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FOUNDATION COURSE IN IT
H-303

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UNIT
1

INTRODUCTION TO COMPUTER & ITS ORGANIZATION

STRUCTURE

➤ Computer Application

➤ Characteristics of Computer

➤ Evolution of Computing Machines

➤ Generations of Computers

➤ Computer's Basic Function

➤ Hardware Organization of a Computer

➤ Computer As a System

   ✿ Summary

   ✿ Test Yourself

LEARNING OBJECTIVES

After going through this unit you will learn :

➤ Basics of computer i.e., its characteristics, applications, functions

➤ *How did computers came into existence*

➤ The organization of hardware units of computer

We live in a computer-oriented society, and we are constantly bombarded with a multitude of terms relating to computers. So it is necessary to understand what the computer is :

The word "computer" comes from the word "compute" which means to calculate. So a computer is normally considered as a calculating device that performs the different operations at an enormous speed. More accurately, a computer may be defined as "a device which takes the input from the user and process this input according to the instructions provided to it and then it produces the desired output."

✦ 1.1. COMPUTER APPLICATION

The computer are now affecting every sphere of human activity and bringing about many changes in the industry, government, education, medicine, scientific research, law, social sciences and even in arts like music and painting. They are presently used, among other applications, to

(1) Design buildings, bridges and machines.

(2) Control inventories to minimize material cost.

(3) Aid in reaching.

(4) Grade examination and process results.

(5) Control space vehicles.

(6) Assist in Railways, Airline reservation.

(7) Systematically store and quickly retrieve data on crimes and criminals.

(8) On-line shopping and banking.

(9) Play games like chess video games.

The areas of application of computers are confined only by limitations on human creativity and imagination. In fact any task that can be carried out systematically, using a precise step-by-step method. can be performed by a computer.

✧ 1.2. CHARACTERISTICS OF COMPUTER

A computer may be thought of as a servant who would carry out instructions obediently, uncritically, at a very high speed, and without exhibiting any emotions. So the main characteristics of a computer are as follows:

1. Speed. The computers work at very fast speed. The computers work at speeds millions and even billions, of times faster than human beings can. For example, many of today's personal computers can perform hundreds of millions of additions per second. Today, the world's fastest supercomputer can perform hundreds of billions of additions per second, and computers that perform trillion instructions per second are already functioning in research laboratories.

2. Accuracy. The accuracy of a computer is consistently high and the degree of accuracy of a particular computer depends upon its design. Errors can occur in a computer, but these are mainly due to human rather than technological weakness, *i.e.*, due to imprecise thinking by the programmer* or due to inaccurate data.

3. Power of Remembering. As a human being acquires new knowledge, the brain subconsciously selects what it feels to be important and worth retaining in its memory, and relegates unimportant details to the back of the mind or just forgets them. With computers this is not the case. A computer can store and recall any amount of information because of its secondary storage. Every piece of information can be retained as long as desired by the user can be recalled as and when required.

4. Diligence. Unlike human beings, A computer is free from monotony, tiredness, lack of concentration, etc. and hence can work for hours together without creating any error and without grumbling. Due to this property, computers obviously score over human beings in doing routine types of jobs which require great accuracy.

5. Versatility. Versatility is one of the most wonderful things about the computer. One moment it is preparing the results of particular examination, the next moment it is busy preparing the water bills, and in between, it may be helping the user to search any file in seconds. i.e in a way a computer is capable of computing, processing, designing, etc. and that too all at the same time. Briefly, a computer is capable of performing almost any task provided that the task can be reduced to a series of logical steps.

6. No I.Q. The computer can only perform the tasks that a human being can. The difference is that it performs these tasks with fast speed and accuracy. It possesses no intelligence of its own. Its I.Q. is zero. It has to be told what to do and in what sequence. Hence only the users can determine what tasks a computer will perform. A computer can not take its own decision in this regard.

✧ 1.3. EVOLUTION OF COMPUTING MACHINES

The first computing instrument known as ABACUS [also known as "soroban"] was developed in 400 B.C. while the first mechanical computer was developed by Blaise Pascal in 1640. The Blaise Pascal's computing machine was based on the wheels and was used for the addition and subtraction of numbers. In 1971 Leibnitz developed a mechanical calculator while in 1822 Babbage developed the difference engine. These devices led to the development of present day computers. The development of computer known as MARK-1, marked the sterling computer generations.

In 1836 Augusta Ada Byron became the first programmer when he programmed 'Babbage'. Analytical Engine. The major break though in the field of software was in 1965 when John Kemeny and Thomas Kurtz introduced the programming language BASIC. In 1981 IBM introduced its first PC and in 1984 the first Macintosh computer "MAC" came with graphic interface. Then in 1985 Microsoft introduced the Window 1.01. In 1992 Microsoft introduced Windows 3.1, which becomes very popular and leave other far behind.

The early computing machines were also able to perform restricted arithmetic computation like addition, subtraction, multiplication and division of numbers. Most of the early computing machines were mechanical. In fact, in the mechanical computers the user has to compute the basic arithmetic operations and

no programmer is required for this. After the invention of Electronic Valves in 1940 the era of electronic computing was started. Now at present the computers are the general purpose machines which process the data according to the set of instruction provided to it. These set of instructions according to which the computer performs operations known as program. The computer can store this program in memory. So we can say that a computer is a programmable computing machine. The computers perform the three main processing functions, namely, calculation, copy and comparison.

The basic technology for the computers generation was started with the computers using the electrical relay and the switching circuits. After this the electronic digital computers came into existence. They are characterized by the switching circuit they used. The output of the digital computers is digital. But the data in the outside world is analog so before processing the data these computers converts the data into binary form and after processing they convert them from binary to user understanding form.

The first general purpose digital computer was called ENIAC (Electronic Numerical Integrator and Calculator). Because of its big size this machine was not popular. The main brain behind the development of ENIAC was of John Van Neuman. In ENIAC the data and programs stored in different memories. John Von Neumen give the concept of stored. program concept. According to this the computer can store the instructions and during execution they can call the instruction to process the data. The computer's ability of copying instructions into its memory from a disc, tape or other sources before any data is processed is referred to as the computer's copying ability. This copying ability also enables computers to directly start the processing of the first instruction in the program. By program was mean the set of instructions that are to be followed in a sequence, that is, one after the other. The modern computers are able to perform number of instructions over and over again on the same set of data or on a new set of data. Today's computers also allows that if a program is waiting for some data then in this time it can execute the other programs for which the data is available. As the technology is changing at a rapid speed similarly the computer too has undergone several generations with truly amazing features.

❖ 1.4. GENERATIONS OF COMPUTERS

The term "computer generation" is widely used particularly by the sales personnel of computer manufacturers. Most often it is used in relation to the hardware of computers. But now it includes both hardware and software. Upto now we have five generations of computers as follows :

First Generation. This generation starts with the evolution of ENIAC (Electronic Numerical Integrator and Calculator) in 1946. ENIAC uses high speed vacuum tube switching devices and has very small memory. With introduction of concept of stored program, Professor Maurice Wilkes design the computer known as EDSAC (Electronic Delay Storage Automatic Calculator) in 1949. EDSAC used mercury delay line for storage. The commercial production of stored program electronic was start with the UNIVACI (built by Division of Remington Rand) in 1951. This computer also used vacuum tubes. The computer programming for the first generation computers was mainly done in machine language. The generation computers have advantage of using vacuum tubes which were the only electronic components available at that time. These computers, were the fastest calculating device of that time. The first generation computers has lots of problems which includes their bulky size, unreliability, nonportability, use of assembly language, limited commercial use and so on.

Second Generation. This generation of computers came into existence after the invention of transistor by Bardeen, Brattain and Schockley in 1946. The transistors require less space and less power compared to the vacuum tubes used at that time. The span of second generation commuters is from 1955 to 1965. The another major event of this period was the invention of magnetic cores for storage. The high level language like Fortran, Cobol, advent of magnetic tape and disk storage, operating systems were developed. Good batch operating systems, particularly the one on IBM 7000 series computers emerged during this generation.

The computer of this generation were smaller in size as compared to the first generation computers. They were more reliable and generate less heat. The computation time is also reduced for these computers and they have better portability and commercial use. But these computers has the problem of frequent maintenance requirement, manual assembly of individual components into a functioning unit and their commercial production was also difficult and costly.

Third Generation. The third generation starts from 1965 when germanium transistors were replaced by silicon transistors. The major development of this period was the introduction of integrated circuit (IC). Integrated circuit has number of transistors on a single chips. This generation computers use Small Scale Integration (SSI) and Medium Scale Integration (MSI) technologies. The SSI has nearly 10 transistors per chip while the MSI has 100 transistors (nearly) per chip. This technology required less space and less power. The processing of this generation computers were fast. The another development was the improvement in the design of magnetic core memories. The size of main memory reached to 4 Megabytes. The high level language were also improved. Fortran IV and optimizing Fortran compilers were developed. The COBOL 68 was standardized by the American National Standards Institute (ANSI). PL/1 of IBM emerged and was quite a powerful language. This generation last upto 1975. The main advantage of this generation computers were smaller size as compared to the previous ones, more reliable, fast computation, lower maintenance cost, easily portable, less power requirement, and commercial production was easier and cheaper. The drawback of this generation computers are requirement of cooling and highly sophisticated technology for the manufacturing of IC chips.

Fourth Generation. This generation of computers marked the introduction of the microprocessor chip. It became possible to fabricated the whole Central Processing Unit (CPU) on a single chip which called microprocessor. This became possible because of the introduction of LSI (Large scale integration) and after this VLSI (Very Large Scale Integration). The VLSI makes it possible to fabricate more than fifty thousand transistors on a chip. Because of the introduction of microprocessor the powerful personal computers comes into the market. The cost of the computers go down compared to the previous ones. The memory of this generation of computers became very large. The microprocessors such as Pentium, power PC, and so on are being used as the CPU of portable lap top and palm held computers. During this generation the computer networks became very important. The Fiber Optic Local Area Network are capable of transmitting 100 MB/sec. To 1 GB/sec. (MB-Megabytes, GB-Gegabyte). A significant development in software was the development of concurrent programming language. The most ambitious language of this generation was ADA. This generation also mark the arrival of C, C++, PROLOG and so on. This generation computers has the advantage of smaller size, very reliable, heating is minimal, easily portable, easy to operate, and cheapest among all generation.

The table 1.1 shows the comparison between the first four generation of computers.

Table 1.1. Comparison between the generation of computers

S. No.	1st Generation computers	2nd generation computers	3rd generation computers	4th generation computers
1.	Use of vacuum tubes	Use of transistors and diodes	Use of integrated circuits	Use of large scale and very large scale integrated (VLSI) circuits
2.	Limited storage capacity	Increased storage capacity	More flexibility with input/output	Increased storage
3.	Slow speed	Faster speed	Smaller size and better performance	Considerably faster and smaller
4.	Symbolic language programming Huge size	Reduction in size and heat generation	Extensive use of high level programming languages	Modular design, versatility and compatibility
5.	Problem of over heating	High level programming language (COBOL, FORTRAN)	Remote processing and time sharing	Sophisticated programs and languages for special applications

Fifth Generation. This generation started with major innovations in computer architecture like parallel processing, intelligent programming and application of Artificial Intelligence and knowledge base systems.

The introduction of ULSI (Ultra Scale Integration) has made it possible to have the fastest microprocessor with the clock speed ranging from 100 MHz to 1GHz.

This generation starts in 1994 and still continues. Voice recognition, language translation, speech processing, multimedia application, video database, artificial intelligence capabilities are the major characteristics of this generation.

❖ 1.5. COMPUTER'S BASIC FUNCTION

All the computer systems perform the following four basic functions :

(i) Data processing

(ii) Data storage

(iii) Data movement (Input and Output)

(iv) Control.

The **Data processing** here refer to the performing the arithmetic operations or logical operations (like comparisons) on the data to produce the useful information from the data.

The **Data storage** refers to the storing the data. The computers must store the data and instructions so that they will be available not only during processing but also for the further processing if needed.

The **Data movement** refers to the movement of data input and data output when data are received from or delivered to a device that is directly connected to the computer, the process is known as input-output (I/O), and the device is referred to as a peripheral. The data movement is necessary to make computer more flexible for the use of users.

The **control** function refers to the controlling of all the above three functions (*i.e.,* Data processing, Data storage and Data movements). Ultimately this control is exercised by the individuals, who provides the computers with instructions.

❖ 1.6. HARDWARE ORGANIZATION OF A COMPUTER

The basic organization or the block diagram of a computer is shown in Fig. 1.1.

Various hardware parts performing some operation are collectively calls UNIT. As shown in Fig. 1.1, the following are the main functional units of a computer.

(1) Input unit

(2) Output unit

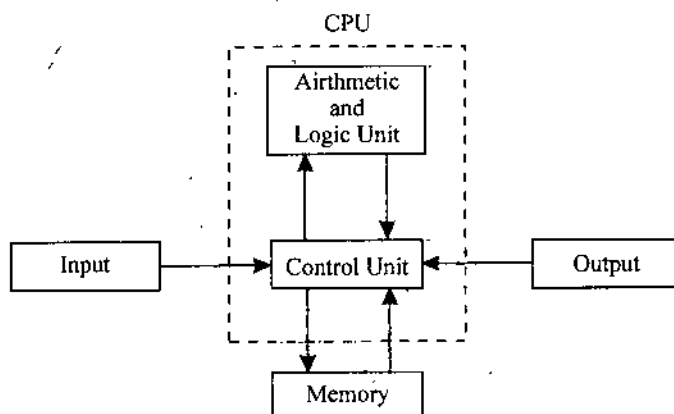(3) Memory unit

(4) Central Processing Unit (CPU).

Fig. 1.1: Block Diagram of a Computer

1.6.1. Input Unit

To perform any type of computation on any type of data, the data and instructions must be entered into the computer system. And this task is performed by input unit. The input unit as shown in Fig. 2.1 represent

the various input devices which are used to input the real word data into the computer. the function of the input unit is to accept coded information from the human operator or from an electro mechanical device or from other computers connected to it through the internet or by any other media. The input devices convert the human data into the form which is acceptable by the computers. Keyboard, mouse, scanners are examples of input device.

1.6.2. Output Unit

The job of the output unit is just opposite to the job of the input unit. The output unit is used to represent the information processed by computer. The purpose of the output unit is to store the processed information and display this information and display this information when it is needed by the user. The computers perform all the operation on the binary data. So whatever, the input is provided to the computer it is first converted to the binary form then the computers perform the operations on it. So the result of the operations is also in the binary form. The output unit also responsible for converting this information into the human readable form Cathode Ray tube (CRT) and printers are example of output devices. In fact, input and output equipment, is usually combined under the term input-output unit. The simplest example is cathode-ray tube (CRT) terminal, consisting of a keyboard for input and a CRT display for output. However the input and output functions are separated within the terminal. Thus the computer sees it as distinct from each other but human sees it is being one of the same unit.

1.6.3. Memory Unit

The memory of a computer is analogous to a notebook where we may note down various things or future reference. Memory unit is also known as storage unit, and its function is to store coded form of information from the human operator through the input device or from other computers connected to it. The computer's memory is consists of a large number of storage spaces known as **cells** or **locations,** which are organised into units of bytes, each comprising 8 bits. No matter what kind of information is being stored, it is coded in some particular form of bits, which is interpreted in a way that is appropriate to the kind of data. The same memory bytes are used to record program instruction codes, numeric or alphabetic data. The information stored in memory may be used immediately or it can be kept for later reference for processing by CPU. The memory can be classified into the following two categories :

(1) Main Memory. It is also known as primary storage. It is used to hold data and instructions after input, **until** needed. It also hold information awaiting output. The instructions, provided by programmers, will specify the action to be taken on the data.

(2) Auxiliary Memory. It is also known as **secondary memory** or **Backing storage.** The main purpose of it to supplement main storage. It is used to store large amounts of data or instructions permanently. This type of memory is much cheaper than main memory. The example of this memory includes—Magnetic tape, Hard disk, Floppy disk and so on.

1.6.4. Central Processing Unit

The CPU is the brain of the computer where all kinds of processing is done. This unit takes the input data from the input device and process it according the instructions provided by the programmer. The result of the processed data. *i.e.,* output, is send to the output unit so that it can be used by the outside world. The major function of the CPU is to store the data temporarily in the registers and perform arithmetic and logical. This unit also control the operation of all the other function units *i.e.,* memory, input and output unit. The CPU is internally divided into two parts–Arithmetic logic unit and Control unit.

(1) Arithmetic Logic Unit (ALU). This unit responsible for carrying two types of operations :

(a) The arithmetical operations on the data, which includes addition, subtraction, multiplication, division of one set of data by another set of data. It also supports the operations like increment, decrement and shift operations.

(b) The logical operations often known by comparing (decisions) by using AND, OR, NOT and exclusive OR operation which is done by analyzing and evaluating data by matching it with a set of known data that are included in the program or called from the memory. The logical operations or comparison can be of type less than, equal to or greater than.

(2) Control Unit (CU). This unit is mainly used for generating the electronic control signals for the synchronization of various operations. All the related functions for program execution such as memory read, memory write, I/O (Input/output) read, I/O write, execution of instruction are synchronized through the control signals generated by the control unit. It controls all the operations of the computer. Because of the control unit the input device known that it is time to send the data into the memory, the ALU take the decision what to do on the data after receiving and how the final results will be send to the output device.

❖ 1.7. COMPUTER AS A SYSTEM

A system is a collection of different parts, which works together to achieve some objective. So the system's generally have following three characteristics:

(a) A system has more than one element (parts).

(b) All the different parts (elements) of a system are logically related.

(c) All the parts (elements) of the system work together in such a way so that they can achieve the system objective.

As the computer is made up of different parts/components like input device, output device, memory and CPU; which work together to perform different steps during the execution of a program, so computer is a system. The input unit and output unit cannot function until they receive the control signals from the CPU (in particular control unit). The memory or the CPU (both ALU and CU) alone is useless. In computers the usefulness of each unit depends on the other units, to the proper operations of the computer is realized only *when all units work together as a system.*

Summary

➤ A computer is an electronic device which takes the input from the user and produces the desired output.

➤ Various characteristics of a computer are speed, accuracy, reliability, versatility storage capacity, No I.Q., etc.

➤ First computing machine was developed by Blaise Pascal known as ABACUS.

➤ Charles Babbage is known as the father of modern computing.

➤ The basic technology for the computers generation was started with the computers using the electrical relay and the switching circuits. After this the electronic digital computers came into existence.

➤ Till date the evolution of computers has passed through four generations with evolvements in both hardware and software, the ongoing generation is the fifth generation which is mainly based on developing artificial intelligence and knowledge based systems.

➤ Basic functions of computer are Data processing, Data storage, Data movement (Input and Output) and Control.

➤ Main functional units of a computer are input unit, output unit, memory unit and central processing unit (it comprises of control unit and arithmetic and logic unit)

TEST YOURSELF

[A] Choose the most appropriate answer among the given options :

1. One of the characteristics of computer is
   (a) Designing
   (b) Calculating
   (c) No. I.Q.
   (d) Playing games

2. Vacuum tubes were used in
   (a) First generation
   (b) Second generation
   (c) Third generation
   (d) Fourth generation

3. Integrated circuits were used in
   - (a) First generation
   - (b) Second generation
   - (c) Third generation
   - (d) Fourth generation

4. Transistors and Diodes where used in
   - (a) first generation
   - (b) second generation
   - (c) third generation
   - (d) fourth generation

5. The first computing machine was known as :
   - (a) soroban
   - (b) Mark I
   - (c) Pascal
   - (d) Analytical Engine

6. The first general purpose digital computer was called
   - (a) ENIAL
   - (b) Mark I
   - (c) EDSAC
   - (d) UNIVAC

7. Electronic Relays and switching devices were used in :
   - (a) first generation
   - (b) second generation
   - (c) fourth generation
   - (d) third generation

8. High level languages came into use in
   - (a) first generation
   - (b) second generation
   - (c) third generation
   - (d) fourth generation

9. Languages like FORTRAN and COBOL were developed in
   - (a) first generation
   - (b) second generation
   - (c) Third generation
   - (d) fourth generation

10. Languages like ADA, C, C++ were developed in
    - (a) first generation
    - (b) second generation
    - (c) third generation
    - (d) fourth generation

11. Computers memory consists of large number of storage spaces known as
    - (a) Bytes
    - (b) Cells
    - (c) Unit
    - (d) specs

12. Control unit is a part of
    - (a) CPU
    - (b) Memory Unit
    - (c) Input Unit
    - (d) Output Unit

13. Auxillary Memory is also referred to as
    - (a) secondary memory
    - (b) main memory
    - (c) primary memory
    - (d) volatile memory

14. Data processing perfers to
    - (a) gathering data
    - (b) displaying data
    - (c) Performing operations
    - (d) storing data

15. A computer is referred to as system because
    - (a) It has more than 1 part
    - (b) All its parts are logically connected
    - (c) all the parts work together to produce desired result
    - (d) All the above

[B] Long Answer Questions

1. What is a computer? Define.
2. Write the different computer applications.
3. What are the characteristics of the computer ?

4. What is the meaning of generation in computer terminology ? How many generations are their till now?

5. What is the meaning of term computer architecture ?

6. Compare the different computer generations?

7. What do you understand by the term computer organization ?

8. What is the difference between computer architecture and computer organization ?

9. What are the basic function of the computer ? Explain.

10. Draw the block diagram of the computer and explain the different functional units.

11. What is main memory and auxiliary memory ?

12. Write short note on the use of CPU in the computer system.

13. What is the difference between input unit and output unit ?

14. Why control unit is required inside the computer ?

15. What is the role of memory in computers? Explain.

ANSWERS

1. c 2. a 3. c 4. 5. a 6. a 7. a 8. b 9. b 10 d 11. b 12. a 13. a 14. c 15. d

❑❑❑

UNIT
2

INPUT AND OUTPUT DEVICE AND MEMORY UNIT

STRUCTURE

➤ *Input Devices*
➤ Output Devices
➤ Memory Hierarchy
✿ Summary
✿ Test Yourself

LEARNING OBJECTIVES

After going through this unit you will learn :

➤ What are Input devices and various types of Input devices
➤ What are Output devices and various types of Output devices
➤ Organization of computer's memory

One of the main tasks of the computer is to process the data. For performing the processing on the user provided data the computers must be able to receive the data from the user and after completing the processing the result should be produced to the user. To perform these task the computers have the Input and Output units. The input and output units of a computer are normally abbreviated as I/O units.

To process any type of data by using the computers it must be first converted to a form which can be understand by the input unit of the computer. This form is known as the machine readable form. The data in the machine readable form is read by an input unit, transformed to the appropriate internal code and stored in the computer's memory. After the processing is complete the data is send to the output unit in internal form. The output unit after receiving this data converts it into the human understandable form. Figure 2.1 shows the various states in data transformation.
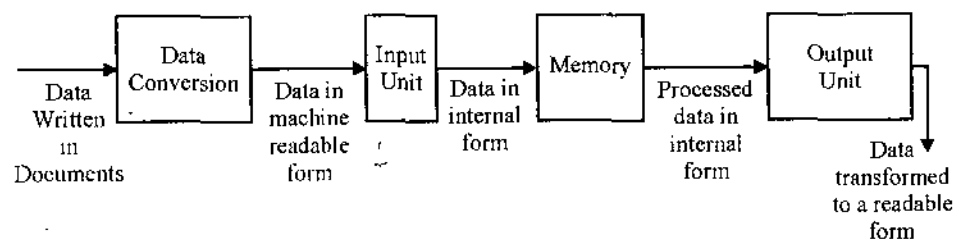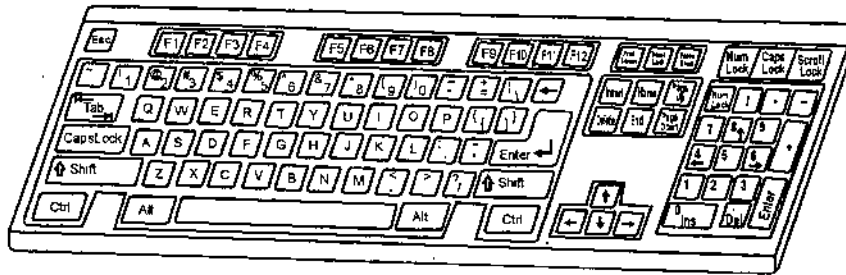

✦ 2.1. IINPUT DEVICES

Input devices are used to enter the command, program, images as well as the devices, which are used to control various operations related to the games and graphics etc. An input device converts input data and instructions into the binary form so that the computer can accept that. The most commonly used input device is a keyboard. A number of other input devices have also been developed which do not require typing for inputting information. Some major input devices are as follows :

(a) Keyboard   (b) Mouse
(c) Scanner   (d) Voice input unit

2.1.1. Keyboard

This is the most popular and common input device for entering textual commands data and programs to the digital computer. The keyboard is similar to the keyboard of a typewriter. The keyboard contains three types of keys: first set for each alphabet and numerals; second set for various special characters; and the third set of key's are the special purpose keys known as function key s. When a key is pressed an electronic signal is produced which is detected by an electronic circuit known as the keyboard encoder.

The CPU after receiving the signal, identify the purpose or the task related with that key and then takes appropriate decision. There are many types of keyboard *e.g.*, QWERTY, Ergonomic, Cordless and Dvork keyboards. The number of keys on a keyboard is not fixed and the manufacturer decides the number of keys as per the requirement of the user. Generally the total no. of keys in a simple keyboard is 101 or 102 Figure 2.2. Figure 2.2 shows a keyboard with different types of keys.


2.1.2. Mouse

This is one of the most widely used input device after the keyboard. The mouse is used as 'point and click' device with the operating system or programs which have the Graphical user interface (GUI).

The mouse is held in one hand and moved across a flat surface. Its movement and the direction of movement is detected by the two rotating wheels on the underside of mouse (In case of traditional mouse). The wheels have their axes at right angles. Each wheel is connected to a shaft encoder which emits electrical pulses for every incremental movement of the wheel.

When a user moves the mouse across a flat surface the cursor in the CRT (cathode ray tube or Picture tube) screen also moves in the direction of the mouse movement. By moving the mouse the user can point to menu on the screen. By pressing the button on the mouse, the user communicate his choice to the computer.

The mouse is also used to draw sketches, diagrams etc. on the CRT screen.

Figure 2.3 shows a mouse. A mouse can have two or more buttons for the control purpose. Now-a-days Touchpad Mouse are also very common and are used with the laptop computers. In touch pad mouse, the finger is moved on the pad and accordingly, the mouse pointer moves on the CRT display. A soft press on the mouse is treated equivalent to the pressing a button of the mouse.
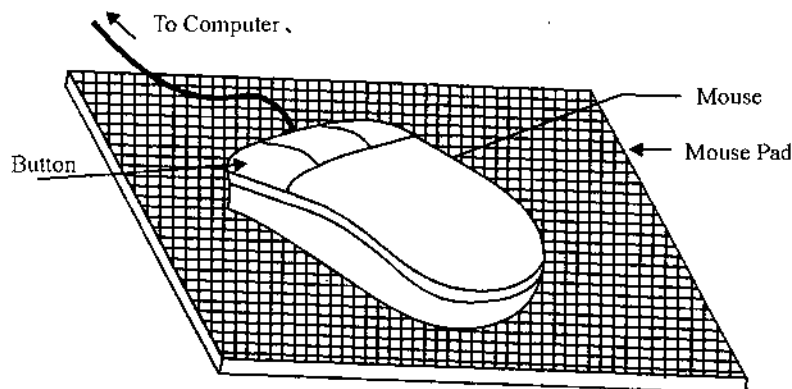
2.1.3. Scanners

These are the input devices generally used for in putting the images in graphics format. The colored images may be scanned by the scanner and may be stored and processed in graphical format. There are some scanners which can also read the text as the images and that can be converted into the text files. The one of

the popular form of storing images is the bit map format. In the bit map format, and image is divided into various small segments and the various parameters of the image such as color, intensity etc. recorded are by the scanner. The scanners provide more faster and more accurate data entry because here the information is entered directly into the system.

Most commonly used scanners are the optical scanners and magnetic-ink character readers.

(a) Optical Scanners. The optical scanners are capable or reading information recorded on the paper, employing light source and light sensors. The information to be scanned is type written information, information) coded as ink or pencil marks or information coded as bars. The following are the commonly used optical scanners :

(b) Optical Character Reader (OCR). As the hand-writing varies from person to person, the different type writers and different typesetters produce the letters of the alphabet in a variety of forms, shapes and sizes.

Nevertheless, there are certain characteristics which are peculiar to, and common to, each letter, however it is produced.

OCR readers, or scanners as they are sometimes called, typically examine each characters if it were made up a collection minute spot or pixel (a picture element) (Fig. 2.4).
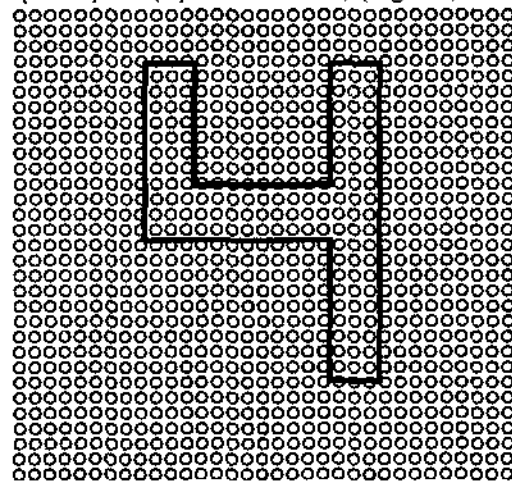
In this the text to be second is illuminated by a low-frequency light source. The light is absorbed by the dark areas while the light is reflected from the lighted areas. The reflected light is received by photocells or CCD (charged coupled devices) which provides binary data corresponding to dark and light areas. Once the whole character is scanned, the pattern detected is matched against a set of patterns stored in the computer.

Whichever pattern it matches, is considered to be the character read. Patterns which can not be identified are rejected. A OCR can scan several thousands of printed or typewritten characters per second. Optical character readers are used in large-volume applications such as computer-oriented bills prepared by public utilities.

(c) Optical Mark Reader (OMR). Forms and cards are pre-printed for special purpose so that a mark can be made in specified position, for example to represent a yes or no answer in the market survey or in a combination of positions to indicate different characters or the different digits of a number of connection for example, with gas and electricity readings. Optical mark readers are able to scan the forms completed in pen or pencil. The forms or cards are passed under a light source and the presence of a mark is detected by measuring very accurately the infra-red light levels. A mark reader may be able to detect coloured marks. It may also be designed to be insensitive to certain colours so that these particular colours can be used safely in the pre-printing of the documents or cards without risk of their being read as marks intended for recognition. A well-designed form provides a versatile and efficient means of collecting data and the main advantage of OMR is that no specialist is required to collect and input data. Data collection can be practised at the point at which the information first becomes available, *e.g.*, on the factory floor, in the warehouse and on the building site. Now, the OMR sheets are also popular in examination.
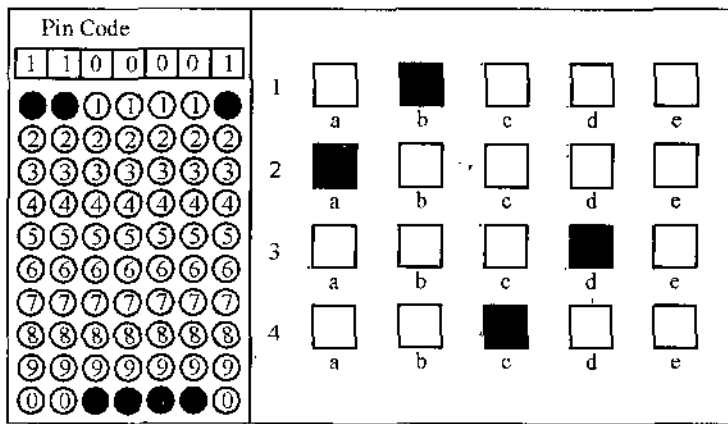
(d) Magnetic-ink Character Reader (MICR). MICR is widely used by the banks to process large volumes of cheques and deposit forms written every day. A special ink called magnetic ink (*i.e.*, an ink which contains iron oxide particles) is used to write characters on the cheques and deposit forms which are to be processed by an MICR. MICR is capable of reading characters in a paper written with magnetic ink. The magnetic ink is magnetized during the input process.
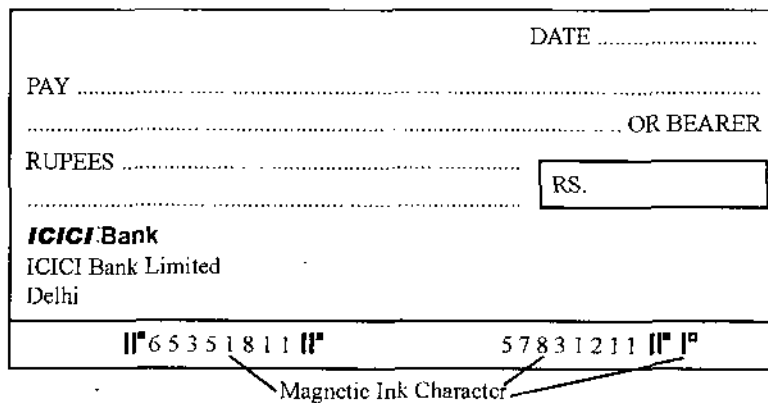

Fig. 2.6. A Bank Cheque that is Processed Using a MICR Device

The MICR reads the magnetic pattern of the written characters. To identify the characters these patterns are compared with special pattern stored in the memory.

Before cheques are issued to the customers the identification number of the bank and the depositor's account number are printed on the lower left-side of the cheques with the magnetic ink. The amount is printed on the lower-right side of the cheques by the bank employee with the same magnetic ink after the cheque is received from the customer. When a cheque is entered into an MICR. it passes through a magnetic field. The iron oxide particles are magnetized under the magnetic field. The read-head reads the characters written on the cheque with the magnetic ink. It interprets the characters and sends the corresponding data directly to the computer processing.

(c) Optical Bar-Code Readers. This method uses a number of bars (lines) of varying thickness and spacing between them to indicate the desired information. Bar-code are used on mot grocery items. An optical-bar reader can read such bars and convert them into electrical pulses to be processed by a computer. The most commonly used bar-code is universal product (UPC). The UPC code uses a series of vertical bars of varying widths. These bars are detected as ten digits. The first five digits identify the supplier or manufacturer of the item. The code also contains a check digit to ensure that the information read is correct or not. Optical bar code is shown in Fig. 2.7.
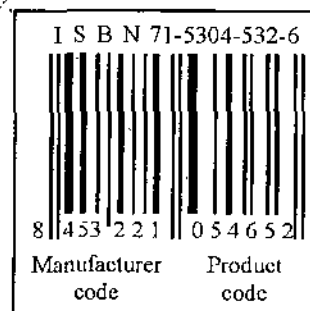
2.1.4. Voice Input Unit

A voice input system accepts spoken input. The weave form created by the spoken input is analysed, patterns are extracted and matched against prestored pattern to identify the input. Once identified, the appropriate coding is generated for handling within the computer. Before a voice-input system can be used it must first be provided with vocabulary. The words and phrases the system is to recognize are spoken with system operating in a so-called' training mode'. In this mode the patterns are created and stored for further matching. A system may be trained to recognize both the voice of one or more operators and a given vocabulary for each operator, in which case the unwanted inputs or unauthorized speakers are rejected.

The voice link to a system may be by microphone, telephone or radio communication. Vocabulary are comparatively small, typically 100 to 300 words. In general, as the size of a vocabulary increases, *recognition reliability decreases. These system can be used in situations* in which an operator needs to be free to move about a work area or to have his hands free, or where an operator travels and realies on telephone contact with his work base.

✦ 2.2. OUTPUT DEVICES

The output devices are used for producing and presenting the data processed by digital computer to the real world. At one time all that appeared to matter, was obtaining results from the computing process and no one bothered very much about the presentation of the material. However, it now becoming increasingly important to present information in the best possible fashion and the industry is responding by placing greater emphasis on improving peripheral type devices (display terminals as well as those providing hard copy output). The example of output devices are video display unit, printers, letters and audio response unit etc.

2.2.1. Video Display Unit (VDU)/Monitor

VDU consists of video terminal and keyboard video terminal is the another of the cathode ray tube (CRT), which is used for displaying images, text, video etc. The VDU is the most commonly used output device. When a key of the keyboard is pressed, the corresponding, character is displayed on the screen. At the same time the cursor moves to the position where the next character will. be displayed. A cursor is a small arrow, underline or a small square which can move horizontally or vertically by the user to indicate the position of a character. VDU also shows output of the processed data. A CRT displays contains an 'electron gun' which sends an electronic beam. When the electronic beam reach the screen it display the image. The co-ordinates of the screen are determined by the CPU. Regular refreshing of the screen is required because whenever the electronic

Fig. A typical VDU (Video Display Unit)

beam hit the screen, it displays the image or text. To display another image or character the CPU refreshes the screen. The smallest area which may be affected by the electronic beam is known as *pixel*. It is the *smallest display element of any picture. In the CRT display, the trio of Red, Green and Blue dots represents* the pixel. An electron gun shoots out a stream of electrons, one for each of three primary colors.
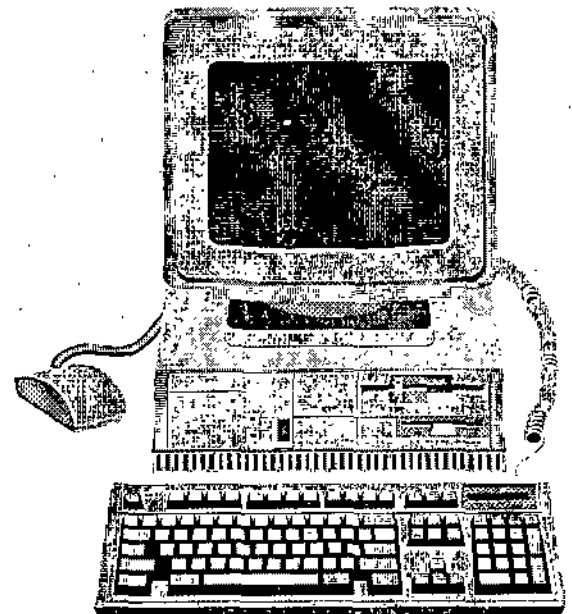
The holes (or dots) are arranged on a metal plate, called the *shadow mask*. *Dot pitch* is the shortest distance between two dots of the same color. It determines the precision and sharpness of a picture. So the smaller the dot pitch, the better is the picture. Generally the character is displayed by a matrix of 2 horizontal and 5 vertical dots as shown in Fig. 2.9.

Fig. A 7 × 5 Dot Matrix Display Characters (The letter A and number 3 is displayed here)

The monitors on the basis of the colours they produce are classified as:

a. Monochrome: these monitors display the result in two colours *i.e.* black/white. green/black, or amber/black.

b. Gray scale: it is a monochrome type of a monitor but it displays the output using different shades of gray, made by various combinations of black and white.

c. Colour monitor: it can display the output in many colours ranging from 16 to 1 million colours. These are called RGB monitors because they work on three colour signals – red, green and blue. It consists of a vacuum tube with three electron guns each for red, green and blue colours.

The monitors are also classified on the basis of the signal received as analog and digital:

a. Analog monitor: these are traditional type of monitors. These are based on CRT(cathode ray tube) technology. These monitors work like the television screen and accept analog signal.

b. Digital Monitor: the digital monitor receives the digital signal and uses CRT technology. The data is received from video adapter. These monitors are fast and produce clear images.

2.2.2. Printers

While the monitors enables us to view the output the printers enables us to get the hard copy of the output. The processed data can be in the form of tables. diagrams, charts, reports etc. This can be printed on the paper by using the printer. The printing techniques can be divided into two major categories : Impact printer and Non-impact printer. The Impact printer uses the familiar typewriter approach of hamming a type face against the paper and lined ribbon. While the Non-impact printers do not hit or impact a ribbon to print, they use thermal, electrostatic, chemical and inkjet technologies. Printers can also be categorized in another way; those which output one character at a time (known as serial printers) and those which output a complete line at a time (known as line/page printers). The description of various type of printers are as follows :

(1) Serial Printers They are also known as character printer because they print the one character at a time, with the print head moving across a line. They are similar to typewriters. The serial printers are normally slow, normally they print 30 to 300 characters per second. A serial printing device can normally be operated using continuous stationary or separate sheets. A serial printer is much slower than the line printer. But the serial printers are cheaper. Generally used serial printers are Dot matrix and Daisy wheel used serial printers.

(i) Dot Matrix Printer. This is the most commonly used serial printer.

This is because of its speed, versatility and ruggedness. These qualities, combined with low cost, make the matrix printer particularly attractive to the personal computer market. The maintenance cost of the dot matrix printer are generally low. In these printers, a moving pin strikes on the ribbon that is coated with the ink. So these printers comes under the category of impact printers A character is formed because of striking of selected pins so the name is dot matrix printer. A character formed because of striking of selected pins onto the ribbon. The paper on which the document has to be printed is kept rolling over the drum and repeated strikes of the pins on the head prints the character on the paper. All the characters printed by dot matrix printer are made up of various vertical dot patterns.

(ii) Daisy-wheel Printer. These printers uses the daisy-shaped disk made of metal or plastic which holds 96 characters on its 'petals'. The head look like a wheel so the name is daisy-wheel printer. Whenever any character has to be printed, then the edge of the head which contains the embossed form of that character
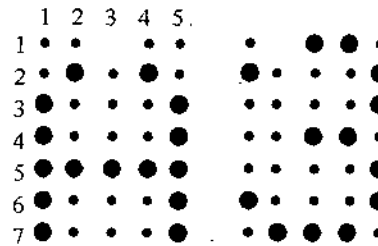
is stroked. Print heads are physically interchangeable, enabling the use of different character fonts. The daisy-wheel printers are used for high quality.

(2) Line Printer. The line printer prints the complete line at a time. Printing speeds vary from 150 lines to 2500 lines per minute. The line printers are used to obtain bulky output. There are two types of line printers—drum printer and chain printer.

The drum printer consist of a cylindrical drum. The characters to be printed are embossed on its surface. One complete set of characters is embossed for each and every print position on the line. The codes of all the characters to be printed on one line are transmitted from the memory of the computer to a storage unit in the printer.

The storage unit called the printer buffer register. The printer drum rotates at very high speed. A set of print hammers, one for each character in a line, are mounted in front of the drum. The position of each character on the band of the drum surface is coded using *its angular displacement from the origin.* A character is printed by striking a hammer against the embossed character on the surface. So these are known as impact printer. The disadvantage of drum printer is that they have fixed font.

The chain printers has a steel band on which the character sets are embossed. So they are also known as band printers. For printing a line, all the characters in the line are sent from the memory to the printer buffer register. The band rotates at a high speed. As the band rotates, a hammer is activated when the desired character as specified in the buffer register comes in front of it. These printers also comes in the category of Impact printer. The main advantage of chain or band printers is the ease with which chains may be changed. Thus the different fonts and different scripts may be used with the same printer.

(3) Laser Printer. The basic limitation of serial and line printers is the need for a head to move and impact on the ribbon to print characters. This mechanical movement is relatively slow because of the high inertia of mechanical elements. The laser printers uses the combination of laser and photocopies technology. these printers are capable of converting computer output into print, page by page. Laser printers produce very high quality images, offer a wide selection of character fonts and operate very quickly. In these printers an electronically controlled laser beam traces out the desired character to be printed on a photoconductive drum. The drum attracts the ink toner on the exposed areas. This image is transferred to the paper which comes in contact with the drum. These printers are capable of printing more than 8 pages per minute (ppm). The Laser printers are more costly than the other type of printers. As these printers do not have the striking head on the ribbon, so they come in the category of Non-Impact printers.

(4) Ink Jet Printers. The ink-jet printers are non-impact printers. The running cost of these printers in comparison to laser-printer is high but they are available at a lesser price than that of Laser printer. These printers are generally used for coloured printing. These printers use cartridges which contain ink. In the colour cartridge, three colour ink is available. Printing is done by the process of squirting the ink through the tiny nozzles of the cartridges. The working is similar so the dot matrix printer. The ink-jet printer also has a printer head that moves over the page, printing an entire line with each pass. The only difference is that the head spews out the ink onto the paper. The size of the dots printed by the Ink-jet is smaller than the ones printed by the Dot matrix printer. This results in greater clarity of the output.

2.2.3. Plotters

Plotters are used for printing high quality graphs with multicolored pens. There are two types of plotters—drum plotter and flat bed plotter. In a drum plotter, *the paper on which the graph is to be drawn is* mounted on a rotating drum. A pen which can move linearly *i.e.,* perpendicular to the direction of drum rotation, is mounted on a carriage. The drum can rotate either clockwise or anticlockwise direction under the control of the plotting instruction set by the computer. *The pen can move left to right, right to left, up or* down. While the flat bed plotter has a stationary horizontal plotting surface on which paper is fixed. The pen is mounted on a carriage which can move in either X or Y direction. The pen can also be moved up or down.

2.2.4. Audio response Unit

The audio response unit is also known as speech (voice) output unit. The audio response unit reads the strings of characters stored in the computer's memory and converts them into the spoken sequence. For the sake of clarity. the response is delivered more slowly than words are normal spoken. Combination of letters form a unit of speech called a **phoneme**. Electronic chips have been designed which accept ASCII characters of a sentence, combine sequence of words into a phoneme, amplifies them and outputs them through a small loudspeaker unit. These speech units for English have been greatly refined and a near natural speech emerges out of such unit. The digitalized format in which the spoken word are retained by the system makes heavy demands on storage and generally systems can only store 400 spoken words or phrases. However within the context of a single applications, the limitation of a small vocabulary may not be unduly restrictive. This type of units can be used during the remote enquiry of the product availability, and instructional sequence of various procedures Now-a-days Indian railway is also using the Audio response unit to answer the user's query regarding trains departure, arrival and PNR status and so on.

✧ 2.3. MEMORY HIERARCHY

A variety of physical types of memory have been employed. The most common today are semiconductor memory, magnetic surface memory, used for disk and tape and optical and magneto-optical.

Several physical characteristics of data storage are important. In a volatile memory the information decays naturally or is lost when electrical power is switched off. In a non-volatile memory the information once stored remains without deterioration until deliberately changed; no electrical power is needed to retain the information. Magnetic surface memories are non-volatile. Semiconductor memory may be either volatile or non-volatile. Nonerasable memory cannot be altered, except by destroying the storage unit. Semiconductor memory of this type is knwon as read only memory (ROM). Of necessity, a practical non-erasable memory must also be nonvolatile.
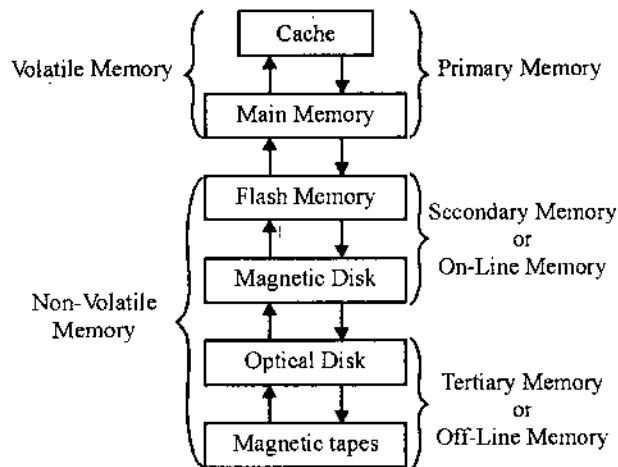
The different storage media can be organized in a hierarchy as shown in Fig. 2.10 according to their speed and their cost. The higher level are expensive, but are fast. As we move down the hierarchy, the cost per bit decreases. whereas the access time increases.

Apart from the hierarchy shown in the Fig. 2.10 their is also a set of registers present in the processor which are also used to hold the data during the manupilation. The registers are faster than cache memory.

2.3.1. Registers

Every computer has a set of registers inside its CPU (Central Processing Unit) for the proper operation. The Fig. 2.11 shows the top-level components and suggests the interactions among them using the system bus (Communication Lines).
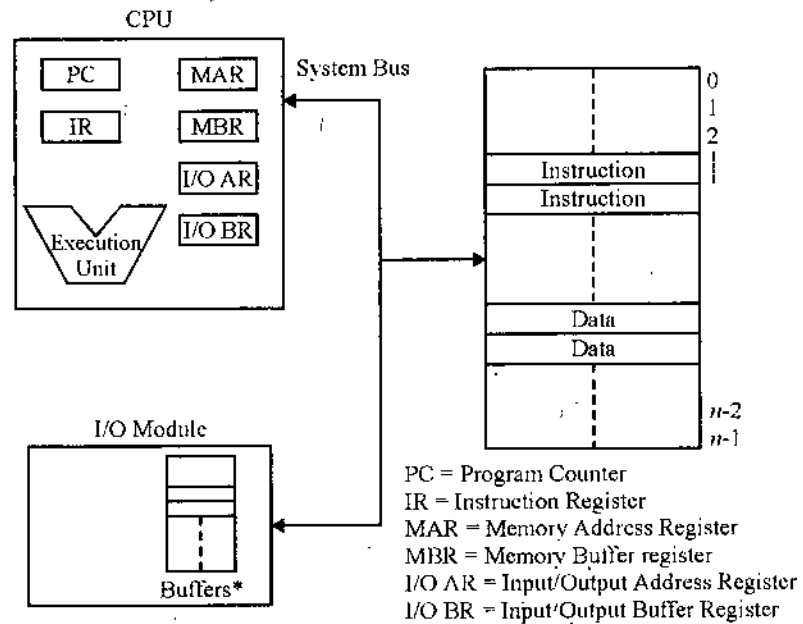
PC = Program Counter
IR = Instruction Register
MAR = Memory Address Register
MBR = Memory Buffer register
I/O AR = Input/Output Address Register
I/O BR = Input/Output Buffer Register

Fig. Computer's Top-Level View

*Buffers are used to store information.

As the CPU has to interpret and execute the different instructions, so to perform this job and speed up the rate of transfer CPU uses special component known as registers. The registers are not part of the main memory and used to hold the information on a temporary basis.

The length of a register equals to the number of bits it can store. So a register capable of holding 8 bits is referred to as 8 bit register, so a register capable of holding bits is referred to as -bit register. The number of registers varies among computers. The most commonly used registers are as follows :

(a) **Memory Address Reigster (MAR).** IT holds the address of the active memory location. The content of the MAR is loaded from the PC (program counter). The content of this register are used identify the memory location whenever a read or write operation from the memory or into the memory is required.

(b) **Memory Buffer Register (MBR).** It is used to hold a word to be stored in the memory. and also used to receive a word from the memory. So that depending on the data further action can be taken. If the data (word) is Instruction word then it is transferred to the instruction register. A data word placed in this register is accessible for operation with the accumulator register or for transfer to the I/O registers.

(c) **Program Counter.** It holds the address of the next instruction to be executed. This register goes through the step-by-step counting sequence and causes the computer to read successive instructions previously stored in the memory. It is assumed that insturction words are stored in consecutive memory locations and read and executed in sequence unless a branch instruction is found. A branch instruction is an operation that calls for a transfer to a non consecutive instruction. The address part of the branch instruction is transferred to the program counter register to become the address of next instruction.

(d) **Accumulator.** This register is used to hold the operands and the results of ALU (Arithmetic Logic Unit) operations temporarily. This register is the most frequently used register during the different operations. The results of arithmetic operations are returned to the accumulator register for transfer to main memory by using MBR. The accumulator is represented by using the letter .

(e) **Instruction Register (IR).** This register holds the current instruction in execution. As soon as the instruction is stored in this register. the opcode (operation PART) and the address part are separated. The address part is sent to the MAR while the opcode is sent to the control unit where it is decoded and interpreted and idfferent control signals are generated to carryout different tasks.

(f) **Input/Output Registers (I/O R).** There are two types of register first- I/O AR (Input/output address register) and second I/O BR (Input/output buffer register). The work done by I/O AR and I/O BR is

similar to MAR and MBR except that I/O AR and I/O BR communicate with the I/O (Input/output) devices. So every communication with the I/O devices is take place by using these register. I/O AR holds the Address while I/O BR hold the data.

2.3.2. Cache Memory

The cache is the fastest and one of the most costly form of data storage. Cache memories are very small in size, their size is specified in KB. The use of cache is managed by the operating system. The cache memory is the primary memory and its contents are lost when the power is switched off, so it is also known as the volatile memory. As shown in the Fig. 2.12. First the processor try to find the required information in the cache memory and if it is not found their then it look for it into the main memory.
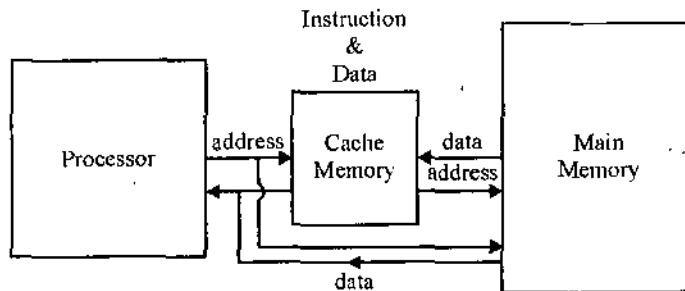
Fig. Illustrating use of Cache memory

2.3.3. Primary Memory

Primary memory has direct link with input unit and output unit. It stores the input data, calculation results. This primary memory is classified into two types of memory as follows :

(i) Random Access Memory (RAM) : As the name indicates, this memory is used to read and write at any part of the memory. But it stores the data temporarily till the steady flow of electricity. The data in RAM is lost, as soon as the power supply is off. So, RAM is also called volatile memory. In computer systems, two types of RAM is found :

(a) (Dynamic RAM (DRAM) : DRAM needs to be refreshed every time a new data is stored or more than 1000 times per second.

(b) (Static RAM (SRAM) : It is required to refresh rarely. So, it is faster than DRAM. It is more expensive than DRAM.

(ii) Read Only Memory (ROM) : This memory allows read only operation on data. It is a memory chip having pre-recorded data provided by manufacturing company. The data written on the ROM-chip can not be removed. So, it stores the data permanently within itself, without being effected by power-supply failure. Hence, it is called Non-Volatile Memory. A small ROM chip is the integral part of most of the computers having the special programs (used for booting, i.e., start-up of the computer). There are various types of ROM available as follows :

(a) (PROM (Programmable Read Only Memory) : PROM chip allows to store the programs/data only once onto itself. These program/data remain in the memory always. It is previous manufactured blank, but later the programs are written on this memory;

(b) (EPROM (Electrically Programmable Read Only Memory) : It is a special type of memory, whose contents can be reprogrammed by exposing it to UV light.

(c) (EEPROM (Electrically Erasable Programmable Read Only Memory) : This memory can be erased by electrical charge. Data can be erased as required. But data can be written only once. The reprogramming is possible.

(d) (Flash Memory : It is the extension of EEPROM in which the reprogramming or erasing is done on a block of memory (differing from EEPROM).

2.3.4. Secondary Memory

We have studied that primary memory is not able to store the calculations permanently for future use. So, some other type of storage technology is required to store the data permanently for a long time. This type of storage technology is known as **Secondary Memory** or **Auxiliary Memory**. There are various types of secondary storage devices available to store the data. These devices allow to read from or write anywhere in memory. The stored data can be read in future also. These devices are also helpful for data transferring from one computer system to another, because these are easily detachable from CPU; while RAM chips are not easy to detach. These devices also work as the **back up devices** which means storing data at one another place for safety. Commonly used secondary storage devices are magnetic tape, magnetic disk, optical disk, etc.

(i) Magnetic Tape : It is similar to audio tape containing a plastic strip coated with magnetic material. The data is encoded on the magnetic material in the form of electric current : conduction state (ON) represents ONE (1) and non-conduction state (OFF) represents ZERO (0). This type of data encoding is called Binary Data Storage. The data can be stored in binary form in the computer system.
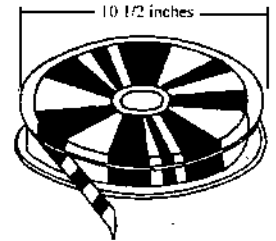

Fig. Magnetic Tape

The magnetic tapes are with large storage capacity and inexpensive. But there is a drawback with their use. The magnetic tapes are sequential access storage media, i.e., tape must go through all previous data for reaching upto a specific data. So these are very slow in processing. It can store data from 60 MB to 24 GB (memory terms are discussed earlier).

(ii) Magnetic Disk : These are the **direct access** storage media, where the accessing of a data is much faster because there is no need to go through all previous data for reaching a specific data. In this type of storage devices, there is present a round diskette (round disk) of plastic material coated with magnetic ink on which data encoding is done. The magnetic disks are commonly of three types : Winchester disk, Floppy disk, Hard disk.

(a) Winchester disk : It is the earlier type of disk developed by IBM. It can store 30 MB of data. But now, it is rarely used.

(b) Floppy disk : It is a magnetic disk made up of soft material coated with magnetic ink. It is covered in a plastic jacket. It is called floppy, because it flopps on waving. But these are very useful for data transportation, because of small size. These are very much inexpensive, but with a limited storage space. These are available in two sizes, as 5.25 inch and 3.5 inc. The floppy of size 5.25 inch can store data between 100 kB and 1.2 MB. Similarly, 3.5 inch floppy has the capacity from 400 kB to 1.44 MB.

Fig. 5.25 and 3.5 inch floppies

(a) Hard disk : These are the magnetic disk which can hold much more data than the floppy disk. A typical hard disk can store the data from 10 MB to several GB. But these are not easily portable.
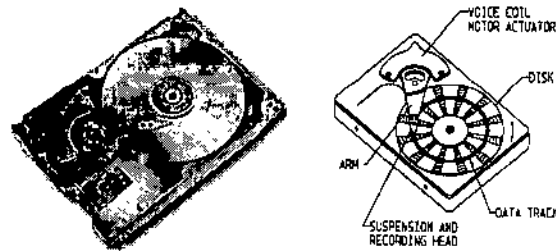
Hard disk

. A hard disk consists of many **platters** (diskette type). Each platter has read/write heads for each side except upper and lower platter. The upper surface of uppermost platter and lower surface of lowermost platter do not have any read/write head. The data is stored on tracks (discussed further) and each platter has equal number of tracks. The read/write heads are used to read and write data from and to the disk. There are two types of head systems with hard disk as **Fixed Head System** and **Movable Head System**.
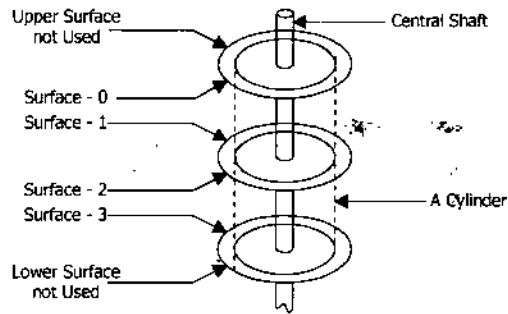
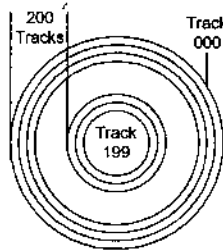Fig. (a) A disk having 3 platters
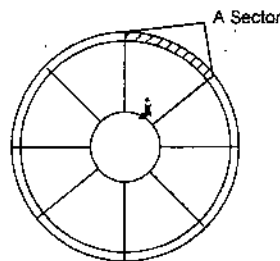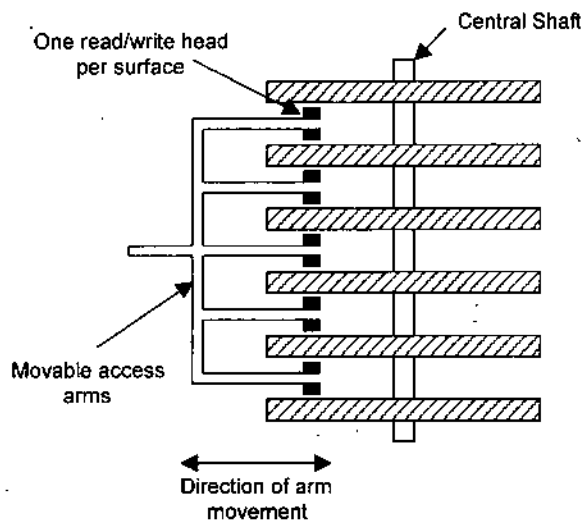
Fig. (b) Track on a disk

Fig. (c) Sectors of a disk

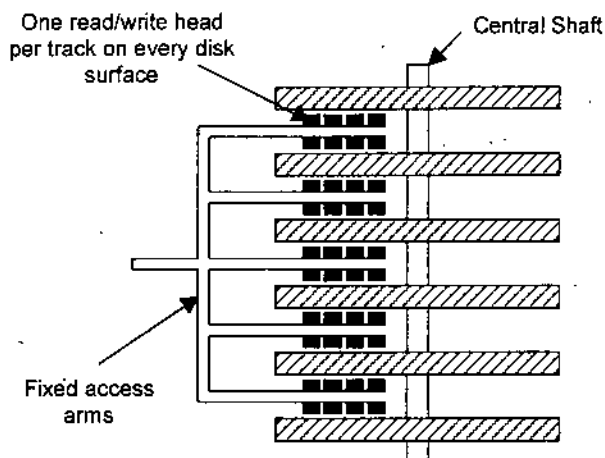Fig. (a) Vertical cross section of a Moving Head Disk
System.

Fig. (b) Vertical cross section of a Fixed Head Disk System

In Fixed Head System, there are many read/write heads present for a platter as there are number of tracks on platter. The platter moves circularly. In Movable Head System, there is only one read/write head for one platter. So this head moves in-out for different tracks and the platter moves circularly.

(iii) Optical Disk : The data can be read from and write to the optical disk by laser beam. These disks are able to store large amount of data into GB. These are available as CD-ROM, WORM (Write Once-Read Many), erasable optical disks.
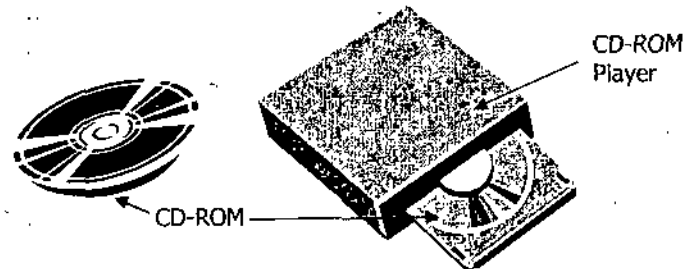

Fig. Optical Disk

In CD-ROM, data can be stored once and then read only. These are called compact disks-Read Only Memory. These can store data from 600 MB to 1 GB. A special device called CD-ROM player is used to read the data from CD-ROM.

2.3.5. Useful memory units

Useful memory units are as follows :

1 Bit = 0/1 (any single binary digit)

8 Bits = 1 Byte

1024 Bytes = 1 KB (Kilo Byte)

1024 KB = 1 MB (Mega Byte)

1024 MB = 1 GB (Gega Byte)

1024 GB = 1 TB (Terra Byte)

Summary

➤ An input device converts input data and instructions into the binary form so that the computer can accept that

➤ Some major input devices are:

1. Keyboard

2. Mouse

3. Scanner

4. Voice input unit.

➤ Commonly used scanners are: optical scanner, optical character reader, optical mark reader, magnetic ink character reader, bar code reader.

➤ A voice input system accepts spoken input.

➤ The output devices are used for producing and presenting the data processed by digital computer to the real world

➤ The smallest area which may be affected by the electronic beam is known as *pixel*

➤ Dot pitch is the shortest distance between two dots of the same colour

➤ The holes (or dots) are arranged on a metal plate, called the *shadow mask.*

➤ Location refers that whether the memory is internal or external to the computer.

➤ 1KB=1024 bytes; 1MB=1024KB; 1GB=1024MB.

➤ Memory is classified as primary and secondary memory.

➤ Primary memory consists of both volatile and non volatile memory.

➤ Secondary memory is classified as optical storage and magnetic storage.

➤ Various methods of accessing data stored in primary memory are: sequential access, direct access, random access.

TEST YOURSELF

[A] Choose the most appropriate answer among the given options :

1. MICR is a type of
   (a) printer
   (b) monitor
   (c) scanner
   (d) plotter.

2. A Plotter is a
   (a) voice input device
   (b) Input device
   (c) display device
   (d) None of these

3. The smallest area which is affected by an electronic beam is known as
   (a) Dot
   (b) Pitch
   (c) Unit
   (d) Pixel

4. It is the shortest distance between two dots of the same color
   (a) Pixel
   (b) Dot Pitch
   (c) Unit
   (d) Pixel

5. A dot matrix Printer is a type of
   (a) Line Printer
   (b) Laser Printer
   (c) Ink Printer
   (d) Serial Printer

6. An Audio Response Unit is a
   (a) Input device
   (b) Voice recognition device
   (c) Output device
   (d) none of these

7. Chain Printers are also known as the
   (a) Impact Printer
   (b) Band Printer
   (c) Line Printer
   (d) Wheel Printer

8. The small storage Areas of which the Internal Memory is made up of the known as
   (a) Cell
   (b) Lace
   (c) Pics
   (d) None of these

9. 1 KB =
   (a) 1000 Bytes
   (b) 8000 Bits
   (c) 1024 Bytes
   (d) None of these

10. The memory internal of the system is known as
    (a) main memory
    (b) auxiliary memory
    (c) primary memory
    (d) both (a) and (c)

[B] Long Answer Questions

1. What are the input and output devices? Why are they used in computers?
2. Which are the different input devices used with computers?
3. Explain the different type of scanner.
4. What is voice input unit?
5. Write short notes on:
   (a) Video display unit: (b) Plotters: (c) Audio response unit
6. Explain the different types of printers along with their usages.

7. Explain the functioning of the video display unit.

8. Write a note on the various types of monitors with their advantages and disadvantages.

9. Explain the different types of input and output devices which according to you should form the essential part of fifth generation computers?

10. Write a short note on the memory unit of the computer.

11. Explain the memory hierarchy in detail?

12. Explain the different memory units of a digital computer?

13. What is the difference between RAM and ROM?

14. Write short notes on PROM, EPROM, EEPROM, Flash memory. Explaining the differences in each.

15. Define primary and secondary memory along with the differences.

16. Compare the magnetic disk with an optical disk.

ANSWERS

1. c 2. d 3. d 4. b 5. d 6. c 7. b 8. a 9. c 10. d

❑❑❑

UNIT
3
OPERATING SYSTEM

LEARNING OBJECTIVES

After going through this unit you will learn :

➤ What actually an operating system is and why do we need it.
➤ Various types of operating system based on their functionality
➤ Introduction to important operating systems *i.e.,* DOS, UNIX, XP, windows 7

✦ 3.1. WHAT IS OPERATING SYSTEM (OS)

The operating system (OS) means different things to different people. So a question like 'what is an OS ?" is likely to evoke different answer. For example :

➤ For a young student, an OS is the software (a program), which permits access to the wealth of knowledge existing on the Internet.

➤ For a programmer, an OS is the software, which permits a computer system to be used for developing programs.

➤ For a person using an application package, the OS of a computer system is simply the software which makes it possible for him to use the package.

➤ For a technician in a computerized chemical plant, the OS is the invisible component of a computer system which controls the plant.

The answer differ because a user's perception about an OS depends on three factors : the purpose for which a computer is using used, the environment of its use, and the degree of identity of the computer system with the purpose being served.

The primary objectives of an operating system is to make computer system convenient to use and utilise computer hardware in an efficient manner.

For an operating system we must remember the following points :

➤ An operating system is a system software which may be viewed as an organised collection of softwares consisting of procedure's for operating a computer and providing an environment for execution of programs.

➤ An operating system acts as an interface between users and the hardware of a computer system.

➤ An operating system is a system software that is mainly responsible for Resource Management.

It keeps track of the status of each resource and decides who will have a control over computer resources, for how long and when.

❖ 3.2. NEED OF OPERATING SYSTEM

In the computers the operating system is required because :

(1) The user interacts with the computer through operating system in order to accomplish his task since it is his primary interface with the computer.

(2) It helps the users to understand the inner functions of a computer very closely.

(3) Many concepts and techniques found in the operating system have general applicability in other applications.

In a computer system the operating system controls all the computer's resources and provides the base upon which the application programs can be written.

In order to shield the programmers from the complexity of the hardware a layer of software is provided on the top of the bare hardware, to manage all parts of the system and present the user with an interface or virtual machine that is easier to understand and program. This layer of software is the operating system.

This Fig. 3.1 shows the users view of a computer.

All the computer can be divided into two category :

(1) System Programs. These programs manage the operation of the computer.

(2) Application Programs. These programs are developed by programmers to perform some specific task of the user.
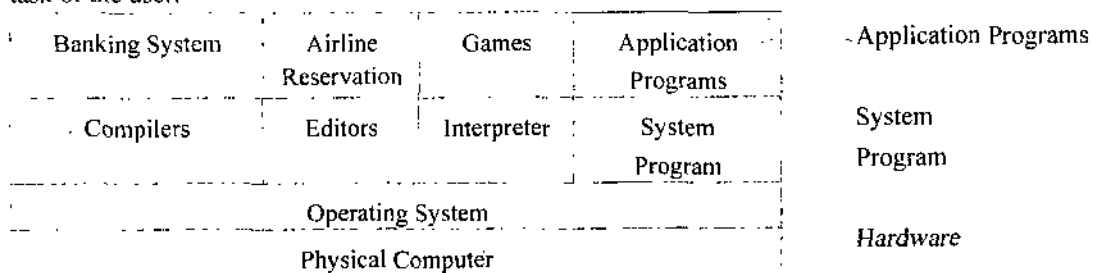
Banking System	Airline Reservation	Games	Application Programs	Application Programs
Compilers	Editors	Interpreter	System Program	System Program
Operating System				Hardware
Physical Computer				

Fig. 3.1 : User view of a computer.

❖ 3.3. TYPES OF OPERATING SYSTEM

The operating system can process the tasks in different manners either sequentially or simultaneously. Due to different processing techniques, the operating systems are classified into following types :

1. Single User System : This is the extensively used type of computer system. In this type of computer system, the system is useable by one user only a time. The operating system is required to perform the tasks only for one user and so most of the time the tasks are performed singly. But sometimes, these tasks are needed to club together. The clubbing of tasks is helpful to reduce the idle time of system. The task clubbing is done in two ways as **Serial Processing** or **Batch Processing.**

(a) Serial Processing system : In early computer systems, the programming was performed in 1's and 0's, *i.e.*. Machine Language. The instructions and data were needed to be fed into the computer system through the input devices.

The programs first loaded into the register of the computer system. Then address of the first instruction of the program is fetched. The result is examined by the contents of various registers and memory locations of the machine. This type of programming causes the low utilization of machine and user.

The program started being coded into the programming language are first changed into the object code by translator. Then this code is automatically loaded into memory by another program called loader. Now the execution of the program begins and the result is produced. This type of processing uses a fixed serial of tasks to do. hence the name **Serial Processing System.**

(b) Batch Processing System : In case of Serial Processing System, the job are processed in a sequential manner one after the other. When a job is stopped, the next job is loaded into the memory. During the transition of CPU from one job to another. the CPU remains idle for a short while. This idle time is wasted from the point of view of user. To solve this problem. a special software program is used to create a

sequence of jobs in the memory. The program always remains in the memory and so called as Resident Monitor. This program determines the beginning and ending of the execution programs with the help of Job Control Language.

The Batch Processing system works in two steps. The first step deals with the storage of processes in the form of a **Batch** (collection). This step is known as "Accumulation of jobs". The jobs are then processed in a sequential manner within the batch. It is the second step of the working of Batch Processing operating system. This working stage is known as **"Periodical Processing of Jobs"**. These two steps refer to the overall processing of the Batch Processing System. The CPU switches automatically from job to another within a batch without interfering the user, *e.g.,* batch files of DOS.

2. Multiprogramming System : Multiprogramming systems are very much sophisticated system. This type of system works in various forms such as Multiprocessing, Multitasking and Multiuser operating systems. The multiprogramming system is the basic need of today's computer environment. The serial processing and batch processing systems were usable only for single user environment. But, today's scenario is the multiuser scenario. So, those systems are not able to process in such environment. The another reason is the maximum utilization of CPU time. Both serial line and batch processing systems are unable to utilize the full CPU time and the CPU remains idle most of the time. The multiprogramming system keeps the CPU busy most of the time and leads to maximum utilization of CPU.
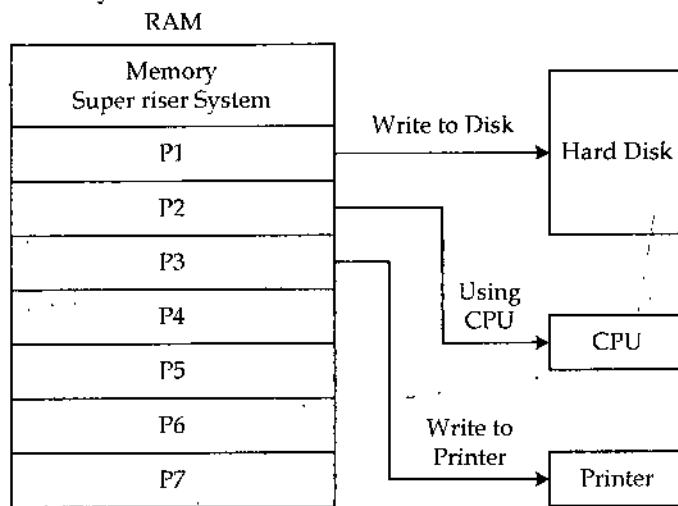

Fig. 3.2 Multiprogramming System

The various forms of multiprogramming systems and their process is described below :

(a) Multitasking Operating System : The task is referred to the running state of a program. The multitasking operating system is able to handle multiple active processes at same time. The CPU controls the working of all the active processes simultaneously. The simplest form of the multitasking system is Serial Multitasking or Context Switching. It means that working on another disk will lead to temporary stoppage of first task. The another form of multitasking is execution of multiple tasks simultaneously and CPU automatically switches from one task to another.

(b) Multiuser Operating System : This system allows the simultaneous access to a computer system through two or more terminals. This operating system allows multiple users to work on same data at same time simultaneously. The multiuser support is necessary for the large organization where the data remains same among various users.

The data is stored centrally in one computer called **Server** and all the users can access this data through the terminals called **Client Machines :** The dedicated transaction processing system such as **Railway Reservation System** is the example of multiuser operating system. This system supports the hundreds of terminals under control of a single program.

(c) Multiprocessing System : When an operating system controls multiple processes at a time, different tasks may be performed on different processors. But all the processors are controlled by one CPU only. The operating system allows the multiple concurrent processes in execution simultaneously.

(d) Time Sharing System : It is a form of multiprocessing operating system, which interact with all the programs with a quick response time. The time sharing system allows multiple programs to simultaneously

share the computer resources. Each action (program) takes a very small fraction of time in one time. The CPU rapidly switches from one program to another (for one user or many users) automatically and each program is given the attention for a quantum time called Time Slice. The time slice scheduling of CPU for all programs is known as Round-Robin Scheduling. In this type of process scheduling, the CPU starts processing from the beginner program, then switches to next program after a fix time slice and continues further. Then the CPU returns to the beginner program in rotation. This process continues till the completion of jobs. If a program is completed, it leaves from the processor.

(e) Real Time Systems : This type of multiprogramming system is used in a large computerized environment, where the events are to be performed by their association with one another. The events must be accepted and processed in a very short time and have some deadline. The real time systems are used in flight control, military applications, etc. The primary role of real time operating system is to process in quick time. Each process is assigned a priority level according to its importance.

3. Network Operating System : The network operating system is the collection of software and protocols. This collection allows the interconnection of many computers by a computer network. By using the network operating, the multiple users can log onto the remote machines and use the resources effectively. Each computer on network has its own operating system.

The users can move the files from one system to another. The network operating system allows the access to various resources of network server. Its common example is Windows NT.

❖ 3.4. UNIX : AN OPERATING SYSTEM

The origin of UNIX started in back 1965 and remains upto 1973. There are some prerequisites for a system to have UNIX. There must be 80 MB hard disk and at least 4 mb of RAM on a 16-bit microprocessor preferably 80386/80486. There should be enough memory on host machine to have more terminals. UNIX supports many languages such as C, FORTRAN, BASIC, PASCAL, COBOL, LISP, PROLOG etc.

The UNIX operating system is available on the machines from microcomputers to mainframe. It offers several salient features as follows :

(1) Portability : UNIX can be ported to almost all computer systems. The UNIX system is written in a very comfortable language 'C', which makes it easier to read and understand. Its code can be changed and compiled on a new machine very easily.

(2) Machine Independence : The UNIX O.S. hides the hardware configuration of machine from user so that the user can work on micro, mini and mainframe computers.

(3) Multiuser Capability : In a multiuser system, *i.e.,* same computer resources 'hard disk, memory, etc. are accessible to many users. The users are given different terminals to operate. A terminal is a keyboard and a monitor which are input and output devices for that user. All terminals are connected to main computer whose resources are availed by all users. So, a user at any of terminal can use not only the computer but also any peripherals attached, for example, printer.
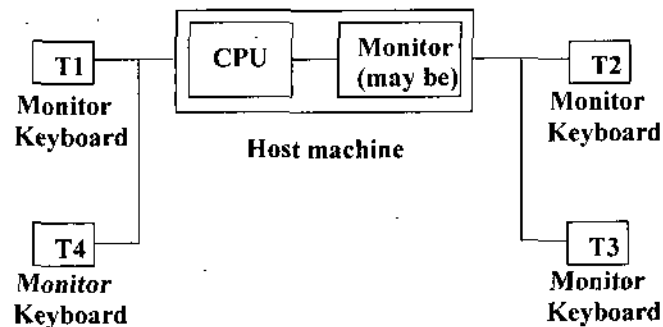

Fig. 3.3. Multiuser Capability

The main computer or host machine is known as Server or Console. The number of terminals depends on the number of ports present in its controller card. These terminals may be of following types :

(a) **Dumb Terminals** : These terminals consist of a keyboard and monitor only and no memory or disk of their own. These can never work as independent machines and are to be connected to host machine for working.

(b) **Terminal Emulation** : By attaching a PC with microprocessor, memory and disk drives to the host machines, this PC can be emulated to work as Dumb Terminal. It transmits the data to host machine for processing. The software that makes the PC work like a dumb terminal id called Terminal Emulation Software, *e.g.,* VTERM, XTALK.

(c) **Dial-In-Terminals** : These terminals use telephone lines to connect with host machine. To communicate over telephones lines, modem has to be attached to terminals and host machine. Modem is used as connector for connecting long distant terminals with host machine. It works for Modulation-Demodulation.
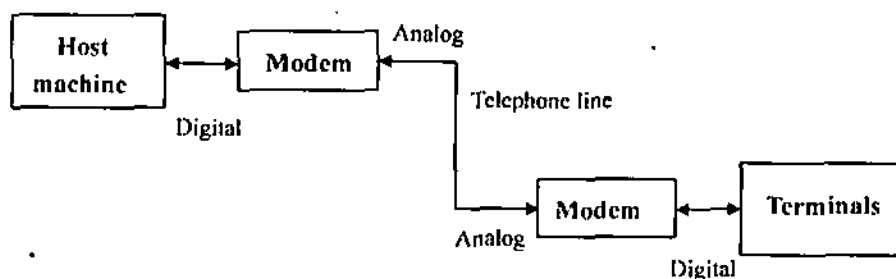

Fig. 3.4. Connection Dial-In-Terminal

(4) **Multitasking Capability** : UNIX is capable of carrying out more than one job at same time. The user can start a process and then start working on other processes. The system runs the first process in background and the second process in foreground. It is managed by dividing the CPU time among all process being carried out. Depending on the priority of task, the Operating System provides small time slice to each foreground and background task. The background processing helps the user in effective utilization of time.

(5) **Communication** : UNIX provides the excellent way for communicating with other users. The communication may be within the same network or more networks. The users can easily exchange mail, data, programs, etc.

(6) **Security of Data** : UNIX allows the sharing of data. It also has the inherent provisions for data protection. There are 3 main provisions for data security in UNIX. The first is provided by assigning passwords and login names to individual users ensuring that unauthorized users can not access the work.

At the file level, there are read, write and execute permissions to each file. Atleast, there is a file encryption utility. This utility encodes the file into an unreadable format, so that no one can read the data.

(7) **Hierarchical File System** : UNIX has hierarchical file structure to store information. This structure has maximum flexibility in grouping the information in a way that does not reflect its natural state. It allows the easy maintenance and efficient implementation (processing) of programs.

(8) **UNIX Utilities and Programs** : UNIX has simple user interface called Shell. It provides the better services to user. It works as the command interpreter.

3.4.1 Comparison of DOS and UNIX

There are some major difference between DOS and UNIX :

(1) DOS is a single user operating system while UNIX is a multiuser operating system. In DOS, the computer can be used just after the loding of O.S., but in UNIX, system security requires login and password before the user wants to use the system.

3.5.1 Structure of DOS

DOS has to perform many functions on PC. Some of its major responsibilities are :

➤ reading whatever you type on the command line. interpret them and executes them if they are command.

➤ *Take care of the file organization so that disk space is utilized as efficiently as possible.*

➤ Provide services related to disk or file management, memory management, I/O device management, launching the application programs and many other similar functions.

To do all these services, DOS has a command interpreter accompanied with a suite of service utilities which takes care of users all needs. Let us now see what are the different components that comprises the whole DOS.

➤ DOS consists of four different files or set of files :

➤ **IO.SYS** It is a file, which contains the device driver DOS loads at startup to perform the initialization tasks.

➤ MSDOS.SYS It is a file which contains the DOS Kernel.

These both are hidden files.

➤ **COMMAND.COM** *It is the file which reads, interprets and executes the commands.*

➤ Reset is a set of independent files which comes as the part of the DOS on the installation diskettes of DOS.

IO.SYS and MSDOS.SYS are called *IBMBIO.COM* and *IBMDOS.COM* respectively in PC-DOS.

When a micro-computer is switched on, the control signals are sent to ROM. Thus ROM is activated and the instructions written in ROM are executed. These instructions loads the IO.SYS in memory. So IO.SYS is the first module which is loaded when DOS is started. It has the drivers of for peripherals. DOS uses to interact with peripherals such as monitor, printer, keyboard, disk drives attached to that system. All attached peripherals of the computer system are checked and if any of the devices is not found in order, appropriate messages are displayed on monitor.

The next module which is loaded into the memory is MSDOS.SYS. As it contains the DOS Kernel it has the name given to all the functions which DOS provides to application programs.

The third important component of DOS is file COMMAND.COM. COMMAND.COM is loaded after IO.SYS and MSDOS.SYS. It provides the user with an interface namely, the command line, in the form of a DOS prompt. Once the DOS prompt appears on the screen it means that system is ready to accept the commands. COMMAND.COM reads and processes what ever user types and executes commands and batch files.

As said earlier that COMMAND.COM, when loaded into the computer breaks up into two portions transient and resident. The former is responsible for error handling and loading and unloading of transient portion and the latter contains the instructions for executing the commands that are given by the user to the computer system. First of all resident portion is loaded into RAM and then transient part of COMMAND.COM is executed.

The whole process of loading the DOS components into main memory and making the system ready for the user to work is called *booting.*

3.5.2. Operating System Commands

Commands are the way of communicating with computers. Any thing we want the computer system do to is told in the form of commands in the pre-defined syntax. DOS has two types of commands : Internal commands and External commands.

INTERNAL commands and EXTERNAL Commands

Internal commands are those commands for which the code for executing them is stored in COMMAND.COM and they execute with out the requirement of any other file. When an internal command is issued by the user, the transient portion knows what to do and executes that command.

External Commands are the independent executable files that can be used as separate utilities also. Information about these files is also stored in the transient portion. When an external command is issued, the transient portion picks the relevant file of that command and executes it. The fourth components of DOS actually consists of External commands.

Broadly, according to their usage all commands can be classified into 6 categories :

1. Disk Commands   2. File Commands   3. System Commands
4. Directory Commands   5. Batch Commands   6. Miscellaneous Commands

❖ 3.6 INTROUDCTION TO WINDOWS XP

Windows XP is a line of operating systems produced by Microsoft for use on personal computers including home and business desktops, notebook computers, and media centers. The name "XP" is short for "experience". Windows XP is the successor to both

Windows 2000 Professional and Windows Me, and is the first consumer-oriented operating system produced by Microsoft to be built on the Windows NT kernel and architecture. Windows XP was first released on 25 October 2001, and over 400 million copies were in use in January 2006. The most common editions of the operating system are Windows XP Home Edition, which is targeted at home users, and Windows XP Professional, which offers additional features such as support for Windows Server domains and two physical processors, and is targeted at power users, business and enterprise clients. Windows XP Media has additional multimedia features enhancing the ability to record and watch TV shows, view DVD movies, and listen to music. Windows XP Tablet PC Edition is designed to run stylish applications built using the Tablet PC platform. Windows XP was eventually released for two additional architectures, Windows XP 64-bit Edition for IA-64 (Itanium) processors and Windows XP Professinoal X64 Edition. There is also Windows XP Embedded, a component version of the Windows XP Professional, and editions for specific markets such as Windows XP Starter Edition.

❖ 3.7 INTRODUCTION TO WINDOWS 7

Windows 7 is the latest version of Microsoft Windows, a series of operating systems produced by Microsoft for use on personal computers, including home and business desktops, laptops, notebooks, tablet PCs, and media center PCs. Windows 7 was released in media on July 22, 2009 and reached general retail availability on October 22, 2009 less than three years after the release of its predecessor, Windows Vista. Windows 7's server counterpart, Windows Server 2008 R2, was released at the same time.

Windows 7 in simpler terms is an upgraded version of the already established Windows line, with the goal of being compatible with applications and hardware with which Windows Vista is already compatible. Microsoft in this new edition of windows focused on multi-touch support, a redesigned Windows Shell with a new taskbar, referred to as the Superbar, a home networking system called HomeGroup, and performance improvements. Some standard applications that have been included with prior releases of Microsoft Windows, including Windows Calendar, Windows Mail, Windows Movie Maker, and Windows Photo Gallery, are not included in Windows 7; most are instead offered separately at no charge as part of the Windows Live Essentials suite, in the form of a bundled product.

The platform required by windows 7 to run on a PC is :

➤ 1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64) processor.

➤ 1 gigabyte (GB) RAM (32-bit) or 2 GB RAM (64-bit).

➤ 16 GB available hard disk space (32-bit) or 20 GB (64-bit).

➤ DirectX 9 graphics device with WDDM 1.0 or higher driver

New Key features added in this latest version of windows are :

I. Windows Touch : once installed and activated you can touch your screen to resize a photo or map or to quickly scroll through your files.

II. Play To : A boon for people who love to keep technology at their fingertips. Using this you can send media from your PC to compatible devices on your home network.

III. Remote Media Streaming : keep in touch always, when away from; you can access photos and more on your home PC by establishing a remote network.

IV. Home group : Create your mini network and share files, music, videos and even printers in just four simple steps.

V. Windows Live Movie Maker : The most user friendly application to make and share movies and slide shows quickly.

Summary

➤ An operating system is a system software that acts as an interface between users and the hardware of a computer system.

➤ System software is a special type of software, which is used to handle all the application softwares.

➤ In a computer system the operating system controls all the computer's resources and provides the base upon which the application programs can be written.

➤ Operating systems are widely classified as single user OS, multiprogramming OS, network OS.

➤ Single user OS is required to perform the tasks only for one user and so most of the time the tasks are performed singly

➤ In single user OS task clubbing is done sing either serial processing or batch processing.

➤ Network OS allows the interconnection of many computers by a computer network and thus makes the accessing of remote machines possible.

➤ DOS, Windows 95 are the examples of single user operating system.

➤ UNIX, LINUX , WINDOWS NT are the examples of multiprogramming operating systems.

TEST YOURSELF

[A] Choose the most appropriate answer among the given options

1. An operating system is a
   - (a) application software
   - (b) Hardware
   - (c) Computer unit
   - (d) system software

2. Program uses for tasks such as Banking system, Airline Reservation is
   - (a) operating system
   - (b) application program
   - (c) system program
   - (d) embedded system

3. The jobs are processes sequentially one after the other in this operating system
   - (a) single were system
   - (b) batch processing system
   - (c) Multiprogramming system
   - (d) serial processing system

4. The client serva model is commonly used in
   - (a) multitasking as
   - (b) multiuser OS
   - (c) multiprocessing US
   - (d) Mutliprocessing OS

5. When the events are to be performed in limited time constraints the as used is
   - (a) time shoring system
   - (b) batch processing system
   - (c) real time system
   - (d) multiprocessing OS

6. When multiple users want to log an to remote machines the OS used is
   - (a) Network OS
   - (b) Real Time System
   - (c) Multiuser OS
   - (d) Multitasking OS

7. The CPU remains idle for most of the time in
   (a) Network OS   (b) Serial Processing OS
   (c) Real Time System   (d) Multitasking OS
8. DOS is an example of
   (a) network OS   (b) multiuser OS
   (c) single user OS   (d) None of these
9. These are the independent excutabple files
   (a) system command   (b) file command
   (c) internal command   (d) external command
10. The code for axecuting these commands is stored in command com.
    (a) internal command   (b) system command
    (c) external command   (d) batch command

[B] Long Answer Questions

1. What is an operating system? Why do we require an operating system?
2. What are the different functions of an operating system?
3. What is batch operating system? Why spooling is used in it?
4. What is multiprogramming operating system? What is the role of program priorities in these systems ?
5. Write short note on time sharing system and real time system?
6. What are the distributed operating system and what are their advantages?
7. Write short notes on UNIX, DOS and Windows XP comparing them all?
8. Write down the essential security measures for the operating system?
9. Compare the UNIX operating system with the Windows XP in terms of accessibity?
10. Compare the various types of operating system based on their usage?

ANSWERS

1. d 2. b 3. d 4. b 5. c 6.a 7. b 8. c 9. d 10. a

❑❑❑

UNIT
4
DATA COMMUNICATION AND NETWORK

LEARNING OBJECTIVES

After going through this unit you will learn :

➤ How is communication carried out in digital form

➤ Advantages of digital communication over analog communication

➤ Importance of computer network and their origin

➤ Why are computer networks designed

✦ 4.1. COMMUNICATION SYSTEM

Communication refers to the sending, receiving and processing of information by electronic means. A modern communication system is first concerned with sorting, processing and sometimes storing of information before its transmission. The actual transmission then follows, with further processing and filtering of noise. Finally we have reception, which may include processing steps such as decoding, storage and interpretation. In this context, forms of communications include radio, telephony and telegraphy, broadcasting, point-to-point and mobile communications, computer communications. radar, radio-telemetry and radio aid to navigation.

Figure 4.1 shows the block diagram of general communication system. The purpose of this system is to transfer information from one point, called the source, to another point, the user destination. An input transducer is required for converting the message to a time-varying electrical quantity called a message signal. At the destination, another transducer converts the electrical waveform to the appropriate message.

The channel provides the electrical connection between the information source and the destination. Channel degrades the transmitted signal in a number of ways. The degradation is a result of signal distortion due to undesirable electrical signals (noise) and interference, and due to imperfect response of the channel.
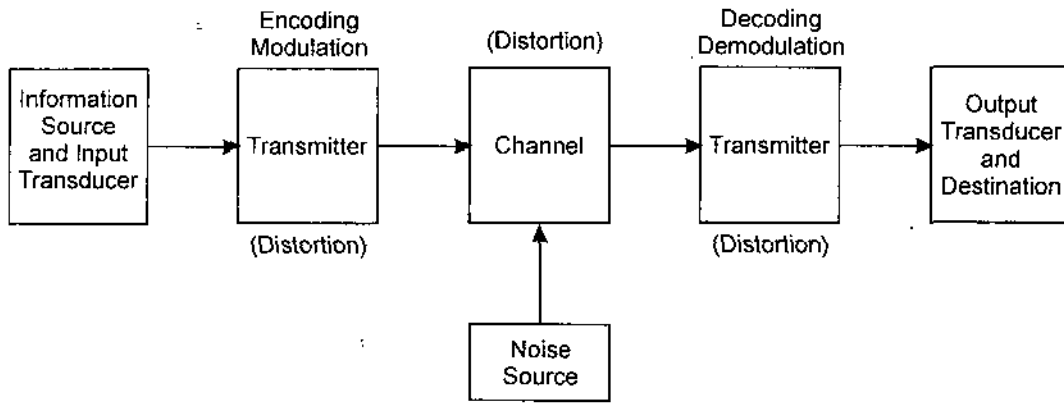
Fig.

The transmitter and the receiver in a communication system are carefully designed avoid signal distortion and minimize the effect of noise at the receiver so that a faithful reproduction of the message emitted by the source is possible.

Modulation is the systematic variation of some attribute of a carrier wave such as amplitude, phase or frequency in accordance with a function of the message signal. There are basically two types of modulation :

➤ (i) Continuous carrier wave modulation

➤ (ii) Pulse modulation.

Therefore, modulation is used in communication systems for matching signal characteristics to channel characteristics, for reducing noise and interference, for simultaneously transmitting several signals over a single channel, and for overcoming some equipment limitations.

There are three categories of communication system based on the type of modulation used and nature of the output of the information source.

(1) Analog Communication System,

(2) Digital Communication System,

(3) Hybrid Communication.

➤ Analog Communication System : Systems designed to transmit analog information using analog modulation methods.

➤ **Digital Communication System :** System designed to transmit digital information using digital modulation schemes.

➤ Hybrid Communication : Systems the digital modulation schemes for transmitting sampled and quantized values of an analog message signals.

✧ 4.2. DIGITAL COMMUNICATION SYSTEM

Digital communication refers to transfer of digital information via electronic media. Fig. 4.2 shows the fundamental element of a digital communication system. The overall purpose of the system is to transmit the message (or sequence of symbols) coming out of source to a destination at as high rate and accuracy as far as possible.

Information Source : Information sources can be classified into two categories based on the nature of their outputs :

(i) Analog information sources

(ii) Discrete information sources.

An analog information source can be transformed into a discrete information source through the process of sampling and quantizing. Discrete information sources are characterized by the following parameters :
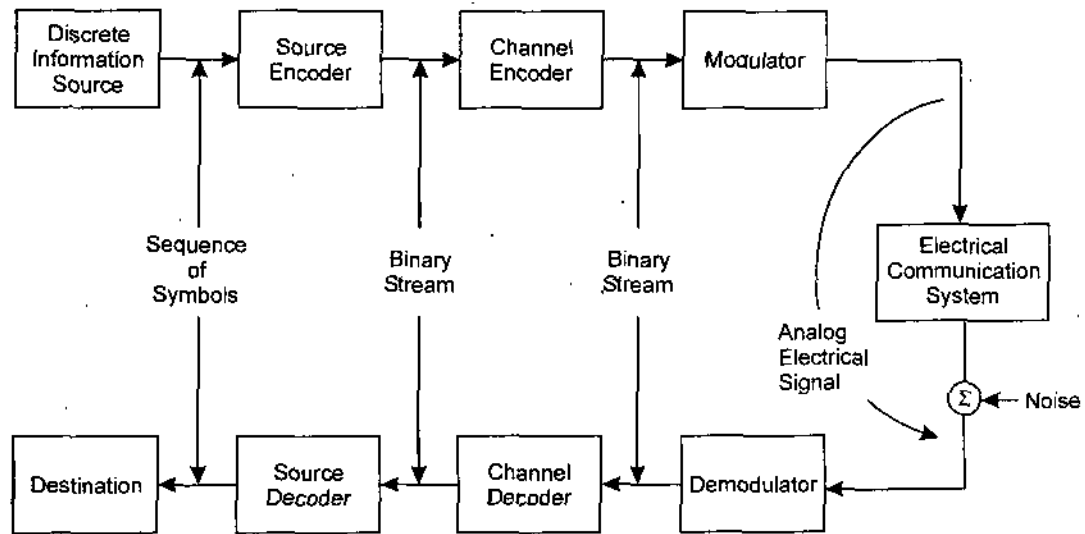
Fig.

1. Source alphabet (symbols or letters),
2. Symbol rate,
3. Source alphabet probabilities,
4. Probabilistic dependence of symbols in a sequence.

From these parameters, we can construct a probabilistic model of the information source and define the source entropy (H) and source information rate (R) in bits per symbol and bits per second, respectively.

Source Encoder/Decoder : *The source encoder converts the symbols sequence into a binary sequence* of 0's and 1's by assigning the code words the symbols in the input sequence. Source encoder may perform this operation is to assign a fixed-length or variable-length binary code word to each symbol in the input sequence. Fixed-length coding of individual symbols in a source output *is efficient only if the symbols occur* with equal probabilities in a statistically independent sequence. In most practical situations, symbols in a sequence are statistically dependent and they occur with unequal probabilities. In these situations the source encoder takes a string of two or more symbols as a block and assign variable-length code words to these blocks. The optimum source encoder is designed to produce an output data rate approaching the source information rate (R). The important parameters of source encoder are block size, code word lengths, average data rate and efficiency of the source encoder.

At the receiver, the source decoder converts the binary output of the channel decoder into a symbol sequences.

Communication Channel : The communication channel provides the electrical connection between the source and the destination. A communication channel is medium of data transfer such as a wire, optical fiber or radio link. Due to the physical limitations, communication channel have only finite band width and the information bearing signal often suffers amplitude and phase distortion as it travels over the channel. Signal power also decrease due to the attenuation of the channel. Furthermore, signal is corrupted by *unwanted, unpredictable electrical signals referred to as noise.* Noise may be internal or external. Signal-to-noise power ratio (S/N), which can be maintained at the output of communication channel, is an important parameter of the system. Other important parameters of the channel are the usable bandwidth (B), amplitude and phase response, and the *statistical properties of the noise.*

If the parameters of a communication channel are known, then we can compute the channel capacity (C), which represents the maximum rate at nearly errorless data transmission is theoretically possible. The channel capacity (C) has to be greater than the average information rate (R) of the source for errorless transmission.

Modulator/Demodulator : The modulator accepts a bit stream at its input and converts it to an electrical waveform suitable for transmission over the communication channel. Modulation can be

effectively used to minimize the effects of channel noise, to match the frequency spectrum of the transmitted signal with channel characteristic, to provide the capability to multiplex many signals and to overcome some equipment limitations.

The important parameters of the modulator are the types of waveforms used, the duration of the waveforms, the power level and the bandwidth used.

Modulation is a reversible process and the extraction of the message from the information bearing waveform produced by the modulator is accomplished by the demodulator.

Channel Encoder/Decoder : Digital channel coding is a practical method of realizing high transmission reliability and efficiency that otherwise may be achieved only by the use of signals of longer duration in the modulation/demodulation process.

There are two methods of performing the channel coding operation. In the first method, called the block coding method, the encoder takes a block of K information bits from the source encoder and adds r error control bits. The number of error control bits added will depend on the value of K and the error control capabilities desired. The second method is known as convolution coding method and the information bearing message stream is encoded in a continuous fashion by continuously interleaving information bits and error control bits. Both methods require storage and processing of binary data at the encoder and decoder.

The important parameters of a channel encoder are the method of coding, rate or efficiency of the coder, control capabilities and complexity of the encoder.

The channel decoder covers the information bearing bits from the coded binary streams. Error detection and possible correction is also performed by the channel decoder. The decoder operation depends on the type of coding used in the system. The complexity of the decoder and time delay involved in the decoder are important design parameters.

✦ 4.3. ADVANTAGES OF DIGITAL COMMUNICATION OVER ANALOG COMMUNICATION

(1) An analog signal, being continuously time varying, has an infinitely large number of levels, whereas a digital signal has a limited number of finite levels. Hence, a digitalized signal requires relatively lower bandwidth to transmit.

(2) Regeneration and decoding of a digital signal is far less complex as compared to an analog signal since number of levels in digitized message are limited.

(3) Digitized data can be conveniently processed by a computer and stored on digital storage media.

✦ 4.4. DIGITAL TRANSMISSION

Digital transmission can be made up of a signal that originated in digital form, such as computer data; analog signals can be converted into digital from and then transmitted. Regardless of whether the original information signals are analog or digital, they are all referred to as "Baseband Signals".

In a communication system the original information signals (base band signals) may be transmitted over the medium. Putting the original signal directly into the medium is referred to as "Baseband transmission". The common example is telephony, especially for the local calls. Here the voice signal converted into electrical form is placed on the wires and transmitted over some distance to the receiver.

On the other hand, there are many instances when the baseband signals are incompatible for direct transmission over the medium. For example, voice signals can not travel longer distances in air, the signal gets attenuated rapidly. Hence for transmission of baseband signals by radio, **modulation** technique has to be used.

In modulation, the baseband signal (such as voice, video etc.) modifies another higher-frequency signal called **carrier.** The carrier is usually a sine wave that is higher in frequency than the highest baseband signal frequency. The baseband signal may vary the amplitude of the carrier, keeping its frequency constant.

This is "amplitude modulation [AM]". In frequency modulation [FM], the baseband signal varies the frequency of the carrier, keeping its amplitude constant. Phase modulation is to vary the amount of phase shift of a constant frequency carrier in accordance with the modulation signal.

Computer Network

Computer Networks enable remotely placed computer systems to communicate with one another. The distance between these computers can vary from a few fact to thousand of kilometers. Today, computer networks form the backbone of most of the big industries. Computer networks are being used to provide resources sharing between systems separated by countries. Users connected to these networks are able to share database, softwares & other computing resources. They are able to communicate with one another by sending electronic mail or initiating video conferencing session Computer Networks have been responsible for development of many new applications which require access to distributed resources. They are reducing delays in manufacturing cycles; helping airlines railways to book seats from around the world and enabling organisation to manage global business from one central location.

When an array of computers is interconnected, the hardware & facilities located at each facility is referred to as a host while the resources devoted to providing the inter-host communication is referred to as a communication network. Certainly, the following are features which are useful such a network.

➤ Network must be able to accept promptly and intended transmission from a host.

➤ Network must be efficient.

➤ Data arriving at a receiving calls for a response, delay of this response should be minimal.

➤ Cost of establishing, maintaining & operating the network should be kept to a minimum.

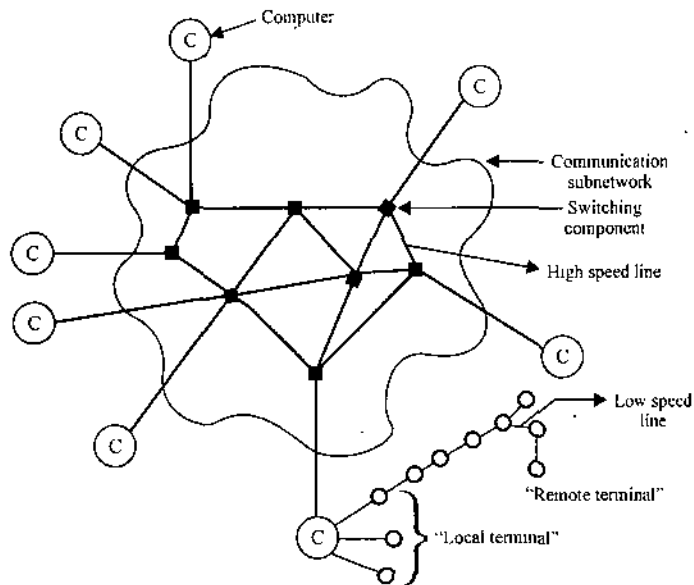A Computer communication network is represented in Fig. 4.3.

Fig.

✦ 4.5. WHAT IS A COMPUTER NETWORK?

➤ It is a **Data Communication System (DCS)** that interconnects **autonomous computers** a various sites.

➤ At its simplest form, a network consists of **two computers** or devices connected with length of communication channel such as a wire or telephone lines or coaxial cable or fiber optic cable or through satellite link.

❖ 4.6. ORIGIN OF NETWORKING

➤ **ARPANET** : ADVANCED RESEARCH PROJECT AGENCY ON NETWORKING—1959-70 Dept. OF DEFENSE. USA.

➤ **DARPANET** : Defense : ARAPENT.

ARPANET is the Origin of Internet.

➤ **Least Cost Path** : It involves

➤ (1) minimization/optimization of channel between the components, which usually entails the traffic through the fewest number of intermediate components.

➤ (2) providing the least expensive channel option for a particular application, *e.g.,* Transmitting low parity data over low cost channel rather than high cost.

➤ **Short Response Time** : Short response time entail minimizing delay between transmission and receiving of data between DTE and is specially important interactive sessions between user application. Throughput entails the transmission of maximum amount of and user data in given period.

❖ 4.7. DISTRIBUTED SYSTEM AND NETWORK

➤ In network, a user must explicitly log onto one machine and does all required jobs.

➤ In distributed systems nothing is done explicitly, it is all handled by the system without the knowledge of the user.

➤ In networking the user is an equal participant in directing the system.

➤ In effect, distributed system is a special case of networks, one whose software gives high degree of cohesiveness and transparency.

There is a difference between a computer network and a distributed system. The main difference is that in a distributed system, the existence of multiple stand-alone computers is transparent to the end user. It is up to the operating system to select the best processor, find & transport all the input files to that processor and put the results in the appropriate place.

A distributed system is a software system built on top of a network. The software gives it a high degree of cohesiveness and transparency. Thus the distinction between a network and a distributed system lies with the software, rather than with the hardware.

❖ 4.8. WHY COMPUTER NETWORKS ?

➤ First goal is to provide resources sharing, to make all programmes, equipment & especially data available to any one on the network irrespective the physical location of the resources & the user.

➤ Second goal is to provide high reliability by having alternating sources of supply.

➤ The third goal is to save money. Small computers have a much better price/performance ratio than larger ones. Mainframes are roughly a factor of ten faster than personal computers, but they may cost a thousand times more. This imbalance has caused many system designers to build systems consisting of personal computers; one per user, with data kept on one or more shared file server machines.

➤ Another goal is scalability *i.e.,* the ability to increase system performance gradually as work load grows just by adding more processors.

➤ A computer network can also provide powerful communication·medium among widely separated peoples.

✦ 4.9. NETWORK DESIGN GOALS

➤ The network designer has four major goals when establishing the **topology of network.**
  ▼ Network Speed
  ▼ Network reliability
  ▼ Least cost path
  ▼ Best response time and throughput.

➤ **Network Speed :** It refers to data rate for which the network is being designed.

Network Reliability : It refers to the ability to deliver user data correctly. It entails the ability to recover from errors or lost data in the network including channel, DTE, DCE or DSE failure.

✦ 4.10. NETWORK SECURITY

Network **security** issues include protecting data from unauthorized access and viruses.

Unauthorized access. For a network to be useful, sensitive data must be prolevels. At the lowest level are user identification codes and passwords. At a higher level are encryption techniques. In these mechanisms, data are systematically altered in such a way that if they are intercepted by an unauthorized user, they will be unintelligible. ·

Viruses. Because a network is accessible from many points, it can be susceptible to computer viruses. A virus is an illicitly introduced code that damages the system. A good network is protected from viruses by hardware and software designed specifically for that purpose.

Authentication is the process of validating the claimed identity of an end user or a device (such as clients, servers, switches, routers, firewalls, and so on). *Authorization* is the process of granting access rights to a user, groups of users, or specified system; *access control* is limiting the flow of information from the resources of a system to only the authorized persons or systems in the network. Data *integrity* ensures that the data has not been altered or destroyed except by people who have the permission or the rights to modify it; data *confidentiality* ensures that only the entities allowed to see the data see it in a usable format.

Summary

➤ Communication refers to the sending, receiving and processing of information. And when communication is done through electronic media it becomes either digital or analog communication.
➤ Hybrid Communication System makes use of the digital modulation schemes for transmitting sampled and quantized values of an analog message signals.
➤ In a digital information system the original information signals or the input signals are referred to as the baseband signals.
➤ Putting the original signal directly into the medium is referred to as Baseband transmission.
➤ The carrier is usually a sine wave that is higher in frequency than the highest baseband signal frequency.
➤ A computer network in its simplest form consists of two or more computers connected via communication channel.
➤ Connection of computers or the formation of network is done in such a way so as to obtain :
  ▼ least cost path
  ▼ shortest response time
  ▼ Speed and reliability for the transmission of data

➤ Distributed systems are a more transparent and cohesive form of computer networks wherein the user can himself login onto the remote system and perform the operations.

➤ The connection of computers is done so as to obtain resource sharing, scalability, to save money, etc.

TEST YOURSELF

[A] Choose the most appropriate answer among the given options

1. The communication system which transmits analog signals using analog modulation methods is
   (a) Digital Communication System
   (b) Analog Communication System
   (c) Hybrid Communication System
   (d) None of these

2. The information source which is characterized by source alphabet, symbol rate its :
   (a) Discrete Information Source
   (b) Analog Information Source
   (c) Hybrid Information Source
   (d) Digital Information Source

3. A communication system which uses digital communication techniques for transmitting analog signals is :
   (a) Digital Communication System
   (b) Hybrid Communication System
   (c) Analog Communication System
   (d) Discrete Communication System

4. The Channel Coding Method in which r error bits are added is known as
   (a) Black coding
   (b) Convolutional coding
   (c) None of these
   (d) Both of these

5. The incoming wave form or the input signals into the digital transmission system is known as
   (a) Carrier wave
   (b) Input wave form
   (c) baseband signal
   (d) transmit signal

6. Computer Network is required for the following reasons
   (a) Resource sharing
   (b) Save money
   (c) Save time
   (d) All of these

[B] Long Answer Questions

1. Explain the communication system in detail?
2. Write short notes on analog and digital communication system explaining the differences?
3. Write down the advantages of digital communication system over analog communication system?
4. Explain the term modulation along with its importance and usage?
5. Write a short note on digital transmission?
6. Explain the digital communication system in detail along with the block diagram.
7. Write down certain devices, which use digital communication technique and explain?
8. How does digital communication system overcome the shortcomings in analog communication system? Explain.
9. Write a short note on Computer Network and its importance.
10. Write a short note on Distributed System Comparing it with the Computer Network.

ANSWERS

1. b 2. a 3. b 4. a 5. c 6. d

UNIT
5
INTERNET

LEARNING OBJECTIVES

After going through this unit you will learn :

➤ Internet in detail including its history and its evolution
➤ Various types of Internet connections
➤ Electronic mail-sending, receiving, advantages and disadvantages

✦ 5.1 INTRODUCTION

The Internet has evolved from a collection of mainframe computers located on a few U.S. College campuses to an interconnected network of thousand sof networks and millions of computers worldwide.

Internet : An interconnected network of thousands of networks and millions of computers (sometimes *called host computers or just hosts*) linking businesses, educational institutions, government agencies, and individual together.
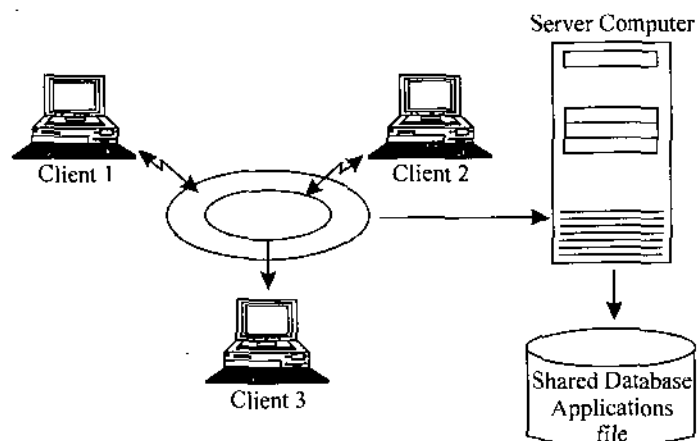

Fig. The Client Server Computing Model.

The world 'Internet' is derived from the word internetwork or the connecting together of two or more computer networks. In essence, Internet can be defined as "The networks that connects people and computers worldwide." It links approximately 1.5 million computers, attached to more than 13,000 networks in 100 or more computers. World Wide.

The Internet provides around 4000 million people around world (and over 170 million people in the United States) with services such as e-mail, newsgroups, shopping, research, instant messaging, music, videos, and news.

The Federal Networking Council (FNC) agrees that the following language relfects our definition of the term 'Internet'. 'Internet' refers to the global information system that :

(i) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent compatible protocols, and

(iii) provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein."

Various Definitions of Internet

Internet : The collection of interconnected networks that are connected using the TCP/IP protocols and that evolved from the ARPANET of the late 60's and early 70's is called the Internet. The Internet connects tens of thousands of independent networks into a vast global Internet and is probably the largest wide area network in the world.

Ther term 'Internet' today refers to the global network of public computers running INternet Protocol. The Internet supports the public w w w (world wide web) and many special purpose client-server computing system (figure). Internet Technology also supports many private corportate intranets and private home LANs.

Businesses uses Internet for a number of tasks. such as sharing files, sending Email and selling goods and services. Fewer than 1% of major companies today are not attached by the internet. Infact, the internet has become such an integral part of the cooperate landscape that it is generating a number of entrepeneurial opportunities and highly specialised jobs.

There are internet explorers, security experts, technicians. librarians, trainers and other service providers. In fact, the internet is becoming so common that many employers expect their new recruits to have a working knowledge of it.

Think of the internet as huge repository of information on almost every topic imaginable. People all over thw world can search the Internet for information, add new information, and exchanve views on Different topics. The Internet is an electronic web that connects people and businesses that have access to networks and allows then to send and receive E-mail and to participate in a number of other activities around the clock : Infact. the internet is so huge, with such a variety of features that these are few, if any, experts in the world who know every thing about it.

✦ 5.2 HISTORY OF THE INTERNET

The U.S. department of Defense laid the foundation of the Internet roughly 30 years ago with a network called ARPANET. But the general public did not use the Internet much until the development of the world wide web int he early 1990s.

In 1957, the first probject agency called ARPA came into existence where USA formed ARPA with Departement of Defence (DOD).

In 1968. ARPA awarded the ARPANeT contract to BBN< it linked four node universities in one.

In 1972. first email program was created by RAy Tomlinson. At that time, ARPA was renamed as DARPA (Defense Advanced Research Project Agency).

In 1973, there was the introduction fo a protocol called TCP/IP (allows interconnection of different computers. communication of data).

Development began in the prtocol called TCP/IP. By the introduction of TCP/IP, the term Internet came into being in 1974.

In 1976, Dr. Robert, Let Calfe development Ethernet which allow coaxial cable to move data extremely fast.

Due to the concept of Ethernet, concept of LAN came into existence.

In 1979, USENET was created by Steve Ballovin. It was the decentralized news groups network.

In 1981, NSF (National Science Foundation) created backbone called ESNET (56 kbps n/w). The CSNET has nothing to do with ARPANET.

In 1983, the University of Wisconsin allowed packets to be directed toward domain name which would be translated by the server database into- the corresponding IP number.

In 1984, the ARPANET was divided into 2 networks.

➤ MILNET and ARPANET

MILENT was to serve the needs of miltary and ARPANET was to support the advanced research ccomponent.

Upgrade to CSNET was done by introducing new circuits that used 7] lines, (1.5 mbps) which is 25 times faster than the old 56 kbps lines. Th,ere are an introduction of new network called NSFNET (National Science Foundation Network). By the introduction of T lines, old lines are banned.

In 1985, the NSF began deploying its lines.

In 1987, BITNET and CSNET merged to form CREN (Corporation of Research and Education Network).

In 1988, Traffic increased so quickly that there was an immediate necessity for upgrading the network again. So there was an introduction of TT, lines which are 45 mbps lines

In 1991, CSNET was discontinued having fulfilled its role in the provision of academic networking services. The NSF established a new network that is known a NREN (National Research and Education Network).

In 1992, WWW was introduced by NSFNET, upgraded to T_3 lines.

Birth of the Web

Tim Berners-Lee introduced to the Internet the system named www (www stands for world wide web) which has the ability to 'link' data together whether that data was located in files on the same server or on servers half a world away, he did this by brinnging together three main elements :

(1) HTTP (www protocol)

(2) HTML (the language for the web)

(3) URL (for addressing web sites anywhere in the world)

The Vision : His vision of the web was, in his own words *"about anything being potentially connected with anything'**. It is a vision that provides us with new freedom and allows us to grow faster than we ever could when we were filtered by the hierarchical classification systems into which we bound ourselves.

✧ 5.3 EVOLUTION OF THE INTERENT

The Internet has developed in three stages over a forty-year period from 1961 to 2000. The three stages are as follows :

1. Innovation Phase—This phase was from 1961 to 1974. In this, basic ideas and technologies were developed. The basic building blocks are :

▼ Packet—Switching hardware

▼ Client—Server computing

▼ Communication Protocol like as TCP/IP

The original purpose to the Internet, in the late 1960s, was to link together large mainframe computers.

2. Institutional Phase : This phase was from 1975 to 1955. In this, these ideas were brought to life. Large Institution such as DOD (Deptt. of Defense) and National Science Foundation (NSF) provided the fledging Invention called the Internet.

3. Commercialization Phase : This phase was from 1995 till dates. In this phases, once the ideas and technologies had been proven, private companies brought the internet to millions of people worldwide. Stages in the development of Internet as follows :

Innovation Phase (1961-1974)
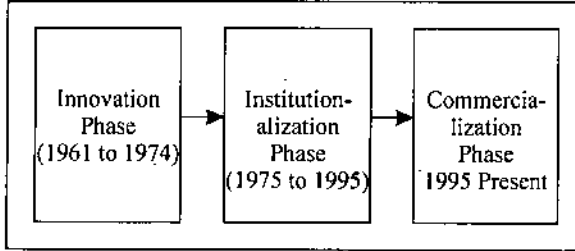
Fig. Stages of Internet during development

Years	Invention
1961	Conecpt of Packet Switching.
1961	First demonstration of a WAN using telephone circuits.
1962	Vision of a globla computer network in born.
1963	ARPA becomes the largest founder of early Internet efforts.
1966	First effort begins to build a packet switched WAN.
1968	The concept of packet switching moves towards physical reality.
1969	The conecpt of packet Switching is realised in hardware.
1972	Email in invented. ·
1973	Clinet/Server computing is invented.
1974	TCP/IP invented. These developments made possible "peer to peer" open networking.

Institutional Phase

Years	Invention .
1980	TCI/IP is officially adopted as the DOD standard communications protocol.
1980	Personal computers are Invented.
1983	The idea of 'civilian' Internet is born.
1983	Telnet and FTP services are deployed.
1984	The concept of "hyperlinked" document is introduced.
1986	The NSF adoptes the Internet as its interuniversity network.
1989	The concept of Internet supported service called www is born.
1990	The Internet backbone grows.
1993	Mosaic is invented.
1994	Netscape-becomes available.
1994	E-commerce 1 era begins.

Commercialization Phase (1995-Present)

Year	Invention
1996	Internet 2 Consortium
1998	The US Federal Govt. encourages the founding of ICANN.

Key Technology Concepts of Internet

1. Packet Switching : is a method of slicing digital messages into packets, sending the packets along different communication paths as they become available, and then reassembling the packets once they arrive at their destination.

2. Routers : are special purpose computers that interconnect the computer networks that make up the Internet and route packets to their ultimate destination as they travel the Internet.

3. TCP (Transmission Control Protocol) : TCP protocols that establishes the connections among sending and receiving web computers, handles the assembly of packets at the point of transmission, and their reassembly at the receiving end.

4. IP (Internet Protocol) : It provides the Internet's addressing scheme.

5. IP addresses : These expressed as 32 bit members that appear as a series of four separate numbers marked off by periods, such as 201.61.196.227.

6. DNS (Domain Name System) : This system is for expressing numeric IP addresses in natural language.

7. URL (Uniform Resource Locator) : The address used by a web browser to identify the location of content on the web.

8. Client Server Model: This is a model of computing in which very powerful personal computers are connected together in a network with one or more servers.

Internet Protocols

1. HTTP (Hyper Text Transfer Protocol) : The internet protocol used for transferring web pages.

2. SMTP (Simple Mail Transfer Protocol) : It is used to send mail to a server.

3. POP (Post Office Protocol) : It is used by the client to recevice mail from an Internet server.
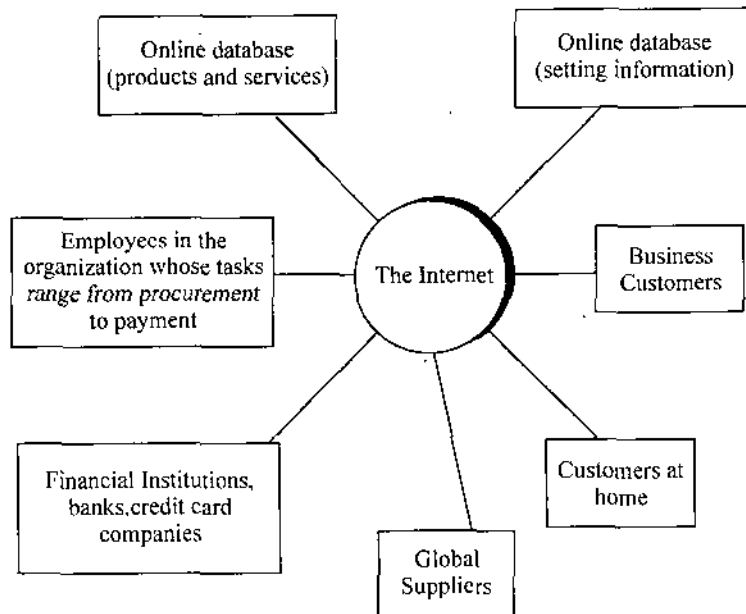

Fig. The commerical use of Internet

4. Internet Message Access Protocol (IMAP) : It is a more current Email protocol that allows users to search, organize and filter their mail prior to downloading it from the server.

5. FTP (File Transfer Protocol) : It permits user to transfer files from the server to their client machine and vice versa.

6. SSL (Secure Socket Layer) : It is a protocol that secures communications between client and server.

7. Telnet : It is a terminal emulation program that runs in TCP/IP.

8. Finger : It is a utility program supported by UNIX computers that tells who is logged in, how long they have been attached, and their user name.

9. Ping : It is a program that allows you to check the connection between your client and server.

Governing the Bodies of Internet

Promoters of the Internet often claim that the Internet is governed by no one, and indeed cannot be governed. In fact, the Internet is tied into a complex web of governing bodies, national legislatures and international professional societies.

Among the governing bodies of the Internet are :

➤ **The Internet Architecture Board (IAB)**—Which helps define the overall structure of the Internet.

➤ **The Internet Corporation for Assigned Names and Numbers (ICANN)** — Which assigns IP addresses, and their Inter NIC, which assigns domain names.

➤ **The Internet Engineering Steering Group (IESG)** —Which oversees standard setting w.r.t. the Internet.

➤ **Internet Engineering Task Force (IETF)** —Which forecasts the next step in the growth of the Internet, keeping watch, over its evolution and operation.

➤ **World Wide Web Consortium (W3F)**—Which sets HTML and other programming standards for web.

CHOOSING AN ISP

Perhaps one of the most important things to consider when determining how to get on internet is choosing your ISP (Internet Service Provider). This is the company that connects end user to the internet via the phone line, DSL, modem, Tl or whatever else user want to use.

ISP provide the following to the user :

(1) A way to get to the internet. This can be a simple dial-up modem, a DSL , line, a cable modem or even a satellite link.

(2) A software package (generally a customized browser such as Netscape or Internet explorer).

(3) A login (username and password).

(4) An access phone number for dialup or ISDN connections.

(5) Free web space (AOL, for example, gives you 2mb per screen name).

(6) Access to a newsgroup server.

(7) One or more email accounts.

Nothing else will enhance or undermine user's surfing experience as quickly or as totally as user's choice of ISP. A good ISP is a joy to work with because basically after installation user never even worry about them. The phone lines are virtually never busy, the connection is robust, their technical services are always available and cheerful. In other words, a good ISP is like the proverbial Maytag repairman (remember those commercials) - user never need to worry about them because they always work well.

A bad ISP, on the other hand, makes your surfing experience miserable. Very little is as frustrating as when user need to access the web and you get constant busy signals.

Lines that hang up mysteriously or newsgroup servers that don't work. Email that's lost or very late, and technical services people that never seem to be available or return phone calls. It's usually wise to take your time when choosing an ISP, because most of them require a multi month contact.

Note : The word "you" is used for end user or user.

There are following advices :

(i) Try and get a month-to-month contact if you can so you can cancel (at least at first, until you know how good they are).

· (ii) Do your research and don't be swayed by fancy ads and television commercials.

(iii) If you can, check out their newsgroup (many ISPs have their own technical support newsgroups), message boards and chat rooms.

(iv) Ask your friends and associates if they have any experience with them.

Before you make the decision get their technical support number and make a call. Pretend like you are a naive user and ask a few questions. See how long you wait on hold and how helpful the people are.

(iv) Check out a history of the value of their stocks. Companies that are having trouble tend to have stock values which have declined in recent months.

(v) Make sure you get a flat rate for connection time. It's a good idea to never, ever get a per-hour charge as these can add up fast.

(vi) Make sure the ISP has a local phone number. Long distance charges will also add up very quickly.

(vii) Even if you can still find a free ISP, I would highly recommend against them. There is always a hidden cost to these places, and lately they have tended to be very unstable.

(viii) Personally, I try not to mix apples and oranges. A good ISP does not necessarily make a good web host.

Once user have chosen an ISP and are set up, don't put up with anything. You wouldn't wait very long if your phone stopped working to get it fixed, would you? So don't wait to let someone know if your service is poor and be prepared to

Internet Connection through Cable : When it comes to Internet access, a flat rate is better. Today, CBN is offering a Internet connection using the cable TV network as the infrastructure. User can enjoy a 24-hour unlimited connection to the Internet.
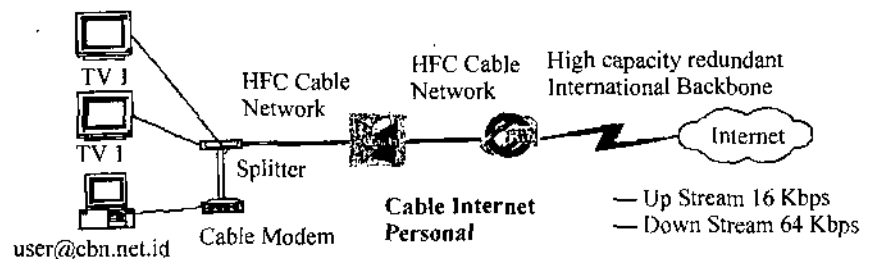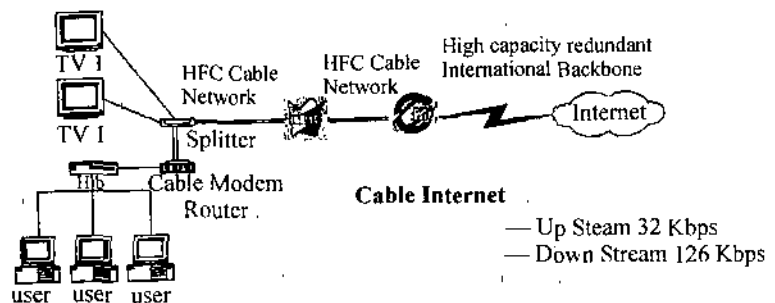

Fig.

Fig.

With the cable Internet connection, user* can free his telephone line for voice calls and other uses. No more phone usage charge to pay, no more long waits for his modem to get connected to the ISP's number, no more need to change the settings on his computer if the ISP number is always busy. Better still, he can enjoy a selection of over fifty TV programs while surfing the Internet.

In addition to the analog TV programs, the cable TV network can also carry digital data from the ISPs. If user already subscribe to the Cable TV service, user can also get Internet service through the same medium. The cable TV operator will install a separate cable into his home or office building, which will terminate in a cable modem. The cable modem, which he should buy, will connect your PC, hub, router or switch to the cable network via its Ethernet port. If his PC is not equipped with an Ethernet card, he can get it from any good computer store and it does not cost much.

Like the TV programs, his Internet access service is available 24 hours a day. He has to subscribe to the company's cable TV service before he can get Internet service. Once his cable TV service is live, CBN can proceed with his cable Internet service installation within 14 days.

❖ 5.4 INTERNET CONNECTIONS THROUGH TELEPHONE

Dial-Up Connections

The most basic type of Internet connection is called a dial-up connection. This connection is made through a modem (the communication mechanism in computers) that uses a telephone line to connect to the Internet. The modem must dial the telephone every time it wants to connect to the Internet, hence the name dial-up connection.

Modem—Dial-Up Connection

The fastest modem that user can use for this type of Internet connection is called a 56K modem. When a regular analog telephone line is used for an Internet connection, the modem must convert the analog signals that it receives from the telephone line into digital signals that the computer can comprehend. To send information from your computer, the modem must take the computer's digital signals and convert them into analog signals to be sent over the telephone line. All of these conversions take cpmpared to other Internet connections, this is a relatively slow connection. One other problem with this type connection mat calling the Internet will tie up your telephone line often forcing frequent users to bear the cost of installing and paying monthly fees for a second telephone line.

ISDN—Dial-Up Connection

The second type of dial-up connection is through an ISDN (Integrated Services Digital Network). This connection is a ;h-speed dial-up and requires a special type of dedicated digital telephone line. This type of connection improves speed .use the signals received are already in a digital format, but it is costly. An ISDN line should be considered only if the band connections.

For a while dial-up connections were the only way to access the Internet. Now, however, broadband connections are Available in many parts of the country as telephone and cable companies install new lines to accommodate Internet connections.

❖ 5.5 BROADBAND CONNECTIONS

Broadband is a high-speed Internet connection that makes surfing the Web more enjoyable. It also easily accommodates video, audio, or complex graphics that are becoming common place on the Internet. Broadband is a type of data transmission whjch a single medium or wire can carry several channels or communication paths at once. So broadband cable connections able to transmit both television signals and Internet data at the same time. Broadband telephone connections like DSL are : to transmit both voice and data over the same line at the same time.

Broadband connections are always on. That means if your computer is on, you will be connected to the Internet with no dial-up involved. For most average users, a broadband connection will mean accessing the Internet by either a cable modem jprovided by their local cable company or a DSL modem and DSL telephone line provided by their local telephone service provider.

Cable—Broadband Connection

A cable modem is a fast connection that you purchase from your cable television company. Most cable companies provide you with the modem and a network card that must be installed in your computer. Their service appears as a reoccurring charge on your monthly cable television bill. With cable Internet access, your cable company becomes your Internet Service Provider. "You do not have to have cable television to use their cable for Internet service. However, most cable companies give price inbreaks on Internet access to their cable television customers.

There are only two drawbacks to cable. First, it is a shared connection. meaning you share the "pipeline" with your neighbours. That doesn't mean that your neighbours will know what you are doing on the Internet. But it does mean that if all *I* ;of your neighbours were on the Internet downloading large files at the same time, your Internet connection would not be as %peedy as usual. In actuality, this won't have any noticeable impact on a neighborhood until a lot more folks start using cable modems. The second drawback to cable is also minor. Because cable modem connections are always on, they, like DSL connections, make you more vulnerable to hacking' and security breaches. For this reason, many cable companies are now providing their customers firewall software to help protect their security.

DSL—Broadband Connection

DSL stands for digital subscriber line. This is a special telephone line that also provides high speed Internet access. In most cases you can use one DSL line for both Internet and voice communications, saving on the cost of a "second line. DSL connections are speedy. In some cases they are as fast as cable connections. The only caveat here is that the closer you are to the main telephone switching station, the *faster your connection speed will be. So when you call the telephone company about* DSL connection, make sure that it is available and also that you will be able to get a relatively fast connection. To get a DSL connection, you will need your telephone company to hook up the line. They usually provide the DSL modem as well. Sometimes the telephone company can also be the service provider, but most often, you will need a different Internet Service Provider to provide the monthly service.

If you are accustomed to using a regular dial-up connection, you may well be amazed by the speed of a cable or DSL connection. It will make surfing the Internet a much more pleasant experience. How fast is fast? Just for a quick comparison. if a file takes one hour to download over a standard 56K modem, it will take only about 26 minutes with an ISDN line. A cable connection would take between 2.2 and 13 minutes. and a DSL connection would take between 2.2 and 26 minutes. So if you want to do some speedy surfing, *think broadband.*

❖ 5.6 SATELLITE INTERNET CONNECTION

A Satellite Internet connection is an arrangement in which the upstream (outgoing) and the downstream (incoming) data are sent from, and arrive at, a computer through a satellite. Each subscriber's hardware includes a satellite dish antenna and a transceiver (transmitter/receiver) that operates in the microwave portion of the radio spectrum.

In a two-way Satellite Internet connection, the upstream data is usually sent at a slower speed than the downstream data arrives. Thus, the connection is asymmetric. A dish antenna, measuring about two feet high by three feet wide by three feet deep, transmits and receives signals. Uplink speeds are nominally 50 to 150 Kbps for a subscriber using a single computer. The downlink occurs at speeds ranging from about 150 Kbps to more than 1200 Kbps, depending on factors such as Internet traffic, the capacity of the server, and the sizes of downloaded files.

Satellite Internet systems are an excellent, although rather pricy, option for people in rural areas where Digital Subscribe! Line (DSL) and cable modem connections are not available. A satellite installation can be used even where the most basic utilities are lacking, if there is a generator or battery power supply that can produce enough electricity to run a desktop computei system. The two-way satellite Internet option offers an always-on connection that bypasses the dial-up process. In this respect, the satellite system resembles a cable modem Internet connection. But this asset can also be a liability, unless a firewall is used to protect the computer against hack attempts.

The nature of the satellite connection is good for Web browsing and for downloading of files. Because of long latency compared with purely land-based systems, interactive applications such as online gaming are not compatible with satelliK networks. In a two-way geostationary-satellite Internet connection, a transaction requires two round trips between the earth's surface and transponders orbiting 22,300 miles above the equator. This occurs in addition to land-based data transfer betweer the earthbound satellite system hub and the accessed Internet sites. The speed in such a connection is theoretically at least 0.4\$ second (the time it takes an electromagnetic signal to make two round trips at 186,000 miles per second to and from i geostationary satellite), and in practice is somewhat longer. Satellite systems are also prone to rain fade (degradation durinj heavy precipitation) and occasional brief periods of solar interference in mid-March and late September, when the sun lines uj with the satellite for a few minutes each day. Rain fade and solar interference affect all satellite links from time to time, no just Internet systems.

The Band, a two-way satellite Internet service, installed at his rural home office. Bandwidth tests were conducted will the new system compared with a conventional telephone modem. The telephone connection provided actual bandwidth ranginj from 10 to 15 Kbps. StarBand worked at 200 to 1350 Kbps; throughput seemed to depend mainly on the download file size The fastest speeds were obtained with files of 50 KB (kilobytes) or less, typical of images and text contained in Web sites Surprisingly, fast downloads were obtained even during times of maximum Internet traffic.

❖ 5.7 E-MAIL

E-mail is an electronic version of sending a letter. You can send e-mail from your computer at any time of the day to any address around the world and your electronic letter will arrive at its destination seconds after you send it... even if the receiver lives on the other side of the world.

To use e-mail, you can use softwares like "mail client", "Outlook Express" or "Eudora Pro" for Windows machines or "Claris Emailer" for Macintosh computers or else you can directly send emails via mail servers like gmail, yahoo, rediffmail,etc.

The mail client simply allows you to :

➤ compose e-mail to send to your ISP to be forwarded to your addressee,

➤ to receive e-mail,

➤ to read and file mail that has been sent and received,

➤ to manage e-mail addresses of your contacts.

Your E-mail Address

Your e-mail address is usually your user name, followed by an @ sign, followed by the domain name of the Internet Service Provider (ISP) through which you are connecting to the Internet.

If your name is "Neha Jain" and your user name is "jainneha", and you are connecting to the ISP through gmail, your e-mail address will be "jainneha@gmail.com".

To send and receive emails you basically require the following :

1.   An internet connection, can be a dial up or a broadband, doesn't make any difference except in the speed.

2.   An email account on the mail server of your choice.

3.   A username and a password to access your email account.

4. Receiver's email address when you are sending the mail.

5. Besides these basic requirements the technical requirements constitute the name of your POP(Post office protocol server) and address of The SMTP(simple mail transfer protocol)

Sending a Mail

To begin a new e-mail message, click on the "New Message" or "New Mail" or "compose mail" button on the tool bar.

Fill in the "To:" field with the e-mail address of the intended recipient, for example, mudit_10@yahoo.com. Always use lowercase characters.Never include spaces. Click on the subject field - or hit the "Tab" key once to jump down a line at a time. Give your message a meaningful title.

If you wish others to also receive the message, enter their e-mail addresses in the "Cc:" or "Bcc:" fields. "Cc" stands for "carbon copy" and any body you copy here will receive a exact duplicate of your message. You can send the copy of the mail to any number of people e.g. your friends, coworkers or family members. "BCC" or "blind carbon copy" does the same thing accept the people in the BCC line cannot be seen by the other people to whom the mail was sent. In other words, BCC allows you to sneak a copy of your message off to a 3rd party.

You can attach other files to your e-mail using the "Attach File" button (often represented as a paper clip). An attached file can be a photograph, a text document, a program or sound file. Drag and drop is also supported for attaching files in some e-mail software packagesNow click in the main "body" of the message - the large, blank area. You are now ready to write the text that makes up the body of your message.

Once you have finished typing your email message and filling in other details just click on the send button and your message will be sent and delivered in a few seconds to all the intended recipients. All the mails sent by you in the past can be viewed under the heading "sent items". You can even save your emails before sending, all the saved emails go under the heading "Outbox".

If after typing you want to add or change your message, simply go to the Outbox, double click on your message and change the message. When you have finished, save/send your message as before. Saving will automatically overwrite your previous message.

If you aren't connected to your ISP, then saved e-mail will wait in the Outbox until you connect to the Internet. Once connected, your "queued" mail will be sent.

A summary of the mail you have received can be viewed in the "Inbox" folderThe Inbox window displays the details of each new e-mail in a single line. This line item is called a "message header". In order it shows, the read/unread icon (a bullet on an unopened envelop), the mail priority, the author, the date, the size in kilobytes, and the subject.

To view individual mail, simply double click on the line describing the mail to be viewed. In some email softwares you can view the mail by a single click only. This opens the sent message either in a new window or on the same window depending on the software or the mail server you are using.

Advantages of Email

The benefits of e-mail are huge in number

➤ *Easy to use*: E-mail frees us from the tedious task of managing data of daily use. It helps us to manage our contacts, send messages and important information quickly, maintain our mail history, store the required information, etc.

➤ *Speed*: The e-mail is delivered instantly, anywhere across the globe. No other service matches the e-mail in terms of speed.

➤ *Easy to prioritize*: Since the mails have subject lines, it is easy to prioritize them and ignore unwanted mails.

➤ *Reliable and secure*: Constant efforts are being taken to improve the security in electronic mails. Thus making it one of the secured ways of communication.

- *Informal and conversational*: The language used in e-mails is generally simple and thus makes the communication informal. Sending and receiving e-mails takes less time, so it can be used as a tool for interaction.

- *Easier for reference*: When one needs to reply to a mail, there is a provision in the mailing system to attach the previous mails as references. This refreshes the recipient's knowledge, on what he is reading.

- *Automated e-mails*: It is possible to send automated e-mails or give automatic replies to the received messages using special programs like the *autoresponders*. The autoresponders reply back to the sender with generalized pre-written text messages.

- *Environment friendly*: Postal mails use paper as a medium to send letters. Electronic mail thus, saves a lot of trees from being axed. It also saves fuel needed in transportation.

- *Use of graphics*: Colorful greeting cards and interesting pictures can be sent through e-mails. This adds value to the e-mail service.

- *Advertising tool*: Many individuals and companies are using e-mails to advertise their products, services, etc.

Disadvantages of Email

The e-mails, though beneficial in our day-to-day life, has got its own drawbacks that have slowly started showing up.

- *Viruses* : These are computer programs having the potential to harm a computer system. These programs copy themselves and further infect the computer. The recipient needs to scan the mails, as viruses are transmitted through them and have the potential to harm computer systems.

- *Spam* : E-mails when used to send unsolicited messages and unwanted advertisements create nuisance and is termed as Spam. Checking and deleting these unwanted mails can unnecessarily consume a lot of time, and it has become necessary to block or filter the unwanted e-mails by means of spam filters. Spamming includes, sending hoax e-mails. *E-mail spoofing* is another common practice, used for spamming. Spoofing involves deceiving the recipient by altering the e-mail headers or the addresses from which the mail is sent.

- *Hacking* : The act of breaking into computer security is termed as hacking. After the e-mail is sent and before it is received by the desired recipient, it "bounces" between servers located in different parts of the world. Hence, the e-mail can be hacked by a professional hacker.

- *Misinterpretation* : One has to be careful while posting any kind of content through an e-mail. If typed in a hurry, the matter could be misinterpreted.

- *Lengthy mails* : If the mail is too long and not properly presented the reader may lose interest in reading it.

- *Not suitable for business* : Since the content posted via e-mails is considered informal, there is a chance of business documents going unnoticed. Thus, urgent transactions and especially those requiring signatures are not managed through e-mails.

- *Crowded inbox* : Over a period of time, the e-mail inbox may get crowded with mails. It becomes difficult for the user to manage such a huge chunk of mails.

- *Need to check the inbox regularly* : In order to be updated, one has to check his e-mail account regularly.

❖ 5.8 VIDEO CONFERENCING

Introduction

Video conferencing involves the visula communication of parties areound the world. you can use Video conferencing to link up with specific parties or you can join Video conferencing communities that operate in the same way Internet Chat does.

There are 38 Victorian Government schools using Video conferencing technology which allows teachers and students to communicate verbally, electronically and visually as if they were in the classroom. On-line discussion grups and electronic mail enable teachers and students to interact between lessons. Clusters of rural schools also purchase mobile technology resources jointly. These shared resources, ShareTeks, are rotated around the schools in the clusters for use by students and teachers. For more information on this Learning Technologies Project.

The Education Department's SOfTNet studio offers facilities for anyone to book their Video conferencing suite at 23 St Andres Place-Melbourne. You can book facilities by contacting Mauro. To book facilities held in schools conact the schools directly.

Cu-SeeMe

The most popular program is CU-SeeME. It is a free Video conferencing program (under copyright of Cornell University and its collaborators) available to anyone with a Macintosh or Windows and a connection to the Internet. With CU-SeeMe, you can video conference with another site located anywhere in the world. If you want to conference with more than one other person/computer you need to connect to a reflector. By using a reflector, multiple parties at different locations can participate in a CU-SeeMe conference, each from his or her own desktop computer. With CU-SeeMe each participant can decide to be a sender, a receiver, or both.

Receiving requires only a standard Mac and a connection to the Internet. Sending requires the same plus a camera and digitizer which can cost as little as $100 to add on.

For PC User to send and receive video you will need a video card supports Microsoft Video For Windows and a video camera to plug into the video card. To send & receive audio you'll also need a Sound Card that conforms to the Windows MultiMedia Specification (Sound Blaster or better). Full Duplex audio is very desirable and Speakers (or headphones) and a microphone.

Summary

➤ Internet is a collection of thousands of computers and millions of networks called host computers.

➤ Internet is even used by the business houses to advertise their products and services.

➤ The evolution of internet took place in 3 phases i.e.,

▼ Innovation phase

▼ Institutional phase

▼ Commercialization phase

➤ DNS or Domain name system is sued for expressing numberic IP addresses in general language.

➤ URL is used by a web browser to identify the location of context on the web.

➤ ISP is the medium that connects the end user to the internet.

➤ Internet connections can be established through telephone line i.e., by using a Dial up or through Broadband media.

➤ DSL lines can be used for both internet an voice communications thus saving the cost of a second line.

➤ Email stands for electronic mail which has lots of advantages over postal mail.

TEST YOURSELF

I. Write True or False

1. Internet is a collection of computer networks all over the world.
2. The evolution of internet took place in 2 phases.
3. Broadband connectinos are slower than dial up connections.
4. URL is used to identify the location of the context on the web.
5. DNS stands for Domain Name SErver.
6. DSL can be used for btoh internet and voice communctions.
7. Email is even used by the companies for marketing and advertising of their products.
8. For sending adn receiving email your compulsarily require softwares like outlook express.

II. Long Answer Questions

1. What do you mean by Internet ? Explain its tools in distributed environment ?
2. Expalin History of Internet ?
3. What are three main elements in birth of the web ?
4. Explain the various governing bodies of Interent ?
5. What do you by the term ISP ? Explain various technologies for choosing an ISP ?
6. Explain :
(i) Interent Satellite connection
(ii) Internet connections-through cable.
(iii) Internet connections through telephone.
7. What are the commercial advantages of Interent ?
8. What do you mean by 'video conferencing' ? Explain any popular program of video conferencing ?
9. What are the basic requirements of software in email application ?
10. Explain statellite connection to a school building in a Email application ?
11. Write a short note on advantages and disadvantages of mail.
12. Compare an emil with a postal mail.

Answers

1. T 2. F 3. F 4. T 5. F 6. T 7. T 8. F

☐☐☐

U N I T
6

E-COMMERCE

STRUCTURE

➤ What is E-Commerce ?
➤ Costs and Benefits of Electronic Commerce
➤ E-Commerce in Organization.
➤ Consumer E-Commerce
➤ E-Commerce Architecture
➤ Introduction to Mobile Commerce
➤ Mobile Computing Application
➤ Mobile Information Access Device
 ✿ Summary
 ✿ Test Yourself

LEARNING OBJECTIVES

After going through this unit you will learn :

➤ What is e-commerce and its importance
➤ Application of e-commerce in business and its integration in various business types like B2B, B2C, C2B and C2C
➤ How is e-commerce implemented
➤ Introduction to mobile commerce and its application

✤ ELECTRONIC COMMERCE

Over thousands of years that people have conducted business, they have adopted tools and technologies that were available. In the twentieth century companies started using different kinds of electronic communication tools to conduct different kinds of business transactions.

E-Commerce has created a new environment in business transactions using internet. It deals with providing information to the consumers regarding products of their interest

Concept : E-commerce is a dynamic set of technologies applications and business processes that links enterprises consumers and communities through electronic transactions and the electronic exchange of goods, services and information.

E-Commerce originated in a standard form for the exchange of business documents. E-commerce is not a one line statement. It is an integration of various business types like B2B, B2C, C2B and C2C. Network infrastructure and transmission media is the backbone of E-commerce. Electronic payment Web security and encryption are the essential features of E-Commerce Rapid and unprecedented growth of Internet makes E-commerce the business opportunities of future. The ability to buy and sell at any time and from any location is changing the scenario of modern business.

✤ 6.1 WHAT IS E-COMMERCE

Electronic commerce means doing business online typically vai the web. It is also called e-business e-tailing and l-commerce. E-commerce maintains business relationship and sells information and service by means of computer telecommunication networks. E-commerce usually refers only to the trading of goods and services over the internet. E-commerce consists of business to consumer and business to business

commerce as well as internal organizational transactions that support these activities. **Overall, E-commerce is a new form of** *corporate operations known as a Virtual Company.*

E-commerce was stated in 1994, but in 2003 with the introduction of first graphical browser software for accessing the word wide web, most of the e-commerce business shifted to Internet

E-commerce is one of the most important aspects of the internet sharing technologies among trading partners, to achieve business objectives. Formally speaking electronic commerce means the business transactions that are being handled electronically. Alternatively we can say it is a gimmick to create the highest quality and most exciting venue for conduction business with in a very short time. There are six basic functions of electronic commerce. These are : (i) Information search (ii) Information communication, (iii) Process management (iv) Service Management (v) Shopping service (vi) Virtual enterprises.

(i) Information Search : Information access provides search and retrieve capability for public domain and proprietors via dial up access to a centralised database.

(ii) Interpersonal communication : It provides methods for different groups with mutual interests to exchange information "discuss " ideas and improve their co-operation . E-mail is one of the simplest among them.The other examples include customer and supplies design groups jointly working out for product specifications and updated fines being sent by a publisher to a printer located at distant place etc.

(iii) Process management : It includes the process improvement functions which cover the automation and improvement of business processes. A good example would be networking two computers together so that they could share and transfer data rather than taking data from one machine to another personally by means of floppy or CD.

(iv) Service management : This is the application of technology to improve the quality of service . A good example is federal Express web site. It allows customers to track shipments and schedule pick ups of cargo throughout the day world wide with out having to talk to a customer service representative. Customer service is greatly increased, by this technique.

(v) Shopping services : This provides the ability to buy/sell goods/services on the internet or some other on-line service. The retail web site of Amazon. come is good example of shopping services.

(vi) Virtual Enterprises : Virtual enterprises are business arrangements in which trading partners separated by geography and expertise are able to engage in complex joint business activities as if they were single enterprise. One example would be true supply chain integration, where planning and forecast data are transmitted quickly and accurately throughout a multi-tier supply chain.
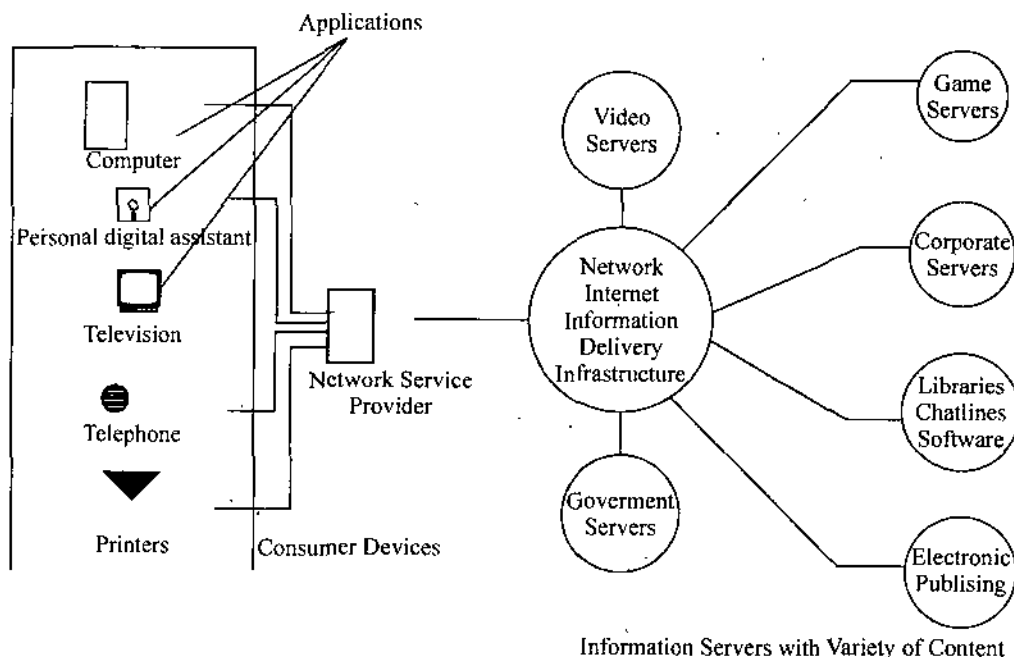

Fig. Elements of E-Commerce

Few Steps to Set up Business on the Web

1. The first requirement is an on-line store or commerce enabled website where goods or services can be described.

2. On line payment like payment through credit cards.

3. Packing and shiping after confirmation of order.

4. Customer service support like complaints returns.

5. Regular promotion because without successful promotion your on line business will fail.

Note : Students should visite the following Websites for an online experience of e-commerce.

1. www. yahoo. com/business

2. www. amazon.com

3. www.aol.com

4. www. baazee.com

Cycle of e-commerce : The concept of e-commerce indicates.

The activities performed and communicated by using internet.

➤ Carrying out business transaction

➤ Performing business operations like mode of payment.

➤ *Providing relevant information to consumers regarding their products goods and services.*

➤ Organising sales management

➤ Receiving and making payments. figure elaborates the cycle of e-commerce.
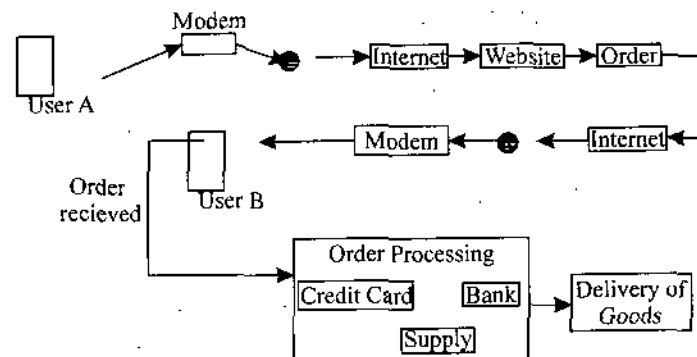
Fig. Cycle of e-commerce

❖ 6.2 COSTS AND BENEFITS OF ELECTRONIC COMMERCE

Let us first estimate the different costs which are involved in starting electronic commerce. The first cost which the company has to incur when it decides to have a web-site is the hosting cost. Hosting determines where the files and images associated with the web site are going to reside. Large companies or those who want total control tend to perform this function in house while small businesses (those who do not consider this function a core competency) will out source the service with an Internet Service Provider (ISP). It is hard to break down hosting costs for companies that perform the service in house because a lot of the costs get absorbed into general overhead,. One has to account for the salaries of the staff who run the operations the connection to to the Internet domain registration and equipment. The costs for out source hosting will be high compared to the in-house hosting.

Once it has been decided where to host the web site, the next task is to design and develop it.This may be performed in house or contracted to outside party. The costs involved in these activities vary depending on size and complexity of the web site. The next type of cost is the cost of maintaining the website.

Hosting construction and maintenance are not the only costs involved in the web site. There are also opportunity costs which are especially true for small businesses if they put up the web site themselves. The decision makers have to decide about the web site operation with limited resources time and money of the organisation.
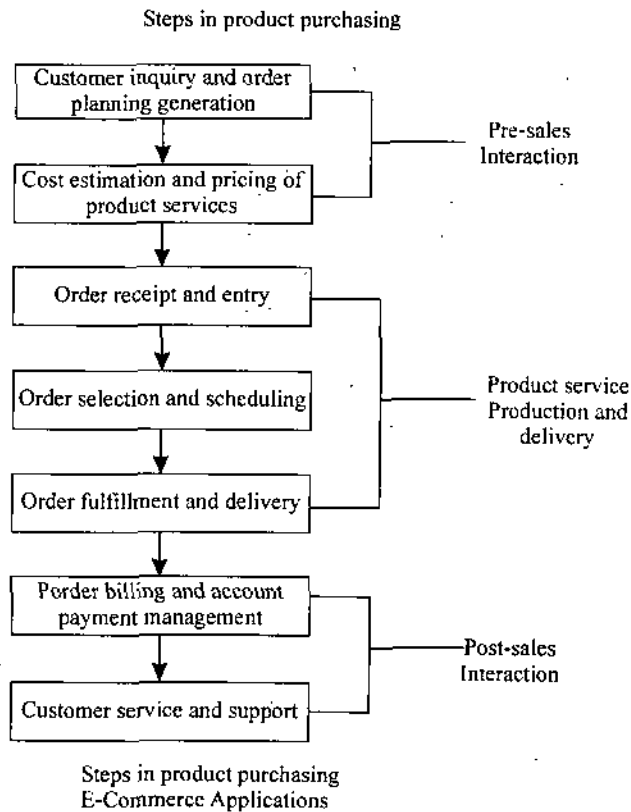
Steps in product purchasing

```
┌──────────────────────────┐
│ Customer inquiry and order │ ─────┐
│   planning generation     │      │
└──────────────────────────┘      ├──── Pre-sales
            │                      │     Interaction
            ▼                      │
┌──────────────────────────┐      │
│ Cost estimation and pricing of │ ─┘
│    product services       │
└──────────────────────────┘

┌──────────────────────────┐
│  Order receipt and entry  │ ─────┐
└──────────────────────────┘      │
            │                      │
            ▼                      │
┌──────────────────────────┐      ├──── Product service
│ Order selection and scheduling │  │     Production and
└──────────────────────────┘      │     delivery
            │                      │
            ▼                      │
┌──────────────────────────┐      │
│ Order fulfillment and delivery │ ─┘
└──────────────────────────┘

┌──────────────────────────┐
│ Porder billing and account │ ─────┐
│   payment management      │      │
└──────────────────────────┘      ├──── Post-sales
            │                      │     Interaction
            ▼                      │
┌──────────────────────────┐      │
│ Customer service and support │ ──┘
└──────────────────────────┘
```

Steps in product purchasing
E-Commerce Applications

Fig. Steps of E-Commerce

Consumers or end users of the web sites also incur some costs because there are lot of misinformations on the web. Some of these are intentional and others are inadvertent. And sincerely you cannot trust everything you read out there.

There are lot of benefits from the web-site, out of which main three benefits are : (i) Building Communities; (ii) Growing Revenues; (iii) Cutting Costs.

(i) Building communities

Companies are are giving the same level of service to the customer through the internet that they are currently getting from a salesman. For example Marshall industries a distributor of electronic components makes it very convenient for customers to order parts online. Visitors to the web-site can search for a part by its number description, or manufacturer. They can place an order for parts pay for them electronically track the status of previous orders and even speed up dielivery time by connecting to the shipping companies web-site.

The combination of these levels of services could make the Internet a very compelling channel for customers. When customers choose to do business through the web-sites they make an investment of their time and attention. It takes some time to know how to use a site and become comfortable with it. If a site involves personalisation, customers have to fill out profiles and perhaps update them over time. They may also modify their own systems to make better use of electronic connections. Due to these once the customer has established a relationship with an electronic seller, he/she is unlikely to go through the effort with many suppliers.

(ii) Growing Revenues

Each time a customer visits a company's web site, there is an opportunity to deliver additional services or provide a path for other businesses to reach him/ her. For instance, Netscape communication corporation, a company that develops and sells internet sofware, receives significat additional revenue at very little marginal cost by selling advertising space on its site. A company can take advantage of its ability to conduct transactions over the Internet to take value away from others.

A company can also plan its own digital assets to serve new customer segments. Standard and Poor Corporation (S&P) or USA, a company that was providing financial information to institutional to institutional customers, is using the information to provide financial planning services to individuals over the Internet. For a very nominal fee, customers are able to evaluate the risk of their individual security portfolios and make protfolio allocation decisions based on the advice of the market experts.

E-commerce also enables merchants to get a lot more feedback. Through the newsgroups mailing lists and chat sites ordinary people can tell now what they like and what they hate and what they are buying and what they are returning. Thus, online merchants can put together a clearer picture of each shoppers interests and preferences much quicker than any surveyor's report.

(iii) Cutting Costs

E-commerce is radically altering the business activities by making the market place more efficient. Each of the models emerging for doing business on the web is focussed on the buyer. Each helps purchasers establish a market place for goods and services, where buyers and sellers clear their transactions at the lowest possible price. In highly structured market. such as insurance and electronic parts, the product is relatively homogenous, as the buyers and the sellers do not know the identity of each other. This will allow for the creation of competitive anonymous markets for many industries, and buyers and sellers will converge and competition will stabilise the price to near optimal levels. In the past the buyers were unable to find the best price. But in this new scenario, a company can enter a priceless offer and wait for multiple parties to bid.

❖ 6.3 E-COMMERCE ORGANIZATION

An inter organization involves information flow among two or more organizations. Major objective is efficient and effective transaction processiong like transmitting order bills and payment using electronic data interchange. Inter-organizational systems are used for B2B applications. Inter organizational E-commerce includes a company. Its suppliers and customers. Through this system buyers and sellers operate business transactions. Communication networks play an important role for flow of information.
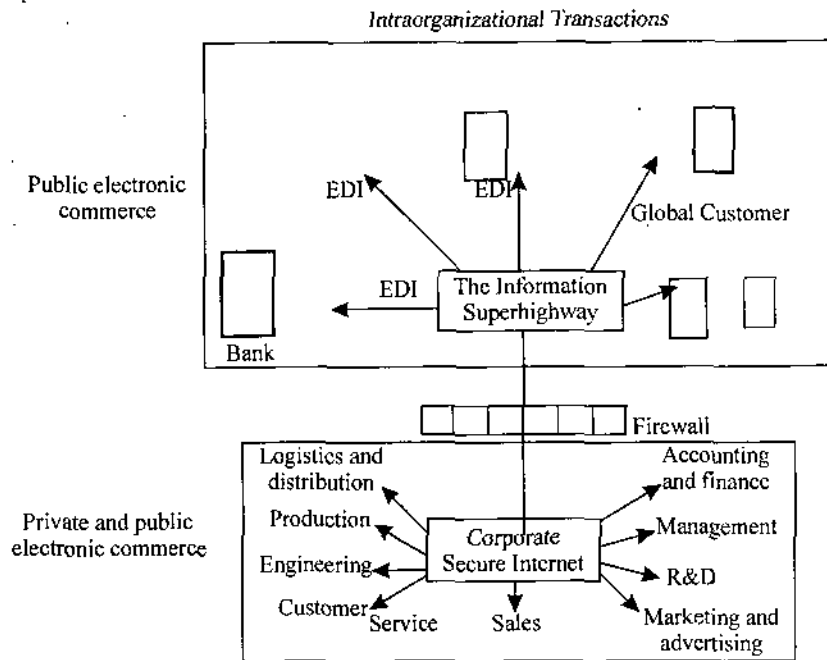
Fig.

Types of Inter organizational Systems :

1. EDI

2. Extranet

3. Electronic Forms

4. Fund transfer

5. Integrated Message

6. Shared database

7. Supply Chain Management

Intra-Organizational E-Commerce means intra business. It includes all internal organizational activities generally performed on intranet. It includes exchange of goods, services or information.

Intra organizational E-commerce. Intra organizational E-commerce is a corporate LAN or WAN that uses internet technology and is secured behind company's firewalls. The intranet links various servers, clients, databases and application programs like ERP (Enterprise Resource Planning).

Intra business is based on the some TCP/IP protocols as the internet. They operate as a private network with limited access. Only authorized employees are able to use it. Intra organizational E-commerce are limited to information related to the company and certain exclusive and sensitive information.

✧ 6.4 CONSUMER E-COMMERCE

Computer analysts and historians might long remember Christmas season 1998 as the "coming of age" for world wide web based consumer E-commerce. According to Forrester Research, online shoppers pushed consumer based E-commerce revenues to almost $8 billion in 1988. Many believe that those numbers will continue to grow at a brisk pace for many years to come.

There are serveral reasons :

Choice : Shoppers are no longer limited by how far they can drive and "shopping bots" are now helping to automate and personalize the online shopping experience by providing exactly what the consumer wants at the lowest possible price.

Convenience : Online stores never close.

Better consumer information : The proliferation of online consumer information such as the dealer costs of new automobiles and self-published consumer comments and reviews, has heightened consumer awareness.

Steadily, these factors are resulting in the masses adopting E-commerce. According to Forrester Research households earning less than $ 25000 annually will use sub- $500 Personal Computers and nearly double their share of current online buys (from 6 percent to 11 percent) in the next few years.

As United Parcel Service Chairman an CEO Jim Kelly said in a January 1999 speech before the Economic Club of Detroit "customer preferences now far outweigh retailer's agenda in the buying and selling experience."

"How we as corporate managers respond to this new reality will determine our success in the coming decade, and n many cases determine what our businesses will even be around 10 years from now" Kelly said.

The ten largest retailing webs sites account for more than 50 percent of overall retail e-commerce revenues. Overall more than 80 percent of retail e-commerce revenues come from four sectors - computer goods, entertainment, travel and discount brokerage. This is remarkable, especially when you consider the fact that (according to a November 1998 Boston Consulting Group Study), only five percent of Web site visitors actually become customers. The Consumer e-commerce sector has also been fairly well insulated from major infrastrctre problems. Only a large scale internet outage or other unforeseen problems could dampen the rosy growth projections.

Models of E-Commerce

The players in e-commerce are the end users. End user are the people involved in the computerised business e-commerce these can be modelled in the following three categories.

Business-to -Business E-Commerce (B2B)

B to B model is that kind of e-commerce in which a company sells or buys from other companies and communicate with each other by electronic means, it serves a limited number of customers and not many people known about its existence.
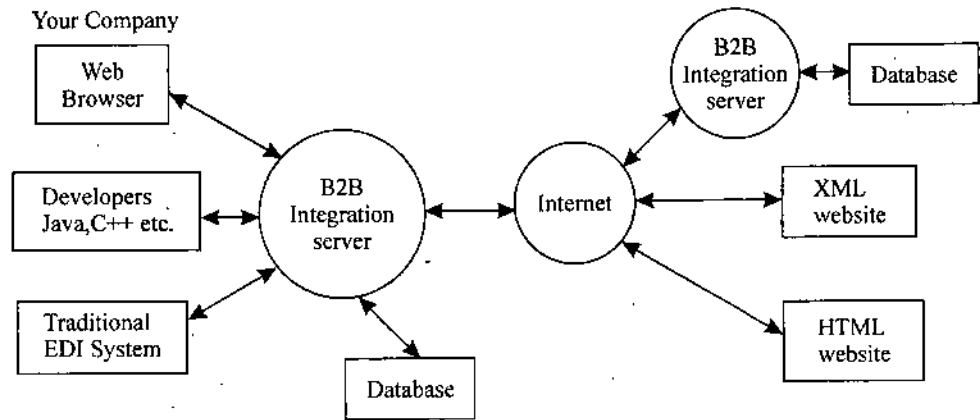
Fig. Details of B2B integration

B2B integration is actually an automated communication and exchange of information between different companies and enterprises. This integration is done on Internet instead of propreitary network. XML AND HTTP standards are used in this business model.

According to most estimates, business-to-business e-commerce produce revenues at a rate eight to ten times higher than those produced by the consumer e-commerce sector. The U.S Department of Commerce explained the phenomena in "The Emerging Digital Economy".

"Internet commerce is growing faster among businesses. It is used for coordination between the purchasing operations of a company and its suppliers, the logistic planners in a company and the transportation companies that warehouse and move their products the sales organizations and the wholesalers or retailers that sell their products, and the customer service and maintenance operations and the company's final customers.

Even at $5 trillion by 2003, Internet commerce only represent 3 percent of total gross domestic product. This means that the greater efficiency companies are experiencing from Electronic Commerce are or e-commerce likely to continue to diffuse through the U.S economy for decades to come.

To many people, the term electronic commerce, means shopping on the part of the Internet called the Web. Electronic commerce is much broader and encompasses many more business, activities than just Web shopping. Some people and businesses use the term electronic busines or e-business. When they are talking about electronic commerce in this broader sense. The web has made online shopping possible for many businesses and individuals electronic commerce has existed for many years. For decades banks have been using electronic funds transfers (EFTs) or wire transfers, which are electronic transmission of account exchange information over private communication networks.

In addition buying or selling online, companies engage in many other activities that keep them in business. In many cases, sellers will customize or create product to a customer's specifications. Product buyers also engage in similar activities. They must examine the needs, identify products that might meet those needs, and evaluate those products. Next, buyers must order the selected product arrange for delivery and pay for the product. In many cases, buyers have to maintain contact with the seller for warranty and other maintenance on the product. Of course buyers and sellers can engage in these transactions for services as well as product. When you think broadly about commerce, you see that it can involve individuals, business companies not for profit organizations and government entities as both buyers and sellers.

A good way to understand the full range of electronic commerce is to learn about the activities that companies undertake when they do any kind of business (engage in commerce) and then to learn how these companies might undertake these activities electronically.

Advantages

➤ Improved customer satisfaction

➤ Improved inventory system

➤ Easy and cost effective marketing coordination between manufacturers, distributers dealers

➤ ·Better management of business.

➤ Better planning, based on available information.

Requirement of B2B Integration through Internet

It must be capable of meeting the following requirements :

➤ The system should be able to support connections among large number of business partners..

➤ The system should provide security through the Internet Protocols such as HTTP etc.

➤ It should be able to support and integrate the existing systems such as EDS, ERS etc.

2. Business to Consumer E-Commerce (B2C) :

This model of e-commerce involves business directly with the customers (i.e., end -consumers).The per transaction volume is low but the service base of customers is very large. In this model the cost of investment is too high both on H/W and S/W to manage the huge transactions. Huge investment is also ·required for marketing so that more and more people visit the site. The activities of this business model are shown in fig.
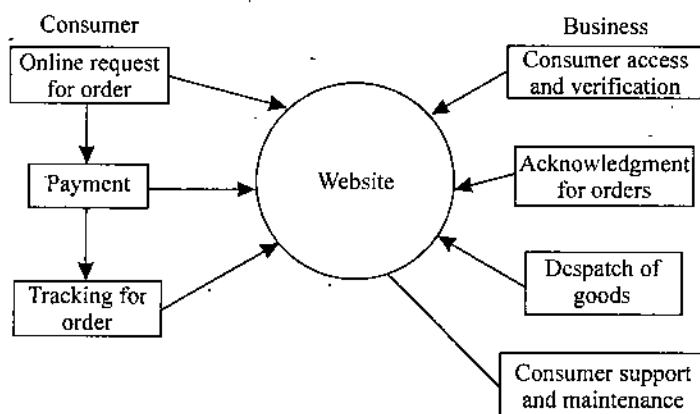
Fig. Activities of B2C model of e-commerce

3. Consumer to Consumer E-commerce (C2C)

· This model does not require·a large area of web based commerce. It can be understood with the help of an e.g. viz 'auction of an item or a site.' If one has something to sell by auction, the same will be listed. Then the actual consumer can bid for it. These sites are again used like B2C. ·

❖ 6.5 E-COMMERCE ARCHITECTURE

A simple Web application can be designed as a three-tier (browser, web server and data-base) architecture constituting three modules viz presentation logic.which deals with the HTML pages that help the user to navigate through the organizational information, Data logic which deals with databases related to the application, and business logic, which is the interface between the presentation logic and the data logic.

But e-commerce applications are based on a multi-tier architecture. Compared to other Web applications, e-commerce applications should be highly secure and depends more on third party service providers like security service providers, merchant bankers, financial institutions etc.

The components of each layer are discussed below in conjuction with the processes and the tools/technology related to them.

E-commerce can not be an independent system that would take care of the business on the Internet on its own. It should be viewed as a giant, integrated information warehouse extended from the existing resources that would cater to the information needs of the employees, customers and supplier. Organizations should leverage their back-end systems at the point of every transaction providing relevant and timely information to customers. E-commerce initiative should integrate and automate marketing, selling fulfilment and service functions across the entire business flow.
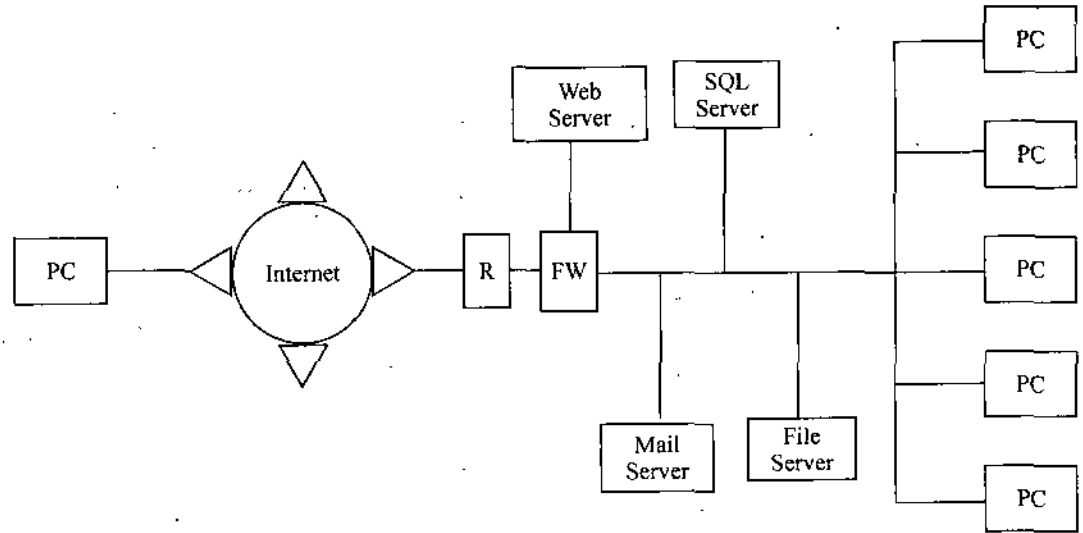
Fig. Architecural Framework

Today, an organizations data is not in a single source it is distributed on Oracle, MFG-PRO Ingress DB2 and so on. The systems interface layer should be designed to integrate these legacy systems and make them more transparent on the Web. For instance when a customer orders an item online the order should immediately get into the order management system that might be residing in a Oracle database and the Supply Chain Management that might be residing in an Ingress database.
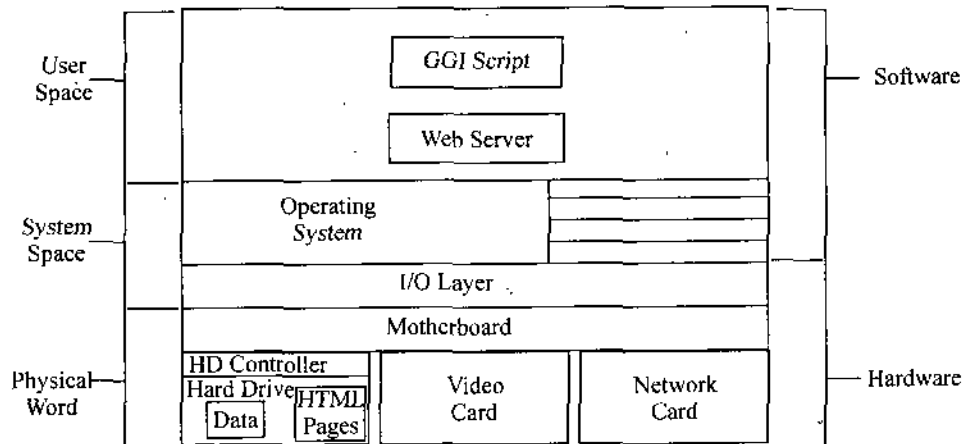

Fig. Architecture

A customer's or partner's transaction should get into the business flow viz production, inventory marketing, salesshipment delivery and finance. This would enable the customers and partners to have up to the minute pricing inventory and order status information directly from the Web,.The data management layer should precisely address the issue of providing a single integrated source of reliable business information for all the stakeholders viz business partners, customers suppliers and employees.

Security is the most critical aspect of the e-commerce application. Even today a majority of customers are not fully convinced in giving their credit card numbers over the Internet. If trading on the Internet is not 100 percent secure the money transaction will continue to happen in the conventional ways only. Conscious of this IT industry is progressively coming up with sophisticated Internet security standards. As the entire business is integrated and thrown open to the world the organization faces security threats both from internal and external sources. Though powerfull security technologies including encryption authentication fire walls and intrusion detection systems are available it is the responsibility of the organization to intelligently select. combine and introduce the technologies, right from the onset of the project.

Money transaction is the essential feature of e-commerce. It is important to implement secure, cost elective and reliable ways to collect payments and process transactions over the Internet. There are plenty of

software products that will take care of the actual transactions. The transaction system of e-commerce should take care of the 24×7 (24 hrs a day, 7 days a week) uptime of the application transaction integrity, concurrent system interface ability to handle the increase in volume of transactions risk management and recovery system, etc. while building the transaction layer, the organization should aim at achieving faster response time and transaction closure.

User interface involves building attractive online storefronts. The e-commerce site should provide well- organized HTML/ASP/JSP pages that display the required information. The customers should be able to navigate through the pages and get the relevant information within a few mouse clicks. The user interface module should aslo take care of personalizing the customers, sending periodic product catalogues, clinet-side verification/systems efficient search engines foot print analysis online help frequently asked questions and answers etc. The core consideration here is in providing a look and feel that would make accessing the site a pleasure!

E-commerce implementation should be in a phased manner. Before actually getting into the development stage, the organization should plan the type of e-commerce application that has to be built first. Here is a sample approach for a phased e-commerce introduction.

➤ Start with e-employee soft service (e-ESS) and test it with the employees:

➤ After evaluation the success and performing a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis an extranet cant be implemented for e-procurement with select vendors in select regions.

➤ Next target could be implementing e-procurement for procurement activities across regions.

➤ After a couple of B to B implementations the organization can go ahead with B to C implementation.

Whatever may be the type the development should start only after implementing the legacy system interfrace layer and the data management layer. Chuck Shih Research Director of Gartner Group, feels that organizations should make a checklist of the best business practices infrastructure and the customers/partners, before and after implementing the e-commerce applications E-commerce development team should include professionals drawn from various divisions like MIS, ERP, procurement inventory marketing quality and software development.

Players in the Arena

Because of the boom in the e-business market, every major IT player wants to cash in and the result is a plethora of e-commerce development suites. The range of suites on different platforms includes the e-commerce server, transaction server security services development kits shopping carts and other services.

While selecting the tools/technology/third party service providers an organization should look into the infrastructure ERP/data warehousing solutions and the network capabilities that are already available . If an organization has already implemented ERP,then it can utilize the tools/solutions provided by the ERP vendor to implement the e-commerce. For example SAP Baan, Oracle and People Soft have come out with products like commerce server online store, Internet Client, Procurement Solutions etc.

One of the major advantage of e-commerce implementation is the cost of building the solution. Unlike the huge costs associated with ERP implementation e-commerce solutions carry smaller price tags. Quick learning curves and faster implementation schedules make the e-commerce application development very interesting.However an unplanned initiative might cost the entire business.

The forces exerted by rapid changes in technology and customer expectations are unstoppable . So the need to constantly re-evaluate and reinvent the existing business processes becomes inevitable. Our aim should be to make the organizations adopt strategic approach towards implementing e-commerce. The key will be to focus on fundamental guidelines.

➤ Do not rush

➤ Lay the foundation strong

➤ Plan carefully and implement.

✦ 6.6 E-COMMERCE OPPORTUNITIES

Many businesses are considering ways to exploit online commerce using the facilities of the internet and the world wide web. The growing online economy is characterised by greater choice of products purchasing optios and also increasing competition. The traditional patterns of commerce have to change as electronic customers have much greater opportunity to select a supplier taking into account factors, such as value price and quality. Benefits for both the sides include the more convenient locations and time for ordering faster buying potential availability of product information and possiblilities for customised service. There are different categories of businesses using electronics commerce such as new businesses which are starting afresh secondly technology companies which would have an interent in improving electronic routch to promote their services and media companies which would benefit from the fast distribution of information together with low set up cost. The following are the different areas of business opportunities in e-commerce.

Business opportunities in E-Commerce

Organisations seeking to achieve larger strategic objectives are focussing their e-commerce initiatives in four areas of business applications . They are: (i) Supply Chain in Management; (ii) Electronic Marketing (iii) Collaborative Work; (iv) New Business Creation

(i) Supply Chain Management : Supply Chain Management (SCM) is to optimise business processes and business value in every corner of the extended enterprises from the supplier's supplier to the customer's customer. SCM used e-business concepts and web technologies to manage beyond the organisation upstream and downstream improve productivity. Some of the processes included within SCM are *Procurement Inventory management; Forecasting Werehousing and Logistics.*

Companies with a network of suppliers vendors and distributors need a fast efficient way to disseminate information and enable two way communication . This is done over the Web using customised extranet site, web servers and group ware. By using e-business based SCM solutions companies can lower operating costs through reduced inventory requirements improve *customer satisfaction by maintaining adequate stock* improve productivity through better data integrity, fewer order entry errors less rework and faster communication.

The bottom line is an improved competitive position, i.e., Customer Relationship Management. Analysing past customer behaviour enables an e-business to personalise its offering and to anticipate the customer's wants and needs. These systems will give customers controlled access to the data they need. In other words the enterprises not only manage the relationship with the customers but give the customers the tools to manage their relationships with the enterprises. As a result the enterprises can fine tune segmentation of the customer improve customer retention by building loyalty improve customer satisfaction, increase customer mind-share and spend share establish a competitive advantage and improve profitability.

(ii) Electronic Marketing : This involves leveraging Internet technologies to market and sell prodcuts directly to consumers. It takes care of developing implementing and managing distribution channel using enabled technologies. It also helps to deliver effective customer support, at very low cost and develops ways to increase sales force effectiveness through greater availability and collaboration.

(iii) Collaborative Work : This covers almost all aspects of individual' life to work together by using the network. Collaborative work is helping to eliminate several barriers such as development of initial products and imporved communication with the customer. Creating Virtual R & D teams of clients, suppliers customers and employees is one type of collaborative work to improve the product and services. A virtual manufacturing organisation, can be assembled taking multiple companies located at different locations, to provide a single product or service.

(iv) New business Creation : The internet is creating opportunities for companies to access a growing global market. Next generation software and network access services are coming up due to the new kind of demands due to internet enabled e-commerce.

Job Opportunities in E-Commerce

According to the computer system analyst, there will be a great demand in the following job specialisations such as :

- ➤ System Programming (Unix, Window, NT, windows 95)
- ➤ Communication Engineers (Routers, ISDN, SLIP, PPP, RAS, TCP/IP, Ethernet)
- ➤ Communication Programmer (C, C++, VB)
- ➤ EDI Programmer
- ➤ Technical Writers
- ➤ Trainers
- ➤ Technical Support
- ➤ Field Engineer Support
- ➤ Sales and Marketing

Effects of E-Commerce

Due to the rapid development of e-commerce there will be a paradigm shift in the business practices. They are as follows :

Virtual Corporation : Opportunities for the use of external business partnership might have no physical location. Two or more parties create a partnership that relies completely on electronic transactions.

Global market access by smaller vendors : Global markets traditionally open only to large companies will be accessible to smaller vendors due to lower need of resources to operate abroad.

Transformation of the retail store : Growth of home shopping and direct from- manufacturer sales causing lower prices by reducing commission and rent and transportation.

Pressure on customer services , development cycle and cost : The value chain will become less and less tolerant of the need for inventory and storage. Greater competition will be unavoidable, that might cause stronger need for inventory and storage resulting in stronger need for electronic cash.

New standard : Many new formal and de-facto standards for components packaging interfaces documentation etc. will be led to as a consequence.

The Indian Scenario of E-commerce

The Indian market is yet to respond to the immense potential of e-commerce. The absence of activities is due to the lack of infrastructure. The Indian government must recognise the power of the Net, and requiste platforms for its utilisation. Next let a market survey be conducted outlining the content of the web site. Next there is a requirement of a body to define the laws that rule E-Commerce. India will have to borrow from the lows of the countries that have governing e-business which are already framed by bodies like OECD, WCO and EU. Taxation laws security system etc have to be made sound. Education has to be qualitative. Other infrastructure like transport should also be made reliable. Besides the technology magic that must happen, it is important to consider all the non-technical issues so that the result is a successful investment and win-win solution for the web site developer and owner.

Conclusion

Electronic commerce is growing exponentially on the Internet. Before the end of the decade millions of individuals and companies will be buying, selling bidding advertising brokering and collaboration on-line on a daily basis. As the Internet merges with other branches of the information highway, the resulting economies will drastically lower the cost of implementing and maintaining a procurement infrastructure.

Organisations wishing to join the e-commerce should continually examine the risks and opportunities created by Electronic commerce. Their information technology departments must prepare enabling capabilities and technologies. The risk of lagging probably exceeds the risk of proceeding with less than optimal adoption strategies. It is very easy to set up a web site , but is quite difficult the create a web based business model. However one thing is certain that the changes made possible by e-commerce are startegic and fundamental. They will undoubtedly affect every company's relationship with the customers and the value proposition for many companies in near future.

✦ 6.7 INTRODUCTION TO MOBILE COMMERCE

Mobile computing builds on the concept of being able to compute no matter where the user is. Once the user begins to choice for mobile computing cellular pocket radio services microwave or some type of satellite services, the goal of mobile computing is to work toward true computing freedom whereby user can connect to the network from any-where anytime and operate as if they were sitting in the home or office. For instance consider the following scenario.

A business professional is working on a project with a colleague who is travelling across the country. A short time after making some crucial think about mobile computing for the local and wide area network environment he must consider specific issues including what type of transport services to utilize.

Edits to the new product design, she plugs in the laptop hits some keys and sends the updated version. This is true computing that provides the most current data no matter what the location is.

It should be note that the terms wireless and mobile do not have the same meaning. Wireless is a transmission or information transport method that enables mobile computing.It covers many appproaches to communication without wires. Take for instance wide area cellular systems which promise to make integrated network a reality. The goal of wireless is to enable distributed and mobile computing for the mobile professionals.

A worker is a ideal candidate for mobile computing if he or she fits any of the following profiles : needs to send and receive e-mails while on the road; needs constant access to the office internal bulletin board system while on the road; needs real time access to software applications such as corporate databases ; moves continually from one floor to another but always in the same building or is constantly on the road and needs a fast way to update the desktop when back at the office. These profiles have different requirements concerning technology equipment and software applications.

Mobile commerce is a transaction with a monetary value that is conducted via a mobile telecommunication network. The development of a new mobile commerce will let consumers send and receive electronic cash, electronic ticket and electronic keys from the mobile phone. Mobile commerce extends the boundries of e-commerce activities and engages as many people as possible in those activities promising a flourishing world of mobile commerce. The scenario involves;

➤ Device manufacturers

➤ Wireless carriers

➤ Mobile portals

➤ Middleware vendors

➤ Service and content providers

Mobile commerce requires new ways of thinking about networks and information management because of two trends : need for increased mobility and location independent data management.

Mobile Computing Framework

Mobile computing is expanding in four dimensions :

1. Wireless delivery technology and switching methods : Wireless LAN communications promise to furnish information to mobile users anywhere at any time.

2. Mobile information access devices : Variety of access equipments are available with large memories and powerful processors to handhelds or plamtops- PDA or personal communicators.

3. Mobile data internet working standards and equipment : Voice oriented cellular systems were not designed with data transmission in mind. Other problems were of insufficient capacity in terms of the number of available frequencies. To solve these problems works is being done in the area of digital cellular standards that support data communication over cellular lines.

4. Mobile computing based business applications : Mobility and portability are creating an entire new class of applications and new markets, combining personal computing and consumer electronics . Organizational applications are not widespread yet, but two types of applications most frequently mentioned include main enabled applications and information or data services to mobile users.
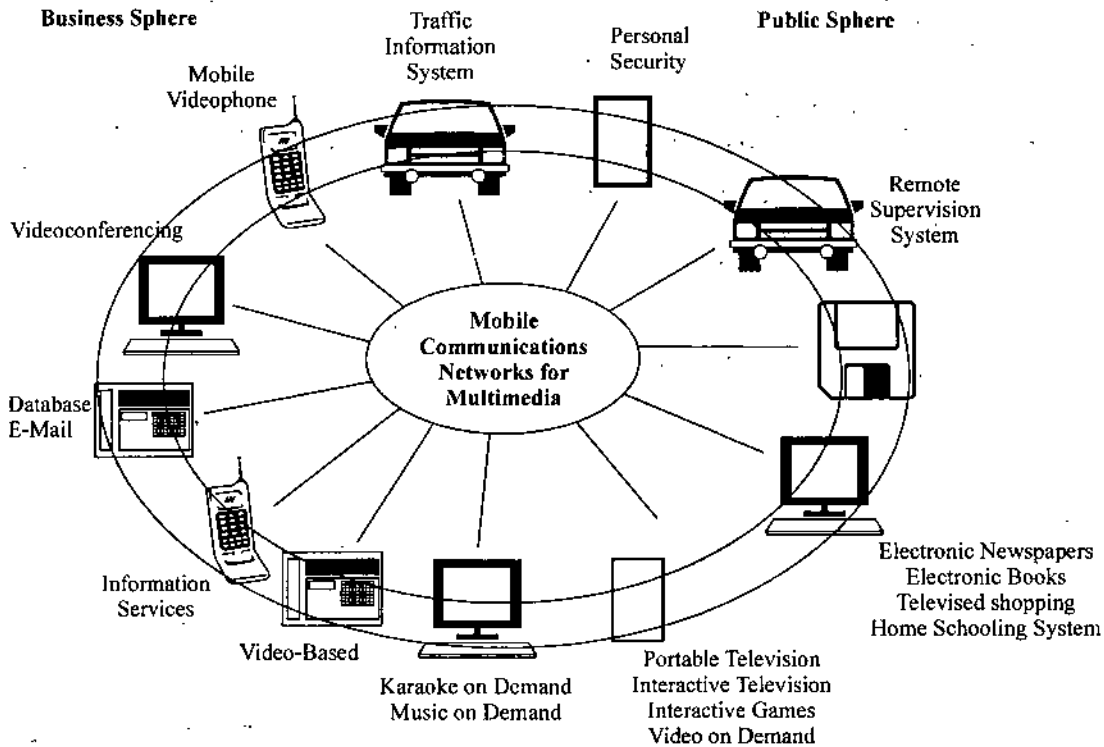
Business Sphere
Mobile Videophone
Traffic Information System
Personal Security
Public Sphere
Videoconferencing
Remote Supervision System
Mobile Communications Networks for Multimedia
Database E-Mail
Information Services
Video-Based
Karaoke on Demand
Music on Demand
Portable Television
Interactive Television
Interactive Games
Video on Demand
Electronic Newspapers
Electronic Books
Televised shopping
Home Schooling System

Fig. 3.1 Private Sphere

✧ 6.8 MOBILE COMPUTING APPLICATIONS

While construction the right wireless infrastructure is a necessary enabler of the new environment mobile computing will be truly realized only when application and computing services required for working while away from office are provided over mobile network. Today's competitive business climate demands tools that allow users to work and communicate at their convenience and discretion. The investment in new technology should yield an immediate benefit to its buyers without asking them to radically alter the way they live or do their work. This is the vision of mobile computing applications and it is resulting in two changes remote communication and data access.

Remote Communication : Being on move is not merely about the absence of wiring. It's fundamentally a different way of communicating. True mobility heigthens the value of business communiation and allows it to be better leveraged for competitive advantage. It allows the work environment and know hours to be established by balancing the needs of the organisation with the desires of individuals.

Remote data access : Mobile workers such as field sales personnel will need access of libraries of reference files containing product and price information.

An important requirement of mobile computing environment is to allow workers to be as effective while at remote location as they are in their usual offices when fully connected. This implies that traditional applications that assumed continuous connectivity must be redesigned to allow a disconnected mode of operation. Take of instance a scenario where a sales representative fills in an order on her laptop at a customer site. The client software in laptop should store the transaction until user is able to reconnect the laptop to network. Upon reconnection, transaction is forwarded to application server in the network.

These are the mobile computing applications :

Sales and Retailing	Manufacturing
Route accounting	Receiving and shipping goods
Non sales	Shopfloor data acquisition
Order entry	Inventory control

Door-to-door sales	Access channel
Duty free sales on aircraft	Plant maintenance
Whole sales	Time and attendance
Services	**Other applications**
Electricity, Gas & water meter reading	Agricultural and forestry data collection
Parcel dispatching	Laboratory instrumentation and data acquisition
Parking fine issuing	Travel ticket issuing
Customer field service	

The three groups of applications most frequently used are :

1. Tracking and dispatching applications

2. Mail-enabled on-line transactions procession providing information

3. Data services to mobile users

Glossary Related to M-commerce

1G : First generation mobile networks based on an analogue standard. There are a number of different technologies associated with 1G including AMPS, TACS, NMT as well as PHS/PDC system in Japan. Analogue has been increasingly phased out worldwide as a comparatively inefficient system that required high-energy consumption for handsets.

2G : Second generation mobile networks based on a digital standard allowing data service such as SMS, FAXand data transfer. 2G is the most prevalent network in the word with systems including GSM, TDMA, cdma One and PDC. GSM is the world's most widely used system mainly in Europe and parts of Asia. An improvement of technologies such as GPRS and HSCSD, which can effectively improve the transfer speed and performance.

3G : Third generation mobile networks using high-speed data transfer rates. Multimedia and improved voice applications are often considered to be the main development areas for 3G. There are three types of system available for 3G including Wideband CDMA (WCDMA), UTRA TDD and MC-CDMA.

AMPS : See also (1G). The Advanced Mobile Phone System is an analogue mobile network system used primarily in the U.S analog.

Bluetooth : Bluetooth is a short wave radio technology that aims to provide data transfer wireless as a replacement to traditional cable transfer. It's strength is based on "personal area networks"- i.e., very localized devices such as notebooks headsets phones etc. The Bluetooth SIG is responsible for maintaining the Bluetooth standard.

CDMA : Code Division Multiple Access is a form of network technology for second generation mobile networks.

CDMA One : Is a phone system used in part of Asia and America. Essentially an improvement on the 2G CDMA standard.

FOMA : Freedom of Mobility Access- DoCoMo's brand name of the new 3G networks.

GPRS : General Packet Radio Service is an improvement on the existing 2G GSM network technology that provides an "always on" connection to the network.

HIPERLAN : High Performane Radio Local Area Network is a standard for Local Area networks (typically office based wireless networks). It allows a high performance wireless network in a local area without the need for expensive fixed wire infrastructure.

HSCSD : High Speed Switched Circuit Data - An upgrade to the current 2G GSM networks that has been implemented by only a few limited operators worldwide. Realistic data speeds are around 14.4 kps and generally it has been by passed on the road to GPRS.

I-mode : I-mode is the proprietary mobile data service developed by NTT DoCoMo.

TDMA : Time Division Multiple Access is a mobile network technology widely used in the US.

Information can be sent over a coaxial cable or a telephone line in such forms-e-mail, data files video, and other information. For utilizing this information there are wide varieties of information access devices such as portable computers, hybrid pen computers personal digital assistants a data communication equipment.

Portable Computers : Portable computers computers are divided into three distinct types . Laptops are useful for running applications that demand very powerful hardware such as Computer aided Design (CAD) and video presentations.

Notebooks serve the more traditional general purpose user who wants to do a large amount of word Processing and manipulate sizable spreadsheets.

The hand held systems have less powerfull version of these capabilities with more intutive functions, such as phone lists and messaging.

Hybrid pen computers : While keyboards traditionally have been the standard interface for many types of computers a pen based interface is clearly more appropriate in many situations. One of the recent developments in pen based computing systems is the addition of a keyboard. It is provided in two ways : when open it reveals a full size keyboard and the pen can be used as a mouse. When the display is closed the user is presented with a tablet sixe writing pad.

Personal Digital Assistance (PDA) : Think of personal digital assistance (PDA) as a PC reducd in size to fit inside the coat pocket PDAs reflect the nerve ending quest to build the smallest possible useful computer.

Digital Assistants : Digital assistants combine personal organizers with a more flexible and more natural means of procession personal information.

Digital assistants include a wide array of information management tools (e.g. file management, address book, calendar, notepad and calculator etc.).

Personal Communicators : Personal communicators couple a cellular telephone with an LCD screen and a standard keyboard on its back NOKIA communicator is the best example of this category. In that cellular phone you can write mail by using keyboard and LCD screen and send it instantly with the help of connected cellular phone. This is very use full but due to high cost it is popular in the market.

Palmtops : Palmtops computers attempt to provide higher functionality and more closely resemble what's available in desktop computers . Hp's 100 LX, for example runs MS-DOS but not WINDOWS and comes with a wide variety of softwares.

In palmtops software is built into the ROM (Read-Only Memory). In the case of the Hp's palmtop-MS-DOS5,0, Lotus 1-2-3 an appointment manager a calculator a text editor a phone books a stop watch/alarm clock, a world time database a terminal emulator a general purpose database a notetaker a file manager, a keyboard macro editor and cc: Mail.

Network Technologies

GSM : Global System for Mobile Communication is the prevailing mobile standard in Europe and most of the Asia-Pacific region. GSM is a digital cellular radio network and is used in more than 200 countries worldwide. GSM enabled phones have a "Smart card" inside called the Subscriber Identity Module (SIM) which is personalized to the user and identifies the account to the network and provides authentication.

GSM is used by more than 50% of the world's mobile phone subscribers.

GSM networks operate in three different frequency ranges :

1. GSM 900 : 900 MHz frequency range common in Europe and the world.

2. GSM 1800 : 1800 MHz frequency range used mainly inFrance, Germany, Switzerland, the UK, and Russia

3. GSM 1900 : The frequency used in the United States and Canada for GSM.

HSCSD : High speed Circuit Switched Data is a circuit switched protocol based on GSM that is used for radio channels simultaneously. Thus as HSCSD Protocol device is able to transmit data up to 57.6 KBPS.or appoximately 4 times the speed of the typical theoretical wireless transmission rate of 14.4.

GPRS : Gereral Packet Radio Service, also known as GSM-IP (Internet Protocol) is packet switched wireless protocol that offers instant access to data networks. This system allows bursts of transmission of up

to 115 KBPS. Main advantage of GPRS, apart from instant connectivity, is always on connection between the mobile terminal and the network. GPRS is the first data transport made to allow full instant mobile Internet access.

EDGE. Enhanced Data Rates for Global Evolution is a higher bandwidth version of GPRS and an evolution of the GSM standard with higher transaction speeds of up to 384 KBPS, suitable for large data transmission .

3G : A new generation of wire less systems - Third Generation systems 3G represents and significant uggrade on digital wireless networks with the capability to deliver broadband data at rates up to 2 MBPS with always on status Mobile Communications have evolved in Generations.

1G: Analog	2G: Digital	2+G: or Digital	3G: Multimedia
1980S	1990S	2000S	2007→
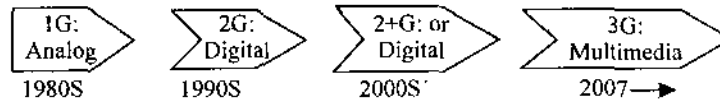
CDMA : Code Division Multiple Access is not a new technology. It has been used in military satellite systems for decades because it is secure, but more important, it enjoys significant efficiencies permitting great channel capacity. CDMA is going to be very popular besause of its low cost. Is India TATA Indicom, Reliance like bit corporate houses have launched their mobile service that work both on GSM and CDMA.

Summary

➤ Electronic Commerce means doing business online typically via the web. Overall, E-commerce is a new form of corporate operations known as a Virtual Company.

➤ There are six basic functions of electronic commerce. These are : (i) Information search (ii) Information communication, (iii) Process management (iv) Service Management (v) Shopping service (vi) Virtual enterprises.

➤ The three main benefits of having a web site are :

▼ Building Communiteis

▼ Growing Revenues

▼ Cutting Costs

➤ An inter organization involves information flow among two or more organizations. Inter-organizational systems are used for B2B applications. Inter organizational E-commerce includes a company. Its suppliers and customers.

➤ Intra-Organizational E-Commerce means intra business. It includes all internal organizational activities generally performed on intranet.

➤ The E-Commerce can be divided in the following three categories :

▼ B2B E-commerce

▼ B2C E-commerce

▼ C2C E-commerce

➤ E-commerce now a days is strongly applied in following four business applications viz.

▼ Supply chain management

▼ Electronic marketing

▼ Collaborative work

▼ New business creation

➤ Mobile commerce is any transaction of monetary value conducted through mobile telecommunication network.

TEST YOURSELF

I. Fill in the Blank

1. E-commerce in its new form is known as ....

2. Trading partners separated geographically use .... to establish network and work as if they are one entity.

3. .... is the essential feature of e-commerce.

4. Mobile commerce is a transaction conducted viz ....

5. E-commerce as system should be viewed as an .... extended from the existing sources.

II. Write True or False

1. E-commrce applications are based on multiplier archutecture ....

2. E-commerce can work as an independent system and can take care of the business on its own

....

3. Building communities is net one of the main benifit of e-commerce ....

4. Mobile computing aims to achieve remote communication and remote data access ....

III. Long Answer Questions

1. Explain in detail the cycle of e-commerce.

2. What is e-commerce and what are the advantages of e-commerce.

3. What are the driving forces of e-commerce.

4. Describe architectural framework of e-commerce.

5. What is the difference between inter and intra organizational e-commerce.

6. Write a short note on various business and job opportunities provided by e-commerce.

7. Explain B2B, B2C & C2C e-commerce with examples.

8. Write a short note on in commerce and its various applications.

Answers

I. Fill in the Blank

1. Virtual company 2. virtual enterprise 3. money transaction 4. mobile telecom network 5.1 integrated information ware house.

II. Write True or False

1. T 2. F 3. F 4. T 5. T

❑❑❑

U N I T

7

MICROSOFT-WORD

LEARNING OBJECTIVES

After going through this unit you will learn :

➤ Ms-Word as word processor
➤ Starting MS-Word
➤ Opening the document writing text in document
➤ Writing text in Document
➤ Selection of text
➤ Moving and copying the text
➤ Checking the spelling in text
➤ Setting the tab stops
➤ Spacing the paragraph lines
✿ Test Yourself–1
✿ Test Yourself–2
✿ Solved Questions

❖ 7.1 WORD PROCESSOR

There are different types of software like programming Languages, Desktop publishing. Electronic spread sheets and word-processing tools.

The examples of programming language are PASCAL, C++, FORTRAN, JAVA etc. Programming Language is basically used for manipulation of data with the help of instructions written in the form of program.

Desktop Publishing software like Page Maker, Corel draw or Ventura are written to manipulate the shapes and symbols alongwith text to prepare the matter for printing. Electronic spreadsheets like Lotus and MS-Excel is to manipulate the data in the rows and columns. Though these software can handle the text also but these can not purely be said as text handling tools because of their technical limitations.

The word processor software is purely designed to handle the text and to manipulate it. The examples of word processor are MS-Word, Word Star, Word perfect etc. The word processor means the software, which is used to manipulate and process the text as per user's requirement.

❖ 7.2 MS-WORD AS WORD PROCESSOR

We mentioned above that MS-Word is word processor software. It has been designed by Microsoft company for handling and manipulating the text in offices. This also fulfills most of the desktop publishing needs. MS-Word can help in generating letters, reports and other text intensive documents. It makes the text handling very easy because of following features :

* It can import data from other applications.

* It has facility to format the text in desired way.

* It can manipulate the characters by changing their Font and Size.

* It can add the pictures to text.

* It provides the facility to convert the text into the form of a table.

* It has customised pattern of writing the documents.

* The merging of text with data through mail-merge is very powerful feature of MS-Word.

* Correcting the text through spelling checks is another feature of Ms-Word.

❖ 7.2 STARTING MS-WORD

MS-Word software needs windows to be installed in the computer for its operating. For starting the MS-Word on your computer, follow the steps mentioned below:

(a) Make sure that your Computer is 'ON' and window software is available in computer.

(b) Click on Start button on desktop as shown is figure 7.1.

Fig. Showing start button

(c) Place the mouse on Programs option, which further displays a menu. This menu options contain one option as Microsoft word. Refer figure 7.2.
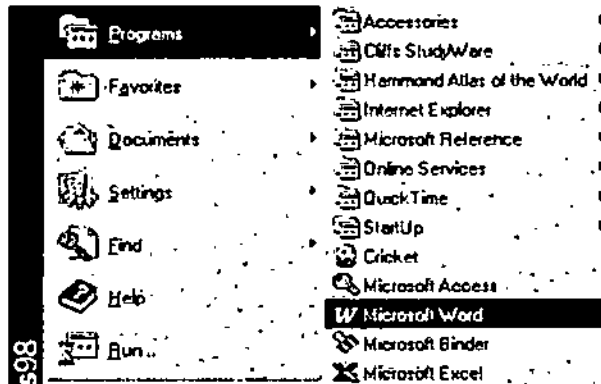
Fig. Starting MS-Word application

(d) Click on option Microsoft Word and wait for MS-Word to start.

(e) After MS-Word has been started, you get the screen as shown in figure 7.3.
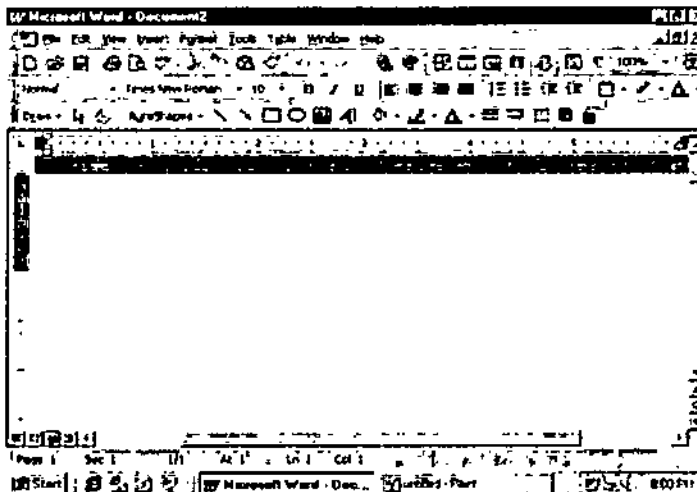
Fig. MS-Word document window

✣ 7.3 OPENING THE DOCUMENT

Opening existing document

MS-Word has facility to remember the documents used recently as per its setting. The names of these documents appear in the list under File menu. The total number of recently used documents appearing in the list may be 1 to 10.

To open such document follow the steps mentioned below :

(a) Click on File option on main menu bar, which displays a drop down menu containing the names of documents used last as shown in figure 7.4.
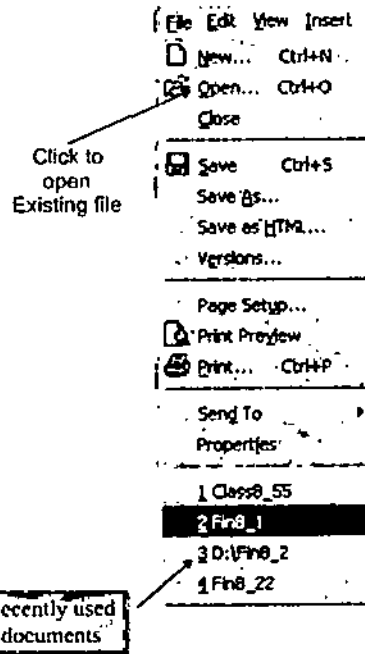
Fig.

(b) Check, if the document you want to open if available in the list.

(c) If it is available in the list, click on the name of document to open it.

Another method of opening the existing document is through menu option as discussed below:

(a) Click on File option of main menu bar, which displays a drop down menu as shown, in figure 7.4.

(b) Click on Open option of drop down menu, which opens a window containing the names of documents as shown in figure 7.5.
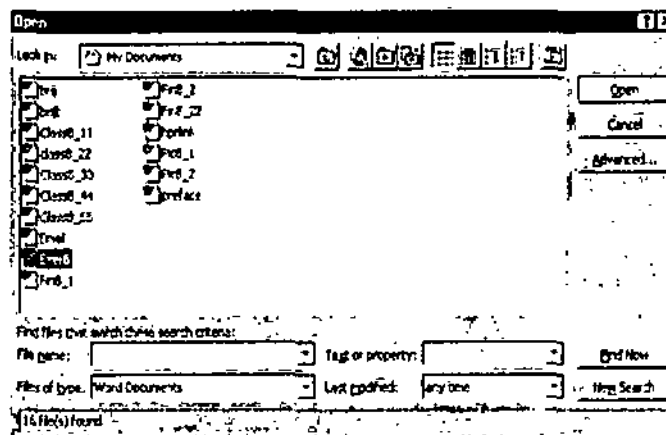
Fig. Windows showing list of document

(c) Select the document by clicking on its name and click **Open** button or you can double click on the document name also to open it.

The existing document can also be opened through start button on desktop or clicking on Open icon on standard tool bar as shown in figure 7.6. The procedure of opening document from desktop is discussed below.

Open ← icon
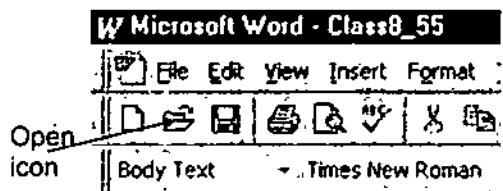
Fig.

(a) Click on **Start** button on desktop.

(b) Place the pointer on **Documents** option, which displays a menu containing the names of documents.

(c) Click on the document name you want to open. Refer figure 7.7.
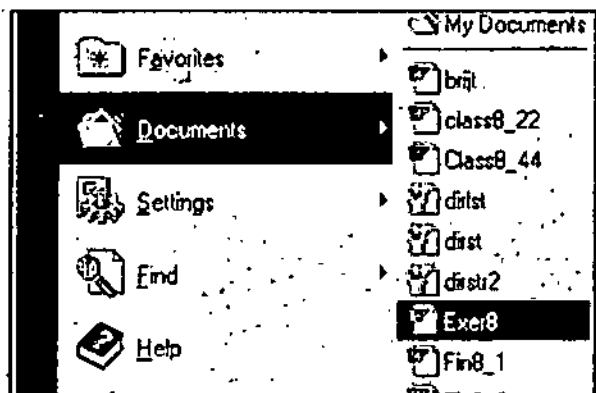
Fig. Opening document through desktop

Opening new document

MS-Word provides the format of many types of business letters, which are generally known as templates. These templates are stored in computer memory.

For opening new document proceed as follows:

(a) Click on **File** option of main menu bar, which displays a drop down menu.

(b) Click on **New** option in drop down menu, which opens a window containing different templates.

(c) If you want a particular format of your letter then select the concerned template and click on **OK** button. Otherwise to open a free format document, click on **Blank Document** and then click on OK button. Refer figure 7.8 and 7.9.
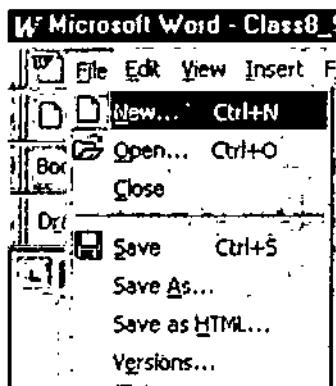
Fig. Menu to open new docuement
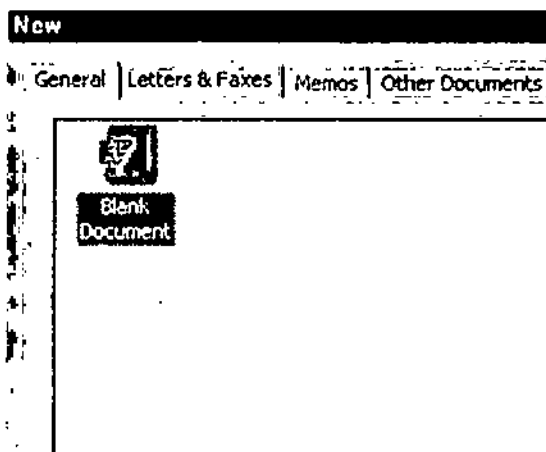
Fig. New docuement opening windows

❖ 7.4 WRITING TEXT IN DOCUMENT

After opening new document, you can start typing the text at cursor position. The cursor will automatically be placed in starting of document. Remember that MS-Word provides the facility of automatic termination of line when text reaches at end of line position. This is called word wrapping. You need not to press Enter Key to switch over to next line. The Enter Key should be pressed only when you have to change the paragraph. Refer figure 7.10.

Draw ▾ ☐ ⓒ | AutoShapes ▾ \ \ ☐ ○ 🖹 ◢ | ◢ ▾ ◢ ▾ ◢ ▾ ☰ ▦ ⁝

. . . ⁝ . . . ⁝ . . . ⁝ . . . 2 . . . ⁝ . . . 3 . . . ⁝ . . . 4 . .

7.1.2 Language Processor

As we know that computer understands the language of zerc
give the command to computer using English language. Tl
to be converted into computer codes with the help of some

❖ 7.5 SELECTION OF TEXT

The text formatting can be changed any time after typing the text. For applying any change of format on the text, it should first be selected using any method written below.

Selecting the text by Keyboard

(a) Position the cursor at place you want to start text selection.

(b) Press and hold the shift key on keyboard.

(c) Select the text by pressing left, right, up or down keys.

(d) If you want to select entire document, press CTRL + A keys.

Selecting text by Mouse

(a) For selecting a word, position the cursor anywhere on the word and double click the mouse by left button.

(b) For selecting entire line, position the mouse pointer in left margin of that line to point it towards line. Now click the mouse by pressing left button.

(c) For selecting the paragraph, place the mouse pointer in left margin so that the pointer points towards paragraph and double click the mouse by pressing left button. Selected text is shown in figure 7.11.
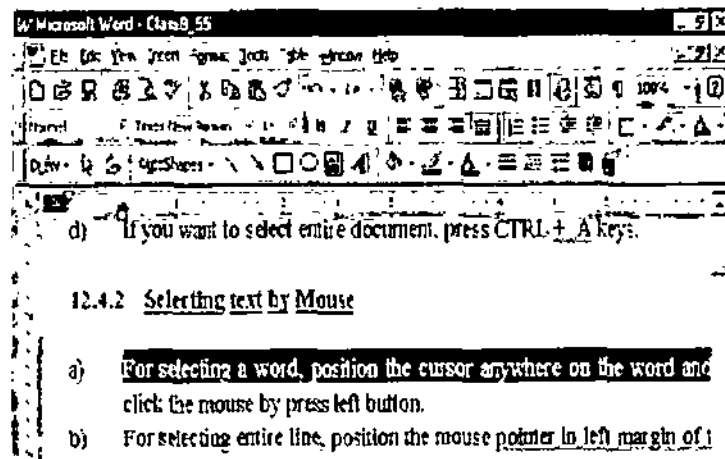
Fig. Showing selected line to text

Moving and copying of text helps in manipulating and arranging it. It avoids re-typing of text. We discuss here following methods to manipulate the text by copying and moving.

Moving text with the help of Menu

(a) Select the text you want to copy or move.

(b) Click the Edit option on main menu bar.

(c) Click on Copy option of Edit menu for copying the text or

Click on Cut option of Edit menu for moving the text. Both, cut and copy will transfer the text to temporary memory of computer made for this purpose. It is also called buffer.

(d) Position the cursor at place where text is to be copied or moved. The new location can be in same document, another document or any other application also.

(e) Click on Edit option on main menu bar.

(f) Click on Paste option of Edit menu. Refer figure 7.12.
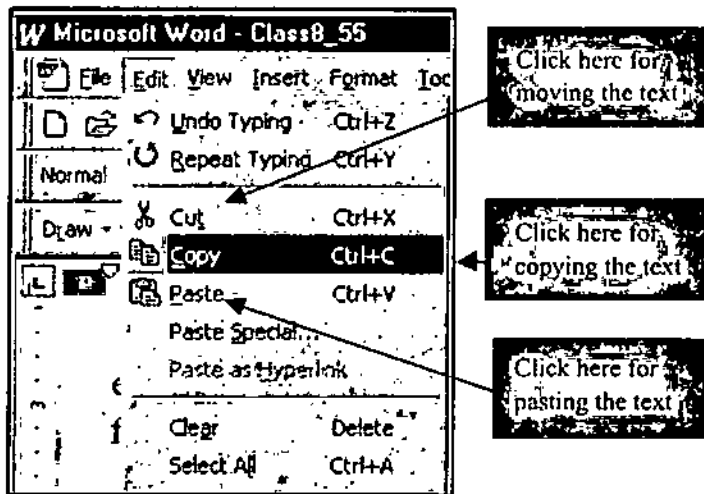
Fig. Showing options cut, copy and paste

Moving text With the help of Keyboard

(a) Select the text as explained in the topic of text selection.

(b) Press CTRL + C for copying and CTRL + X for cutting the text.

(c) Position the cursor at location where text is to be copied or moved.

(d) Press CTRL + V for pasting the text.

Moving text With the help of tool bar

(a) Select the text to be copied or moved.

(b) Click on Copy icon of standard toolbar for copying the text and Cut icon for cutting the text.

(c) Position the cursor at location where text is to be moved or copied.

(d) Click on Paste icon of standard toolbar. Refer figure 7.13.

Note : When we either copy or cut the text, it gets copied in to computer memory kept reserve for this purpose. This part of computer memory is also called buffer or clipboard. The text will remain in memory till another text is copied and over-write the previous text.
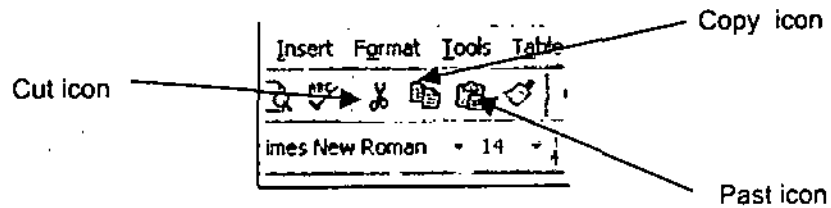
Fig. Cut, Copy and Paste icon

❖ 7.7 CHECKING THE SPELLING IN TEXT

MS-Word provides you the facility for checking the spelling of the words of the text. This software has built-in dictionary. You can add the new words to this dictionary by clicking on Add option. Follow these steps to check the spellings:

(a) Select the text for which you want to check the spelling in case a part of text to be checked. Place the cursor at a position from where you want to start spelling checks.

(b) Click on Tools option of main menu bar. Refer figure 7.14.
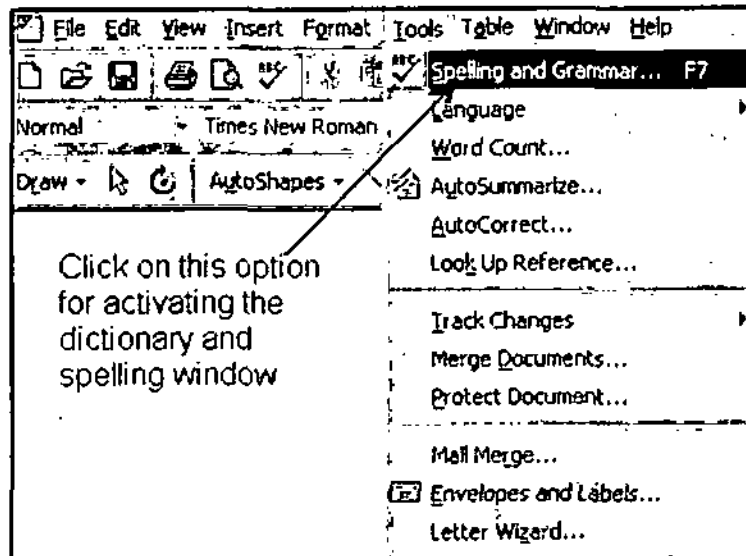
Fig. Spelling check option

(c) Click on Spelling and Grammar option of Tools menu. It will activate the spell checker by opening the dictionary in appropriate window. Cursor will stop if it finds any spelling mistake. Refer figure 7.15.
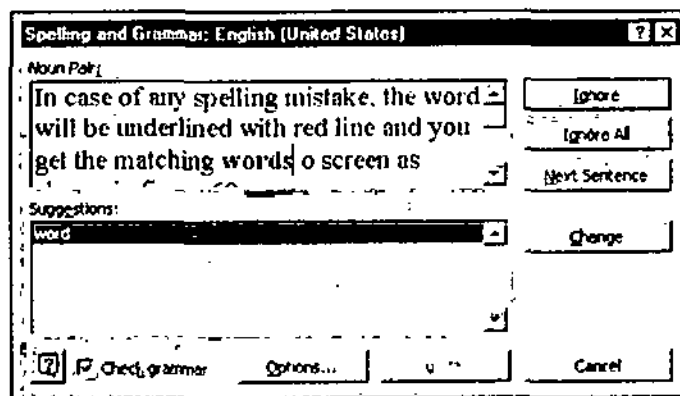
Fig. Spelling check window
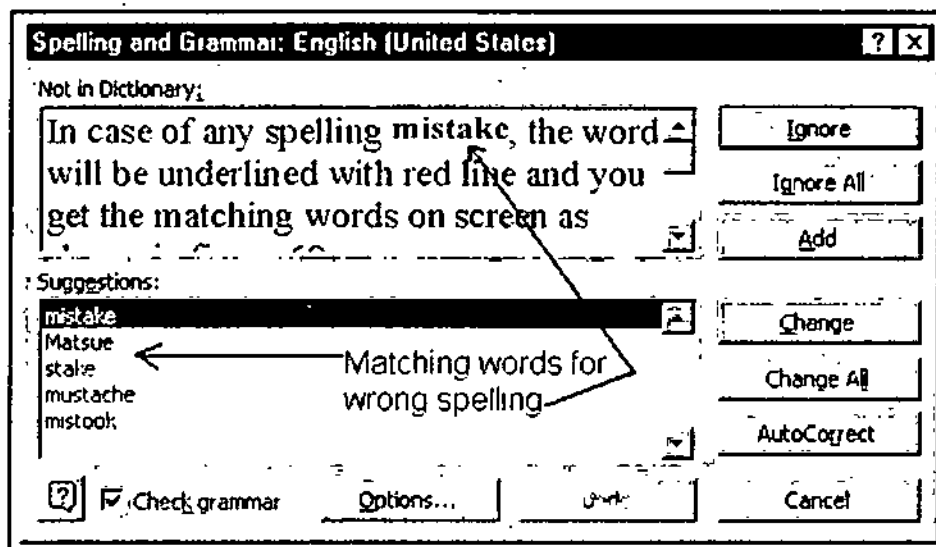
Fig. Spell check window showing matching words

(d) If no spelling mistake is found anywhere, you get the message on screen.

(e) In case of any spelling mistake, the word will be underlined with red line and you get the matching words on screen as shown in figure 7.16.

(f) If you want to replace the word with any word available in list, just click on the word shown in list.

(g) You can also ignore the spelling mistake by clicking on Ignore button.

(h) You can also add the word in to dictionary by clicking on **Add** button.

(i) If spell checker has some doubt about spelling and the correct word is not available in dictionary, it will display the message about its non-availability in dictionary.

❖ 7.8 SETTING OF TAB STOPS

MS-Word application provides the facility of inserting the tab stops. Generally we move the cursor with the help of spacebar key on keyboard while typing the text. If you want that cursor should jump more than one space with each press of key, then you have to press tab key on keyboard instead of space bar. The tab key makes the cursor to jump as per its setting. Another use of tab setting is to align the text in column when it is being typed in the tabular form.

Types of tab

There are four types of tabs, set for text alignment.

(a) **Left aligned tab :** These tabs align the text to the left edge of the tab. Text entry moves from left to right while typing.

(b) **Right aligned tab :** These tabs align the text at right edge where tab has been inserted. The text entry pushes the text to its left from the tab setting point while typing.

(c) **Center tab :** This tab aligns the text at center point and pushes the text equally to left and right side of tab setting point during typing.

(d) **Decimal tab :** This tab is used to align the decimal number one above the other keeping decimal point at tab setting place.

Tab Setting through menu options

(a) Click on **Format** option of main menu bar.

(b) Click on **Tabs** option of Format menu as shown in figure 7.17. which opens the tabs window as shown in figure 7.18.
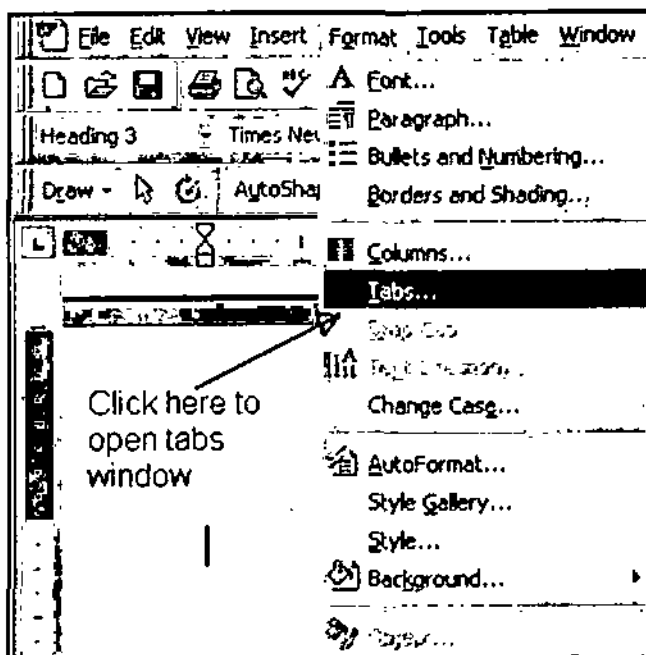
Fig. Tab setting menu
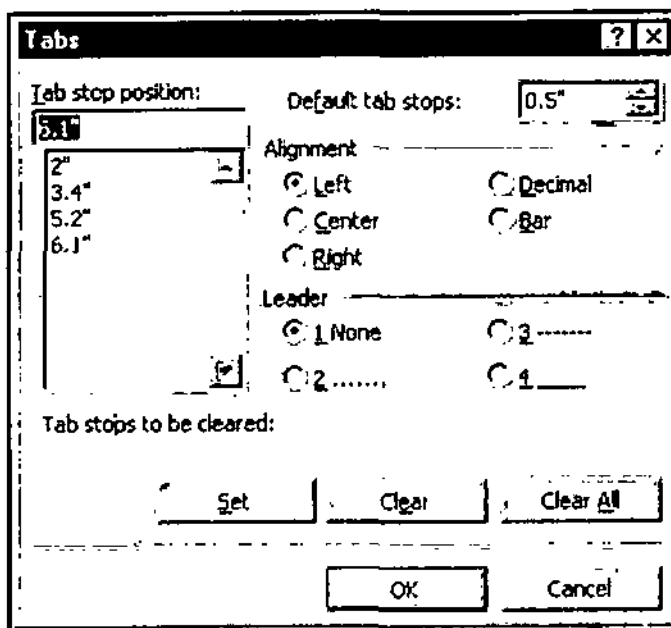
Fig. Tab setting window

(c) Select the type of tab out of Left, Center, Right or Decimal shown under alignment option.

(d) Type the scale reading in the column "Tab Stop Position" and click on Set button to set the tab.

(e) After setting all the tabs as per page width, click on **OK** button.

(f) If you want to clear any tab, select the particular tab stop reading in the tab list shown under tab stop position by clicking on this and click on clear button.

Tab Setting through Ruler

(a) If ruler is not visible, click on View Option of main menu bar.

(b) Click on **Ruler** option in View menu to display the ruler.

(c) Ruler indicates present tab selection on its left side as shown is figure 7.19. (Clicking once on this indicator can change the type of selected tab.)
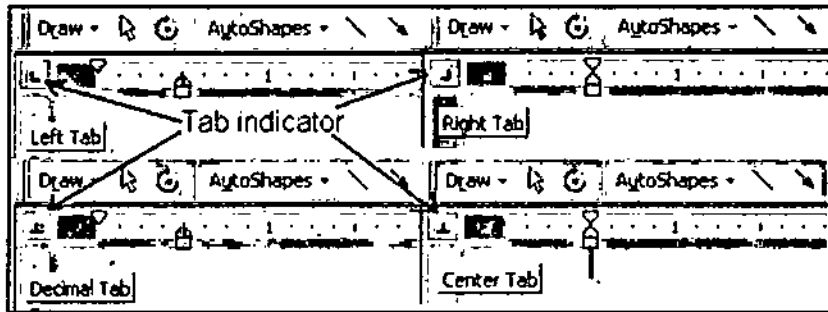
Fig. Various type of tabs indicators

(d) Select the desired tab on indicator.

(e) Click the ruler at position you want to set the tab.

Note : Before clicking on ruler, make sure that desired tab is selected on tab indicator.

(f) For clearing the tab, click on tab and drag it out of ruler.

❖ 7.9 SPACING THE PARAGRAPH LINES

Generally the word processor provides single space between lines. This space can be increased as per the requirement. Spacing is measured in points. The size of the text or lines also changes as per the change of font size.

The line space can be changed with the help of menu options and also through keyboard. For changing the line space with the help of keyboard, follow the steps mentioned below:

(a) Select the text for which line spacing is to be changed.

(b) Press CTRL + 2 for double space, CTRL + 5 for one and half space and CTRL + 1 for single space.

For changing line space with the help of menu, follow the steps written below:

(a) Select the text for which line space is to be changed.

(b) Click on **Format** option of main menu bar as shown in figure 7.20.
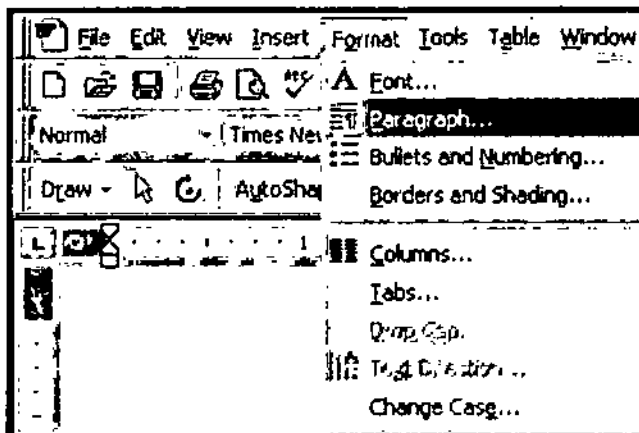
Fig. Menu option for changing the line space

(c) Click on **Paragraph** option in Format menu. It opens the paragraph window as shown in figure 7.21.

(d) Click on **Indents and spacing** in Paragraph Window.

(e) Set the desired spacing before and after paragraph.
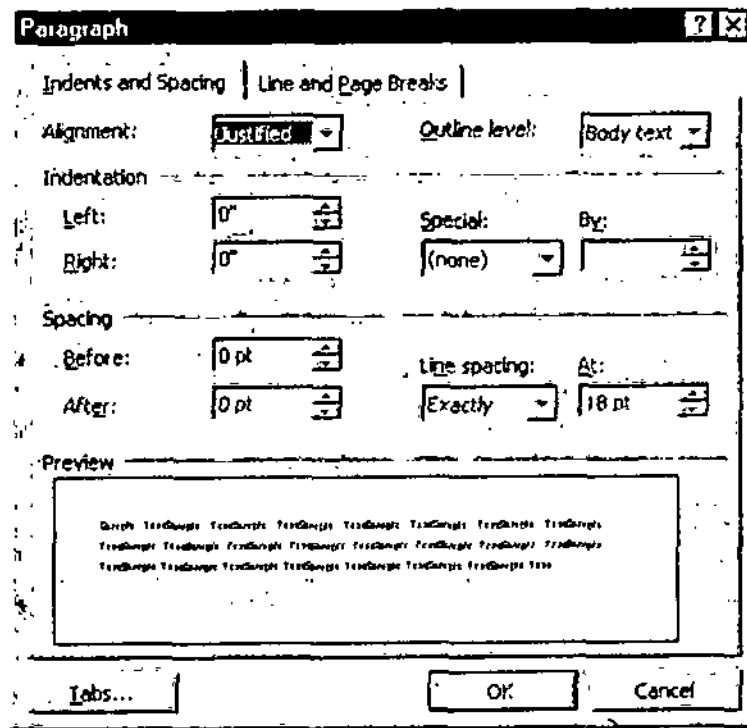
Fig. Paragraph window for setting the line space

(f) Set the spacing from the Line Spacing list as single, 1.5 spacing, double, exactly, At least or Multiple. The at least, exactly and multiple needs the setting of scale reading in provided column.

(g) Click on **OK** button to make the spacing effective.

TEST YOURSELF

1. What do you understand by the term word processor?
2. Write the main features of MS-Word as a word processor.
3. Write the procedure to start MS-Word application.
4. Write the procedure to open the existing file is MS-Word.
5. How can you select following with the help of mouse?
   (a) A Word. (b) A line (c) A Paragraph.
6. Write the procedure to move first two line of your document to end of your document.
7. Write the steps to be followed to activate & open the spell checker window.
8. How many types of tabs are available in MS-Word . Write the purpose of each type of tab stop.
9. Write the procedure to set following tabs through the ruler and tab indicator.
   (a) Left aligned tab at 2". (b) Decimal tab at 4".
   (c) Center tab at   5.3". (d) Right aligned tab at 6.5".
10. Is it possible to increase the space between lines? If yes then write the procedure to do so.
11. Fill in the blanks.

(a) Document scrolling is faster in . . . . when compared with page layout view.
(Normal view, Outline view, Master document view)

(b) Line spacing of selected document can be made double by pressing .... keys on keyboard.
(CTRL + S, CTRL + 2, CTRL+ 7)

(c) The exact setting of document on paper as appears after printing, can be checked through . . . . view of document.
(Print Preview, Top Preview, Display Preview)

(d) Tab indicator is available on left side of . . . . on screen.
(Horizintal rular bar, Vertical rular bar, Space bar)

(e) . . . . tab is used to align the decimal points in numbers.

(Left align, Right align, Decimal)

(f) You can add the new word to spell checker dictionary by clicking on .... button of spell checker window.

(Add, Subtract, Edit)

(g) The selected text can be cut by pressing .... keys on keyboard.

(CTRL + A, CTRL + Y, CTRL + X)

(h) For pasting the contents of buffer to document, you have to press .... keys on key board.

(CTRL + Y, CTRL + V, CTRL + A)

(i) For selecting the entire text of document, you have to press .... keys on keyboard.

(CTRL + A, CTRL + H, CTRL + S)

(j) For opening the new document you have to chick on File ⟶ .... ⟶ blank document.

(Close, Open, New)

Answers

(a) Normal view (b) CTRL + 2 (c) Print Preview (d) Horizintol rular bar (e) Decimal (f) Add (g) CTRL + X (h) CTRL + V (i) CTRL + A (j) New

Solved Question

Q. 1. Which DOS command is used to format the floppy.

(a) Prepare   (b) Format   (c) Delete   (d) Print

Ans. Format.

Q. 2. Write at least five features of MS - word as word processor.

Ans. 1. It can import data from another application.

2. It has facility to format the text.

3. It can add picture to text.

4. It provides facility to convert the texts in to the form of table.

5. It contains customized patten of writing the document.

Q. 3. Which menu option will you click to start MS- Word ?

Ans. MS– Word option in program menu of start button should be clicked to start MS–Word.

Q. 4. Under which menu option of MS–Word you have existing file opening menu ?

Ans. File menu option on main menu bar contains existing file opening menu option.

Q. 5. Which key will you press to select entire document ?

Ans. Press CTRL + A keys to select entire document.

Q. 6. Which menu option will you click to copy the selected text ?

Ans. Copy option of edit menu should be clicked to copy the selected text.

Q. 7. Which key should you press to cut the selected text.

(a) CTRL + Y   (b) CTRL +T   (c) CTRL + X   (d) CTRL + A

Ans. CTRL +X.

Q. 8. Spelling and grammar checking option is available under –

(a) Table menu   (b) Edit menu   (c) Format menu   (d) Tools menu

Ans. Tools menu.

Q. 9. Write the names of a various types of tabs available is MS -Word.

Ans. There are four types of tab available in MS- Word.

1. Left Aligned tab.   2. Right Aligned tab.

3. Center tab.   4. Decimal tab.

Q. 10. Under which menu on main menu bar, the tab setting option is available ?

Ans. Tab setting option is available under format menu of main menu bar.

Q. 11. Write the names of different views of page available in MS - Word.

Ans. Following page views are available in MS -Word.

1. Normal view.   2. Page Layout view.

3. Outline View.   4. Print Preview.

5. Master document view.   6. Full screen view.

Q. 12. Adjusting of paragraph by promoting and demoting the paragraph can be done in –

(a) Page Layout view   (b) Outline view   (c) Normal view   (d) Print preview.

Ans. Out line view.

<div align="center">

U N I T

8

MORE ABOUT MS-WORD

</div>

LEARNING OBJECTIVES

After going through this unit you will learn :

➤ Formatting the Page
➤ Opening of multiple documents
➤ Switching between multiple open
➤ Printing the document
➤ Document
➤ Applying number and bullets styles
➤ Finding and replacing the text
➤ Customizing the word options
   ✿ Test Yourself–1
   ✿ Test Yourself–2
   ✿ Solved Questions

❖ 8.1 FORMATTING THE PAGE

As we know that before or after writing the text, the formatting of page is necessary. The page formatting decides the following :

* Size of page.

* Margins setting on the page - (Left, Right, Top & Bottom).

* Position of header and footer.

* Print orientation like portrait & landscape.

Setting the Margin

Setting up margins on page is the part of page formatting. It is necessary to set the margins at left and right side of page for filing purpose of document. Follow the steps written below to set the margins:

(a) Click on **File** option of main menu bar as shown in figure 8.1.
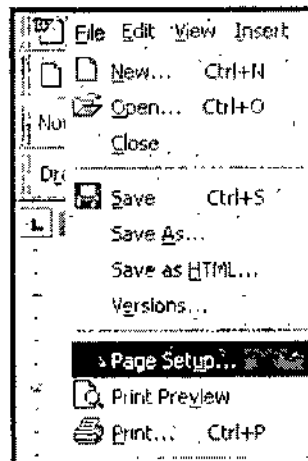
Fig. Page setup menu

(b) Click on Page Setup option of File menu. It opens the Page Setup window as shown in figure 8.2.
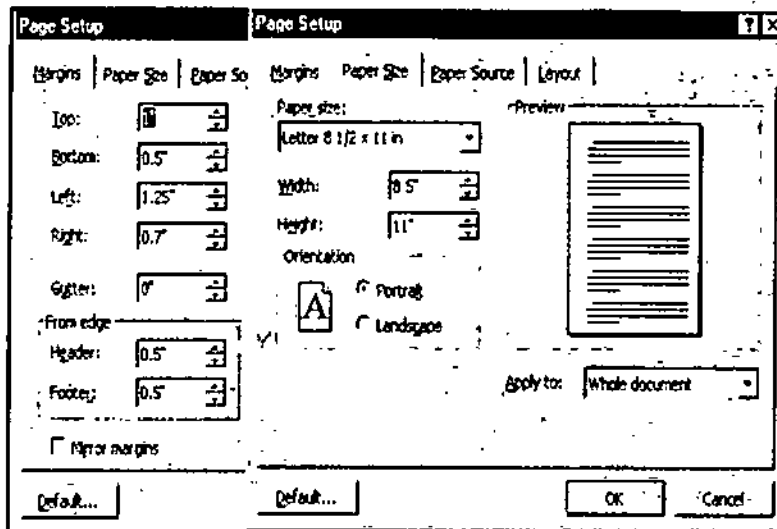
Fig. Page setup window showing page setting

(c) Click on **Margins** tab if it is not opened.

(d) Type the value for Top, Bottom, Left and Right margins. The existing values can be changed by clicking on UP or Down arrows provided in each window.

(e) The value of Gutter is normally set to zero by default. The Gutter is the space provided before the left margin on the paper used for binding purpose.

(f) Refer figure 8.3 showing the Gutter.

(g) Header is the space at upper side of paper for writing normally the page number.

(h) Footer is the space at lower side of paper below the bottom margin.The changes made on margins will be shown on the paper preview shown under preview in page setup window.

(i) Now click on **Paper Size** tab.

(j) Click the paper size list and select the size of the paper you are currently using. If you want to change height or width of the paper, you can change it in the column provided as width and height. The print orientation can be changed from the option given as Portrait or Landscape. In portrait option, the text is printed from left to right on the paper. We know that the general use printer can take the paper of restricted width. If the printing text needs wider page for its printing like banners then we have to select the print orientation as Landscape. In Landscape option of print, the movement and direction of print head will remain same but text flow will be from top to bottom on the page as shown in figure 8.3.
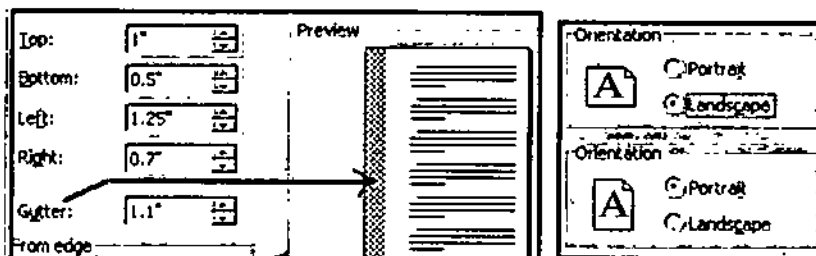
Fig. Showing gutter and portrait/landscape print orientation.

(k) Now you can apply the formatting on your document from the list given in apply to option of page setup window. Clicking on "whole document" will apply the formatting to entire document and clicking on " **This point forward**" will apply the formatting from the cursor position onward.

Setting Margins through Ruler

We discussed the procedure of setting the margin with the help of Page Setup Window. Margins can also be set directly from ruler line. The ruler line indicates the current margin set for the document. Refer figure 8.4. For setting the margin through ruler, proceed as follows :
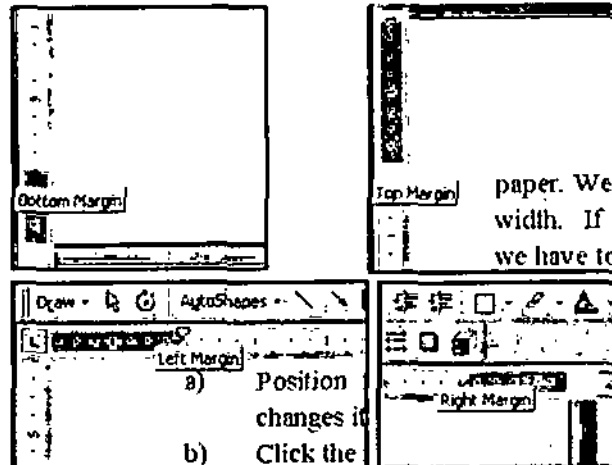
Fig. Margine setting through ruler

(a) Position the mouse pointer on outer edge of margin indicator where it changes its shape to double headed arrow.

(b) Click the mouse button and keep it pressed.

(c) Drag the margin indicator to setting requirements.

(d) Apply same methods to set all the margins.

Portrait and Landscape Orientation of Printing

The print orientation can be changed from the option given as Portrait or Landscape. In portrait option, the text is printed from left to right on the paper. We know that the general use printer can take the paper of restricted width. If the printing text needs wide page for its printing like banners then we have to select the *print orientation as Landscape. In Landscape option of print, the movement and direction of movement of* print head will remain same but text flows from top to bottom on the page.

Paragraph Indentation and ruler setting

The indenting of a paragraph or entire document can be changed any time. For this purpose indent markers are provided on horizontal ruler bar. These indent markers are called as :

* First line indent marker.

* Hanging indent marker. It means that the marker for rest of the lines in paragraph except first line.

* Right indent markers.

Refer figure 8.5 and 8.6 for indent markers.
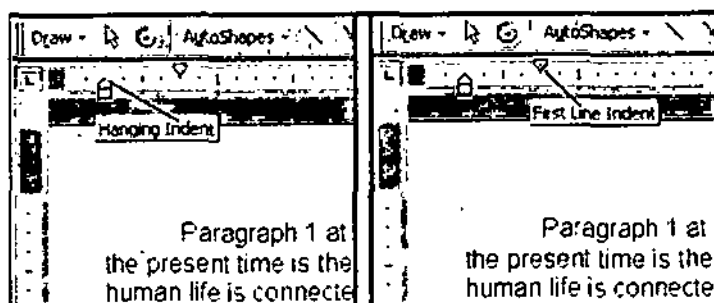
Fig. Hanging & first line indent marker
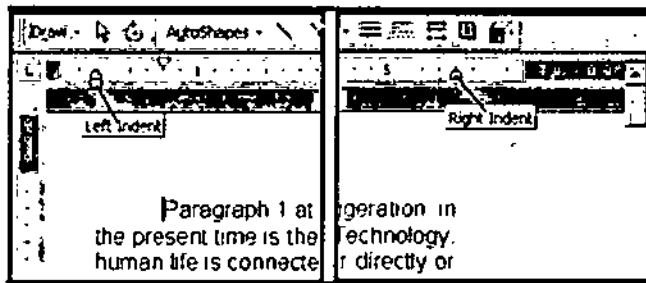
Fig. Left and right indent marker

Follow this procedure to indent the paragraph or document.

(a) Select the text to be indented.

(b) Click on first line indent marker and drag it to set required indent space.

(c) Click on hanging indent marker and drag to set required indent space.

(d) In similar way move also the right indent marker.

(e) The first line indent marker and hanging indent marker can be moved together just by clicking on left indent marker (square box) attached to hanging indent marker. and drag it.

Another method of indenting the paragraph is through menu. Follow the steps written below to indent the paragraph through menu.

(a) Select the text to be indented.

(b) Click on **Format** option of main menu bar.

(c) Click on **Paragraph** option of Format menu as shown in figure 8.7.
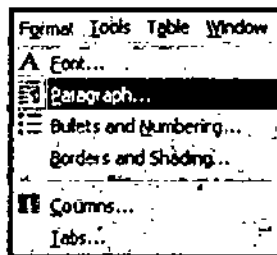
Fig. Menu of resetting indent marker

(d) It opens Paragraph Window as shown in figure 8.8.
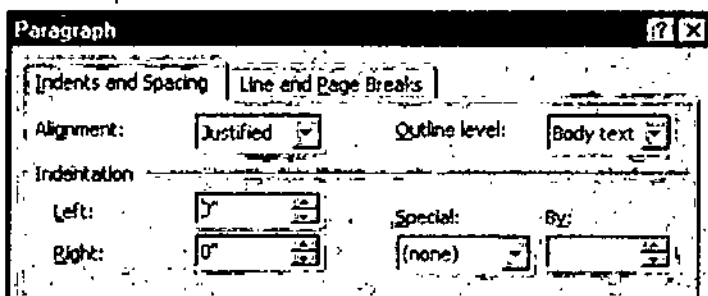
Fig. Paragraph window showing indent setting.

(e) Click on **Indents and Spacing** tab if it is not opened.

(f) Type the indentation value in left and right boxes under indentation.

(g) Select the **First line** from the list given under special and set indentation value. Similarly set the value for hanging indentation.

(h) Click on **Ok** button.

Setting Ruler Bar

➤ (a) Click on **View** option of main menu bar.

➤ (b) Click on **Ruler** option of view menu. This option of view menu works like a switch. If ruler is displayed on screen and you click this option, it will hide the ruler. If ruler is not available on screen and you click this option, it will display the ruler on screen.

For changing the scale of the ruler follow the procedure written below :

➤ (a) Click on **Tools** option of main menu bar

➤ (b) Click on **Options** in tools menu. Refer figure 8.9. It opens Options window as shown in figure 8.10.
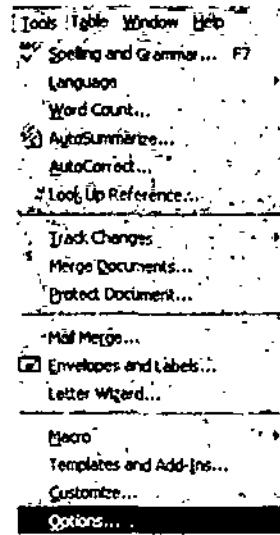
Fig. Menu for opening the opions window

➤ (c) Click on **General** tab in option window.

➤ (d) Select the desired scale from the list given against option **Measurement Units**.

➤ (e) Click on **Ok** button.

Vertical alignment of text

The entire document or selected text can be centered on the page. For example, if you write only 10 lines on a page, you can position them in center portion of page or in top half or spread across the full page. For doing so, follow the steps written below :
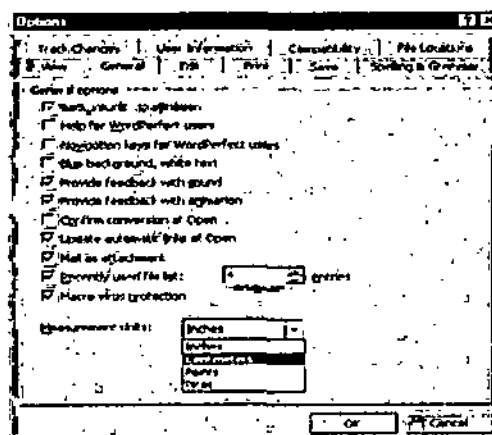
Fig. Options windows for setting the mesurement unit

(a) Click on File option on main menu bar.

(b) Click on Page Setup option of File menu. It opens Page setup window.

(c) Click on Layout tab in Page setup window. Refer figure 8.11.

(d) If you want to format only selected text then the text should be selected before you click on File menu.

(e) Select the Vertical alignment from the list as :

➤ Top option will align the text to top margin.

➤ Center option will align the text in center of page leaving equal space   towards top and bottom margins.

➤ Justified option will spread the text equally on full page from top margin to bottom margin.

➤ Select the option from "Section Start" list as: -

➤ Continuous option will apply formatting without disturbing the page numbers of document.

➤ New Page Option will align the selected text on new page.

➤ Even page option will apply the formatting only on even pages.

➤ Odd pages will apply it to only on odd page.

(f) Lastly select your choice from "Apply to" list whether you want to apply formatting to entire document, from the point further to cursor position or on selected text only.
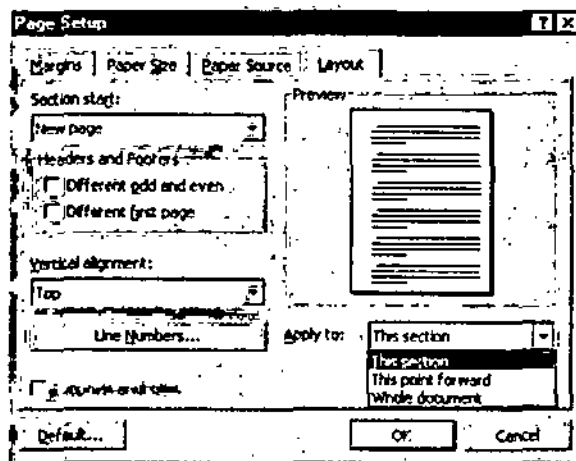
Fig. Settings for vertical formatting of page

(g) Now click on Ok button.

✦ 8.2 OPENING MULTIPLE DOCUMENTS

MS-Word is the application which needs the windows platform for its functioning. As we have already discussed that window operating system is multitasking. In multitasking systems more than one program can be opened at a time. One program be active and run in foreground and rest of the programs run in background process. Each program opens in an independent window. Here we are discussing about opening of more than one documents from MS-Word. Name of each opened application appears on task bar. For opening multiple documents follow the steps written below :

(a) Click on File option on main menu bar.

(b) Click on Open option of File menu. It opens a window showing file list.

(c) Double click on the file name you want to open.

(d) All opened documents can be seen through Window option on main menu bar.

❖ 8.3 SWITCHING BETWEEN MULTIPLE OPEN DOCUMENT

If you have many documents open at a time, you may have to go through them one after other for the purpose of editing and reading them. All opened documents appear as a list under Window option of main menu bar as discussed earlier. For switching over from one document to other :

(a) Click on Window option of main menu bar.

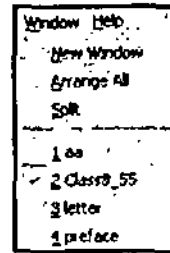(b) Click on the name of document to make its window active as shown in figure 8.12.

Fig. Multiple opened document

❖ 8.4 PRINTING THE DOCUMENT

MS-Word has the facility to print the document on printer and screen as well. It is always advised to print the document on screen before printing it by the printer. It will show you the exact appearance of printed document as it will appear after printing on printer.

For printing the document on screen follow the steps written below :

(a) Click on **File** option at main menu bar.

(b) Click on **Print Preview** option in File menu. OR

(c) Click on **Print preview** button on standard tool bar.

Checking the document through prints preview before printing it on printer, is a time and paper saver.

Printing document through Printer

For printing the document through printer, follow the steps written below :

(a) Click on **File** option on main menu bar.

(b) Click on **Print** option of File menu as shown in figure 8.13. It will display the Print window as shown in figure 8.14.
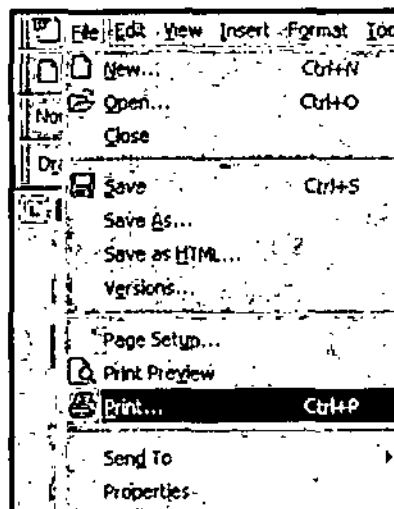
Fig. Print menu.
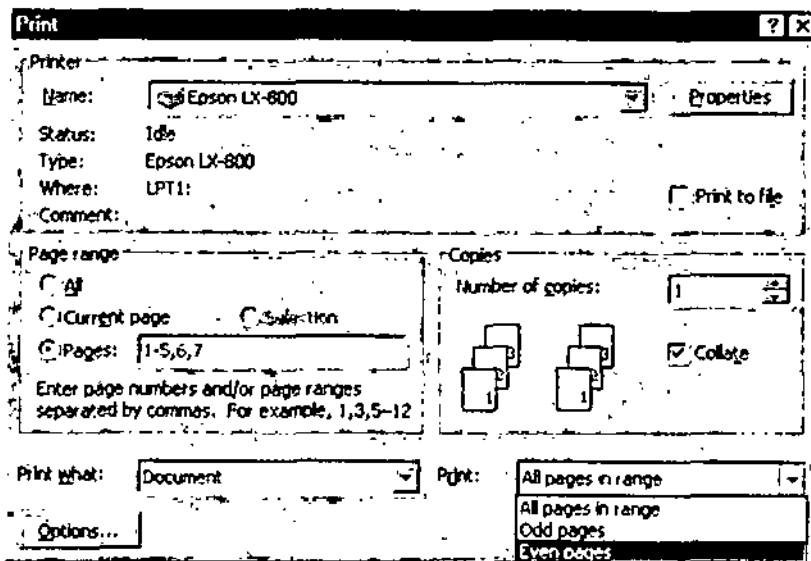
Fig. Print window for setting print options

Or

Click on Print button on standard tool bar.

Or

Press CTRL + P Keys on Keyboard.

(c) Select the name of the printer from the list available in print window.

(d) Select the paper range as follows :

All–To print all the pages of document.

Current Page - To print current page of document.

Pages–Mention the numbers of the pages to be printed.

(e) Make sure that "Print what" option indicates word "document" if you are printing document.

(f) Type the value against number of copy option Or you can increase Or decrease the number just by clicking on arrows provided.

(g) If you want more than one copy of more than one page then set the collate option accordingly. If the collate option is ON, it will print one copy of all the pages first then second copy and so on. When collate option is OFF and you want to print more than one copy of more than one page. the total number of copies of first page will be printed before switching over to next page.

For example, if you want to print 3 copies of pages 1 - 3, 5 & 7.

When collate is ON, the printing sequence will be

    Page 1 – 3. 5 & 7 (First copy)

    Page 1 - 3. 5 & 7 (Second copy)

    Page 1 - 3. 5 & 7 (Third copy)

When collate is OFF. the printing sequence will be

    Page 1, (Three copies)

    Page 2, (Three copies)

    Page 3 (Three copies)

    Page 5 (Three copies)

    Page 7 (Three copies)

(h) You can select whether you want to print odd pages, even pages or all the pages. This selection is done through print text box option.

(i) The document can be printed in file also instead of printer. It can be possible by clicking on **Print to file** option in print window.

✦ 8.5 APPLYING NUMBERS AND BULLETS TO TEXT

The automatic numbering and bulleting features of MS-Word allow you to create a bulleted or numbered list as you type into your document. *For starting the numbered or bulleted list, follow the* procedure written below :

(a) Position the cursor at starting point in the document or select the text to be numbered or bulleted.

(b) Click on number or bullets button on formatting tool bar as shown in figure 8.15.

(c) It will display either number 1 or a bullet as per selection at cursor position or in the beginning of each paragraph if text is selected. Text is considered new paragraph after each press of Enter key.

Fig. Bullets & Numbering bulttons

(d) Type the line or paragraph. When you press the Enter key, you will see another bullet or incremented number appearing in new line.

(e) Whenever you press enter key, you note that either next number or bullet appearing in new line.

(f) If you want to stop the entry of bullets or numbers, click on bullet or numbering button on Formatting toolbar when cursor reaches to new line.

(g) You can add number or bullet in same paragraph by pressing Shift + Enter key.

Changing the bullet style

Follow the procedure written below for changing the bullet style.

(a) Select the text for which bullet style is to be changed or applied.

(b) Click on **Format** option on main menu bar.

(c) Click on **Bullets and Numbering** option of Format menu as shown in figure 8.16. It opens the Bullets and Numbering window as shown in figure 8.17.
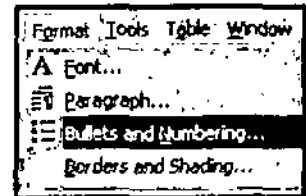
Fig. Menu to open Bullet and Numbering windows

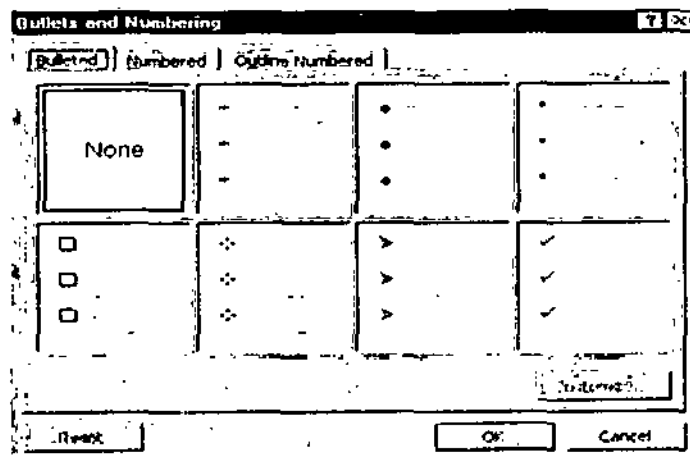(d) Click on **Bulleted** tab in Bullets and Numbering window shown figure 8.17.

Fig. Window for changing bullet style

(e) Click on Bullet style you want to select.

(f) Click on **Ok** button to apply it on your document.

Changing the symbol in bulleted list

The symbols provided in bulleted list can be changed any time. For this follow the procedure written below :

(a) Click on **Customize** button in Bullets and Numbering Window. It opens Customize Bulleted List Window.

(b) Select the bullet character from the given list.   Or

(c) Click on **Bullet** button, which opens a list of different symbols.

(d) Click on **Ok** button in Customize Bulleted list window.

(e) Click on **Ok** button in Bullets and Numbering Window.

Changing the numbering style

As the bullet style can be changed any time in the document, the numbering style also can be changed. Follow this procedure to change the numbering style.

(a) Select the text for which numbering style is to be changed or applied.

(b) Click on **Format** option on main menu bar.

(c) Click on **Bullet and numbering** option of Format menu. It opens the bullet and numbering window as shown in figure 8.18.

(d) Click on **Numbered** tab in Bullets and Numbering window.

(e) Select the numbering style from the list. Click on Ok button.
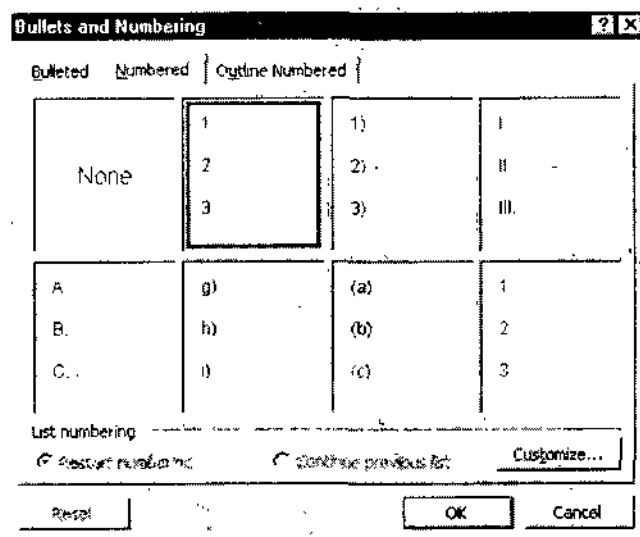
Fig. Window for changing Numbering style

✦ 8.6 FINDING AND REPLACING THE TEXT

MS-Word software provides the facility to find and replace the text in case of any mistake occurred.

Find using wild card characters

Follow the procedure written below to find and replace the text in document.

(a) Place the cursor at position from where you want to start the search for the text.

(b) Click on **Edit** option of main menu bar.

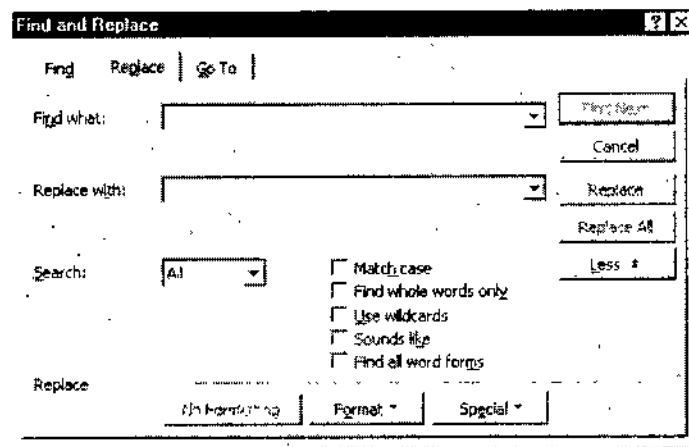(c) Click on **Find** option in Edit menu. It opens Find and Replace window as shown in figure 8.19.

Fig. Find and Replace window

(d) Click on **Replace** tab in Find and Replace window.

(e) Type the text in **Find what** option either by using wild card characters or in full.

(f) For example if you want to search chapter1, chapter2, chapter3, chapter4, etc. you can type chapter*
to find these words.

(g) Click on **Find next** button. The cursor will stop at first occurrence of matching word.

(h) If you want to replace this word with another word, type the new word against the option **Replace
with** and click on replace button.

(i) If you do not want to replace it then click on **find next** button in Find and Replace window. After
completion of Find and Replace operation click on window close button to close the window.

Find using exact match

(a) Place the cursor at position from where you want to start the search for the text.

(c) Click on **Edit** option of main menu bar.

(c) Click on **Find** option in Edit menu. It opens Find and Replace window as shown in figure 8.19
above.

(d) Click on **Replace** tab in Find and Replace window.

(e) Click on **More** button of the window, which will expand the Find and Replace window as shown in
figure 8.19 above.

(e) Type the text to be searched against **Find what** option.

(g) Click on **Find next** button. The cursor will stop on first match. If you want to replace it with other
word, type the new word against Replace with option and click on replace button.

(h) For replacing all the occurrences, type the word and click on **Replace All** buttons.

Search list provides three options :

All – Select All option to search the entire document.

Down – Select Down option to search down ward from cursor position.

Up – Select Up option to search upward from cursor position.

There are few check boxes in this window as explained below :

Match case : Click on this option if you want to search exact match of your typed word. It means that
the upper case character like A B C and lower case character like a b c will not be considered same. For
example if you type a word "The" for search and the document contains word "the" then both the words will
not be considered same.

Find whole : This option when clicked, will find only those words which are same as typed in "Find what "option". For example if this option is not clicked and any word in document contains the word written against "Find what" option, will also be searched. For example if you search for the word "The" then cursor will stop on the words then, their, there, them etc. because these words also contain 'the' word.

Sound like : If you select this option, the words having similar pronunciation will also be searched. For example, if you are trying to search "there" then "their" also will be searched.

Find All : When this option in clicked it will find all grammatical forms of word. If you search for eat, the ate, eaten and eating. Also will be searched.
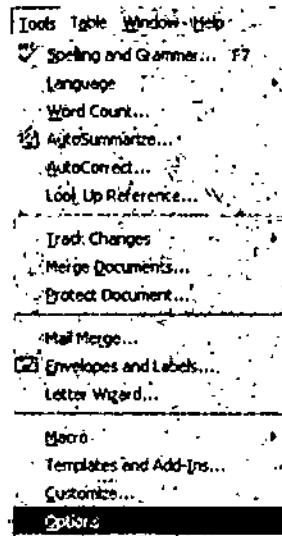
Fig. A Menu for opening the options window

❖ 8.7 CUSTOMISING THE WORD OPTIONS

MS-Word provides the facility to customise the various options available in the software. We can enable or disable the facilities provided in the software.

View option

By making the changes in view option we can make many things to appear on screen through document and many to disappear as per our requirements. To make the changes in view option proceed as follows:

(a) Click on **Tools** option of main menu bar.

(b) Click on **Options** in Tools menu. It opens the options window as shown in figure 8.20.

(c) Click on **View** tab in Options window.

(d) Click on desired options provided in window as explained below also refers figure 8.21.
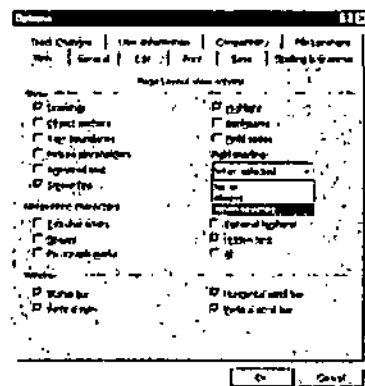

Fig. Setting of view options

Drawings : Click on this option if you want the drawings available in document should be displayed on screen. Drawing objects make the scrolling of screen slow. Putting this switch off to make the screen scrolling faster can hide the drawing objects.

Object anchors : By clicking this switch, the anchor objects will be displayed on screen and indicate that object is attached to paragraph.

Text Boundaries : It displays the boundary around the text.

Picture Place holders : Putting this switch ON makes the screen scrolling faster because it displays only the empty frames instead of picture.

Animated text : It enables the text animation on the screen.

Tab characters : Displays the hidden tab character when this box in checked.

Spaces : Displays the hidden character indicating spaces. This character is the form of a dot.

Paragraph Marks : Displays the paragraph marks as a character generated by Enter key. This is also hidden character.

Status bar : Display the status bar.

Vertical Ruler : Display Vertical Ruler.

Horizontal Scroll bar : Displays when the box is checked.

Field Shading : This list has three options like Never, Always and when selected. We can choose the display of shades on fields as per our requirement from this list.

Save Option

Save option contains the setting about saving of the documents. To open save options, click on Save tab in Options Window. It provides the following facilities. Also refer figure 8.22.
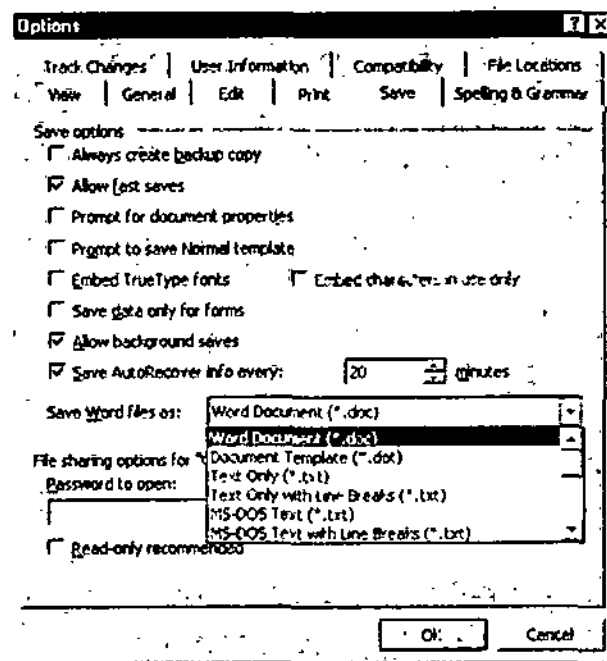

Fig. Option window showing save settings

Always create backup copy : If this switch is ON, the MS-Word will create a backup copy of document every time when you save your document.

The backup will update on each save of document.

Allows fast saves : Selecting this option will increase the saving speed of the system. In fast saving the computer will record only changes made in document. Fast saving cannot create the backup copies while saving.

Prompt to save normal template : When this box is checked, it will ask the user for saving the files whenever user exits from MS-Word. If it is left unchecked, the files will be saved automatically whenever user exits from MS-Word.

Allows background saves : It saves the document in the background so that you can continue working in the MS-Word while it is saving a document.

Saves auto recover info every [Time] : When this box is checked, it makes the automatic recovery of the document after specified time. The time can be 1 to 120

minutes. The advantage of doing so is if your system hangs while working and you have to switch it OFF then your unsaved file will be recovered when you switch ON the system next time.

Spelling and Grammar

These settings are also available in Options windows. The various setting are discussed below also refer figure 8.23.
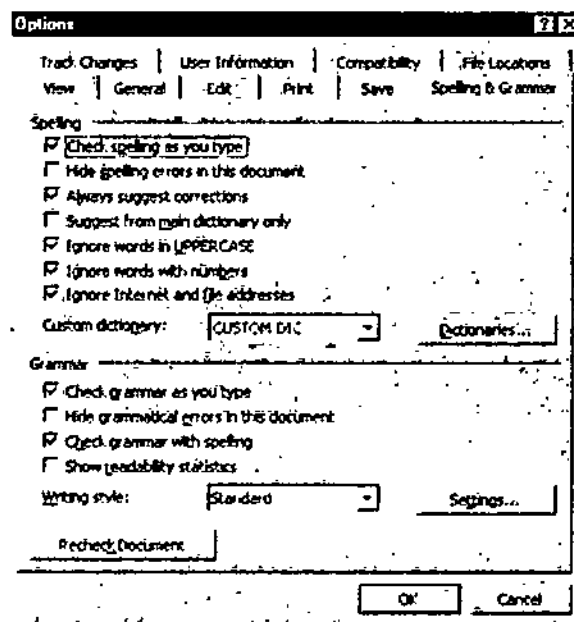
Fig. Spelling and grammer options setting

Check spelling as you type : If you click on this option, it will check the spelling as and when you type the word.

Hide spelling errors in this document : Whenever MS-Word finds any spelling mistake, it underlines the word with red line. If you want that words with wrong spelling should not be underlined, then click on this option. It will hide the red underline.

Always suggest corrections : This option will force the MS-Word to display the list of correct words whenever it finds any spelling mistake.

Ignore words in upper case : It instructs the MS-Word not to check the spellings for the words written in capital letter (upper case).

Ignore the words with numbers : It prevents the spelling checks on words, which contains the numbers like chapter1, lesson2 etc.

Ignore Internet and file addresses : If you check this box, it ignores the spelling check of word like Internet addresses, E-mail addresses etc.

Check grammar as you type : By keeping this option ON, MS-Word will check for grammar mistakes as soon as you type the sentence.

Hide grammatical errors : This is same as hiding spelling errors. This option will not display the grammatical errors on the screen. Underlining it with green line indicates grammatical errors.

Check grammar with spelling : Clear this box if you do not want to check grammar along with the spelling.

General Options

General options are also available in options window. You can click on Tools ⟶ Option ⟶General to open these information. Following options are available in the window. Refer figure 8.24 for general options.

Background re-pagination : When we execute the print command, MS-Word arranges the pages to be printed. If background re-pagination option is 'ON' it allows the arrangement of pages even when the other programs are running.

Blue background white text : When this Option is checked, it makes the background of the document as dark blue and text will appear as white.

Provide Feedback with sound : By keeping this box checked, it adds the sound to certain action or events throughout the word session. For example, word plays a sound when an alert appears or when process completes. This facility can be available if your computer has sound card and speaker installed.
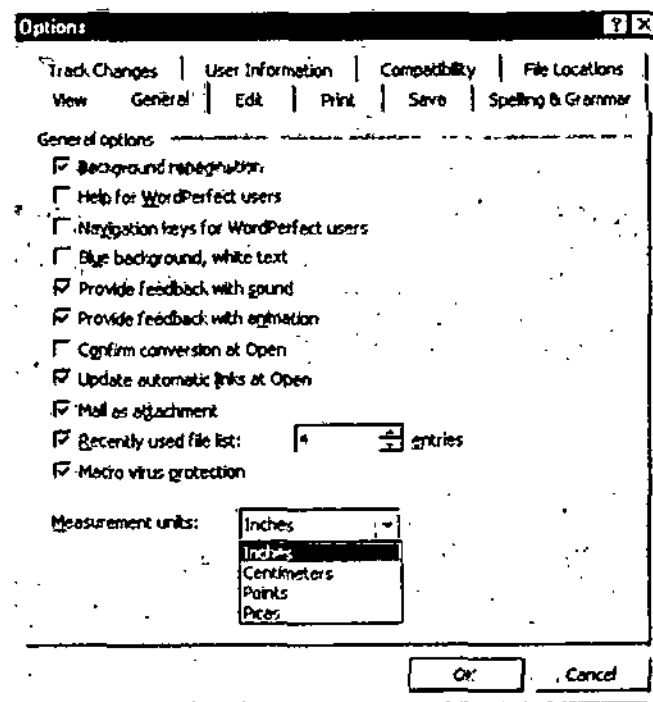

Fig. Option window showing general settings

Provide feedback with animation : It animates the movement of mouse and makes animated cursor in place of usual static cursor for actions such as printing, repagination, saving etc.

Confirm conversion at open : If any document is created using any other application than MS-Word like word star, word perfect etc. MS-Word can convert this document in its format automatically when the document is opened in MS-Word. If you check this box, MS-Word will display the name of program used to convert this document. Otherwise it will convert without indicating any message on screen.

Update automatic link at open : MS-Word has facility to link more than one file. If files are linked together and any change is made in main file it will change all the linked files also. You have to keep this switch ON to make the link effective as soon as linked files are opened.

Recently used file list : MS-Word maintains the record of recently used files. The maximum number of such files can be 9. The list of such files appears in File menu. You can mention here the number of recently used files to be displayed in list.

Measurement Units : This option contains the list of scales used by MS-Word for measuring. Selected scale appears on ruler. You can select the desired scale from the list. The list has following options :

➤ Inches.

➤ Centimeters.

➤ Points.

➤ Picas.

Print Options

Print options is also a part of Options Window. It can be opened by clicking on Tools ¾® option ¾® Print.

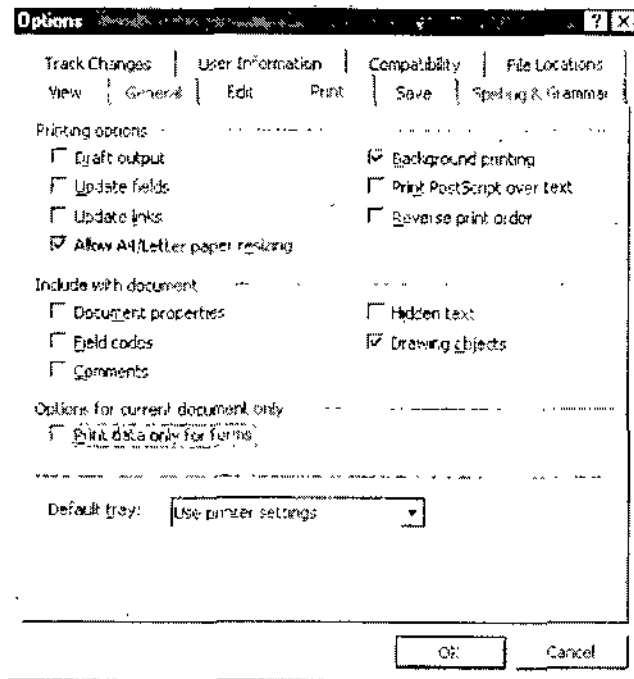The important options are discussed below and shown in figure 105.

Fig. Print options setting

Draft Output : When this switch is put ON, the document is printed with minimum formatting. It makes the printing job faster.

Update fields : This updates all the fields before printing them.

Update Links : It update all the links of document before printing. We have already discussed about the links of document.

Document properties : MS-Word maintains the summary of all the documents. The summary contains Author's name, date of creation, number of characters in document etc. If you want the summary also to be printed alongwith document then click on this option.

Comments : If you click this option, the comments inserted in document will also be printed along with the document.

Reverse Print Order : MS-Word prints the document from beginning to last. This can be reversed by clicking on this option. After reversing the print order, the printing will be done from last page to first page.

❖ TEST YOURSELF-1

1. Write the procedure to set the margins through ruler.

2. Differentiate the Portrait and Landscape printing.

3. Write the procedure to change the paragraph indentation.

4. What do you understand by the gutter space ?

5. How can you hide the ruler display ?

6. Write the procedure to change the scale of ruler.

7. How can you switch over from one document to other when multiple documents are opened?

8. Write the purpose of collate button on print window.

9. Which are the various methods to start printing of the document ?

10. Write the procedure to change the name of printer in print window.

11. Write the procedure to change the bullet style in your document.

12. While typing your text, you have typ~ word 'Their' in place of 'There' in your entire document. Write the procedure to replace this word with correct one.

13. Write the purpose of "Match case" option in find and replace window.

14. Write the purpose of Sound like option in find and replace window.

15. How can you create the back up copy of your document while saving.

❖ TEST YOURSELF–2

1. Start MS-Word and open new document.

2. Type four paragraphs on first page.

3. Paste first three paragraphs at end of your document.

4. Format the entire document to meet the following requirements:

First line indent of each paragraph	–	.35"
Left margin	–	1.50"
Right margin	–	1.25"
Top margin	–	.5"
Bottom margin	–	.5"

5. Change the ruler scale to measure centimeters.

6. Align the text of second page vertically in center of page.

7. Open three more existing document.

8. Try switching over from one document to another among all opened documents.

9. Try to print any document if you have printer attached to your computer.

10. Apply different type of bullets to all the paragraphs of first page.

11. Apply different style of numbers to all the paragraphs of your document.

12. Change at least two symbols in bullet list.

13. Open the Options window and review the settings in view option.

14. Review the settings in save option.

15. Review the settings in General option.

16. Close the Option Window.

17. Close all the Opened documents.

18. Exit MS–Word and shut down your system.

Solved Question

Q. 1. Which menu option on main menu bar will you click for page setting is MS - Word ?

Ans. File menu option on main menu bar contains the option for page setting in MS-Word.

Q. 2. What do you understand by first line indent and hanging indent ?

Ans. The space between margin and first character of first line in any paragraph is known as first line indent. The space between left margin and first character of subsequent lines of paragraph in known as hanging indent.

Q. 3. Which menu option contains the option to change the scale measurement of ruler ?

Ans. First click tools option on main menu bar. Now click on options word under tools menu which opens a window click general tab and change the scale measurement.

Q. 4. Which menu option displays the list of opened document in MS-Word.

Ans. Window menu option on main menu bar contains the list of opened document in MS-Word.

Q. 5. The buttons to change the numbers and bullets are available on –

(a) Standard toolbar　(b) Drawing toolbar　(c) Formatting toolbar　(d) Mail merge toolbar

Ans. Formatting toolbar.

❑❑❑

UNIT
9

MS-POWERPOINT

LEARNING OBJECTIVES

After going through this unit you will learn :

➤ PowerPoint presentation in appropriate detail
➤ How to make a powerpoint presentation
➤ Important points to be kept in mind while making a presentation

✧ 9.1 INTRODUCTION

PowerPoint is a software application to increase the efficiency of the oral presentations and to keep the audience focused on the subject. It operates like an old-fashioned slide show, but uses modern technology in the form of computers and digital projectors rather than a slide projector of old. PowerPoint is actually an important part of MS office which is a complete tool for all the office needs. PowerPoint presentations are widely used in classrooms as note outlines for teachers and for project presentations by students. The style in which you create slides is completely up to you. PowerPoint allows you to choose from a wide variety of formats that include sections such as titles, lists, images, or charts. Any of these can be incorporated into your presentation. The main thing to keep in mind, however, is that an audience will be viewing this material; it must be large enough to read, yet not so large that it takes up far too much of the screen to include relevant information.

Each page in a PowerPoint presentation is called a slide. PowerPoint presentations run just like the slide shows of old, only they are broadcast through a computer instead of a slide projector.

✧ 9.2 OPENING POWERPOINT

To begin running PowerPoint, go to the Start menu, and navigate to "Programs." and from there, navigate to the Microsoft Office applications, you will see Microsoft Office PowerPoint 2003(or the version installed) listed.
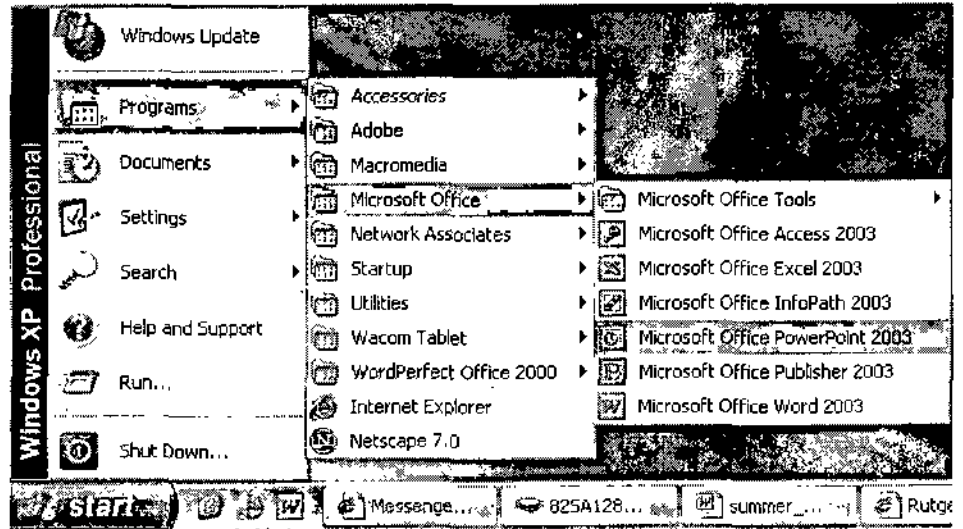
The opening screen

On Starting the Power Point application this is the first thing you will come across, hence the name *opening screen. Across the top of the screen, you'll notice a toolbar that looks similar to ones used in word* processing program. These tools allow you to format and edit text and other elements in your slide. On the left side of the screen, there's a panel with two tabs called "Slides" and "Outline" this allows you to view all of your slides in your slideshow as small images (in the "Slides" mode) or as text (you can view as text if you click on the "Outline" tab).
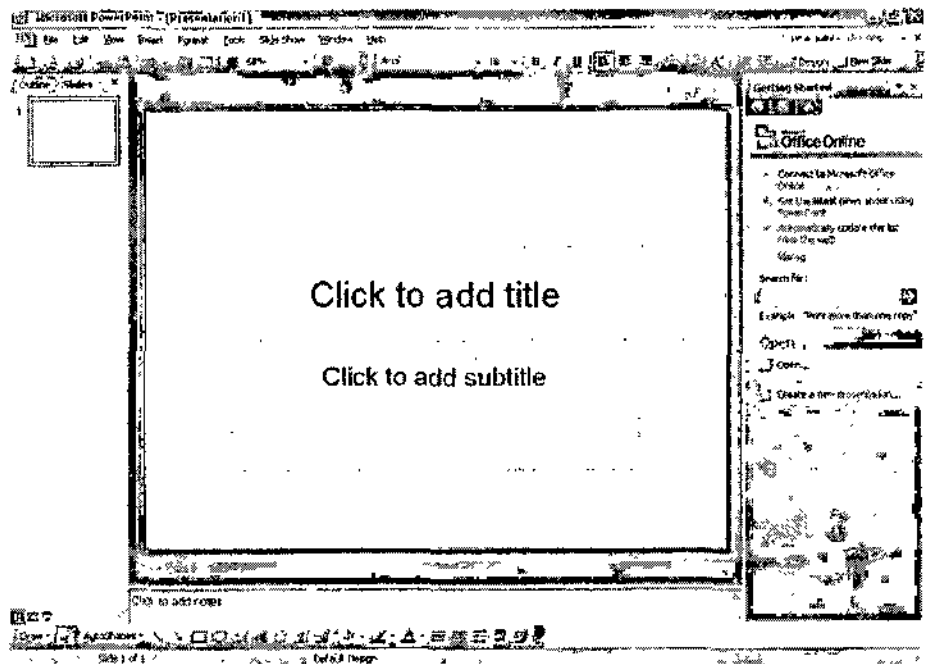

❖ 9.3 THE TASK PANE

The panel on the right side of the screen is actually called the "Task Pane." As the name implies, it controls all the main slide control tasks for your presentation. If you ever lose sight of this panel, go to the menu bar in PowerPoint, navigate to "View," select the "Toolbars" menu, and make sure "Task Pane" is selected. When you first open PowerPoint, the "Task Pane" is set to display as the "Getting Started" panel. This will help you in beginning your presentation.
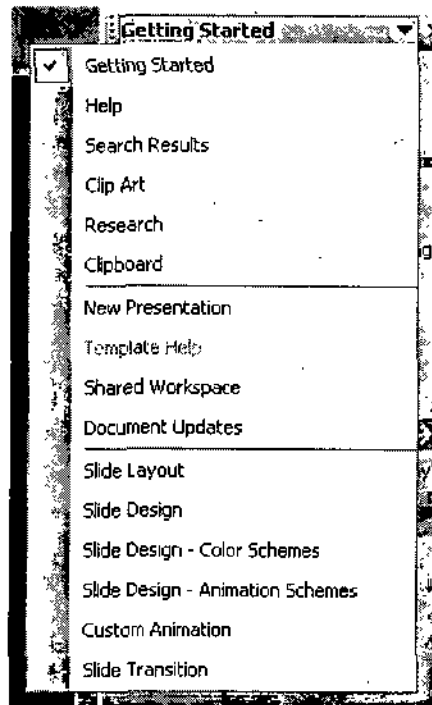
❖ 9.4 CREATE A NEW PRESENTATION

If you want to start a new presentation, you can do one of many things. Click on the "Create a new presentation..." button. You'll notice a change in the "Getting Started" panel. It's now called "New Presentation," and you can also move forward, back, and go "home" using the buttons on the top of the panel if you want to go back and read information you may have passed.
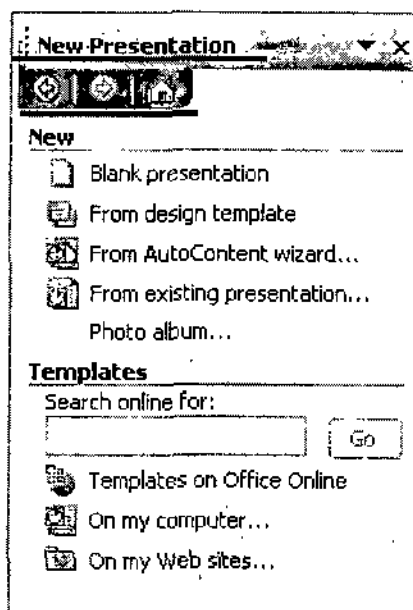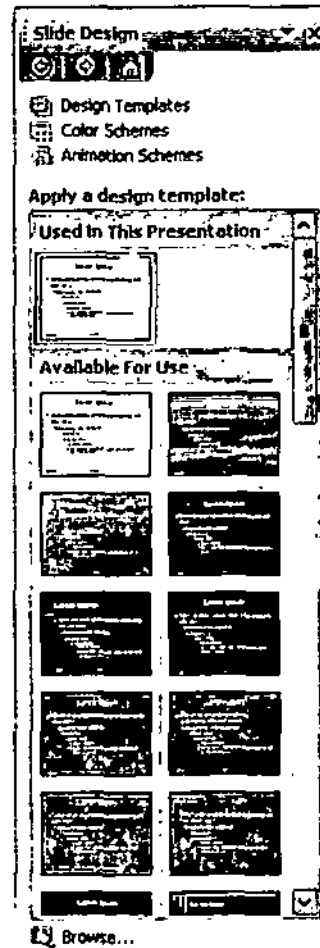

Blank Presentation

Click on the "blank presentation" button. The panel will then give you a number of slide layouts to choose from.

If you choose to select from one of these pre-made slide layouts, keep in mind that you can change the positioning and even delete some of the objects in the layout. Nothing is fixed, and you can always modify objects, even in the pre-made slide layouts.
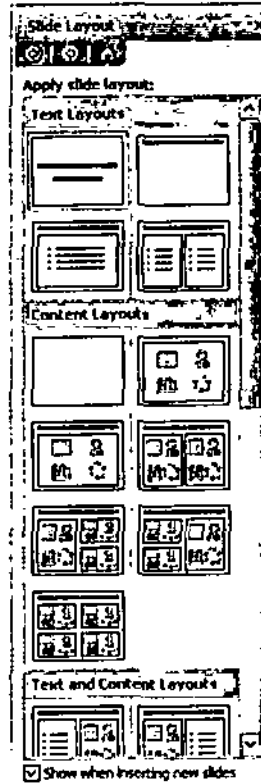
Design Template

In the "New" section of the "New Presentation" panel, click on the "From Design Template" button. The following panel will then appear.

This is a list of different design templates. They are pre-made backgrounds and layouts that you can use to build your presentation. Use the scroll bar to see the entire list of designs.

✧ 9.5 EXISTING PRESENTATION

You can also choose to make a presentation from an existing file. To choose this option, click on the "From Existing Presentation" button in the "New" section of the "New Presentation" panel on the right or if in case you no longer see the "New Presentation" panel, click on the house (Home) icon in the panel on the right. This will take you to the "Getting Started" panel. From there, click on "create a new presentation," and you will see the various "New presentation" options.

Photo Album

You can create a new presentation based on images you have saved on your computer or digital camera. Select the "Photo Album..." button from the "New Presentation" panel. The following window will then pop up
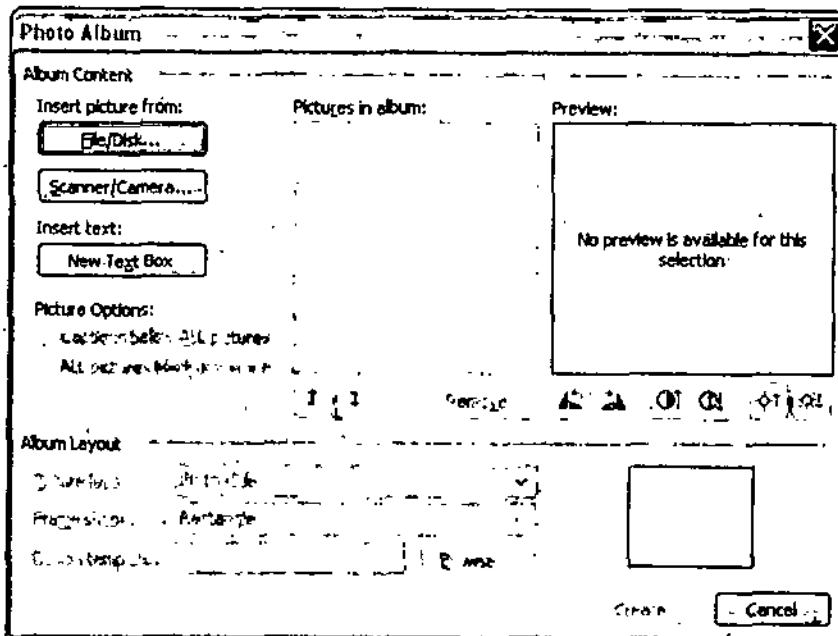

✧ 9.6 SAVE YOUR SLIDE SHOW

It's important to save your work frequently, so that you don't use your work. To save your presentation, go to the menu bar and select File > Save As. When the window appears, find a location to save your presentation on your computer, and give it a file name in the text box. To save your file periodically as you work on it, go to the menu bar and select File > Save (or use the shortcut Ctrl+S).
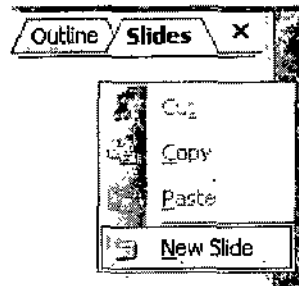
Create a New Slide

Whether you are using a pre-made design template or working from your own design, it is very easy to insert a new slide.

(1) Use the "New Slide" button :
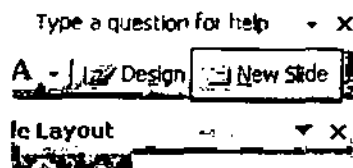
(2) Right-click in the "Slide" panel

(3) Insert New Slide : Go to the file menu and select Insert >> New Slide. A new slide will be inserted after the slide you are currently working with (shortcut command: Ctrl+M).

Slide Design

Once you have created a slide, you can begin creating a design for that slide. To view the Slide Design

menu, click on the button in the upper right corner of the screen that says "Design"

There are three sub-menus in the "Slide Design" panel: Design Templates Color Schemes, and Animation schemes.

Design Templates
Color Schemes
Animation Schemes

❖ 9.7 VARIOUS INSERTIONS

Insert Text Box : *Go to the file menu and select Insert > Insert Text Box*

Insert Picture : Go to the file menu and select Insert > Picture and choose from one of the options, depending on what type of picture you want to insert.

Clipart : "Clipart" are images that already come packaged with your computer. These are generally simple images that can be very effective when used in PowerPoint presentation. Clipart also functions as eye-candy for your slideshow to keep things looking interesting. Use the Clipart menus to navigate through different categories of images to find the pictures that best suit your needs.

From File : You can use the "From File" option to browse your computer to insert a specific image that *you have saved.*

AutoShapes : "AutoShapes" lets you create your own simple graphics, such as lines, word balloons, stars, and other shapes.

Insert Slide Number : In PowerPoint, you can number each of your slides. To do this, *insert a new text* box for where you want your slide number to be positioned, and select Insert > Slide Number from the menu bar.

Insert Date and Time : Works just like the above "Insert Slide Number" tool. You must make a separate text box to insert your date and time. Then, select Insert > Date and Time from the menu bar. A pop up window will then appear, allowing you to select an appearance for the date and time.

Insert Movie or Sound : For a media-rich slideshow, you may decide to display some movie or sound files that you can play during your presentation. You must first have the movie or sound file saved on your *computer.*

Insert Chart : By going to the menu bar and selecting Insert > Chart, a spreadsheet will pop up into PowerPoint. You can manipulate data in order to create your own charts and graphs.

Insert Table : Go to the menu bar and select Insert > Table to insert a number of rows and columns to create a table. When the table is inserted, a new table menu window will pop up with various formatting features. Here, you can add borders, change the border sizes of the table, and manage the cells in the table.

Insert Hyperlink : If you are giving a presentation on a computer that has access to the Internet, then you may find it helpful to have some hyperlinks in your slideshow, so that you can click on a link while you are presenting and then demonstrate a web site. To insert a hyperlink, go to the menu bar and select Insert > Hyperlink. Then, a new window will appear for specifying the information regarding the hyperlink you want to insert into your document.

✣ 9.8 THINGS TO KEEP IN MIND

Do Not Crowd Slides

For a good presentation the rule is approximately 15-20 words per slide. If you stray too far from this, either your audience will not read it, or they will read it and become too preoccupied and not listen to you. When giving presentations, the slides act as a guide to summarize the major points, and what you say should provide all the related details.

An important point to note here is that All graphics, sounds and animation should never interfere with the speakers ability to communicate information. They should always HELP this process. Be cautious of using these options at right time and at right place; overuse only hampers the concentration.

View

In darker rooms, a lighter background with dark text will be easier on the audience's vision than a dark background with light text. In a well-lit room, both work equally well.

✣ 9.9 GENERIC LAYOUT OF A PRESENTATION

The layout of a presentation depends on the goal of the presentation.

Here is a Generic outline of presentation elements which are mostly the part of all the presentataions :

(1) Title Page

(a) Identify yourself and your affiliation, the project title, and the date

(b) This page typically has a photo related to prsentation or some other graphic

(2) Introduction

(a) State the purpose of the discussion. You should answer the question: "Why are we all here?"

(b) Engineers and scientists are not fond of "mystery stories" in presentations. In this slide you should have identified:

> ▼ The problem/purpose/challenge
> ▼ The solution and how well it does the job
> ▼ Why this presentation/work is important

(3) Topics of Discussion

(a) State the main ideas you'll be talking about

(4) Topic One

(a) Details about this topic

(b) Supporting information and examples

(c) How it relates to your audience

(5) Topic Two

(a) Details about this topic

(b) Supporting information and examples

(c) How it relates to your audience, and so on.

(6) Real Life

(a) Give an example or real life anecdote

(b) Sympathize with the audience's situation if appropriate

(7) What This Means

(a) Add a strong statement that summarizes how you feel or think about this topic

(b) Summarize key points you want your audience to remember

(8) Next Steps

(a) Summarize any actions required by your audience

Summary

➤ PowerPoint is a software application to increase the efficiency of the oral presentations and to keep the audience focused on the subject.

➤ Each page in a PowerPoint presentation is called a slide.

➤ On starting the PowerPoint presentation the first thing you come across is the opening screen.

➤ The task Pane exhibits all the main controls for making a slide and thus a presentation.

➤ In the Design template you find various pre made back grounds and layouts that can be used for making a presentation.

➤ It is important to save your presentation periodically to avoid loosing the data.

  ▼ While making a presentation the two most important things to be kept in mind are :

  ▼ *The slides should not be crowded*

  ▼ The view of the should be kept according to the lighting in the room.

➤ The generic layout of any presentation includes :

  ▼ Tile Page

  ▼ Introuction

  ▼ Topics of Discussion

  ▼ real life examples

  ▼ What thid means/conclusion

  ▼ Next steps/future prospects

TEST YOURSELF

I. Write True on False

1. Each page in a power point presentation is called a slide.

2. The power point presentations can be created on any software.

3. The task pane is the one which contains link to various sladie design and layouts.

4. The very first thing which you come across on openinga power point presentation is called Front Page.

5. The power point presentations are used only for business purposes.

6. The over crewding of sliods is not considered good for presentations.

7. While saving a presentation you need to save each slide individually.

8. Power point presentations can even include movies and sounds.

II. Long Answer Questions

1. Describe the process of making a powr point presentation in simple steps.

2. Write a short note on importance of power point presentations and their usage in the corporate sector.

3. What should be the generic layout of a class room prsentation? Explain.

4. What do you mean by task pane and new it functions?

5. Prepare a power presentation having a minimum of seven slides on the topic "Common Wealth Games 2010."

Answers

I. Ture and False

1. T 2. F 3. T 4. F 5. F 6. T 7. F 8. T

☐☐☐