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Master of Computer Applications

COMPUTER FUNDAMENTALS AND PC SOFTWARE

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COURSE INTRODUCTION

This course on ***Computer Fundamentals and PC Software*** is designed with an aim to acquaint the learners with the basics of computer, operating systems, hardware and software and also how to use basic application programs for managing data in a computer system.

The course consists of eleven units. It includes the fundamental concept of an Operating System besides MS DOS, MS Windows and LINUX operating systems are inctroduced in this course. The course also deals with Microsoft Office which is an application software consists of different applications that helps us to perform different activities. It covers MS-Word, MS-Excel and MS-PowerPoint. *MS-Word* is the word processing program that allows us to create documents and reports. *MS-Excel* helps us to develop spreadsheets that display data in various tabular and visual formats. *MS-PowerPoint* creates multimedia presentations to display information in a graphical format.

Each unit of this course includes some along-side boxes to help you know some of the difficult, unfamiliar terms. Some “EXERCISES” have been included to help you apply your mind to some of the points in the units. You may find some boxes marked with: “LET US KNOW”. These boxes will provide you with some additional interesting and relevant information. Again, you will get “CHECK YOUR PROGRESS” questions. These have been designed to enable you to self-check your progress of study. It will be helpful for you if you solve the problems put in these boxes immediately after you go through the sections of the units and then match your answers with “ANSWERS TO CHECK YOUR PROGRESS” given at the end of each unit.

MASTER OF COMPUTER APPLICATIONS

Computer Fundamentals and PC Software

DETAILED SYLLABUS

UNIT 1 : INTRODUCTION TO COMPUTER

UNIT STRUCTURE

1.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- trace the evolution of Computer
- classify the different types of Computer
- describe the model and functioning of a Computer

1.2 INTRODUCTION

Computer is the most powerful tool man has ever created. Computers have made a great impact on our everyday life.Today, computer technology has permeated every sphere of existence of modern man . With the growing information needs in the modern world ,the computer has become one of the vital components for the survival of the business houses. Their presence is felt in almost every working place from the bus,air and railway ticket counters to satellite launching, from retail stores to medical diagnosis and from home use to research and design organization .- everywhere, we witness the elegance, sophistication and efficiency made possible only with the help of computers.Computer has become a part and parcel of our

daily existence.

In this unit, we will introduce you to the computer fundamentals including its various components and functionality. Besides discussing the characteristics of computers including its evolution and generations. We will also throw light on the categories of computers along with its application in the various fields of the modern world.

1.3 COMPUTER EVOLUTION AND GENERATION

The term ***computer*** is derived from the word ***compute***, which means ***to calculate.*** It can be defined as an ***Electronic machine*** capable of performing calculations and other manipulations of various types of data, under the control of a stored set of instructions. In the simplest form, a computer can be defined as a ***programmable machine***. A computer accepts data from an input device and processes it into useful information which it displays on its output devices. A general purpose computer generally has an *input unit*, an *output unit*, a *cental processing unit* and a *memory unit*.

Most of today's computer designs are based on the concepts developed by **John Von Neumann** refered to as the " **Von Neumann architecture**". According to this structure, a computer must have *two* units - a *processing unit* and a single *separate storage unit*. The term "*storedprogram computer*" is generally used to mean a computer of this design. The processing unit is termed as **central processing unit (CPU)** which mainly comprises another two units, namely Arithmetic and Logic Unit (**ALU**) and Control Unit (**CU**). The ALU performs the arithmetic operations on data such as addition, subtraction,multiplication and division, and the logical operations such as, >, <, >=. <= etc. The control unit directs the ALU to perform specific arithmetic and logical functions on the data.

The storage unit is used to store instructions and data temporarily. This component is referred to as memory. The memory unit stores all the information in a group of memory cells, also called memory locations, as binary digits(bits). Each memory location has a unique address and can be

addressed independently.

The following figure shows the basic structure of a conventional Von Neumann machine :

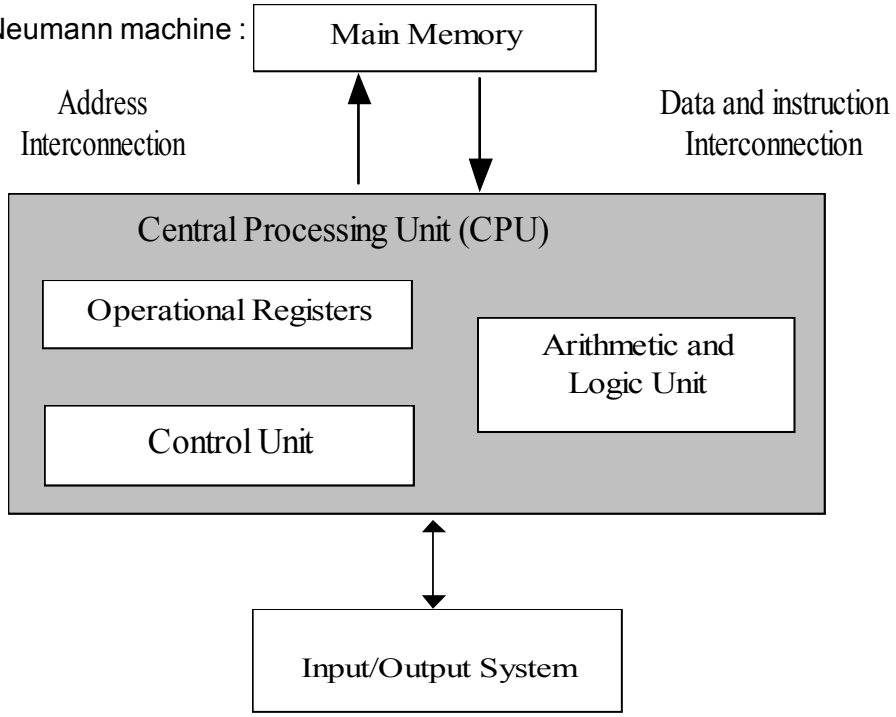


Fig. 1.1 : Von Neumann Architecture

Depending on the major technological development, the whole evolution process of the computer can be categorised into some generation which possessed some special characteristics.

There are *five* generations of computers as follows :

First Generation (1945 – 55) : The computers of this generation used vacuum tubes and consumed more power. Assembly languages were used for preparing programs. Mercury delay line memories and Electrostatic memories were used for storing programs. Punched cards and paper tape were invented to feed programs and data and to get results. The cost of the first generation computers were very high and they were mainly used for scientific computations.

Examples of computers of this generation are :

ENIAC – Electronic Numerical Integrator And Calculator

EDSAC – Electronic Delay Storage Automatic Calculator

EDVAC – Electronic Discrete Variable Automatic Computer

NOTE :

All the arithmetic and logical operations are performed in the CPU in special storage areas called registers. The size of the register is one of the important consider-ations in determining the processing capabilities of the CPU. Register size refers to the amount of information that can be held in a register at a time for processing. The larger the register size, the faster may be the speed of processing CPU. Processing power is measured in Million Instruction Per Second (MIPS).

UNIVAC – Universal Automatic Computer IBM 701

Second Generation (1955 – 65) : The second generation computers used transistors. They consumed less power and were smaller in size. Magnetic ferrite core memories were used as main memory and magnetic tapes and magnetic disks were used as secondary memory. High level languages such as FORTRAN, COBOL etc were used. Examples of computers of this generation are– IBM 7030, Digital Data Corporation's PDP 1/5/8 Honeywell 400.

Third Generation (1965 – 75) : The third generation computers used IC(Integrated Circuits). Small Scale Integration and Medium Scale Integration technology were implemented during this generation. Semiconductor memories were introduced in this generation computers They became smaller in size with fast processors and the cost of the computers had gone down.

Examples of computers of this generation are - 360 Mainframe from IBM, PDP-8 Mini Computer from Digital Equipment corporation).

Fourth Generation (1975 – 89) : Microprocessors were introduced as CPU. Very large Scale Integration (VLSI) techniques were used during this generation. Semiconductor memory chips were used as main memory. Hard disks, floppy disks, magnetic tapes were used as secondary memory. A lots of technology like parallelism, pipelining, cache memory, virtual memory and networking techniques were applied during this generation.

Examples of computers of this generation are - Intel's 8088, 80286, 80386, 80486 .., Motorola's 68000, 68030, 68040, Apple II, CRAY I/2/X/MP etc.).

Fifth Generation (1989 to present) : Computers based on artificial intelligence are available in the fifth generation. ULSI (Ultra Large Scale Integration) technology used in fifth generation computer, for example, Intel's Pentium 4 microprocessor contains 55 million transistors, millions of components on a single IC chip. Superscalar processors, Vector processors, SIMD processors, 32 bit micro controllers and embedded processors, Digital Signal Processors (DSP) etc have been developed in fifth generation. Recent development of grid technology and nanotechnology will radically

change the phase of computers.

Examples of computers of this generation are– IBM notebooks, Pantium PCs-Pentium 1/2/3/4/Dual core/Quad core.. SUN work stations, Origin 2000, PARAM 10000, IBM SP/2).

1.4 CLASSIFICATION OF COMPUTER

Computers can be classified according to their size and power as follows :

- Micro computer
- Mini computer
- Mainframe
- Supercomputer

Micro Computers :

- A microcomputer uses a microprocessor as its central Processing Unit. Microcomputers are tiny computers that can vary in size from a single chip to the size of a desktop model
- They are designed to be used by only one person at a time
- Small to medium data storage capacities 500MB – 2GB or more

The common examples of microcomputers are chips used in washing machines, TVs, Cars and Note book/Personal computers.

E.g. : IBM PC, PS/2 and Apple Macintosh

Applications : Used in the field of desktop publishing, accounting, statistical analysis, graphic designing, investment analysis, project management, teaching, entertainment etc. The different models of microcomputers are given below :

a) **Personal computers :** The name PC was given by the IBM for its microcomputers. PCs are used for word processing, spreadsheet calculations, database management etc.

b) **Note book or Lap Top :** It is small in terms of size and can be folded and carried around.Its monitor is made up of LCD and the keyboard and system units are contained in a single box. It has all the facilities of a personal computer (HDD, CDD, Sound card,

N/W card, Modem etc) and a special connection to connect to the desktop PC which can be used to transfer data.

c) **Palm Top :** Smaller model of the microcomputer.Its size is similar to that of a calculator – pocket size. It has a processor and memory and a special connection to connect to the desktop PC which can be used to transfer data.

d) **Personal Digital Assistance :** A personal digital assistant is a small palm-sized hand-held computer which has a small colour touch screen with audio and video features. They are used as smart phones, web-enabled plamtop computers, portable media players or gaming devices. Most PDAs today have a touch screen for data entry, a memory card, bluetooth, Wi-Fi or an infra red connectivity and can be used to access the Internet and other

a) Personal computer

b) Notebook computer

d) Palmtop computer

e) PDA (personal digital assistant)

Fig. 1.6 : Micro Computer

Mini Computers :

- Perform better than micros
- Large in size and costlier than micros

- Designed to support more than one user at a time
- Possess large storage capacities and operate at higher speed
- Support faster peripheral devices like high speed printers
- Can also communicate with main frames

Applications :

- These computers are used when the volume of processing is large For example Data processing for a medium sized organization
- Are used to control and monitor production processes
- Used to analyze results of experiments in laboratories
- Used as servers in LANs (Local Area Networks)

Examples of mini computers are - Digital Equipments PDP 11/45 and VAX 11 etc. The following fig. shows a mini computer :

Main Frame Computers :

- Are able to process large amount of data at a very high speed
- Support multi-user facility
- Number of processors varies from one to six.
- Cost: 3500 to many million dollars
- Are to be kept in air conditioned room to keep them cool
- Support many I/O and auxiliary storage devices
- Support network of terminals

Fig. 1.7 : Mini computer

Fig. 1.8 : Mainframe computer

Applications :

- Mainframe computers are used to process large amount of data at a very high speed such as in the case of Banks/ Insurance Companies/ Hospitals/ Railways…which need online processing of large number of transactions and requires massive data storage and processing capabilities
- used as controlling nodes in WANs (Wide Area Networks)
- used to mange large centralized databases

Examples of main frame computers are– IBM 370, IBM 3081, IBM 3000 series, Univac 1180, DEC IBM 3000 series, CDC Cyber - 2000V etc.

Super Computer : Supercomputer is a broad term for one of the fastest computers currently available. The main characteristics of a super computer are :

- Most powerful Computer system -it needs a large room
- Minimum world length is 64 bits
- CPU speed: 100 MIPS (Million instruction per second)
- Equivalent to 4000 computers
- High cost: 4 – 5 millions
- Able to handle large amount of data
- High power consumption
- High precision

Fig. 1.9 : PARAM 1000 Series Super Computer

Applications :

- In petroleum industry - to analyze volumes of seismic data which are gathered during oil seeking explorations to identify areas where there is possibility of getting petroleum products inside the earth
- In Aerospace industry - to simulate airflow around an aircraft at different speeds and altitude. This helps in producing an effective aerodynamic design for superior performance
- In Automobile industry – to do crash simulation of the design of an automobile before it is released for manufacturing – for better automobile design

- In structural mechanics – to solve complex structural engineering problems to ensure safety, reliability and cost effectiveness. For example the designer of a large bridge has to ensure that the bridge must be proper in various atmospheric conditions and pressures from wind, velocity etc and under load conditions.
- Meteorological centers use super computers for weather forecasting
- In Biomedical research – atomic nuclear and plasma analysis – to study the structure of viruses such as that causing AIDS
- For weapons research and development, sending rockets to space etc.

Examples of supercomputers are : Cray-1(1976), Cray-2(1985), Cray T3D(1993), NEC's SX-S/44(1991), Fujitsu VP 2600/10(1991), Hitachi 820/80(1987), C-DAC's PARAM Series of supercomputers etc. A PARAM 10000 series super computer of IIT Guwahati is shown in the above figure.

1.5 APPLICATIONS OF COMPUTER

Now a days ,computeris are used almost in every aspect of life. Every company , small or large, government offices, educational institutions are now directly or indirectly dependent on computers mainly for information processing. Computer based railway and airway reservation system is a common example of computer application. Computer system is helping in the efficient management of the banking sector, hospital records, payroll records and so on. Some of the areas where computers are being used mostly can be listed as below:

Science : Scientists are using computers to carry out their research works based on complex computations because of computer's fast speed and the accuracy.

Education : In schools and colleges, to make education much more interesting, computers are used now a days. Computer Aided Education (CAE) and Computer Based Training (CBT) packages are making learning much more interactive.

Health and Medicine : Starting from diagnosing the illness to monitoring a patient's status during a surgery , in pathological analysis ,in CAT scans or MRI scans etc. , doctors are using computers. Some special purpose computers are available which can even be operated within the human body.

Engineering : Engineers and architects are using computers in designing machineries, drawing design layouts. Architects can object that can be viewed from all the three dimensions by using techniques like virtual reality. In manufacturing industries, using computerized robotic arms hazardous jobs can be performed. The packages like Computer Aided Designing (CAD), Computer Aided Manufacturing (CAM) and so on are used in designing the product, ordering the parts and planning production.

Entertainment : With the use of multimedia facilities , computers are now greatly used in entertainment industry. Computers are used to control and bring special effects on image and sound.

Communication : Computer network and finally the Internet has brought a drastic change in communication system. Through E-mail or Electronic mail, it is possible to send messages and reports very fast from one person to another or a group of persons with the aid of computers and telephone lines.

Business and Banking : Computer network and finally the Internet has brought a drastic change in communication system. Through E-mail or Electronic mail, it is possible to send messages and reports very fast from one person to another or a group of persons with the aid of computers and telephone lines.

In order to deposit or withdraw cash from bank, people can use ATM (Automated Teller Machine) services 24 hours of the day. Through the computer networks among different branches of a bank, inter branch transactions can be carried out without delay.

Apart from the above mentioned applications , there are many other applications of computers that can be seen in our day to day activities.

CHECK YOUR PROGRESS

Q.1. State True or False:

i) PARAM is a super computer.

ii) A laptop is a portable computer.

iii) Vacuum tubes were part of the second generation computers.

iv) Micro computers are more powerful than mini computers.

v) EDSAC is an example of a second generation computer.

Q.2. Fill in the blanks :

i) Physical components of a computer are called _____.

ii) The basic components of first generation computers was _____.

iii) PDA stands for _____.

iv) _____ is a very small computer that can be held in the palm of the hand.

v) Analytical Engine was developed by _____.

Q.3. What is a PDA?

.....

Q.4. Name some storage device used in computer.

.....

ACTIVITY

- Create a table on various generations of computers with hardware and software details.
- Prepare a list of areas where computers are used. Mention the specific software for each application and its significance.

1.6 LET US SUM UP

- Computer is an electronic device that is used to perform diverse operations with the help of instructions to process the data in order to produce desired results.
- Computer development is divided into five generations.
- The first generation of computers used **vacuum tubes** for circuitry and **magnetic drums** for memory, and were often enormous, taking up entire rooms.
- In the second generation of computers, **transistors** replaced vacuum tubes.
- The **integrated circuits** were used in the third generation of computers.
- The fourth generation of computers are based on **microprocessors.**
- Fifth generation computers are based on ***artificial intelligence.***
- Micro computer is a small, low cost digital computer and includes desktop, laptop, PDA.
- A mini computer is a small digital computer which is more powerful than a micro computer.
- A mainframe computer consists of several processors that carry out most of the computations and have direct control over all the other computers in a network.
- Supercomputers are the most powerful computers used for processing complex scientific applications that involve task with highly complex calculations and solving problems with mechanical physics, such as weather forcasting and climate research systems, nuclear weapon simulation and simulation of automated aircrafts.

1.7 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : i) True, ii) True, iii) False, iv) False, v) False

Ans. to Q. No. 2 : i) Hardware, ii) Vacuum tubes, iii) Personal Digital

Assistant, iv) Palmtop, v) Charles Babbage.

Ans. to Q. No. 3 : A personal digital assistant is a small palm-sized hand-held computer which has a small colour touch screen with audio and video features.

Ans. to Q. No. 4 : Hard Disk, CD-ROM, DVD-ROM, Pen Drive etc.

1.8 FURTHER READINGS

- *Computer Fundaments* by P. K. Sinha, BPB Publication.
- *Computer Fundaments* by B. Ram, New Age International Publishers.

1.9 MODEL QUESTIONS

Q.1. Who invented the concept of stored program ? Why is this concept so important ?

Q.2. List the key hardware technologies used in building computer of each of the five generations.

Q.3. What are the advantages of transistors over vacuum tubes?

Q.4. What is an IC ? How does it help in reducing the size of computers

Q.5. Discuss the important features of various generations of computers. Give some examples of the computers of each generation.

Q.6. What is computer? What are the characteristics of a Computer? Do you think computers are superior to human being?

Q.7. Describe the evolution of computers.

Q.8. How are computers categorized into different categories?

UNIT 2 : BASIC COMPONENTS OF COMPUTER

UNIT STRUCTURE

2.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- explain the concept of bits and bytes
- understand the block diagram of a computer
- discuss the primary and secondary memory in computer
- analyse the different types of input and output devices
- know the different types of buses

2.2 INTRODUCTION

A computer system is composed of various components which perform their unique functions. In this unit, we will introduce you to the basic components of a computer system where you will first learn how the data are represented in the form of bits and bytes. Through this unit you will be acquinted with the types of computer memory. Various types of input and output devices and the basic functioning of a *bus* are also included as a part of discussion in this unit.

2.3 CONCEPTS OF BITS AND BYTES

You may be surprised to know that the computer is made up of millions of tiny electric circuits that are not visible to us. The memory elements are also built with these tiny circuits which are used for storing data. For every circuit in a computer chip, there are two possibilities:

- an electric current flows through the circuit, or
- an electric current does not flow through the circuit.

When an electric current flows through a circuit, the circuit is on. When no electricity flows, the circuit is off. An "on" circuit is represented by the number one (1) and an off circuit is represented by the number zero (0). The number 1 or 0 is called ***bit***. A number system that uses only two digits, 0 and 1, is called the ***binary number system***. The binary number system is also called the base two system. The two symbols 0 and 1 are known as binary digit. The word **bit** comes from "**bi**nary digi**t**".

Always remember that each time a computer reads an instruction, it translates that instruction into a series of bits, 1's and 0's. On most computers

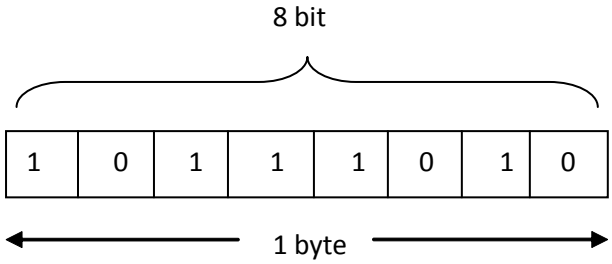


Fig. 2.1

every character from the keyboard is translated into eight bits, a combination of eight 1's and 0's. Each group of 8 bits is called 1 byte as shown in the follwing figure. Each group of four bits is called a nibble.

Thus, 8 bits = 1 byte and 4 bits = 1 nibble

and 1024 byte = 1 kilo byte

We know that, all the quantities, physical or abstract, can be measured in some units. For example, time is measured in second; length is measured in metres ,and mass in grams. Similarly, the computer memory can be measured in terms of bits, bytes, kilobytes, megabytes, gigabytes etc.

The followings are the measuring units given in terms of bytes :

1 kilobyte (KB) = 1,024 byte

1 megabyte (MB) = 1,048,576 bytes

1 gigabyte (GB) = 1,073,741,824 bytes

1 terabyte = 1,099,511,627,776

2.4 BLOCK DIAGRAM OF A COMPUTER

All general-purpose computers require the following hardware components:

Input Unit : This is the unit through which data and instructions enter into a computer. Usually a keyboard and mouse are the common input devices.

Output Unit : This unit communicates the results to the user. A display screen and a printer are the common devices that let you see what the computer has accomplished.

Central Processing Unit (CPU) : Execution of programs is the main function of the computer. The program to be executed is a set of instructions that is stored in the computer's memory. A task becomes completed when the instructions of the program are executed by the central processing unit. All the major calculations and comparisions are carried out inside the CPU. The CPU is responsible for activating and controlling the operations of various units (input & output) of the computer system.

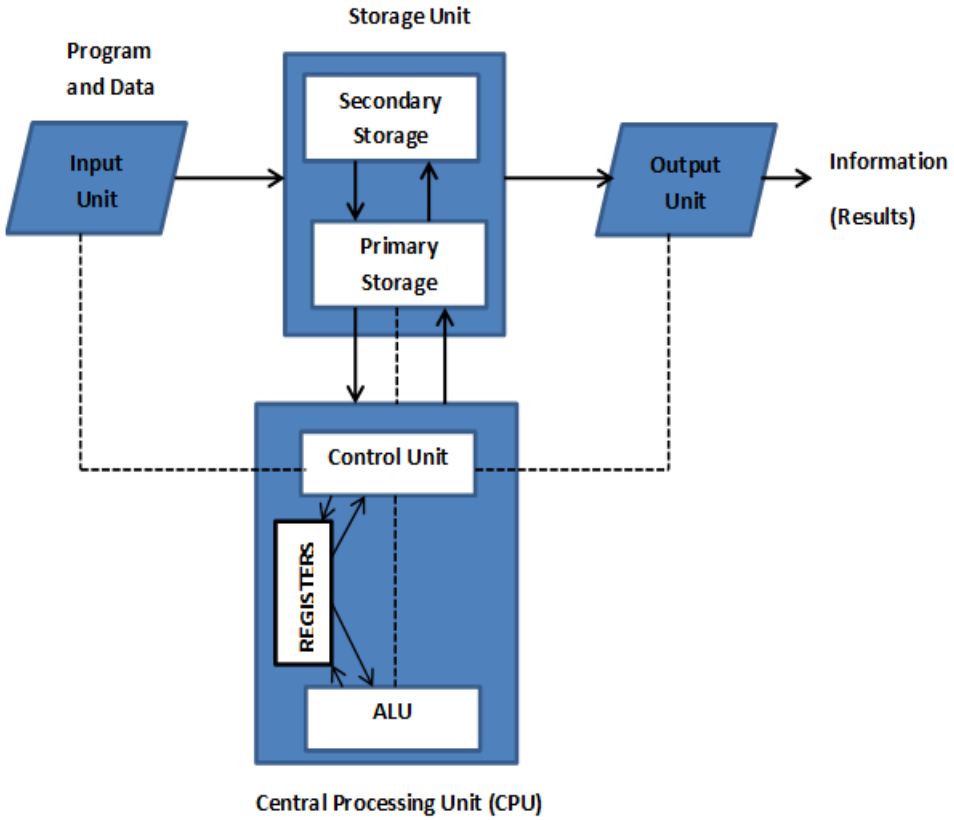


Fig. 2.2

The CPU is made up of three major components : the **registers,** the a**rithmetic and logic unit (ALU)** and the **control unit**. The registers are responsible for storing the intermediate data during the execution of program. The control unit supervises the transfer of information between the registers and instructs the ALU to perform the required operation.

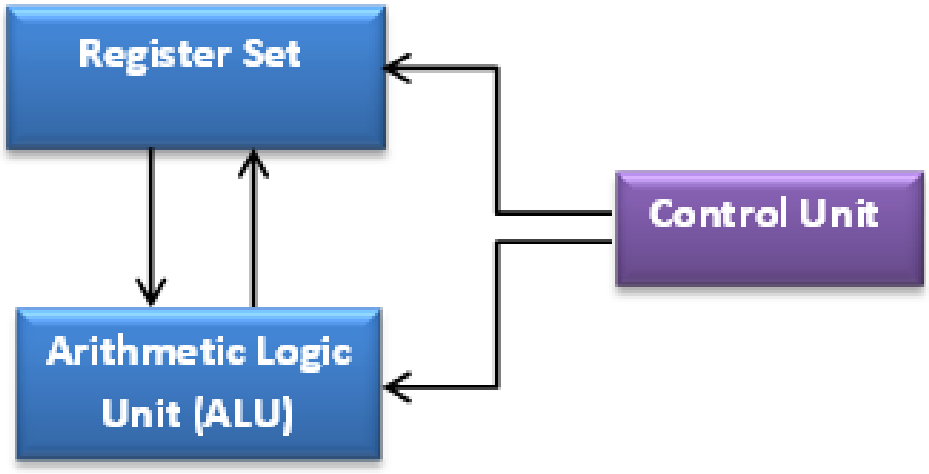


Fig. 2.3 : Components of CPU

Control Unit(CU) : The control unit controls and guides the interpretation, flow and manipulation of all the data and information. It does not perform the actual processing of data, but manages and coordinates the entire computer system, including the input and output (I/O) devices. Control unit retrieves and interprets the instructions from the main memory and send signals to the other units to execute them one after the other. Some special purpose registers found inside the CPU like *instruction register, program counter* etc. help the CU to perform its function smoothly.

Arithmetic Logic Unit (ALU) : The ALU performs all the arithmetical functions +, -, *, / and some logical functions like <, >, =, <=, >=, <> etc. When two numbers are required to be added, these numbers are sent from memory to ALU where addition takes place and the result is sent back to memory. In the same way, ALU has the special circuitry to carry out the logical operations.

Storage Unit : The storage unit allows a computer to permanently retain large amount of data. The storage unit can be categorised into two types namely *primary storage* and *secondary storage* which we will discuss in the next section. Common mass storage devices include disk drives and tape drives etc.

2.5 COMPUTER MEMORY

The term ***memory*** usually refers to a form of semiconductor storage and sometimes other forms of fast but temporary storage. In a computer the data and instructions are stored and subsequently retrieved from the memory. We have come to know that the CPU has some storage elements known as registers for storing data and instructions during the program execution. Every computer requires storage space for storing programs and data temporarily during the time of program execution or storing the data parmenently for future use. Generally, a computer has three set of memories :

a) **Primary storage or main memory :** Primary memory, also known as *memory*, is the only one *directly accessible to the CPU*. The CPU continuously reads instructions stored there and

executes them. Any data actively operated on is also stored there in uniform manner. It is a form of semiconductor storage known as random access memory (**RAM**) and sometimes other forms of fast but temporary storage. It is small-sized, light, but quite expensive. This type of memory is divided into the following two types : *RAM (Random Accress Memory), ROM (Read Only Memory).*

b) **Secondary storage or auxiliary memory :** Secondary memory or *storage* provides the facility of storing information and programs permanently . It differs from primary storage in that it is *not directly accessible by the CPU*. The computer usually uses its input/output channels to access secondary storage and transfers the desired data using intermediate area in primary storage. Secondary storage does not lose the data when the device is powered down; it is non-volatile. It is typically also an order of magnitude less expensive than primary storage.

c) **Internal processor memory :** It consists of a small set of high-speed registers that are used as a temoprary locations inside the processors during the execution of instructions.

Another type of memory, the *cache memory*, is gaining wide acceptance in modern computers. Its logical position is between the mainmemory and the internal memory(registers). Its primary function is to store and cache part of the main memory's contents that the processor is currently using.

The computer system has a memory hierarchy consisting of the storage devices in it. A typical memory hierarchy is illustrated in the figure 2.4 below :

There are three key characteristics of the memory. They are cost, capacity and access time. On moving down the memory hierarchy, it is found that the cost of the storage devices decreases but their storage capacity as well as the memory access time increases. In other words, the smaller memories are more expensive and much faster. These are supplemented by the larger, cheaper and slower storage devices.

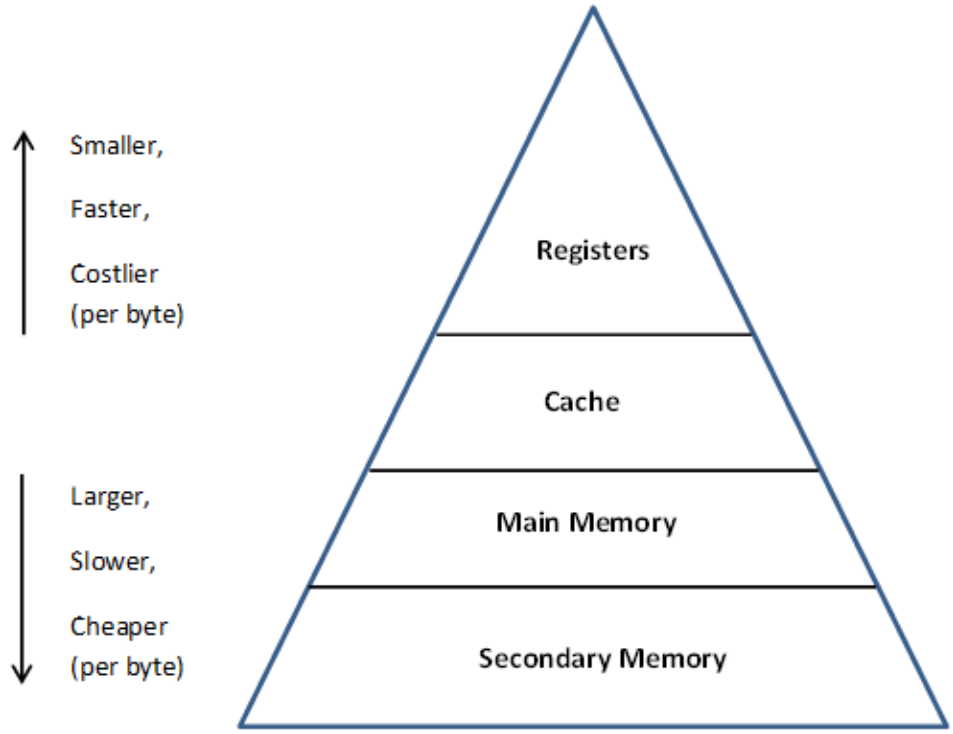


Fig. 2.4 : Memory hierarchy

Thus, from the above figure it can be seen that the registers are at the top of the hierarchy and so provides the fastest, the smallest and the most expensive type of memory device for the CPU to access data.

Memory Capacity : Capacity in a computer system is defined in terms of the number of bytes that it can store in its main memory. This is usually stated in terms of kilobytes (KB) which is 1024 bytes or megabyte which is 1,048,576 bytes. The rapidly changing memory capacity of computer system has resulted in defining the capacity in terms of gigabytes (GB) which is 1,073,741,824 bytes. Thus, a computer system having a memory of 1GB is capable of storing (1024 X 1024 X 1024) bytes.

2.5.1 Primary Memory

We have found that primary memories can be categorised into two types - RAM and ROM. We will now briefly describe them in this sub section.

Random Access Memory (RAM) : A computer's **main memory** is often referred to as RAM - an area in the computer system unit

that temporarily holds user data, operating system instructions and program instructions. Every time we turn on our computer, a set of operating system instructions is copied from hard disk into RAM. These instructions, which help control basic computer functions, remain in RAM until we turn the computer off.

RAM features :

a) RAM is the place which holds the data that has to be processed by the computer's preocessor. Moreover, it holds the operating system and other application programs also.

b) RAM is made up of different ICs (Integreted Circuits). They are also called *semiconductor memory*.

c) Each element of RAM is a memory location in which data can be stored. Each location has a **unique address**. Using this address data can be directly retrieved or stored.

d) Since RAM must hold both the data to be processed and the instructions for processing, its size or capacity is one of the measures of power of the computer.

e) RAM is a volatile memory. It loses its data when the computer is turned off.

There are generally two broad categories of random access memory :

i) **DRAM** memories (*Dynamic Random Access Memory*)

ii) **SRAM** memories (*Static Random Access Memory*)

DRAM : Dynamic RAM is a type of RAM in which data is stored in a storage cell, consisting of transistors and capacitors. A common property of a capacitor is its tendency to get discharge, it means the current goes down in the circuit and finally data cannot holds for long time. To come over this effect, the DRAM needs to be continuously refreshed with power supply and thus it has one *refreshing circuit* which rewrites the data in certain time intervals. This refreshing circuit refreshes or rewrites the data several hundred times in a second.

SRAM : Static RAM is a type of RAM that holds its data as long as power is supplied to the circuit. The SRAM does not need any refreshing circuit. SRAMs are used for specific applications within the PC. The SRAM has the following properties :

- **Simplicity :** SRAMs don't require external refresh circuitry in order for them to keep their data intact.
- **Speed :** SRAM is faster than DRAM.

In contrast, SRAMs have the following weaknesses, compared to DRAMs:

- **Cost :** SRAM is more expensive than DRAM.
- **Size :** SRAMs take up much more space than DRAMs

Read Only Memory (ROM) : One major type of memory that is used in PCs is called *read-only memory*, (*ROM*). ROM is the memory that stores the data permanently i.e. the instructions in ROM are permanent whether the power is on or off. We have no way to change them, unless we remove the ROM chips from the main board and replace them with another set.

Read-only memory is most commonly used to store system-level programs that we want to be made available to the PC at all times. For example, the ROM-BIOS (ROM basic input and output services) programs are stored in ROM chips which are used to boot up (start up) the computer.

The following are the different types of ROMs with a description of their relative modifiability :

Programmable ROM (PROM) : This is a type of ROM that can be programmed using special equipment; it can be written to, but only once.

Erasable Programmable ROM (EPROM) : *EPROM* is a ROM that can be erased and reprogrammed. Ultraviolet light of a specific frequency is used for erasing the EPROM and for allowing it to be reprogrammed again.

Electrically Erasable Programmable ROM (EEPROM) : The next level of erasability is the *EEPROM*, which can be erased under

software control. This is the most flexible type of ROM, and is now commonly used for holding BIOS programs.

2.5.2 Secondary Memory

Secondary memory or *storage* provides the facility of storing information and programs permanently . It differs from primary storage in that it is not directly accessible by the CPU. The computer usually uses its input/output channels to access secondary storage and transfers the desired data using intermediate area in primary storage. Secondary storage does not lose the data when the device is powered down; it is non-volatile. It is also typically an order of magnitude less expensive than primary storage. Consequently, modern computer systems typically have an order of magnitude more secondary storage than primary storage and the data is kept for a longer time there. The following figure shows the commonly used secondary storage devices and their classification.

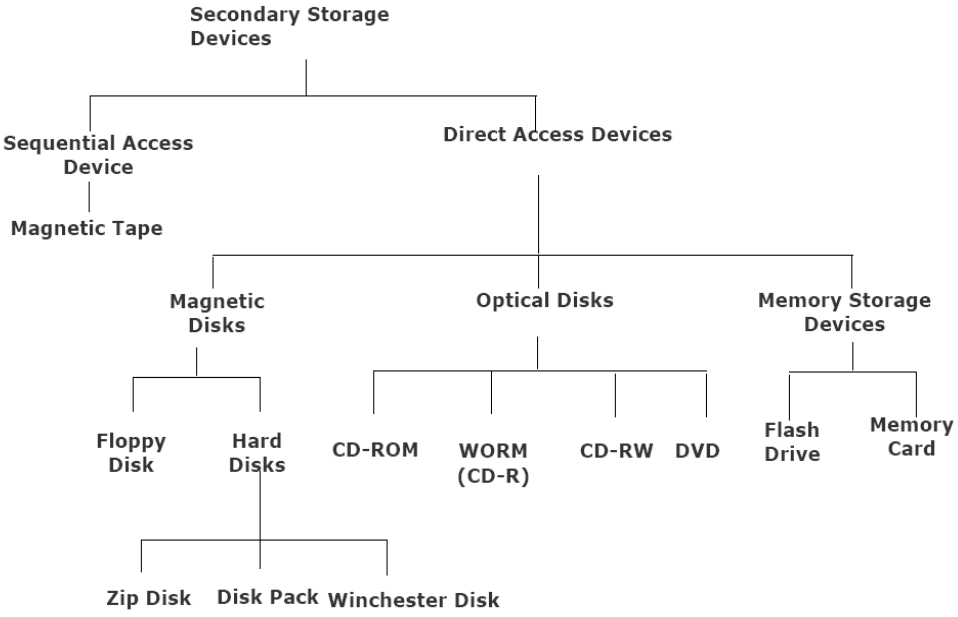
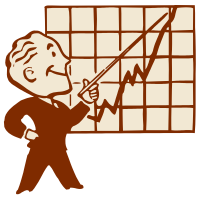


Fig. 2.5 : Secondary storage devices and their classification

In modern computers, hard disks are usually used as secondary storage. The time taken to access a given byte of information stored on a hard disk is typically a few thousandths of a second, or

milliseconds. By contrast, the time taken to access a given byte of information stored in random access memory is measured in thousand-millionths of a second, or nanoseconds. Some other examples of secondary storage technologies are: **Flash Memory (e.g. USB sticks or keys), Floppy Disks, Magnetic tape, Paper tape, Punch Cards, standalone RAM disks, and Zip drives**.



CHECK YOUR PRPOGRESS

Q.1. State True or False:

i) The secondary memory is slower than the main memory but has a large capacity.

ii) In random access memory any memory location can be accessed independently.

iii) Cache memory increases load on main memory.

iv) Flash memory is one kind of ROM.

v) High speed memories are needed to bridge the gap of speed between I/O device and memory.

vi) Registers are the fastest memory element in computer system.

vii) Main memory of a computer system cannot store very large data.

Q.2. Which memory is known as the main memory of the computer system ?

.....

.....

Q.3. What are the differences in :

a) Volatile versus Non-volatile memory

.....

.....

.....

b) Static RAM versus dynamic RAM

.....

.....

.....

.....

Q.4. What is the similarity between ROM and PROM?

.....

.....

2.6 INPUT DEVICES

We have already mentioned about the input unit of a computer system whose main function is to provide information into the computer system for execution. Programs and data must be entered into the computer memory for processing through the input devices, and the results obtained from the execution by the CPU must be displayed or recorded for the user's. The most commonly used input devices can be classified into the following categories :

- **Keyboard devices**
- **Point and draw devices** (mouse, track ball, joystick, light pen, touch screen)
- **Scanning devices** (optical mark recognition, magnetic ink ch aracter recognition, optical bar code reader, digitizer, electronic card reader)
- **Voice recognition devices**
- **Vision-input devices** (Webcam, video camera etc)

2.6.1 Keyboard

It is the main input device used in most of the computer systems. It has letter and number (alphanumeric) keys, and some function keys, computer specific task keys, that allow the user to use an English-like language to issue instructions to an electronic environment. It uses a cursor to keep your place on the screen and

to let you know where to begin typing. You are able to input commands, type data into documents, compose documents, draw pictures with use of certain keys, pull down menus, and respond to prompts issued by the computer. The keyboard contains s*pecial function keys* labelled F1, F2, ..., F12 to manipulate the user interface. When a key is touched, an electrical impulse is sent through the device which is picked up by the operating system software, and sent through the computer to be processed.

The keyboard operates as a typical typewriter and uses a standard “QWERTY” keyboard. QWERTY is the way the keyboard is set up for typing. If you look at the keyboard under the top number row, you will see that the alphabet top row begins with QWERTY.

Some special purpose keyboards are also found which are used for specific applications. A very typical example of such kind of keyboards can be seen at the Automatic Teller Machines or the ATMs where the keyboard is required for limited functionality by the customers.

2.6.2 Mouse

The mouse is a hand held pointing device that lets you point to and select items on your screen. In a PC mouse there are mostly 2-3 buttons and on a Mac there is one. A ball under the mouse senses movement. The mouse is included in almost every computer that is sold today. Besides becoming an important input tool, it has provided access to the computer for many individuals with disabilities that might not otherwise have the opportunity to use the computer.

Variants of a Mouse :

Touchpad : A touchpad is a touch sensitive input device which takes user input to control the onscreen pointer and perform other functions similar to that of a mouse. Instead of having an external peripheral device such as a mouse, the touchpad enables the user to interact with the device through the use of one or multiple fingers

being dragged across the relative positions on a sensitive pad. These touch pads are mostly found in Notebook and Laptops.Touchpads are pressure and touch sensitive.

Fig. 2.6 : Touchpad of a Laptop

2.6.3 Hand-held Devices

Trackball : The trackball is an upside-down mouse that remains stationary on your desk. It is the same principle as the mouse except that the rollers are reversed and the ball is on top. This ball does not need as much attention as the normal mouse because the only thing that touches it is your hand as the normal mouse touches a surface.

Joystick : The Joystick is a vertical stick that moves the graphic cursor in the direction the stick is moved. It consists of a spherical ball, which moves within a socket, and has a stick mounted on it.The user can move the ball with the help of the stick in any direction. Video games, training simulators and control panel of robots are some common uses of a joystick.

Fig. 2.7 : Trackball

Fig. 2.8 : Joystick

Light pen : The light pen is a pen shaped tool that allows the user to touch the computer screen with a lighted pen to activate commands and make selections. Light pens are typically used in CAD (Computer Aided Design) applications to directly draw on screen.

Touch Screen : A touch screen is probably one of the simplest and most intuitive of all input devices. It uses optical sensors in, or near, the computer screen that can detect the touch of a finger on the screen.

2.6.4 Optical Input Devices

Scanner : Scanning devices are input devices used for direct data entry from the source document into the computer system. Scanners capture and store information in a graphical format, and then display it on the graphical screen. A scanner consists of two parts, one that illuminates the page for capturing the optical image, and the other that converts and stores the graphical image in a digital format. Once this is done, the computer can then see and directly process this scanned graphical image. A scanner's sophistication is the ability to translate an unlimited number of analog voltage levels to digital values. The scanner takes the information it sees on a page and converts into code that the computer can use. A picture once scanned can be edited, printed, or used in an application. Capturing information by using scanners reduces the possibility of human error typically seen during large data entry.

Optical Mark Recognizer (OMR) : Optical mark recognization devices sense the marks on computer readable paper. They are usually used by academic institutions for grading aptitude tests where the correct option is marked from multiple options given on special kinds of answer sheets. The OMR device directly reads this paper, and the computer can then use it for further processing.

Fig. 2.9 OMR Device

Magnetic Ink Character Recognition (MICR) : MICR is similar to optical mark recognition and is used exclusively by the banking industry. The banking industry makes use of MICR devices for directly reading the account numbers written on cheques and for processing them further as required. MICR characters are printed in special typefaces with a magnetic ink or toner, usually containing iron oxide.

Optical Barcode Reader (OBR) : Data coded in the form of small vertical lines forms the basis of barcoding. Alphanumerikc data is represented using adjacent vertical lines called barcodes. These are of varying width and the spacing between them is used to uniquely identify books, merchandise in stores, postal packages etc. A barcode reader uses laser beam technology. The laser beam is moved across the patterns of bars in a barcode. These bars reflect the beams in different ways. The reflected beam is then sensed by a light-sensitive detector, which then converts the light patterns into electrical pulses, thereby transmitting them to logic circuits for further conversion to alphanumeric value.

Fig. 2.10 Barcode Reader

Digitizer : The digitizer is another kind of input device used for converting (digitizing) picture,maps and drawings into digital form for storage in computers. These devices are commonly used in the

area of Computer Aided Design (CAD) by architects and engineers to design car, buildings, medical devices, robots and mechanical devices.

Electronic Card Reader : Card readers are devices that allow direct data input into a computer system. The electronic-card reader is connected to a computer system and reads the data encoded on an electronic card and transfers it to the computer system for further processing. Typical example of electronic cards are the plastic coated cards provided by the banks to its customers for use in Automatic Teller Machines or ATMs.

2.7 OUTPUT DEVICES

The outputs produced by a computer system can be in two forms : *hard copy and soft copy*.

Hard copy : The output produced in a physical form is called hard copy output. This type of output is permanent and a relatively stable form of output. Paper is one of the most commonly used hard copy output media. The most widely used hard copy output device is the printer.

Soft copy : The output that remains in electronic form, stored in computer memory or on disk are called soft copy outputs. This kind output is not permanent and is usually displayed on monitor or screen. It includes both audio and visual forms of output.

A wide range of output devices are available today which are :

- Display device (monitors, multimedia projectors, terminals)
- Plotters (flatbed, drum)
- Voice response system (voice response system, speech synthesizer)
- Printers

2.7.1 Display Devices

The display device shows the processed output from a computer system. The increasing demand for displaying the graphics and

pictures for presenting information in a visual form has led to the popularity of graphics display device. Display screen technology may belong to one of the following categories :

a) **Cathod Ray Tube(CRT) :** The CRT is a vacuum tube containing an electron gun (a source of electrons) and a fluorescent screen, with internal or external means to accelerate and deflect the electron beam.It is used for creating images in the form of light emitted from the fluorescent screen. A CRT display can be either of the following two types : *Raster scan display and Vector display*.

b) **Liquid Crystal Display(LCD) :** The LCD technology is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have displaced cathode ray tube (CRT) displays in most applications. They are usually more compact, less energy consuming, lightweight, portable, less expensive, more reliable, and easier on the eyes.

Monitor : The monitor is the common output device mostly used. It can be thought of as a high resolution TV set. The monitor displays text and images (pictures) converted to output from the video adapter. The video adapter is an expansion card that plugs into the motherboard. The adapter changes the instructions from the central processing unit (CPU) into a way that the monitor can understand it.

Most computer monitors are based on Cathode Ray Tube (CRT) technology. The basic operation of these tubes is similar to that in television sets. With the widespread use of smaller computers like PDAs and laptops now-a-days, a new type of display screen Liquid Crystal Display (LCD) has been used.

2.7.2 Printers

It is a widely used hard copy output device. A printer prints

information and data from the computer onto a paper. Some printers can produce only textual information but some others can produce graphics also.

Printers can be classified into categories based on : *printing technology, printing speed, printing quality.*

Printing technology : Printers can be divided into two types - *(i)impact printers* and *(ii)non impact printers*.

(I)*Impact printers* : The printers that work by physically striking a head or needle against an ink ribbon to make mark. Impact printers are divided into *Dot matrix printers , Daisy-Wheel printers* and *Drum printers.*

- *Dot Matrix Printer* : This printer is the cheapest but loudest of all the printers. This printer prints one character at a time. The printer uses a fine stripe of carbon and depending on what pin it is, will determine the quality of the printing. The pin sizes range from 9-24. The print head hits the ink ribbon with one of its many pins causing it to form a letter number or character.

Fig. 2.11 : A Dot-Matrix Printer

With the pins hitting the ribbon this printer becomes quite loud. The ppm (page per minute)ranges from 1 to 3 but with new changes in the technology it is being more and more used in offices today and it can also print 3 - 6 ppm ;besides it is much quitter. The drawback in most dot matrix printers is the on-roll paper which has a track which feeds it through the printer. Also, in most new dot matrix printers there is a paper feed which allows most forms of paper.

- *Daisy Wheel Printer* : Daisy-wheel printers operate in much

the same fashion as a typewriter. A hammer strikes a wheel with petals (the daisy wheel), each petal containing a letter form at its tip. The letter form strikes a ribbon of ink, depositing the ink on the page and thus printing a character. By rotating the daisy wheel, different characters are selected for printing.You can change the daisy wheel to print different fonts. This printer is also called the letter quality printer.

- *Drum printer* : Drum printer is one of the most commonly used line printers.

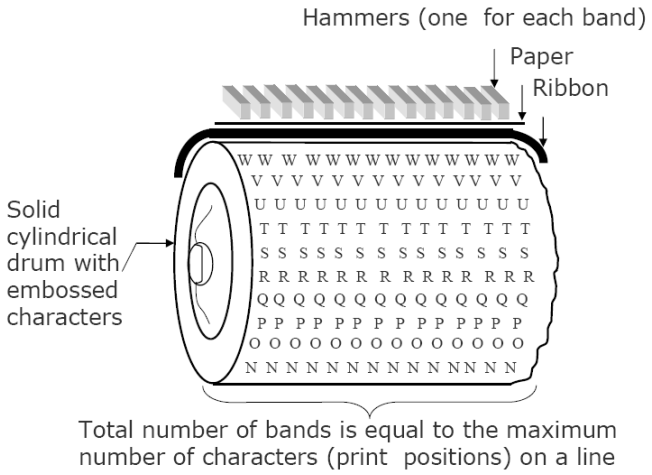


Fig. 2.12 : Printing Mechanism of a Drum Printer

In a typical drum printer design, a fixed font character set is engraved onto the periphery of a number of print wheels, the number matching the number of columns (letters in a line) the printer could print. The wheels, joined to form a large drum (cylinder), spin at high speed and the paper and an inked ribbon are stepped (moved) past the print position. As the desired character for each column passes the print position, a hammer strikes the paper from the rear and presses the paper against the ribbon and the drum, causing the desired character to be recorded on the continuous paper. Because the drum carrying the letterforms (characters) remains in constant motion,

the strike-and-retreat action of the hammers has to be very fast. Typically, they are driven by voice coils mounted on the moving part of the hammer.

(ii)Non impact printers : The printers that work by not physically striking a head or needle against an ink ribbon to make a mark. Inkjet, Laser and thermal printers fall under this category of printers.

The ***non impact printers*** commonly used are :

Inkjet Printer : This printer is set at the standard for home use. It is a non impact printer and it does not touch the paper while printing. Instead, the print head sprays ink onto paper forming an image or text

For business letters a ink jest printer is the most common one used for its high quality printing. The common speed on an ink jet printer is about 3 ppm and 300 dpi (dots per inch).

Laser Printer : Among the different types of printers, laser printers remain the fastest, and the most efficient way to reproduce text and images, offering high resolution and quick speeds at a relatively low cost. A laser printer uses an electrostatic process similar to a photocopier. The laser charges the areas of a photosensitive image drum. Toner particles are then attracted to these areas of the drum. By rolling this drum against a piece of paper, the printer creates an image on a page.In the final stage, heat is used to fuse the toner to the paper.

Fig. 2.13 : Inkjet printer and Laser Printer

Plotter : A plotter is a hard copy output device which is used to draw high-resolution charts, graphs, maps, and other line based

diagrams. It is a pen based output device , attached to a computer for making vector graphics ,that is, images created by a series of many straight lines. A plotter is a very slow and expensive output device. It is mainly used for Computer Aided Design(CAD) and Computer Aided Manufacturing applications. Plotters are classified as **Drum plotters** and **Flatbed plotters.**

Fig. 2.14 : Plotter

Audio Output : Voice response systems enable the computer to talk to its users. It consists of an audio-response device that produces the audio output. Voice response systems are of *two* types : *voice reproduction system* and *speech synthesiser.*

Voice reproduction system produce an audio output by selecting the appropriate response from a predefined set of responses. These responses may be in the form of speech (words or phrases spoken by human beings), musical sounds, alarms, or other sounds. Text is converted into spoken words by speech access systems.

CHECK YOUR PROGRESS

Q.5. State true or false

a) One of the most common input device is keyboard.

b) Plotters are devices used for outputting pictures, drawings.

c) Digitizers are used as output devices.

d) In case where graphical user interfaces are common mouse should not be used.

e) Speech recognition devices are input devices.

Q.6. Answer the followings :

a) What are electronic card readers?

b) Compare and contrast the Laser and Dot Matrix Printers.

c) What is an OMR device?

d) On what basis are the printers classified?

2.8 COMPUTER BUS

Bus is an electrical pathway through which the processor communicates with the internal and external devices that are assembled with the computer. It is resposible to carry memory address as well as data to the control location in memory. Computer system contains a number of different buses that provide pathways between components at various levels of the computer system hierarchy. The name of the bus is determined by the type of the signals it carries and the operations it performs. A bus that connects major computer components (CPU, memory, I/O) is called a *system bus*.

The interaction between the CPU and memory and CPU and I/O takes place very frequently. To enable this interaction, some type of connectivity is needed between the units of a computer system. This connectivity channel is known as *bus*. *A key characteristic of a bus is that it is a shared transmission medium.* Physically, a bus is set of wires, which carries a group of bits in parallel and has an associated control scheme. The bus width is defined as the number of parallel lines in the bus. Every computer has three types of buses for interconnecting the CPU and memory and CPU and I/O. The functions performed by bus are as follows :

- Bus transfers data between the computer subsystem. It sends

instructions and commands to and from the processors.

- It connects all internal computer components to the main memory and the CPU.
- It logically connects various peripheral devices which can easily communicate with the CPU.
- It has the clock speed which is measured in MHz.

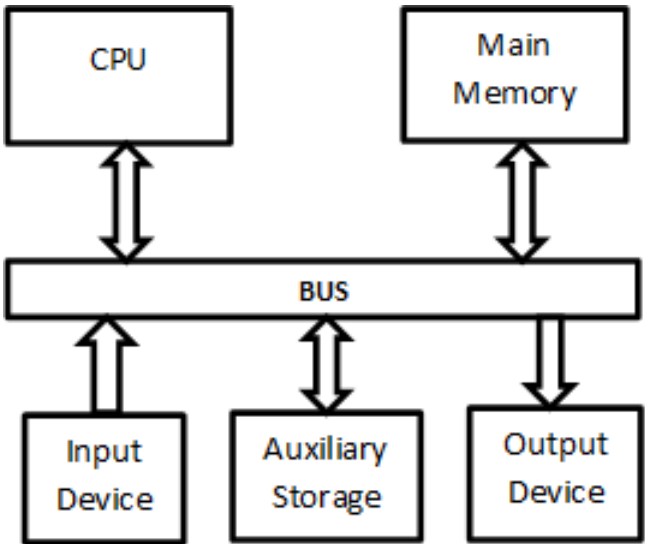


Fig. 2.15 A Typical Bus

Data Bus : The data bus is used to transfer data between the CPU and memory and CPU and I/O. The one that you hear most about is the data bus. The bus width of the data bus is an important parameter that affects the overall speed of a computer system. This is because each wire of a bus can transfer one bit at a time. Hence, a 8-bit bus can move 8 bits data time, a 16 bit bus can transfer two bytes, and 32 bit bus can transfer four bytes at a time. This is similar to a multi-lane highway. The wider the highway, the more traffic can flow simultaneously. Similarly the wider the bus enables more bits of data to travel, simultaneously resulting in faster exchange of data. The data bus is also referred to as a *memory bus* which is often called *system bus*

Address Bus : Every location in the memory has a unique address. The address of a location does not change, but the data stored in it can change. In order to retrieve some data from memory, it is necessary to specify the address of the location where the data is stored. The address

bus is used to carry the address of a memory location whenever data is to be transferred to or from memory.

Again, a computer system normally has multiple I/O devices like disk, tape, network etc simultaneously connected to it. Each I/O device has a unique identifier associated to it. The address bus is used to carry the address of the I/O device to be accessed by the CPU.

Control Bus : In addition to spending address and exchanging data with the memory, the CPU also needs to send control signals to the memory to specify whether the data is to be read from or written to the specified address location. The control bus carries such signals, which are in the form of READ/WRITE commands. A typical Bus structue is shown in the following figure :

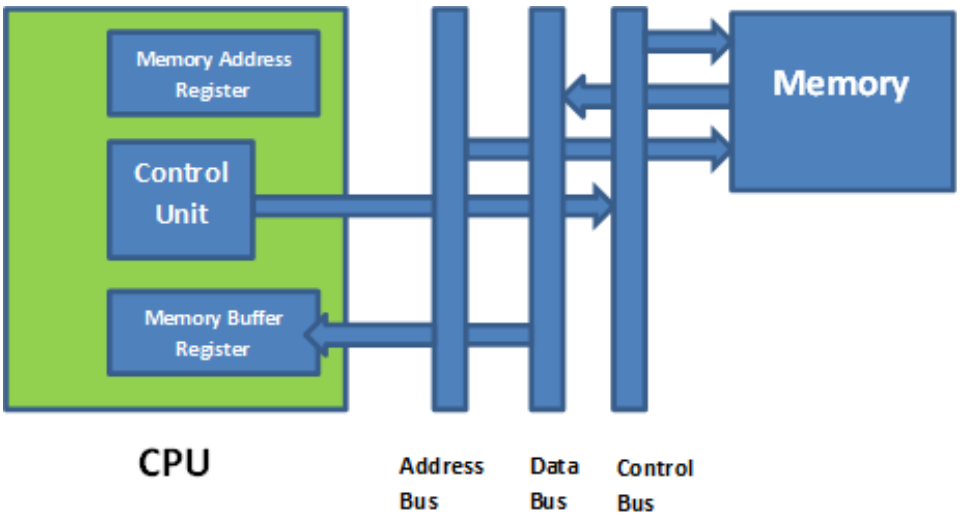
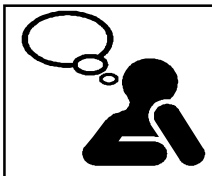


Fig. 2.16 The three types of Bus



ACTIVITY

- Find out the capacity and structure of the memory types used in a computer system.
- Prepare a list of all old and new input and output devices with illustrations.

2.9 LET US SUM UP

- Data inside a computer is stored in the form of 0s and 1s. These 0 and 1s are called bit. 4 bit constitute a nibble and 8 b it constitute a byte.
- The ***memory*** usually refers to a form of semiconductor storage i.e. primary memory and ***storage*** refers to mass storag i.e. secondary memory.
- Random access memories are the semiconductor memory. They are volatile in nature. RAMs are of two types - dynamic RAM and static RAM.
- ROMs are also the semiconductor memory. The instructions in ROMs are permanent whether the power is on or off. PROM, EPROM, EEPROM are the types of ROMs.
- Cache memory is a special type of RAM which is the faster memory used in a computer system in between the CPU and main memory.
- Secondary memory also called secondary storage stores information and programs permanently. In personal computer, secondary memory typically consists of hard disk or any removable media, if present, such as a CD or DVD etc.
- Magnetic tapes are the magnetic-coated plastic tapes, which are used for storing data and audio or video files.
- Input device is an electromechanical device that accepts data or information from the user in user readable form, and translates them into computer readable form.
- An output device is an electromechanical device, which produces the output of processing by the computer to the user. Computer produces the output in a machine readable form, and the output device converts it to a human readable form.
- Bus is an electrical pathway through which the processor communicates with the internal and external devices that are assembled with the computer. Basically ,the buses are of three types :

data bus, address bus and control bus.

2.10 FURTHER READINGS

- Computer Fundamentals Architecture and Organization, B. Ram, New Age International (P) Ltd.
- Introduction to Computer Science, ITL Education Solution Limied, Pearson Education
- Digital Logic and Computer Design, M. M. Mano, PHI
- Computer Fundamentals, P K Sinha, BPB Publication
- DOEACC O & A Level Books.

2.11 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : i) True, ii) True, iii) False, iv) True, v)True, vi)True,
vii) True

Ans. to Q. No. 2 : Random Access Memory is known as the main memory of the computer system.

Ans. to Q. No. 3 :

a)	**Volatile Memory**		**Non-volatile memory**
i)	Power is required all the time	i)	Power is not required once data is stored
ii)	Temporary storage	ii)	Permanent storage
iii)	Normally faster than non-volatile types	iii)	Slower than volatile memories.
b)	**Static memory**		**Dynamic memory**
i)	Loses its signal	i)	Doesnot lose signal strength
ii)	Periodic refreshing of memory is needed	ii)	No refreshing
iii)	Expensive	iii)	Cheap
iv)	Used as Cache	iv)	Used as main memory

Ans. to Q. No. 4 : The similarity in ROM and PROM is that both write operations which can be performed only once and whatever has been written cannot be changed.

Ans. to Q. No. 5 : a) True, b) True, c) False, d) False, e) True

Ans. to Q. No. 6 : a) Card readers are devices that allow direct data input into a computer system. The electronic-card reader is connected to a computer system and reads the data encoded on an electronic card and transfers it to the computer system for further processing.

b)

	Laser Printer		**Dot Matrix Printer**
i)	High cost	i)	Low cost
ii)	Forms character using laser beam	ii)	Use Dot Matrix to print character
iii)	Non-impact printer	iii)	Impact printer
iiv)	High quality output	iv)	Output is of low quality
v)	Noiseless operation	v)	Noisy
vi)	Cannot produce multiple copies of a single print	vi)	Can produce multiple copies in a single print with the help of carbon paper.

c) An input device (a scanner) is capable of recognizing a pre-specified type of mark made by pencil or pen. Any input data that is of a choice or selection nature can be recorded for OMR input.

d) Printers can be classified into categories based on : printing technology, printing speed, printing quality. Printing technology : Printers can be divided into two types - *impact printers* and *non impact printers*.

2.12 MODEL QUESTIONS

Q.1. Differentiate between a bit and a byte.

Q.2. What do you understand by computer memory ? List the two different categories of memory.

Q.3. What is a RAM? What are its two types? Differentiate between them.

Q.4. What is a ROM? Why is it called so? List the differenet types of ROMs and their key features.

Q.5. What is a cache memory? How is it different from a primary memory?

Q.6. Differentiate between

a) PROM and EPROM.

b) Static RAM and Dynamic RAM

Q.7. Why are input and output devices necessary for a computer system?

Q.8. What are pointing devices? Discuss some of the commonly used pointing devices.

Q.9. Explain the different types of printers. Make a clear difference among them in terms of speed, cost, and method of operation.

Q.10. What is a bus? List out the main functions performed by buses in a computer system.

Q.11. Write short note :

a) RAM b) Light pen

c) MICR d) Scanner

e) Computer Bus

UNIT 3 : INTRODUCTION TO OPERATING SYSTEM

UNIT STRUCTURE

3.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- learn about the basic definition of operating systems
- describe the different functions of operating systems
- distinguish the various types of operating systems
- distinguish between network operating system and distributed operating systems.

3.2 INTRODUCTION

Operating systems have evolved through a number of phases during the last half of a century or earlier. The earliest electronic computer developed

in the mid-1940s had no operating system at all. At that time, the machines were equiped with a console consisting of toggle switches and display lights. There were no programming languages or translators for developing high-level language programs and converting them to machine understandable instruction. The scene was improved from 1960 onwards. A lot of new techniques and technology were developed and finally the concept of operating system came. Operating System is an important component of a computer. The primary objective of an operating system is to make computer system convenient to use and utilise computer hardware and various resources in an efficient manner. An operating system is a large set of software which is also an interface between users and computer systems. It is a system software. Operating system also manages resources of the computer system, such as memory, processor, file system and input/output devices.

The introductory concepts and principles of operating system will be the main issues for our discussion in this unit. Moreover, various types of operating system will also be covered in this unit.

3.3 DEFINITON OF OPERATING SYSTEM

A Computer system is made up of hardware, operating system and user interface. Computer software can be divided into *system programs* which manage the operation of the computer itself and the *application programs,* which solve problems for their users. **Operating System i**s the most fundamental of all the system programs (or System Software). The operating system controls the entire computer's resources and provides the base upon which the application programs can be written.

We can define operating system in different ways. Some of the definitions are: *An operating system is program that makes the computing power available to users by controlling the hardware*. Another definition is that *operating system is a program that controls the execution of application programs*. It is a set of processes permanently or transitively resident within the computer that makes the resources of the computer system available to the user in a consistent, reliable, friendly way.

Operating system can be divided into two parts: the *Kernel* and the *shell*. The kernel is the essential centre of a computer operating system, the core that provides basic services for all other parts of the operating system. A synonym of kernel is *nucleus*. A kernel can be contrasted with a shell, the outermost part of an operating system that interacts with user commands. *Kernel* and *shell* are terms used more frequently in UNIX. Users interact with operating system through *Command Line Interfaces* (CLIs) or *Graphical User Interfaces* (GUIs). The operating system thus contributes to the simplification of the human interaction with the computer hardware. They are responsible for linking application programs with the hardware, thus achieving an easy user access to the computers.

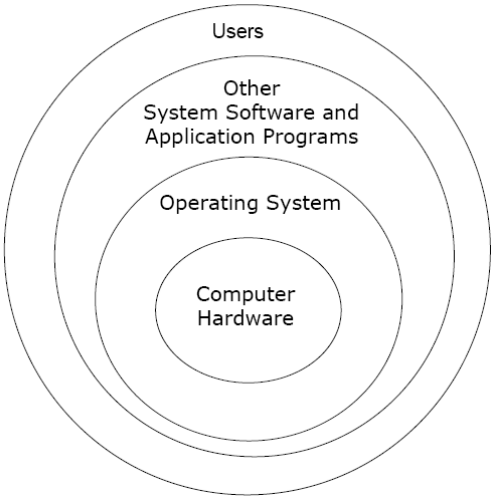


Fig. 3.1

3.4 FUNCTIONS OF OPERATING SYSTEM

There are various functions performed by an operating system. The basic functions are :

Input/Output management

Memory management

Process management

File and directory management

Security management

Command interpretation

Input/Output management : An operating system makes efficient usage of input and output devices and controls them properly. The Input/ output management module of the operating system coordinates and assigns different input and output devices, namely terminals, printers, disk drives, tape drives ect. It controls all input and output devices, keeps track of input and output requests, issues commands to these devices and takes measures which would ensure that data is transmitted efficiently and correctly to and from input and output devices.

Memory or storage management : Memory is an important resource for a computer system. So memory allocation and deallocation for programs and data is an another function of an operating system. Memory management module of an operating system takes care of allocation and de-allocation of main memory to various procsses. It allocates the main memory and secondary memory to the system programs, user programs and data.

Process management : Process can be defined as a program in execution. It is the job which is currently being executed by the processor (CPU) . During its excution , a process would require certain system resources, such as processor time, main memory, files, input and output devices etc. UNIX operating system supports multiple processes simultanously. The process management module of UNIX takes care of creation and termination of processes, assigning required resources to different processes currently running, scheduling processor's time to different processes etc.

Files and directory management : Files and directories are also properly managed by an operating system. Data is stored in a computer system as files. The file management module of the operating system would manage files as well as directories held on various storage devices as well as transfer of files from one storage device to another device. Thus ,file management takes care of organization, storage, retrieval, naming, sharing and protection of different files. It also allows files to be read and modified by using text editors or some other file manipulation software packages.

Security management : It is also one of the most important function of an operating system to protect its various resources from the outer world. Security management module of the operating system which are executing concurrently in the memory, in such a way that system can ensure data security and integrity. That is, it protects data and program stored in the computer system from destruction and unauthorised access. It keeps different programs and data in such a way that they donot interfere with each other. Moreover, it protects files from being accessed or modified by unauthorised users.

Role of Operating System :

- Must communicate with the PC's hardware
- Works with the BIOS to provide access to devices such as hard drives
- Communicates with device drivers
- Provides a user interface

Let us explain these in details :

To ***communicate with the PC's hardware***, the operating system starts running immediately after the PC has finished its Power-On Self Test (POST), when it takes control of the PC. The operating system works with the BIOS to provide access to devices such as hard drives, floppy drives, keyboards, mice, and basic video. If a user wants to access a file on a diskette in a floppy drive, the operating system passes the request to the appropriate set of BIOS instructions that tells the floppy controller to send the requested information to RAM.

If the BIOS is unable to talk with the hardware, the operating system talks to the hardware directly. For this capability, it needs some additional programming. Device drivers provide the code necessary for the operating system to communicate with specific hardware. Device drivers are written specifically for a particular operating system, usually by the hardware manufacturer.

In addition to ***communicating with hardware***, the operating system provides for some type of error handling and error notification. If a piece of hardware is not functioning properly, the operating system tries to fix the

problem or tries to communicate with the device a few more times. If it is still unable to communicate with the device, it provides an error screen notifying the user of the problem.

Providing a user interface is the second function of an operating system. Basically, the operating system organizes applications so that the users can easily access them, use them, and store application data. When an application is opened, the operating system lets the application provide the majority of the user interface. That is, the operating system disappears or moves away from the center of the screen. The operating system still has the responsibility of providing access to the hardware for whatever the application needs. If the program cannot function properly, the operating system again takes control, stops the application, and provides some sort of error message.

3.5 TYPES OF OPERATING SYSTEM

Operating systems are categorised based on the types of computers they control and the sort of applications they support. The types are:

Single User Operating System
Multi User Operating System
Single Tasking Operating System
Multi Tasking Operating System
Multiprogramming Operating System
Real Time Operating System
Network Operating System
Distributed Operating System

3.5.1 Single User Operating System

A computer system in which only one user can work at a time is called a single user operating system. The familiar Intel processor based Windows OS personal computer is an example of single user system. Such a typical system will have a single keyboard, mouse

and monitor as I/O devices for the user to interact with the system. Users apply command through the keyboard and mouse and the computer displays its responses (output) on the monitor.

3.5.2 Multi User Operating System

This type of operating system which is running on a computer will manage the work of all different users, without letting them know that they all are actually working on a single computer. A multi user operating system allows a number to work together on a single computer. Each user will be provided with a terminal and all such terminals will be connected to the single computer. For example, UNIX, Linux, Windows XP etc.

A multi user operating system allows many different users to take advantage of the computer's resources simultaneously. The operating system must make sure that the requirements of the various users are balanced, and that each of the programs they are using has sufficient and separate resources so that a problem with one user doesnot affect the entire community of users. Unix, mainframe operating systems, such as *MVS*, are examples of multi user operating systems.

3.5.3 Single Tasking Operating System

It is one type of operating system which can execute a single job at a time.It is known as Single Tasking operating system. For example, MS-DOS is a single tasking operating system because one can open and run only one application at one time in MS-DOS.

When a single program is allowed to run at a time, the system is grouped under a single-tasking system.

3.5.4 Multi Tasking Operating System

Multitasking is concerned with a single user executing more than one program simultaneously or concurrently. Now a days most of

the operating systems such as UNIX, LINUX, OS/2 etc. are multi tasking operating system.

Multi tasking can be of two types namely, pre-emptive and co-operative. In pre-emptive multitasking, the operating system slices the CPU time and dedicates one slot to each of the programs. Unix like operating systems such as *Solaris* and *Linux* support pre-emptive multi tasking. Cooperative multi tasking is achieved by relying on each process to give time to the other processes in a defined manner. *MS Windows* prior to *Windows 95* used to support cooperative multitasking.

3.5.5 Multiprogramming Operating System

In multiprogramming technique of processing , the CPU runs several programs at the same time. Multiprogramming is implemented in such a way that it appears as if many programs are being executed concurrently. Mltiprogramming keeps the CPU busy, switching its attention from one program to another. For example, while one program is waiting for some input or output operation, another program can use the processor because of the high speed of the processor.

Multiprogramming is the rapid switching of the CPU between multiple processes in memory. It is done only when the currently running process requests I/O, or terminates. It was commonly used to keep the CPU busy while one or more processes are doing I/O. It is now mostly superceded by multitasking, in which processes also lose the CPU when their time quantum expires.

Multiprogramming makes efficient use of the CPU by overlapping the demands for the CPU and its I/O devices from various users. It attempts to increase CPU utilization by always having something for the CPU to execute.

The prime reason for multiprogramming is to give the CPU something to do while waiting for I/O to complete. If there is no DMA,

the CPU is fully occupied doing I/O, so there is nothing to be gained (at least in terms of CPU utilization) by multiprogramming. No matter how much I/O a program does, the CPU will be 100% busy. This of course assumes that the major delay is the wait while data is copied. A CPU could do other work if the I/O were slow for other reasons (arriving on a serial line, for instance). I/O operations are exceedingly slow (compared to instruction execution). A program containing even a very small number of I/O operations, will spend most of its time waiting for them. Hence, poor CPU usage when only one program is present in memory.

3.5.6 Real Time Operating System

Real time operating systems work towards providing immediate processing and also responding to user's commands in a very short period of time. This type of operating system is more commonly used in chemical industries for process control and scientific processing like airplane control and space vehicle control operations. The success of a real time operating system does not depend only on the correctness of the result but also on the timeliness of the result. For example HP-RT and VTWorks etc. It is a multitasking operating system that aims at executing real-time applications. Real-time operating systems often use specialized scheduling algorithms so that they can achieve adeterministic nature of behavior. The main object of real time operating system is their quick and predictable response to events. They either have an event-driven or a time-sharing design.

An event-driven system switches between tasks based on their priorities while time-sharing operating systems switch tasks based on clock interrupts.

3.5.7 Network Operating System

Network Operating System (NOS) is an operating system specifically designed to establish network connections for

workstations, personal computers (PC) accross the world via Local Area Network and internetworking. NOS provides support for multiuser operating system as well as administrative, security and network management functions. Some examples of network operating system are Windows NT, Novell's Netware ect.

A network operating systems has to acknowledge and respond to requests from many workstations, managing network access, resource allocation and sharing, data protection as well as error control.

Features of Network OS :

All network ooperating system provide certain core functions such as connection to other computers on the network. Some of the significant features of NOS are as follows :

- It gives the features of basic (Operating System) such as protocols, processors, hardware detection and multi processing.
- It suppors name and directory services.
- It provides file and print services over the network, back up and replication services, web services.
- It facilitates internetworking such as routing, switching, wireless set-up and WAN ports.
- It provides cluster and grid computing capabilities, fault tolerance and high availability systems.
- It provides user management services such as logon, logoff, remote access, auditing tools with Grapgical User Interface (GUI) features and administration tools.
- It strictily provides security features such as authentication, authorization, logon restrictions for users and access controls etc.

3.5.8 Distributed Operating System

A distributed system is composed of large a number of computers connected by high-speed networks. The computers in

the distributed system are independent, but they appear to the users as a single system. A distributed operating system hides the existence of multiple computers which are interconnected by a network from the user. That is, the user remains unaware of the fact that many computers are being used to process the data. These computers may be located at many places around the globe.

Distributed Operating System provides single-system image to its users. All these computers work in close coordination with each other. Processes and systems resources are managed globally and controlled from specific locations.

An operating system that manages a group of independent computers and makes them appear to be a single computer is known as a distributed operating system. The development of networked computers that could be linked and communicate with each other, gave rise to distributed computing. Distributed computations are carried out on more than one machine. When computers in a group work in cooperation, they make a distributed system.

Advantages :

i) Data sharing : Allows data sharing access to common databases.
ii) Device sharing : Allows many users to share expensive peripherals like high resolution printers, scanners and digital cameras.
iii) Communication : Makes communication between users easier.
iv) Spreads the availability workload over independent computers of the system in cost-effective way.

Disadvantages :

i) Network communication is delayed due to saturation or other problems.
ii) Security : Needs tools and techniques for providing controlled access to sensitive data.

CHECK YOUR PROGRESS

Q.1. Choose the correct option :

(i) An operating system is a software that

(a) helps the operators who are maintaining a computer system.

(b) helps other programs to run.

(c) helps in resource management.

(d) all of the above.

(ii) UNIX is an example of

(a) batch processing operating system

(b) time sharing operating system.

(c) real time operating system.

(d) none of these.

(iii) The program which takes user input , interprets it and takes necessary actions is

(a) kernel (b) system calls

(c) shell (d) scheduler.

(iv) The main job of one of the following is to allocate CPU to process

(a) kernel (b) shell (c) sceduler (d) login

(v) The objective of a multiprogramming operating system is to

(a) minimize the net execution time.

(b) maximize the processor utilization.

(c) minimize the user response time.

(d) none of above.

(vi) In UNIX, a process is a

(a) program in execution.

(b) sub-program which can be called from other programs.

(c) sequence of commands required to run a program.

(d) none of above.

(vii) MS-DOS operating system is a

(a) time sharing operating system

(b) single user operating system.

(c) distributed operating system

(d) all of the above.

(viii) The example of real time operating system is

(a) UNIX (b) MS-DOS

(c) WINDOWS 2000 (d) HP-RT

(ix) Example of embedded operating system is

(a) FreeBSD (b) Unix

(c) MS-DOS (d) Linux.

3.6 LET US SUM UP

An Operating System is an important component of a computer system. The primary objecives of an operating system is to make computer system convenient to use and utilise computer hardware and various resources in an efficient manner. An operating system is a large set of software which is also an interface between users and computer systems. It is also a system software.

Input and Output management : An operating system makes efficient usage of input and output devices and controls properly.

Memory or storage management : Memory is an important resource for a computer system. So memory allocation and deallocation for programs and data is an another function of an operating system.

Process management : Process can be defined as a program in execution.It is the job which is currently being executed by the processor (CPU).

Files and directories management : Files and directories are also properly managed by an operating system.Data is stored in a computer system as files.

Scheduling : The operating system also establishes and enforces process-priority. That is, it determines and maintains the order in which jobs are to be executed by the computer system.

Security management : It is also one of the most important function of an operating system to protect its various resources from the outer world.

- **Single user Operating System** the simplest operating system which allows only one user to work.
- **Multi user operating system** which is running on a computer will manage the work of all different users.
- **Multitasking operating system** allows the user to perform more than job at the same time on a computer.
- In **multiprogramming technique of processing ,** the CPU runs several programs at the same time.
- **Real time operating system** work towards providing immediate processing and also responding to user's commands in a very short period of time.
- **Network operating System (NOS)** is an operating system specifically designed to support interconnection of several computers.
- **A distributed operating System** hides the existence of multiple computers which are interconnected by a network from the user.

3.7 FURTHER READINGS

- Andrew S Tanenbaum, Albert S. Woodhull, "*Operating Systems Design and Implementation*", Prentice-Hall India publication.
- Deitel & Deitel, Choffnes, "*Operating System*", Pearson Education.

3.8 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : (i) (d), (ii) (b), (iii) (c), (iv) (c), (v) (b), (vi) (a), (vii) (b), (viii) (d), (ix) (a)

3.9 MODEL QUESTIONS

Q.1. What is an operating system? Why is it necessary to use operating system for a computer ?

Q.2. What is process? What are the main objectives of the process-management module of the operating system?

Q.3. Differentiate between multiprigramming and multi-tasking operating system.

Q.4. Describe the role of operating system in the computer system.

Q.5. What are different functions performed by an operating system?

Q.6. Describe different types of operating systems?

Q.7. What is virtual memory? Why is it so called? How is it used?

Q.8. What is network operating system? How is it different from the distributive operating system?

UNIT 4 : MS DOS OPERATING SYSTEM

UNIT STRUCTURE

4.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- describe the DOS operating system
- identify the system files of DOS
- describe files and directory structure
- identify the internal and external commands
- identify the batch files.

4.2 INTRODUCTION

By now you are aware of the basic definition of an operating system including its functions and various types. In this unit, we will introduce you to the Microsoft Disk Operating System (MS DOS) which is a single user, single tasking operating system. We will discuss about the system files of DOS, files and directory structure and internal and external commands of DOS.

4.3 DOS OPERATING SYSTEM

Microsoft Disk Operating System (MS-DOS) is the most popular single user operating system in the world. Microsoft Corporation of USA had released it in August 1981. First version of MS-DOS was a refined version of an operating system developed by Tim Peterson of Seattle Computers, which he had named as QDOS (Quick and Dirty Operating System) as he had developed it in record two months and could not introduce some good functions of process management and memory management into it. After the release of the first version of MS-DOS, every time some refinement is made, a new version of it is launched. The latest version of MS-DOS available in the market are 9.x.

4.4 SYSTEM FILES OF DOS

The modern DOS operating system is distributed on 3-5 high density floppy disks. It comes with backup utilities and (depending on how the lawyers feel) disk compression drivers. However, all the stuff that goes into C:\DOS and its subdirectories are programs and utilities. The core DOS operating system consists of six files:

- The boot sector is a 512 byte record placed at the beginning of the C: drive when DOS was installed, or placed there subsequently using the “sys c:” command.
- Two “hidden” files are stored in the root directory of the C: drive. They do not show up in a DIR listing unless the /A switch is used. On IBM PC DOS systems, they are *IBMBIO.SYS* and *IBMDOS .SYS*. On MS DOS systems, they are called *IO.SYS* and *MSDOS.SYS*. These files form the kernel of the DOS system.
- *COMMAND.COM* is the “shell” or command interpreter. It prints out the “C:\&gt “ prompt and reads user commands. It also supports BAT files.
- The user configuration files are *CONFIG.SYS* and *AUTOEXEC. BAT*. The reader is assumed to be familiar with these files.

COMMAND.COM is initially stored in the C:\ root directory. The problem is that OS/2 and Windows NT have their own versions of COMMAND.COM. To avoid confusion, each COMMAND.COM should be stored in the subdirectory that belongs to its particular operating system. In normal use, this means that the DOS version should be in C:\DOS. To relocate it, two statements must be added to the user configuration files:

"SHELL=C:\DOS\COMMAND.COM" is added to CONFIG.SYS.

"SET COMSPEC=C:\DOS\COMMAND.COM" is added to AUTOEXEC.BAT.

The hidden files IBMBIO, IBMDOS, IO, or MSDOS have names that do not conflict with each other or with any system file belonging to any other operating system. They can stay in the C:\ root directory no matter what gets added to the system. This means that the volatile part of the DOS system consists of the boot record, C:\CONFIG.SYS, and C:\AUTOEXEC. BAT.

4.5 CONCEPT OF BOOTING

The term 'boot' is used to describe the intial loading of an operating system or of some other program into a computer. The word "boot" comes from the term "Bootstrap". The loading of DOS into main memory involves loading of three essential files of DOS i.e. IO.SYS, MSDOS.SYS and COMMAND.COM into the main memory. Loading these files into main memory is called *booting up* of the computer. The booting up process is a step by step process as described below

a) As soon as the machine is switched on, POST (Power On Self Test) is performed which checks for integrity of all the components (CPU,RAM, I/O devices etc.) of a computer system. If any component is found faulty, an error message is displayed.

b) A chip called ROM-BIOS (Read Only Memory-Basin Input-Output Services) is read and executed. Then a check is performed for DOS files presence in the following order

   i) First in 'A drive'; if found there, DOS is loaded from the drive A.

ii) If not found in drive A, then 'C drive' scanned for the DOS files and if available there from the C drive DOS is loaded.

iii) If nowhere DOS file is located, an error message will come.

c) If DOS files are found in a drive, its very first sector (called *boot sector*) is read which stores a small program called bootstrap loader in which instructions for booting up process are stored. The bootstrap loader is then loaded into the main memory and its instructions are executed and as a result DOS system files IO.STS, MSDOS.SYS and COMMAND.COM will be loaded into the main memory one by one.

Two files IO.SYS and MSDOS.SYS make the kernel of DOS which actually interacts with the hardware and the gets the work done. The user interacts with the shell of DOS which is COMMAND.COM. The shell in turn interprets user request and interacts with the kernel for carrying out the user request. Shell is resposible for user interface.

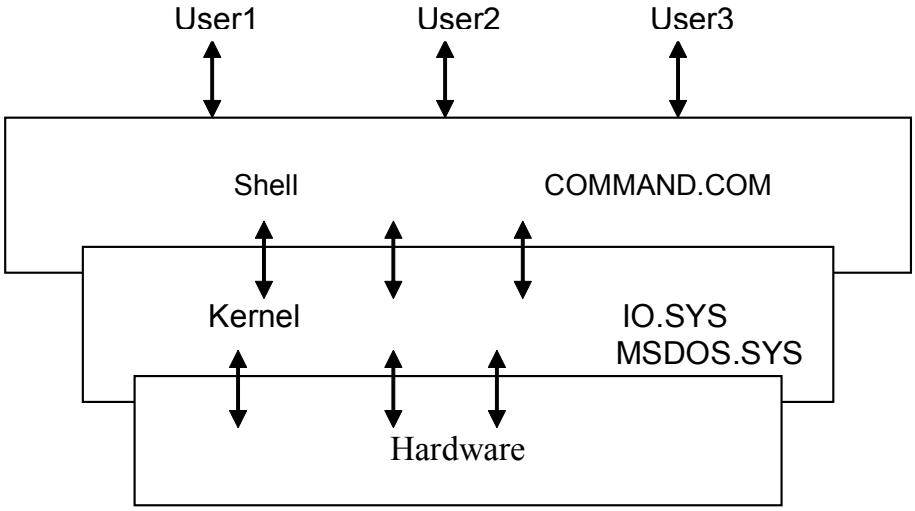


Fig. 4.1 : Hierarchy of Interaction with MS-DOS

4.6 FILES AND DIRECTORY STRUCTURE

Files : Any information which is to be stored on the computer's secondary storage, would be stored as a file. A file is a logically related information, such as a file containing all details about mid-term exams, a file containing monthly sales data etc. Each file stored on the system is

given a name. The file name has two parts : *primary file name* and *secondary file name* (also called extension). A primary file name consists of one to eight (1-8) characters in length. File extension consists of a period followed by zero to three (0-3) characters. Extensions are optional, but it is better to us as they are useful for describing the contents of a file. The primary file name and file extensions can have any characters other than following :

[ ] / \ : , ; < > + " = ? |

Extension **.exe** specifies that it is an executable file, **.doc** specifies that it is a document file, **.bas** specifies it is a BASIC program file, .pas specifies that it is a PASCAL file.

Directories : In an office, the file cabinet is divided into shelves, shelves into boxes, boxes into drawers etc. and files are kept in them. Similar types of files are groupd and kept in the same drawer or box or shelf. In the same way files on the disk are stored. The disk (similar to file cabinet) is divided into sub-directories (similar to shelves); each sub-directory can further be divided into sub-directory (similar to box) and so on. DOS files with some similarity (e.g. belonging to the same project) are grouped together and a directory is formed for them under which they are kept.

So, directories let you group your files in convenient categories. These directories, in turn, may contain other directories (referred to as sub-directories). This organised file structure is referred to as multilevel or hierarchical directory system.

The first level in a multilevel directory system is root directory, which is created automatically at the time of the disk formatting. Within the root directory, additional directories and sub-directories can be created. Within each directory or sub-directory, new files or new sub-directories can be created.

Immediately after the booting, root directory is the current directory or working directory i.e. by default all operations will be performed under it unless you specify another directory or files for it. Working directories can be changed using CD or CHDIR command of DOS.

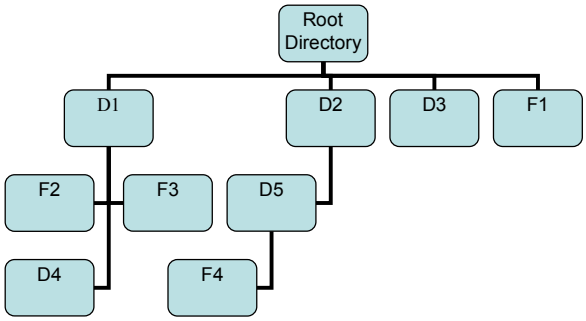


Fig. 4.2

In the Fig. 4.2 D1, D2, D3 are sub-directories or child directories of root directory and root is the parent directory of D1, D2, D3. D4 is the child directory of D1 and D5 is the child directory of D2; D1 is the parent directory of D4 and D2 is the parent directory of D5. One thing, to be kept in mind is that, a directory can have many sub-directories (child), but a child directory can have only one parent directory, it cannot have more than one parent directory. Directory names follow the file naming rules.

4.7 CONCEPT OF PATHS

Full name of a file or directory consists of path ***primary name. extension*** .Path is a sequence of directory names which give you the hierarchy to access a particular directory or file name. Let us consider the following directory structure :

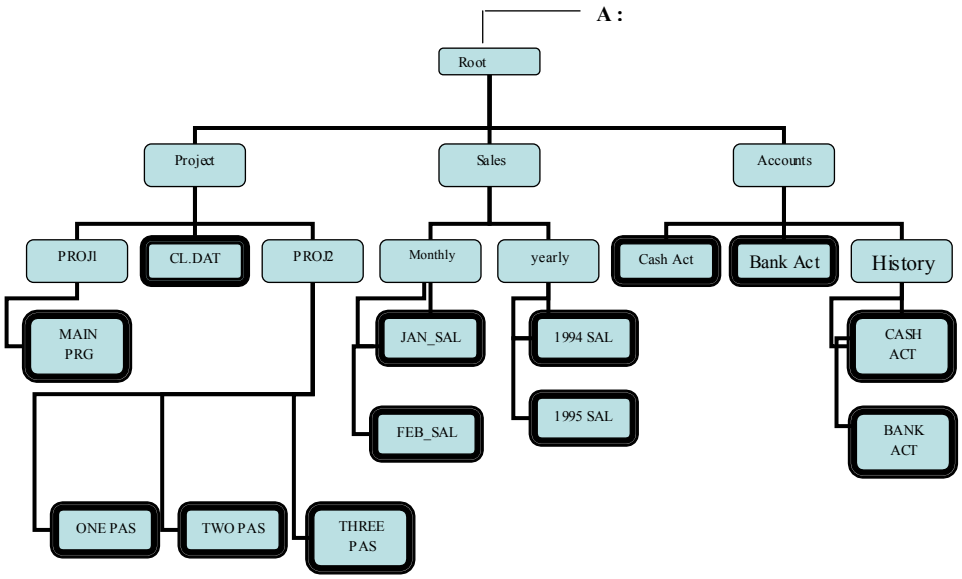


Fig. 4.3

Now, the full name directories PROJECT, SALES and ACCOUNTS will be

A: \PROJECT, A: \SALES and A:| ACCOUNTS respectively.

So format of path can be given as

Drive-letter: \directory[\directory.....]

Where first \ (backslash) refers to root directory and other ('\' s) separate a directory name form the previous directory name. Now the path of directory JAN SAL will be :

A: \SALES\Monthly\JAN SAL

As to reach JAN SAL the sequence one has to follow is under drive A, under root directory (first \), under SALES subdirectory of root, under Monthly subdirectories of SALES, there lies JAN SAL directory.

Similarly the full name of ONE PAS file under PROJ2 subdirectory will be :

A: \PROJECT\PROJ2\ONE PAS

Now, you can see that there are two files with the same name CASH ACT, one under the Accounts directory and the other under HISTORY directory but according to DOS rule no two files can have same names (path names). Both these files have same names but their path names differ, therefore, these can exist on system. So, the paths of the two files will be

A: \Accounts\CASH ACT

and A: \Accounts\HISTORY\CASH ACT

Above mentioned path names are *absolute path names* as they mention the paths from the top most level of the directory structure.

Relative pathnames mention the paths relative to current working directory. Let us assume that the current working directory now is, say, PROJ2. The symbol **.** and **..** can be used now in relative paths and path names. The symbol **.** can be used in place of current working directory and **..** denotes the parent directory.

So, with PROJ2 as current working directory, pathyname of TWO PAS will be :

.\TWO PAS (PROJ2 being working directory)

Which means under current working directory, there is file TWO PAS. Similarly, path name for file CL DAT will be :

..\CL DAT (PROJ2 being working directory)

Which means under parent directory of current directory, there is a file CL DAT. Similarly, path name for MAIN PRG will be :

..\PROJ1\MAIN PRG

that is under parent directory of current directory, there lies a file MAIN PRG.

4.8 INTERNAL AND EXTERNAL COMMANDS

We have seen that, user interface is the shell's responsibility. Therefore, a user passes its request (in the form of DOS command) to the shell i.e. COMMAND.COM. Whenever a request is passed to it, the shell interprets it and then searches for its specification i.e. what is to be done ? and how it is to be done inside COMMAND.COM. These specification of commands can either be found inside the shell or outside it, thus giving rise to two types of DOS commands.

i) ***Internal Commands :*** DOS commands for which specifications are available within the shell (i.e. COMMAND.COM) are called Internal Commands (as they are internally available in shell).

ii) ***External Commands :*** DOS commands for which specifications are not internally available within the shell (i.e. COMMAND.COM) are called External Commands. The specification for these commands are made available to the shell through external specification files e.g. FORMAT is an external command and its specifications are available in FORMAT.COM, for DISKCOPY external command, specification file is DISKCOPY.COM and so on. The specification files are executable files i.e. files with extensions *.EXE* or *.COM*.

A) Internal Commands : The Internal commands include the following some important commands :

File Commands – File commands are those commands which

operate on files. Under file commands we will discuss the following commands –

1. ***COPY :*** Allows the user to copy one or more files to an alternate location.

Syntax :

Copies one or more files to another location.

COPY [/A | /B] source [/A | /B] [+ source [/A | /B] [+ ...]] [destination] [/A | /B]] [/V] [/Y | /-Y]

source Specifies the file or files to be copied.

/A	Indicates an ASCII text file.
/B	Indicates a binary file.
destination	Specifies the directory and/or filename for the new file(s).
/V	Verifies that new files are written correctly.
/Y	Suppresses prompting to confirm you want to overwrite an existing destination file.
/-Y	Causes prompting to confirm you want to overwrite an existing destination file.

The switch /Y may be preset in the COPYCMD environment variable. This may be overridden with /-Y on the command line.

To append files, specify a single file for destination, but multiple files for source (using wildcards or file1+file2+file3 format).

Examples :

copy *.* a:

Copy all files in the current directory to the floppy disk drive.

copy autoexec.bat c:\windows

Copy the autoexec.bat, usually found at root, and copy it into the windows directory; the autoexec.bat can be substituted for any file(s).

copy win.ini c:\windows /y

Copy the win.ini file in the current directory to the windows directory. Because this file already exists in the windows directory it normally would prompt if you wish to overwrite the file. However, with the /y switch you will not receive any prompt.

copy myfile1.txt+myfile2.txt

Copy the contents in myfile2.txt and combines it with the contents in myfile1.txt.

copy con test.txt

Finally, a user can create a file using the copy con command as shown above, which creates the test.txt file. Once the above command has been typed in, a user could type in whatever he or she wishes. When you have completed creating the file, you can save and exit the file by pressing **CTRL+Z**, which would create ^Z, and then press enter. An easier way to view and edit files in MS-DOS would be to use the.

2. DEL : Del is a command used to delete files from the computer.

Syntax :

Windows 2000 and Windows XP syntax

Deletes one or more files.

DEL [/P] [/F] [/S] [/Q] [/A[[:]attributes]] names

ERASE [/P] [/F] [/S] [/Q] [/A[[:]attributes]] names

names-	Specifies a list of one or more files or directories. Wildcards may be used to delete multiple files. If a directory is specified, all files within the directory will be deleted.
/P	Prompts for confirmation before deleting each file.
/F	Force deleting of read-only files.
/S	Delete specified files from all subdirectories.
/Q	Quiet mode, do not ask if ok to delete on global wildcard
/A	Selects files to delete based on attributes
attributes	R - Read-only files, S - System files, H - Hidden files, A - Files ready for archiving

Windows 2000 and Windows XP recovery console syntax

Deletes one file.

del [drive:][path]filename

delete [drive:][path]filename

[drive:][path]filenameSpecifies the file to delete.

Delete only operates within the system directories of the current Windows installation, removable media, the root directory of any hard disk partition, or the local installation sources.

Del and delete do not support replaceable parameters (wild cards).

del test.tmp = Deletes the test.tmp in the directory that you currently are in, if the file exists.

del c:\windows\test.tmp = Delete the c:\windows\test.tmp in the windows directory if it exists.

del c:\windows\temp*.* = (* is for wild character(s)) *.* indicates that you would like to delete all files in the c:\windows\ temp directory.

In the previous directory structure, to delete all the files having the .PAS extension under PROJ2, the command will be :

Del A:\PROJECT\PROJ2*.PAS/P

This command will be carried out by displaying all PAS file names for confirmation i.e.

ONE.PAS Delete (Y/N) ? Y

TWO.PAS Delete (Y/N) ? Y

THREE.PAS Delete (Y/N) ? N

3. ***REN (RENAME) :*** Used to rename files and directories from the original name to a new name.

In earlier releases of MS-DOS instead of using ren or rename you need to use the move command to rename your MS-DOS directories or files.

Syntax :

Renames a file/directory or files/directories.

RENAME *[drive:][path][directoryname1 | filename1] [directoryname2 | filename2]*

REN [drive:][path][directoryname1 | filename1] [directoryname2 | filename2]

Note that you cannot specify a new drive or path for your destination.

rename c:\chope hope

Rename the directory chope to hope.

rename *.txt *.bak

Rename all text files to files with .bak extension.

In our example to rename file CL DAT as CLASS DAT under PROJECT, the command will be

REN A:\PROJECT\CL DAT CLASS DAT

4. TYPE : Allows the user to see the contents of a file.

To edit the files, the user would need to use either edit or copy con.

Syntax :

Displays the contents of text files.

TYPE [drive:][path]filename

Examples :

type c:\autoexec.bat

This would allow you to look at the autoexec.bat

In our example, to display the content of the file 1995 sal under yearly subdirectory, the command will be as follows :

TYPE A:\SALARY\YEARLY\1995 SAL

Directory Commands : In this section four internal commands of DOS will be discussed.

5. DIR : The dir command allows you to see the available files in the current and/or parent directories.

Microsoft Windows 2000 and Windows XP syntax

Displays a list of files and subdirectories in a directory.

DIR [drive:][path][filename]	[/A[[:]attributes]] [/B] [/C] [/D] [/L] [/N] [/O[[:]sortorder]] [/P] [/Q] [/S] [/T[[:]timefield]] [/W] [/X] [/4]
[drive:][path][filename] -	Specifies drive, directory, and/or files to list.
/attributes	D Directories R Read-only files H Hidden files A Files ready for archiving S System files - Prefix meaning not

/B	Uses bare format (no heading information or summary).
/C	Display the thousand separator in file sizes. This is the default. Use /-C to disable display of separator.
/D	Same as wide but files are list sorted by column.
/L	Uses lowercase.
/N	New long list format where filenames are on the far right.
/O	List by files in sorted order.
sortorder	N By name (alphabetic) S By size (smallest first) E By extension (alphabetic) D By date/time (oldest first) G Group directories first - Prefix to reverse order
/P	Pauses after each screenful of information.
/Q	Display the owner of the file.
/S	Displays files in specified directory and all subdirectories.
/T	Controls which time field displayed or used for sorting
timefield	C Creation A Last Access W Last Written
/W	Uses wide list format.
/X	This displays the short names generated for non-8dot3 file names. The format is that of /N with the short name inserted before the long name. If no short name is present, blanks are

displayed in its place.

/4 Displays four-digit years

dir

Lists all files and directories in the directory that you are currently in.

dir /ad

List only the directories in the current directory. If you need to move into one of the directories listed use the cd command.

dir /s

Lists the files in the directory that you are in and all sub directories after that directory, if you are at root "C:\>" and type this command this will list to you every file and directory on the C: drive of the computer.

dir /p

If the directory has a lot of files and you cannot read all the files as they scroll by, you can use this command and it will display all files one page at a time.

dir /w

If you don't need the info on the date / time and other information on the files, you can use this command to list just the files and directories going horizontally, taking as little as space needed.

dir /s /w /p

This would list all the files and directories in the current directory and the sub directories after that, in wide format and one page at a time.

dir /on

List the files in alphabetical order by the names of the files.

dir /o-n

List the files in reverse alphabetical order by the names of the files.

dir \ /s |find "i" |more

A nice command to list all directories on the hard drive, one screen page at a time, and see the number of files in each directory and the amount of space each occupies.

dir > myfile.txt

Takes the output of dir and re-routes it to the file myfile.txt instead of outputting it to the screen.

6. ***CHDIR/CD :*** CD (Change Directory) is a command used to switch directories in MS-DOS. For example, if you needed to run Windows 3.11 from DOS, you would type:

cd windows - Changing the directory to Windows;

win - To run the win.com file within the windows directory.

Syntax :

CHDIR [drive:][path]

CHDIR[..]

CD [drive:][path]

CD[..]

Examples :

cd

Goes to the highest level, the root of the drive.

cd..

Goes back one directory. For example, if you are within the C:\Windows\ COMMAND> directory, this would take you to C:\Windows>

Windows 95, 98, and later versions have a feature in the CD command that allows you to go back more than one directory when using the dots. For example, typing: **cd...** with three dots after the cd would take you back two directories.

cd windows

If present, would take you into the Windows directory. Windows can be substituted with any other name.

cd \windows

If present, would first move back to the root of the drive and then go into the Windows directory.

cd windows\system32

If present, would move into the system32 directory located in the Windows directory. If at any time you need to see what directories are available in the directory you're currently in use the dir command.

7. ***MKDIR (MD) :*** Allows you to create your own directories in MS-DOS.

Syntax :

Creates a directory.

MKDIR [drive:]path

MD [drive:]path

Examples :

md test

The above example creates the “test” directory in the directory you are currently in.

md c:\test

Create the “test” directory in the c:\ directory.

8. ***RMDIR (RD) :*** Removes empty directories in MS-DOS. To delete directories with files or directories within them the user must use the deltree command, or if you are running Microsoft Windows 2000 or Windows XP use the /S option.

Syntax :

Removes (deletes) a directory.

RMDIR [drive:]path

RD [drive:]path

Windows 2000 and Windows XP Syntax.

RMDIR [/S] [/Q] [drive:]path

RD [/S] [/Q] [drive:]path

S Removes all directories and files in the specified directory in addition to the directory itself. Used to remove a directory tree.

/Q Quiet mode, do not ask if ok to remove a directory tree with /S.

Examples :

rmdir c:\test

Remove the test directory, if empty. If you want to delete directories that are full, use the deltree command or if you’re using Windows 2000 or later use the below example.

rmdir c:\test /s

Windows 2000, Windows XP and later versions of Windows can

use this option with a prompt to permanently delete the test directory and all subdirectories and files. Adding the /q switch would suppress the prompt.

Miscellaneous Commands :

In this section, we will discuss some different commands of MSDOS

i) ***Break :*** Break can be used to enable or disable the breaking capability of the computer. For example, if a user wanted to cancel a batch file or another MS-DOS processes, that user could simply press CTRL + C (break), which would then prompt the user if they wish to cancel the current process.

Turning break off will cancel CTRL + C; however, the user will still be able to press CTRL + PAUSE/BREAK and have the capability of getting out of a batch file / current running process.

Note : Newer versions of Windows (Windows ME, Windows 2000, Windows XP, and higher) only include this command for backwards compatibility and turning the break off has no effect.

Syntax :

Sets or clears extended CTRL+C checking.

BREAK [ON | OFF]

Type BREAK without a parameter to display the current BREAK setting.

Examples :

break on

Turns on the break, which allows the Ctrl + C function.

break off

Turns off the break, not allowing Ctrl + C to cancel a process.

ii) ***CLS :*** Cls is a command that allows a user to clear the complete contents of the screen and leave only a prompt.

Syntax :

CLS

Examples :

cls

Running the cls command at the command prompt would clear your

screen of all previous text and only return the prompt.

iii) DATE : Displays or sets the date.

Syntax :

DATE [date]

Type DATE without parameters to display the current date setting and a prompt for a new one. Press ENTER to keep the same date.

Examples :

date

Display the current date and prompt for a new one. If no date is entered, the current date will be kept.

iv) PATH : Path is used to specify the location where MS-DOS looks when using a command. For example, when using the command "format", if the path is not specified to where the command is you will receive bad command or file name.

Syntax :

Displays or sets a search path for executable files.

PATH [[drive:]path[;...]]

Type PATH ; to clear all search-path settings and direct Windows to search only in the current directory.

Type PATH without parameters to display the current path.

Examples :

path=c:\windows\command

This is where a lot of DOS commands are stored in Window 95; if you are not able to do a dos command, type this command in, allowing all commands you type in, such as "deltree", to be loaded from this directory. However, if you have another file in another directory such as C:\DOS it will no longer look there.

v) TIME : Allows the user to view and edit the computer's time.

Syntax :

Displays or sets the system time.

TIME [time]

Type TIME with no parameters to display the current time setting and a prompt for a new one. Press ENTER to keep the same time.

Examples :

time 12:00

Set the time to 12:00

vi) VER : Displays the version of MS-DOS or if running Windows 95 or above the version of Windows. Information about Windows versions can be found on our Windows version page.

Syntax :

Displays the MS-DOS version.

VER

Examples :

ver

Display what version of MS-DOS or Windows command prompt you're using. Below is an example of what this may look like.

Microsoft Windows XP [Version 5.1.2600]

vii) VOL : Displays the volume information about the designated drive.

Syntax :

Displays the disk volume label and serial number, if they exist.

VOL [drive:]

Examples :

vol c :

Display the volume of drive c: as shown in the below example.

Volume in drive C has no label.

Volume Serial Number is 1C24-AB20

B) External Commands : It has already been mentioned that external commands are those, for which specifications are not available within COMMAND.COM. Some important external commands are discuss in this section.

1. COMP : A simple compare that compares two or more files.

Syntax :

Compares the contents of two files or sets of files.

COMP [data1] [data2] [/D] [/A] [/L] [/N=number] [/C]

data1 Specifies location and name(s) of first file(s) to compare.

data2 Specifies location and name(s) of second files to compare.

/D Displays differences in decimal format.

/A Displays differences in ASCII characters.

/L Displays line numbers for differences.

/N=number Compares only the first specified number of lines in each file.

/C Disregards case of ASCII letters when comparing files.

To compare sets of files, use wildcards in data1 and data2 parameters.

Examples :

Note : Unless the /N option is used the comp command will only compare the size of the file.

comp file1.txt file2.txt /N=10 /A

Compares file1.txt with file2.txt. In this example we are using the /A option to display the ASCII characters that the compare has found different. If the /A option is not displayed, the comp command will display the differences in hexadecimal notation.

2. ***FORMAT :*** Format is used to erase **all** of the information off of a computer diskette or fixed drive.

Syntax :

Microsoft Windows 2000 and Windows XP syntax

Formats a disk for use with Windows 2000.

FORMAT volume [/FS:file-system] [/V:label] [/Q] [/A:size] [/C] [/X]

FORMAT volume [/V:label] [/Q] [/F:size]

FORMAT volume [/V:label] [/Q] [/T:tracks /N:sectors]

FORMAT volume [/V:label] [/Q] [/1] [/4]

FORMAT volume [/Q] [/1] [/4] [/8]

volume Specifies the drive letter (followed by a colon), mount point, or volume name.

/FS:filesystem	Specifies the type of the file system (FAT, FAT32, or NTFS).
/V:label	Specifies the volume label.
/Q	Performs a quick format.
/C	Files created on the new volume will be compressed by default.
/X	Forces the volume to dismount first if necessary. All opened handles to the volume would no longer be valid.
/A:size	Overrides the default allocation unit size. Default settings are strongly recommended for general use. NTFS supports 512, 1024, 2048, 4096, 8192, 16K, 32K, 64K. FAT supports 512, 1024, 2048, 4096, 8192, 16K, 32K, 64K, (128K, 256K for sector size > 512 bytes). FAT32 supports 512, 1024, 2048, 4096, 8192, 16K, 32K, 64K, (128K, 256K for sector size > 512 bytes). Note that the FAT and FAT32 files systems impose the below restrictions on the number of clusters on a volume: FAT: Number of clusters <= 65526 FAT32: 65526 < Number of clusters < 268435446 Format will immediately stop processing if it decides that the above requirements cannot be met using the specified cluster size. NTFS compression is not supported for allocation unit sizes above 4096.
/F:size	Specifies the size of the floppy disk to format (160,180, 320, 360, 640, 720, 1.2, 1.23, 1.44, 2.88, or 20.8).
/T:tracks	Specifies the number of tracks per disk side.
/N:sectors	Specifies the number of sectors per track.
/1	Formats a single side of a floppy disk.

/4 Formats a 5.25-inch 360K floppy disk in a high-density drive.

/8 Formats eight sectors per track.

3. LABEL : Label is used to view or change the label of the computer disk drives.

Syntax :

Creates, changes, or deletes the volume label of a disk.

LABEL [drive:][label]

Examples :

label a: mydisk

This would label the disk currently in the drive to “mydisk”, but will not label if your disk is write protected.

4. MEM : Allows you to determine the available, used and free memory.

Syntax :

Displays the amount of used and free memory in your system.

MEM [/CLASSIFY | /DEBUG | /FREE | /MODULE module name] [/PAGE]

/CLASSIFY or /C Classifies programs by memory usage. Lists the size of programs, provides a summary of memory in use, and lists largest memory block available.

/DEBUG or /D Displays status of all modules in memory, internal drivers, and other information.

/FREE or /F Displays information about the amount of free memory left in both conventional and upper memory.

/MODULE or /M Displays a detailed listing of a module’s memory use. This option must be followed by the name of a module, optionally separated from /M by a colon.

/PAGE or /P Pauses after each screen full of information.

Examples :

mem

This would display information about your memory as seen in the below examples.

Windows 2000 and Windows XP example output:

655360 bytes total conventional memory
655360 bytes available to MS-DOS
633872 largest executable program size
1048576 bytes total contiguous extended memory
0 bytes available contiguous extended memory
941056 bytes available XMS memory
MS-DOS resident in High Memory Area

mem /f

Display the amount of conventional memory free.

5. ***PRINT :*** Print was first introduced in MS-DOS 2.0 as PRINT.COM and later was changed to PRINT.EXE in MS-DOS 5.0 and above. This command allowed users to print a text file to a line printer, in the background.

Syntax :

print	*/d:device /b:size /u:ticks1 /m:ticks2*
	drive:\path\ filename /c /p
/d:device	Name of printer device Printer Ports: LPT1, LPT2 orLPT3 Serial Ports:Com1, Com2, Com3 or Com4
/b:size	Sets size (in bytes) of internal buffer. Default=512 with range of 512 to 16384.
/u:ticks1	Maximum number of clock ticks PRINT is to wait for a printer to become available. Default=1 with a range of 1 to 255.
/m:ticks2	Maximum number of clock ticks PRINT can take to print a character or printer. Default=2 with a range of 1 to 255.

drive:\path\ filename	Location and filename of file to be printed.
/c	Removes files from the print queue.
/p	Adds files to the print queue.

Examples :

print c:\file.txt /c /d:lpt1

Prints the file file.txt to the parallel port lpt1.

6. TREE : Allows the user to view a listing of files and folders in an easy to read listing.

Syntax :

TREE Drive:\ Path /f /a

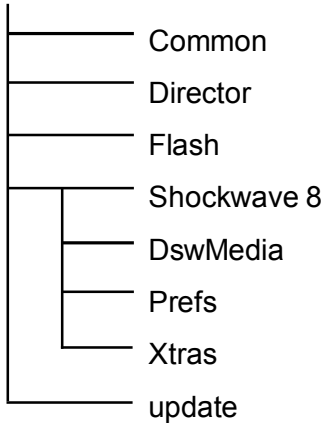
Drive:\Path	Drive and directory containing disk for display of directory structure.
/f	Displays file names in each directory. /a ext characters used for linking lines, instead of graphic characters.
/a	is used with code pages that do not support graphic characters and to send output to printers that do not properly interpret graphic characters.

Examples :

tree

List a tree listing of the current drive. Below is a basic example of what a directory may look like.

C:.



7. XCOPY : Xcopy is a powerful version of the copy command with additional features; has the capability of moving files, directories, and even whole drives from one location to another.

Syntax :

Windows 2000 and XP xcopy syntax

XCOPY source [destination] [/A | /M] [/D[:date]] [/P] [/S [/E]] [/V] [/W] [/C] [/I] [/Q] [/F] [/L] [/H] [/R] [/T] [/U] [/K] [/N] [/O] [/X] [/Y] [/-Y] [/Z] [/EXCLUDE: file1[+file2][+file3]...]

source	Specifies the file(s) to copy.
destination	Specifies the location and/or name of new files.
/A	Copies only files with the archive attribute set, doesn't change the attribute.
/M	Copies only files with the archive attribute set, turns off the archive attribute.
/D:m-d-y	Copies files changed on or after the specified date. If no date is given, copies only those files whose source time is newer than the destination time.
/EXCLUDE: file1 [+file2][+file3]...	Specifies a list of files containing strings. When any of the strings match any part of the absolute path of the file to be copied, that file will be excluded from being copied. For example, specifying a string like \obj\ or .obj will exclude all files underneath the directory obj or all files with the .obj extension respectively.
/P	Prompts you before creating each destination file.
/S	Copies directories and subdirectories except empty ones.
/E	Copies directories and subdirectories, including empty ones. Same as /S /E. May be used to modify /T. /V Verifies each new file.
/W	Prompts you to press a key before copying.
/C	Continues copying even if errors occur.
/I	If destination does not exist and copying more than one file, assumes that destination must be a directory.
/Q	Does not display file names while copying.
/F	Displays full source and destination file names while copying.

/L	Displays files that would be copied.
/H	Copies hidden and system files also.
/R	Overwrites read-only files.
/T	Creates directory structure, but does not copy files. Does not include empty directories or subdirectories. /T /E includes empty directories and subdirectories.
/U	Copies only files that already exist in destination.
/K	Copies attributes. Normal Xcopy will reset read-only attributes.
/N	Copies using the generated short names.
/O	Copies file ownership and ACL information.
/X	Copies file audit settings (implies /O).
/Y	Suppresses prompting to confirm you want to overwrite an existing destination file.
/-Y	Causes prompting to confirm you want to overwrite an existing destination file.
/Z	Copies networked files in restartable mode.

Examples :

xcopy c:\temp /e

The above example is the basic xcopy command to copy the files, directories, and subdirectories to the directory you're currently in.

xcopy "c:\documents and settings\hope" /e

In the above example the xcopy command would copy all files and directories in the user "hope" directory to the directory or drive you're currently in.

xcopy h:*.* /a /e /k

The above command would copy everything located on the H drive to the drive you are currently on.

4.9 BATCH FILE

In MS-DOS, OS/2, and Windows, a **batch file** is a text file containing a series of commands intended to be executed by the command interpreter.

When a batch file is run, the shell program (usually COMMAND.COM or cmd.exe) reads the file and executes its commands, normally line-by-line. A batch file is analogous to a shell script in Unix-like operating systems.

Batch files are useful for running a sequence of executables automatically. Many system administrators use them to automate tedious processes. Although batch files support elementary program flow commands such as *if* and *goto*, they are not well-suited for general-purpose programming.

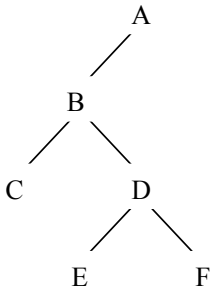
DOS batch files have the filename extension .BAT. Batch files for other environments may have different extensions, e.g. .CMD in Windows NT and OS/2, or .BTM in 4DOS and related shells.

File extension : .bat .cmd .btm

Type of format : Scripting

CHECK YOUR PROGRSS

Q.1. It is required to create six directories viz. A,B,C,D,E,F. These directories should follow the hierarchy shown in the following tree.



The directory A should be created in the root directory of drive C. Give the sequence of MS-DOS commands which would yeild the desired results.

.....

.....

.....

Q.2. How the DOS XCOPY command differ from DOS COPY command.

.....

.....

.....

Q.3. Many times, the computer goes into hang. Which key combination is used to reboot the system?

.....

4.10 LET US SUM UP

- MS-DOS is an acronym for Microsoft Disk Operating System, first released in August 1981.
- Loading of DOS into main memory is known as booting.
- The three system files of MS-DOS are loaded in order of IO.SYS, MSDOS.SYS and COMMAND.COM
- DOS commands are of two types : internal and external.
- Internal commands are those that are directly interpreted by the command processor, COMMAND.COM.
- External commands are those that are interpreted with the help of external files (with extension .COM or .EXE)
- Storage area on a disk are known as directories. A directory may contain files and/or subdirectories inside it.
- Path is a sequence of directory names which give you the hierarchy to access a particular directory or file name.
- The full name of a file or directory (including path) is also called path.
- Some DOS internal commands are COPY, DEL/ERASE, REN, TYPE, DIR, CHDIR/CD, MKDIR/MD, RMDIR/RD, BREAK, CLS, DATE, TIME, PATH, VER etc.
- Some external commands are DISKCOMP, DISKCOPY, FORMAT, LABEL, MEM, PRINT, TREE, XCOPY etc.

- Batches of MS-DOS commands stored under a filename with extension .BAT are known as batch files.
- The batch file with the name AUTOEXEC.BAT is automatically executed by MS-DOS at the time of booting.

4.11 FURTHER READINGS

- Peter Norton's DOS Guide by Peter Norton (Author)
- DOS 6.2 by Thomas Robert.

4.12 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : C>MD A ↵

C>MD C:\A\B

omitting C: as it is the current i.e. dafault drive

C>MD \A\B\C ↵

C>MD \A\B\D ↵

C>MD \A\B\D\E ↵

C>MD \A\B\D\F

Or alternatively

C>MD A ↵

C>CD A ↵

C>MD B ↵

C>CD B ↵

C>MD C ↵

C>MD D ↵

C>CD D ↵

C>MD E ↵

C>MD F

Ans. to Q. No. 2 : COPY can only copy the specified files from one directory only whereas XCOPY /s can copy the files

from subdirectories also. COPY can not ask for confirmation before copying files whereas XCOPY /p can ask for confirmation also.

Ans. to Q. No. 3 : Ctrl + Alt + Del

4.13 MODEL QUESTIONS

Q.1. What do you understand by kernel and shell of MS DOS? What are their roles ?

Q.2. What do you understand by internal and external commands? How are they different ?

Q.3. Write the purpose of the following commands? Also state whether they are internal or external commands.

TYPE, PROMPT, DISKCOPY, MEM

Q.4. Write the purpose of the following commands? Also state whether they are internal or external commands.

RD, VER,MEM, LABEL, FORMAT

Q.5. What functions do the following commands perform?

a) DISKCOPY b) DISKCOMP

Q.6. How is XCOPY a better copy command then COPY?

UNIT 5 : MS WINDOWS OPERATING SYSTEM

UNIT STRUCTURE

5.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- introduce yourself to Windows 7
- describe the features of Windows 7
- explore the components of Windows 7
- customize your Windows working environment
- work with files and folders to suit your needs.

5.2 INTRODUCTION

Windows 7 is the latest version of Operating System to have evolved in the Microsoft Windows Operating Systems family, and is the best-reviewed and technically better than the earlier versions of Windows. Hence Windows

7 has proved to be the most universally accepted operating system so far. Unlike its predecessor Windows Vista, which introduced a large number of new features, Windows 7 was intended to be a more focused, incremental upgrade to the Windows line, with the goal of being compatible with applications and hardware with which Windows Vista was already compatible. Windows 7 is technically an evolution of Windows Vista in terms of stability and security, maintaining everything that was good about Vista. Some of the improved features of Windows 7 that make this version more superior to Vista are: ***greater speed, less hardware requirements*** and its ***user-friendliness***.

In this unit, we will discuss about the features that are new in Windows 7 making it a better and more accepted operating system than the earlier versions. The different components of Windows 7 like the desktop, icons, menus etc that are somewhat more improved will also be discussed. And lastly, the technique of customizing the desktop to suit our usage needs will also be covered.

5.3 FEATURES OF WINDOWS 7

The Windows 7 operating system is more stable, intuitive and easy to use than any previous version. Here we look at some of the most compelling overall end-user features that will make a difference on the desktop. Some are small, and some are major, but taken all together it makes for the most exciting upgrade for Windows users since the arrival of Windows XP.

1. **Speed :** Even aside from incompatibilities and other issues that many people had with Windows Vista, one of the most straightforward was speed as it just felt too sluggish compared to XP, even on good hardware. Windows 7 brings a more responsive and sprightly feel, and Microsoft has spent a lot of time and effort getting the Start Menu response just right. Microsoft has also recognized the need for improved desktop responsiveness, which gives the impression that the computer

is responding to the user and that they are in control. One can also expect faster boot times, and the boot sequence is now not only prettier than it was with Vista, but it is speedier too.

2. **Compatibility :** In simple terms, compatibility on Windows 7 is far better than it was with Vista. Many programs that individuals and companies used on Windows XP did not work immediately and required updates, but with Windows 7 almost all applications that work on Vista should still run. In essence, Windows Vista has done most of the hard work for Windows 7 in this respect.
3. **Lower hardware requirements :** Windows Vista gained a reputation for making even the best hardware look rather ordinary. Windows 7, however, runs well on lower end hardware, making the transition from Window XP less painful.
4. **Search and organization :** Search is vastly improved in Windows 7. We type a search term in the window (***the window right above the Start key when we click on it***), and get a list of all results. What is great is that the results are not just presented as one huge list, but are grouped into categories like Programs, Music and Documents. It makes finding files a lot easier. Search is also lightning-fast with no more waiting, like in Vista or XP.
5. **TaskBar/Start menu :** At first glance, the task bar looks like nothing much has changed since Windows Vista. In fact, that is not the case and it is a lot more powerful. Microsoft is now making best use of its aero technology. By default, taskbar icons are now larger and items are grouped together and are not labeled with clumsy text. If we have multiple **Word/ Windows Explorer** windows open then we will see a stack appear on the task bar. When we hover over the application, each window will be visible in a thumbnail. If we hover over each thumbnail it will become visible, while all other open windows temporarily disappear. We can close each document or Window down from the thumbnail directly or click on it to bring it to the front.

6. **Aero-shake :** The favorite new visual feature of Windows 7 is called '**Aero Shake'**. In case we have a multitude of Windows open but want to focus on just a single Window, all we have to do is grab it by the title bar (at the top) and shake with the mouse. This minimizes all the other Windows leaving just the one we grabbed on the desktop.
7. **Stacking :** Another great touch is Stacking, whereby we may simply drag a Window to the sides of the screen and it will stick automatically to the side filling half the screen, thus making it quick and easy to view documents side by side. If we move to the top, it will maximize to the whole screen.
8. **Action Center :** The User Account Control (UAC) was one of the headline annoyances in Windows Vista. In a reaction to malware problems, the Windows designers introduced the UAC, a dialogue box that popped up every time any changes were made to Windows when installing apps. It proved quite annoying, especially to power users who tended to turn it off straight away, thereby negating any benefit it might have. In Windows 7, a slider has been added, enabling users to tone down its nagging factor, making them less likely to turn it off completely.
9. **Touch :** The most whizz-bang visual feature to come to Windows 7 is its touch capability. This of course will only be available to those with a touch enabled PC, but for those suitably equipped it will provide a new way of interacting with their PC. The video will let them open applications from the taskbar, scroll up and down by flicking, and zoom and rotate pictures by holding and turning.
10. **Gadgets :** Windows Vista introduced Gadgets and a sidebar which provides the ability to anchor Gadgets to the side of the user's desktop. In Windows 7, the sidebar has been removed, while gadgets can still be placed on the desktop. Windows 7 adds a Windows Media Center gadget to the default collection while removing the Contacts and Notes gadgets. Managing

gadgets is more closely integrated with Windows Explorer, but the gadgets themselves continue to operate in a separate *sidebar.exe* process. The Desktop context menu includes a new "**Gadgets**" menu option to access the gadget gallery, and a "**View**" sub-menu option to show or hide gadgets. Hiding gadgets results in the *sidebar.exe* process being unloaded, which Microsoft says is a power-saving practice.

5.4 EXPLORING WINDOWS

The Windows system is made up of several parts that function separately in their own unique way. These parts or components provide the users many utilities, using which the users can perform several tasks in a very user-friendly manner.

The Windows system consists of several separate components like the desktop, which is the very first thing we get to see on starting Windows. It consists of a taskbar which is used to launch and monitor applications, a start button that is visible at all times in the lower left-hand corner of the screen, a Start Menu that serves as the central launching point for applications, providing a customizable, nested list of programs for the user to launch, as well as a list of most recently opened documents, a way to find files and get help, and access to the system settings. Files in the Windows system provide a very easy and safe way to store different kinds of information related to different application. These files can be saved and stored and can later be also edited or deleted. The help and support system in Windows is also a very interesting feature that provides easy assistance to users who are in need of help while working with the Windows system. In the later sub-sections we will get to know about these components of Windows, and discuss in detail the different features and functionalities of these components.

5.4.1 The Desktop

The desktop is the main screen area that we get to see after turning on a computer and logging on to Windows as shown in **Figure**

5.1. The desktop serves as a surface for work, with open programs or folders appearing on the desktop. We can also put things on the desktop, such as files and folders, and arrange them accordingly. The desktop is sometimes defined more broadly to include the taskbar which sits at the bottom of the screen. The taskbar shows us the running programs and allows switching between them. It also contains the Start button, which allows us to access programs, folders, and computer settings.

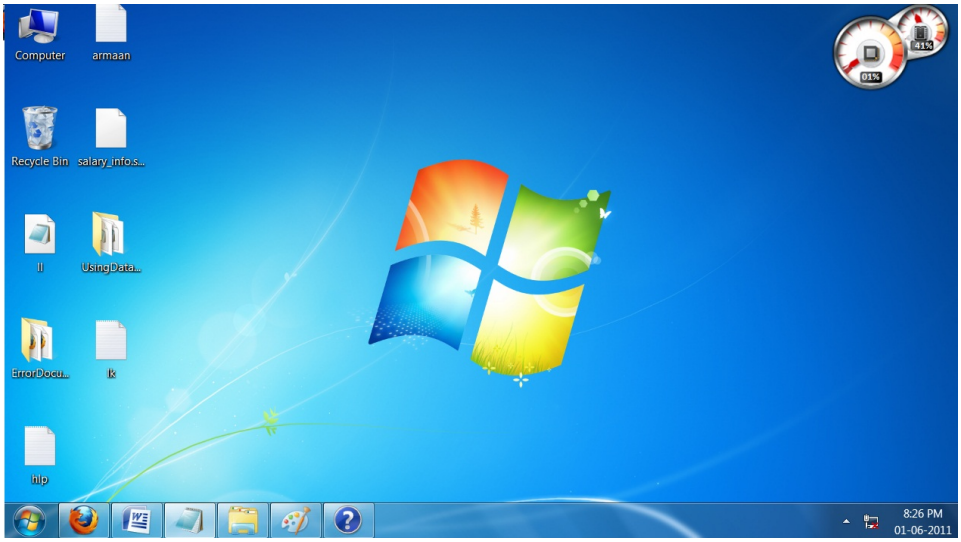


Fig. 5.1 : The Desktop

CHECK YOUR PROGRESS

Q.1. State whether the following statements are True or False.

(i) The Windows 7 operating system is more stable, intuitive and easy to use.

(ii) The desktop serves as a surface for work.

(iii) The taskbar shows us the running programs and allows switching between them.

(iv) The Start button does not allow us to access programs, folders, and computer settings.

(v) In Windows 7, the sidebar has been removed, while gadgets can still be placed on the desktop.

5.4.2 The Icons

Icons are small pictures representing files, folders, programs, and other items of a computer. These icons give quick access to frequently used programs, files and folders. When we first start Windows, we can see at least one icon on the desktop: the Recycle Bin. Some examples of desktop icons are shown below.

When we double-click an icon, the corresponding window of that icon opens. We can also add, remove, rename and move icons on the desktop according to our needs. Common desktop icons include My Computer, the user's personal folder, the Recycle Bin, and Control Panel.

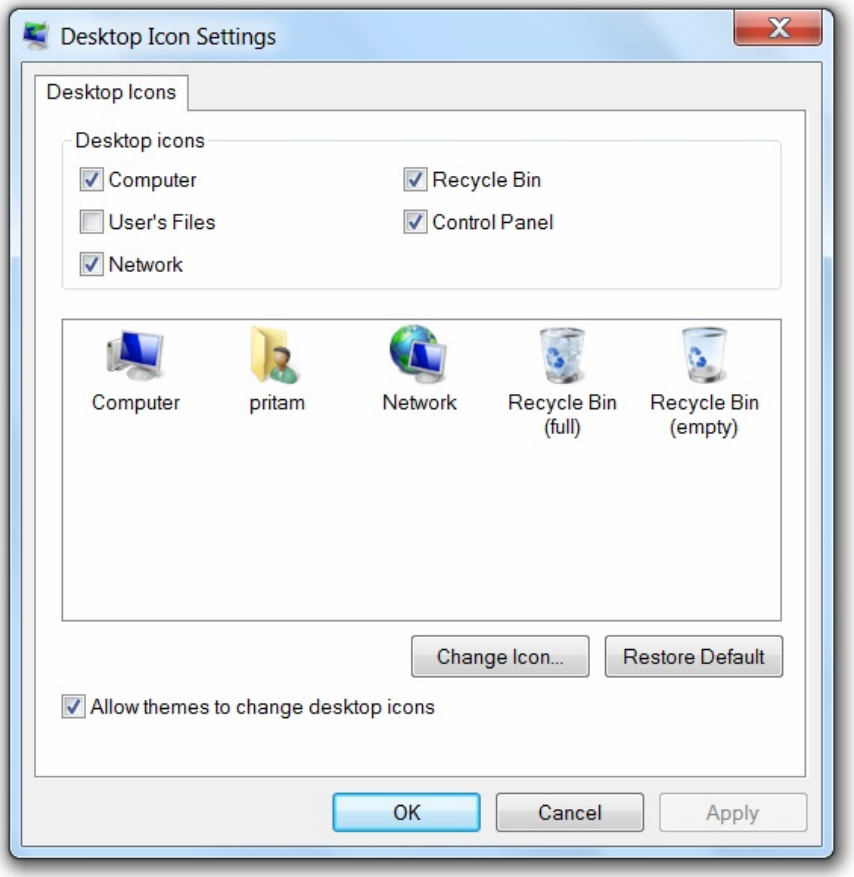


Fig. 5.2 : The Desktop icon settings dialog box

- **Adding or Removing desktop icons**
  1. Firstly we right-click on empty area of the desktop, and then click **Personalize**.
  2. In the left pane, we click **Change desktop icons** which opens the **Desktop icon settings** dialog box as in **Figure 5.2**
  3. Under **Desktop icons**, we select the check box for each icon that we want to add to the desktop, or clear the check box for each icon that we want to remove from the desktop, and then click **OK**.

To remove an icon from the desktop we may right-click the icon, and then click **Delete**. In case the icon is a shortcut, only the shortcut is removed but the original item is not deleted.

- **Renaming icons** – A desktop icon can be easily renamed by the following steps:
  1. Firstly we right-click the icon on the desktop
  2. Then from the pop-up menu we select the rename option
  3. We then enter a new name for the icon

  OR

  1. We first select the icon to be renamed
  2. Then we press the **F2** key
  3. Finally we enter a new name for the icon
- **Moving icons :** Icons on the desktop are stacked in columns on the left side of the desktop. But if desired such an arrangement can be changed by moving an icon by dragging it to a new place on the desktop. To do so we follow these steps:
  1. Firstly we select the item to be moved
  2. Pressing and holding the left mouse button, we move the icon to the desired destination
  3. As soon as the destination is reached we release the mouse button
- **Arranging icons :** Windows can also arrange our icons automatically. To do so we follow these steps:
  1. Firstly we right-click an empty area of the desktop

2. We then select **View** and click on **Auto arrange icons**
3. Windows automatically stacks our icons in the upper-left corner and locks them in place

In order to unlock the icons to move them again, we may click **Auto arrange icons** again, clearing the check mark next to it.

- **Moving multiple icons :** In order to move or delete a bunch of icons at once, we must first select all of them. To do so we follow these steps:
  1. At first we click an empty area of the desktop and drag the mouse.
  2. We surround the icons that we want to select with the rectangle that appears.
  3. When the desired icons are surrounded we release the mouse button.
  4. Now we can drag the icons as a group or delete them.

5.4.3 Working with Windows

While working in the Windows environment, we perform many tasks like creating different application files, editing them, managing them and many other tasks that require us to constantly use a number of windows that are related to the currently used processes. In such a situation we need to '**move**', '**minimize'**, '**maximize**', '**restore**', '**resize**', '**close**' and perform other tasks related to separate windows. In this section we will be discussing these in detail, as to how to control separate windows according to our needs.

When we open a program, file, or folder, it appears on the screen in a frame called a window. These windows are of two types as shown below–

1. **Program application window :** These **windows** are associated with application programs and their look and feel may vary across different application software. **Figure 5.3** shows the window of MS Excel 2007 which is a MS Office application program window.

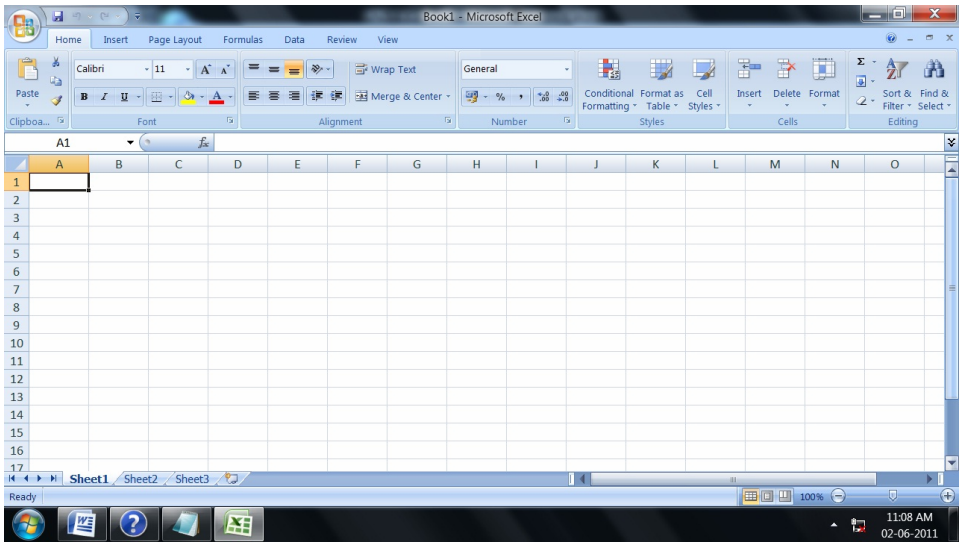


Fig. 5.3 : A program application window

2. **Folder window :** These windows are viewed when we browse through the different folders in a hierarchical order to work with different files and folders. A typical folder window is shown in **Figure 5.4** below.

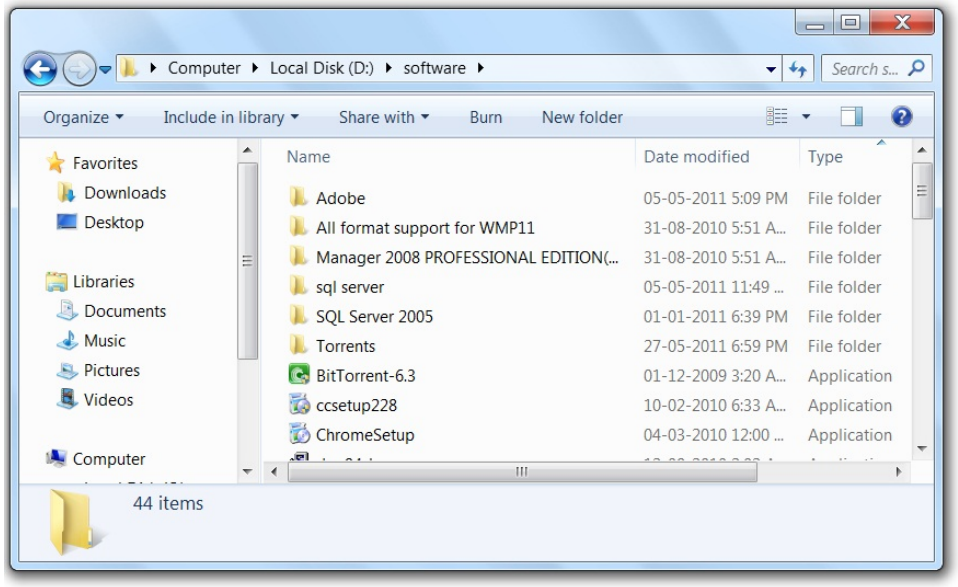


Fig. 5.4 : A folder window

Although program application windows and folder windows are used for different purposes, there are some features that are common between both the types.

- **Minimizing a window :** A window can be minimized by doing any one of the following :

- By clicking the minimize button. 
- With the keyboard shortcut **Alt** + (**space**) + **n**

On minimizing a window it disappears from the desktop and is visible only as a button on the taskbar as shown below.

MS Word as a Taskbar button

- **Restoring a window :** A window can be restored by doing any one of the following:
  - By clicking the restore button. 
  - By the keyboard shortcut + ↓
  - By the keyboard shortcut **Alt** + (**space**) + **R**
  - By dragging the window down from the top of the screen
  - By double-clicking the title bar

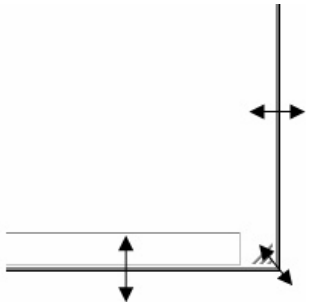
On restoring a window its size decreases from all the four sides but it does not get minimized.

- **Maximizing a window :** A window can be maximized by doing any one of the following:
  - By clicking the restore button. 
  - By the keyboard shortcut + ↑
  - By double-clicking the title bar
  - By the keyboard shortcut **Alt** + (**space**) + **X**
  - By dragging the window up against the top of the screen

On maximizing a window it gets maximized to its full size covering the entire desktop.

- **Moving a window :** A window can be moved only when it is in a restored position by doing any one of the following:
  - By clicking on the title bar of the window and dragging it to the position we want
  - By the keyboard shortcut **Alt** + (**space**) + **M.** We have to then use the arrow keys to position the window accordingly, and finally we press the **Enter** key when positioning is done.

- **Resizing a window** – A restored window can be resized by following these steps:
  1. Firstly we point to any of the window's borders or corners.
  2. When the mouse pointer changes to a two-headed arrow, we drag the border or corner to shrink or enlarge the window.



Fig; 5.5 : Resizing a window

- **Closing a window :** A window can be closed by doing any one of the following:
  - By clicking the close button located in the upper-right corner
  - By pressing **Alt** + **F4**
  - By double-clicking the upper-left corner of the window
  - By using the keyboard shortcut **Alt** + (**space**) + **C**
  - By right-clicking the window's taskbar button, and then choosing **Close**
  - By right-clicking the title bar and choosing **Close**
  - By choosing **File** > **Close**

5.4.4 The Start Menu and Taskbar

The START menu : The Start menu as in **Figure 5.6** is the first doorway to a computer's programs, files folders, settings etc. In other words, it provides the users an entry-point wherefrom they can START using a computer and access all its resources. We can use the Start menu to perform many activities like start different programs, open commonly used folders, search for files, control computer settings, get help with the Windows operating system, turn off the computer, log off or switch user accounts etc.

- To open the Start menu, we may do any one of the following:
  - Click the Start button  in the lower-left corner of the screen.

    OR
  - Press the Windows logo key on the keyboard

The Start menu is split down the middle into two columns :

1. **Left** column (white) : At the top and above the thin divider line is the **pinned items** list, which the user can modify. It lists programs, folders, documents and everything else that we need to open quickly. This list never changes unless we change it. Below the fine line is the standard Window's **most frequently used programs** list. This list is automatically computed by Windows and may change from day to day. At the very bottom is the **All Programs** list which includes a list of all the installed programs in the computer, plus the **search box**.
2. **Right** column (dark) : In general, the right side of the **Start menu** lists important places on the computer namely folders like documents, pictures and music or special windows like network, control panel, and computer.

At the bottom is the **Shut down** button, which turns the PC off. The button next to it offers several variation of '**off**' like '**log-off**', '**lock**', '**restart**', '**sleep**' and '**hibernate**'.

Search box : The search operation can find files, folders, programs and all sorts of documents that are in the computer. The moment we start typing in the **Search** box, we trigger Window's very fast computer search function. It also finds anything in the **Start menu**, thus making it a very quick way to pull up something without clicking through a bunch of sub-menus.

Fig. 5.6 : The Start menu

The Taskbar : The long horizontal bar that we can see at the bottom of the computer screen is the taskbar. It is divided into three main sections as illustrated in **Figure 5.7**.

1. The START button is at the extreme left of the taskbar and opens the Start menu.
2. The middle part contains the icons of the programs that are currently open. These icons make it easier to switch from one program to another.
3. The notification area at the extreme right includes a clock and icons (small pictures) that communicate the status of certain programs and computer settings.

Fig. 5.7 : The Taskbar

CHECK YOUR PROGRESS

Q.2. Fill in the blanks.

(i) _____ give quick access to frequently used programs, files, and folders.

(ii) When we _____ an icon, the corresponding window of that icon opens.

(iii) _____ can also arrange our icons automatically.

(iv) On _____ a window it disappears from the desktop and is visible only as a button on the _____.

(v) A window can be restored by double-clicking the _____.

Q.3. State whether the following statements are True or False.

(i) A window can be minimized by clicking the maximize button.

(ii) A window can be moved only when it is in a restored position.

(iii) We can open the start menu by clicking the start button.

(iv) The Start menu is split down the middle into three columns.

(v) The START button is at the extreme left of the taskbar.

5.4.5 Quitting Windows

After finishing our work on a computer, it is important to turn it off in a proper manner. Shutting down a computer in a recommended way saves energy and also helps to keep the computer more secure by making sure that our data is saved. If this is not done, all the

unsaved data will be lost forever. Therefore it is very important to shut down a computer in a proper manner.

- **To quit windows we should follow these steps –**
  1. Firstly, we need to save all the unsaved data
  2. Then we click the **Start** button
  3. The start menu opens up which includes the **Shut down** button
  4. When we click the **Shut down** button, we exit Windows and after sometime the entire computer comes to a halt, indicating that Windows was shut down successfully.

The button ▶ next to the **Shut down** button offers several variation of '**off**' like '**log-off**', '**lock**', '**restart**', '**sleep**' and '**hibernate**'.

Fig. 5.8 : Quitting Windows

Log-off : When we log off from Windows, all the running programs are closed, but the computer is not turned off. After logging off, another user can log on without restarting the computer. Also

we do not need to worry about losing our information if another user turns off the computer.

- **To do so we follow these steps :**

1. We click the **Start** button 
2. Then point to the arrow ▶ next to the **Start** button
3. From the menu we select the **Log off** option

Lock : This command locks the computer and hides the screen from view. By doing so we can protect our computer from any unauthorized use, because after locking a computer it can later be accessed only by providing the correct password by the person who provided it for locking the computer.

- **To do so we follow these steps :**

1. First we click the Start button 
2. Then we point to the arrow ▶ next to the **Start** button
3. From the menu, we select the **Lock** option

Switch user : This command comes into play when we have multiple accounts and need to switch users. When we select **Switch user**, somebody else can log into the computer using their respective name and password. Even though users switch their accounts, all their respective settings and open files remain intact and in the same position where they had left before switching their accounts.

- **To do so we follow these steps :**

1. We click the **Start** button 
2. Then we point to the arrow ▶ next to the **Start** button
3. From the menu we select the **Switch user** option

Restart : This command quits all open programs, and then quits and restarts Windows again automatically.

- **To do so we follow these steps :**

➢ First we click the **Start** button 
➢ Then we point to the arrow ▶ next to the **Start** button
➢ From the menu we select the **Restart** option

Sleep : Sometimes instead of shutting down the computer we can put it to the sleep mode, whereby the computer goes to sleep and the display turns off, and often the computer's fan stops. A light on the outside of the computer case blinks or turns yellow to indicate that the computer is asleep. The whole process takes only a few seconds.

Windows will remember what the computer was doing before going to sleep, there is no need to close our programs and files before the computer is set to sleep. But it is always recommended to save our work before putting the computer into any low-power mode. Later, when we turn on the computer (and enter a password, if required), the screen will look exactly as it did when the computer was turned off. To wake the computer, we may press the power button.

- **To do so we follow these steps :**
  1. Firstly we click the Start button 
  2. Point to the arrow ▶ next to the Start button
  3. From the menu select the Sleep option

5.5 CUSTOMIZING THE DESKTOP

We have already come across the concept of the desktop, the different components that constitute the desktop and the ways to use those components. In this section we will be dealing with some of the issues that relate to customizing the desktop. The desktop is the work area on a computer screen, similar to the top of an actual desk. The desktop contains the Recycle Bin and icons (shortcuts to programs, files, folders, and various types of documents such as letters, reports, or pictures) that we can arrange just like arranging real objects on a desk.

- **Customizing the desktop theme :** The Desktop theme is a combination of pictures, colors, and sounds on our computer which includes a desktop background, a screen saver, a window border color, and a sound scheme. Windows 7 comes with several themes that we may choose from.

These are –

- An Aero theme to personalize the computer
- The Windows 7 Basic theme.
- A High Contrast theme.

- **To choose a Windows theme we do the following –**
  1. Firstly we right-click a blank spot on the desktop
  2. From the pop-up menu, we click on **Personalize** which opens the **Personalize** control panel as in **Figure 5.11**
  3. There we find several pre-built themes to choose from
  4. Clicking on any of those themes applies that theme to the desktop world instantly

We may also change a theme's pictures, color, and sounds individually to create a customized theme by doing the following –

1. We first open the **Personalize** window of **Figure 5.9**
2. Then we select the theme that we want to customize
3. We do one or more of the following

- To change the background, we click **Desktop Background** and select the check box for the image that we want to use, and finally click **Save changes**.
- To change the color of window borders, we click **Window Color** and click the color we want to use. We may adjust the **intensity**, and then click **Save changes**.
- To change the sounds for the theme, we click **Sounds** and change sounds in the **Program Events** list under the **Sounds** tabs. Finally we click **OK**.
- To add or change a screen saver, we click **Screen Saver**. Then we click an item in the Screen saver list and change any settings that we want, and finally click **OK**.

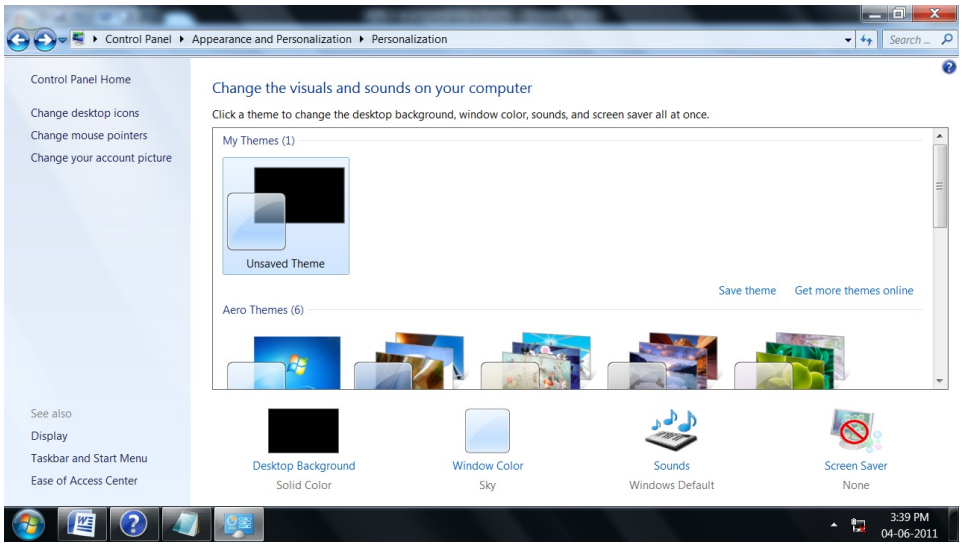


Fig. 5.9 : The Personalize window

- **Customizing the desktop background (**wallpaper**) :** The desktop background (wallpaper) can be set as any picture, or we can display a slide show of pictures. To change the desktop background we do the following:
  1. We open the **Personalize** window of **Figure 5.9**
  2. Then we click on **Desktop Background** which opens the window as in **Figure 5.10**
  3. We click the picture or color we want as our desktop background. If the picture we want is not in the list of desktop background pictures, we may click an item in the **Picture location** list to see other categories, or click **Browse** to search for the picture on the computer. On finding the picture, we double-click it to apply it as the desktop background.
  4. Under **Picture position**, we click the arrow and choose whether to crop the picture to fill the screen, fit the picture to the screen, stretch the picture to fit the screen, tile the picture, or center the picture on the screen, and then click **Save changes**.

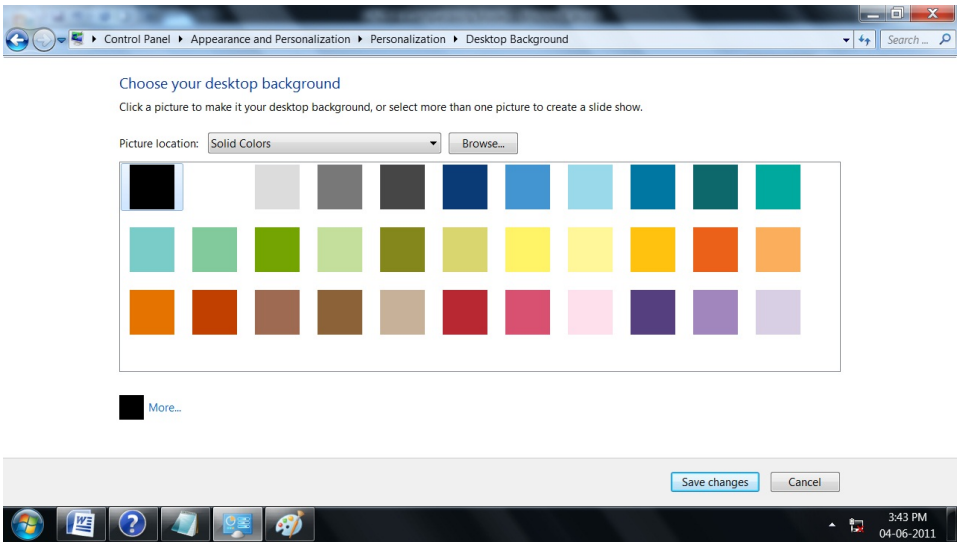


Fig. 5.10 : Desktop Background

Customizing the Start menu : If we customize the Start menu according to our needs, it becomes easier for us to find our favourite programs and folders.

- **Pin a program icon to the Start menu :** When we use a program very often, it can be useful to create a shortcut to it by pinning the program icon to the Start menu. These program icons appear on the left side of the Start menu.

  To do so we do the following :

  - We right-click the program icon that we want to pin to the Start menu
  - Then click **Pin to Start Menu**.

  (**Tip**: *To unpin a program icon, right-click it and click Unpin from Start Menu*)

- **Remove a program icon from the Start menu :** When we remove a program icon from the Start menu, it does not remove it from the All Programs list or uninstalls the program.

  To do so we do the following :

  1. First we click the **Start** button
  2. Then we right-click the program icon we want to remove from the Start menu
  3. Finally we click **Remove from this list**

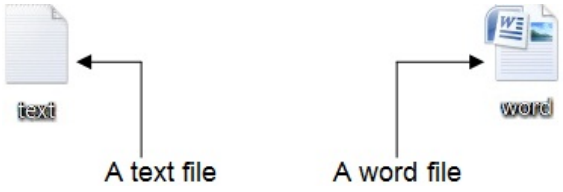
- **Move the Start button :** The **Start** button is located on the extreme left of the taskbar. Though we cannot remove the Start button from the taskbar, we can of course move the taskbar — and the Start button along with it.

  To do so we follow these steps :

  1. Firstly we right-click on empty space on the taskbar. In case **Lock the taskbar** has a check mark beside it, we uncheck it.
  2. Then we click an empty space on the taskbar, and holding down the mouse button we drag the taskbar to one of the four edges of the desktop. When the taskbar is where we want it, we release the mouse button.

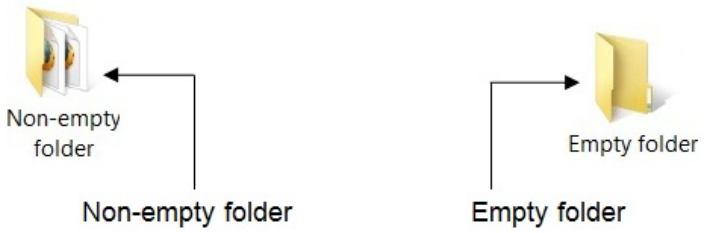
5.6 FILES AND FOLDERS

Files : Files in a computer are items containing varied sorts of information. Files can be of various types - e.g. text files, music files, video files, image files, sound files etc. Files are represented by icons, thus making it easy to recognize a type of file by looking at its icon. A file icon often represents the application program that can open the file. The following are some common file icons:



Folders : A folder acts as a container that can be used to store files. Folders in a computer are used to store files in an organized way. When there are too many files of different types all related to different purposes, folders can be of big help in organizing those files. This can be achieved by having different folders to store different types of files.

Folders may also store other folders, and in such cases a folder located inside a folder is called a subfolder. We may keep on creating many such subfolders, each holding many files and additional subfolders. Following are two folder icons.



- **The parts of a window :** Every time we open a folder, we see it in a window having various parts which help us to navigate around Windows or work with files and folders. Here is a typical window with each of its parts described below:

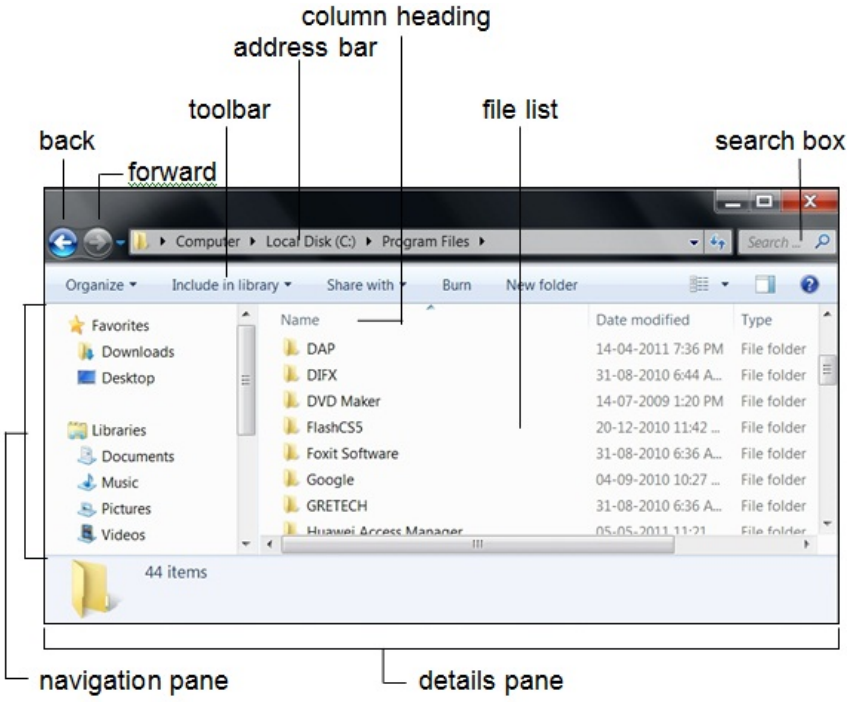


Fig. 5.11 : Windows Files and Folders Explorer

Navigation pane : We can use this pane to access libraries, folders, saved searches, and the hard disks. The Favorites section is used to open the commonly used folders and searches. The Libraries section can be used to access our libraries. The Computer folder also enables us to browse folders and subfolders.

Back and Forward button : These two buttons are used to navigate other folders or libraries without closing the current window. If we use the address bar to change folders, we can use the Back button to return to the previous folder.

Toolbar : The toolbar is used for some common tasks, like changing the appearance of files and folders, burning CDs, or starting a slide show. The buttons of the toolbar change to show only the tasks that are relevant. That is, a toolbar for a picture file would be different from the toolbar of a music file.

Address bar : This is used to navigate to a different folder or library or to go back to a previous one.

Column headings : We use these to change the organization of files in the file list. We may click the left side of a column heading to change the order in which the files and folders are displayed, or click the right side to filter the files in different ways.

File list : The file list displays the contents of the current folder or library. In case we type in the search box to find a file, only the files that match the current view will appear.

Search box : We type a word or phrase in the search box to search an item in the current folder or library. As we begin typing the first letter, the searching process begins — that is typing "A" will display all files with names starting with the letter A in the file list.

Details pane : The details pane is used to see the most common properties associated with the selected file, like the author, the modification date, and other descriptive tags added to the file.

- **Viewing and arranging files and folders :** We can change the appearance of files in a window when we open a folder or libraries that contain them. For example, we can use the Views button I in the toolbar to switch between larger or smaller icons, or a view that shows different information about each file. Clicking the left side of the **Views** button changes the display of files and folders by cycling through five different views :
  - **Large Icons**
  - **List**
  - **Details**, shows several columns of information about the file
  - **Tiles**
  - **Content**, shows some of the content from within the file.

On clicking the arrow on the right side of the **Views** button, we see the **Figure 5.12**. Moving the slider up or down changes the size of the file and folder icons.

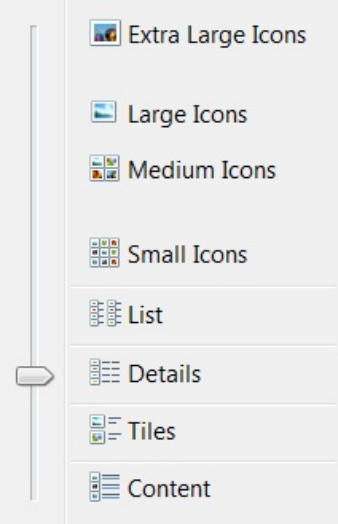


Fig. 5.12 : The views options

- **The search box :** The search box located at the top of every window is used to search for a file.

  To do so we follow these steps :

  1. We open the folder or library that is the starting point for the search.
  2. Then click the search box
  3. As we type the name in the search box, it filters the current view based on the typed text.

  Files are displayed as search results if our search term matches the file name, tags or other properties, or even the text inside a text document.

- **Copying and moving files and folders**

  While working with several files and folders, we may sometimes need to copy and move them between different locations.

  To do so we follow these steps :

  1. Firstly we select the file to be copied. To select multiple files we use **Shift + Arrow** keys OR **Ctrl + click**.
  2. We right-click on them and choose **Cut/Copy**, or press **Ctrl + C** to copy, **Ctrl + X** to cut

OR

From the **Organize** button we select **Cut/Copy**

3. Open the destination where the file/folder has to be **Pasted**
4. **Right-click** and choose **Paste**

   OR

   From the **Organize** button select **Paste**

   OR

   Press **Ctrl + V**

CHECK YOUR PROGRESS

Q.4. Fill in the blanks.

(i) Shutting down a computer in a recommended way saves _____.

(ii) When we log off from Windows, all the running programs are _____, but the computer is not turned _____.

(iii) The _____ command comes into play when we have multiple accounts and need to switch users.

(iv) The Desktop _____ is a combination of pictures, colors, and sounds.

(v) The desktop _____ can be set as any picture.

(vi) When we use a program very often, it can be useful to create a shortcut to it by pinning the program icon to the _____.

Q.5. State whether the following statements are True or False

(i) When we remove a program icon from the Start menu, it removes it from the All Programs list.

(ii) We can remove the Start button from the taskbar.

(iii) Folders in a computer are used to store files in an organized way.

(iv) Folders cannot store other folders.

(v) Address bar is used to navigate to a different folder.

(vi) The details pane is used to see the most common properties associated with the selected file.

5.7 LET US SUM UP

- Windows 7 is technically an ***evolution*** of Windows Vista in terms of stability and security.
- The hardware requirements of Windows 7 are ***lower*** than that of Windows Vista.
- The ***desktop*** is the first thing that we get to see when we start Windows.
- ***Icons*** are small pictures that represent files, folder and programs.
- ***Folder application windows*** are used to view and browse through folders.
- The ***start menu*** is the first gateway to a computer's programs, files, folders etc.
- The ***search operation*** can find files, folders, programs and all sorts of documents that are in the computer.
- The ***restart command*** quits all open programs, and then quits and restarts Windows again automatically.
- We can ***customize*** the look and feel of the desktop according to our preferences.
- ***Files*** in a computer are items containing varied sorts of information.
- A ***folder*** acts as a container that can be used to store files.

5.8 FURTHER READINGS

- David Pogue : Windows 7 – the missing manual. O Reilly.

5.9 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : (i) true, (ii) true, (iii) true, (iv) false, (v) true.

Ans. to Q. No. 2 : (i) Icons, (ii) double-click, (iii) windows, (iv) minimizing, taskbar, (v) title bar.

Ans. to Q. No. 3 : (i) false, (ii) true, (iii) true, (iv) false, (v) true.

Ans. to Q. No. 4 : (i) energy, (ii) closed, off, (iii) switch user, (iv) theme, (v) background, (vi) start menu

Ans. to Q. No. 5 : (i) false, (ii) false, (iii) true, (iv) false, (v) true, (vi) true

5.10 MODEL QUESTIONS

Q.1. Explain any five important features of Windows 7.

Q.2. What are Windows components? Give examples.

Q.3. What are icons? What are the steps of moving icons?

Q.4. Explain briefly the types of Windows. How do we close, minimize, move and resize a window?

Q.5. What is the Windows 7 Start menu? Explain its parts.

Q.6. How do we restart, log-off and lock a computer.

Q.7. How can we customize the start menu?

Q.8. Describe the different parts of the Window Explorer.

UNIT 6 : LINUX OPERATING SYSTEM

UNIT STRUCTURE

6.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- know about the Free and Open source
- understand the advantages and disadvantages of Linux
- discuss the Booting process of linux
- know about Linux file system hierarchy
- various Linux command.

6.2 INTRODUCTION

In the previous unit, we have discussed the Windows operating system. In this unit we are going to discuss the Linux operating system.Windows operating system is not free and we need to buy in order

to use.In addition Windows hides the detailed working of the Operating System from the user and it will not allow the users to see or modify the source code. But in case of Linux Operating system it is completly free and the source code is available for free to use or modify. The advantages of linux operating are: Better Security, Freedom to use ,it is free, Multitasking,Flexibility ,Stability etc.

In the following section we are going to discuss about the Open Source and Free Software as well as the Path concept and various Linux commands.

6.3 OPEN SOURCE AND FREE SOFTWARE

Free software is the software that can be used,modified or studied without restriction. It is generally available without charge, but it can also have a fee, such as in the form of distribution medium like CD or DVD etc.

The free software movement was conceived in 1983 by Richard Stallman to satisfy the need for and to give the benefit of software freedom to computer users.The definition, written by Richard Stallman, is still maintained today and it states that software is free software if the software have the following four freedoms:

- To run the program for any purpose.
- To study how the program works, and change it to make it do what you wish.
- To redistribute copies so you can help your neighbor.
- To improve the program, and release modified versions to the public, so that the whole community benefits.

Free Software and Open Source have more or less the same aims but differ in their philosophy and values. The fundamental difference between the two movements is in their values, their ways of looking at the world as mentioned by GNU Foundations.

For the Open Source movement, non-free software is a suboptimal solution. For the Free Software movement, non-free software is a social problem and free software is the solution.

Open-source software is computer software that is available in source code form provided under a software license that permits users to study, change, improve and also to distribute the software.

6.4 ADVANTAGES OF LINUX

There are various advantage of Linux over Windows Operating as described below:

Cost : Linux is compleley free Operating System and we can modify or re-disrtibute the source code without any restrictions. However Windows is not free and we have to pay for using it.

Multi User interface : Linux is multi user system .i.e. more than one user can interact with the linux system. But Windows is single user system that can interact at a time.

Security : The security aspect of Linux is much stronger than that of Windows.

6.5 DISADVANTAGES OF LINUX

Understanding : It is not so easy to understand the Linux operating clearly. We have to give much care while learning the Linux system.

Alternative Software : There are still some applications that exist on Windows that have no equivalent Linux application.

Compatibility : Though the kernel contributors and maintainers work hard at keeping the kernel up to date to make it compatable with all hardware, sometimes we can find third party applications, sometimes we can't.

6.6 LINUX BOOTING PROCESS

Booting is a bootstrapping process that starts operating systems when the user turns on a computer system.Before going to the booting process of linux lets take a look at the general booting process of a machine.

Booting Sequence :

a. Turn On the PC

b. CPU jump to address of BIOS

c. BIOS runs POST (Power-On Self Test)

d. Find bootable devices

e. Loads and execute boot sector from MBR(Master Boot Record)

f. Load the OS to RAM

BIOS (Basic Input Output System) refers to the software code run by a computer when first powered on.Master Boot Record, a small program that is executed when a computer boots up and typically, the MBR resides on the first sector of the hard disk.The main function of POST is to check whether all the hardware component are working properly or not and report the errors if any to the users.

After the POST operation as described above, BIOS loads and execute the partition boot code from the designated boot device which contains phase 1 of a Linux boot loader.Phase 1 loads Phase 2 boot loader.The boot loader often presents the user with a menu of possible boot options. It then loads the operating system. Then call the start_kernel() which performs the memory management, device initialization etc and start the init process. The init process starts all the non-operating system services and provides the user with a login screen.

In summary,

– BIOS loads the Phase1 boot loader
– Phase 1 boot loader start Phase 2 boot loader
– then start-kernel() function is called
– init process starts
– init starts all non-operating system services and presents users with login screen.

6.7 LINUX FILESYSTEM HIERARCHY

One interesting thing about Linux is that everyting is treated as either a file or directory.Even the hardware is considered a file which is stored in the /dev directory.Linux dosen't use drive letters to distinguish between different partitions and devices. the "root" is deonted as / whereas in Windows it would most probably be C:

Drives in linux are “mounted” to the specific directories(e.g /mnt/ pen_drive, you need to create **pen_drive** directory) where their data can then be accessed, So for instance, if you need to use your thumbdrive, you would plug it into your computer and then mount it using the “mount” command, which specifies the path to the device.

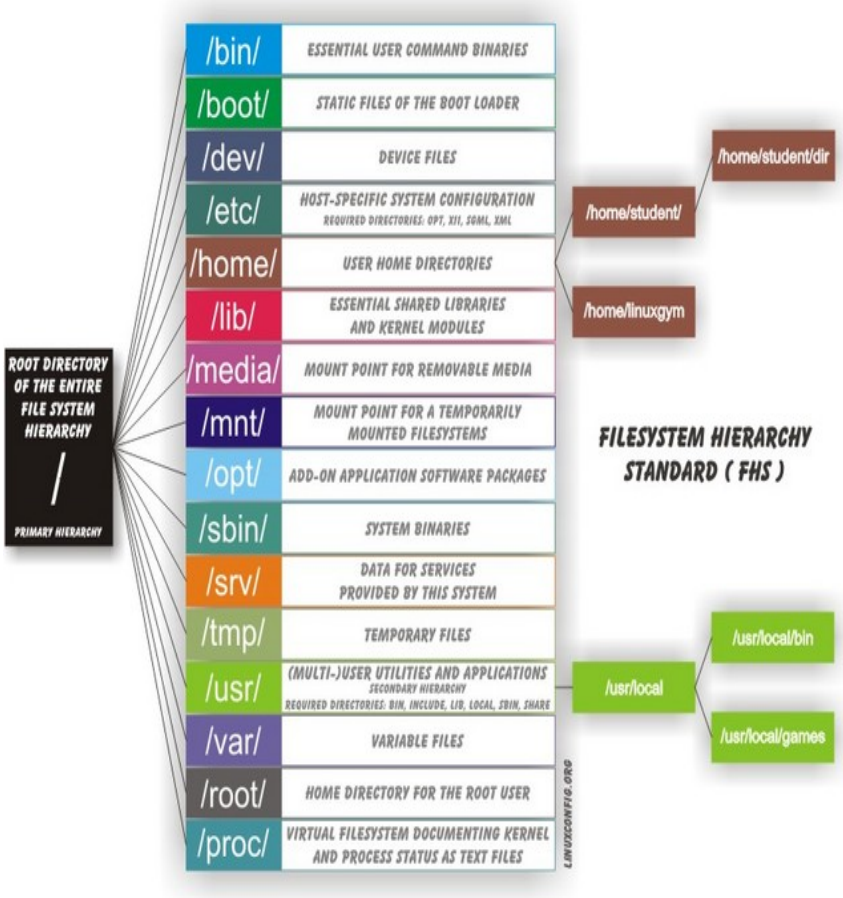


Fig. 6.1

The image above shows the linux filesystem hierarchy and is described in brief below:

/

this is the root folder, all other folders come under root.We can consider it as C: drive in a Windows context.

/bin

this folder contains all the user-essential binaries programs .e.g cp, ls etc.

/boot

It contains configuration files and other necessary files that are needed by the bootloader

/dev

This folder contains device files.

/etc

This folder contains all the configuration files used by the system.

/home

This contains the home folders of all the normal users on the system.

/lib

It contains software libraries

/media

This is a mount point for removable devices

/mnt

This is a temporary mount point

/opt

This folder contains add on software

/sbin

This folder contains binaries that can only be run as the root user

/tmp

This folder contains temporary files that are erased upon reboot

/usr

This folder and its subfolders contains user installed programs and utilities and libraries

/var

This folder contains files that change a lot. e.g contains log files.

/root

This folder contians the root user's files

/proc

This folder contains information about the Linux kernel and hardware that is updated in realtime.

Linux supports numerous file system types as described below in brief:

Ext2 : It uses the concepts of blocks, inodes and directories.

Ext3 : It is the enhanced version of ext2 file system with journalling capabilities. Journalling allows fast file system recovery.

Sysfs : It is a ram-based filesystem initially based on ramfs. It is used to exporting kernel objects so that end user can use it easily.

Procfs : The proc file system acts as an interface to internal data structures in the kernel. It can be used to obtain information about the system and to change certain kernel parameters at runtime using sysctl command.

6.8 THE MAIN COMPONENT OF LINUX OPERATING SYSTEM

The Linux operating system is made up of three parts; the kernel, the shell and the programs.

The kernel : The kernel is the hub of this operating system. We can consider it as a bridge between applications and the actual data processing done at the hardware level.

The main function of kernel includes memory management, device management,process management etc.

The Shell : It acts as an interface between the user and the kernel. Shell is also known as command line interpreter. When the user types the command, shell executes the command according to the order of command.

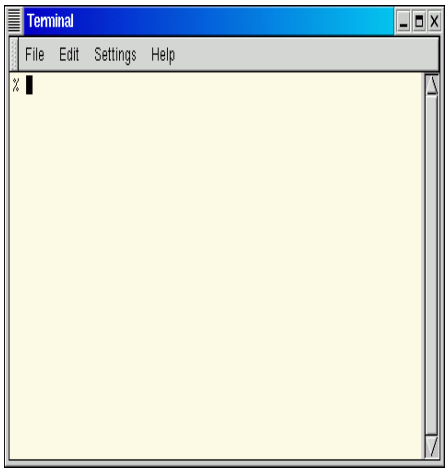


Fig. 6.2

Programs : This are the program used for general application like copying file using **cp**,creating directory **mkdir.** The shell provides the interface for such program.

6.9 CONCEPT OF PATH

In Linux, all file systems (Hard Disks, CD-ROMs, Floppy Disks, ZIP drives, network mounts, etc…) are “mounted” onto one logical tree. The top of the hierarchy is traditionally called **root** which is represented by a **/** (**slash**). In Linux, everything is treated as a file. A directory is a file. It is a file that contains a list of files and information belonging to those files. This would include things like who “owns” (created) the file, how long it is, and who can use it. Since a directory is simply a list of files, it can contain any file in it, including other directories.

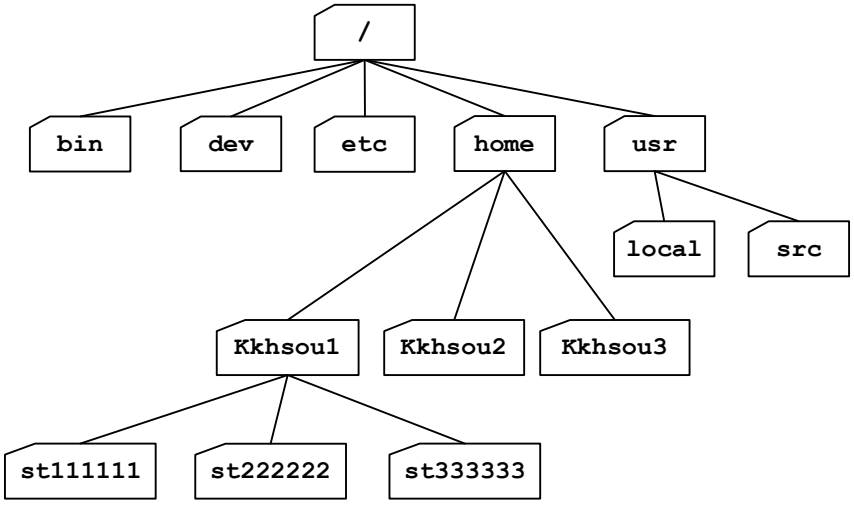


Fig. 6.3 : Part of file-system tree

You can specify a file or directory by its path name. There are two ways of expressing the path name: Full (absolute) path name or Relative path name. The full path name starts with the root. /, and follows the branches of the file system, each separated by /, until you reach the desired file.

However, a relative path name specifies the path relative to your current working directory. Relative path names are more convenient because they are shorter, but must be used with care. They never begin with / (slash). Now, we have to introduce two special directory entries:

- the current directory
- the parent directory

As an example, (Using the above diagram) assume that your current working directory (your current position in the file system) is **kkhsou1**:

1. A file named "**test.txt**" is placed inside the directory "**st111111**".
   The absolute (full) name is : ***/home/kkhsou1/st111111/test.txt***
   The relative name is : ***st111111/test.txt*** OR ***./st111111/test.txt***
2. A directory named "**DEC**" is placed inside the directory "**kkhsou2**".
   The absolute (full) name is : **/home/kkhsou2/DEC**
   The relative name is : **../kkhsou2/DEC**
3. A file named "**csh**" is placed inside the directory "**bin**".
   The absolute (full) name is : **/bin/csh**
   The relative name is : **../../bin/csh**
4. A directory named "**st123456**" is placed inside the directory "**kkhsou1**".
   The absolute (full) name is : **/home/kkhsou1/st123456**
   The relative name is : **st123456** OR **./st123456**

CHECK YOUR PROGRESS

Q.1. Write the purpose of the following directory in LINUX:

/var

/tmp

/proc

.....

.....

.....

Q.2. Mention the main component of LINUX.

.....

Q.3. Write the two the advantage of Linux.

.....

6.10 BASIC LINUX COMMANDS

Directory Handling Command :

ls (list) :

ls command is used to lists the contents of the current working directory.Also to list the hidden files we can use:

ls -a

The output of the above command will show all the files which name starts with dot(.). In Linux hidden file names are prefixed with dots(.).

Some other options along with its functions are given below .

Options	Purpose
ls -x	get multi-columnar output.
-r	list files and sub-directories in reverse order
-t	list files and sub-directories with time order.
-a	list all files, including the normally hidden files
-c	list files by inode modification time.
-i	list the inode for each file.
-l	display permission, owner, size, modification, time ect along with file and directory names.
-h	display names of hidden files
-q	display filenames having non-printable character.

mkdir (make directory) :

This command is used to create the directory. For example, to create a directory **data** we can use as **:**

Syntax : **mkdir data**

pwd (print working directory) :

To find out the absolute pathname of the currently working directory use the following command:

Syntax : **pwd**

cp (copy)

Syntax : **cp file1 file2**

It makes a copy of file1 in the current working directory and calls it file 2**.**

rm (remove), rmdir (remove directory) :

Syntax : **rm test.c**

rmdir software

rm command is used to delete a file (here test.c) and rmdir is used to delete a directory (here software).

cd :

Syntax : **cd test** (where soft is a directory)

This command is used to change the directory.

Important Command :

cat (concatenate)

Syntax : **cat hosts**

The command cat can be used to display the contents of a file on the screen.

less :

Syntax : **less text1.txt**

The command **less** writes the contents of a file onto the screen a page at a time.

head :

Syntax : **head kkhsou.txt**

The head command writes the first ten lines of a file to the screen.

tail :

Syntax : **tail science.txt**

The tail command writes the last ten lines of a file to the screen.

grep :

Syntaz : **grep kkhsou text1.txt**

It searches files for specified words or patterns.For example the above command searches the word ‘kkhsou’ in ‘text1.txt’ files.

wc (word count) :

Syntax : **wc -w text1.txt**

wc -l text1.txt

wc command with -w as shown in above is used to count number of words in a particular file. Also with –l option in wc can be used to count the number of lines in a particular file.

who :

Syntax : **who**

madhu tyy01 03:45

The **who** command can also tell you who is logged in at the terminal you're using.

date :

date

Tue Nov 4 13:39:24 EST 1997

This command is used to display the current date and time of the system.

cal :

This command is used to see the calendar of any specific month, or a complete year. If we wish to see the calendar for the month of December of the current year, we can provide this as applying the following cal command:

cal dec

December 2008

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	2	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

echo :

This command is used to display a message on the screen or to display the content of a variable. For example,

echo “Well Come to KKHSOU”

To display the content of a variable, we can also use echo command. time.

x = 30

echo $x

passwd :

The **passwd** command is used to change passwords.Changing password for sysadmin.

passwd sysadmin

(current) UNIX password:

Enter new UNIX password:

Retype new UNIX password:

REDIRECTION : We use the > symbol to redirect the output of a command. For example, to create a file **kkhsou.txt** with a list of student name we can use the following command:

cat > kkhsou.txt

(Then type the student name :)

Jitu

Gunajit

Sonabar

^D (Control D to stop)

The output of the above command is the successful creation of the file **kkhsou.txt** with contents having student name as typed above.

If we use the **>>** as:

cat >> kkhsou.txt

(and then type the name)

mukalmua

nalbari

^D (Control D to stop)

Then the content typed later is appended to the file **kkhsou.txt**. So we can say >> appends standard output to a file.

In the previous section, we have described the redirection of the output of a command to file.We can use '<' to redirect the input to a command. For example, if the file **kkhsou.txt** contains the following content:

c

b

a

the output of the command: **sort < kkhsou.txt** will be:

a

b

c

6.11 FILE PERMISSION

There are three types of file access: Read, Write and Execute. Each file belongs to a specific user and group.Access to the files is controlled by User, Group, and Other. The term, 'other', is used to refer to someone who is not the user (owner) of the file, nor is the person a member of the group the file belongs to.

There are 10 characters that are shown on the left that indicate type and permissions of the file. File permissions are shown according to the following syntax example : **d rwe rwe rwe**

There are a total of 10 characters in all Linux files as seen in the above example. The first character indicates the type of file, and the next three indicate Read, Write, and Execute permission for each of the three user types, User, Group and Other.

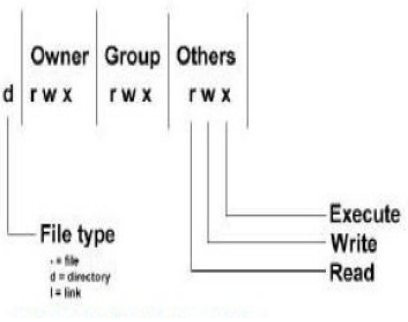


Fig. 6.4

Type as '**ls -l**' in the terminal you can see like :

drwxrwxrwx	4	debajit	grp1	122	Dec 1 18:02	kkhsou
-rw-rw-rw-	1	debajit	grp1	1873	Aug 21 08:34	test
-rw-rw-rw-	1	debajit	grp1	1234	Sep 14 11:13	data

last modification date

Size in bytes

file name

File's Group

File's Owner

Links

Fie type and permission field

Type field : The first character in the field indicates a file type of one of the following:

d = directory

l = symbolic link

s = socket

p = named pipe

– = regular file

c = character (unbuffered) device file special

b = block (buffered) device file special

Links : The number of directory entries that refer to the file. In this example the number is 4.

Let us discuss **chmod** command which is used to change the permission of a file or directory.

chmod : In order to change these default permissions and set your own, **chmod** command is used. Only the owner of a file can change the permission on that file.

The syntax of chmod is:

chmod category operation permission filename

Here the argument *category* specifies the user's access. The argument *operation* specifies whether the permission is to be granted or denied. The argument *permission* specifies the type of permission.

The different values for these arguments are listed in the following table :

Category	**Operation**	**Permission**
u (owner)	+ (assign)	r (read)
g (group)	– (deny)	w (write)
o (other)	= (absolute assignment)	x (execute)
a (all)		

Table : Values of chmod argument

In the first argument we supply one or more of a (all), u (owner), g (group) and o(other). Then we specify whether we are adding right (+) or taking them away (-). Finally we specify one or more od r (read), w (write) and x (execute) permissions.

The file permissions bits include an execute permission bit for file owner, group and other. When the execute bit for the owner is set to "s" the set user ID bit is set. This causes any persons or processes that run the file to have access to system resources as though they are the owner of the file.

Changing Ownership : There are two commands that can be used to change the Some Examples:

ownership of a file or directory. These are:

(**a) chown**

(b) chgrp

For example, to grant the ownership of a file test1 to John, we can use:

$ chown john test1

The command **chgrp** changes the group ownership of the file. This command , like chown, can only used by the owner of the file, irrespective of whether the user belongs to the same group or not.

Some examples :

chmod +s kkhsou.txt

sets the user ID bit on the file "kkhsou.txt". The command:

chmod g+s kkhsou.txt

sets the group ID bit on the file "kkhsou.txt".

chmod u+x kkhsou.doc

Gives the user execute permission on kkhsou.doc .

chmod +x kkhsou.doc

Gives everyone execute permission on kkhsou.doc.

chmod ugo +x kkhsou.doc

Gives execute permission to user, group and other.

chmod 400 kkhsou.doc

Gives the user Read permission, and removes all other permission.

Permission is also denoted by the numbers as mentioned below:

Read permission : 4

Write permission : 2

Execute permission :1

chmod 764 kkhsou.doc

Gives user full access(4+2+1=7), Group Read and Write access(4+2=6), and other Read access(4).

chmod 751 kkhsou.doc

Gives user full access(4+2+1=7), Group Read and Execute permission(4+1=5), and other, Execute permission(1).

6.12 TEXT EDITOR vi:

The **vi** editor is a screen-based editor and it is the most powerful text editor available in almost all UNIX and LINUX systems. The **vi** editor has powerful features to aid programmers, but many newvies avoid using the different features that overwhelm them. Operating **vi** editor is entirely different from that of any modern simplified editor that you are familiar with. This editor has remarkable editing capabilities. It is rather a very simple editor, if all the elementary **vi** commands are at your finger tips.

LINUX features a number of vi editors, of which **vim** (vi improved) is the most common. Apart from vim, there are **xvi**, **nvi** and **elvis** which have certain exclusive functios not found in the Berkeley version.

Three Modes : The three modes of vi editor are:

(a) Command Mode

(b) Input Mode

(c) Ex Mode

Command Mode : Command Mode is the mode where you will be giving commands to the vi editor. When you invoke vi, this is the mode where you will be placed initially.

Input Mode : When you give the commands i, I, a , A, R, s, S, or O then you get shifted to the input mode of vi editor. It is also known as insert mode or editing mode. In this mode you can add text to the file. For example, when you want to insert text at the current cursor position, give i in the command mode. you will now get placed in the input mode and you can perform the intended mode. For example, if you type ‘a’ here it will not be interpreted as an ‘append’ command, but as character ‘a’ to be inserted in the file.To move back to command mode press Esc key.

Ex Mode : Ex mode of vi editor enable us to give commands at the command line. To move to the ex mode, press ':'(colon) if we are in command mode. If we are in the input mode, forst press Esc key and then press':' to move to the ex mode. Cursor moves to the bottom of the vi screen and we can provide the ex mode commands here. Some impotant and common ex mode commands are given below:

Command	**Used to**
w	save the change we have made to the file
q	quit vi without saving changes
wq	save and quit
q!	force quit if'q' does nor work

Ex mode is named after the ex line-editor of UNIX or LINUX. The commands we give the ex mode are actually the ex line-editor's commands.

Invoking vi Editor :

$ vi test1

The file 'test1" will get opened in vi editor. If the file does not exist, vi will create a new file with that name. In either case we will see a screen full of the tilde'~' which indicates empty lines.

Remember that vi editor opens in the command mode. That means we are now in the command mode.Let us started by inserting some text in our file "test1". For that we will have to switch to the 'input mode' . We can see that to insert text 'i' command is used. Press 'i' and type the following text.

Saving Text and Quitting *vi* Editor : Having inserted the text, we now need to save these changes. To save the changes first press Esc key to move to command mode. Now press ':' to move to ex mode. Note that now the cursor has moved to the end of the screen. Type 'w' to save changes. If we want to quit vi type 'q'. We can also save and quit vi in one go by giving the command 'wq'.

Note : We can also save the file in the command mode by presenting Z (uppercase) twice, i.e ZZ.

When we quit vi, a note at the bottom of the screen indicates the name , number of lines and number of character in the file.

Editing File in *vi* : Invoke again the vi editor, by typing vi test1 at the command prompt. We will see the text we have typed followed by multiple empty lines, each starting with a '~' sign. The cursor appears at the beginning of the first line of the file. Let us first learn how we can move this cursor to a particular line or character.

Adding Text : Let us now append some text to the file. For this first move cursor to the last line of the file. Pressing 'G'(uppercase) will move the cursor to the beginning of the last line in the file. Additionally, you can precede 'G' with the line number where we want the cursor to move. For example , to move to 6th line then we type '6G'.

We can move to the beginning of a file by pressing '1G'. Now press 'o' to open a new line below this last line. By pressing 'o' we are in the 'input mode'.

Inserting Text in The Middle : If we missed any character(s) while typing, then move the cursor to that particular line or word. Press Esc key to move to the 'command mode'. Now press 'i' to insert the character(s) before the current cursor position or press 'a' to insert the character (s) after the current cursor position. 'A' will append text at the end of current line.

Replacing Text : Text character can be replaced with the 'r', 'R', 's' and 'S' commands. Before we use these commands switch to the command mode, if we are currently in the insert mode.

First move the cursor to the character which we want to replace. Pressing 'r' followed by a character replaces the existing character with the character given after 'r'.

To replace more than one character use 'R' followed by the characters. The existing text will get overwritten with these characters.The replacment of text with 'R' command is limited to the current line only.

To replace a character with multiple characters without overwriting the subsequent text, use 's' followed by the characters. 'S'(uppercase) replaces the entire line irrespective of the cursor position. That menas, it deletes the current line completely and makes it ready for a new line of text.Pressing 'R', 's' and 'S' shifts you to the 'input mode'. Press Esc key to move back to the command mode.

Deleting Text : To delete a character, first move the cursor to that particular character position. Press 'x' to delete a single character. We can also precede 'x' with the number of characters we want to delete. For example, '4x' will delete four characters. Note that the rest of the line gets adjusted automatically.

If we go on deleting all the characters in the current line, the characters to the left of the current line starts getting deleted, instead of that in the next line.

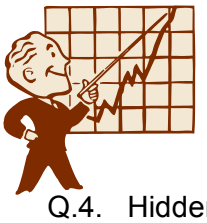
Note : To delete the current line press 'dd' . To delete more than one line use '#dd', where # represents the number of lines we want ot delete.

'X' (uppercase) is used to delete a character to the left of current cursor position. To understand it better, it can be said that 'x' functions like the delete key and 'X' funtion like the Backspace key.

Undoing and Repeating Commands : The repeat command (a dot(.)) can be used to repeat the most recent command. For example, if we have recently given the 'a' command and appended one character, we can repeat the whole process again by pressing a . (dot). We will have the character inserted two times.

The undo (u) command can be used to recover from the most recently committed mistake. For example , press u and we will see that the second character we have inserted using disappears.

Let us now save our file and quit vi editor, Rememeber to press Esc key to switch to command mode if you are not in it already and then use :wq to save the file and quit vi.



CHECK YOUR PROGRESS

Q.4. Hidden files in LINUX can be listed using

a. ls -t b. ls -h c. ls -a d. none of the above.

Q.5. In LINUX, the command to delete all files started with sg and ending with hj is

a. rm sg*hj b. rm sg?hj

c. rm -prefix sg -suffix hj c. none of the above.

Q.6. The LINUX command **rm -r project** will

a. delete the file project from the current directory.

b. delete all the files from the directory project and all its subdirectories.

c. recursively delete the directory project and all its subdirectories.

d. None of the above.

Q.7. UNIX can have

a. one file system only.

b. n file systems, if it had n hard disks.

c. any number of file systems depending upon the number of partitions.

d. none of the above.

Q.8. The UNIX command “ls | more” displays a list of

a. files in the current directory one line at a time.

b. files in the current directory one screen time

c. all the files in the current directory and then wait for the next command

d. none of the above.

Q.9. The UNIX ,full pathname originates from

a. your home directory b. the root directory

c. your working directory d. none of the above.

Q.10. The chmod command in UNIX

a. change the current execution status from user mode to kernel.

b. makes the file hidden so that it cannot be seen using the ls command.

c. changes the access permissions of a fileor directory.

d. none of the above.

Q.11. Which out of the following commands would you use to change your password in UNIX system.

a. pass b. passwd

c. chpass d. setpass

Q.12. The execute permission to a file allows a user to

a. execute the file b. edit the file

c. list the contents of the file d. none of the above.

Q.13. The chown command in UNIX changes the

a. home directory of a user

b. access permissions of a file or directory

c. priority of a process.

d. none of the above.

Q.14. Find out the TRUE and FALSE statements

i. The command pwd shows the name of the current directory.

ii. UNIX makes a distinction between the text files and the binary files.

iii. The command mv file1 file2 renames file1 as file2.

iv. The more command appends new lines to a file.

v. A binary file is also known as an ASCII file.

vi. The command rm * removes all files from the current directory.

vii. A file having protection 466 cannot be used by anybody other than the owner.

viii. Only the super user can view the passwordof a user in the file /etc/passwd file.

ix. chmod u-x gives the user permission for execution.

x. ls command is used to list the files and directories.

6.13 LET US SUM UP

- **Linux Command :** A command given to UNIX or LINUX is a series of characters that one type. These characters consist of words separated by white spaces. The first word is the command itself and the rest are the command's arguments. The arguments provide information that the command may need for its execution.

- **Internal commands :** Internal commands are such programs that are built-in into the operating system and reside in the memory along with the kernel.
- **External commands :** External commands are not built in into the operating system, but loaded from other program files.
- To create a new directory, use the mkdir command.
- You can change the working directory using the **cd** command
- The command **rmdir** followed by the directory name which is to be removed is used for deleting a directory.
- To list the names of the files and the sub -directories of the current directory, **ls** command is used. its function is equivalent to the **DIR** command in MS-DOS.
- To find which directory you're currently in, use the **pwd** (print work ing directory) command.
- To create a file, type the command **cat** at the shell prompt, followed by a > character and the filename.
- A file can be shifted or moved from one directory to another by using the **mv** command.
- The command **cp** is used to copy a file into another. MS-DOS equivalent for cp is ths COPY command.
- **more** command allows us to view the output one screen at a time.
- The **who** command can also tell you who is logged in at the terminal you're using.
- The **passwd** command is used to change passwords
- File and directory permissions fall into three main divisions. These are Read permission (r)**,** Write permission (w), Execute permission (x)
- In order to change these default permissions and set your own, **chmod** command is used.
- There are two commands that can be used to change the own -ership of a file or directory. These are:

  (**a) chown**

  (b) chgrp

6.14 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : /var: this folder contains those file that change frequently.

/tmp : contains temporary files that are erased upon reboot.

/proc: This folder contains information about the Linux kernel and hardware that is updated in realtim

Ans. to Q. No. 2 : Main components are Kernel, Shell and programs

Ans. to Q. No. 3 : Free Cost, Multi User Interface Supported and Good Security,

Ans. to Q. No. 4 : (c)

Ans. to Q. No. 5 : (a)

Ans. to Q. No. 6 : (c)

Ans. to Q. No. 7 : (c)

Ans. to Q. No. 8 : (b)

Ans. to Q. No. 9 : (b)

Ans. to Q. No. 10 : (c)

Ans. to Q. No. 11 : (b)

Ans. to Q. No. 12 : (a)

Ans. to Q. No. 13 : (d)

Ans. to Q. No. 14 : i. (T), ii. (F), iii. (T), iv. (F), v. (F), vi. (T), vii. (F), viii. (F), ix. (F), x. (T).

6.15 FURTHER READINGS

- UNIX concept & Applications, Sumitabha Das, TATA McGRAW HILL.
- Operating System Design and Implementation, Andrew S. Tanenbaum, Albert S. Woodhull, Prentice - Hall India.

6.16 MODEL QUESTIONS

Q.1. What is the difference between **cp** and **mv** commands? Explain with an example.

Q.2. Distinguish between:

(a) **cat** and **more** commands

(b) **tail** and **head** command

Q.3. List out the different options and significance of **ls**.

Q.4. A file has got a protection 756 (octal). What protections does it really have ?

Q.5. Explain how you can implemente the cut, copy and paste operations in vi .

Q.6. Give the syntax for opening a file in vi editor. Also explain the different options.

Q.7. How can you access ex commands in vi?

Q.8. Explain the booting process of Linux?

Q.9. What do you mean by Open Source and Free Software?

Q.10. Write two advantages of Linux?

UNIT 7 : MICROSOFT WORD-PART I

UNIT STRUCTURE

7.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- learn about MS-word
- create, save and print Word documents
- view an existing document
- open and close a new document
- learn about different bars of document window
- learn about formatting text
- work with paragraph
- include bullets and numbering
- learn about copy, cut, and paste
- find the mistakes and replace them with the appropriate words.

7.2 INTRODUCTION

Word Processor is a software package that enables us to create, edit, print and save documents for future retrieval and reference. Creating a document means typing by using a keyboard and saving it. Editing a document involves correcting the spelling mistakes, if any, deleting or moving words sentences or paragraphs.

In this unit, we will learn about a most commonly used word processing software, Microsoft Word which works in Windows operating system. Microsoft Word also known as MS-Word was developed by *Microsoft*. Microsoft introduced MS-Word in *Microsoft Office Program* along with other application programs. There are different versions of Microsoft Office like MS-Office. This unit will introduce learners with the basics of MS-Word 2003. Microsoft Word is a powerful tool which helps us to create documents like application forms, office letter, reports, resume writing, etc. With this unit, learners will also be acquainted with the method of inserting hyperlink, images, tables etc. to make their documents more attractive and understandable.

7.3 STARTING MS-WORD

While working in MS-Word, we can use a mouse. One can also work, to some extent, through the keyboard. The use of mouse is slightly simpler as it is fully menu driven.

There are two ways to open MS-Word.

1. We can start Microsoft-word by clicking left mouse button on **Start** → **Programs** → **Microsoft Word** as shown in the following screenshort:

Fig. 7.1 : Way to open MS Word through Programs

2. If a shortcut of MS-Word already exists in the desktop, the Double click on the Microsoft Word icon on the desktop.

Fig. 7.2 : MS-Word 2003 shortcut icon

7.4 DOCUMENT WINDOW AND ITS COMPONENTS

When we start MS-Word, a new document window appears on the screen as shown in Fig.7.3. There are many components of Document Window. Some of them are: title bar, menu bar, ruler bar, status bar, toolbars, text area etc.

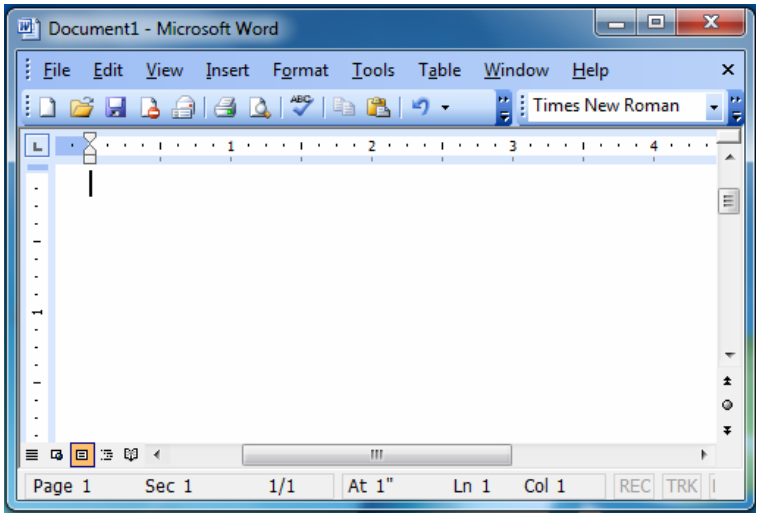


Fig. 7.3 : Document Window

7.4.1 The Title Bar

The Title bar displays a number of items about the currently active document. It displays the title of the document on which we are currently working. Word names the first new document we open *Document1*. As we open additional new documents, Word names them sequentially. When we save our document, we assign the document a new name. Title bar also contains ***Minimize*** button, ***Maximize/Restore*** button, and ***Close*** button.

Fig. 7.4 : The Title Bar

7.4.2 The Menu Bar

The Menu bar is generally found directly below the Title bar. The Menu bar displays the menu. Menu bar consists of nine drop-down

menues. Those are: *File*, *Edit*, *View*, *Insert*, *Format*, *Tools*, *Table*, *Window*, and *Help*. With the help of these menues, different functions can be performed like mail our document, use styling of text, insert picture, save our document etc. We can point with the mouse to a menu option and click the left mouse button to open a drop-down menu. We can then use the left and right arrow keys on the keyboard connected to or computer to move left and right across the Menu bar options. We can use the up and down arrow keys to move up and down the drop-down menu.

Fig. 7.5 : The Menu Bar

A right arrow after a menu item signifies additional options as shown in the following screenshot (Fig.7.6); if we select that menu item, another submenu appears.

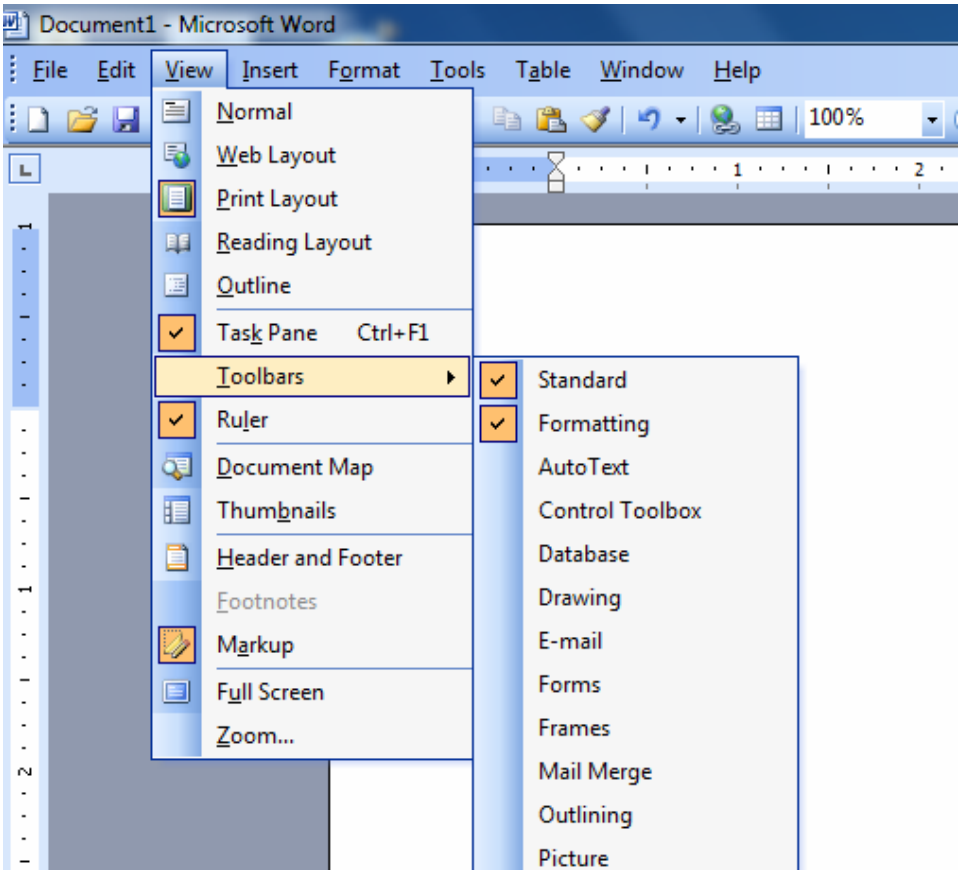


Fig. 7.6 : The View menu showing right arrow & submenu

7.4.3 The Ruler

Ruler allows us to format the vertical alignment of text in a document. If the ruler is not visible, we can select the *Ruler* option from the *View* menu to display the ruler.

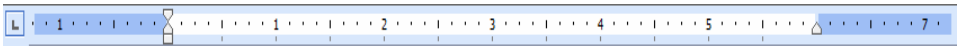


Fig. 7.7 : Ruler Bar

7.4.4 The Status Bar

Status bar shows the information about the current document on which we are working. It provides information like page number, line number, the number of words in our document etc. It appears at the very bottom of our document window.

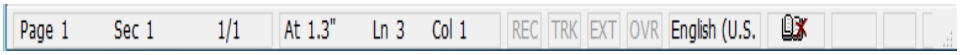


Fig. 7.8 : The Status Bar

7.4.5 The Text Area

The text area also known as workplace is the area in the document window where we enter the text. In Fig.7.3, the cursor, the vertical and horizontal scroll bar are labelled. The cursor marks the insertion point. As we type, our text displays at the cursor location. The vertical and horizontal scroll bars enable us to move up, down, and across our window simply by dragging the icon located on the scroll bar. We will not be able to see a horizontal scroll bar if the width of our document fits in our screen. To move up and down our document, we can click and drag the vertical scroll bar up and down. Again, to move back and forth across our document, we can click and drag the horizontal scroll bar back and forth.

7.4.6 The Toolbars

Toolbar contain buttons, drop-down menus and other controls. These are just the shortcuts to the menu items in the ***Menu*** bar. The

most commonly used toolbars are :

- ***standard toolbar***
- ***formatting toolbar***

If our document window is not showing the toolbars as shown below (Fig. 7.9) then we can view them by clicking the ***View*** menu and then selecting the *Standard* and *Formatting* options from the *Toolbars* submenu. This process is shown in Fig. 7.10.

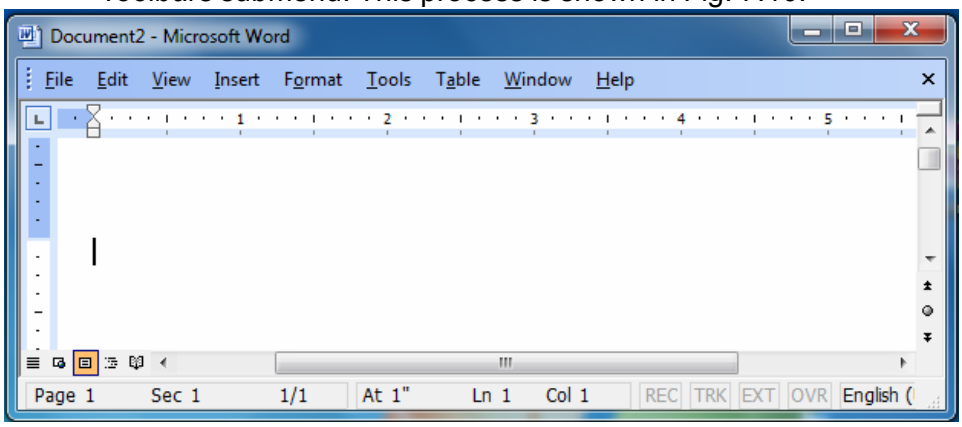


Fig. 7.9 : Document window without showing the toolbars

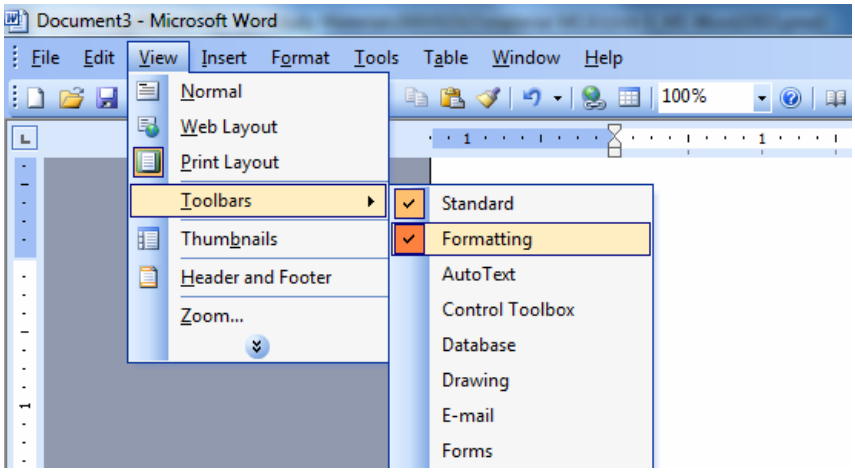


Fig. 7.10 : Document window with the View menu and Toolbars option

Standard Toolbar : Standard toolbar provides shortcuts for menu items. The left of the toolbar enables us to perform tasks common to many windows-based operations, such as opening a new file or existing file, saving or printing files, cutting and pasting of text, and undoing and redoing the most recent actions. The right of the standard toolbar offers some functions more specific to word application.

Fig. 7.11 : The Standard Toolbar

The buttons of standard toolbar with a brief description is listed below:

New Blank document : Opens a new Word document.

Open : Opens an existing saved Word document.

Save : Saves the current document.

E-mail : Sends the contents of the document as the body of the e-mail message.

Print : Open the print dialog box.

Print Preview : Shows how a file will look when we print it.

Spelling and Grammar : Starts the spell check functions.

Cut : Places selected text on the Windows Clipboard.

Copy : Places a copy of selected text on the Windows Clipboard.

Paste : Pastes the contents of the Clipboard on the document.

Format Painter : Enables us to copy formatting from one object to another.

Undo : undoes the last action.

Redo : redoes the last undone action.

Insert hyperlink : Inserts a link to a WWW site on the document.

Web Toolbar : displays the Web toolbar.

Insert Table : Inserts a word at the insertion point.

Insert Microsoft Excel Worksheet : Inserts an Excel worksheet with Excel tools available for editing.

Tables and Borders : Inserts a table and Borders toolbar.

Columns : Changes the number of columns in a document.

Drawing : Displays or hides the Drawing toolbar.

Document Map : Turns on or off Document map.

Show/Hide : Displays nonprinting characters such as tab characters, paragraph marks and hidden text.

Zoom : Allows you to zoom in or out to make the document screen larger or smaller.

Microsoft Office Word Help : Opens the Office Assistant or Help.

Formatting Toolbar : The Formatting Toolbar contain tools that are common to windows programs and related to formatting of text in documents. This includes changing document style, font, font type, color, paragraph alignments, borders etc.

Fig. 7.12 : The Formatting Toolbar

The names and functions of Formatting Toolbar are as follows:

Style : Opens a drop-down list for selection of style.

Font : Opens a drop-down list for selection of font.

Font Size : allows you to enter a new size for the selected text.

Bold : Toggles the text from bold to normal text.

Italic : Toggles the text from italic to normal text.

Underline : Underline the text.

Shadow : Applies a shadow effect to the selected text.

Left Alignment : Aligns selected text to the left.

Center Alignments : Aligns selected text to the center.

Justify : Aligns selected text at the left and right margins or indents.

Right Alignment : Aligns selected text to the right.

Numbering : Applies a numbering format to selected text.

Bullets : Applies a bullet list format to selected text.

Increase Indent : Increases spacing between selected lines of the text.

Decrease Indent : Decrease spacing between selected lines of the text.

Outside Border : Add or Remove a border around the selected text, paragraphs, pictures etc.

Highlight : Marks text so that it is highlighted.

Font Color : Formats the selected text with the color you click.

7.5 DOCUMENT VIEW

There are five views in MS-Word to display our document, which are: *Normal, Web Layout, Reading Layout*, *Online Layout* and *Print Layout*. Let us describe each of these views briefly.

Normal View : Normal view is used most often and shows formatting such as line spacing, font, point size, and italics.

Web Layout : Web layout view enables us to view our document as it would appear in a browser like Internet Explorer.

Reading Layout : Reading Layout view formats our screen to make reading our document more comfortable.

Outline View : Outline view displays the document in outline form. Headings can be displayed without the text. If we move a heading, the accompanying text moves with it.

Print Layout : The Print Layout view displays the document as it will look when it is printed.

7.6 CREATING A NEW DOCUMENT

We can create personal as well as professional documents with the help of MS-Word. We can type a document with the help of keyboard and save it to the hard disk of our system. Following are the steps to create our own document.

- Select the ***New*** option from ***File*** menu of the ***Menu*** bar.
- A dialog box appears on the right of the screen as shown in Fig.7.13. It shows different type of document we can create like Blank document, XML document, Web page and E-mail message etc.
- Click on ***Blank document*** link.
- A new blank document will be displayed.

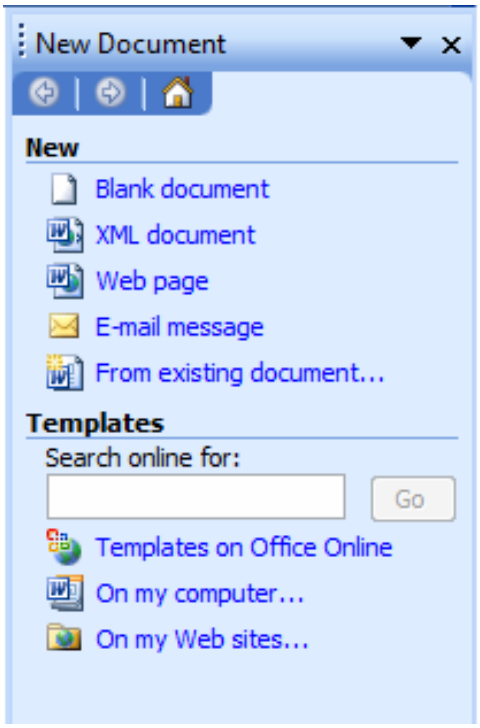


Fig. 7.13

7.7 SAVING A DOCUMENT

We need to store the document we created on the disk so that it can be used whenever required. Following are the steps for this process:

- Select the ***Save*** option from the ***File*** menu of the ***Menu*** bar.
- Enter a filename in the *File name box* and click on the ***Save*** button.

The first and second steps are depicted in Fig. 7.14 and Fig.7.15 respectively. In Fig.7.15, we can see that the file is saved with a file name "education" in the *My Documents* folder. There are another two methods for saving a newly created file. Those are:

- Keyboard shortcut: ***Ctrl + S***
- Clicking the ***save***  button from the *Standard tool bar*.

By default, the new document is saved as Word document with the extension "**.doc**". In the higher version of MS-Office like Windows 2007/ 2010, the default MS-Word file extension is "**.docx**".

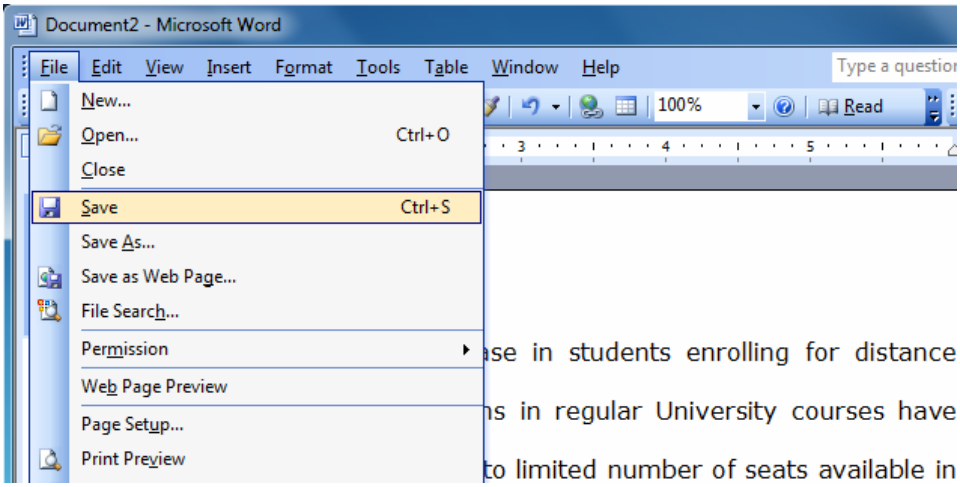


Fig. 7.14 : File Menu with showing the Save option

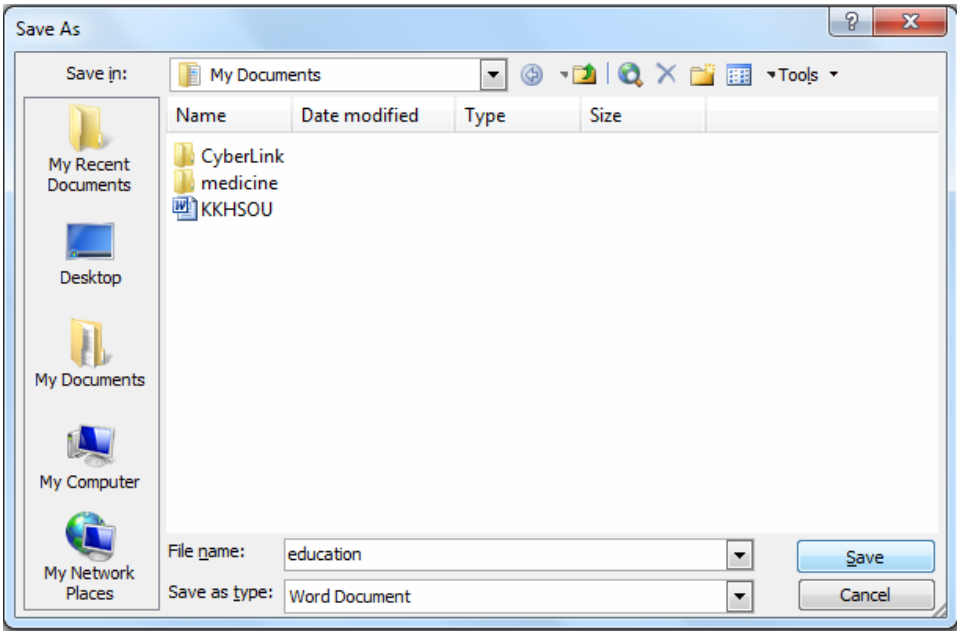


Fig. 7.15 : File Menu with showing the Save option

7.8 OPENING AN EXISTING DOCUMENT

In MS-Word, we can open any existing or previously saved documents for alteration or reading purpose. For opening an existing document or file, we have to:

- select the ***Open*** option from the ***File*** menu of the ***Menu*** bar.
- select the appropriate drive and folder.
- double click on the desired filename to open the document.

The keyboard shortcut for opening an existing document is **Ctrl+O**.

7.9 EXITING MS-WORD

To exit MS-Word, we have to:

- click on ***File*** menu
- click ***Exit***, which can be found at the bottom of the drop-down ***File*** menu.

If we have already entered text then we will be prompted with a message like "Do you want to save changes to Document1?" If we want to save, then we have to click on **Yes**, otherwise, we have to click on **No**. We have to specify the correct folder in the *Save As box* as discussed earlier.

LET US KNOW

During the unit, you will be asked to "click" items. When asked to click:

- Point to the item.
- Press your left mouse button once.

If you are asked to double-click an item :

- Point to the item.
- Quickly press your left mouse button twice.

If you are asked to right-click:

- Point to the item.
- Press your right mouse button.

CHECK YOUR PROGRESS

Q.1. How do you select text in MS-Word?

.....

.....

Q.2. How do you close MS-Word current document?

.....

.....

Q.3. How do you exit MS-Word?

.....

Q.4. Fill in the blanks:

(i) The name of the first document in MS-Word is _____.

(ii) The extension name of MS-Word 2003 and MS-Word 2007 documents are _____ and _____ respectively.

(iii) _____ shows how a file will look when we print it.

(iv) _____ bar consists of _____ drop-down menues.

(v) To view standard toolbar, we have to click _____ menu and then _____ option from the Toolbars submenu.

Q.5. Choose the correct option:

(i) The keyboard shortcut to save a file is

(a) Ctrl+S (b) Alt+F5

(c) Ctrl+V (d) Alt+S

(ii) The keyboard shortcut for opening an existing document is

(a) Ctrl+D (b) Alt+O

(c) Ctrl+O (d) Alt+F6

(iii) The keyboard shortcut for selecting all contents of a document

(a) Ctrl+S (b) Ctrl+A

(c) Ctrl+F2 (d) Ctrl+O

7.10 WORKING WITH TEXT

To enter text into a file in MS-Word, we simply type just as we would if we were using a typewriter. To capitalize, we have to hold down the ***Shift*** key while typing the letter. We do not need to press ***Enter*** key to start a new line; Ms-Word automatically wraps at the end of the line. To start a new parapraph, we have to press ***Enter*** key.

7.10.1 Erasing Text

Using the Backspace Key : The ***Backspace*** key erases text before the *cursor* position. On one press on the ***Backspace*** Key, only one letter is erased. Let us consider the following example:

Example 1 :

1. Type the text : *State Open University*
2. Suppose you have to erase the word “University”. Now using either the ***arrow*** keys or the mouse, place the *cursor* after the letter “y” in “University”
3. Press the ***Backspace*** key until the word “University” is erased.
4. After erasing the word University, the sentence will be:
   State Open

Using the Delete Key : The ***Delete*** key erases text after the *cursor* position. On one press on the ***Delete*** key, only one letter is erased. Let us consider the following example:

Example 2 :

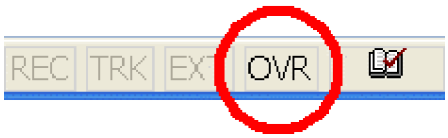
1. Type the following text:
   Indira Grandhi National Open University
2. Suppose you have to erase the word “Indira Gandhi”. Now using either the ***arrow*** keys or the mouse, place the *cursor* below the letter “I” in “Indira Gandhi”
3. Press the ***Delete*** key until the word “Indira Gandhi” is deleted.
4. The resulting text will be : National Open University

We can also erase text by highlighting the text to be erased and then either pressing the ***Backspace*** key or the ***Delete*** key only once.

7.10.2 Inserting Text

To insert text, we must be in the *Insert Mode*. To check to see whether we are in the *Insert Mode*, we can look at the right side of the *Status Bar*. If the word ***“OVR”*** is gray, we are in the *Insert Mode*. If the word ***“OVR”*** is black, we are in the *Overtype Mode*.

Insert Mode



Overtype Mode

To change to the *Insert Mode,* we have to :

- double click the word **"OVR"**. The word ***"OVR"*** is now gray.

  Or

- press the ***Insert*** key (or *Ins* key) in the keyboard.

Example 3 : Let us type the following sentence:

Indira National Open University.

Make sure the word ***"OVR"*** is gray before proceeding. Let us insert the word "Gandhi" between the words "Indira" and "National":

1. Place the *cursor* after the word "Indira".
2. Type the word "Gandhi".
3. Press the ***Spacebar*** to add a space.
4. The sentence will be:

   Indira Gandhi National Open University.

7.10.3 Overtyping Text

We can type over the current text (replace the current text with new text). However, we must be in the *Overtype Mode*. We have to do the following to change to the *Overtype Mode*.

1. Double Click ***"OVR"*** on the ***Status Bar.***
2. The word ***"OVR"*** should now be black.

Make sure the word ***"OVR"*** is black before proceeding to the following exercise.

Example 4 : Type the following sentence :

Faculty of Science

Now, Change the word "Science" to "Commerce"

1. Place the *cursor* before the letter “S” in “Science”
2. Type the word “Commerce”.
3. It should now read :

   Faculty of Commerce

7.10.4 Highlighting Text

Throughout these units, weou will be asked to *highlight* text. We can use either of the following methods:

Highlighting by Using Arrow Keys :

For this, we have to :

1. place the *cursor* before or after the text we wish to *highlight* and *click* the left mouse button.
2. press the appropriate *arrow* key (*left arrow* to move to the left or *right arrow* to move to the right) until the text is *highlighted*. We can use the *up* or *down arrow key* to *highlight* one line at a time.

Highlighting by Using the Mouse :

For this, we have to :

1. place the *cursor* before or after the text we wish to *highlight*.
2. hold down the left mouse button.
3. move the mouse *left*, *right*, *up*, or *down* until the text is *highlighted*.

7.10.4 Formatting Text

Formatting a document involves assigning fonts and font sizes, aligning text, changing color of the text, paragraph specing, setting margins etc. By selecting different menu options from Menu bars and Toolbar buttons, we can format our documents.

Applying Fonts and Font Styles : Fonts refer to the manner or style in which text is displayed in the document. MS-Word offers large number of fonts styles like *Arial*, *Arial Black, Times New Roman*, *Impact*, etc. For applying new styles to our text, first we have to select text that we want to be formatted. For changing fonts and font styles, we have to:

- click on the ***Font*** option of the ***Formatting tool bar***, a drop-down list will appear on our window as depicted in Fig. 7.16.
- type the name of the desired font directly or select an option from the drop-down list and press *Enter* key.

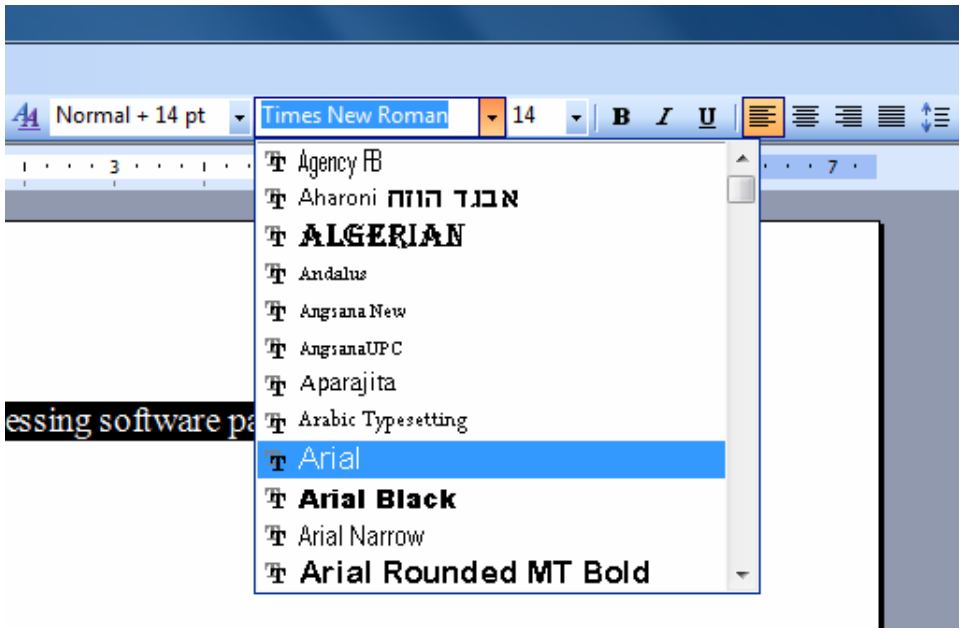


Fig. 7.16 : Window showing Formatting tool bar with Font option

Changing Font Size : Font size is measured in points. Points and picas are used for measuring spacing, lines, and thickness and so on. There are 12 points to a pica and six picas to an inch; therefore there are 72 points to an inch. To change font size, we have to:

- use the drop-down list of ***Font Size*** on the ***Formatting*** toolbar.
- type the font size or select a font size from drop-down list and press Enter key.

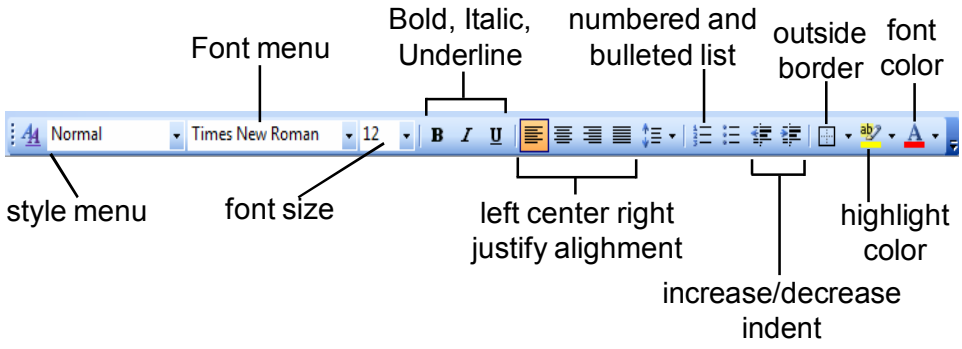


Fig. 7.17 : Formatting toolbar showing different options

- **Bold, Underline and Italicize Text :** If we want to make Bold, Italic and Underline our text, first we have to select the text and then directly click **Bold**  , **Italics**  , **Underline**  options of the ***Formatting toolbar***. In other way, we can click on the *bold* option and type the text. Similarly, we can select *Italic* and *Underline* button. The keyboard shortcuts for making bold, italics and underline text are ***Ctrl+B***, ***Ctrl+I*** and ***Ctrl+U*** respectively.

The other options of formatting toolsbars shown in Fig. 7.17 are discussed below:

- ***Allignment :*** This option is used to align text to the left,center or right side of the page or it can be justified across the page.
- ***Numbered and Bulleted Lists :*** This option is used to add numbers or bullets to the highlighted text.
- ***Increase/Decrease Indent :*** This option is used to change the indentation of a paragraph in relation to the size of the page.
- ***Outside Boarder :*** When this option is used, it adds a border around a text selection.
- ***Highlight Color :*** This option is used to change the color behind a text selection. The color displayed on the button is not the default color but it is the last color used. To change a different color we have to click on the drop-down arrowhead. It will display the available colors. We have to select the color of our choice.
- ***Text Color :*** This option is used to change the color of the text. The color displayed on the button is the last color used. We have to click the drop-down arrowhead to select another color.

Alternatively we can use ***Font*** dialog box (Fig. 7.18) which appear when we click ***Font*** option of ***Format menu*** to change font size, fonts and font styles. To give specific color to the text, we have to select the font color from the ***Font color*** drop-down menu. The default font color is black. We can also specify different effects to the text by selecting the Effects that we want to add to the text by

clicking on the checkbox in the ***Effects*** box. The ***Preview*** box at the bottom displays the specified changes that we have made to our text. To save the modifications that have been made in the text, we have to press the ***OK*** button.

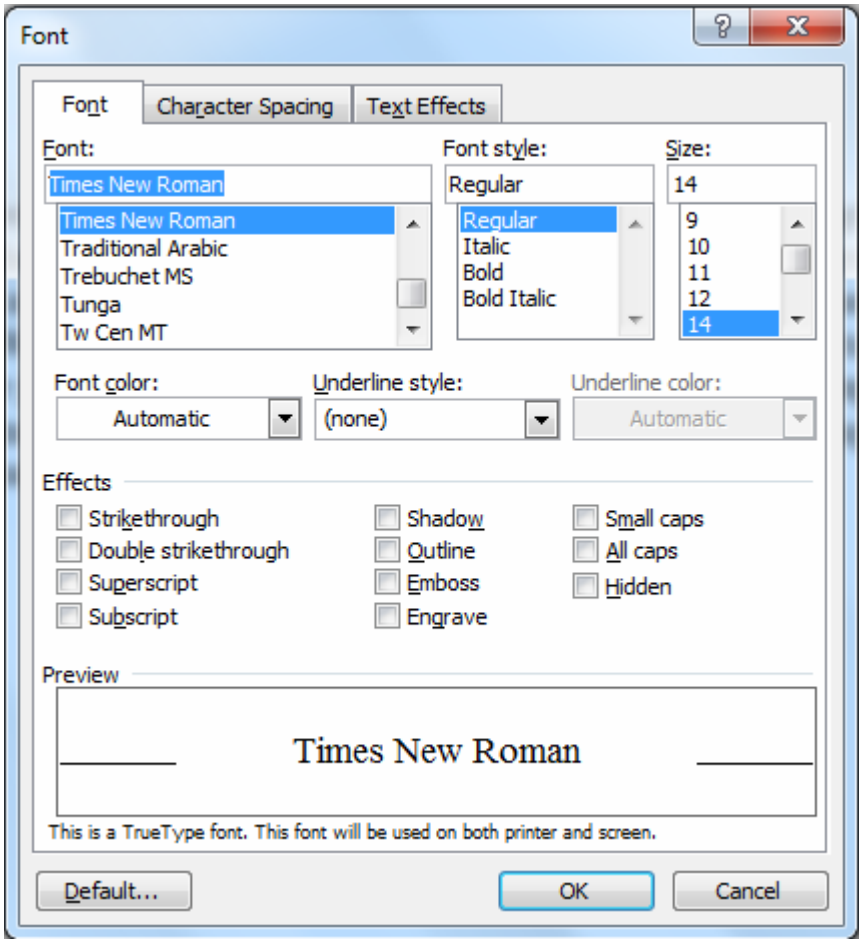


Fig. 7.18 : Font dialog box

7.11 WORKING WITH PARAGRAPH

In this section we will learn various ways to arrange a paragraph. In MS-Word, whenever we press the *Enter* key, we create a new paragraph. When we open a new document, the default paragraph setting stored as a style is applied. When we are formatting a paragraph, we do not need to highlight the entire paragraph. Placing the cursor anywhere in the paragraph enables us to format it. After we set a paragraph format, subsequent paragraphs will have the same format unless we change their format.

Line Spacing : Spacing is used to design our document and make it more readable. Line Spacing sets the amount of space between lines within a paragraph.The default setting of spacing is single. Word enables us to change the line spacing in our text. We can set spacing to *single*, *double* or *one and half* lines. To set the line spacing, we have to follow the following steps:

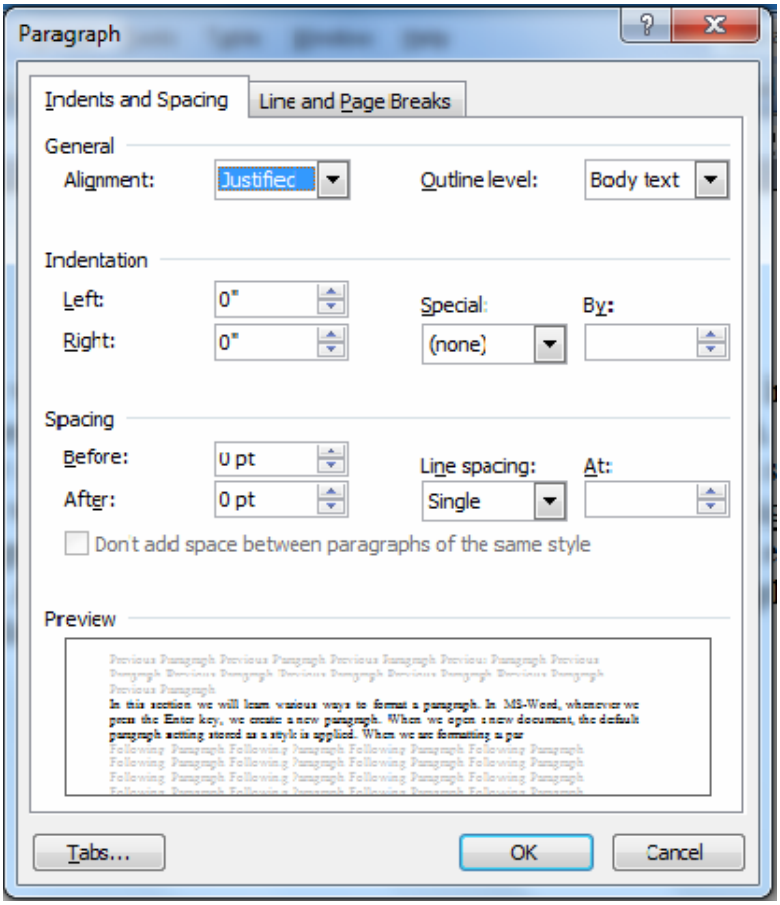


Fig. 7.19 : The Paragraph dialog box

- select the ***Paragraph*** option on the ***Format*** menu. The Paragraph dialog box gets invoked as displayed in the Fig. 7.19.
- select the ***Indents and spacing*** tab
- select an option from the ***Line spacing*** drop-down list.
- select the value from the ***At*** list box.
- click on the ***OK*** button to close the dialog box

At 1.5 lines, the Line Spacing is set to one-and-a-half times the single-space amount. For double-spaced lines, the line spacing is set to

two times the single-space amount. We can define white space placed before and after paragraphs by giving values in the ***spacing*** area of ***Paragraph*** dialog box.

Indenting Text : Indentation allows us to indent a paragraph from the left or right margin. Indents are added to margins thereby increasing the white space and decreasing the text area for specific paragraphs. To set the Indents for text by using paragraph dialog box:

- Enter the specification for left, right and first line indents in the indentation area of Paragraph dialog box.
- Select an option from the drop-down list.
- Click n the ***OK*** button.

In the *Paragraph dialogue box, Spacing Before* specifies how much space to leave before the paragraph. *Spacing After* specifies how much space to leave after the paragraph. *Line Spacing* sets the space between lines within a paragraph. One can type a paragraph of text and see the effect of Spacing Before, Spacing After, and Line Spacing by performing the following steps.

- Highlight the paragraph or place the cursor anywhere in the paragraph.
- Choose ***Paragraph*** from ***Format*** menu.
- Type **1"** in the Left field.
- Type **1"** in the Right field.
- Click ***OK***.

The paragraph will be indented one inch from both the left and right.

Alignment of Text in a Paragraph : Alignment is the way of organizing the text. It refers to the position of the text relative to margins. It enables us to ***left-align***, ***right-align***, ***center-align*** and ***justify*** the text in our document. The default alignment in MS-Word is left alignment.

- *Right-Aligned Text*: If the text is aligned with the right margin of the page then it is said to be right-aligned.
- *Left-Aligned Text*: If the text is aligned with the left margin of the page then it is said to be left-aligned. The default alignment for MS Word is.

- *Center-Aligned Text*: If the text is aligned to the center of the page then it is said to be center-aligned.
- *Justified*: This feature aligns a paragraph both the left and the right margins.

The following screenshot (Fig.7.20) shows all the above alignement options.

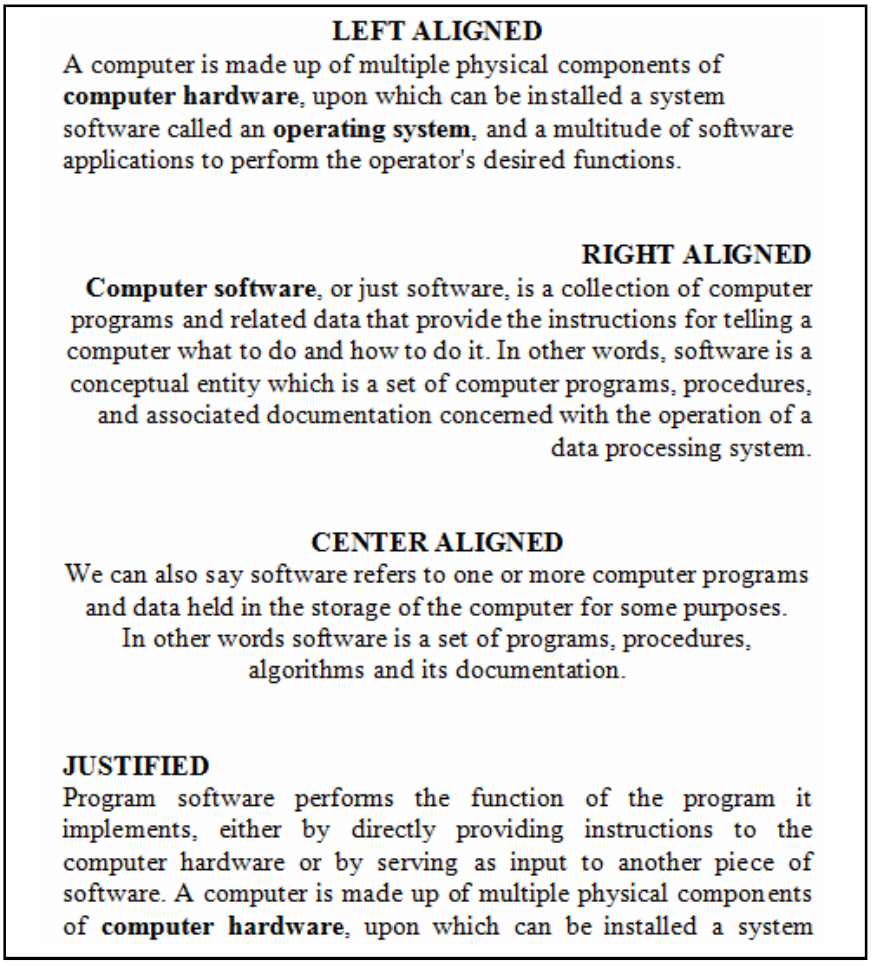


Fig. 7.20 : Allignment of paragraph showing four types of allignments

CHECK YOUR PROGRESS

Q.6. Fill in the blanks :

(i) To delete a letter just before the cursor position in a single step, we have to press _____ key.

(ii) To delete a letter above the cursor position, just press _____ key.

(iii) To insert text, we must be in the _____ mode.

(iv) *Font Size* is a _____ toolbar option.

(v) Bold,Italics and Underline options are present in _____ toolbar.

(vi) The default font color is _____.

Q.7. Write T for True and F for False :

(i) Highlight color option is used to change the color behind a text selection

(ii) ***Outside Boarder*** option is used to remove a border around a text selection

(iii) *Indent and Spacing* tab is present in *paragraph dialog box*.

(iv) Right is default alignment for MS Word.

7.12 ADDING BULLETS AND NUMBERS

Bullets and Number highlight the portion of a text we want to highlight. We can use bullets and numbers to make the lists and it is easy to read. For this, we have to:

- select the text before adding bullets and numbers.
- select the "***Bullets and Numbering***" options of the ***Format*** menu. The *Bullets and Numbering dialog box* get invoked shown in Fig. 7.21.
- click on the ***Bulleted*** tab in the *Bullet and Numbering* dialog box.
- click to select a style of your choice.
- click on ***OK***

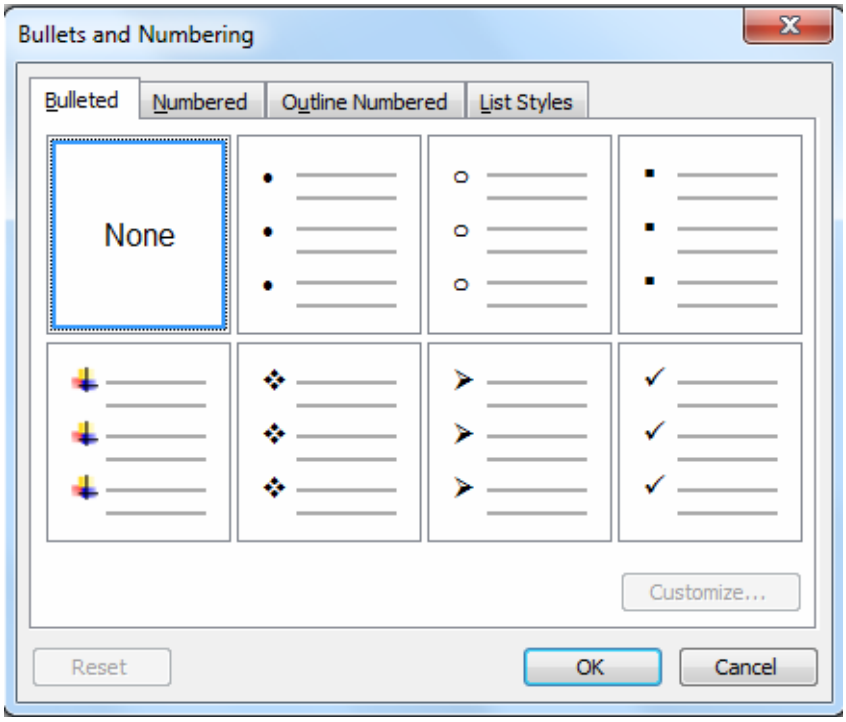


Fig. 7. 21 : Bullets and Numbering dialog box

Alternatively, we can also click on the ***Bullets and Numbering*** options of the ***Formatting toolbar***. We can also change the predefined specifications for bullets and numbering by using ***Customize*** option in the "***Bullets and Numbering***" dialog box. A few examples of numbered and bulleted list is given below :

1. CCA	I. CCA	i. CCA
2. BCA	II. BCA	ii. BCA
3. PGDCA	III. PGDCA	iii. PGDCA
4. MCA	IV. MCA	iv. MCA
a. CCA	a) CCA	A. CCA
b. BCA	b) BCA	B. BCA
c. PGDCA	c) PGDCA	C. PGDCA
d. MCA	d) MCA	D. MCA
● Physics	➢ Physics	✓ Physics
● Chemistry	➢ Chemistry	✓ Mathematics
● Botany	➢ Botany	✓ Botany
● Zoology	➢ Zoology	✓ Zoology
● Statistics	➢ Statistics	✓ Statistics

7.13 FIND AND REPLACE OPTION

In MS-Word, we can search for text, special character and other document items. We can also replace the searched items with a specified item.

For finding text, we have to:

- click the ***Find*** option from the ***Edit*** menu. The ***Find and Replace*** dialog box gets invoked as shown in Fig.7.22.
- enter the text in the ***Find what*** box.
- click on the ***Find Next*** option of the ***Find and Replace*** dialog box to find the position of the text being searched.

The keyboard shortcut for finding text is ***Ctrl+F.***

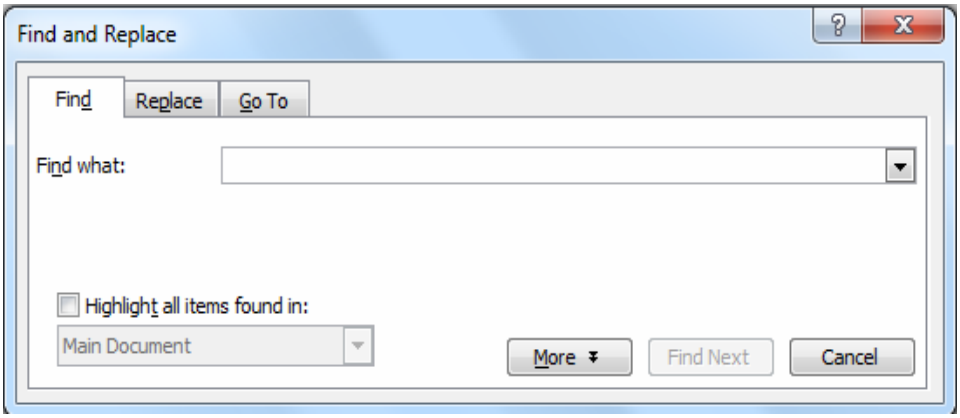


Fig. 7.22 : Find and Replace dialog box showing Find tab

For replacing text, we have to :

- select the ***Replace*** option from the ***Edit*** menu. The ***Find and Replace*** dialog box as shown in Fig. 7.23 gets invoked.
- select the ***Replace*** tab.
- enter the text to be replaced in the ***Find what*** box of the dialog box.
- enter the text to be replaced with in the ***Replace with*** text box.
- click on the ***Find Next*** button of the ***Find*** dialog box to start the search.
- click on the ***replace*** button to replace the highlighted text with in text in the ***Replace with*** box.

The keyboard shortcut for replacing text is ***Ctrl+H.***

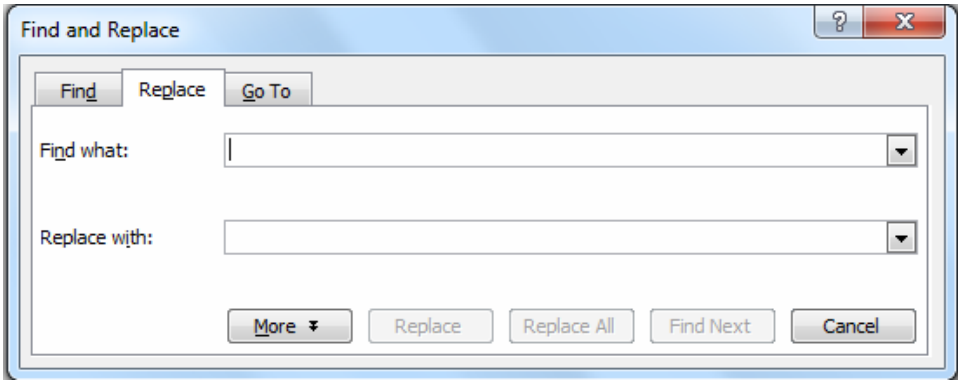


Fig. 7.23 : Find and Replace dialog box showing Replace tab

7.14 CUT, COPY AND PASTE

In MS-Word, we can cut (delete) text from one area of a document and save that text so that it can be pasted elsewhere in the document. When we cut a text, it is stored on the Clipboard. We can also copy text. When we copy text, it is also stored on the Clipboard. Information stored on the Clipboard stays there until new information is either cut or copied. Each time we execute Cut or Copy, we replace the old information on the Clipboard with whatever we just cut or copied.

Cut and Paste :

Cut - using Menu

Select the content that you want to delete

Click **Edit** menu and then choose **Cut** from the menu.

Paste - using Menu

Place the cursor where you want to paste the deleted content.

Click ***Edit*** menu and then choose ***Paste*** from the menu.

Cut - using Icon 

Select the content that you want to delete

Click the ***Cut*** icon from the ***Standard*** toolbar.

Paste - using Icon 

Place the cursor where you want to paste the deleted content.

Click the ***Paste*** icon from the ***Standard*** toolbar .

Cut - using Keyboard shortcut

Select the content that you want to delete

Press ***Ctrl + X***

Paste - using Keyboard shortcut

Place the cursor where you want to paste the deleted content.

Press ***Ctrl+ V***

Copy and Paste : In Microsoft Word, we can copy text from one area of the document and place that text elsewhere in the document. As with cut data, copied data is stored on the Clipboard.

We can copy the text to another location or file by specifying the path. To copy text, we can selct ***Copy*** option from the ***Edit*** menu. Another way to copy content is by clicking ***Copy*** icon  from the ***Standard*** toolbar, or simply pressing ***Crtl+C*** after selecting the content.

To paste cut or copied text, we have to place the cursor at the location where the text is to be moved and then select ***Paste*** option from the ***Edit*** menu. Alternatively, we can click the ***Paste*** icon  from the ***Standard*** toolbar or we can simply press ***Ctrl+V*** to paste the text.

CHECK YOUR PROGRESS

Q.8. What is the best option to move a small part of text to a shorter location in a document?

.....

.....

.....

.....

Q.9. How do you access the *Find and Replace* option?

.....

.....

.....

7.15 LET US SUM UP

- Microsoft Word is a ***Word Processor*** - a type of application software used to *create* letters, memos, reports, term papers etc.
- ***Title bar, Menu bar, Status bar, Ruler, Formatting*** and ***Standard*** toolbars are the key elements of a MS-Word document window.
- The ***Title Bar***, located at the very top of the screen, displays the name of the document you are currently using and maximize, minimize, close button.
- The various components of ***Menu Bar*** are *File, Edit, View, Insert, Format, Tools, Table, Window* and *Help*.
- ***Rulers*** are found at the top and left of a document and indicate text positioning, such as size of the margins.
- The ***Status Bar*** appears at the very bottom of the screen and provides information such as *current page*, *current section, total number of pages, inches from the top of the page, current line number* and *current column number*.
- The ***Horizontal Scroll Bar*** and ***Vertical Scroll Bar***, enable you to move up and down or across the window.
- The ***Text Area***, just below the ***Ruler***, is a large area where you can type your document.
- The ***Backspace*** key erases text before the *cursor* position.
- The ***Delete*** key erases text after the *cursor* position.
- To insert text, you must be in the ***Insert Mode***.
- In the ***Overtype Mode***, you can type over the current text (replace the current text with new text).
- Text can be formatted by changing ***font style***, ***size*** and ***color.***
- Text in a document can be made ***bold***, ***underline*** and ***italicize.***
- In Microsoft Word, you can easily create ***bulleted or numbered lists*** of items.
- A paragraph can be formatted by placing the cursor within the paragraph and selecting ***Paragraph*** option from the ***Format*** menu.
- ***Line Spacing*** sets the amount of space between lines within a paragraph.

- The ***first-line indent*** feature indents the first line of the paragraph.
- ***Indentation*** allows you to indent your paragraph from the left or right margin.
- The different types of alignments are ***right***, ***left***, ***centre*** and ***justified***.
- In Microsoft Word, you can ***copy*** text from one area of the document and place that text elsewhere in the document.
- You can ***cut*** (delete) text from one area of a document and save that text so it can be pasted elsewhere in the document.
- The find and replace option can be accessed either by selecting ***Edit > Find*** or ***Edit > Replace*** menu by pressing key combinations as ***Ctrl+F*** and ***Ctrl+H*** for replace.

7.16 FURTHER READINGS

- "*Introduction to Information Technology*", by Sanjay Saxena, Vikash Publishing, New Delhi.
- "*SAMS teach yourself Microsoft Office 2003 in 24 Hours*" by Greg Prerry, Pearson Education.
- "*MS Office XP for Everyone*", by Sanjay Saxena, Vikash Publishing, New Delhi.

7.17 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : To select the text drag the mouse over the specific portion of text while keeping the left mouse button pressed.

Ans. to Q. No. 2 : To close the current document in MS-Word from the Menu bar, select ***Close*** option from the ***File*** menu.

Ans. to Q. No. 3 : To exit MS-Word, we have to click ***Exit*** option from the ***File*** menu.

Ans. to Q. No. 4 : (i) Document1, (ii) .doc, .docx, (iii) Print Preview, (iv) Menu, nine, (v) View, standard

Ans. to Q. No. 4 : (i) (a) Ctrl+S, (ii) (c) Ctrl+O, (iii)(b) Ctrl+A

Ans. to Q. No. 6 : (i) backspace, (ii) delete, (iii) insert, (iv) formatting (v) formatting, (vi) black

Ans. to Q. No. 7 : (i) T, (ii) F, (iii) T, (iv) F

Ans. to Q. No. 8 : For moving a small part of text to a shorter distance, use drag-and-drop method. Highlight the text to be moved. Click the text selection using the mouse and drag this selection to the location where you want to move the text and release the mouse button.

Ans. to Q. No. 9 : The **Find and Replace** option can be accessed either by selecting ***Edit > Find*** or **Edit > Replace** menu or by pressing key combinations as ***Ctrl+F*** for find and ***Ctrl+H*** for replace.

7.18 MODEL QUESTIONS

Q.1. What do you mean by Word Processor? Give one example of a popular Word Processor.

Q.2. What is MS-Word? What is the purpose of MS-Word ?

Q.3. What are the basic components of toolbars and explain them?

Q.4. What is the difference between removing text with the Delete key and with the Backspace key?

Q.5. What is Insert mode?

Q.6. What is Overtype mode?

Q.7. How can a text be made Bold, Italic and Underlined? Mention the shortcuts to mark the text as bold, italic and underlined.

Q.8. How can bulleted or numbered text be created in a document?

Q.9. What are the functions of menu bar?

Q.10. How do you create a new document in MS-Word?

Q.11. Explain the steps involved in paragraph formatting.

Q.12. How can line spacing in a paragraph be changed?

Q.13. How can the first line indent be assigned in a paragraph?

Q.14. Differentiate between the copy-paste and cut-paste method.

UNIT 8 : MICROSOFT WORD– PART II

UNIT STRUCTURE

8.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- learn how to check spellings and grammars of your document
- use undo and redo option
- insert header, footer and page number to your document

- learn to setup page margin, paper size and layout of the pages of your document
- prepare your document for printing
- insert pictures to make your document more attactive
- create table in MS-Word document and enter text into it
- delete a table
- format a table by adding rows and columns
- remove rows and columns from a table
- merge and split cells according to your requirements
- create multiple columns of your document

8.2 INTRODUCTION

In the previous unit (Unit 7) we have discussed the basics of MS-Word. Our discussion includes how to create a new Word document, how to open an existing document, exiting Word etc. Learners have also been acquainted with bulleted and numbered list in a Word document; formatting text as well as paragraphs and about copy, cut paste option.

In this unit we will learn about some other features of MS-Word which include checking of spelling and grammars, inserting header and footer, page number, pictures, undo and redu options etc. We will also learn to insert tables into our document so that we can represent some data in tabular format. We will be able to add/delete rows and columns into/from a table which is already exists. We will also be able to learn to merge and split cells of a table according to our requirements .

8.3 SPELLING AND GRAMMAR CHECKER

MS-Word provides spelling and grammar checking facility so that we can identify or rectify our spelling mistakes as well as grammar.

- **AutoCorrect option :** The **AutoCorrect** feature of MS-Word automatically corrects many commonly misspelled words and wrong punctuation marks which are predefined. To view the list of words that can be corrected automatically, from the menu

bar, we have to select ***AutoCorrect option*** from the ***Tools*** menu. The ***AutoCorrect*** dialog box will be displayed as shown in Fig. 8.1.

Many options that include the additional capitalization of the first two letters of a word and capitalization of the first word of the sentence can be corrected automatically.

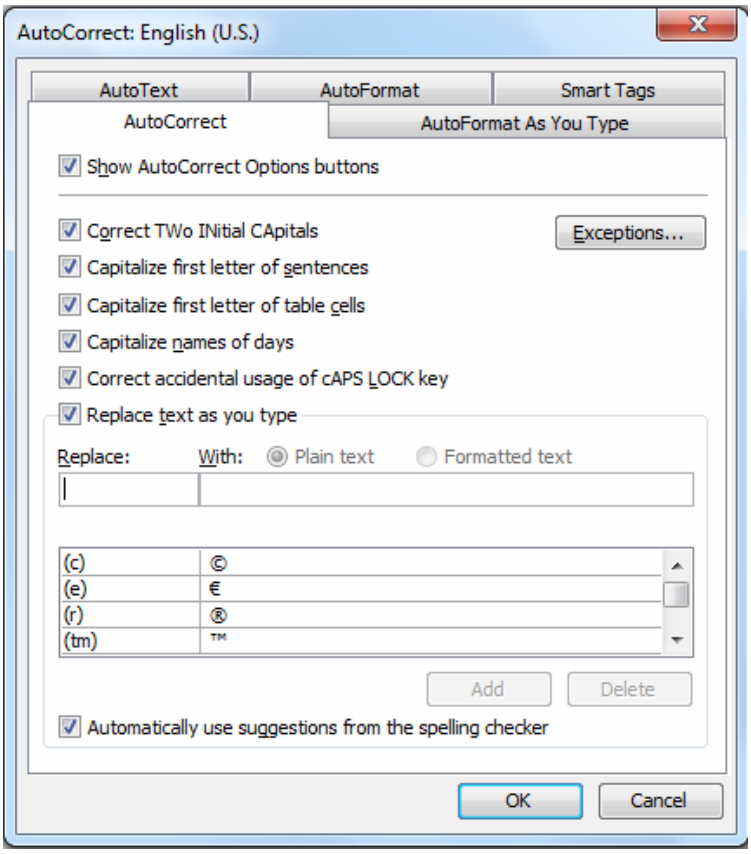


Fig. 8.1 : AutoCorrect dialog box

- **Spelling and Grammar Check :** Word checks spelling and grammar as we type. Spelling errors are displayed with a red wavy line under the word. The red wavy line also appears under a word when there is no Dictionary meaning of that word. Grammar errors display with a green wavy line under the error. There are three different methods to spell check our entire document. These are listed below:
  - by pressing **F7** key
  - by clicking the spelling icon  from the ***Standard toolbar***

– by choosing ***Spelling and Grammar*** option from the ***Tools*** menu. The *Spelling and Grammar* dialog box will appear as shown in Fig.8.2.

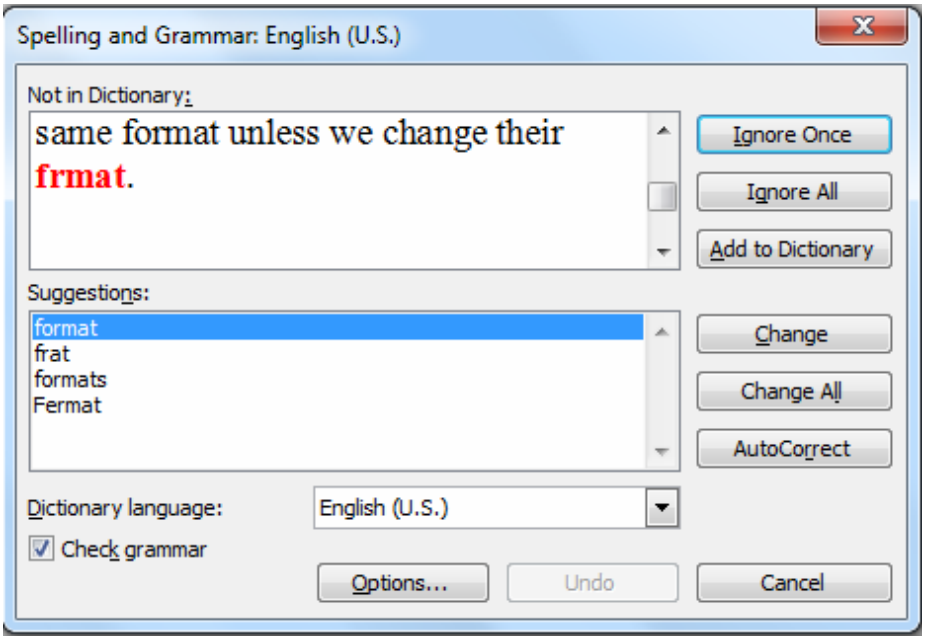


Fig. 8.2 : Spelling and Grammer dialog box

If we want to check the spellings of a part of a document, we have to select the area first. After that we can follow any one of the above three steps.

8.4 UNDO AND REDO

We can undo the last action by clicking the ***Undo*** button on the ***Standard*** toolbar or by selecting ***Edit >Undo Typing*** option from the ***Menu*** bar. To remove the Undo action, click the ***Repeat Typing*** button on the ***Standard*** toolbar or select ***Edit > Repeat Typing***.

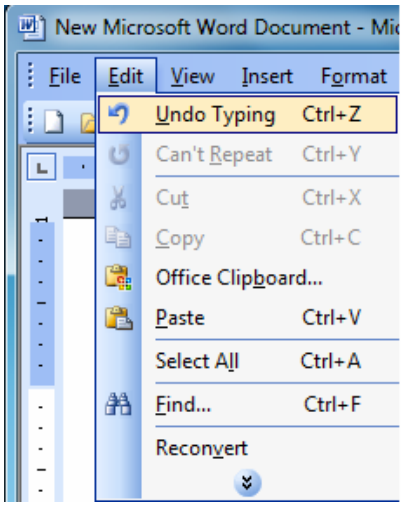


Fig. 8.3 : Undo and Redo option of Edit Menu

8.5 HEADER AND FOOTER

Another useful feature of MS-Word is ***Header and Footer***. A *header* is a text that appears at the top of each page of our document. A *footer* appears at the bottom of our pages.Using this feature, one can create a standard piece of text and/or an image at the top or end of each page of their document(s). The most common use of header and footer is to display *page numbers* and *reference titles*.

We can add header and footer by choosing the ***Header and Footer*** option from the ***View*** menu Fig. 8.4. As soon as we select the option, two dashed line box (one at the top and one at the bottom of the text area) will appear as shown in Fig.8.5 . We can write any reference title as well as page number within these dashed line boxes.

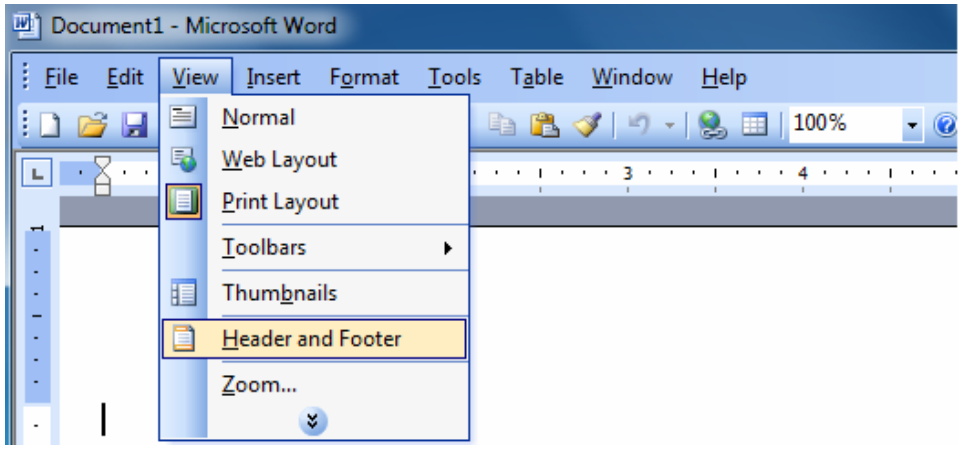


Fig. .4 : Header and Footer option of View menu

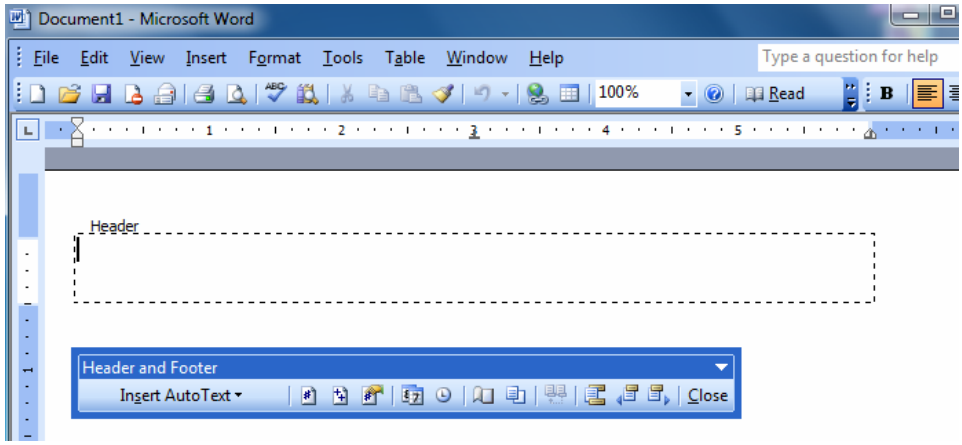


Fig. 8.5 : The dashed box for Header

- **Inserting Page Number :** For inserting page number, we can choose ***Page Numbers*** option from the ***Insert*** menu. The following dialog box (Fig.8.6) will appear on the document. We can put page number either in the header or in the footer section. Page number can be aligned in any one of the direction: left, right, center, inside and outside.

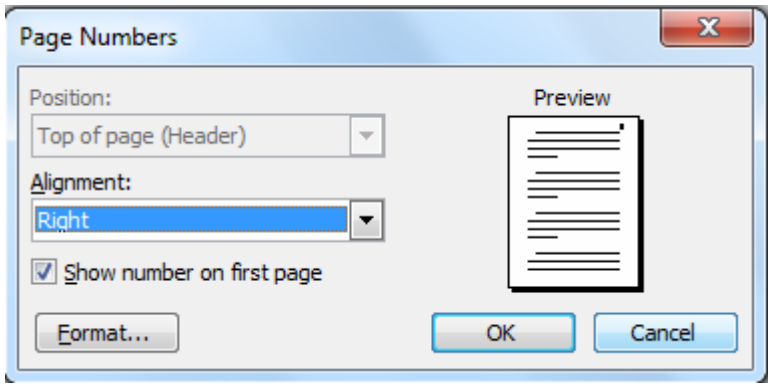


Fig. 8.6 : The Page Numbers dialog box

If we want to insert a clip art graphic in the first page header, we can choose ***Clip Art*** from the ***Picture*** option of the ***Insert*** menu. After that we have to :

- ***Organize clips*** from the right panel. The *Clip Organizer* will pop out.
- choose the ***Collection list*** from the left panel
- choose a clip art of your choice from any folder of the *Collection list*
- copy and paste the clip art or drag it on to the header. The chosen graphic would be displayed.

8.6 THE TAB KEY

The default Tab setting for Microsoft Word is .5 inches. When we press the Tab key, the cursor moves 1/2 inch across the page and an arrow appears on the screen. The arrow is a nonprinting character, when we print our document the arrow does not print. One can notice how the cursor moves across the page by pressing the Tab key a few times. To change the default Tab setting, we have to :

- choose ***Tabs*** from the ***Format*** menu. The *Tabs dialog box* opens.
- enter ***1"*** in the ***Default Tab Stops*** field.
- click ***OK***.
- press the *Tab key* a few times. We can notice how the cursor moves across the page. The cursor stops at every inch.

We can also set up Custom Tab Stops. To set our Tab Stops to 1", 3.5", and 5", we have to :

- choose ***Tabs*** from the ***Format*** menu. The Tabs dialog box will appear.
- enter **1"** in the Tab Stop Position field.
- click ***Set***.
- enter ***3.5*** in the ***Tab Stop Position*** field.
- click ***Set***.
- enter ***5*** in the ***Tab Stop Position*** field.
- click ***OK***.
- press the *Tab key* a few times. Note how the cursor moves across the page.

8.7 PAGE SETUP

The page margins of the MS-Word document can be set and changed using the ***Rulers*** on the page and the ***Page setup window***. To set the ***Ruler***, we have to:

- move the mouse over the region where the Write ruler changes to gray,
- click with the mouse and the margin indicator to the desired location when the cursor becomes a double-ended arrow,
- release the mouse when the margin is set.

Page Margins and Orientation : The margins can also be set or changed using the ***Page Setup*** dialog box as shown in Fig.8.7. For this, we have to:

- select ***Page Setup*** option from the ***File*** menu and specify the ***Margin*** tab in the dialog box,

- enter margin values in the *Top*, *Bottom*, *Left* and *Right* boxes. The *Preview window* will reflect the changes.
- click on ***OK*** when specified.

We can change the ***Page Orientation*** within the *Page Setup* dialog box. For this, we have to change the page orientation from ***Portrait*** or ***Landscape*** by checking the corresponding radio button.

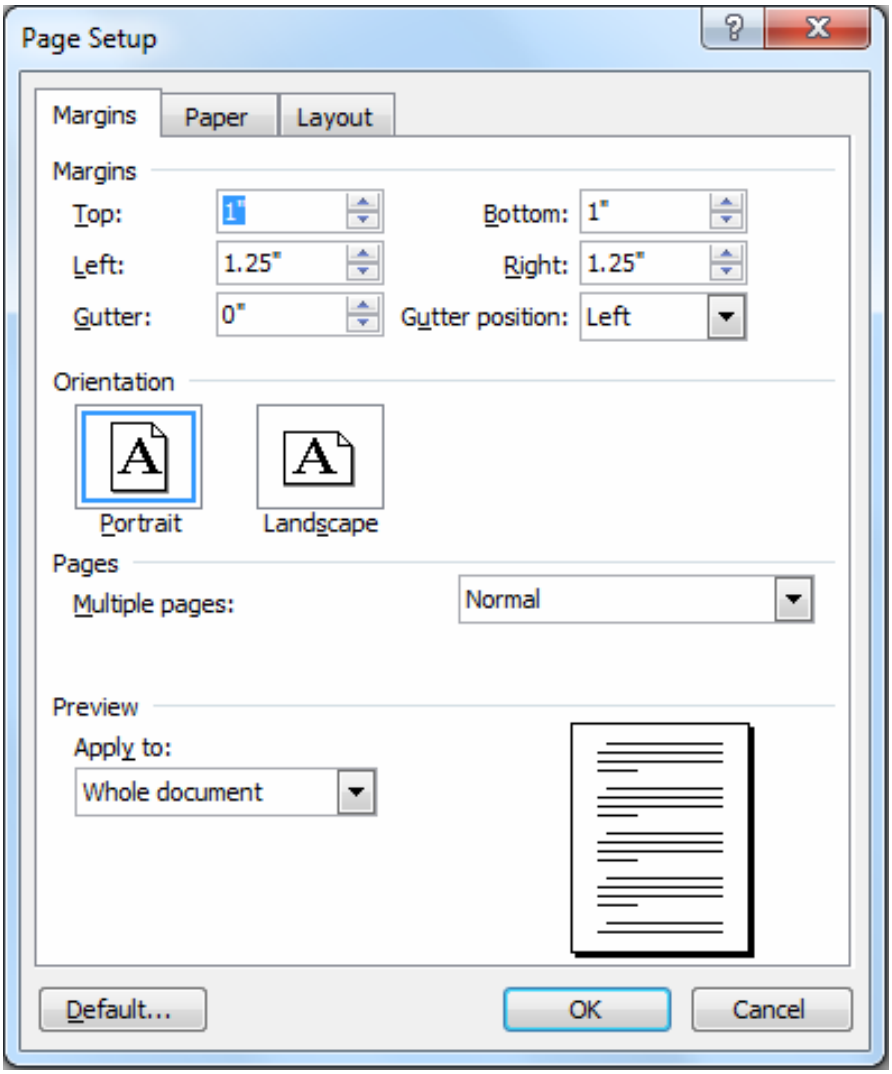


Fig. 8.7 : Page Setup dialog box showing Margins tab

Paper Size : To set the paper size, we have to :

- click the ***Paper*** tab of *Page Setup* dialog box (Fig. 8.8).
- select the appropriate paper size from the drop-down menu of *Paper size* box
- click on ***OK*** to save the changes made.

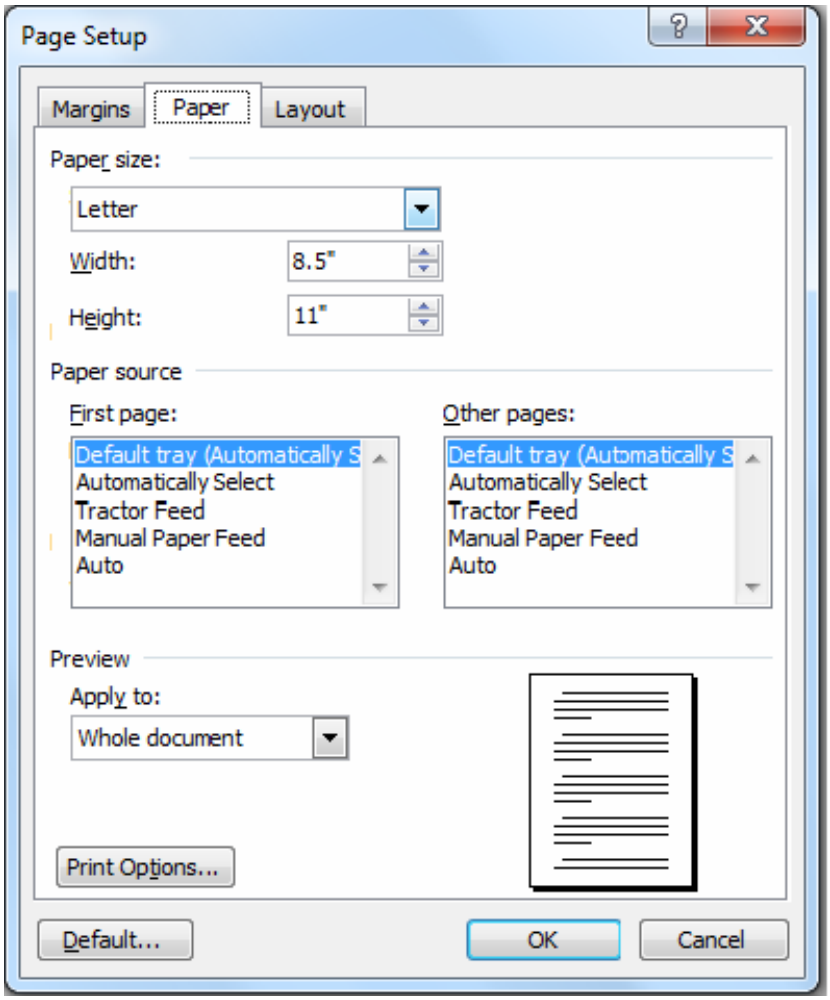


Fig. 8.8 : Page Setupdialog box showing Paper tab

8.8 PRINTING DOCUMENTS

MS-Word allows us to take printout of our document. We should first setup our print properties and layouts before printing the documents. Before taking the print we should be sure that our computer is connected with printer. For taking a printout, we have to:

- select ***Print Preview*** to check whether the layout of our document is appropriate or not. Otherwise, select ***Print*** from ***File*** menu of the ***Menu*** bar. A ***Print dialog box*** will appear.
- set all the parameters like number of copies, take print from current page or we can specify page number too.
- finally click on ***Print*** button.

CHECK YOUR PROGRESS

Q.1. Fill in the blanks :

(i) The_____ feature of MS-Word automatically corrects many commonly misspelled words and punctuation marks which are predefined.

(ii) The default tab setting for Microsoft Word is _____.

(iii) Red wavy line under a word indicates that the _____ of the word is wrong. or there is no Dictionary meaning of that word.

(iv) Grammar errors display with a _____ wavy line under the error.

Q.2. Write T for True and F for False :

(i) Page number cannot be inserted in the header part of a document.

(ii) If the spelling of a word is incorrect, then by right clicking on the word, we will get the probable correct options for the particular word.

(iii) We can change the size of a picture which is inserted in a Word document with the help of a mouse.

(iv) The page margins of a MS-Word document can be setup using the *Rulers* on the page.

8.9 INSERTING PICTURE

We can add a picture from the Clip-Art gallery or we can put a picture from the drives. Word facilitates us to design our document through enabling this feature. For inserting pictures, we have to:

- click where we want add our picture.
- click ***Insert*** from the ***Menu*** bar.
- select ***Picture***.

- select ***Clip Art*** or From File.
- select ***picture*** and click ***Insert***.
- select an appropriate picture from gallery or drives.
- click on the ***OK*** button.

8.10 WORKING WITH TABLES

We can create tables in MS-Word document to display our text in tabular format. We can create multiple tables in one document. As per our need we can add numbers of rows and columns in the table.

8.10.1 Inserting Table

To insert a table in MS-Word document, we have to :

- click where we want to insert the table
- click on the ***Table*** menu from the ***Menu*** bar.
- select ***Insert***
- select ***Table*** (Fig.8.9). The ***Insert Table*** dialog box will appear on the screen as shown in Fig.8.10.
- enter number of ***rows*** and ***columns*** according to our need
- click on the ***OK*** button.

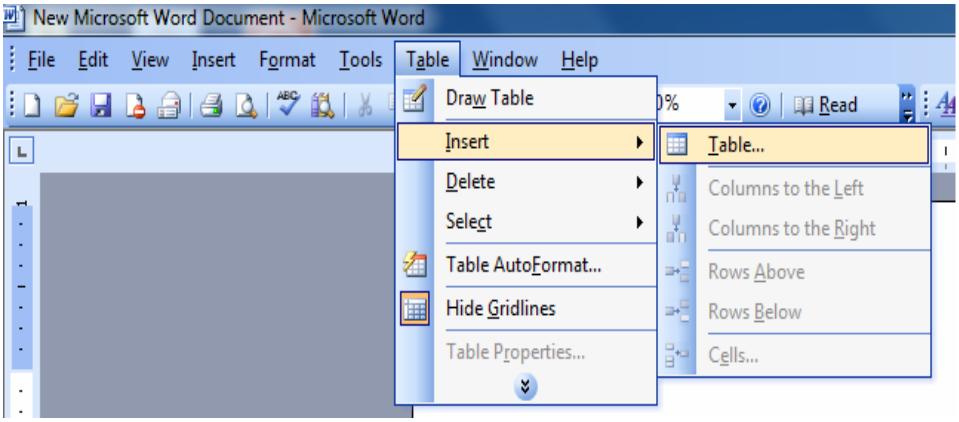


Fig. 8.9 : Tables option of Table menu

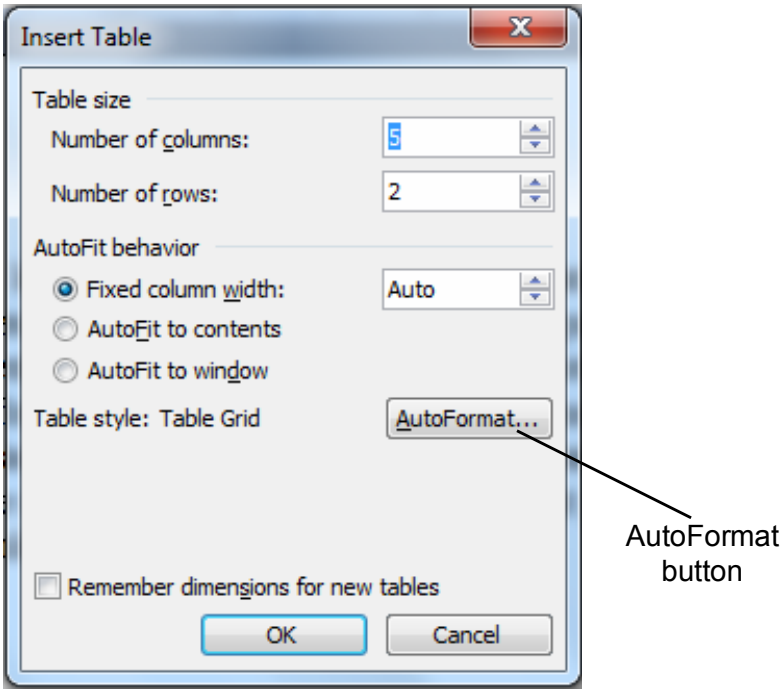


Fig. 8.10 : Insert Table dialog box showing table size of 2 rows and 5 columns

A table will be inserted in the current position of the cursor. If we click the ***AutoFormat...*** button, a ***Table AutoFormat*** dialog box will be displayed as shown in the Fig.8.11. We have to select any of the formats from the ***Table styles*** list box. We can also set the

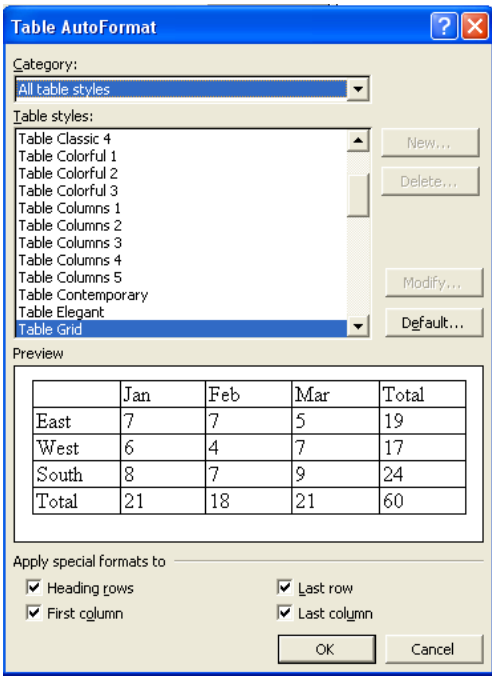


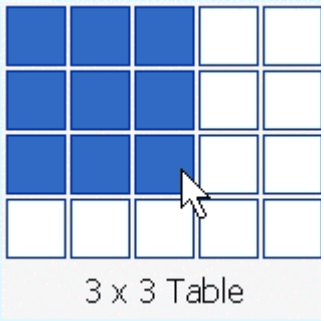
Fig. 8.11 : Table AutoFormat dialog box

other options in the dialog box according to our need and then have to click ***OK*** button to close the dialog box. After that we have to click the ***OK*** button of the ***Insert Table*** dialog box. We also can set this table format as default format for the new tables by clicking the ***Default*** in the *Default table styles dialog box* and click the ***OK*** button.

Alternate Method : *Creating a Table by Using the Insert Table Icon :* We can also create a table by clicking on the ***Insert Table*** icon on the *Standard toolbar*. For this, we have to:

- click the ***Insert Table*** icon as shown below.

- highlight the number of rows and columns we need. The maximum table size we can create by this method is a ***four-row*** by ***five-column*** table.



- Press ***Enter*** (or click) to create the table.

8.10.2 Deleting a Table

To delete a table, we can click any of the cells of the table and then select the ***Delete > Table*** command from the ***Table*** menu as shown in Fig.8.12.

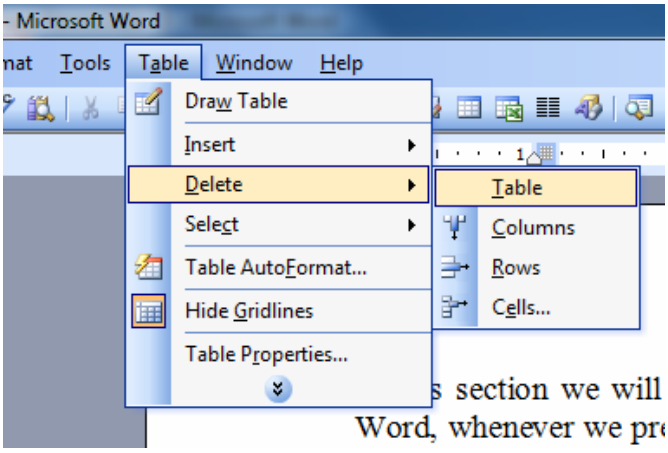


Fig. 8.12 : *Delete Table* option from *Table* menu

8.10.3 Traversing a Table

Each block in a table is termed as a ***cell***. One of the easier ways to enter data in a table's cell is to click the cell and type. We can also use the ***Tab*** *key* to move from cell to cell from left to right. If we use ***Shift +Tab*** key together, then it will move cell to cell in the reverse direction i.e., from right to left. The keyboard shortcuts to move the cursor in a table are given below :

Keyboard shortcut	Location in the table from the current position of the cursor
Tab	The next cell
Shift+Tab	The preceding cell
Alt+PageUp	The column's top cell
Alt+PageDown	The column's bottom cell
Alt+Home	The current row's first cell
Alt+End	The current row's last cell

8.10.4 Selecting a Table, Column, Row, and Cell

A table in MS-Word document can be selected by clicking at any of the cells of the table and then selecting the ***Select > Table*** option from the ***Table*** menu.

A row in a table can be selected by clicking at any of the cells in the row and then by selecting the ***Select > Row*** option from the ***Table*** menu.

The same methods can be applied for selecting a column. We can select a column by clicking at any of the cells in the column and then by selecting the ***Select > Column*** command from the ***Table*** menu.

A cell in a table can be selected by clicking at the cell of the table and then by selecting the Select >Cell option from the ***Table*** menu.

Alternatively, a table, its cells, rows and columns can also be seleted with the help of mouse.

8.10.5 Inserting Rows and Columns

We can insert columns and rows in a table which is already created. A row in a table can be inserted by clicking a cell in the row above or below which the new row is to be inserted. By selecting the ***Rows Above*** or ***Row Below*** option from the ***Table*** menu, we can insert a row above or below the selected row.

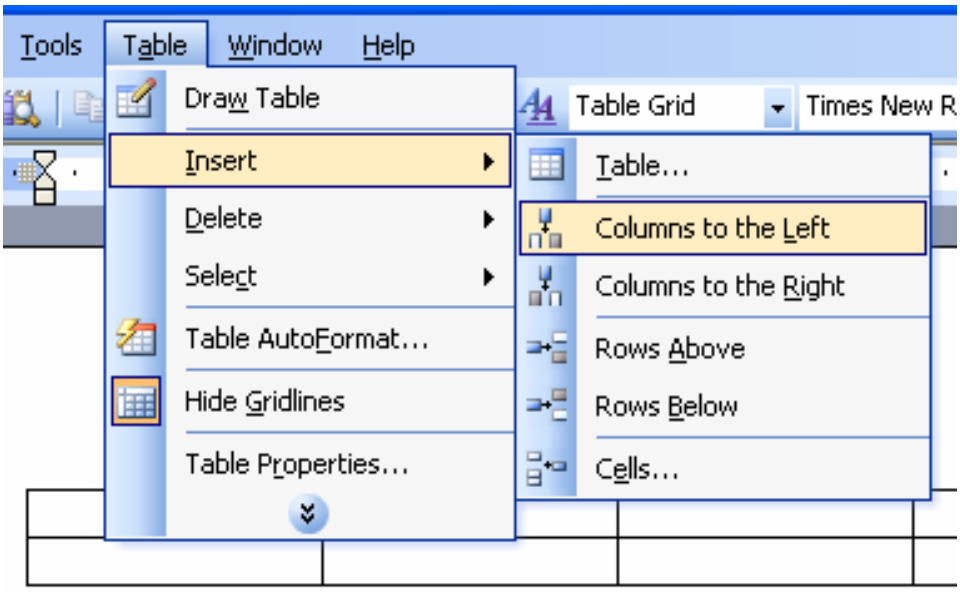


Fig: 8.13 : Insert option for Rows and Columns in the Table menu

Similarly, to insert a column in the table, we have to click at a cell of the column after or before which the new column is to be inserted. Now, by selecting the ***Columns to the Left*** or ***Columns to the Right*** option from the ***Table*** menu (Fig.8.13), we can insert a column to the left or right of the selected column.

8.10.6 Deleting ROWS and Columns

Similar procedures can be applied for deleting rows and columns from a table. To delete a column from the table, we have to click at a cell of the column, which is to be deleted. Now by selecting the ***Table > Delete > Columns*** option (Fig.8.14) from the ***Table*** menu, the entire column can be deleted.

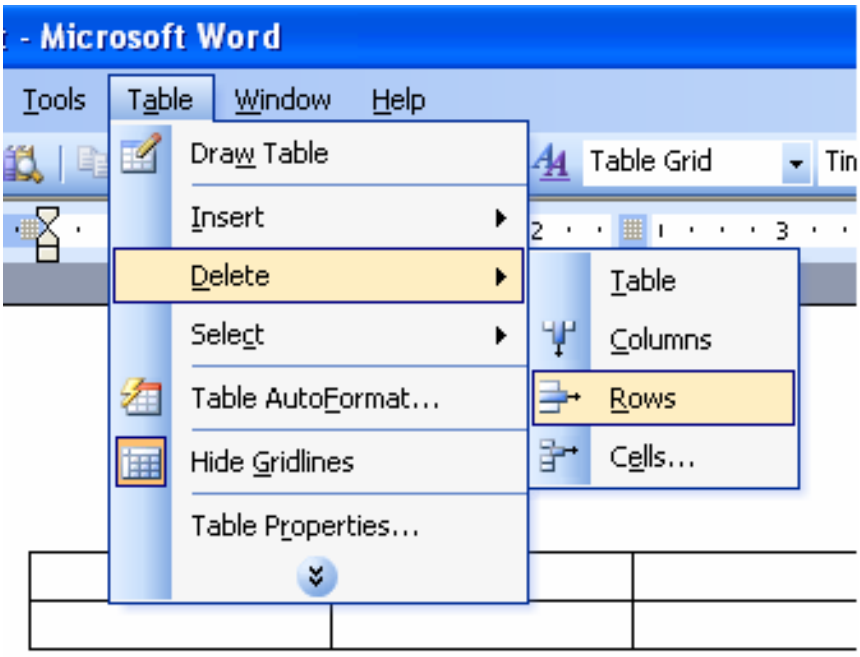


Fig. 8.14 : Table menu showing Delete option

We can delete a row in a table by clicking at a cell of the row, which is to be deleted and then by selecting the ***Table > Delete > Rows*** option from the ***Table*** menu.

8.10.7 Merging of Cells

In MS-Word, we have the facility to merge cells in a table. Merging of cells means combining two or more cells into one single cell. For example, let us consider the following table for better understanding of merging of cells.

Subject	Physics	Chemistry	Maths	Total Marks
Rahul	65	76	81	222
Preeti	78	76	80	224

If we want to write a table heading above the row containg subjects name, then it will look better if we merge the all five cells of first row into a single cell. The structure of the table will be as followes after merging all the 5 cells of first row. We have written the heading “Marks of Class Test 1” in the first row.

Marks of Class Test 1				
Subject	**Physics**	**Chemistry**	**Maths**	**Total Marks**
Rahul	65	76	81	222
Preeti	78	76	80	224

Merging of cells can be done by :

- selecting the cells to be merged
- clicking the ***Merge Cells*** option from the ***Table*** menu.

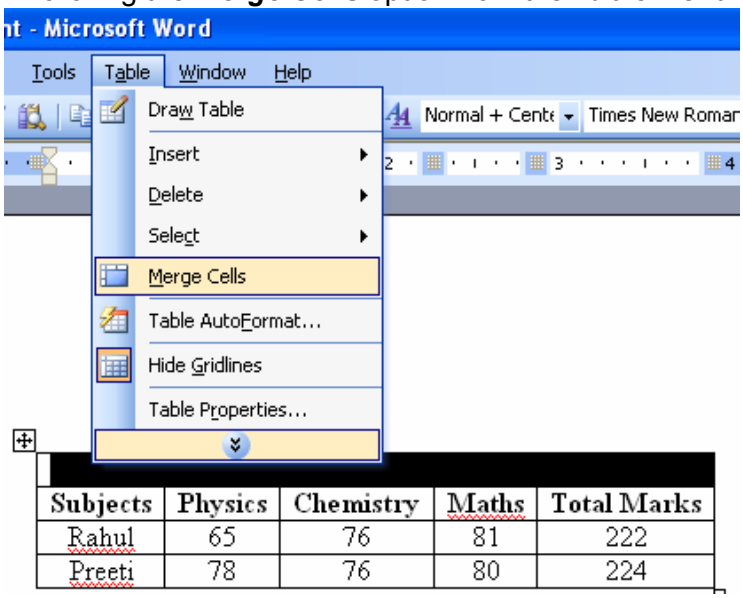


Fig. 8.15 : Table menu showing Merge Cells option

Alternatively, we can right click on the selected position. As a result, a drop-down menu appears on the screen as shown in Fig.8.16. By selecting ***Merge Cells*** option, we can merge the cells of the table.

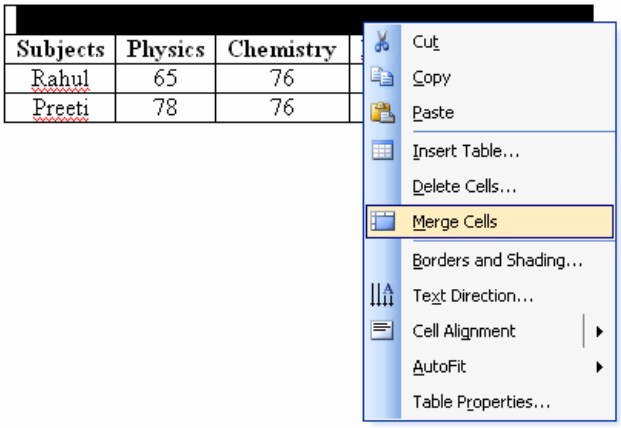
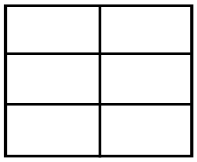


Fig. 8.16 : Drop-down menu showing Merge Cells option

8.10.8 Splitting of Cells

There is a Split Cells options in MS-Word table which provides us the facility to split cells i.e., turn one cell into more than one cell. Let us consider the previous example. Let us consider the following table :



Suppose, we want to split the lower left corner cell of the above table.

To split a cell, we have to:

- place the cursor inside the cell by clicking the left mouse button.
- click ***Split Cells*** option from the ***Table*** menu (Fig.8.17).

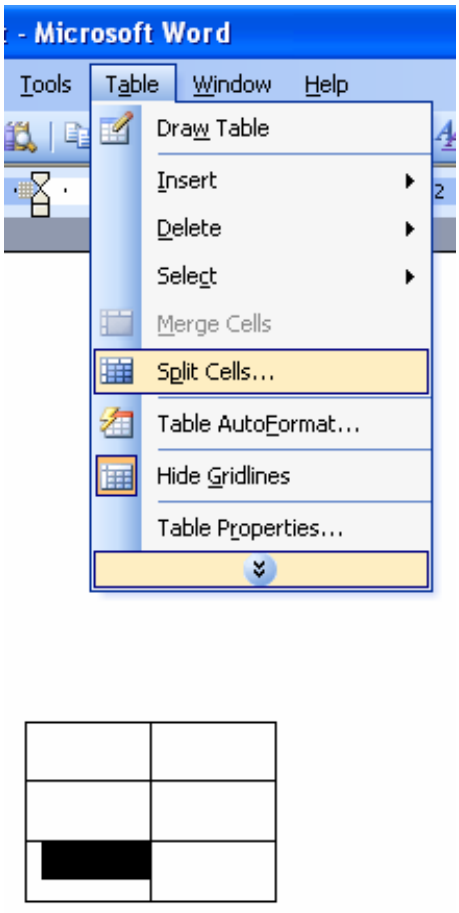


Fig. 8.17 : *Table menu* showing *Split Cells...* option

A window will be displayed as shown in Fig. 8.18. In the window, we have to specify the number of rows and number of columns the cell will contain after splitting. After that we have to click the ***OK*** button.

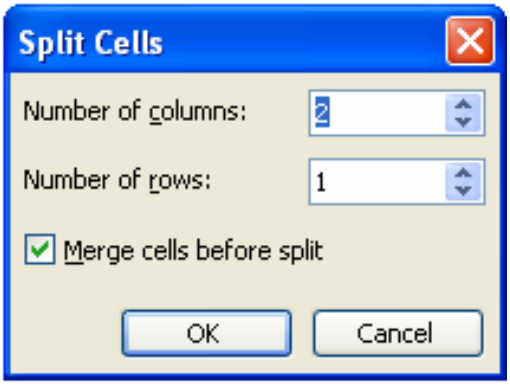
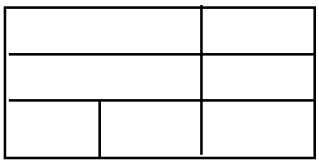


Fig. 8.18 : Window showing options for number of rows and columns

If we set the number of columns as **2** and the number of rows as **1**, then the structure of the table will look like:



Alternatively, we can split cells by right clicking the selected cell and then choosing *Split Cells* option.

8.11 CREATING MULTIPLE COLUMNS

MS-Word provides us the facility to create newspaper-style columns-such as those that appear in newsletters and brochures to format our text with multiple columns. We can assign multiple columns to the entire documnet or to only a selected part of our document. When we want to set multiple columns, we have to:

- select the text we want to convert to multiple columns.
- select ***Columns*** option from the ***Format*** menu.The ***Columns dialog box*** will appear as shown in Fig.8.19.

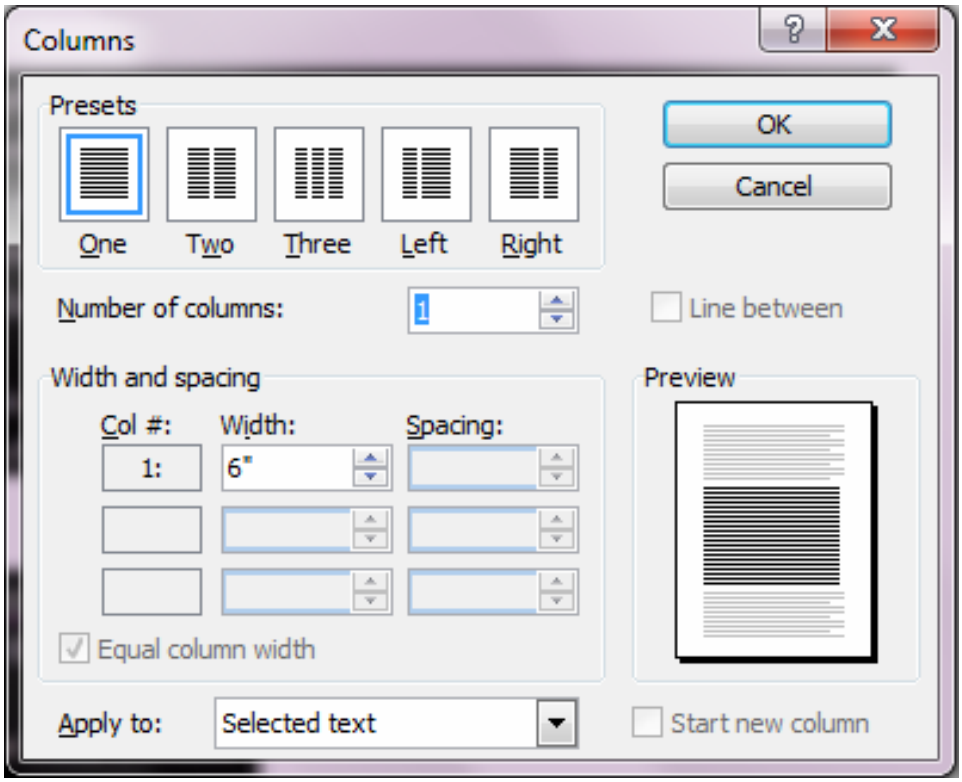


Fig. 8.19 : Columns dialog box to set up multiple columns

- In the ***Preset area***, click the column format we want and then enter the number of columns we want to produce.
- In the ***Width and Spacing area***, adjust the column width and spacing between columns or accept Word's default. Gener ally, the default measurements work well. As we adjust the columns, Word updates the ***Preview*** area to give us an idea of the final result.
- If we want a line between the columns, select the option ***Line between***.

When we click ***OK*** button, Word formats our selected text into multiple columns.

Figure 8.20 shows a document with three columns and a single column at the top of the title area. Generally, we should type our document's text before breaking into multiple columns.

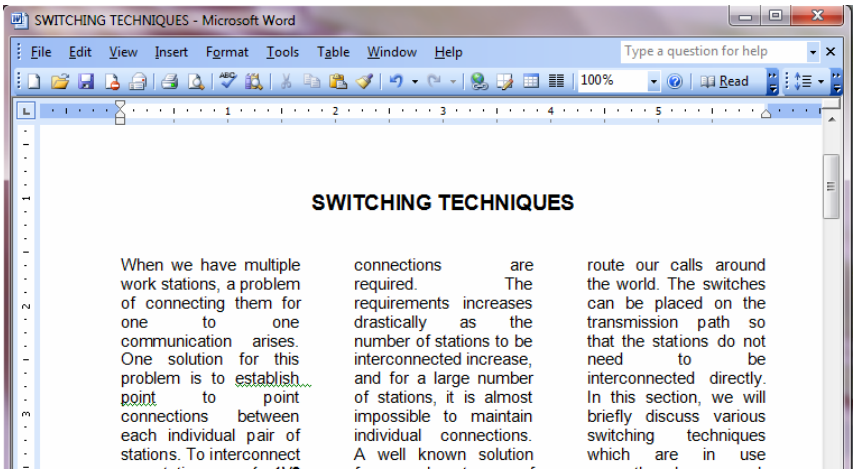


Fig. 8.20 : Text document in Newpaper format showing 3 columns

Multiple columns option can be used when we want our text to flow from the bottom of one column to the top of another.

CHECK YOUR PROGRESS

Q.3. Multiple Choice :

(i) The keyboard shortcut for Undo operation is

(a) Ctrl+U (b) Shift+Z

(c) Alt +U (d) Ctrl+Z

(ii) The maximum table size which can be created by the *Insert Table* option of toolbar is

(a) 35 table (b) 44 table

(c) 45 table (d) 54 table

Q.4. Write T for True and F for False :

(i) A table can also be drawn with the *Tables and Borders* option of the Standard toolbars

(ii) We cannot insert a chart in MS-Word document.

(iii) We can apply cut and paste feature in case of table also.

(iv) Contents within a table cell cannot be aligned.

(v) We can select a table by clicking the plus sign which appears at the upper right corner of the table while we move the mouse over the table.

Q.5. What is the difference between a table and a document formatted with multiple columns?

.....

.....

.....

.....

8.12 LET US SUM UP

- **Word** checks our spelling and grammar as we type. *Spelling errors* display with a *red wavy line* under the word. *Grammatical errors* are displayed with a *green wavy line* under the error.
- We can quickly reverse most commands we execute by using ***Undo*** command
- Using the ***Redo*** command, we can go to the previous state after the use of ***Undo*** command.
- ***Header*** is a special text that appears at the top of the page, which is often used for repeating the title of a document from a page to another page. Page number and pictures can also be entered as header in a document.
- ***Footer*** is often used for the same purpose but at the bottom of a document.
- The ***default tab setting*** for Microsoft Word is .5 inches.
- The margin of a MS-Word document can be changed with the ***Page SetUp*** option.
- ***Print Preview*** enables us to view either a full readable page or an unreadable view of page depending on screen size.
- MS- Word provides us the facility to add pictures and graphics into our document to make the document more attarctive.
- A table in a MS-word document can be created with the ***Insert > Table*** option from the Table menu. While creating a table, we have to specify the size of the table (i.e. the Number of Rows and Number of Columns of the table)

- To delete a table, click any of the cells of the table and then choose the ***Delete > Table*** option from the ***Table*** menu.
- Each block in a table is called a ***cell.***
- After creating a table, additional rows and columns can be inserted at any position in the table.
- The size of a table can be reduced by deleting row(s) or column(s) from the table.
- In a table, the cells can be merged.
- In a table, a particular cell can be split to form new cells.
- Multiple columns work well for newsletters and brochures to keep reader's attention.

8.13 FURTHER READINGS

- "*Introduction to Information Technology*", by Sanjay Saxena, Vikash Publishing, New Delhi.
- "*SAMS teach yourself Microsoft Office 2003 in 24 Hours*" by Greg Prerry, Pearson Education.
- "*MS Office XP for Everyone*", by Sanjay Saxena, Vikash Publishing, New Delhi.

8.14 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : (i) AutoCorrect, (ii) half inches, (iii) Spelling, (iv) green

Ans. to Q. No. 2 : (i) F, (ii) T, (iii) T, (iv) T

Ans. to Q. No. 3 : (i) (d) Ctrl+Z, (ii) (c) 45 table

Ans. to Q. No. 4 : (i) T, (ii) F, (iii) T, (iv) F, (v) T

Ans. to Q. No. 5 : Both tables and multicolumn documents have multiple columns. The multicolumn document, however, is useful when we want to create a newspaper-style documnet with flowing columns of text and graphics. Tables have both columns as well as rows, making cells at each row and column intersection for specific

data. A multicolumn document might contain a table in one of its columns. We can use tables when we want side-by-side columns of related information. Multiple columns option can be used when we want our text to frow from the bottom of one column to the top of another.

8.15 MODEL QUESTIONS

Q.1. What is the use of the Tab key? How can the Tab key can be set?

Q.2. How can you turn off the automatic spell check?

Q.3. What is Undo and Redo command?

Q.4. What is the use of header and footer in a word document? How can header and footer be inserted in a document?

Q.5. How can page number be displayed in header and footer in a document?

(a) Create a header and footer in a word document. The text “PC Software” should be included in the header part and the page number should be included in the footer part. The page number should be right aligned.

(b) Change the margin of the document as: Top 1.20", Bottom 0.80", Left 1.20" and Right 2.55".

Q.6. Describe the steps to create a new table?

Q.7. How a new row can be inserted in a table?

Q.8. How a new column can be inserted in a table?

Q.9. How two or more cells can be merged to form a new cell in a table?

Q.10 How a cell can be split to more than one cell in a table?

Q.11. Create a table as shown below:

(a) Delete the 2nd row from the table

(b) Delete the 3rd column from the table.

Q.12. Write down the steps to color all cells of a table.

Q.13. Write down the steps to insert an image whcih is saved in the in computer desktop.

UNIT 9 : MICROSOFT EXCEL

UNIT STRUCTURE

9.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- work with MS Excel
- use the different toolbar
- know Rows, Columns and Cells
- perform different operations on Cells, Rows and Columns
- create a new Workbook
- save and close a Workbook

9.2 INTRODUCTION

While working with large amounts of data we need to order them logically. Such data often need to be organized in a nice tabular format. For

that purpose we need a program that allows us to organize and manipulate huge amounts of data in a nice and easily understandable manner. Such a computer program is often called a Spreadsheet. A spreadsheet is the computer equivalent of a paper ledger sheet. It consists of a grid made from columns and rows. It is an environment that can make number manipulation easy and somewhat painless. Excel is an electronic spreadsheet program that can be used for storing, organizing, making calculations and manipulating data.

In this unit, we will be discussing these features of MS Excel and introduce ourselves to the basic features of Excel that one should understand in order to use and work in the MS Excel environment.

9.3 STARTING MS EXCEL

In order to start using MS Excel 2007, we have to launch it first by selecting it from the **Programs** list.

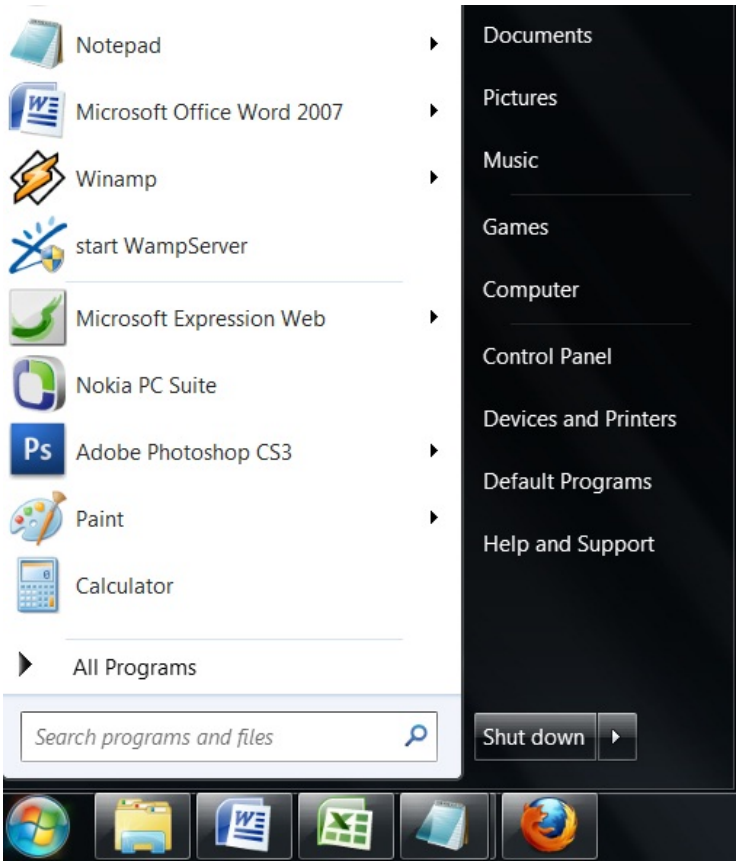


Fig. 9.1 : The Start menu

To do so we follow these steps :

1. Firstly we have to click on the **Start** button  located on the extreme left of the taskbar
2. This opens the **Start** menu of **Figure 9.1**
3. We then select the **Programs** menu, which gives us a list of all the installed programs
4. From among the installed programs we click on Microsoft Excel 2007 which shows the application window of MS Excel 2007 as in **Figure 9.2**.

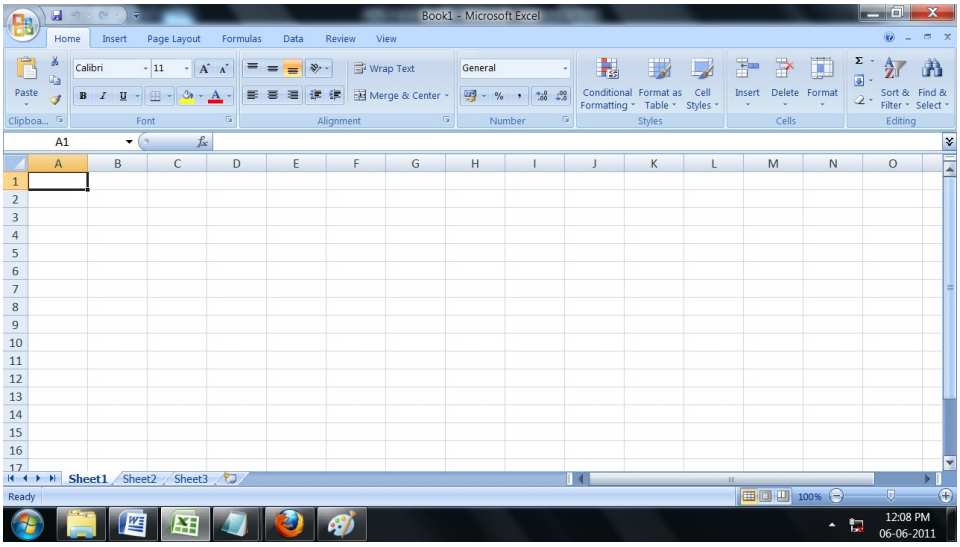


Fig. 9.2 : MS Excel 2007 application window

9.3.1 Working with Toolbars

The previous versions of MS Excel had many menus and toolbars wherefrom we could easily select many menu options and tools. But in MS Excel 2007 the menu bar and toolbar have been done away with. Excel 2007 introduces the **Ribbon**, which has replaced the menus and toolbars found in earlier versions of Excel. The Ribbon can quickly be hidden to give you more room to work in your spreadsheet.

Ribbon : The Ribbon is the strip of buttons and icons located above the work area in Excel 2007. Above the Ribbon are a number

of tabs, such as Home, Insert, Page Layout etc. Clicking on a tab displays the options located in this section of the ribbon. For example, when Excel 2007 opens, the options under the Home tab are displayed. These options are grouped according to their function - such as Clipboard (includes cut, copy, and paste options), and Font (includes current font, font size, bold, italic, and underline options).

Clicking on an option on the ribbon may lead to further options contained in a Contextual Menu that relate specifically to the option chosen.

In Excel 2007 we can use the scroll wheel on the mouse to scroll from one tab to another on the ribbon.

- **To Scroll Through Ribbon Tabs :**
  - We place the mouse pointer in the ribbon area at the top of the Excel 2007 screen.
  - Then we turn the scroll wheel on the mouse to scroll through the different ribbon commands.
- **To Hide the Ribbon Commands :**
  - We double click on one of the ribbon tabs - such as Home, Insert, or Page Layout.

    OR
  - Press the **CTRL + F1** keys on the keyboard.

  Only the tabs will be left showing above your spreadsheet.
- **To Show the Ribbon Commands Again :**
  - We click on one of the ribbon tabs - such as Home, Insert, or Page Layout.

    OR
  - Press the CTRL + F1 keys on the keyboard a second time.
- **To always keep the Ribbon minimized:**
  1. First we click the **Customize Quick Access** toolbar.
  2. In the list, we click **Minimize the Ribbon**.
  3. To use the Ribbon while it is minimized, we click the tab that we want to use, and then click the option or command we want to use. For example, with the Ribbon minimized, we

can select text in MS Office Word document, click the Home tab, and then in the Font group, we may click the size of the text needed. After clicking the desired text size, the Ribbon goes back to being minimized.

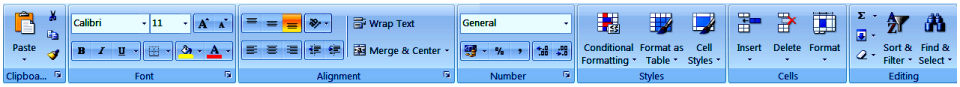


Fig. 9.3 : The Ribbon

- **The Quick Access toolbar :** The **Quick Access Toolbar** in Excel 2007 is found in the upper left corner of the spreadsheet program above the ribbon and next to the Office Button. It is used to store shortcuts to frequently used features in Excel 2007. It is also where we add the shortcuts to Excel features that are not available on the ribbon in Excel 2007.

Fig. 9.4 : The Quick Access toolbar

- **Moving the Quick Access toolbar :** The Quick Access toolbar is located above the Ribbon by default. **To bring it below the Ribbon we follow these steps**:
  1. We click **Customize Quick Access Toolbar**
  2. Then in the list, we click **Show Below the Ribbon**
- **Customizing the Quick Access toolbar :**
  - **Adding a command to the Quick Access Toolbar directly from the Ribbon**

We can add a command to the **Quick Access Toolbar** directly from commands that are displayed on the Ribbon by following these steps:

1. On the Ribbon, we click the appropriate tab or group to display the command that is to be added to the **Quick Access Toolbar**.
2. We right-click the command, and then click **Add to Quick Access Toolbar** on the shortcut menu.
   - **Adding a command to the Quick Access Toolbar by using the Program Name Options dialog box**

The new Ribbon in Office 2007 can take a while to get used to, so the Quick Access Toolbar is a great way to put the most frequently used commands on a single toolbar while getting used to the Ribbon. We can add a command to the **Quick Access Toolbar** from a list of commands in the **Program Name Options** dialog box, where **Program Name** is the name of the program being used, for example, Word Options

1. Firstly we do any one of the following
   - Using the MS Office button
     (i) We click the MS Office Button, and then click **Program Name Options**, where Program Name is the name of the program being used, for example, Excel Options.
     (ii) We click **Customize**.
   - Using the **Quick Access toolbar**
     (i) We click **Customize Quick Access Toolbar**
     (ii) In the list we click **More Commands** which opens the dialog box of **Figure 9.5**.
2. In the ***Program Name*** **Options** dialog box, in the **Choose commands from** list, we click the command category that we want.

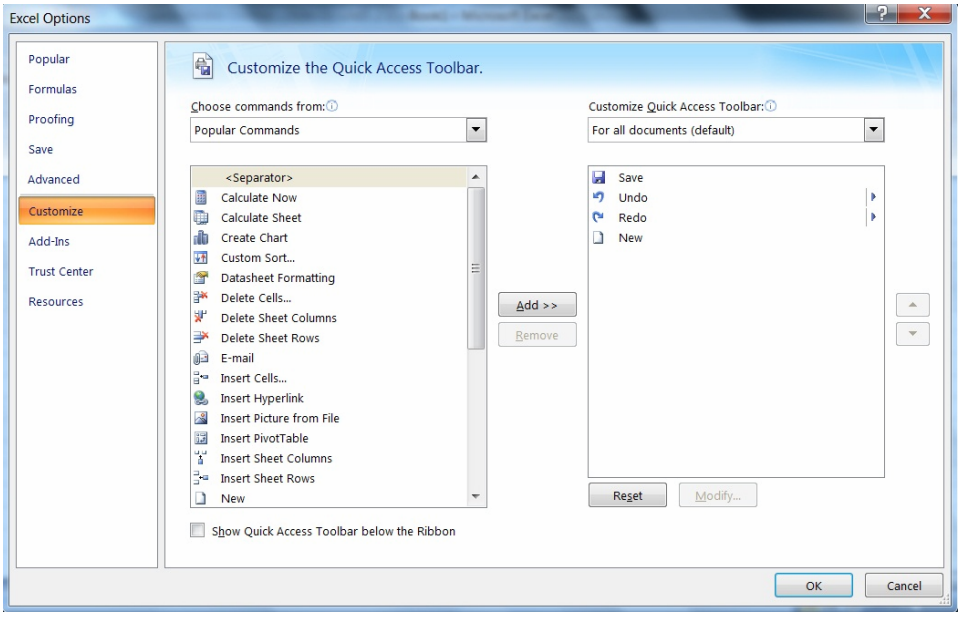


Fig. 9.5 : The Excel Options dialog box

3. In the list of commands in the selected category, we click the command to be added to the **Quick Access Toolbar**, and then click **Add**.
4. After adding we click **OK**.

9.4 ROW, COLUMN AND CELL

MS Excel can be used to organize data into rows and columns. When we look at the Excel screen of **Figure 9.2**, we can see a rectangular table or grid of rows and columns. The horizontal rows are identified by numbers (1,2,3 etc) and the vertical columns are identified with letters of the alphabet (A,B,C etc). For columns beyond 26, columns are identified by two or more letters combination such as AA, AB, AC etc

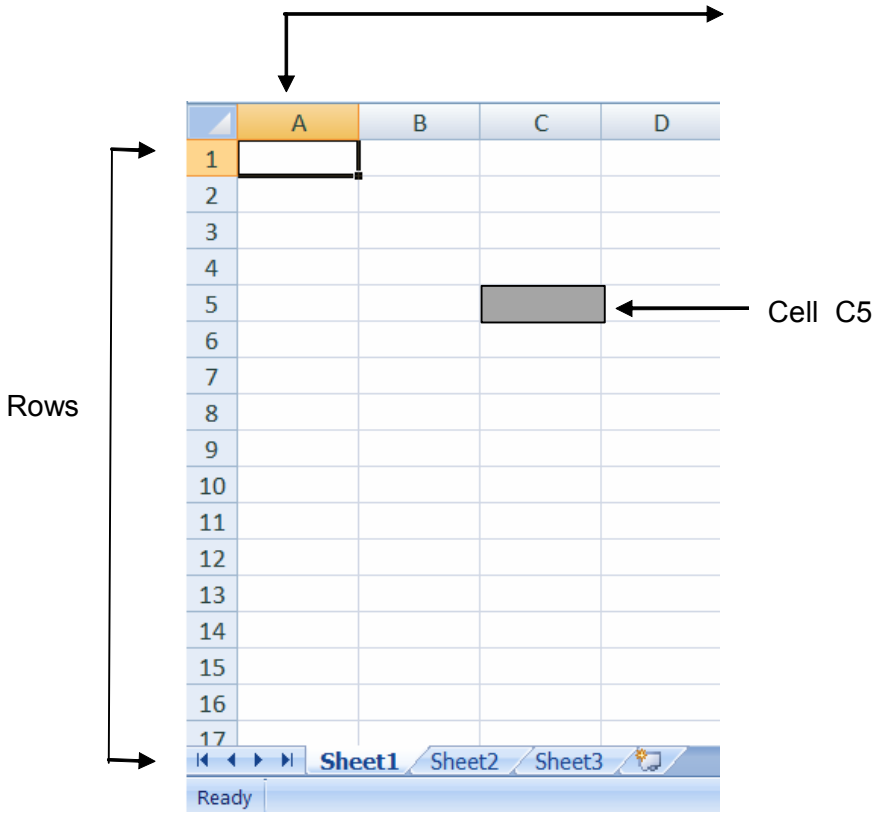


Fig. 9.6 : Rows, Columns and Cells in an Excel Worksheet

The intersection point between a column and a row is a small rectangular box known as a **cell**. A cell is the basic unit for storing data in the spreadsheet. Because an Excel spreadsheet contains thousands of

these cells, each is given a **cell reference** or address to identify it. Sometimes referred to as a cell address, a cell reference consists of the column letter and row number that intersect at the location of the cell such as A3, B6, AA345. A cell reference identifies the location of a cell or group of cells in the spreadsheet. When listing a cell reference, the column letter is always listed first.

- Cell references are used in formulas, functions, charts and other Excel commands.
- While references often refer to individual cells such as **A1**, **B38**, or **Z345**, they can also refer to a group or range of cells.
- Ranges are identified by the cell references of the cells in the upper left and lower right corners of the range.
- The two cell references used for a range are separated by a colon (:) which tells Excel to include all the cells between these start and end points.
- An example of a range of adjacent cells would be **B5:D10**.

CHECK YOUR PROGRESS

Q.1. Fill in the blanks.

(i) A _____ is the computer equivalent of a paper ledger sheet.

(ii) In Excel 2007 the _____ has replaced the menus and toolbars found in earlier versions of Excel.

(iii) The _____ is used to store shortcuts to frequently used features in Excel 2007.

(iv) In Excel 2007 we can use the _____ on the mouse to _____ from one tab to another on the ribbon.

Q.2. State whether the following statements are True or False.

(i) The Ribbon can quickly be hidden to get more room to work in our spreadsheet.

(ii) The Ribbon is the strip of buttons and icons located above the work area in Excel 2007.

(iii) Horizontal rows are identified by letters of the alphabet and the vertical columns are identified by numbers.

(iv) The intersection point between a column and a row is a small rectangular box known as a cell.

(v) A cell reference consists of the column number and row letter that intersect at the cell's location.

9.5 WORKING WITH EXCEL

Before working with excel and using its various features and functions that help us to create Worksheets which enable us to manipulate data in rows and columns, it is important to understand some basic ways of working in the excel environment which would enable us to use later the more advanced features and techniques present in Excel 2007.

- **Navigating in Excel :** Any application program that has windows includes the navigation bars that allow us to have a full look into a worksheet, as shown in **Figure 9.7**.

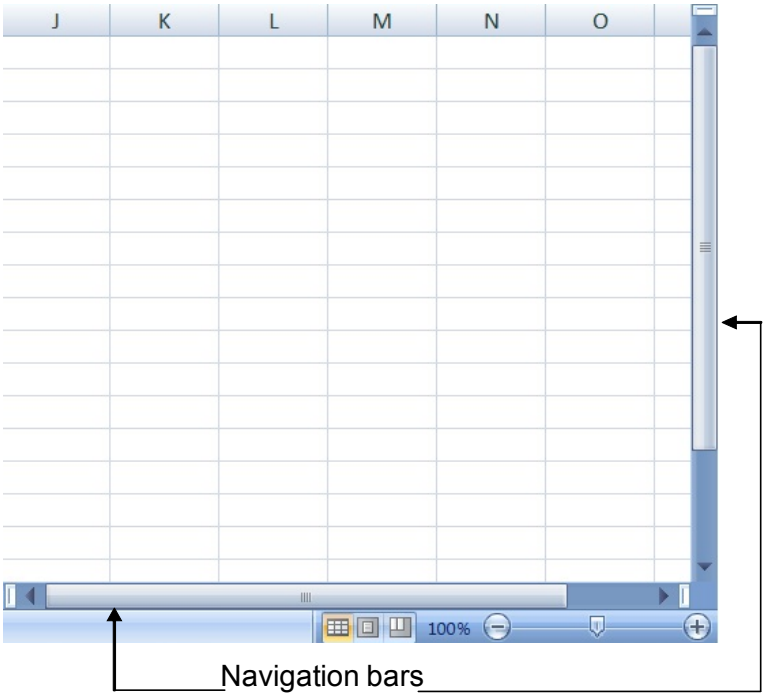


Fig. 9.7 : Navigating the Worksheet

Using these two navigation bars we can browse through the entire worksheet.

- **Selecting sheets :** In order to work with multiple worksheets in Excel, we need to select them numerous times. If we have multiple worksheets in the Excel document, they can be seen as shown in **Figure 9.8**

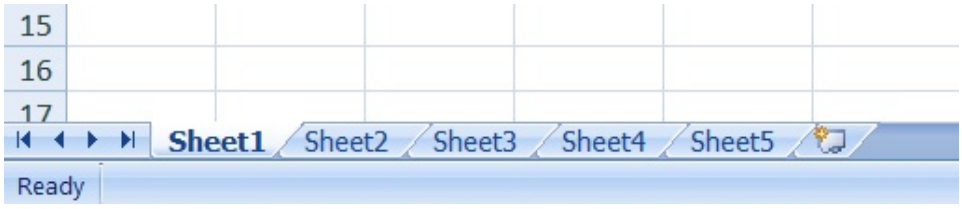


Fig. 9.8 : Multiple Sheets in Excel

  - To select a single sheet while working with Excel we click the tabs of worksheets (or sheets) at the bottom of the window.
  - To select two or more adjacent sheets we click the tab for the first sheet, and then holding down **SHIFT** we click the tab for the last sheet that we want to select.
  - To select two or more nonadjacent sheets we click the tab for the first sheet, and holding down **CTRL** we click the tabs of the other sheets that we want to select.
  - To select all sheets in a workbook we right-click a sheet tab, and then click **Select All Sheets** on the shortcut menu.
- **Entering data into cells :**

  To enter data into Worksheet cells we do the following :

  1. Firstly we select the cell where data is to be inserted
  2. We then type the text into that cell
  3. Finally we press **Enter** or **Tab**
- **Editing data in cells :**

  To edit data in a Worksheet cell we do the following:

  1. To place the contents of a cell in editing mode
     - We double-click the cell whose data is to be edited.

       OR

- We click the cell whose data is to be edited, and then click anywhere in the formula bar.

This positions the insertion point in the cell or formula bar.

2. **To edit the cell contents**
   - To delete characters, we click where we want to delete them, and then press BACKSPACE, or select them, and then press DELETE.

     OR
   - To insert characters, we click where we want to insert them, and then type the new characters.

     OR
   - To replace specific characters, we select them, and then type the new characters.

     OR
   - To turn on Overtype mode so that existing characters are replaced by new characters while typing, we press **INSERT**.

     OR
   - To start a new line of text at a specific point in a cell, we click where we want to break the line, and then press **ALT+ENTER**.

- **Deleting data from cells :**

  To delete data from a Worksheet cell we do the following:

  1. Firstly, we select the cell whose data is to be deleted
  2. Then we do one of the following
     - Press the **DELETE** key
     - Press the **BACKSPACE** key
     - Right-click the cell and select **Clear Contents** from the drop-down menu
     - Right-click the cell and select **Delete**, or on the **Home** tab, in the **Cells** group, we select **Delete** and click **Delete Cells**, which opens up the dialog box in **Figure 9.9**.

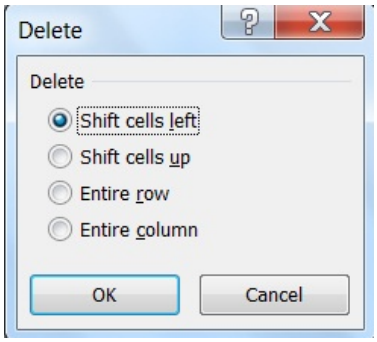


Fig. 9.9

3. Now we select any of the two options **Shift cells left** or **Shift cells up**.

9.5.1 Creating a New Workbook

A MS Excel workbook is a file containing one or more worksheets that we use to organize several kinds of related information.

- **To create a new workbook, we may**
  - Open a blank workbook
  - Base a new workbook on an existing workbook
  - Base a new workbook on a template
- **To open a new blank workbook we follow these steps:**
  1. We click the **Microsoft Office Button** and then click **New**.

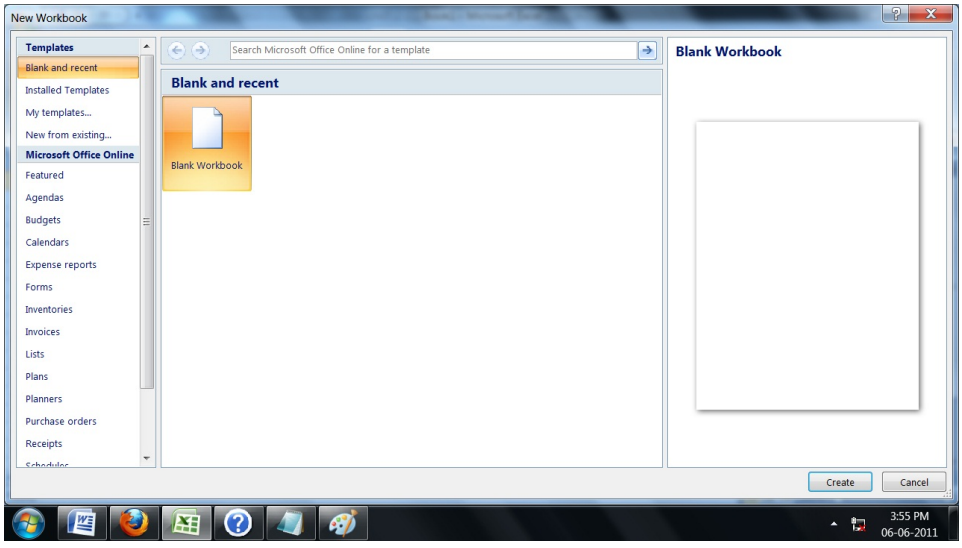


Fig. 9.10 : The New Workbook dialogue box

OR

Press **Ctrl + N**

2. This opens the **New Workbook** dialog box as in **Figure 9.10**
3. Under **Templates**, we select **Blank and recent**, and then under Blank and recent in the right pane, we click **Blank Workbook**.

- **To base a new workbook on an existing workbook we follow these steps:**
  1. We click the **Microsoft Office Button** and then click **New** or press **Ctrl + N** which opens the dialogue box of **Figure 9.10**
  2. Under **Templates**, we click **New from existing** which opens up the **New from Existing Workbook** dialog box of **Figure 9.11**
  3. In the **New from Existing Workbook** dialog box, we browse to the drive, folder, or Internet location that contains the workbook that we want to open.
  4. We click the workbook, and then click **Create New**.

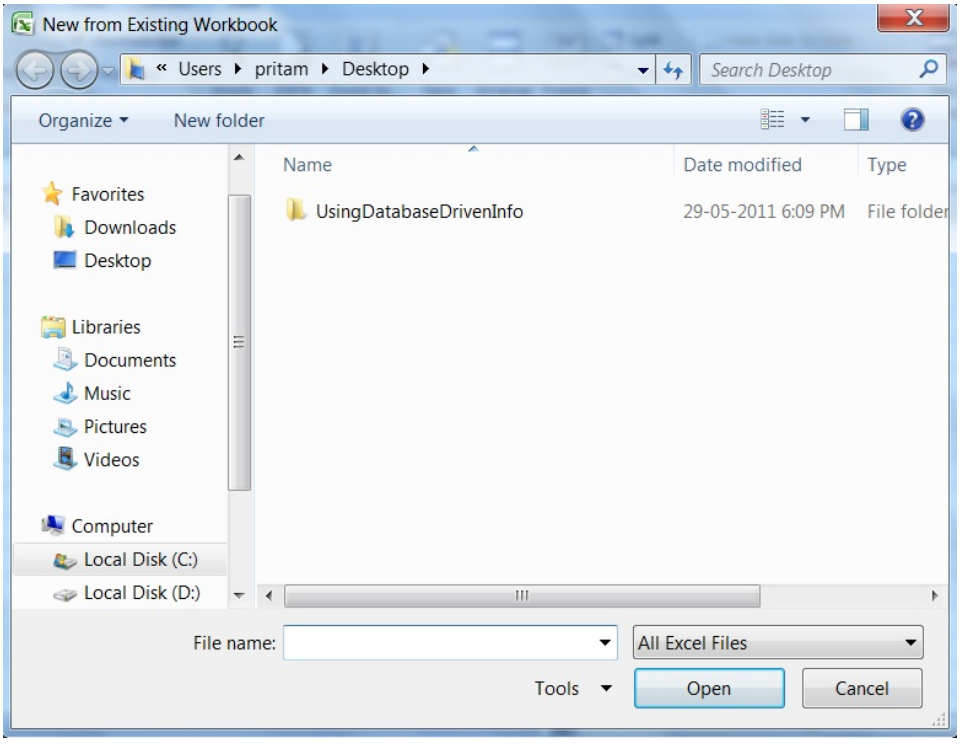


Fig. 9.11 : The New from Existing Workbook dialog box

- **To base a new workbook on an existing template we follow these steps:**
  1. We click the **Microsoft Office Button** and then click **New** or press **Ctrl + N** which opens the dialogue box of **Figure 9.10**.
  2. Under **Templates**, we click **Installed Templates** which opens the dialog box of **Figure 9.12** or **My templates** which opens the dialog box of **Figure 9.13**.
  3. Finally we do one of the following
     - To use an installed template, under **Installed Templates**, we click the template we want, and then click **Create**.
     - To use our own template, on the **My Templates** tab, we double-click the template that we want.

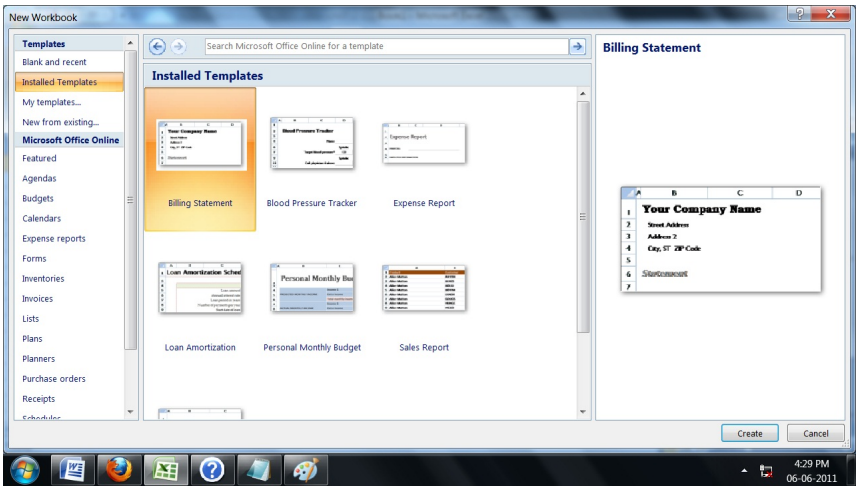


Fig. 9.12 : The Installed Templates

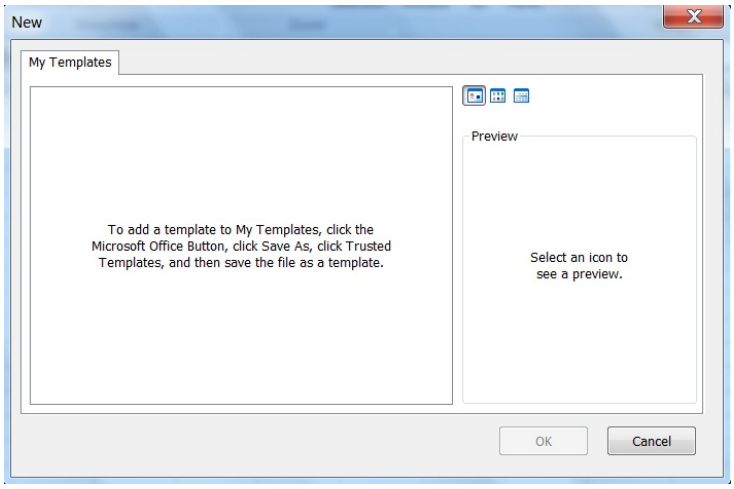


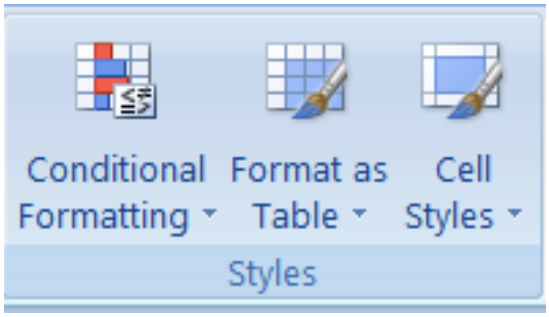
Fig. 9.13 : The New dialog box

9.5.2 Working with Cells and Fonts

When we are working in Excel we are actually dealing with the data that we insert into the cells. We have already seen how we can perform operations on cell data like insertion, edition and deletion. In this section we will look into some other features of working with cells.

When we work with cells we can apply different formatting techniques to them. Also we can work with Fonts in Excel in a similar manner. Some of them are discussed below.

- **Working with Styles :** A cell style is a defined set of formatting characteristics, such as fonts and font sizes, number formats, cell borders, and cell shading. To prevent anyone from making changes to specific cells, we can also use a cell style that locks cells. To apply several formats in one step, and to ensure that cells have consistent formatting, we can use a cell style.
  - **To apply a cell style, we follow these steps :**
    1. Firstly we select the cells we want to format
    2. On the **Home** tab, in the **Styles** group, we click **Cell Styles**



    3. Lastly we select the cell style that we want to apply
  - **To create a custom cell style we follow these steps :**
    1. Firstly on the **Home** tab, in the **Styles** group, we click **Cell Styles**.
    2. Then we click on **New Cell Style** which opens the dialog box of **Figure 9.14**.

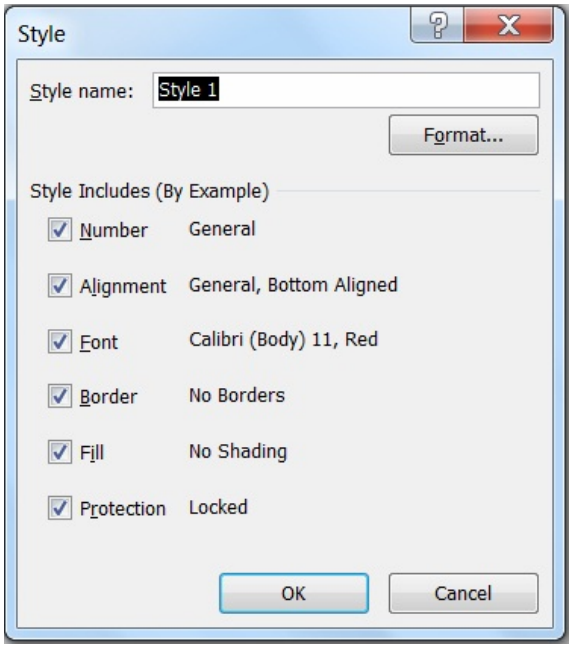


Fig. 9.14 : The New Cell Style dialog box

3. In the **Style name** box, we type an appropriate name for the new cell style.
4. Then we click **Format to open the Format Cells dialog box of Figure 9.15**.

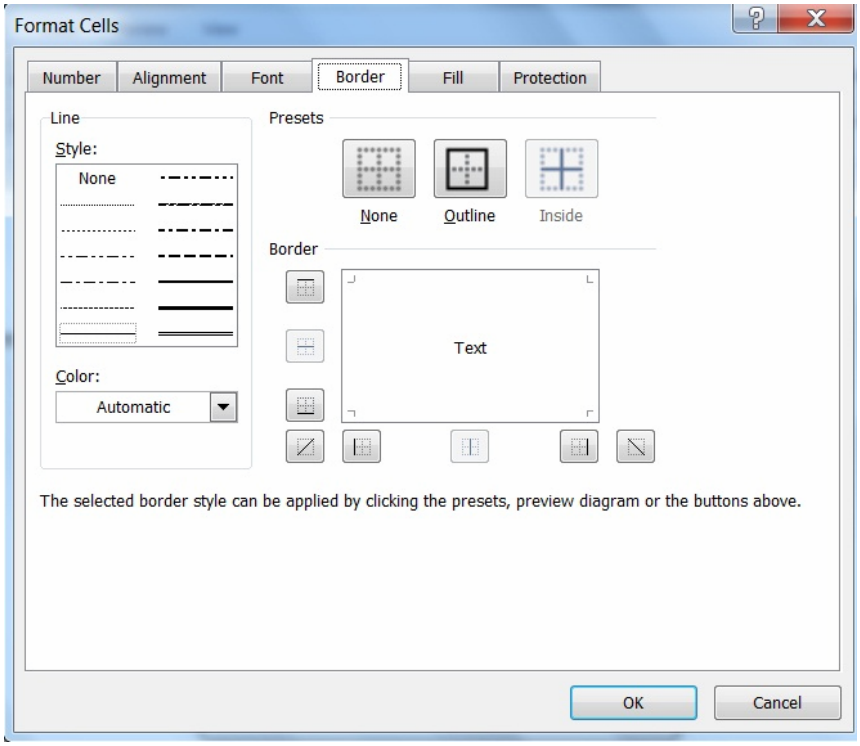


Fig. 9.15 : The Format Cells dialog box

5. On the various tabs in the **Format Cells** dialog box, we select the formatting and click **OK**.
6. In the **Style** dialog box, under Style Includes, we clear the check boxes for any formatting that we do not want to include in the cell style.

➢ **To fill cells with solid colors we follow these steps:**

1. Firstly we select the cells that we want to apply shading to or remove shading from
2. On the **Home** tab, in the **Font** group, we do one of the following:
   - To fill cells with a solid color, we click the arrow next to **Fill Color** in the **Font** group on the **Home** tab, and then click the color we want.
   - To apply the most recently selected color, we can click **Fill Color**.

➢ **To fill cells with patterns, we follow these steps :**

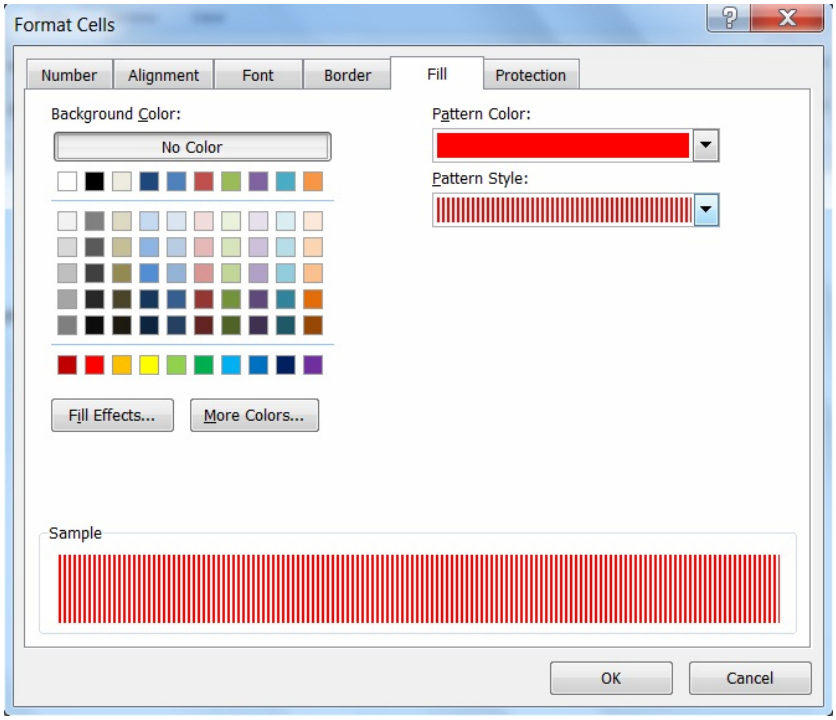


Fig. 9.16 : The Format Cells dialog box

1. We select the cells to be fill with a pattern.
2. On the Home tab, we click the **Dialog Box Launcher** next to **Font**, and then click the **Fill** tab as shown in **Figure 9.16** below.
3. Under **Background Color**, we click the background color that we want to use.

➢ **To apply cell borders we follow these steps :**

1. Firstly we select the cell/range of cells that we want to add a border to, to change the border style on, or to remove a border from
2. On the **Home** tab, in the **Font** group, we click the arrow next to **Border**s, and then click a border style.

- **Working with Fonts :** We can not only change the font or font size for selected cells or ranges in a worksheet, but also change the default font and font size that are used in new workbooks.

➢ **To change the font or font size we follow these steps :**

1. Select the cell, range of cells, text, or characters that you want to format.
2. On the **Home** tab, in the **Font** group, we do the following:
   - To change the font, we click the needed font in the Font box Arial

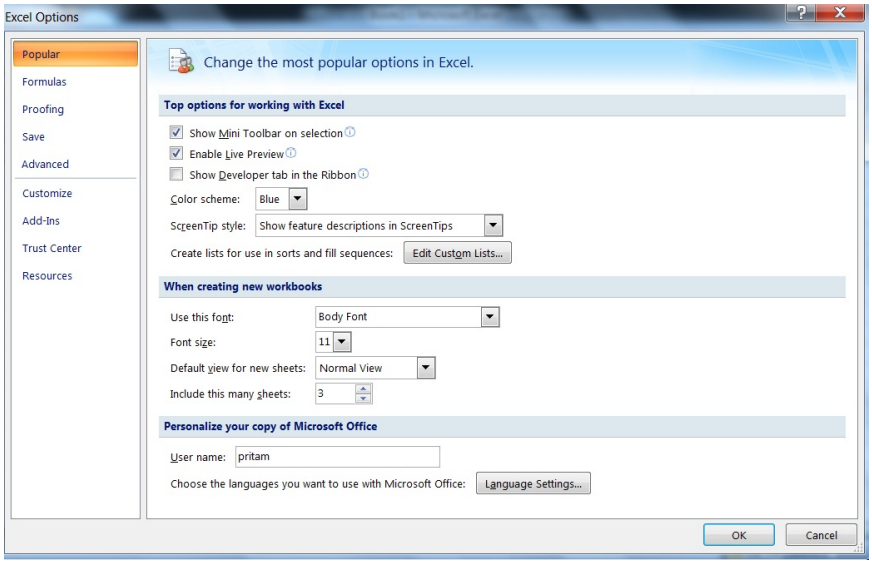


Fig. 9.17 : The Excel Options dialog box

- To change the font size, we click the font size that we want in the **Font Size** box 11 or click **Increase Font Size** A or **Decrease Font Size** A until the size you want is displayed in the Font Size box.

➢ **To change the default font or font size for new workbooks we follow these steps :**

1. We click the MS Office Button and then click **Excel Options** which opens the dialog box of **Figure 9.17**
2. In the **Popular** category, under **When creating new workbooks**, we click a font in the **Use this font** box, and then specify a font size in the **Font Size** box.

CHECK YOUR PROGRESS

Q.3. State whether the following statements are True or False :

(i) To select two or more adjacent sheets we click the tab for the first sheet, and then holding down SHIFT we click the tab for the last sheet that we want to select

(ii) We cannot base a new workbook on an existing workbook.

(iii) Base a new workbook on a template.

(iv) We cannot use a cell style that locks cells.

(v) We can fill cells with patterns.

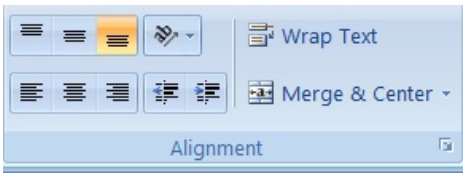
9.5.3 Merging Cells

The Merge formatting feature in Excel 2007 is a handy option to quickly format titles and headings in Excel 2007 spreadsheets. It allows us to align titles evenly above our data by merging a number of cells into one and then aligning the title in this one cell. In previous versions of Excel problems often occurred when we tried to make formatting changes to an area of the worksheet where the Merge

feature had been applied. Adding new columns to the merged area was particularly difficult and it was necessary to un-merge the cells, add the new columns, and then reapply Merge. In Excel 2007 this problem has been corrected. Adding new columns to the merged area is now quite easily done.

When we merge two or more adjacent horizontal or vertical cells, the cells become one large cell that is displayed across multiple columns or rows. The contents of one of the cells appear in the center of the merged cell. A merged cell is a single cell that is created by combining two or more selected cells. The cell reference for a merged cell is the upper-left cell in the original selected range.

- **To merge adjacent cells we do the following :**
  1. Firstly we need to select two or more adjacent cells that we want to merge
  2. On the **Home** tab, in the **Alignment** group, we click **Merge and Center**.

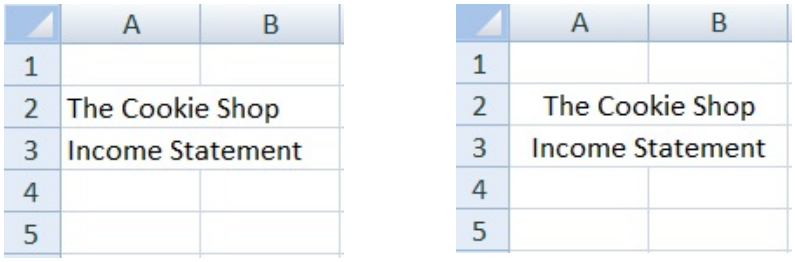


  3. The cells will be merged in a row or column, and the cell contents will be centered in the merged cell. To merge cells without centering, we click the arrow next to **Merge and Center**, and then click **Merge Across** or **Merge Cells**
  4. (Optional) We may change the alignment in the merged cell, if desired. For example, we may click the **Align Text Right** button in the **Alignment** group in case we want the text in the merged cell to be right-aligned instead of centered.

Example using the Merge and Center cells feature.

1. Firstly, we click on cell A2.
2. Then type in a title such as: **The Cookie Shop**.
3. Click on cell A3.
4. Then type in a subtitle such as: **Income Statement**.

5. We drag select cells A2 to C2
6. Then click on the **Home** tab.
7. Click on the **Merge & Center** option on the ribbon.
8. The title should be centered across columns A to C.
9. Drag select cells A3 to C3
10. Click on the Merge & Center option on the Ribbon.
11. The subtitle should be centered across columns A to C.



	A	B
1		
2	The Cookie Shop	
3	Income Statement	
4		
5		

Before applying Merge

	A	B
1		
2	The Cookie Shop	
3	Income Statement	
4		
5		

After applying Merge and Center

If we try to Merge & Center more than one row at a time only the title in the top row will be retained by Excel. All other titles will be discarded.

Splitting a merged cell :

We may also unmerge or split a merged cell into its original, individual cells. We can only split a cell that has previously been merged.

- **To split a merged cell we follow these steps :**
  1. Firstly we select the merged cell that we want to unmerge
  2. The **Merge & Center** button appears selected in the **Alignment** group.
  3. Finally we click the **Merge & Center** button in the **Alignment** group.

The merged cell reverts to a cell range again, and any text contained in the merged cell displays in the upper-left cell of the range.

9.5.4 Inserting and Deleting Rows and Columns

In an Excel workbook we can insert rows above a row and columns to the left of a column. We can also delete rows and columns in a worksheet.

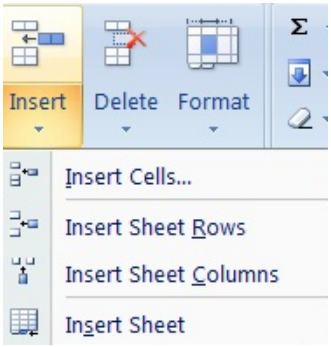
- **To insert rows on a worksheet we follow these steps :**
  1. Firstly, if we want to insert a single row, we select the row or a cell in the row above which we want to insert the new row.

     OR

     If we want to insert multiple rows, we select the rows above which we want to insert rows. We select the same number of rows as we want to insert.

     OR

     If we want to insert nonadjacent rows, we hold down **Ctrl** while selecting the nonadjacent rows.
  2. On the **Home** tab, in the **Cells** group, we click the arrow next to **Insert**, and then click **Insert Sheet Rows**.



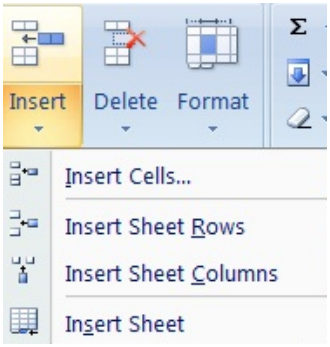
- **To insert columns on a worksheet we follow these steps :**
  1. Firstly, if we want to insert a single column we have to select the column or a cell in the column immediately to the right of where we want to insert the new column.

     OR

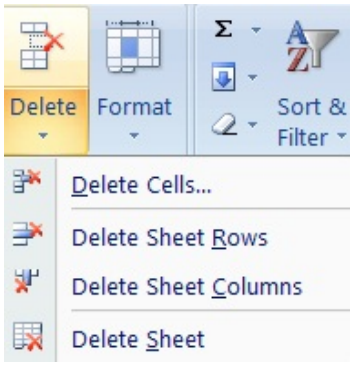
     If we want to insert multiple columns we have to select the columns immediately to the right of where we want to insert columns. We similarly select the same number of columns as we want to insert.

     OR

     If we want to insert nonadjacent columns, we have to hold down the **Ctrl** key while selecting nonadjacent columns
  2. On the **Home** tab, in the **Cells** group, we click the arrow next to **Insert**, and then click **Insert Sheet Columns**.



- **To delete rows or columns from a worksheet we follow these steps :**
  1. Firstly, we select the rows or columns to be deleted.
  2. On the **Home** tab, in the **Cells** group, we do one of the following:
     - To delete selected rows, we click the arrow next to **Delete**, and then click **Delete Sheet Rows**.
     - To delete selected columns, we click the arrow next to **Delete**, and then click **Delete Sheet Columns**.



When we delete rows or columns, the other rows or columns automatically shift up or to the left.

9.6 SAVING A WORKBOOK

When we save a file, we can save it on the hard disk drive, a network location, disk, CD, the desktop, or another storage location. We need to identify the target location in the **Save in list**. Otherwise, the saving process is the same, no matter what location we choose.

- **To Save an Excel 2007 file we do the following :**
  1. Firstly we click the **Microsoft Office button**
  2. From the drop down menu we click **Save**.

     OR

     We press **Ctrl + S** on the keyboard

*(If we are saving the file for the first time, the **Save As** dialog box opens and we are asked to give a file name)*

- **To save a copy of an Excel 2007 file we do the following :**
  1. Firstly we click the **Microsoft Office button** and choose **Save As**.
  2. Click the folder or drive to which we want to save.
  3. In the **File name** box, we enter a new name for the file.
  4. Click **Save**.
- **To save an Excel 2007 file to another format we do the following :**
  1. Firstly we click the **Microsoft Office Button** and then click **Save As**.
  2. In the **File name** box, we enter a new name for the file.
  3. In the **Save as type** list, we click the file format that we want to save the file in
  4. Click **Save**.

9.7 CLOSING A WORKBOOK

After we have finished working with our Excel workbook and saved it on the hard drive, we should close the workbook. The ways that are involved in closing a Workbook are discussed below.

- **To close a Workbook without quitting MS Excel 2007 we do the following :**
  1. We click the MS Office button and click **Close**

     OR

     Click the **Close window** button just above the worksheet
  2. If the Worksheet has not been saved, the dialog of **Figure 9.18** is displayed asking us if we would like to Save the Workbook.

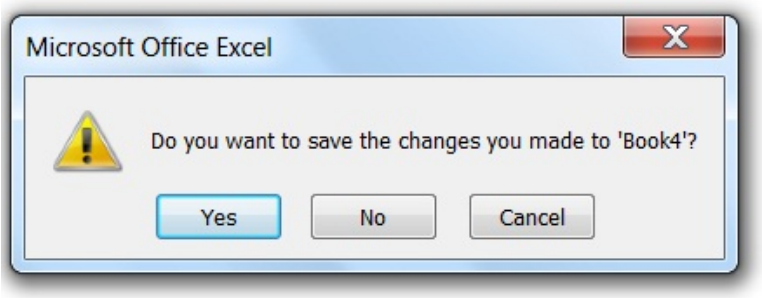


Fig. 9.18 : Saving a Workbook

2. If we select **Yes**, another dialog box is provided which allows us to Close the workbook by saving it.

- **To close a Workbook by quitting MS Excel 2007 we do the following:**
  1. Firstly we click the **Close** button  that closes MS Excel
  2. If the Worksheet has not been saved, the dialog of **Figure 9.18** is displayed asking us if we would like to Save the Workbook
  3. If we select **Yes**, another dialog box is provided which allows us to Close the workbook by saving it.

CHECK YOUR PROGRESS

Q.4. Fill in the blanks:

(i) The _____ formatting feature is a handy option to quickly format titles and headings.

(ii) A _____ is a single cell that is created by combining two or more selected cells.

(iii) If we try to _____ more than one row at a time only the title in the top row will be retained by Excel.

(iv) We can only _____ a cell that has previously been _____.

(v) If we want to insert nonadjacent rows, we _____ the nonadjacent rows.

9.8 LET US SUM UP

- Excel is an ***electronic spreadsheet program*** that can be used for storing, organizing and manipulating data.
- MS Excel can be used to organize data into ***rows and columns***.
- For columns beyond 26, columns are identified by ***two or more letters combination*** such as AA, AB, AC etc
- A ***cell*** is the basic unit for storing data in the spreadsheet.
- To select a single sheet while working with Excel we click the ***tabs of worksheets*** (or sheets) at the bottom of the window.
- When we work with cells we can apply different ***formatting techniques*** to them.
- A ***cell style*** is a defined set of formatting characteristics.
- When we ***merge*** two or more adjacent horizontal or vertical cells, the cells become one large cell that is displayed across multiple columns or rows.
- We can also ***unmerge or split*** a merged cell into its original, individual cell.
- In an Excel workbook we can ***insert rows above a row and columns to the left of a column***.

9.9 FURTHER READINGS

1 "*Introduction to Information Technology*", by Sanjay Saxena, Vikash Publishing, New Delhi.

- "*SAMS teach yourself Microsoft Office 2003 in 24 Hours*" by Greg Prerry, Pearson Education.

9.10 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : (i) spreadsheet, (ii) ribbon, (iii) quick access toolbar, (iv) scroll wheel, scroll

Ans. to Q. No. 2 : (i) true, (ii) true, (iii) false, (iv) true, (v) false

Ans. to Q. No. 3 : (i) true, (ii) false, (iii) false, (iv) false, (v) true

Ans. to Q. No. 4 : (i) Merge, (ii) merged cell, (iii) Merge and Center, (iv) Split, merged, (v) Ctrl + click

9.11 MODEL QUESTIONS

Q.1. What purpose is Excel used for? What are its applications?

Q.2. How do we start working with MS Excel 2007?

Q.3. Describe the Ribbon in Excel 2007.

Q.4. What are Rows, Columns and Cells in Excel?

Q.5. What are the steps involved in creating a new worksheet in Excel 2007?

Q.6. How can we merge cells? Give an example.

Q.7. How do we spit a merged cell? Explain

Q.8. Explain the process of inserting rows and columns in Excel.

Q.9. Explain the process of deleting rows and columns in Excel.

Q.10. How do we close an Excel worksheet?

UNIT 10 : FUNCTIONS IN EXCEL

UNIT STRUCTURE

10.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- know the different operators used in excel
- use the various calculation techniques
- use functions in excel to work with data
- use sorting to sort data differently
- learn about charts and use different types of charts
- use different charts to display data trends

10.2 INTRODUCTION

In the previous unit, we were introduced to MS Excel 2007, where we got to know the purpose of Excel and its use. We were introduced to the terms like rows, columns, cells etc. We have also leant how to add and delete rows and columns. The basics of an Excel workbook were also introduced in the previous unit.

One important fact while using excel is data manipulation. Data manipulation in Excel involves inserting various types of data in cells and

performing several different operations on them. Excel supports numerous functions and formulas that we can implement in order to get the desired result. These involve calculation of data, both simple and complex, using those functions and formulas.

Another concept involved with data manipulation is that of charts. Excel 2007 provides several different types of charts, each suited for a particular type of data-set. These charts give a graphical representation of data in worksheets, showing the relative comparison among data. In this unit we will be discussing at length these operations performed on worksheet data.

10.3 DIFFERENT OPERATORS USED IN EXCEL

Operators specify the type of calculation that we want to perform on the elements of a formula. There is a default order in which calculations occur, but we can change this order by using parentheses.

- **Types of operators :** There are four different types of calculation operators: arithmetic, comparison, text concatenation, and reference.
  - **Arithmetic operators :** To perform basic mathematical operations such as addition, subtraction, or multiplication; combine numbers; and produce numeric results, we use the following arithmetic operators.

OPERATOR	MEANING	EXAMPLE
+	Addition	4+4
–	Subtraction, Negation	4-2, -3
*	Multiplication	4*2
/	Division	3/3
%	Percent	30%
^	Exponentiation	2^3

  - **Comparison operators :** We can compare two values with the following operators. When two values are compared by

using these operators, the result is a logical value either TRUE or FALSE.

OPERATOR	MEANING	EXAMPLE
=	Equal to	A2=B2
>	Greater than	A3>B3
<	Less than	B3<A3
>=	Greater than or equal to	A4>=B4
<=	Less than or equal to	B4<=A4
<>	Not equal to	A2<>B4

- **Text concatenation operator :** We use the ampersand (&) to join, or concatenate, one or more text strings to produce a single piece of text.

OPERATOR	MEANING	EXAMPLE
&	Concatenates, two values to produce one continuous text value	(“Independence”&”day”)

- **Reference operators :** We can combine ranges of cells for calculations with the following operators.

OPERATOR	MEANING	EXAMPLE
:	Range operator, which produces one reference to all the cells between two references, including the two references	B5:B15
,	Union operator, which combines multiple references into one reference	SUM(B5:B15,D5:D15)
(Space)	Intersection operator, which produces on reference to cells common to the two references	B7:d7 c6:c8

- **The order in which excel performs operations in formulas :** In some cases, the order in which calculation is performed can affect the return value of the formula, so it is important to understand how the order is determined and how we can change the order to obtain desired results.
  - **Calculation order :** Formulas calculate values in a specific order. A formula in Excel always begins with an equal sign (=), which tells Excel that the succeeding characters constitute a formula. Following the equal sign are the elements to be calculated (the operands), which are separated by calculation operators. Excel calculates the formula from left to right, according to a specific order for each operator in the formula.
  - **Operator precedence :** When we combine several operators in a single formula, Excel performs the operations in the order shown in the following table. If a formula contains operators with the same precedence — for example, if a formula contains both a multiplication and division operator — Excel evaluates the operators from left to right.

OPERATOR	DESCRIPTION
, : (space)	Reference operators
–	Negation
%	Percent
^	Exponentiation
* And /	Multiplication and division
+ And –	Addition and subtraction
&	Concatenation
= < >	

>	Comparison
=	
<	
=	
<	
>	

- **Use of parentheses :** In order to change the order in which an expression is evaluated, we enclose in parentheses the part of the formula to be calculated first. For example, the following formula produces 11 because Excel calculates multiplication before addition. The formula multiplies 2 by 3 and then adds 5 to the result.

  = 5+2*3

  In contrast, if we use parentheses to change the syntax, Excel adds 5 and 2 together and then multiplies the result by 3 to produce 21.

  = (5+2)*3

  In the example below, the parentheses around the first part of the formula forces Excel to calculate B4+25 first and then divide the result by the sum of the values in cells D5, E5, and F5.

  =(B4+25)/SUM(D5:F5)

10.4 WORKING WITH FORMULA AND FUNCTIONS

Calculations in a worksheet are performed using formulas. Formulas are one of the most useful features of spreadsheets like Excel. Formulas can be as simple as adding two numbers or can be complex calculations needed for high end business projections.

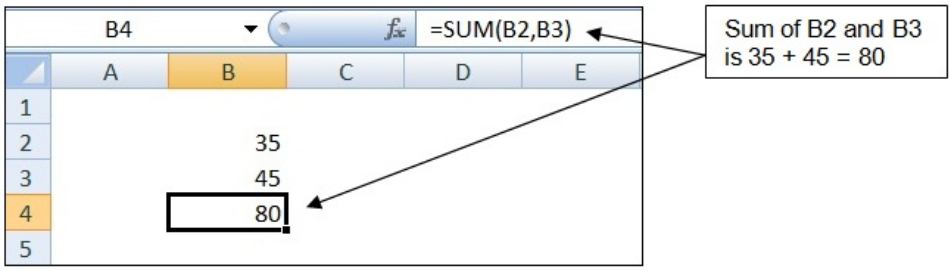
Excel 2007 formulas allow us to perform calculations on data entered into the spreadsheet.

A formula is a set of mathematical instructions that can be used in Excel to perform calculations. Formals are started in the formula box with an = sign.

There are many elements to an Excel formula.

- References – The cell/range of cells use in the calculation.
- Operators – Symbols (+, -, *, /, etc.) specifying the calculation to be performed
- Constants – Numbers or text values that do not change
- Functions – Predefined formulas in Excel

- **To create a basic formula in Excel :**
  1. We select the cell for the formula
  2. Then type = (the equal sign) and the formula
  3. Finally we click **Enter**



Example : The example creates a basic formula. The steps used to create this basic formula are the same ones to follow when writing more complex formulas. The formula will add the numbers 3 + 2. The final formula will look like this:

= E1 + E2

1. Type a 3 in cell E1 and press the **ENTER** key.
2. Type a 2 in cell E2 and press the **ENTER** key.

When creating formulas in MS Excel, we always start by typing the equal sign. We type it in the cell where we want the answer to appear.

3. Click on cell E3 (E3 displays the result).
4. Type the equal sign (=) in cell E3.

Following the equal sign, we add in the cell references of the cells containing our data. By using the cell references of our data in the formula, the formula will automatically update the answer if the data in cells E1 and E2 changes. The best way of adding cell references is by using the Excel feature called **pointing**. Pointing allows us to click on the cell containing the data to add its cell reference to the formula.

5. Click on cell E1 to enter the cell reference into the formula.
6. Type a plus (+) sign.
7. Click on cell E2 to enter the cell reference into the formula.
8. Press the **ENTER** key.
9. The answer 5 should appear in cell E3.
10. Click on cell E3. The formula = E1 + E2 is shown in the formula bar above the worksheet.

- **Functions :** Excel functions are mathematical expressions which are already available in excel, and are categorized by their functionality. If we know the category of the function we are looking for, we can click that category. Excel uses functions to dynamically calculate results from data in our worksheets. There are several in-built functions in Excel 2007 that can be used to perform several operations on the data in a worksheet. Before using those functions, let us go through a list of functions that are provided by Excel 2007.
  - **Excel Date and Time Functions :** Dates are very important in spreadsheets. Not only is it important to add the current date to a spreadsheet when it is created, but much of the data stored in a spreadsheet is date related - such as the date of purchases or expenditures, the length of term of investments, and the date of scientific observations.

Function	Description
DATE	Returns the serial number of a particular date
DAY	Converts a serial number to a day of the month
HOUR	Converts a serial number to an hour
MINUTE	Converts a serial number to a minute
MONTH	Converts a serial number to a month
NOW	Returns the serial number of the current date and time
TIME	Returns the serial number of a particular time
YEAR	Converts a serial number to a year
TODAY	Returns the serial number of today's date

SECOND	Converts a serial number to a second
WEEKDAY	Converts a serial number to a day of the week

- **Lookup and reference functions :** The **LOOKUP** functions of MS Excel 2007 help us find specific information in large data tables such as an inventory list of parts or a large membership contact list. They can also be used in array formulas which makes it possible to create lookup formulas using multiple criteria or to return entire records from a database rather than just one field.

Function	Description
ADDRESS	Returns a reference as text to a single cell in a worksheet
COLUMN	Returns the column number of a reference
HLOOKUP	Looks in the top row of an array and returns the value of the indicated cell
INDEX	Uses an index to choose a value from a reference or array
LOOKUP	Looks up values in a vector or array
ROW	Returns the row number of a reference
VLOOKUP	Looks in the first column of an array and moves across the row to return the value of a cell.

- **Math and trigonometry functions**

Function	Description
ABS	Returns the absolute value of a number
COS	Returns the cosine of a number
DEGREES	Converts radians to degrees
EXP	Returns *e* raised to the power of a given number
FACT	Returns the factorial of a number
FLOOR	Rounds a number down, toward zero
INT	Rounds a number down to the nearest integer
LOG	Returns the logarithm of a number to a specified base
PI	Returns the value of pi

POWER	Returns the result of a number raised to a power
PRODUCT	Multiplies its arguments
SIN	Returns the sine of the given angle
SQRT	Returns a positive square root
SUM	Adds its arguments
SUBTOTAL	Returns a subtotal in a list or database
TAN	Returns the tangent of a number

- **Logical functions :**

Function	Description
AND	Returns TRUE if all of its arguments are TRUE
FALSE	Returns the logical value of FALSE
IF	Specifies a logical test to perform
NOT	Reverses the logic of its argument
OR	Returns TRUE if any argument is TRUE
TRUE	Returns he logical value of TRUE

- **Database functions :**

Function	Description
DAVERAGE	Returns the average of selected database entries
DCOUNT	Counts the cells that contain numbers in a database
DMAX	Returns the maximum value from selected database entries
DMIN	Returns the minimum value from selected database entries
DPRODUCT	Multiplies the values in a particular field of records that match the criteria in a database
DSUM	Adds the numbers in the field column of records in the database that match the criteria

- **Statistical functions :**

Function	Description
AVEDEV	Returns the average of the absolute deviations of data points from their mean

AVERAGE	Returns the average of its arguments
COUNT	Counts how many numbers are in the list of arguments
DEVSQ	Returns the sum of squares of deviations
GEOMEAN	Returns the geometric mean
HARMEAN	Returns the harmonic mean
MAX	Returns the maximum value in a list of arguments
MEDIAN	Returns the median of the given numbers
MIN	Returns the minimum value in a list of arguments

- **Text functions :**

Function	Description
CHAR	Returns the character specified by the code number
CONCATENATE	Joins several text items into one text item
DOLLAR	Converts a number to text, using the $ (dollar) currency format
LOWER	Converts text to lowercase
TEXT	Formats a number and converts it to text
TRIM	Removes spaces from text
UPPER	Converts text to uppercase

Apart from the above listed functions there are several more functions that Excel uses to perform several other manipulation operation using data in a spreadsheet.

- **Inserting a function :** Each of the functions of MS Excel 2007 is a predefined formula acting on a range of cells selected by us. Excel refers to each range of cells in the function as an **argument**. Although a few functions do not use arguments, most have one or more and some complex functions use as many as 3 or 4 arguments. The **Insert Function** window of Excel makes it easy to insert functions into worksheets and does not require us to remember the exact syntax of each function.

To insert a function we follow these steps :

1. Firstly we select the cell into which we have to insert the function.

2. Then we click the **Insert Function** button below the **Ribbon** to open the Insert Function dialog box as in **Figure 10.1**

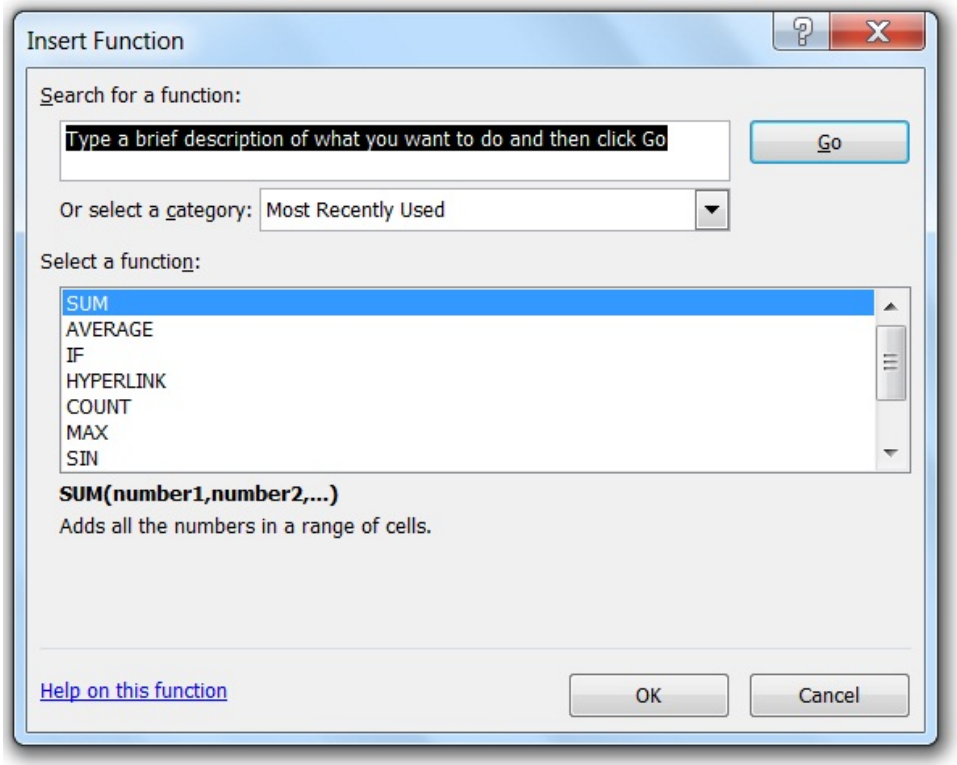


Fig. 10.1 : The Insert Function dialog box

3. Excel remembers the last ten functions used, and displays them in the box labeled **Select a function** at the bottom of the window.
4. In order to insert a function, we do any one of the following
   - If the function name appears in the last ten function list, we click on the function name to select it.

     OR
   - If the function needed does not appear in the list at the bottom of the window, we type the name of the function that we want to use into the box labeled **Search for a Function**. Then we click **Go, which shows** a list of recommended functions in the **Select a function** list at the bottom of the window. Then we click on the name of the function you wish to insert from that list, and click **OK** to proceed.
5. Clicking **OK** displays the **Function Arguments** dialog box of **Figure 10.2**

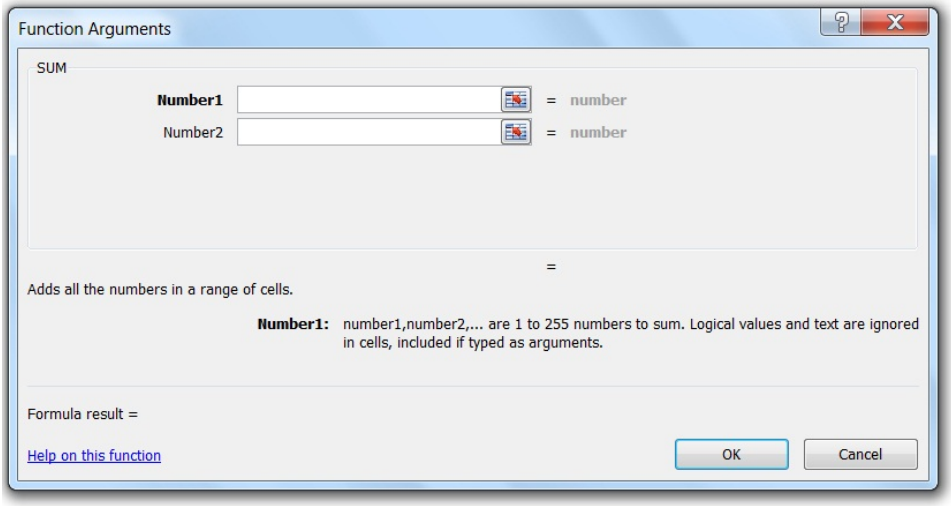


Fig. 10.2 : The Function Argument dialog box

6. We then have to drag and select the cells that will be used as the first argument of the function. As we select these cells, the **Function Arguments** window will be temporarily minimized.
7. On finishing the selection making, the **Function Arguments** window reappears and the first argument of the function will appear in the box labeled **Number 1**.
8. In order to specify a second argument for the function we:
   - Click inside the box labeled **Number 2**.
   - Select the cell range for use in the second argument.
9. We may follow this process for specifying additional arguments for our function.
10. Finally, clicking **OK** inserts the function into the worksheet.

CHECK YOUR PROGRESS

Q.1. Fill in the blanks:

(i) _____ specify the type of calculation that we want to perform on the elements of a formula.

(ii) When two values are compared using _____ operators, the result is either TRUE or FALSE.

(iii) A formula in Excel always begins with an _____ sign.

(iv) _____ in a worksheet are performed using formulas.

(v) _____ are started in the formula box with an = sign.

(vi) The cell or range of cells used in calculation are called _____.

(vii) _____ are Predefined formulas in Excel.

(viii) The _____ function returns the serial number of a particular date.

Q.2. State whether the following statements are True or False

(i) The LOOKUP function looks in the first column of an array and moves across the row to return the value of a cell.

(ii) The ABS function returns the absolute value of a number.

(iii) The SUBTOTAL function returns a subtotal in a list or database.

(iv) AND function Returns TRUE if any argument is TRUE.

(v) DCOUNT counts the cells that contain numbers in a database.

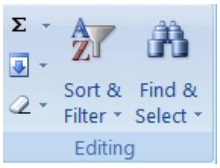
(vi) CHAR returns the character specified by the code number.

(vii) Excel functions are not predefined formulas.

10.5 SORTING DATA

Sorting data is an integral part of data analysis. We sort data by numbers (largest to smallest or smallest to largest) text (Z to A or A to Z), and dates and times (newest to oldest and oldest to newest) in one or more columns. We can also sort by a custom list (such as Small, Medium, and Large) or by formats like font color, cell color, or icon set. Most sort operations are column sorts, but we can also sort by rows.

- **To sort text we follow these steps :**
  1. Firstly, we select a column of alphanumeric data in a range of cells, or make sure that the active cell is in a table column containing alphanumeric data
  2. On the **Home** tab, in the **Editing** group, we click **Sort & Filter**.



  3. Here we do one of the following:
     - To sort in ascending alphanumeric order, we click **Sort A to Z**.
     - To sort in descending alphanumeric order, we click **Sort Z to A**.

- **To sort numbers we follow these steps :**
  1. Firstly, we have to select a column of numeric data in a range of cells, or make sure that the active cell is in a table column containing numeric data.
  2. On the **Home** tab, in the **Editing** group, we click **Sort & Filter**, and then do one of the following:
     - To sort from low numbers to high numbers, we click **Sort Smallest to Largest**.
     - To sort from high numbers to low numbers, click Sort **Largest to Smallest**.

- **To Sort by cell color, font color, or icon we follow these steps :**
  1. Firstly, we select a column of data in a range of cells, or make sure that the active cell is in a table column.
  2. On the **Home** tab, in the **Editing** group, we click **Sort & Filter**, and then click **Custom Sort**, to open the **Sort** dialog box of **Figure 10.3**

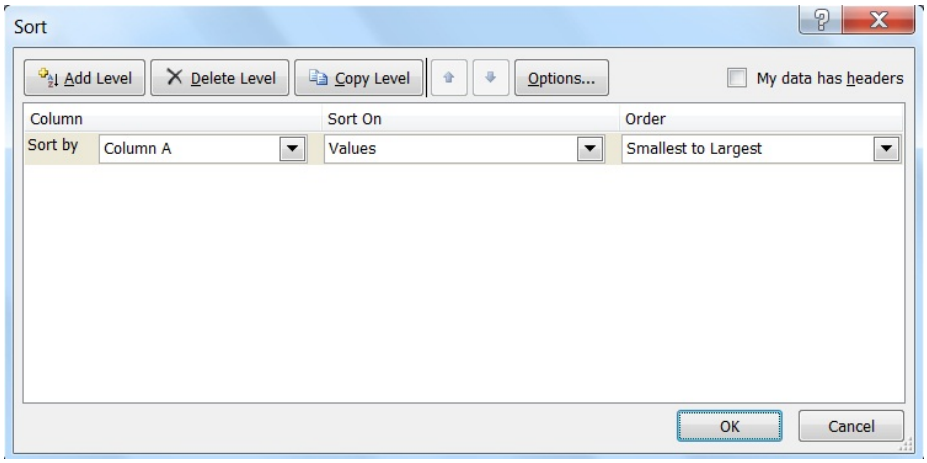


Fig. 10.3 : The Sort dialog box

3. In the **Sort** by box and under **Columns**, we select the column to be sorted.
4. Under **Sort On**, we select the type of sort. Do one of the following:
   - To sort by cell color, we select **Cell Color**.
   - To sort by font color, we select **Font Color**.
   - To sort by an icon set, we select **Cell Icon**.
5. Under **Order**, we click the arrow next to the button, and depending on the type of format, we may select a cell color, font color, or cell icon.
6. Under **Order**, we select define how to sort by doing one of the following:
   - To move the cell color, font color, or icon to the top or left, we may select **On Top** for a column sort, and **On Left** for a row sort.
   - To move the cell color, font color, or icon to the bottom or right, we may select **On Bottom** for a column sort, and **On Right** for a row sort.
7. To specify the next cell color, font color, or icon to sort by, we click **Add Level**, and then repeat steps three through five.

- **Sort by more than one column or row :** If we have data to be grouped by the same value in one column or row, we might sort by more than one column or row and then sort another column

or row within that group of equal values. For example, if we have a Department and Employee column, we can first sort by Department (to group all the employees in the same department together), and then sort by name (to put the names in alphabetical order within each department). We can sort by up to 64 columns.

1. We select a range of cells with two or more columns of data, or make sure that the active cell is in a table with two or more columns.
2. On the **Home** tab, in the **Editing** group, we click **Sort & Filter**, and then click **Custom Sort** to open the **Sort** dialog box of **Figure 10.3**
3. Then under **Column**, in the **Sort by** box, we select the first column to be sorted.
4. Under **Sort On**, we select the type of sort. We do one of the following :
   - To sort by text, number, or date and time, we select **Values**
   - To sort by format, we select **Cell Color**, **Font Color**, or **Cell Icon**.
5. Under **Order**, we select as to how we want to sort. We do one of the following:
   - For text values, we select A to Z or Z to A.
   - For number values, we select **Smallest to Largest** or **Largest to Smallest**.
   - For date or time values, we select **Oldest to Newest** or **Newest to Oldest**.
   - To sort based on a custom list, we select **Custom List**.
6. We click **Add Level** if we want to add another column to sort by, and then repeat steps 3 through 5.
7. To copy a column to sort by, we select the entry, and then click **Copy Level**.
8. To delete a column to sort by, we select the entry, and then click **Delete Level**.

9. To change the sorting order of the columns, we select an entry, and then click the **Up** or **Down** arrow to change the order.

Entries higher in the list are sorted before entries lower in the list.

10.6 WORKING WITH CHARTS

In the previous versions of MS Excel, we had the chart wizard that helped us to create charts. But in Excel 2007 there is no chart wizard, and we can create a basic chart by clicking the chart type that we want on the MS Office Fluent user interface known as Ribbon. To create a professional-looking chart that displays the details that we want, we can modify the chart, apply predefined styles and layouts, and add eye-catching formatting. We can also reuse our favorite chart by saving it as a chart template.

Charts can convey much more than numbers alone can because charts present data in a visual way that makes it easier to see the meaning behind the numbers. MS Excel 2007 supports numerous types of charts like Column Chart, Line Chart, Pie Chart, Bar Chart, XY-Scatter Chart etc. to display data in ways that are meaningful to the user. We will introduce only the Column Chart and Pie Chart in this section.

Creating a Chart

Different chart types have different data arrangement requirements that relate to that particular type of chart. Therefore it is important to know how the data has to be arranged before applying a chart to a data set. We have shown only two types of data arrangement. You can explore the remaining types using MS Excel's help.

Chart type	Data arrangement
Column chart, Bar chart, Line chart, Area chart, Surface chart and Radar chart	Data arrangement should be in columns or rows, for example 1 2 3 4 or 1 3 2 4

<table>
<tr><th>Chart type</th><th>Data arrangement</th></tr>
<tr><td>Pie chart and Doughnut chart
(with more than one series)</td><td>In multiple columns or rows of data and one column or row of data labels, like:
<table><tr><td>A</td><td>1</td><td>2</td></tr><tr><td>B</td><td>3</td><td>4</td></tr><tr><td>C</td><td>5</td><td>6</td></tr></table>or
<table><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>4</td><td>5</td><td>6</td></tr></table></td></tr>
</table>

- **To create a chart we follow these steps :**
  1. Firstly, we arrange the data on the worksheet by following any of the above mentioned ways of arrangement.
  2. Select the cells that contain the data to be used for the chart
  3. On the **Insert** tab, in the **Charts** group, we do one of the following:
     - We click the chart type, and then click a chart subtype that we want to use.
     - In order to see all available chart types, we click a chart type, and then click **All Chart Types** to display the **Insert Chart** dialog box, then click the arrows to scroll through all available chart types and chart subtypes, and then click the ones to be used.

Column charts : Data that is arranged in columns or rows on a worksheet can be plotted in a column chart. Column charts are useful for showing data changes over a period of time or for illustrating comparisons

among items. In column charts, categories are typically organized along the horizontal axis and values along the vertical axis.

Example : Let us consider the marks obtained by three students in three subjects as shown below. We will create a chart to represent their individual performances.

	English	Mathematics	Science
Ramesh	65	70	72
Jyoti	75	60	55
Suraj	88	77	68

We represent this data using a 2D column chart by the following steps:

1. We insert the above data in an Excel worksheet as shown.
2. Then we select the data
3. Clicking the **Insert** tab of the **Ribbon** we select a Chart type from the **Charts** group.
4. The data in the table is then displayed in the selected chart type as shown in **Figure 10.4**

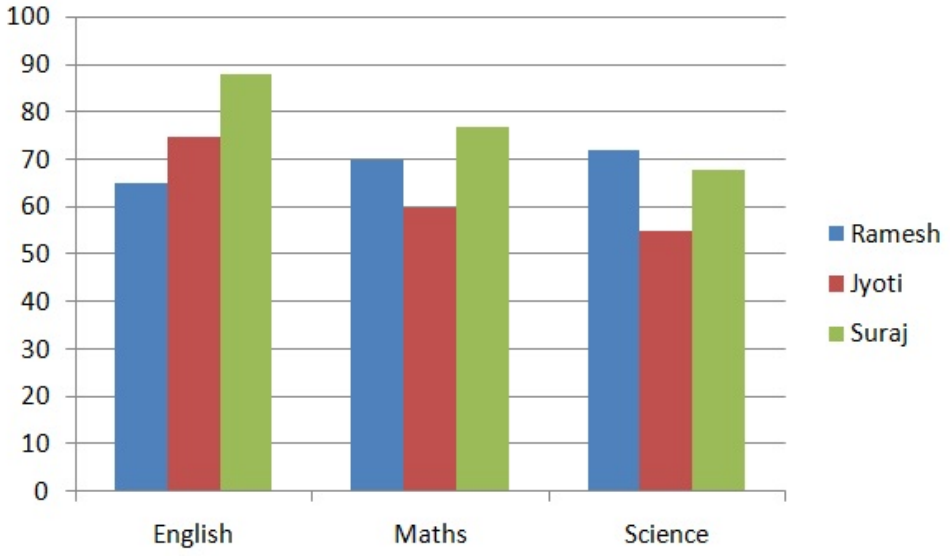


Fig. 10.4 : A 2D Column chart

- **The different elements in a chart :** A Chart has many elements. Some of these elements are displayed by default, while others can be added as needed. We may change the display of the

chart elements by moving them to other locations in the chart, resizing them, or by changing the format. We can also remove chart elements that we do not want to display.

Fig. 10.5 : The different elements of a chart

1. The **chart area** of the chart, which includes the entire chart and all its elements.
2. The **plot area** of the chart, which is the area bounded by the axes, including all data series in a 2D chart. In a 3D chart, it is the area bounded by the axes, including the data series, category names, tick-mark labels, and axis titles.
3. The **data points** of the data series that are plotted in the chart. **Data series**: The related data points that are plotted in a chart. Each data series in a chart has a unique color or pattern and is represented in the chart legend. We can plot one or more data series in a chart. Pie charts have only one data series. Data points are the individual values plotted in a chart and represented by bars, columns, lines, pie or doughnut slices, dots, and various other shapes called data markers. Data markers of the same color constitute a data series.

4. The horizontal (category) and vertical (value) **axis** along which the data is plotted in the chart. The Axis is a line bordering the chart plot area used as a frame of reference for measurement. The y axis is usually the vertical axis and contains data. The x-axis is usually the horizontal axis and contains categories.
5. The **legend** of the chart which is a box that identifies the patterns or colors that are assigned to the data series or categories in a chart.
6. A chart and axis **title** used to describe text that is automatically aligned to an axis or centered at the top of a chart.
7. A data **label** used to identify the details of a data point in a data series, provides additional information about a data marker, which represents a single data point or value that originates from a datasheet cell.

When we hover the mouse pointer over one of these elements in the chart area, Excel displays information about that element in a ScreenTip.

Clicking anywhere in a chart also makes the Chart Tools available, adding the Design, Layout, and Format tabs.

Pie charts : Data that is arranged in one column or row only on a worksheet can be plotted in a pie chart. Pie charts show the size of items in one data series proportional to the sum of the items. The data points in a pie chart are displayed as a percentage of the whole pie.

We should use a pie chart when :

- We only have one data series to plot.
- None of the values to be plotted are negative.
- Almost none of the values to be plotted are zero values.
- We do not have more than seven categories.
- The categories represent parts of the whole pie.

Example : Let us consider the example of marks obtained by a student in five subjects. This time we will create a pie chart to represent the student's individual performance in each subject.

	English	Maths	Science	Hindi	Computer
Ramesh	65	80	72	70	90

We represent this data using a 2D pie chart by the following steps:

1. We insert the above data in an Excel worksheet as shown.
2. Then we select the data
3. Clicking the **Insert** tab of the **Ribbon** we select a Chart type from the **Charts** group.
4. The data in the table is then displayed in the selected chart type as shown in **Figure 10.6**

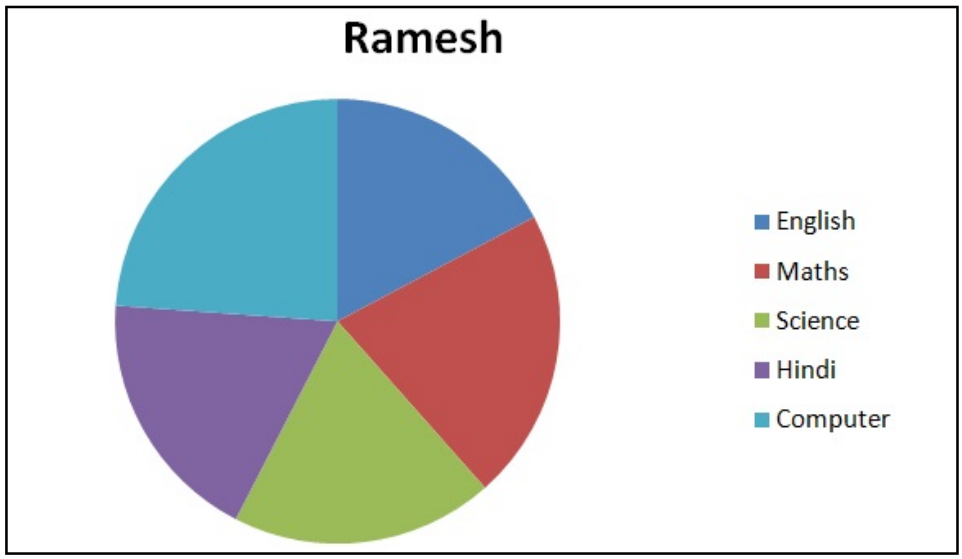


Fig. 10.6 : A Pie chart

CHECK YOUR PROGRESS

Q.3. Fill in the blanks:

(i) We can ____ data by text, numbers, dates and times in one or more columns.

(ii) We can sort by more than one _____ or ___.

(iii) Excel 2007 does not have a _____ wizard.

(iv) _____ present data in a visual way.

(v) ____ charts show the size of items in one data series, proportional to the sum of the items.

10.7 LET US SUM UP

- Excel 2007 is used to perform tasks related to the data organized in rows and columns in a spreadsheet.
- Operators in Excel are used to perform numerous operations on different types of data.
- Calculations in Excel are performed using formulas
- Functions are mathematical expressions already available in Excel
- Formulas are mathematical expressions that we create to calculate result
- LOOKUP Functions can help you find specific information in large data tables
- Excel's Insert Function window makes it easy to insert functions into your worksheets and eliminates the need to remember the exact syntax of each function.
- Sorting data is an integral part of data analysis
- You can also reuse a favorite chart by saving it as a chart template
- The chart area of the chart, which includes the entire chart and all its elements.

10.8 FURTHER READINGS

- "*Introduction to Information Technology*", by Sanjay Saxena, Vikash Publishing, New Delhi.
- "*SAMS teach yourself Microsoft Office 2003 in 24 Hours*" by Greg Prerry, Pearson Education.

10.9 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : (i) Operators, (ii) logical, (iii) equal, (iv) calculations, (v) Formulas, (vi) references, (vii) Functions, (viii) DATE

Ans. to Q. No. 2 : (i) False, (ii) True, (iii) True, (iv) False, (v) True, (vi) True, (vii) False

Ans. to Q. No. 3 : (i) sort, (ii) column, row, (iii) chart, (iv) Charts, (v) Pi

10.10 MODEL QUESTIONS

Q.1. What are operators in Excel? How many types of operators are there in Excel?

Q.2. What is the text concatenation operator in Excel and why is it used?

Q.3. How are calculations performed in excel? give examples.

Q.4. What is a formula? Give an example showing the use of formulas in excel

Q.5. What are excel functions? Give examples of the LOOKUP function

Q.6. How do we create a function in a worksheet

Q.7. What do you mean by sorting data in excel? Give the steps to apply sorting by cell color

Q.8. What are charts in excel and why are they used ?

Q.9. What are pie charts? Create a pie chart to show data trends.

Q.10. Define the different elements in a chart.

UNIT 11 : MICROSOFT POWERPOINT

UNIT STRUCTURE

11.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- know the use of PowerPoint
- create presentations in PowerPoint
- work with text and graphics in PowerPoint
- use design templates
- apply slide animation and transition effects
- work with PowerPoint presentations

11.2 INTRODUCTION

Before computers were commonplace, presenters usually had an easel with posters or drawings to show any necessary graphics to the

audience. In some cases the speaker would have a slide projector with a carousel of individual slides to show photographs on a screen.

Today, many software package suites contain a program designed to accompany the speaker when he makes a presentation. The specific presentation program in this suite of programs is usually (but not always) in the form of a slide show, much like the ones used in the past. These presentation software programs make it simple and often fun to create a presentation for the audience. They contain a text editor to add written content, and abilities within the program to add charts and graphic images such as photographs, clip art or other objects to liven up the slide show and get our point across simply. Microsoft PowerPoint, usually just called PowerPoint, is a commercial presentation program developed by Microsoft, and is part of the Microsoft Office suite.

Microsoft Office PowerPoint 2007 provides a comprehensive set of features that can be used to create and format our information. We can create and add designer-quality SmartArt graphics with only a few mouse-clicks. This unit provides an introduction to MS PowerPoint 2007, and describes the methods and tools to create powerful and eye-catching presentations.

11.3 STARTING MS POWERPOINT

In order to work with PowerPoint and start building presentations we first have to start PowerPoint 2007. To start MS PowerPoint 2007, we have to follow these steps:

1. Firstly, we click on the **START** button.
2. Then we click/hover on **All Programs** which opens a list of all the installed programs.
3. We then click on the **Microsoft Office** option which shows a list of the installed MS Office applications as shown in **Figure 11.1**

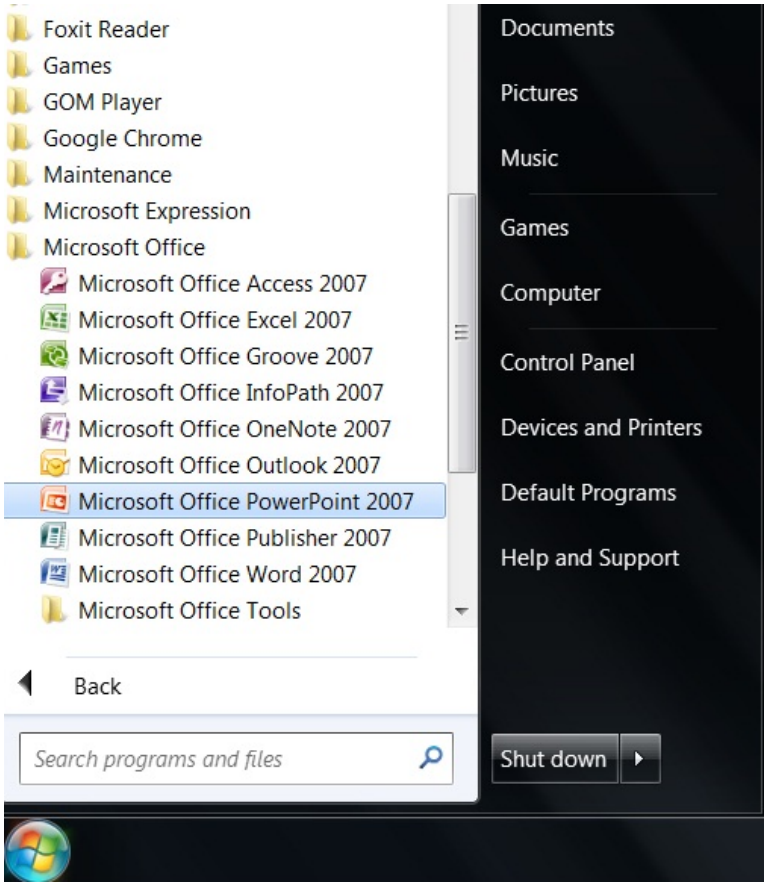


Fig. 11.1 : The MS Office 2007 applications

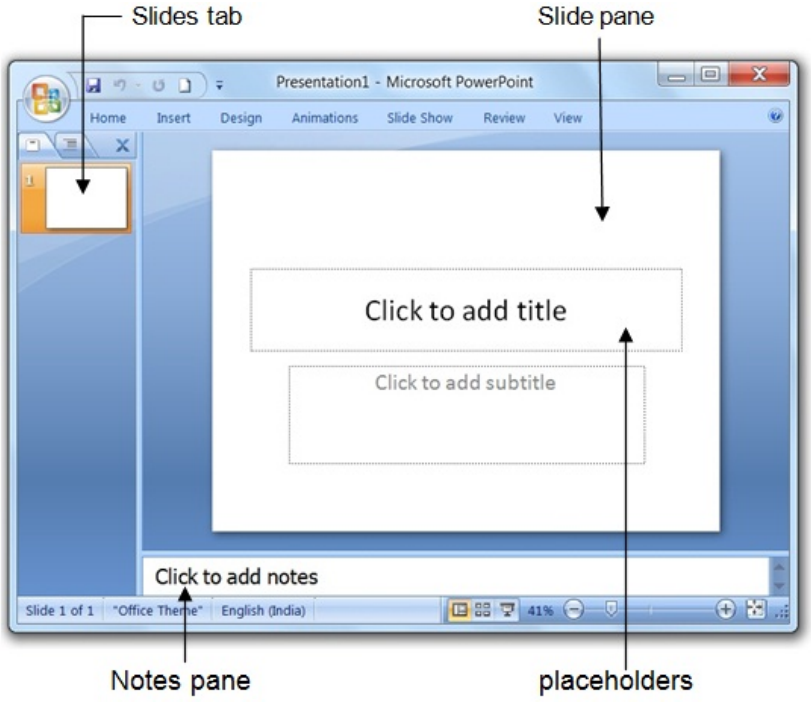


Fig. 11.2 : The Microsoft PowerPoint 2007 application window

Slide pane : Allows us to work directly on individual slides.

Placeholders : These are the borders that are part of most slide layouts, where we can type text or insert pictures, charts, and other objects.

Slides tab : This tab shows a thumbnail version of each full size slide shown in the Slide pane.

Notes pane : Here we can type notes about the current slide.

11.4 CREATING A NEW PRESENTATION

After we start PowerPoint as shown in the previous section, we are presented with the PowerPoint working interface as in **Figure 11.2** above. To begin working with PowerPoint and start creating a new presentation we follow these steps.

1. Firstly we click the MS Office button of PowerPoint and select **New**.

   OR

   Click the **New** icon  on the **Quick Access** toolbar

   OR

   Press **Ctrl + N** on the keyboard

2. If we click the **New** icon or press **Ctrl + N**, a blank presentation automatically opens.

   OR

   If we select **New** from the **Office button**, the **New Presentation** dialog box of **Figure 11.3** opens where we do any one of the following.

   - To apply a recently used template, we click **Blank and recent**, and click the template that we want, and then click **Create**.
   - To apply a template installed to the local hard drive, we click **Installed Templates**, and then click **Create**.
   - To create (and apply) a new template based on another template that is installed on the local hard drive, we click **New from existing**, and then click **Create New**.

- To apply a template that has been saved to C:\Program Files\Microsoft Office\Templates\, we click **My templates**, select a custom template, and then click **OK**.
- To download and apply a template from Office Online, under **Microsoft Office Online**, we click a template category, select a template, and then click **Download**.

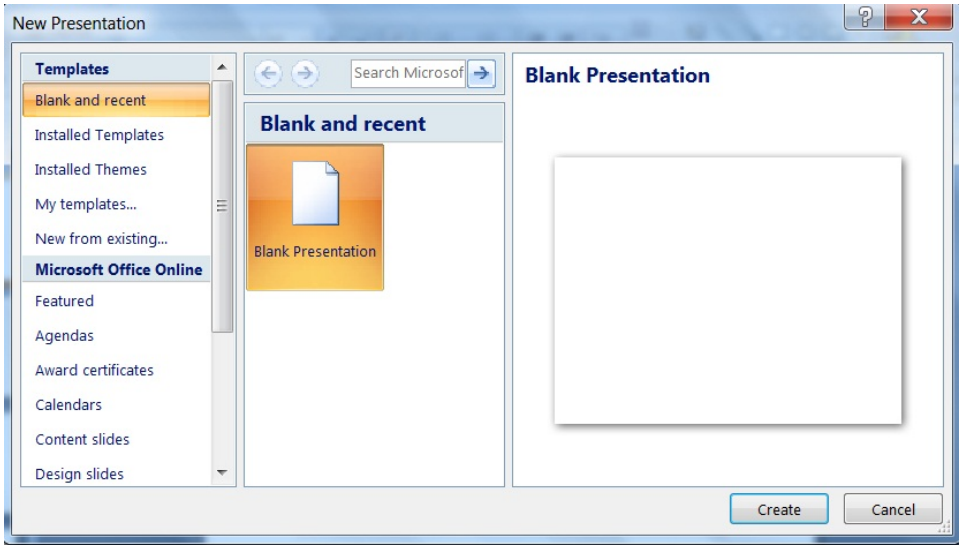


Fig. 11.3 : The New Presentation dialog box

Now that we are ready to begin working on our new presentation, we will be discussing further on how to work with the different elements of a PowerPoint presentation in the later units.

11.5 WORKING WITH SLIDES

When working with MS PowerPoint we apply text, sound, color, graphic, animation, transitions etc to our presentation, and these effects are represented on slides. To create an effective PowerPoint presentation we should be able to carry out slide related tasks. Inserting, deleting, reusing slides to a presentation are a few of them and which will be discussed in this section.

- **Adding Slides :** There are several choices when we want to add a new slide to the presentation: Office Themes, Duplicate Selected Slide, or Reuse Slides.

  To create a new slide from Office Themes, we follow these

steps :

1. Firstly, we select the slide immediately BEFORE where the new slide is to be inserted.
2. Then we click the **New Slide** button on the **Home** tab.
3. Finally, we click the slide choice that fits our material.

- **Duplicate Slides :**

  To create a slide as a duplicate of a slide in the presentation we follow these steps :

  1. Firstly we select the slide that we want to duplicate.
  2. Then we click the **New Slide** button on the **Home** tab
  3. Finally we click **Duplicate Selected Slides**

  A Slide may also be duplicated by right-clicking the slide and selecting **Duplicate Slide**.

- **Reusing Slides**

  To create a new slide from another presentation we follow these steps :

  1 Firstly we select the slide immediately BEFORE where we want the new slide

  2 Then we click the **New Slide** button on the **Home** tab

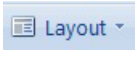
  3 We click **Reuse Slides**

  4 We click **Browse**

  5 We click **Browse File** and locate the slide show and click on the slide to import.

- **Changing the layout of slide/slides :** We can change the layout of slide/slides by applying a different layout to.

  To do so we follow these steps :

  1. Firstly we select the slide/slides.
  2. From the **Slides** group on the **Home** tabs, we click on the layout button 

  3. Finally we select the layout that we want.

- **Deleting slide/slides :** We can delete one or many slides at a time.

  To do so we follow these steps :

1. First we select the slide/slides that we want to delete
2. Then we right-click on the selected slide/slides, and select **Delete Slide**.

   OR

   From the **Slides** group on the **Home** tabs, we click on the **Delete** button 

- **Changing the background of a slide/slides :**

1. Firstly we select the slide.
2. Then we right-click the slide and select **Format Background**, which opens the **Format Background** dialog

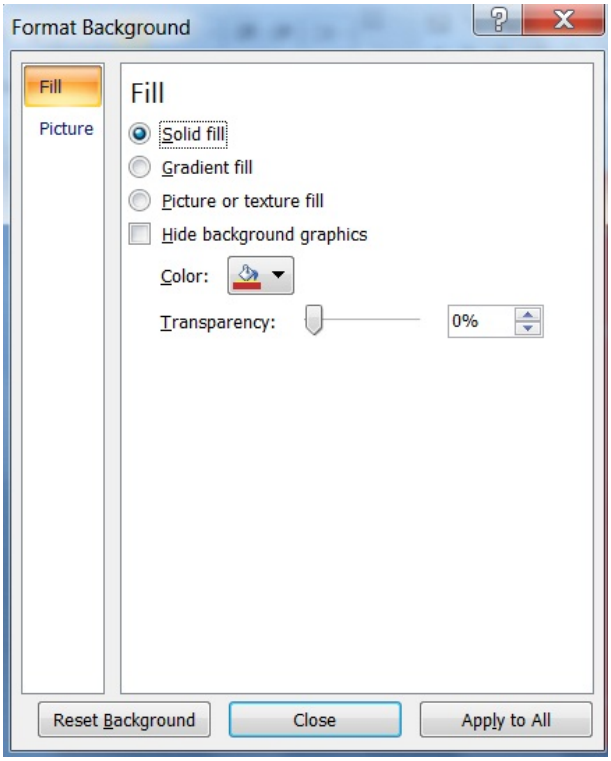


Fig. 11.4 : The Format Background dialog box

In the dialog box of **Figure 11.4**, we have several options to choose from whereby we can apply different fills to the background.

3. After selecting the background **Fills**, we may **Close** the dialog box, which applies the effects only to the selected slide. Clicking on **Apply to All** applies them to all the slides

in the presentation.

- **Changing the order of slides :** When we create a presentation, we may sometimes want to change the order of the slides.
  1. In the pane that contains the **Outline and Slides** tabs, we click the **Slides** tab.
  2. Then on the **Home** tab, we select the slide thumbnails that are to be moved, and then drag them to their new location.

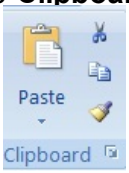
11.6 ADDING TEXT AND GRAPHICS

When creating presentations in PowerPoint 2007, we have to work with text and graphics. Text and graphics are an integral part of any presentation since they act together to bring forward the purpose and objective of a PowerPoint presentation. Text can be inserted, edited, cut, copied, pasted, and formatted by changing the Face, Type and Color. Paragraphs of text can be formatted by indenting them, etc. Graphics in PowerPoint can be included by inserting pictures, Clip Art, Shape, Smart Art etc. in this section we discuss these aspects of PowerPoint.

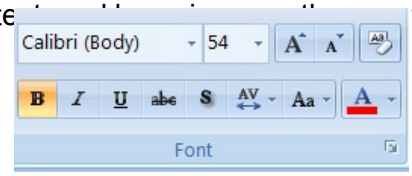
- **Working with text :**
  - **To enter text we follow these steps:**
    1. Firstly, we select the slide where we want the text
    2. Then we click in a Textbox to add text
  - **To add a text box we follow these steps:**
    1. Firstly, we select the slide where we want to place the Text Box
    2. On the **Insert** tab, we click **Text Box**
    3. Then we click on the slide and drag the cursor to expand the Text Box
    4. Finally we type in the text.
  - **To copy and paste data we follow these steps:**
    1. Firstly, we select the item(s) to be copied
    2. On the **Clipboard** group of the **Home** tab, we click **Copy**
    3. Then we select the item(s) where we would like to copy

the data

4. Finally, on the **Clipboard** group of the **Home** tab, we click **Paste**



- **To cut and paste data we follow these steps:**
  1. Firstly, we select the item(s) to be cut
  2. On the **Clipboard** group of the **Home** tab, we click **Cut**
  3. Then we select the items(s) where we would like to copy the data
  4. Finally, on the **Clipboard** group of the **Home** tab, we click **Paste**
- **To change the font typeface we follow these steps:**
  1. In the Font group under the **Home** menu, we click the arrow next to the font name and choose a font.
  2. We can preview how the new font will look by highlighting the te font typeface.



- **To change the font size we follow these steps:**
  - We click the arrow next to the font size and choose the appropriate size

    OR
  - We click the increase or decrease font size buttons.

- **Font Styles and Effects :** Font styles are predefined formatting options that are used to emphasize text. They include: **Bold**, **Italic**, and **Underline**.
  - **To add these to text we follow these steps**:
    - We select the text and click the **Font Styles** included on the **Font** group of the **Home** tab

OR

- We select the text and right click to display the font tools

➢ **To change the text color we follow these steps :**

1. We select the text and click the **Colors** button  included on the **Font** Group of the **Ribbon**

   OR

   We highlight the text, right click and choose the colors tool.
2. Then we select the color by clicking the down arrow next to the font color button.

- **WordArt :** WordArt is a gallery of text styles that we can add to any 2007 Microsoft Office system documents to create decorative effects, such as shadowed or mirrored (reflected) text. In Microsoft Office PowerPoint 2007, we can also convert existing text into WordArt.

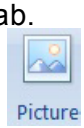
➢ **To apply Word Art we follow these steps :**

1. Firstly, we select the text
2. Then from the **Te** 

p of the **Insert** tab we click the **WordArt** button
3. Finally we choose the WordArt to be applied

- **Working with Graphics :** We can add Pictures, ClipArt, Shapes, SmartArt or a Photo Album to a presentation.

➢ **To add a picture we follow these steps :**

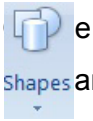
1. Firstly we click the **Insert** tab.
2. We click the **Picture** button 

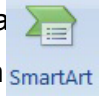
from the **Illustrations** group
3. We browse to the picture from the files and click the name of the picture
4. We click **insert**
5. To move the graphic, we click it and drag it to where we

want it.

- **Clipart :** Clipart is a single piece of ready-made art, often appearing as a bitmap or a combination of drawn shapes that we can use in our presentation.
  - **To add Clip Art we follow these steps:**
    1. Firstly, we click the **Insert** tab
    2. Then fr 

he **Illustrations** group we click the **Clip Art** button
    3. We may search for the clip art using the search Clip Art dial 

    4. Finally we click the clip art
    5. To move the graphic, we click it and drag it to where we want it
  - **To add Shapes to a presentation we follow these steps:**
    1. Firstly, we click the **Insert** tab
    2. 

e **Illustrations** group, we click the **Shapes** button and click the shape we want
    3. Then we click and drag on the slide to draw the shape
    4. Finally we drag the cursor to resize the Shape.
- **Adding SmartArt :** SmartArt is a feature in Office 2007 that allows us to choose from a variety of graphics, including flow charts, lists, cycles, and processes.
  - **To add SmartArt we follow these steps:**
    1. Firstly, we click the **Insert** Ta
    2. We click the **SmartArt** button 

on the **Illustrations** group
    3. This opens the Choose **a SmartArt Graphic** dialog box

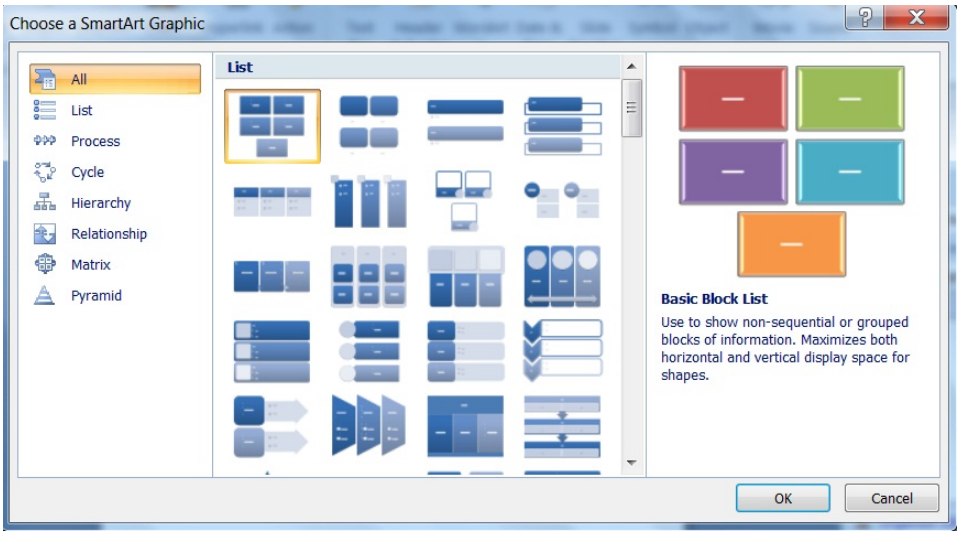
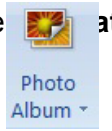


Fig. 11.5 : The Choose a SmartArt Graphic dialog box

4. We select the **SmartArt** and click **OK**
5. Finally we drag it to the desired location on the slide

- **Photo Album :** The photo album feature is new in PowerPoint 2007 and allows us to easily create a photo album to share pictures.
  - **To create a photo album we follow these steps:**
    1. Firstly, we click the **Insert** tab
    2. Then from the **ations** group, we click the **Photo Album** button 

    3. Then we select **New Photo Album** which opens the **Photo Album** dialog box of **Figure 11.6**
    4. We click **File/Disk** which opens up the **Insert New**

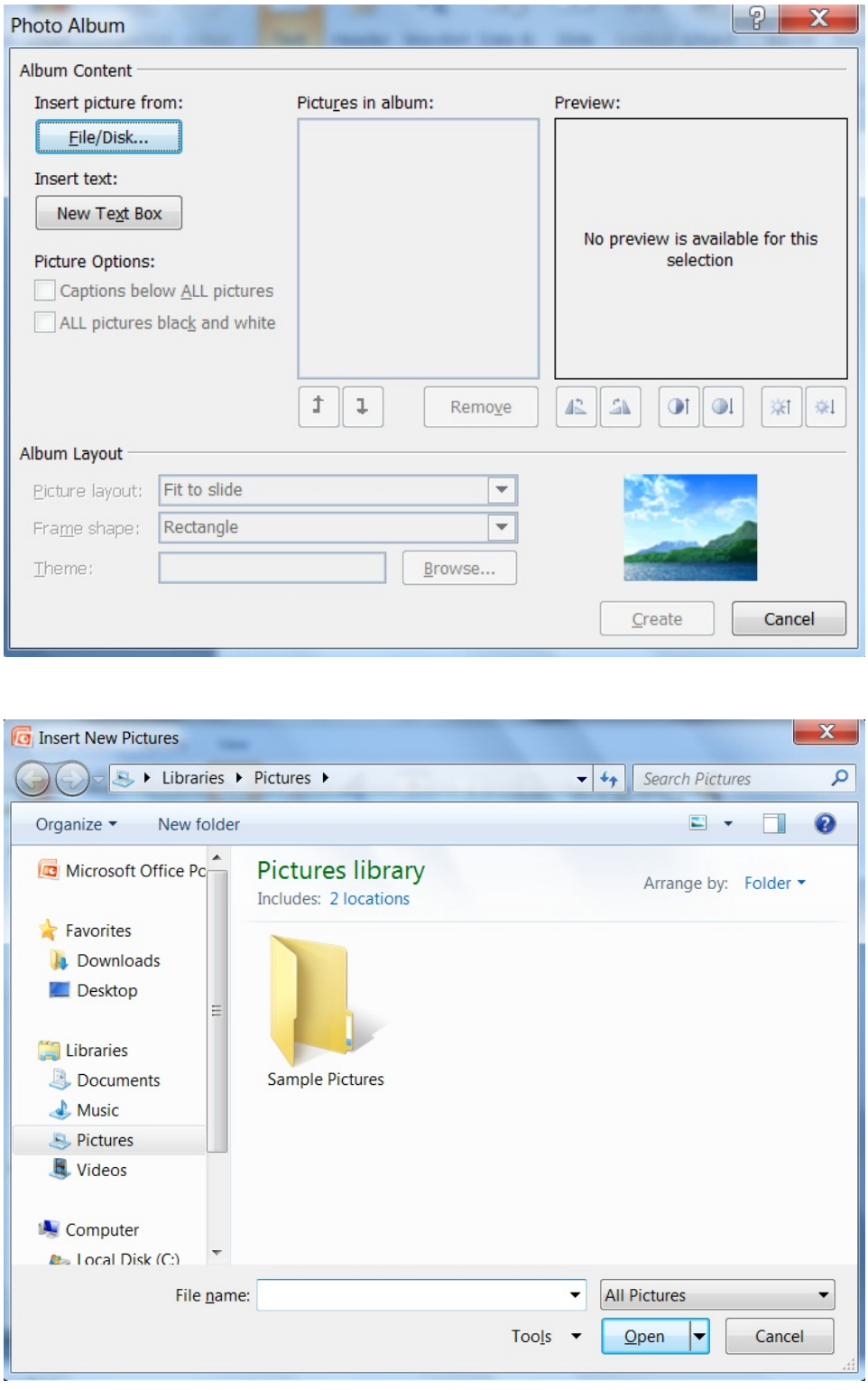


Fig. 11.7 : The Insert New Pictures dialog box

5. We browse through to find the picture to add to the photo

album.

6. Finally, we move the pictures up and down in the order of the album by clicking the **up/down** arrows in the **Photo Album** dialog box.

11.7 APPLYING THEMES

Design themes are a new addition to PowerPoint 2007. They work in a similar way as the design templates in earlier versions of PowerPoint. A really nice feature of the design themes, is that we can immediately see the effect reflected on our slides, before making a decision as to which theme has to be applied to our presentation finally. Microsoft Office PowerPoint 2007 contains several built-in themes which include theme colors, theme fonts, and theme effects such that if we change the theme, a complete set of new colors, fonts, and effects is applied to our entire document. We can use these themes and customize them by changing a few elements according to our needs.

- **To apply a theme to our presentation we follow these steps :**

  If a blank presentation is already open–

  1. In the Themes group on the **Design** tab are shown the available themes. More themes can be seen on clicking the **More** button as shown in **Figure 11.8**

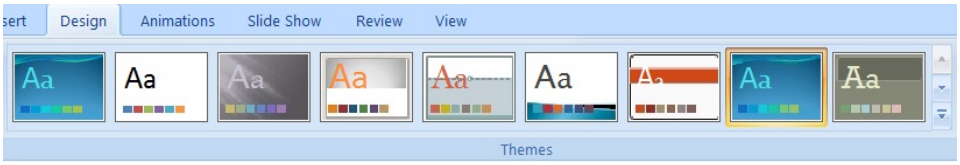


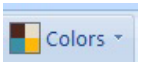
Fig. 11.8: The Themes group

  If a blank presentation is not open already–

  1. In the **New Presentation** dialog box of **Figure 11.3**, we select any of the installed themes
  2. Then we click **Create** to apply the selected them to the slide/ slides.

- **Design Theme Color Schemes :** Once we have selected a

style of design theme that we like for the PowerPoint presentation, we are not limited to the color of the theme as it is currently applied.

1. We click on the **Colors** button  at the right end of the design themes on the **Design** ribbon.
2. Then we hover the mouse over the various color schemes shown in the drop down list. The current choice will be reflected on the slide.
3. Finally we click the right color scheme.

- **Select a Font Family :** Each design theme is assigned a font family. Once the design theme for the PowerPoint presentation is selected, we can change the font family to one of the many groupings within PowerPoint 2007.
  1. Firstly, we click the **Fonts** button  at the right end of the design themes shown on the **Design** ribbon.
  2. Then we hover over any of the font families to see how this group of fonts will look in the presentation.
  3. On making the selection, we click the mouse and the font family will be applied to our presentation.
- **Change the Background Style :** Just as we changed the background on a plain PowerPoint slide, we can do the same while using one of the many design themes.
  1. We Click the **Background Styles** button  on the Design ribbon.
  2. Then we hover over any of the background styles.
  3. The background style will be reflected on the slide for us to evaluate.
  4. Finally on getting our desired background style we click the mouse.
- **Hide background Graphics :** Sometimes we want to show slides with no background graphics. which is often the case for printing purposes. The background graphics will remain with

the design theme, but can be hidden from view.

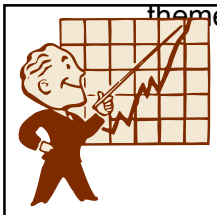
1. We check the **Hide Background Graphics** box on the **Design** ribbon. 

2. The background graphics will disappear from our slides, but can be turned back on at any later time, by simply removing the check mark in the box.

- **Select a set of theme effects :** Theme effects are sets of lines and fill effects. When we click the **Theme Effects** button, we see the lines and fill effects used for each set of theme effects in the graphic displayed with the Theme Effects name. Even if we cannot create our own set of theme effects, we can choose the one we want to use in our own document theme.
  1. Firstly, on the **Design** tab, in the **Themes** group, we click **Theme Effects** 

  2. Then we click the effect we want.
- **Save a theme :** We can save any changes made to the colors, fonts, or line and fill effects of a theme as a custom theme that we can apply to other documents or presentations.
  1. On the **Design** tab, in the **Themes** group, click **More**. 
  2. Then we click **Save Current Theme**.
  3. In the **File Name** box, we type an appropriate name for the theme, and then click **Save**.

  The custom theme is saved in the **Document Themes** folder as a .thmx file and is automatically added to the list of custom themes.



CHECK YOUR PROGRESS

Q.1. Fill in the blanks:

(i) _____ allows us to work directly on individual slides.

(ii) _____ are the borders that are part of most slide layouts, where you can type text or insert pictures, charts,

and other objects.

(iii) _____ is a single piece of ready-made art, often appearing as a bitmap or a combination of drawn shapes that we can use in our presentations.

(iv) _____ is a feature in Office 2007 that allows us to choose from a variety of graphics, including flow charts, lists, cycles, and processes.

(v) We can customize _____ by changing a few elements according to our needs.

Q.2. State whether the following statements are True or False.

(i) Font styles are predefined formatting options that are used to emphasize text.

(ii) In PowerPoint 2007, we cannot convert existing text into WordArt.

(iii) We can add Pictures, ClipArt, Shapes, SmartArt or a Photo Album to a presentation.

(iv) We cannot delete one or many slides at a time.

(v) Theme effects are sets of lines and fill effects.

11.8 CUSTOMIZING SLIDE SHOW

In the previous section we have learnt the basics of PowerPoint, the way PowerPoint presentations are created and the different methods of working with slides were also discussed. Text and Graphics, that are the heart and soul of every powerful and eye-catching PowerPoint presentation, have already been discussed. Apart from text and graphics we can also customize a presentation by applying animation and transition effects to our slides. Animation is nothing but the way of adding a special visual or sound effect to a slide object. For example, we can have our text bullet points fly in from the left, one word at a time, or hear the sound of applause when a picture is uncovered. We can use animation to focus on important points, to control the flow of information, and to increase viewer interest in our presentation.

Slide transitions are the visual effects that are applied to a

presentation, and can be seen when we move from one slide to another slide during the presentation. These slide transition effects prevent the viewer from seeing a sudden change between slides, and present a smooth and gradual change between the slides.

In the next two sections, we shall be dealing with these two aspects of PowerPoint presentations.

11.8.1 Applying Custom Animation

PowerPoint 2007 has numerous animation effects to choose from. Apart from that, we can also apply other animation effects that have been customized by us to gain more control over how and when effects are applied. For example, we can make text grow or shrink, spin or shimmer, and we can set an animation to hear the sound of applause when a picture is revealed. We can apply more than one animation, so we can make a line of text fly in with or without sound, and then make the text fly out. We can use emphasis, entrance, or exit options in addition to preset or custom motion paths.

We create custom animations in the **Custom Animation** task pane. The Custom Animation task pane shows important information about an animation effect, including the type of effect, the order of multiple effects in relation to each other, and a portion of the text of the effect.

- **Add a Custom Animation from the Quicklist :**
  - **Animations Tab on the Ribbon :**
    1. Firstly, we click the **Animations** tab on the ribbon.
    2. We select the object to be animated, such as a text box, or a graphic object.
    3. We click the drop down button beside the **Custom Animation** button located beside **Animate**
    4. The list of options allows us to quickly add one of the

most commonly used animation types.

- **Open the Custom Animations Task Pane :**
  1. We simply click on the **Custom Animation** button on the **Animations** group under the **Animations** menu.
  2. This opens the **Custom Animations** task pane on the right side of

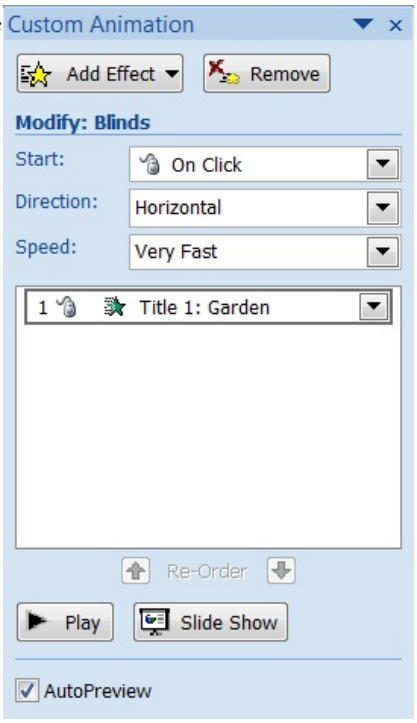


Fig. 11.9 : The Custom Animation task pane

  3. We choose the title, a picture or clip art, or a bulleted list to apply the first animation by the following.
     - We select graphics by clicking on the object.
     - We select a title or bulleted list by clicking on the border of the text box.
  4. Once an object has been selected, the **Add Effect** button becomes active in the **Custom Animations** task pane.
  5. We select a style of effect, such as **Entrance**, **Emphasis**, **Exit** or **Motion Path**. Choosing one of these styles will reveal a sub-menu with selections of animations.
  6. We click on different animations and we will see a preview of the effect on the slide.

7. Lastly we make our selection.

- **Modifying an Animation Effect :**
  1. Firstly, we select the object whose animation effect has to be modified
  2. To modify the custom animation effect, we select the drop-down arrow beside each of the three categories – **Start**, **Direction** and **Speed**.

  a) Start
  - **On click** – Starts the animation on the mouse click
  - **With previous** – Starts the animation at the same time as the previous animation (could be another animation on this slide or the slide transition of this slide)
  - **After previous** – Starts the animation when the previous animation or transition has finished

  b) Direction
  - This option will vary depending on which Effect we have chosen. **Directions** can be from top, from right side, from bottom and so on.

  c) Speed
  - Speeds vary from Very Slow to Very Fast.

- **Move Animation Effects Up or Down in the List :** After applying more than one animation to a slide, we may wish to re-order them so that the title appears first and objects appear as they are referred.
  1. Firstly, we click on the animation to be moved.
  2. Then we use the **Re-Order** arrows at the bottom of the **Custom Animation** task pane to move the animation up or down in the list.
- **Other Effect Options for Custom Animations :** We can apply additional effects to objects on our PowerPoint slides such as sound effects or dim the previous bullet points as each new bullet appears.
  1. Firstly we select the effect in the list.

2. Then we click the drop-down arrow to see available options.
3. We select **Effect Options** which opens the dialog box in

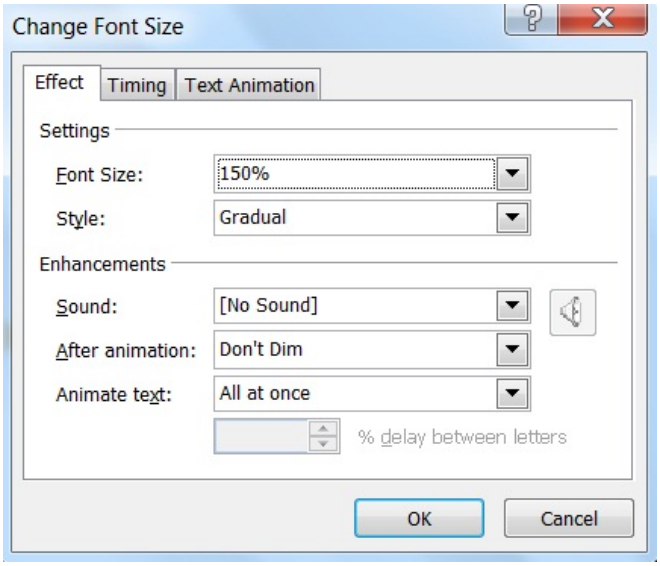


Fig. 11.10 : The Effect Options dialog box

Timings are settings that automate our PowerPoint presentation. We can set the number of seconds for a specific item to show on screen and when it should start.

In the **Timing** dialog box we can also modify settings previously set.

Text Animations allow us to introduce text on the screen by paragraph level, automatically after a set number of seconds or in reverse order.

11.8.2 Applying Slide Transition

Slide transitions are the animation-like effects that occur in Slide Show view when moving from one slide to the next during an on-screen presentation. We can control the speed of each slide transition effect, and can also add sound.

Transition effects add some great animation to the slides in a presentation. Microsoft Office PowerPoint 2007 includes many different types of slide transitions. These transition effects are

included in groups, each group having several effects of different types. The groups are Fades and Dissolves, Wipes, Push and Cover and Stripes and Bars.

- **To add the same slide transition to all of the slides in a presentation we follow these steps:**
  1. Firstly, on the left side of the slide window, in the pane that contains the **Outline and Slides** tabs, we click the **Slides** tab.
  2. Then we select the slide thumbnails of the slides that we want to apply slide transitions to.
  3. On the **Animations** tab, in the **Transition To This Slide** group, we click a slide transition effect.

     To see more transition effects we may click the **More** button 
  4. To set the slide transition speed between the current slide and the next slide, in the **Transition To This Slide** group, we click the arrow next to **Transition Speed**, and then select the speed that we want.
  5. In the **Transition To This Slide** group, we click **Apply to All**.
- **To add different slide transitions to the slides in a presentation we follow these steps:**
  1. On the left side of the slide window, in the pane that contains the **Outline** and **Slides** tabs, we click the **Slides** tab, and then click a slide thumbnail.
  2. On the **Animations** tab, in the **Transition To This Slide** group, we click the slide transition effect that we want for that slide.

     To see more transition effects, we may click the **More** button 
  3. To set the slide transition speed between the current slide and the next slide, in the **Transition To This Slide** group, we click the arrow next to **Transition Speed**, and then select the speed that we want.
  4. To add a different slide transition to another slide in the

presentation, we may repeat steps 2 through 4.

11.9 SAVING, RUNNING AND CLOSING A PRESENTATION

After we have finished creating our presentation in PowerPoint 2007, we have to save it in order to later use it. Let us now see how we can save, run and close a presentation in PowerPoint 2007.

- **To save a presentation we follow these steps:**
  1. Firstly, we click the Microsoft Office button then click **Save**.

     OR

     Click the **Save** button

     OR

     Press **Ctrl + S**
  2. If we are saving the file for the first time, we are asked to

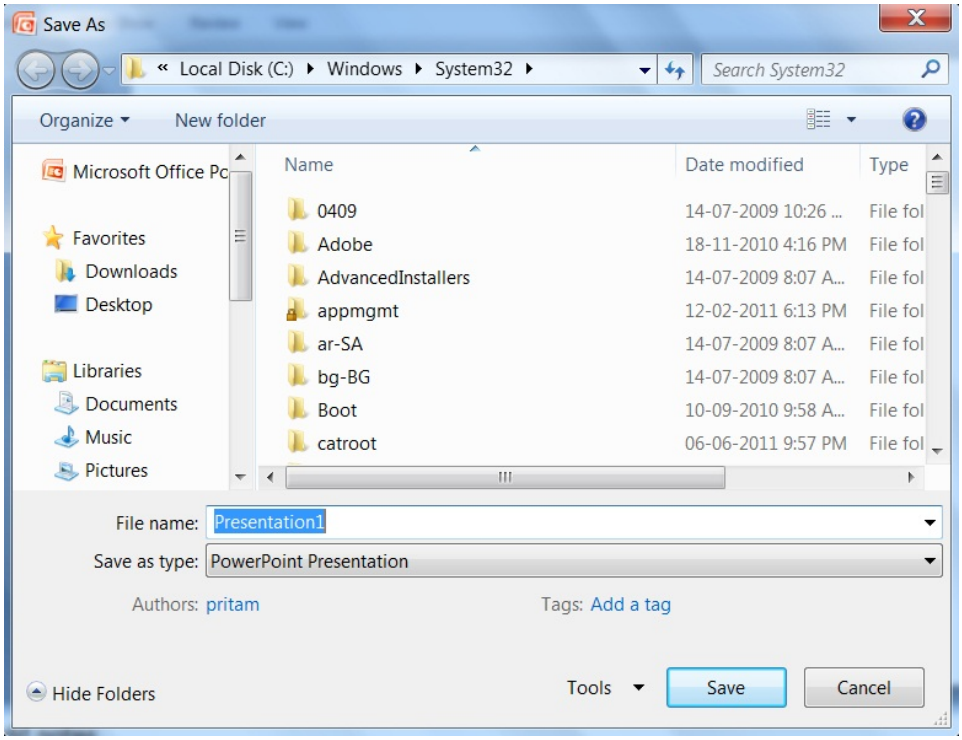


Fig. 11.11 : The Save As dialog box

We then specify the file format type in the **Save as type** list, in which the presentation is to be saved. If we want to save the file for use in earlier version of PowerPoint, we may save our file in the 97-2003 file

format by selecting 97-2003 from that list.

- **Running a presentation :** Running a finished presentation in PowerPoint gives us several options to choose from, that allow us to run a presentation in a variety of ways.

  Clicking on the **Slide Show** tabs on the Ribbon shows us a lot

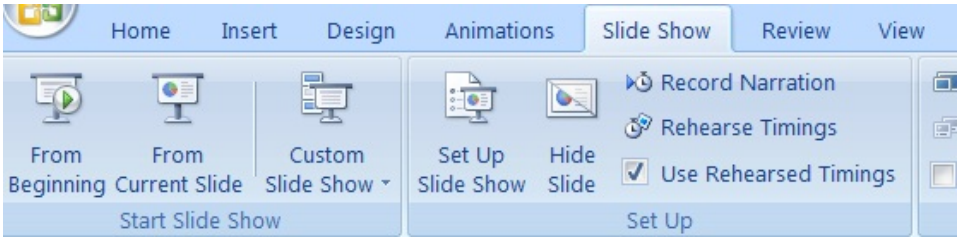


Fig. 11.12 : Options for slide show

In the **Start Slide Show** group there are options to choose from that allow us to begin the slide show.

- **From beginning :** Clicking on this option begins the slide show from the very first in the presentation.
- **From Current Slide :** Clicking on this option begins the slide show from the slide that is selected.
- **Custom Slide Show :** Clicking this option and then selecting **Custom Shows** opens the dialog box of **Figure 11.13**, which how.

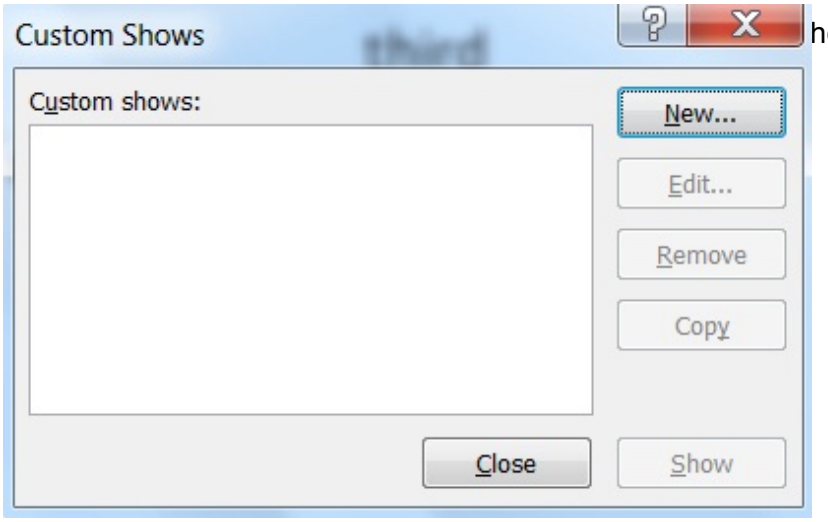


Fig. 11.13 : The Custom Shows dialog box

- We click the **New** button to open the **Define Custom Show**

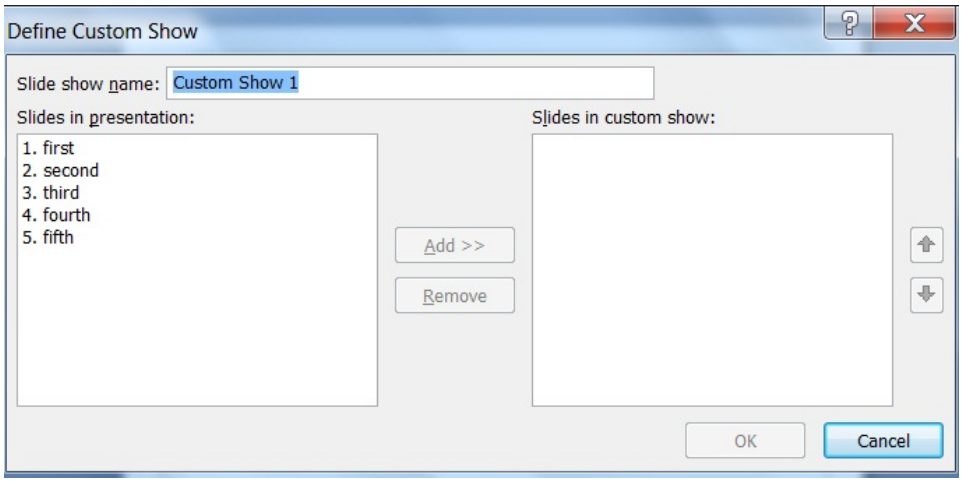


Fig. 11.14 : The Define Custom Show dialog box

The **Slides in presentation** box display the slides that are included in the current presentation, and the **Slides in custom show** list display the slides that are included in the **Custom show**. To add slides to the Custom show, we select the slide in the **Slides in presentation** list and click the **Add** button, which adds that particular slide to the **Slides in Custom show** list.

- After including the slides to our Custom show, we give it a name and click **OK,** which closes the **Define Custom Show** dialog box. The **Custom Shows list** in the **Custom Shows** dialog box now includes the name of our custom show.
- To run the presentation we may click the **Show** button of the **Custom Shows** dialog box or Close the **Custom Shows** dialog box to run the presentation at a later stage.
- To run the presentation at a later stage, we click on the **Custom Slide Show** button on the **Ribbon** in the **Start Slide Show** group under the **Slide Show** menu, and click on the name of our **Custom show** which starts the show.

- **Closing a presentation :** We can have several ways by which we close a presentation.

  When we finish viewing the last slide of a presentation, we get to see the screen as in **Figure 11.15**

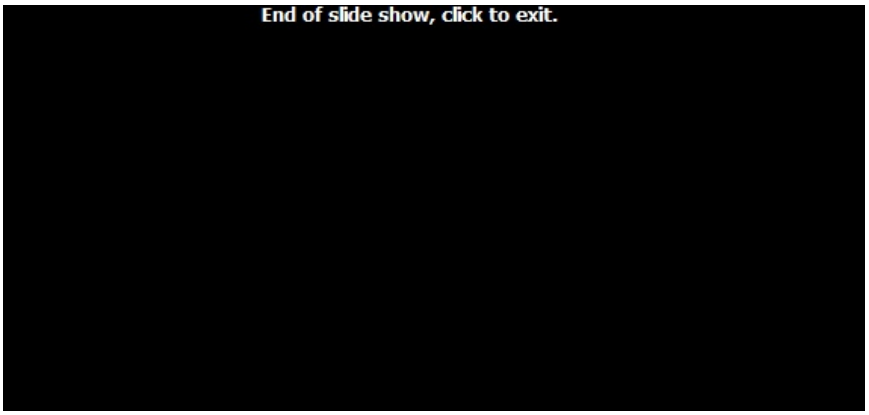


Fig. 11.15 : End of a Presentation

From the figure It is quite obvious that the presentation has ended and we are asked to close the presentation with a mouse-click.

We can also close a presentation mid-way during the slide show by

- Right-clicking on the slide being shown and selecting **End show**.

  OR

- Pressing the **Esc** key.

11.10 OPENING AN EXISTING PRESENTATION

We have already learnt how to create various kinds of presentations in PowerPoint 2007, adding text, graphics, transitions etc. Let us now see how to open an already existing PowerPoint presentation.

- **To open a presentation we follow these steps :**

  1. We click the Microsoft office button and select the **Open** option

     OR

     Use the keyboard shortcut **Ctrl + O**

     OR

     Click the **Open** icon on the **Quick Access toolbar**

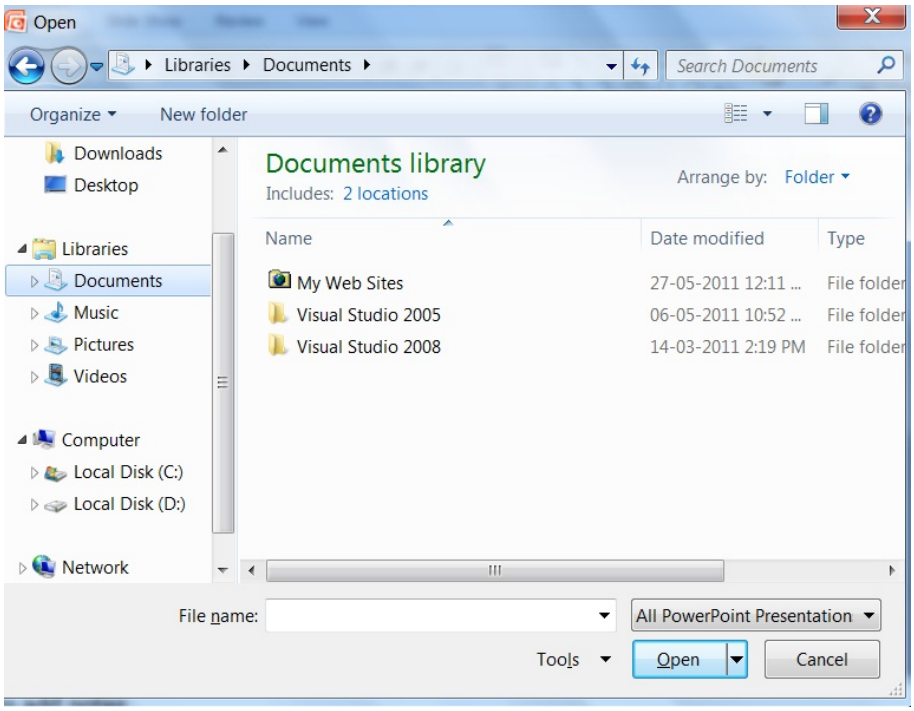


Fig. 11.16 : The Open dialog box

3. We browse through directories and select an already existing MS PowerPoint file.
4. Then we click the **Open** button to open the selected file in PowerPoint.

CHECK YOUR PROGRESS

Q.3. Fill in the blanks:

(i) Animation is the way of adding a special _____ or _____ effect to a slide object.

(ii) We can apply animation effects that have been _____ to gain more control over how and when effects are applied.

(iii) We create custom animations in the _____ task pane.

(iv) _____ are settings that allow us to automate our

PowerPoint presentation.

(v) We can set the number of _____ for a specific item to show on screen and when it should start.

(vi) We can control the speed of each slide _____ effect.

(vii) _____ effects are included in groups, each group having several effects of different types.

(viii) The Slides in _____ box display the slides that are included in the current presentation, and the Slides in _____ display the slides that are included in the Custom show.

11.11 LET US SUM UP

- PowerPoint, is a commercial presentation program
- Slides in a PowerPoint presentation may contain text, graphic, effects, sounds etc
- We can change the layout of our PowerPoint slide/slides
- WordArt is a gallery of text styles
- The photo album feature is new in PowerPoint 2007 and it allows us to easily create a photo album to share pictures.
- Design themes are a new addition to PowerPoint 2007.
- Slide transitions are the visual effects that are applied to a presentation, and can be seen when we move from one slide to another slide during the presentation.
- The Custom Animation task pane shows important information about an animation effect.
- Text Animations allow us to introduce text on our screen by paragraph level, automatically after a set number of seconds or in reverse order.
- Slide transitions are the animation-like effects that occur in Slide Show view when you move from one slide to the next during an on-

screen presentation.

11.12 FURTHER READINGS

- "*Introduction to Information Technology*", by Sanjay Saxena, Vikash Publishing, New Delhi.
- "*SAMS teach yourself Microsoft Office 2003 in 24 Hours*" by Greg Prerry, Pearson Education.

11.13 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : (i) Slide pane, (ii) Placeholders, (iii) ClipArt, (iv) SmartArt, (v) themes

Ans. to Q. No. 2 : (i) True, (ii) False, (iii) True, (iv) False, (v) True

Ans. to Q. No. 3 : (i) visual, sound, (ii) customized, (iii) Custom Animation, (iv) Timings, (v) seconds, (vi) transition, (vii) Transition, (viii) presentation, custom show list

11.14 MODEL QUESTIONS

Q.1. What is MS PowerPoint 2007, and why is it used?

Q.2. How do we create a new PowerPoint presentation?

Q.3. What are slides and what are the operations that we perform on slides?

Q.4. What are text and Graphics in PowerPoint and how can we use them?

Q.5. What are PowerPoint SmartArt? How do we use them?

Q.6. What are design themes in PowerPoint 2007, and how do we apply them?

Q.7. What is animation in PowerPoint 2007?

Q.8. How can we apply Custom Animation to our PowerPoint presentation slides?

Q.9. What are slide transition effects? Give an example of applying any transition effect to slides.

Q.10. How do we run a PowerPoint presentation?