Closure

1. Introduction Skill: The skill of introducing the lesson provides the students with advance information of what is to come and why it is important for them to learn the knowledge and contents comprising the lesson. Introducing the lesson to the students skillfully allows information to be presented in a unique and interesting way. Lesson differs from quizzes because lesson allows the path the educator chooses to be followed by the answers being provided.

In the words of Hall Houston, " Ideally a good introduction should get students thinking about the topic before they open their course books. It should help students consider what they already know about the topic and present some useful vocabulary."

The components consider in introducing a lesson are follows:

Desirable		Undesirable
1.	Using previous knowledge	Lack of continuity
2.	Proper use of Technique	Non-verbal behaviour
3.	Co-operation with pupils	
4.	Related to subject matter	
5.	Cooperation of students	
6.	Over all impression about introducing a lesson	

SKILL OF QUESTIONING

The skill of questioning is a key technique of the art of teaching. There is evidence available that teachers can improve upon their teaching with the use of questions, focusing on types of questions and strategies for using them. Questions should draw students into learning process as well as checking an acquisition of knowledge. By asking such questions again, the teacher makes the pupils more thoughtful. Enable the pupils to understand the subject deeply.

According to Calvin," No teacher of elementary or secondary subjects can succeed in his instructions who has not a fair mastery of the art of questioning."

According," Teaching means skillful questioning to force the mind to see, to arrange and to act."

The skill of questioning inspires the gifted and talented learners to embrace cognitive thought at a higher level so that it becomes easier for the teachers to achieve higher standards of teaching through the use of questions. These questions are often arranged according to their level of complexity, this is called taxonomy. Bloom's taxonomy is one approach that can be used to help plan and formulate higher order questions. This type of questioning also actively encourages the development of thinking and dialogue skills amongst the students. The skill of questioning plays a major role in both formal and informal educative processes. On the one hand, it is the means by which a child expresses the desire to understand the world outside and on the other hand, this skill becomes the means by which a teacher assesses whether or not a child has satisfactorily comprehended the lesson or the topic of study.

TYPES OF QUESTIONS

1.   Introductory questions: These questions are put while introducing a lesson. The purpose of these questions are:

i.   To test previous knowledge of the students.
ii.   To establish a link between the old knowledge and new knowledge.
iii.   To motivate the students to gain new knowledge.
iv.   To introduce a new lesson.

2.   Developing Questions: Developing questions are used for the development of the lesson and put during the course of a lesson. These stimulate the thinking.

3.   Recapitulatory Questions: These are put at the end of a lesson. These are used to know whether students have understood or not. These are helpful in retaining the subject matter that is just learnt. Thus provide the feedback to the teachers about the level of student's attainment.

COMPONENTS OF QUESTIONING

1.   Questions should be grammatically correct.
2.   Questions should b relevant to the topic in hand
3.   Questions should b specific.
4.   Questions should be concise.
5.   Questions should be put with proper speed and pause speed and pause and voice.
6.   Questions should be not repeated un-necessarily.
7.   Sufficient questions

SKILL OF CHALK-BOARD WRITING

Blackboard is most commonly used aid in the classroom. It is best tool in the hand of the teacher for effective teaching. If a teacher judiciously uses this aid, he can make his teaching effective. He can use it for drawing flowcharts, writing technical terms, writing various steps used in opening and closing different dialog boxes, creating new documents, slides, work book etc. He should be proficient in the skill of using blackboard.

COMPONENTS OF THE SKILL OF CHALKBOARD WRITING ARE:

(i) Legibility

(ii) Size and alignment

(iii) Highlighting main points

(iv) Utilization of the space

(v) Blackboard summary

(vi) Correctness

(vii) Position of the teacher and

(viii) Contact with the pupils.

SKILL OF EXPLANATION

It involves the ability of a teacher to describe logically 'How', 'Why' and 'What' of concept. Generally, the skill of explanation is some what complex or that it is not an easy job. Explanation is to explain or to let the other persons, the students understand what the teacher actually wants to convey. It leads from the known to the unknown and it also bridges the gap between a person's knowledge or experience and new phenomena. It assists the learner to assimilate and accommodate new data or information or knowledge.

PRECAUTIONS FOR SKILL OF EXPLAINING:

(i) It should be in simple language.

(ii) It should not be given the shape of an advice.

(iii) It should be in a sequence.

(iv) It should be according to the age, experience and mental level of the pupil.

COMPONENTS OF SKILL OF EXPLANATION:

Desirable	Undesirable
Introducing Statement	Use of irrelevant words
Concluding statement	Lacking continuity in statement
Visual techniques	Use of vague words
Explaining links	Lacking fluency
Covering essential points	
Interesting to pupils.	
Testing Pupils	
Technical words	

SKILL OF STIMULUS VARIATION

Stimulus variations in general terms means something which is the cause of activity. In the field of teaching, the skill of stimulus variations is a way of enhancing children learning by helping them remain attentive. It is the way of maintaining student's attention. The skillful change in the stimuli is known as the skill of stimulus variation. Just to avoid boredom, it is the teacher's skills to stimulate the students, increase their active participation, enthusiasm and spirit of study. The teacher can make lesson more interesting through the effective use of stimulus variations to make learners motivated on grasping concepts.

1. Teacher movement
2. Teacher gestures
3. Change in voice
4. Focusing
5. Change in the interaction pattern
6. Pausing
7. Student's physical participation
8. Audio-visual aids

SKILL OF ACHIEVING CLOSURE

Questions and statements by the teacher related to the consolidation of the major points covered during the lesson. Opportunities provided by the teacher to the pupils for linking the present knowledge with the past knowledge. Opportunities provided by the teacher to the pupils for applying the knowledge gained during the lesson to the new situations.

ADVANTAGES OF MICROTEACHING

It focuses on sharpening and developing specific teaching skills and eliminating errors.

It enables understanding of behaviours important in class-room teaching.

It increases the confidence of the learner teacher.

It is a vehicle of continuous training for both beginners and for senior teachers.

It provides experts supervision and constructive feedback.

SUMMARY

1.   Microteaching involves presentation of micro lesson.
2.   Audience….small group of peers.
3.   Feedback given by peers role playing as students
4.   Participants learn about strengths & weakness in themselves as teachers
5.   Plan strategies for improvement in performance

CHAPTER 24

VALUE BASED LESSON PLAN

Class: 7th   **Duration:40 mins**

Subject : Computer Science   **Topic : Input Devices**

GENERAL AIDS:

   A well–equipped classroom with proper seating arrangement, a blackboard, colored chalks, a duster, and a pointer.

SPECIFIC AIDS:

   Chart related to topic and real objects.

GENERAL AIMS:

1.   To develop interest of students in computer.
2.   To develop understanding among students regarding use of computer.
3.   To enable students to make use of computer in real life.
4.   To make use of computer in other subjects also.

SPECIFIC OBJECTIVE:

   To enable the students to understand about input devices and to inculcate in them the core value of cooperation and team work.

VALUE TO BE INCLUCATED:

   Cooperation and team work.

EXPECTED BEHAVIOURAL OBJECTIVES:

1.   The students will be able to understand the concept of input devices.
2.   The students will be able to know the various types of input devices.
3.   The students will be able to express the function of input devices.

ENTRY BEHAVIOUR:

   Pupil–Teacher will assume that students have already know about the basic knowledge of computer.

ENTRY BEHAVIOUR TESTING:

   In order to test the previous knowledge of the students, Pupil- Teacher will ask the following questions:

Pupil –Teacher Activity	Expected Answers
1. What do you mean by computer?	It is an electronic device which performs various functions.
2. What are the various uses of computer in daily life?	Transportation, Research, Schools, Hospitals, Banks, Homes, Offices etc.
3. Give an example of hardware.	Physical components of computer are hardware. Mouse, Keyboard, Monitor etc.
4. Define Software.	Software is a general term for the various kinds of programs used to operate computers and related devices.
5. What do mean by Input devices	Unsatisfactory response.

ANNOUNCEMENT OF THE TOPIC

After getting unsatisfactory response from students, Pupil-Teacher will announce the topic by saying, "Well, students, today we will learn about the concept of input devices and its various types in details."

PRESENTATION OF THE TOPIC:

Pupil teacher will present the topic with active participation the students. "Whole to part" method will be used. Blackboard will be used where needed. Pupil – teacher will develop the lesson by using lecture cum demonstration method.

Teaching Points	Value To Be Inculcated	Pt Activity	Pupils' Activity	Bb Works/Av Aids
Introduction of Input devices **Types of Input devices:** **Keyboard** **Mouse** **Scanner**	This will lead to the inculcation of the values co-operation It will lead to the formation of values of team work. It will inculcate the values of sharing, mutual understanding in them. It will lead to the inculcation of intellectual value.	Pupil –teacher will give a brief introduction of input devices. Pupil-Teacher will say that An input device is any hardware device that sends data to a computer, allowing you to interact with and control the computer. PT will use the real keyboard and explain that keyboard allow data entry into a computer system by pressing a set of keys neatly mounted on a keyboard. Types of keyboard : (1). Standard keyboard (2). Multimedia keyboard (3).Wireless keyboard Pupil–teacher will use the real computer mouse and explain that mouse is the most popular point-and-draw device. It has 2 or 3 buttons and can be clicked or double-clicked to perform tasks. Optical mouse doesn't have a ball but uses a laser to sense the motion. Types of mouse: (1). Serial mouse (2). PS/2 mouse (3).Optical mouse (4).Wireless mouse	Pupils will listen to the pupil –teacher carefully and note it down in their note-books. Pupils will be attentive and listen carefully to the pupil-teacher . Pupils will be attentive and listen carefully by noting it in their note books and will try to grasp the knowledge about it.	

Teaching Points	Value To Be Inculcated	Pt Activity	Pupils' Activity	Bb Works/Av Aids
		Pupil-teacher will explain that Data scanning devices are input devices used for direct data entry into a computer system from source documents.		
Types of Scanner **Joystick** **Digital Camera**	Here the value of sharing, mutual understanding and utilitarian will be inculcated. Here the emphasis will be on the value of understanding, social.	PT will use chart to explain the common scanner devices (1) Magnetic Ink Character Recognition (MICR) reader :- used by banks to process large volumes of cheques and drafts (2) Optical Mark Reader (OMR) scanner :- scanning the answer sheet of an objective type test in which answers are marked by darkening a square or circle space by pencil (3) Optical Character Recognition (OCR) scanner :- used for direct reading of any printed character (4) Barcode reader :- used to read the barcodes printed on practically every item purchased from a department store	Pupils will listen carefully and note down the important points in their notebooks. Pupils will listen carefully and note down the important points in their notebooks.	

Teaching Points	Value To Be Inculcated	Pt Activity	Pupils' Activity	Bb Works/Av Aids
	Here the value of sharing, mutual understanding and utilitarian will be inculcated. Here the emphasis will be on the value of understanding, social.	Pupil-Teacher will use chart and explain that A joystick is a pointing device that works on the principle of trackball. To make the movement of the spherical ball easier, it is placed in a socket with a stick mounted on it. On most joysticks, a button on the top is provided to select the option currently pointed to by the cursor. Commonly used for controlling player movements in video or computer games PT will use digital camera and explain that the camera creates an image of the object in digital form so that It can be stored and interpreted by the computer. The digitized image of the object is matched against similarly formed pre-stored images in the computer's image database	Pupils will listen carefully and note down the important points in their notebooks. Pupils will listen carefully and note down the important points in their notebooks.	

Generalization

Pupil-Teacher will generalize the topic by saying that today we have learnt about input devices and its various types such as keyboard, mouse, joystick, scanner, digital camera.

RECAPITULATION

In order to recapitulate the topic, pupil-teacher will ask the following questions:

1. What do you mean by Input devices?
2. How many keys are there in a keyboard?
3. Give name of different types of mouse?
4. Explain the function of joystick?
5. What are the uses of digital camera?

APPLICATION

1. Writing a paragraph in MS Word by using mouse and keyboard.
2. How digital camera works?

HOME WORK

Write an assignment on input devices.

LESSON PLAN BASED ON CONCEPT ATTAINMENT MODEL
(COMPUTER SCIENCE)

Subject: Computer Science   **Class : 8th**

Topic: Secondary Storage Devices   **Time : 35 min**

SUPPORT SYSTEM

Using Audio-Visual aids for the Topic, 'Secondary Storage Devices'.

FOCUS

 1. Students will be able to define Secondary Storage Devices.

 2. Students will be able to explain various secondary storage devices.

 3. Students will be able to differentiate between secondary storage devices .

SYNTAX:

Phase I	Phase II	Phase III
Presentation of data	Testing attainment of the concept	Analysis of thinking strategy

The whole teaching-learning procedure will be divided into three phases. Suitable examples will be presented and hypotheses concept formation will be made on the basis of students..

Phases	Teacher's Activity	Student's Activity
Phase I- Present the topic about topologies of network.	Teacher will show a video on the topic 'secondary storage devices' in order to explain the advantages and disadvantages. Teacher will tell the students that there is one idea common in all advantages. Teacher will give explanation while testing the hypotheses. Now the teacher will also show the flash cards on which unlabeled secondary storage devices are given	Student will seen the video carefully and observe various secondary storage devices. Students will go on giving hypotheses on the basis of advantages of the concept whatever in their mind. At last Students will identify the concept and will try to define it that advantages are secondary storage device is a non-volatile device that holds data until it is deleted or overwritten.
Phase II- Testing attainment of concept	Here teacher will ask the students to label the flash cards with names. Teacher will restate the concept "Secondary storage devices separate from the computer itself, where software and data can be stored on a permanent basis"	Now the students will label the secondary storage devices with names and keeping in view the explanation given by the teacher while testing their hypotheses. Students will observe the flash cards and name the secondary storage devices. Secondary storage is necessary because memory, or primary storage, loses its data when a computer is turned off whereas secondary storage does not. So it is non-volatile storage. It has large storage capacity than primary memory.
Phase III- Analysis of thinking strategies.	Which secondary storage device requires the light beam and optical drive for its operation ? How data is store in Hard Disk? Teacher will explain the advantages and disadvantages with the help of examples.	CD ROM, DVD, CD RW, VCD requires the light beam and optical drive for its operation. Its read/write speed is slower compared to hard disk and flash memories. Hard disk stores large amounts of data on an electromagnetically charged surface or set of surfaces. Students will note down on their notebooks.

APPLICATION:
1. What is Floppy?
2. Which secondary storage device stores digitally encoded data on rapidly rotating platters with magnetic surfaced ?

HOME ASSIGNMENT:
1. Explain various secondary storage devices with diagram.
2. Difference between Hard disk and Optical Memory.

LESSON PLAN BASED ON GLASER'S BASIC TEACHING MODEL

Class : 10th   **Duration: 40 minutes**

Subject: Computer Science   **Topic: Network Topologies**

FOCUS:

To enable the students to understand the concept of "Network Topologies" in detail.

SUPPORT SYSTEM:

Flash cards and model related to Network Topologies.

SYNTAX:

Phase 1	Phase 2	Phase 3	Phase 4
Formulating the Inst./Behavioural objective	Testing the entry behaviour	Instructional procedures	Performance Assessment

PHASE 1: FORMULATING THE BEHAVIOURAL OBJECTIVES.

After the completion of the topic:
  I.   Students will be able to define Network Topologies.
 II.   Students will be able to enlist various types of Network Topologies.
III.   Students will be able to explain advantages and disadvantages of network topologies.
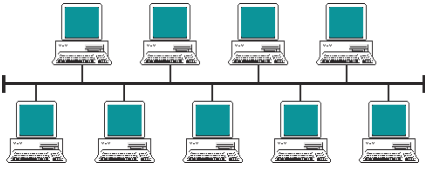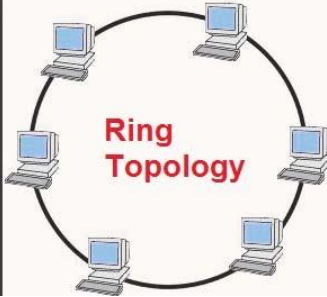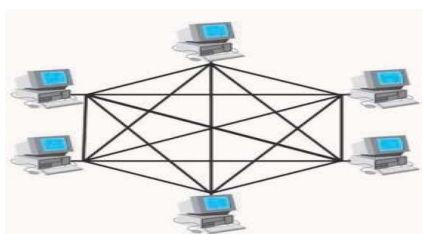 IV.   Students will be able to use network topologies in their daily life.

PHASE 2: TESTING THE ENTRY BEHAVIOUR:

Sr.No	Questions	Expected Response
1	What is a computer network?	Computer network is a group of computers linked together, so that can share information and resources.
2	What is LAN?	A local area network (LAN) is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building.
3	What is the full form of MAN?	Metropolitan Ares Network
4	Which network occupies a very large area, such as an entire country or the entire world?	Unsatisfactory response

Sr.No	Questions	Expected Response
5	What do you mean by network topologies?	Unsatisfactory response

After getting an unsatisfactory response from students, Pupil teacher will announce the topic by saying "Well, students, today we will learn about 'Network Topologies' in detail."

Phase 3: Instructional Procedures

Teaching Points	Teacher-Learning Activity	Material Resources Used / BB Summary
Definition of Network Topologies	Pupil-teacher will explain the meaning of network topologies by giving its definition and write it on BB and students will listen carefully. Pupil-teacher will use the flash card to explain Bus Topology.	Network Topology :- The layout pattern of the interconnections between computers in a network is called network topology.
Types of Network Topologies:	Pupil-teacher will explain the meaning Star Topology. Pupil-teacher will explain concept with the help of a model. Students listen carefully and note down in the notebooks.	In star topology, each computer is connected to a central hub using a point-to-point connection. The central hub can be a computer server that manages the network,
1 Bus Topology 2. Star Topology 3. Ring Topology 4. Mesh Topology 5. Tree Topology	Pupil-teacher will use a flash card to explain the concept of Mesh Topology. Pupil-teacher will define Tree Topology to students	

Teaching Points	Teacher-Learning Activity	Material Resources Used / BB Summary
		Tree topology combines multiple star topologies onto a bus. Hub devices for each star topology are connected to the bus. Each hub is like the root of a tree of devices.

PHASE 4: PERFORMANCE ASSESSMENT
1. Define Network Topology?
2. Enlist various types of Network Topology?
3. Define Bus Topology?
4. How Star topology works?
5. What is Ring Topology?
6. What are the various advantages of Tree Topology?

INSTRUCTIONAL EFFECTS:
Pupil teacher will generalize the topic by saying that students today have learnt about network topologies and its various types like bus topology, star topology ring topology, mesh topology, tree topology.

APPLICATION:
Pupil-teacher will tell the students to draw a chart of star topology and ring topology.

HOMEWORK:
1. Define network topology? Enlist various types of network topologies ?
2. Use any network topology to write the advantages and disadvantages of network topology.

ICT BASED LESSON PLAN
(COMPUTER SCIENCE)

Class: 7th   **Duration: 40 Minutes**
Subject: Computer science   **Topic: Internet and its uses**

GENERAL AIDS
A well ventilated computer laboratory with proper sitting arrangement, a pointer, a projector, a whiteboard, a marker and a duster.

SPECIFIC AIDS
PowerPoint Slides related to internet and its uses.

GENERAL AIMS
1. To create interest of students in computer through technology.
2. To develop thinking and reasoning power through technology.
3. To make them aware about technology.
4. To develop sense of appreciation towards computer and technology.

SPECIFIC OBJECTIVE:-
To provide students knowledge about internet and its uses through PowerPoint slides.

INSTRUCTIONAL OBJECTIVES:-

After the completion of the lesson:

1. Students will be able to understand the concept of internet and its uses.
2. Students will be able to analyze the use of internet in daily life.
3. Student will be able to understand the uses of internet in hospital, banks, education, science and technology and reservation.

PREVIOUS KNOWLEDGE ASSUMED/ENTRY BEHAVIOR:-

It is assumed that the students are familiar with the network and networking process.

ENTRY BEHAVIOR TESTING:-

In order to test the previous knowledge of the students, Pupil- Teacher will ask the following questions:

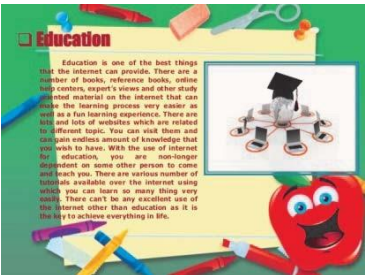| Pupil-Teacher Activity	Expected Answers
1. Define computer.	It is an electronic device which performs various functions.
2. What are the various uses of computer in daily life?	Transportation, Research, Schools, Hospitals, Banks, Homes, Offices etc.
3. Define network?	It is a connection between two or more computers.
4. What do you need to have on your computer system for searching anything on Google?	We require internet facility for searching anything on Google.
5. What do you know about internet?	Unsatisfactory response.

ANNOUNCEMENT OF THE TOPIC:-

After getting unsatisfactory response from students, Pupil-Teacher will announce the topic by saying, "Well, students, today we will learn about the concept of internet and its uses in details."

PRESENTATION OF TOPIC:

Pupil-Teacher will present the lesson with help of lecture-cum-demonstration method by using ICT. PowerPoint slides will be used by the pupil-teacher to present topic. Active participation of students will be there. PT will act as facilitator.

Teaching points/ content highlights	Pupil Teacher's Activity	Pupils' Activity	Teaching Aids/ ICT Resource
Internet **Uses of internet:-**	Pupil teacher will perform an activity for pupil participation. PT will tell students to make a circle by joining their hands and explain that as all of you have got connected to each other after joining your hands. In the same way, when for sharing purpose number of computers are connected to each other, it is called as internet information. Pupil teacher will use slides for explanation.	Pupils will participate actively and do the same. To understand the concept of internet, pupils will join their hands Pupils will linking the concept by positively respond to the activities Pupil will listen carefully.	
1.Bussiness **2.Hospital** **3.Science and Technology**	Pupil-Teacher will use slides to clear the main points and ask some questions Have you ever done online shopping? What do you see in this slide?	Pupils will observe the slides and listen carefully. Pupils will give the answer. Usually our parents do so.	

Teaching points/ content highlights	Pupil Teacher's Activity	Pupils' Activity	Teaching Aids/ ICT Resource
4.Bank **5.Education** **6.Reservation**	Do you get computerized slips or hand written slips in hospitals? Pupil-Teacher will give the mobile to a student and ask him to search for the names of satellite recently launched by ISRO.	It is a picture of Hospital Computerized slips. Pupil will search and answer the question that India launched 104 satellites in a single rocket on 15 February 2017. Pupils will listen and see carefully.	
	Pupil–Teacher will use slides to explain the different uses of internet in banks. How does a computer useful in completing your assignments? Pupil-Teacher will describe the use of internet in education. How do we book online movie tickets? Pupil teacher will use slides to explain it.	By the use of net surfing, Internet helps us to gather information. Pupils will listen carefully. We use internet in mobile and laptop. Students will listen carefully and actively participate.	

GENERALIZATION:

Pupil-Teacher will generalize the topic by saying that today we have learnt about internet and its multiple uses in different fields such as business, hospitals, education, reservation, science and technology.

RECAPITULATION

1. E-mail stands for…………….
2. Money can be transferred with the help of internet.
3. Database and information of hospital do not depend on internet.

4. Internet is
    a)   Local Area Network
    b)   Wide Area Network
3. Internet can be used in
    a)   Hospitals
    b)   Banks
    c)   Reservation
    d)   All the above

HOME ASSIGNMENT:

1. Make a visit to a bank with your parents and prepare the report on the uses of computer in a bank.
2. Download a video depicting the process of reservation of railway tickets booking from YouTube.

CHAPTER
ONLINE TESTING

It's an Internet era. Internet has made our lives simple and time saver. With the advancement in the technology system and with the growing length of 'Online World' everything has made its place online. From studies to meetings, from projects to reports, from exam to results, all the things can be done online. These Online testing are organised at various centers that are technically equipped. Computers have left behind the use of Pen and Paper with the arrival of online tests. Computer savvy students find it much easier to sit in-front of the system for on-screen testing. Top premier institutes have started the format of online examination. Starting from registration to payment for the exam can be done online.

Online Examination consists of mainly **MCQ (Multiple Choice Questions)** which provides an easy-to-use environment for preparing questions, conducting exams and managing results. Also, online testing are very cost effective as no expenses are incurred for printing or distribution of question papers. Candidates can take exams as per their convenience. Exam can be conducted in several geographically scattered locations at the same time. The candidate has the flexibility to choose the exam location and time.

Online testing has also emerged as a boon for the candidates with physical disability including hearing, visual, etc. Text can be presented in a variety of ways that enhance readability, making it easy for the needed candidates. Role of scribes has almost finished with the online exam system. Various input devices can be used to extend access to such students. Braille keyboards are available for those with vision problems

For the help of the students complete information related to exam instructions and steps is provided before the commencement of exam. Candidates can practice through the **Mock Tests** which are available online. The best advantage of *online testing* is that one can change the answer frequently at a click while in offline it is difficult to change your answer once you circle OMR with pen.

The question panel is clearly indicated on the computer screen which helps the candidates to easily understand the category and questions. Questions are shown in different colour schemes which indicate that which questions are answered, left unanswered or marked for review.

Online testing provides an advantage in scheduling of exam, because online tests can be administered in very less time than it takes to administer a paper test. People already engaged in full time jobs or classes find these online entrance exams easily accessible as the feasibility to take exam at the preferred location and instant availability of test scores gives them the opportunity to appear for the exam for the desired course. This fast and effective system of online testing is helping the aspiring candidates to understand their level of performance and decide their next step related to the course or career after taking the examination.

COMPONENTS OF ONLINE TESTING

An Assessment Engine: It deals with hardware and software. Software is to create and deliver a test. Various software packages are available in market. An assessment engine uses the item bank to generate a test.

An Item Bank: Software package does not contain questions and it is provided by an item bank. An item bank is for repository of test items that belongs to a testing program as well as all information pertaining to those items. Items in online testing are of multiple choice questions, matching, checking the correct item in correct place, checking the correct word.

Flash, videos and images makes the test styles more interactive. Students are provided with Username and password. After typing at appropriate places, they click on login button. Online test will be displayed. After doing the test, they submit the answers and get immediate knowledge of the result.

Username :

Password :

Remember Me:

ADVANTAGES OF ONLINE TESTING

An online testing has plenty of advantages:

1.   It saves paper. You never have to print an exam for your students and hand them out. Saves paper. Saves trees. Everybody happy.

2.   It saves time. You can setup an exam in such a way that it will auto-grade itself. If you only use multiple choice questions you never have to check an exam again. The online exam system will take care of that hassle. Completely automated.

3.   It saves more time. The distribution of the exam does not take you any time. Just upload the email addressess of your students and send them an invite. And after the exam they get their result instantly.

4.   It saves money. You don't need to buy any paper. Sending an email is free. On top of that you save on the logistics: students don't have to assemble in classroom to take the exam. They can do it within a given time frame from their own device. You don't have to rent a classroom. You don't have to hire someone to check the students taking the exam.

5.   It saves the student money. Students don't have to travel to a specific location to conduct the exam. So even for students from remote area's it's possible to take the exam.

6.   It's more secure. You can make a big question bank with a lot of questions. Every student gets a random selection from that question bank. So it's of little use to share the questions among the exam takers to give them a head start.

7.   Immediate Feedback: It provides instant and detailed feedback (results) after the exam.

8.   Overcome Language constraints: This **online testing** has overcome the language constraints as candidate has the facility of taking exam in multiple languages which benefits the performance of the candidate.

9.   Enhanced interactivity: Different question styles and repetition of online test as

frequently as desired by the learner enhanced interactivity and aids learner learning. Teachers can mix and match the question styles in examination, including graphics and make them more interactive than paper examination.

10.   Reduce burden of teacher: It reduces workload of the teacher. It simplifies the testing process, checking and paper work.

11.   More Reliable: Machine marking is much more reliable than human being.

12.   Impartial: Machine marking does not know the students so it neither favors students not make allowances for minor errors.

13.   Highly Individualised: Online testing is highly individualized. Learner can proceed at his own pace.

DISADVANTAGES OF ONLINE TESTING

1.   Costly: The creation of item bank is more costly and time consuming then the installation and configuration of the assessment engine.

2.   Connectivity Problem: There is possibility of dropping a student's Internet connection either in a school lab or at home at any time for various reasons. Sometimes connections time out with inactivity. In those cases, students may have to open second browser windows and remember to reload pages occasionally.

3.   Chance of Cheating: You have to keep in mind that your students will take the exam on their own device in their own time with nobody to check up on them, so you have to alter your questions to provide for this situation. You have to ask questions which are not easily to be retrieved from books or the internet. Or you can add a timer to each question so there will no time to search for the answer.

4.   Lack of human touch: Students who need a social change may struggle with the concept of online education.

5.   Needs technical skills: It needs technical skills.

6.   No order for higher order skills: It is not suitable for testing higher order skills.

7.   Open text questions are possible, but they don't auto-grade, so you have to check them yourself.

8.   An element of Fraud : An online exam system is a little bit more susceptible for fraud. So you have to keep that in mind if you setup your exam. Do you want to share the results immediately after the result? In that case you can setup a question bank to solve the issue of fraud. Handing out all questions & Answers of a question bank to students is ok. Because they have to learnt all the questions & answers by heart. And when they're done they master the material.

CHAPTER 26
TEXT BOOKS

TEXT BOOKS

Text books occupies a very important role in the teaching of computer science. A textbook is a prescribed book for the students of particular age groups. Textbooks form the basis of teaching learning in the class. These are the most important tool in the hands of the teacher. Textbook has been defined as an instrument of instruction that facilitates teaching learning process. All the material in the text book of computer science is planned according to the mental ability of students. Computer science textbook is designed on the based of modern technology. The teacher should take care of its utilization for the maximum learning outcomes of the students.

DEFINITIONS OF TEXTBOOKS

Webster's Dictionary,' A textbook is any manual of instruction, a book containing a presentation of the principles of the subject used as a basis of instruction."

Douglas," The teacher and textbooks make the school."

P.C. Hill,' A text book ought not to be used as a collection of fats to be learned by heart but rather as a store house of basic information which pupil can use in a variety of active ways."

Keating," text book is a basic instrument of teaching."

Oxford Dictionary," A book used as a standard work for the study of a particular subject, a manual of instructions in a subject of study."

Encyclopedia America," Text book is a book that presents a body of knowledge in an organized and usually simplified manner for purpose of learning. Text book is frequently the most important teaching tool because it can determine not only what will be taught but also how it will be taught."

Hall and Clifford," Text book is a record of thinking organized for instructional purpose."

Bacon Paul," Text book designed for classroom use, carefully prepared by experts in the field and equipped with the usual teaching devices."

Paul Eauge," A text book is a standard book for any branch of study."

NEED AND IMPORTANCE OF TEXT BOOK IN COMPUTER SCIENCE

Good text books play an important role in the field of education. They are helpful for both teacher as well as students. Text book play a dominant role in present days in teaching and learning of computer science. What is to be taught and learnt in particular class is entirely based on the prescribed text book.

Education commission Report remarked." A good text book written by a qualified and competent specialist, in the subject, and produced with due regard to quality of printing, able illustrations and

general set up, stimulates the pupil's interests and help the teacher considerably in his work."

Text book is an important aid to teaching as well as learning. The importance of text book can be seen from the following points:

1. **Source of Knowledge:** A text book provides knowledge about the subject matter related to the subject of computer science. It present the synthesis of material borrowed from many sources. It embodies knowledge worked over by master minds.

2. **Save time and energy**: The relevant material concerning the syllabus of the class is readily available. It guides the teacher about the boundaries and limits of is teaching in the class. Thus, the time and energy is saved. On the other hand the students can save their time and energy as it acts as complement to the class work.

3. **Overcome classroom limitations**: A good text book removes the worries of the students and teacher to finish the syllabus in the prescribed time also. It also overcome the limitation of availability of material, instruction programmes and illustrations.

4. **Helpful in Planning:** The text book is divided into unit, sub units, chapters and topics and they are properly sequenced. It also helps in finding out new ideas. The teacher can plan for day, week, month and year using text book. The teacher can give different assignment to the students and organize different activities in the classroom and outside.

5. **Meets the needs of the students**: It becomes difficult for the teacher to cater to the needs of all types of students. Text books help in meeting the requirements of slow, average and fast learners. It meets the requirements by use of simple language, headings, questions, assignments, programmes and commands.

6. **Needed for self-study:** The text book are available to the students in school, class, home, library et. The students can use whenever they want . They need not to wait for the class teacher. Their study is not delimited to time table hours.

7. **Help in pre-preparartion:** Text books provide the material before hand. They help a teacher before going to class, students before examinations tests etc. They are also available to the students when the teacher is not present.

8. **Help in Illustration:** Text books of computer science present illustrative examples concerning various topics, hardware, software etc. It makes the task of teacher and students easy as both get related examples from text books. There are certain concept in computer science which can be understood by examples only.

9. **Treasure of Answers:** Text books act as a treasure of the answers of problems in computer science. They also give suggestions for projects, experiments, programmes and solutions etc. All these things help a teacher and students a lot.

10. **Uniformity of Standards:** Text books help in maintaining uniformity of standards. This helps in serving the purpose of uniform and common education. It also ensues uniformity in examination and evaluation of students.

CHARACTERISTICS OF A TEXT BOOK

The text book helps the teacher in many ways. It helps to know what the teacher has to teach. It helps the teacher to revise what has been taught to them in the classroom. Only good text books can

do all this. All this is due to the fact that good text books have certain characteristics which equip the books with qualities. A good text book of computer science has following characteristics in it.

1. **Tool for achieving instructional Objectives**: A good text book serves as a tool for achieving instructional objectives of computer science. The teacher get the objectives from the text book instructions. He comes to know why he has to teach.

2. **Mannual for instructions:** A good text book is a manual for instructions. Text book does not give only the content or the subject matter for each time of study.

3. **Source of stimulation:** Good text books act as a source of stimulation for the students of computer. They get motivation when they read the work which can be done with help of computer.

4. **Logical Arrangement**: The subject matter presented in good text book is systematically and logically arranged. The teacher needs not to rearrange it. The arrangement is according to psychological needs of the students.

5. **Knowledge at Single Place:** Good text books of computer science provide the knowledge in integrated form. The teacher and student need not to rush here and there for searching knowledge. The knowledge given can be of both theory and practical work in computer.

6. **A Teaching Instrument:** Good text books act as learning instruments to the teacher. The teachers get guidance, aims, objectives, methods and other instructions from the text book before going to the class for actual teaching.

7. **Act as Learning Instrument**: Good text books act as learning instruments for the students. The students get a lot of information and knowledge from them. They also get verified the information given by the teacher.

8. **Cover Syllabus:** A good text book of computer cover all the syllabus required for particular class. It provide all the content or subject matter required at that stage of learning.

9. **Useful in formal and informal Education**: Good text books are not only useful in formal education but also in informal education. In fact they provide more guidance in informal education where there is no one to guide.

10. **Make learning individualized**: Good text books helps the students according to their abilities. The students interpret the book according to their abilities fast and slow interpretation. Thus each student study as its own pace. Thus learning gets individualized.

11. **Base for practical work**: Good text books provides base for the practical work. In computer, students get many ideas from where they can have the problems for the practical. Also the text books provide guidance for solution of problems.

12. **Ready made experience**: Good text books are written by scholars and experienced persons. They provide the conclusions of their experience in unified form, the experience which has no comparison. Thus text books provide the experience without any experience to the students.

13. **Directions for Future Problems**: Computer has an endless ocean of problems. The good text books provide a direction for the problems which can come in student life related to computer. Thus students have the experience of future in their present.

14. **Awake Intellectual curiosity**: The good text books are so written that they awake intellectual curiosity of the students and also they keep the interest of students in computer alive.

The books attract the students to learn more and more and do more practical work in computer.

15. **Illustrated Learning**: Good text books provide a lot of examples for practical work. Thus they help to make learning with the help of illustrations. The illustrations further develop many qualities such as comparison, analyses.

CRITERIA FOR SELECTION OF COMPUTER SCIENCE TEXT BOOKS

A good text books has certain qualities in it. The qualities, infact, make a text book good. There is always a need of good books in computer. So we now proceed to see what should be the qualities of a good text book.

In words of Kothari Education Commission," A good text book written by a qualified and competent specialist in the subject and produced with due regards of printing, illustrations and general get up, stimulates the pupils interest and help the teacher considerably in his work."

A Text Book Is Said To Be Good If It Contains Certain Qualities.

The qualities of the text book of computer can be divided into two categories.

1. External Qualities
2. Internal Qualities

1. External Qualities:

External qualities are related to external view of the book. These deals with format, size, binding, printing etc. A good text book should have following external qualities.

(i) **Size of book:** The size of book depends upon one's attitude as to its proper function. Those who want logical outline syllabus or guides require only small books. Generally, the size of book should not be too small or too large. It should be convenient in handling and carrying.

(ii) **Printing of book:** The outlook of the book should be good and it depends on its printing. It should be neat and clean, free from all the errors. The spacing between the words, lines, paragraphs should be proper.

(iii) **Paper Used:** A book is for ever. It should not damage with time. The major physical loss of book is that of paper. So the paper used in the text book should be of good quality i.e. adequately thick, durable and smooth.

(iv) **Binding of Book:** The external binding of the book should be durable, attractive and string. As beautifully served food attracts the eater so as an attractive book attracts the students to read. The binding play a good role in attracting the students. It also saves the book from being damaged.

(v) **Price:** The price of the book should be within the reach of the students. It should be suitable in view of the economical background of the students. It should be suitable keeping in view the printing layout, size and durability of the book.

(vi) **Availability:** The availability is another quality. The book should be in sufficient number in the market, so that the students can buy the book easily and can read the book in time.

2. Internal Qualities

Internal qualities are the qualities which are related to software part of the book. These are related to language, illustrations, style, subject matter etc. These qualities differ from subject to

subject. In computer these are elated to theory and practical book. However both qualities are interrelated. So they are discussed in combination.

(i)   **Table of Content:** The table of content is supposed to indicate the scope and organization of whole book. It should have a logical outline, one that shows the space developed to the major divisions and to the important minor divisons.

(ii)   **Title Page:** The title page is supposed to convey some idea of its specific quality. It furnishes the full name of the book. It should give complete information related to the publisher and author of the book.

(iii)   **Objective Based:** Every subject has certain objectives. So as computer, a text book should be according to the objectives of computer teaching, content should be according to the objectives. It should cover all the syllabus. Content should be accurate, authentic and reliable.

(iv) **Text book style:** Text book should be written in excellent style. Sentence length should be proper. The heading should be attractive and interpretative. The main heading should be accompanied by brief, logical and condensed heading

(v)   **Vocabulary and Language**: A student can learn frequently a new concept by means of new word as early as he can expand the meaning of a familiar word. The introduction of new words may actually simplify a paragraph, provided that they are used in such a way as to reveal their meaning. A text book of computer should increase vocabulary in computer.

(vi) **Well Illustrated:** A computer text book should be well illustrated, have variety of pictures, tables, diagrams. Pictures can be the integral part of computer teaching. If they are judiciously selected, properly placed with respect to material and skillfully utilized, they furnish an effective teaching and learning aid. Pictures help a lot in understanding the hardware of computer.

(vii)   **Subject Matter:** Computer is a dynamic subject. It is changing every second. The subject matter should be upto date, adequate and integrated form. There should be continuity in the subject matter. It should be linked to the real life of student. The content should be accurate, authentic and adequate in quality.

(viii)   **Suggest methodology:** The application of content should be given i.e. the methodology should be specified in the book. Computer is a theoretical as well as practical subject so both type of methodologies are used. There should be specification of all types of methodology for the topic, according to the topic.

(ix)   **Well organization of content:** Any book is for the students. It should present content according to their abilities. There are many principles and maxims for the purpose. Content can be in logical, psychological, simple to complex, arrangement etc. So, organization should be according to the abilities of student who are going to use it.

(x)   **Adequate Exercise:** Text books should provide adequate exercise for the students. The exercise should not be theoretical in nature. For the practical books the exercise should be practical. It should fulfill the objectives of that particular topic. Small and large programs can be given for exercise.

(xi)   **Child Centered:** A text book is made for the students. It should be according to their needs and abilities. The content, methods, pictures, illustrations all should be according to the students. The problems, content should be according to the level of the students.

(xii)   **Well Appendices:** A text book should contain appendices. It should contain the detailed syntax, abbreviation etc, which can help the students in understanding the content of the text book.