

# 1

## BASIC CONCEPTS

### 1.1 INTRODUCTION

Let us begin with the word ‘compute’. It means ‘to calculate’. We all are familiar with calculations in our day-to-day life. We apply mathematical operations like addition, subtraction, multiplication, etc. and many other formulae for calculations. Simple calculations take less time. But complex calculations take much longer time. Another factor is accuracy in calculations. So man explored with the idea to develop a machine, which can perform this type of arithmetic calculation faster, and with full accuracy. This gave birth to a device or machine called ‘computer’.

### 1.2 OBJECTIVES

After going through this lesson, you would be in a position to:

- define a computer
  - identify the characteristics of a computer
  - explain the origin and evolution of a computer
  - identify the capability of computer in terms of speed and accuracy
  - distinguish computer from human beings and calculator
  - appreciate the evolution of computer through five generations
  - define the different types of computers based on electronics
  - explain the classification of computer on the basis of size of memory
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### 1.3 WHAT IS A COMPUTER

The computer as we see today is quite different from the one made in the beginning. The number of applications of computer has increased and the speed and accuracy of calculation has also increased. You have already experienced the impact of computers in our day-to-day life. Reservation of tickets in Air Lines and Railways, Payment of telephone and electricity bills, Deposits and withdrawals of money from banks, Business data processing, Medical diagnosis, Weather forecasting, etc. are some of the areas where computer has become extremely useful.

But as you will see later it does much more than that. It can be compared to a magic box, which serves different purpose to different people. For a common man computer is simply a calculator, which works automatically and quite fast. For a person who knows much about it, computer is a machine capable of solving problems and manipulating data. It accepts data, processes the data by doing some mathematical and logical operations, and gives us the desired output.

Therefore, we may define computer as a device that transforms data into meaningful information. Data can be anything like marks obtained by you in various subjects. It can also be name, age, sex, weight, height, etc. of all the students in your class or income, savings, investments, etc., of a country. Computer can also be defined in terms of functions it can perform. A computer can i) accept data ii) store data, iii) process data as desired, iv) retrieve the stored data as and when required, and v) print the result in desired format. You will know more about these functions as you go through the later lessons.

***Fig. 1.1 : A personal computer***

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## 1.4 CHARACTERISTICS OF A COMPUTER

Let us identify the major characteristics of a computer. These can be discussed under the headings of speed, accuracy, diligence, versatility and memory.

### (a) Speed

As you know computer can work very fast. It takes only few seconds for calculations that we take hours to complete. Suppose you are asked to calculate the average monthly income of one thousand persons in your neighborhood. For this you have to add income from all sources for all persons on a day-to-day basis and find out the average for each one of them. How long will it take for you to do this? May be one day, two days or one week? Do you know your small computer can finish this work in few seconds? The weather forecasts that you see every day on TV is the result of compilation and analysis of huge amount of data on temperature, humidity, pressure, etc. from various places processed by computers. It takes few minutes for the computer to process this huge amount of data and give the result.

You will be surprised to know that computer can perform several million (1,000,000) of instructions and even more per second. Therefore, we determine the speed of computer in terms of microsecond ( $10^{-6}$  part of a second) or nano-second ( $10^{-9}$  part of a second). From this you can imagine how fast your computer can perform.

### (b) Accuracy

Suppose some one calculates faster but commits a lot of errors in computing. Such result is useless. There is another aspect. Suppose you want to divide 15 by 7. You may work out up to 2 decimal places and say the quotient is 2.14. I may calculate up to 4 decimal places and say that the result is 2.1428. Some one else may go up to 9 decimal places and say the result is 2.142857143. Hence, in addition to speed, the computer provides very high level of accuracy or correctness in computing.

### (c) Diligence

A computer is free from tiredness, lack of concentration, fatigue, etc. It can work for hours without creating any error. If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy. Due to this capability it is better than human being in routine type of work.

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**(d) Versatility**

It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electricity bills or prepare accounts, etc. Therefore computer is highly versatile.

**(e) Power of Remembering**

Computer has the power of storing huge amount of information or data. Information can be stored and recalled as long as you require it, for any number of years. It depends entirely upon you, how much data you want to store in a computer and when to use or retrieve these data.

**(f) No IQ**

Computer is a dumb machine and it cannot do any work without instructions from the user. It is considered as a faithful idiot that can only perform the instructions given to it at tremendous speed and with high accuracy without understanding of the work being done. Computer has to be guided as to what you want to do and in what sequence. So a computer cannot take its own decision as you can.

**(g) No Feeling**

It does not have feelings or emotion, taste, knowledge and experience. Thus it does not get tired even after long hours of work. It does not distinguish between users.

**(h) Storage**

The computer has an in-built memory where it can store a large amount of data. You can also store data in secondary storage devices such as floppies and CDs, which can be kept outside your computer and can be carried to other computers.

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**INTEXT QUESTIONS**

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1. What is a computer? Why is it known as data processor?
  2. What are the important characteristics of a computer?
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## 1.5 HISTORY OF COMPUTER

History of computer could be traced back to the effort of man to count large numbers. This process of counting of large numbers generated various systems of numeration like Babylonian system of numeration, Greek system of numeration, Roman system of numeration and Indian system of numeration. Out of these the Indian system of numeration has been accepted universally. It is the basis of modern decimal system of numeration (0, 1, 2, 3, 4, 5, 6, 7, 8, 9). Later you will know how the computer solves all calculations based on decimal system. However, you will be surprised to know that the computer does not understand the decimal system and uses binary system of numeration for processing.

We will briefly discuss some of the path-breaking inventions in the field of computing devices.

### **(a) Calculating Machines**

It took generations for early man to build mechanical devices for counting large numbers. The first calculating device called ABACUS, was developed by the Egyptian and Chinese people.

The word ABACUS means calculating board. It consists of sticks in horizontal positions on which are inserted sets of pebbles. A modern form of ABACUS is shown in Fig. 1.2. It has a number of horizontal bars each having ten beads. Horizontal bars represent units, tens, hundreds, etc.

***Fig. 1.2 : Abacus***

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**(b) Napier's bones**

English mathematician John Napier built a mechanical device for the purpose of multiplication in 1617 AD. The device was known as Napier's bones.

**(c) Slide Rule**

English mathematician Edmund Gunter developed the slide rule. This machine could perform operations like addition, subtraction, multiplication, and division. It was widely used in Europe in 16th century.

**(d) Pascal's Adding and Subtraction Machine**

You might have heard the name of Blaise Pascal. He developed a machine at the age of 19 that could add and subtract. The machine consisted of wheels, gears and cylinders.

**(e) Leibniz's Multiplication and Dividing Machine**

The German philosopher and mathematician Gottfried Leibniz build around 1673 a mechanical device that could both multiply and divide.

**(f) Babbage's Analytical Engine**

It was in the year 1823 that a famous English man Charles Babbage built a mechanical machine to do complex mathematical calculations. It was called difference engine. Later he developed a general-purpose calculating machine called analytical engine. You should know that Charles Babbage is called the Father of computers.

**(g) Mechanical and Electrical Calculator**

In the beginning of 19th century the mechanical calculator was developed to perform all sorts of mathematical calculations and it was widely used till 1960. Later the routine part of mechanical calculator was replaced by electric motor. It was called the electrical calculator.

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**Fig. 1.3 : Switching Devices used in different generations of Computers**

#### **(h) Modern Electronic Calculator**

The electronic calculator used in 1960s was run with electron tubes, which was quite bulky. Later it was replaced with transistors and as a result the size of calculators became too small.

The modern electronic calculators can compute all kinds of mathematical computations and mathematical functions. It can also be used to store some data permanently. Some calculators have in-built programs to perform some complicated calculations.

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#### **INTEXT QUESTIONS**

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3. What is the first mathematical device and when was it built?
  4. Who is called the father of computer technology?
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#### **1.6 COMPUTER GENERATIONS**

You know that the evolution of computer started from 16th century and resulted in the form that we see today. The present day computer, however, has also undergone rapid changes during the last fifty years. This period, during which the evolution of computer took place, can be divided into five distinct phases known as Generations of Computers. Generation of computer means the technological evolution over the period of time. Computers are classified as belonging to specific “generations”. The term generations was initially intro-

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duced to distinguish between different hardware technologies. Gradually it shifted to both hardware and software as the total system consists of both of them.

### **(a) First Generation Computers (1946-59)**

First generation computers used Thermion valves or Vacuum tubes. These computes were large in size and writing programs on them was difficult. Some of the computers of this generation were:

**ENIAC:** It was the first electronic computer built in 1946 at University of Pennsylvania, USA by John Eckert and John Mauchly. It was named Electronic Numerical Integrator and Calculator (ENIAC). The ENIAC was 30 x 50 feet long, weighed 30 tons, contained 18,000 vacuum tubes, 70,000 resistors, 10,000 capacitors and required 150 kilowatts of electricity. Today your favourite computer is many times as powerful as ENIAC, still the size is very small.

**EDVAC:** It stands for Electronic Discrete Variable Automatic Computer and was developed in 1950. The concept of storing data and instructions inside the computer was introduced here. This allowed much faster operation since the computer had rapid access to both data and instructions. The other advantage of storing instruction was that computer could take logical decisions internally.

### **Other Important Computers of First Generation**

**EDSAC:** It was developed by M.V. Wilkes at Cambridge University in 1949.

**UNIVAC-1:** Eckert and Mauchly produced it in 1951 by Universal Accounting Computer setup.

Followings were the major drawbacks of first generation computers.

1. They were quite bulky.
2. The operating speed was quite slow.
3. Power consumption was very high.
4. It required large space for installation.
5. They had no operating system.
6. The programming capability was quite low.

### **(b) Second Generation Computers (1959-64)**

Around 1959 an electronic device called Transistor replaced the bulky

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vacuum tubes in the first generation computer. A single transistor contained circuit produced by several hundred vacuum tubes. Thus the size of the computer got reduced considerably. Transistors therefore provided higher operating speed than vacuum tubes. They had no filament and require no heating. Manufacturing cost was also very low. It is in the second generation that the concept of Central Processing Unit (CPU), memory, programming language and input and output units were developed. The programming languages such as COBOL, FORTRAN were developed during this period. Some of the computers of the Second Generation were

IBM 1920 : Its size was small as compared to First Generation computers and mostly used for scientific purpose.

IBM 1401 : Its size was small to medium and used for business applications.

CDC 3600 : Its size was large and used for scientific purpose.

The salient features of this generation were:

1. relatively faster than the first generation computers.
2. smaller than the first generation computers
3. generated lower level of heat
4. more reliable
5. higher capacity of internal storage

### **(c) Third Generation Computers (1964-71)**

The third generation computers were introduced in 1964. They used Integrated Circuits (ICs). These ICs are popularly known as Chips. A single IC has many transistors, resistors and capacitors built on a single thin slice of silicon. So it is quite obvious that the size of the computer got further reduced. Some of the computers developed during this period were IBM-360, ICL-1900, IBM-370, and VAX-750. Higher-level language such as BASIC (Beginners All purpose Symbolic Instruction Code) was developed during this period.

The features of computers belonging to this generation were:

- used tiny ICs
  - relatively very small in size
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- made use of operating system
- high processing speed
- more reliable
- power efficient and high speed
- use of high level languages
- large memory
- low cost

#### **(d) Fourth Generation Computers (1971 onwards)**

The present day computers that you see today are the fourth generation computers that started around 1975. It uses Large Scale Integrated Circuits (LSIC) built on a single silicon chip called microprocessors. Due to the development of microprocessor it is possible to place computer's central processing unit (CPU) on a single chip. These computers are called microcomputers. Later very large scale Integrated Circuits (VLSIC) replaced LSICs. These integrated circuits are so advanced that they incorporate hundreds of thousands of active components in volumes of a fraction of an inch.

Thus the computer, which was occupying a very large room in earlier days, can now be placed on a table. The personal computer (PC) that you see in your school is a Fourth Generation Computer.

The salient features of this generation are:

- very fast
- very low heat generation
- smaller in size
- very reliable
- negligible hardware failure
- highly sophisticated

#### **(e) Fifth Generation Computers**

The computers, which can think and take decisions like human beings have been characterized as Fifth generation computers and are also referred as *thinking machines*. The speed is extremely high in fifth generation computer. Apart from this they can perform par-

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allel processing. The concept of Artificial Intelligence has been introduced to allow the computer to take its own decision. It is still in a developmental stage. A lot of research and development work is going on in this area in United States and Japan but it will take some time before such machines are produced for use by the industry.

## **1.7 COMPUTER CLASSIFICATION**

Differences in certain computer characteristics have led to the development of major computer classifications based on the type of electronic signal and memory size.

### **1.7.1 Types of computers based on electronic signal**

Computers, in general are of three types as per the electronic signal they transmit.

- (i) Analog Computers
- (ii) Digital Computers
- (iii) Hybrid Computers

#### **Analog Computers**

An analog computer operates on inputs of continuously varying electrical voltages. An example of the use of an electronic analog computer is that of controlling a flight simulator for training pilots. The computer responds to the cockpit simulator control movements made by the pilot and makes physical changes in the environment so that the pilot feels as if he is controlling an actual aeroplane. Analog computers are used mainly in scientific design and production environments. Each one has to be constructed to do a specific job and will respond very quickly to changes in the measurement of inputs.

***Fig. 1.4***

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### **Digital Computers**

In digital computers, mathematical expressions are represented as binary digits (0 and 1) and all operations are done using these digits at a very high rate. It means that the computer operates on electrical inputs that have only two states, ON and OFF. These computers are widely used in commercial and control systems. Now a days when we use the word computer, we mostly refer to a digital computer.

***Fig. 1.5***

### **Hybrid Computers**

Hybrid computers are computers with combined features of both digital and analog type. Desirable features of analog and digital machines can be combined to create a Hybrid Computer. This type of computer operates by counting as well as by measuring. In other words, the output can be either in the form of numbers or required units of measurement, e.g., an analog device measures patient's heart beat (ECG). These measures will be converted into digital form and a digital device checks for any abnormality. Further, we can also input digital data like your marks and get digital results like the result of your class. Another example is a Modem. (which converts the digital signals into analog, carry it along the line and at the receiving end again changes it back into digital signal).

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**Fig. 1.6**

### **1.7.2 Types of computers based on memory size**

On the basis of size of memory computers can be divided into following categories:

1. **Microcomputer :** Microcomputer is at the lowest end of the computer range in terms of speed and storage capacity. Its CPU is a microprocessor. The first microcomputers were built of 8-bit microprocessor chips. The most common microcomputer is a personal computer (PC). The PC supports a number of input and output devices. An improvement of 8-bit chip is 16-bit and 32-bit chips. Examples of microcomputer are IBM PC, PC-AT.
  2. **Mini Computer:** This is designed to support more than one user at a time. It possesses large storage capacity and operates at a high speed than a microcomputer. The mini computer is used in multi-user system in which various users can work at the same time. This type of computer is generally used for processing large volume of data in an organization. They are also used as servers in Local Area Networks (LAN).
  3. **Mainframe Computer:** This type of computers are generally 32-bit computers. They operate at very high speed, have very large storage capacity and can handle the workload of many users. They are generally used in centralized databases. They are also used as controlling nodes in Wide Area Network (WAN). Example of mainframes are DEC, ICL and IBM 3000 series.
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4. **Super Computer:** This is the fastest and most expensive machines. It has high processing speed compared to other computers. They also have multiprocessing technique. One of the ways in which supercomputers are built is by interconnecting hundreds of microprocessors. Supercomputer is mainly used for weather forecasting, biomedical research, remote sensing, aircraft design and other areas of science and technology. Examples of supercomputers are CRAY YMP, CRAY2, NEC SX-3, CRAY XMP and PARAM from India.

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### INTEXT QUESTIONS

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5. Into how many generations the evolution of computer is divided?
  6. What is VLSI?
  7. The personal computer that you see today is which generation of computer?
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### 1.8 APPLICATIONS OF COMPUTERS IN VARIOUS FIELDS

Computers have their application or utility everywhere. We find their applications in almost every sphere of life—particularly in fields where computations are required to be done at a very fast speed and where data is so complicated that the human brain finds it difficult to cope up with.

As you must be aware, computer now-a-days are being used almost in every department to do the work at a greater speed and accuracy. They can keep the record of all the employees and prepare their pay bill in a matter of minutes every month. They can keep automatic checks on the stock of a particular item. Some of the prominent areas of computer applications are:

**In Tourism:** Hotels use computers to speed up billing and checkout the availability of rooms. So is the case with railways and airline reservations for booking tickets. Architects can display their scale models on a computer and study them from various angles and perspectives. Structural problems can now be solved quickly and accurately.

**In Banks:** Banks also have started using computers extensively. Terminals are provided in the branch and the main computer is located centrally. This enables the branches to use the central computer system for information on things such as current balance,

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deposits, overdrafts, interest charges, etc. MICR encoded cheques can be read and sorted out with a speed of 3000 cheques per minute by computers as compared to hours taken by manual sorting. Electronic funds transfer (EFT) allows a person to transfer funds through computer signals over wires and telephone lines making the work possible in a very short time.

**In Industry:** Computers are finding their greatest use in factories and industries of all kinds. They have taken over the work ranging from monotonous and risky jobs like welding to highly complex jobs such as process control. Drills, saws and entire assembly lines can be computerized. Moreover, quality control tests and the manufacturing of products, which require a lot of refinement, are done with the help of computers. Not only this, Thermal Power Plants, Oil refineries and chemical industries fully depend on computerized control systems because in such industries the lag between two major events may be just a fraction of a second.

**In Transportation:** Today computers have made it possible for planes to land in foggy and stormy atmosphere also. The aircraft has a variety of sensors, which measure the plane's altitude, position, speed, height and direction. Computer use all this information to keep the plane flying in the right direction. In fact, the Auto-pilot feature has made the work of pilot much easy.

**In Education:** Computers have proved to be excellent teachers. They can possess the knowledge given to them by the experts and teach you with all the patience in the world. You may like to repeat a lesson hundred times, go ahead, you may get tired but the computer will keep on teaching you. Computer based instructions (CBI) and Computer Aided Learning (CAL) are common tools used for teaching. Computer based encyclopedia such as Britannica provide you enormous amount of information on anything.

**In Entertainment:** Computers are also great entertainers. Many computer games are available which are like the traditional games like chess, football, cricket, etc. Dungeons and dragons provide the opportunity to test your memory and ability to think. Other games like Braino and Volcano test your knowledge.

## APPLICATION OF COMPUTER

Computer, Its Development and Application

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*Fig. 1.7*

## **1.9 DEVELOPMENTS IN THE FIELD OF GRAPHICS IN COMPUTERS**

As we know computer graphics involves the generation, representation, manipulation, processing and evaluation of graphic images by a computer. Moreover, it combines graphic images with related non-graphic information residing in the computer files. Graphic objects may be photographic images or they may be created with the aid of a computer in the form of alphanumeric character, special symbols, line drawings or gray shaded areas.

We will learn here how new developments in the field of graphics in computers are changing the way we see the world of arts. The technique of 3D(Three Dimensional) rendering is responsible for this change.

### **1.9.1 What is 3D Graphics**

The display screen or the paper in the dimensional rendering cannot display three-dimensional objects but only their projections. 2D graphics are just line drawings whereas a 3D-rendering involves modeling an object with the help of computers down to the details of lighting, shading and reflections so that it will look realistic.

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**Fig. 1.8**

Thus, the process of creating three-dimensional models within a computer's memory such as setting lights and applying textures is called 3D Graphics. After you tell a computer about the angle from which you want to view the 3-D scene, it will generate an image that simulates the conditions you have defined for the scene.

3D-rendering involves modeling an object (using a mesh called a wire frame to represent the object) and then covering it with a smooth material having the right kind of optical properties to make it look real. The modeling is usually done entirely on a computer. Rendering the model to produce a real life appearance can be done in several ways. No scene, be it 3D-rendered or real, is perfectly shot the first time yet touching it up on a computer can work wonders. We all watch advertisements on the television. The famous Kawasaki Bajaj motor bike advertisement, the 3D animated logos for the samachar, the World this week, Newstrack are all examples of wonderful work of computer graphics.

### **1.9.2 Desk Top Publishing (DTP)**

While computers have invaded various industries through the latest technology and software, they have entered the printing industry through a process called DTP. DTP has made printing procedure faster, more efficient and accurate. The traditional method of printing involves phototypesetting the text, cutting and pasting the typed

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text by the artist, where the artist has to draw lines and boxes manually to create a ready to use artwork.

***Fig. 1.9***

The method of DTP involves, (i) typing the text on the computer keyboard, (ii) setting it in the page form with the help of DTP software, (iii) giving different fonts to Headings, captions, etc. by simple commands, and (iv) taking the final printout on a laser printer. Ventura, PageMaker, CorelDraw are some of the software using which very high class text setting, graphics designs and simple line drawings can be created faster and more accurately.

### **1.9.3 Computer and Medical Science**

Computers have proved to be very useful in the field of medical science. In hospitals, computers are used for monitoring patients, raising the alarm if the pulse rate falls below a certain level, maintaining medical records, record of patient's treatment, laboratory test, billing, etc. Computer controlled electronic scanners can build up a picture of a patient slice by slice, measuring the strength of the rays which have been sent through the body. A computer uses this information to show a cross section of the body revealing any abnormalities which cannot be seen from outside. Computers also help a doctor to perform difficult surgical procedures.

### **1.9.4 Space Research**

INSAT IIB and all the satellites and spacecraft could not have taken their flight but for the valuable assistance provided to the scientists by computers. Spacecrafts are monitored with the help of comput-

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ers, which not only keep the continuous analog records of the voyage and the digital records of the speed direction, fuel, temperature, but also suggests corrective measures which are to be taken in case of some error. The picture shows an American Space shuttle lifting off. The space shuttle was totally designed using computers. Thus the computers have arrived in a big way and have become essential for our life.

*Fig. 1.10*

### **1.10 WHAT YOU HAVE LEARNT**

In this lesson we have discussed about the major characteristics of computer. The speed, accuracy, memory and versatility are some of the features associated with a computer. But the computer that we see today has not developed over night. It has taken centuries of human effort to see the computer in its present form today. There are five generations of computer. Over these generations the physical size of computer has decreased. On the other hand, the processing speed of computer has improved tremendously. We also discussed about the varieties of computers available today. Various application areas of computers have also been discussed.

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### **1.11 TERMINAL QUESTIONS**

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1. Why is computer known as data processor?
  2. Explain in brief the various generations in computer technology?
  3. Write a short note on the fifth generation of computer. What makes it different from Fourth generation computer?
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4. Why did the size of computer get reduced in the third generation computer?
5. Discuss briefly the computer applications in various fields.

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### **1.12 KEY TO INTEXT QUESTIONS**

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1. A computer is an electronic device, which is used to accept, store, retrieve and process the data. It is called a data processor because it is mainly used for processing data for producing meaningful information.
2. The characteristics of computer are speed, accuracy, diligence, versatility and storage.
3. Analytical engine, 1823.
4. Charles Babbage
5. Five generations
6. Very Large

#### Scale Integration

7. Fourth Generation
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## 2

# COMPUTER ORGANISATION

### 2.1 INTRODUCTION

In the previous lesson we discussed about the evolution of computer. In this lesson we will provide you with an overview of the basic design of a computer. You will know how different parts of a computer are organized and how various operations are performed between different parts to complete a specific task. As you know from the previous lesson the internal architecture of computer may differ from system to system, but the basic organization remains the same for all computer systems.

### 2.2 OBJECTIVES

After going through this lesson you would be able to:

- explain basic organization of computer system
- define arithmetic logical unit, control unit and central processing unit
- differentiate between bit, byte and a word
- differentiate between primary memory and secondary memory
- explain primary storage and secondary storage units

### 2.3 BASIC COMPUTER OPERATIONS

A computer as shown in Fig. 2.1 performs basically five major opera-

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tions or functions irrespective of their size and make. These are 1) it accepts data or instruction by way of input, 2) it stores data, 3) it can process data as required by the user, 4) it gives results in the form of output, and 5) it controls all operations inside a computer. We discuss below each of these operations.

1. **Input:** This is the process of entering data and programs in to the computer system. You should know that computer is an electronic machine like any other machine, which takes as input raw data and performs some processing giving out processed data. Therefore, the input unit takes data from us to the computer in an organized manner for processing.

***Fig. 2.1: Basic Computer Operations***

2. **Storage:** The process of saving data and instructions permanently is known as storage. Data has to be fed into the system before the actual processing starts. It is because the processing speed of Central Processing Unit (CPU) is so fast that the data has to be provided to CPU with the same speed. Therefore the data is first stored in the storage unit for faster access and processing. This storage unit or the primary storage of the computer system is designed to do the above functionality. It provides space for storing data and instructions.

The storage unit performs the following major functions:

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- All data and instructions are stored here before and after processing.
  - Intermediate results of processing are also stored here.
3. **Processing:** The task of performing operations like arithmetic and logical operations is called processing. The Central Processing Unit (CPU) takes data and instructions from the storage unit and makes all sorts of calculations based on the instructions given and the type of data provided. The result is then sent back to the storage unit.
  4. **Output:** This is the process of producing results from the data for getting useful information. The results could either be displayed on the screen or may be printed for future reference. The output unit therefore allows the results to be either stored inside the computer for further processing or may give you the results in human readable form.
  5. **Control:** The process of input, output, processing and storage is performed under the supervision of a unit called 'Control Unit'. It decides when to start receiving data, when to stop it, where to store data, etc. It takes care of step-by-step processing of all operations inside the computer.

## 2.4 FUNCTIONAL UNITS

In order to carry out the operations mentioned in the previous section the computer allocates the task between its various functional units. The computer system is divided into three separate units for its operation. These are 1) arithmetic logical unit, 2) control unit, and 3) central processing unit.

### (a) Arithmetic Logical Unit (ALU)

After you enter data through the input device it is stored in the primary storage unit. Arithmetic Logical Unit performs the actual processing of data and instruction. The major operations performed by the ALU are addition, subtraction, multiplication, division, logic and comparison. Data is transferred to ALU from storage unit when required. After processing, the output is returned back to storage unit for further processing or getting stored.

### (b) Control Unit (CU)

The next component of computer is the Control Unit, which acts like the supervisor seeing whether things are done in proper fash-

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ion. The control unit determines the sequence in which computer programs and instructions are executed. Things like processing of programs stored in the main memory, interpretation of the instructions and issuing of signals for other units of the computer to execute them. It also acts as a switch board operator when several users access the computer simultaneously. Thereby it coordinates the activities of computer's peripheral equipment as they perform the input and output. Therefore it is the manager of all operations mentioned in the previous section.

*Hardware*

*Software*

**Fig. 2.2: Computer Architecture**

### **(c) Central Processing Unit (CPU)**

The ALU and the CU of a computer system are jointly known as the central processing unit. You may call CPU as the brain of any computer system. It is just like a human brain that takes all major decisions, makes all sorts of calculations and directs different parts of the computer by activating and controlling the operations.

### **Personal Computer Configuration**

Now let us identify the physical components that make the computer work. These are

1. Central Processing Unit (CPU)
  2. Computer Memory (RAM and ROM)
  3. Data bus
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4. Ports
5. Motherboard
6. Hard disk
7. Output Devices
8. Input Devices

All these components are inter-connected for the personal computer to work.

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### **INTEXT QUESTIONS**

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1. What are the five basic operations performed by the computer?
2. What is the full form of ALU, CU and CPU.
3. Choose the correct answer.
  - (a) The unit which performs arithmetic and logical operations is called
    - (i) ALU      (ii) editing      (iii) storage      (iv) output
  - (b) The ALU and CU jointly are known as
    - (i) RAM      (ii) ROM      (iii) CPU      (iv) none of the above
  - (c) The process of producing results from the data for getting useful information is called.
    - (i) output      (ii) input      (iii) processing      (iv) storage

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### **2.5 MEMORY SYSTEM IN A COMPUTER**

There are two kinds of computer memory: primary and secondary. Primary memory is an integral part of the computer system and is accessible directly by the processing unit. RAM is an example of primary memory. As soon as the computer is switched off the contents of the primary memory is lost. The primary memory is much faster in speed than the secondary memory. Secondary memory such as floppy disks, magnetic disk, etc., is located external to the computer. Primary memory is more expensive than secondary memory. Because of this, the size of primary memory is less than that of secondary memory. We will discuss about secondary memory in later lesson.

Computer memory is used to store two things: I) instructions to

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execute a program and ii) data. When the computer is doing any job, the data that have to be processed are stored in the primary memory. This data may come from an input device like keyboard or from a secondary storage device like a floppy disk.

As program or the set of instructions is kept in primary memory, the computer is able to follow instantly the set of instructions. For example, when you book ticket from railway reservation counter, the computer has to follow the same steps: take the request, check the availability of seats, calculate fare, wait for money to be paid, store the reservation and get the ticket printed out. The program containing these sequential steps is kept in memory of the computer and is followed for each request.

But inside the computer, the steps followed are quite complex than what we actually see on the monitor or screen. In computer's memory both programs and data are stored in the binary form. You have already been introduced with decimal number system, that is the numbers 1 to 9 and 0. The binary system has only two values 0 and 1. These are called bits. As human beings, we all understand decimal system but the computer can only understand binary system. It is because a large number of integrated circuits inside the computer can be considered as switches, which can be made ON or OFF. If a switch is ON it is considered 1 and if it is OFF it is 0. A number of switches in different states will give you a message like this: 110101...10. So the computer takes input in the form of 0 and 1 and gives output in the form 0 and 1 only. Is it not absurd if the computer gives outputs as 0's & 1's only? But you do not have to worry about. Every number in binary system can be converted to decimal system and vice versa; for example, 1010 meaning decimal 10. Therefore it is the computer that takes information or data in decimal form from you, convert it into binary form, process it producing output in binary form and again convert the output to decimal form to make it understandable.

The primary memory in the computer is in the form of IC's (Integrated Circuits). These circuits are called Random Access Memory (RAM). Each of RAM's locations stores one byte of information. (One byte is equal to 8 bits). A bit is an acronym for binary digit, which stands for one binary piece of information. This primary or internal storage section is made up of several small storage locations (ICs) called cells. Each of these cells can store a fixed number of bits called word length.

Each cell has a unique number assigned to it called the address of

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the cell and it is used to identify the cells. The address starts at 0 and goes up to (N-1). You should know that the memory is like a large cabinet containing as many drawers as there are addresses on memory. Each drawer contains a word and the address is written on outside of the drawer.

### **(a) Capacity of Primary Memory**

You know that each cell of memory contains one character or one byte of data. So the memory capacity is defined in terms of byte or words. The relation is: 1 kilobyte (KB) = 1024 bytes. Thus 64 kilobyte (KB) memory is capable of storing  $64 \times 1024 = 32,768$  bytes. The memory size ranges from few kilobytes in small systems to several thousand kilobytes in large mainframe and super computers. In your personal computer you will find memory capacity in the range of 32 MB, 64 MB and even 128 MB (MB = Million bytes and 1 MB = 1024 KB).

The following terms related to memory of a computer are discussed below:

1. **Random Access Memory (RAM):** The primary storage is referred to as random access memory (RAM) because it is possible to randomly select and use any location of the memory directly for storing and retrieving data. It takes same time to reach any address of the memory whether it is in the beginning or in the last. It is also called read/write memory. The storage of data and instructions inside the primary storage is temporary. It disappears from RAM as soon as the power to the computer is switched off. The memory, which lose its contents on failure of power supply, are known as volatile memories. So now we can say that RAM is volatile memory.
  2. **Read Only Memory (ROM):** There is another memory in computer, which is called Read Only Memory (ROM). Again it is the ICs inside the PC that form the ROM. The storage of program in the ROM is permanent. The ROM stores some standard processing programs supplied by the manufacturer to operate the personal computer. The ROM can only be read by the CPU but it cannot be changed. The basic input/output program, which is required to start and initialize equipment attached to the PC, is stored in the ROM. The memories, which do not lose their contents on failure of power supply, are known as non-volatile memories. ROM is a non-volatile memory.
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3. **PROM:** There is another type of primary memory in computer, which is called Programmable Read Only Memory (PROM). You know that it is not possible to modify or erase programs stored in ROM, but it is possible for you to store your program in PROM chip. Once the programs are written it cannot be changed and remain intact even if power is switched off. Therefore, programs or instructions written in PROM or ROM cannot be erased or changed.
4. **EPROM:** This stands for Erasable Programmable Read Only Memory, which overcomes the limitations of PROM & ROM. EPROM chip can be programmed time and again by erasing the information stored earlier in it. Exposing the chip for some time to ultraviolet light erases information stored in EPROM. The chip can be reprogrammed using a special programming facility. When the EPROM is in use, information can only be read.
5. **Cache Memory:** The speed of CPU is extremely high compared to the access time of main memory. Therefore the performance of CPU decreases due to the slow speed of main memory. To minimize the mismatch in operating speed, a small memory chip is attached between CPU and Main memory whose access time is very close to the processing speed of CPU. It is called CACHE memory. CACHE memories are accessed much faster than conventional RAM. It is used to store programs or data currently being executed or temporary data frequently used by the CPU. So cache memory makes main memory to work faster and larger than it really is. It is also very expensive to have bigger size of cache memory and therefore it is available in limited capacity generally KiloBytes.
6. **Registers:** The CPU processes data and instructions with high speed. There is also movement of data between various units of computer. It is necessary to transfer the processed data with high speed. So the computer uses a number of special memory units called registers. These are not part of the main memory but they store data or information temporarily and pass it on as directed by the control unit.

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### INTEXT QUESTIONS

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4. Distinguish between bit and byte.
  5. Define volatile and non-volatile memory.
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6. Write True or False:

- (a) There are two kinds of computer memory—primary and secondary.
- (b) The computer takes inputs in the form of 0 and 1.
- (c) The storage of program and data in the RAM is permanent.
- (d) PROM is a secondary memory.
- (e) The memories, which do not lose their content on failure of power supply, are known as non-volatile memories.

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## 2.6 SECONDARY STORAGE

You are now clear that the operating speed of primary memory or main memory should be as fast as possible to match with the CPU speed. These high-speed storage devices are very expensive and hence the cost per unit of storage is also very high. Again the storage capacity of the main memory is also very limited. Often it is necessary to store hundreds of millions of bytes of data for the CPU to process. Therefore additional memory is required in all the computer systems. This memory is called auxiliary storage, backup storage or secondary storage.

In this type of memory the cost per bit of storage is low. However, the operating speed is slower than that of the primary storage. Huge volume of data are stored here on permanent basis and transferred to the primary storage as and when required. Most widely used secondary storage devices are magnetic tapes, floppy disk, magnetic disk and optical disks.

1. **Magnetic Tape:** Magnetic tapes are used for large computers like mainframe computers where large volume of data is stored for a longer time. In PC also you can use tapes in the form of cassettes. The storage of data in tapes is inexpensive. Tapes consist of magnetic materials that store data permanently. It can be 12.5 mm to 25 mm wide plastic film-type and 500 meter to 1200 meter long, which is coated with magnetic material. The tape unit is connected to the central processor and information is fed into or read from the tape through the processor. It is similar to a cassette tape recorder.
-

**Fig 2.3: Magnetic Tape**

***Advantages of Magnetic Tape:***

- **Compact:** A 10-inch diameter reel of tape is 2400 feet long and is able to hold 800, 1600 or 6250 characters in each inch of its length. The maximum capacity of such tape is 180 million characters. Thus data are stored much more compactly on tape.
  - **Economical:** The cost of storing data is very less as compared to other storage devices.
  - **Fast:** Copying of data is easier and fast.
  - **Long term Storage and Re-usability:** Magnetic tapes can be used for long term storage and a tape can be used repeatedly with out loss of data.
2. **Magnetic Disk:** You might have seen the gramophone record, which is like a circular disk and coated with magnetic material. Magnetic disks used in computer are made on the same principle. It rotates with very high speed inside the computer drive. Data is stored on both the surfaces of the disk. Magnetic disks are most popular as direct access storage device. Each disk consists of a number of invisible concentric circles called tracks. Information is recorded on tracks of a disk surface in the form of tiny magnetic spots. The presence of a magnetic spot represents one bit and its absence represents zero bit. The information stored in a disk can be read many times without affecting the
-

stored data. So the reading operation is non-destructive. But if you want to write a new data, then the existing data is erased from the disk and new data is recorded.

***Fig. 2.4: Magnetic Disk***

3. **Floppy Disk:** It is similar to magnetic disk discussed above. It is 3.5 inch in diameter. These come in single or double density and recorded on one or both surface of the diskette. The capacity of a high-density 3.5 inch floppy it is 1.44 mega bytes. It is cheaper than any other storage devices and is portable. The floppy is a low cost device particularly suitable for personal computer system.

***Fig. 2.5: Floppy Diskette***

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#### 4. **Optical Disk:**

With every new application and software there is greater demand for memory capacity. It is the necessity to store large volume of data that has led to the development of optical disk storage medium. Optical disks read and write the data using light and not the magnetization as in above storage devices. Optical disks can be divided into the following categories:

1. **Compact Disk/Read Only Memory (CD-ROM):** CD-ROM disks are made of reflective metals. CD-ROM is written during the process of manufacturing by high power laser beam. Here the storage density is very high, storage cost is very low and access time is relatively fast. Each disk is approximately 4 ½ inches in diameter and can have over 600 MB of data. As the CD-ROM can be read only we cannot write or make changes into the data contained in it.
2. **Write Once, Read Many (WORM):** The inconvenience that we cannot write anything onto a CD-ROM is avoided in WORM. A WORM allows the user to write data permanently on to the disk. Once the data is written it can never be erased without physically damaging the disk. Here data can be recorded from keyboard, video scanner, OCR equipment and other devices. The advantage of WORM is that it can store vast amount of data amounting to gigabytes (10<sup>9</sup> bytes). Any document in a WORM can be accessed very fast, say less than 30 seconds.
3. **Erasable Optical Disk:** These are optical disks where data can be written, erased and re-written. This makes use of a laser beam to write and re-write the data. These disks may be used as alternatives to traditional disks. Erasable optical disks are based on a technology known as magneto-optical (MO). To write a data bit on to the erasable optical disk the MO drive's laser beam heats a tiny, precisely defined point on the disk's surface and magnetises it.

### 2.7 DATA REPRESENTATION IN COMPUTER MEMORY

As we know the central processing unit (CPU) in a computer system uses electronic elements such as switches, etc. which are represented in one of the two states viz, on or off, high or low, etc. These two states are indicated as 1 and 0. If a switch is on, it is said to be in state 1 and if it is off, it is state 0. In other words, a computer oper-

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ates with only two digits 0 and 1, called *binary digits* (or bits). In memory, a bit position is a miniature transistor within an integrated circuit. The data is represented as a string consisting of 0s and 1s. Hence the ordinary decimal system of data representation is not suited to CPU. It works with simple but rather longish binary system.

### 2.7.1 Binary System:

Binary system works with only two bits: 0 and 1 unlike the decimal system that works with 10 digits, 0 through 9. Let us take the number 1267 of ordinary decimal system. Its binary equivalent is computed below by successive division by 2. And, then (on the right hand side) 1267 is got back by conversion by weightage of  $2^*$ .

| Number , 2      | Quotient | Remainder | Weightage, $2^*$ | Remainder x $2^*$ |
|-----------------|----------|-----------|------------------|-------------------|
| Col. 1          | 2        | 3         | 4                | 5 = 3 x 4         |
| $1267 \div 2 =$ | 633 +    | 1         | $2^0 = 1$        | 1                 |
| $633 \div 2 =$  | 316 +    | 1         | $2^1 = 2$        | 2                 |
| $316 \div 2 =$  | 158 +    | 0         | $2^2 = 4$        | 0                 |
| $158 \div 2 =$  | 79 +     | 0         | $2^3 = 8$        | 0                 |
| $79 \div 2 =$   | 39 +     | 1         | $2^4 = 16$       | 16                |
| $39 \div 2 =$   | 19 +     | 1         | $2^5 = 32$       | 32                |
| $19 \div 2 =$   | 9 +      | 1         | $2^6 = 64$       | 64                |
| $9 \div 2 =$    | 4 +      | 1         | $2^7 = 128$      | 128               |
| $4 \div 2 =$    | 2 +      | 0         | $2^8 = 256$      | 0                 |
| $2 \div 2 =$    | 1 +      | 0         | $2^9 = 512$      | 0                 |
| $1 \div 2 =$    | 0 +      | 1*        | $2^{10} = 1024$  | 1024              |
| *(Senior digit) |          |           |                  | 1267              |

$$1267 = 10011110011$$

**Table 2.1**

The equivalent is obtained by writing the contents of Col. 3 starting with the senior digit i.e., from bottom to top.

**Binary Arithmetic :**  $2^*$ , in the above example gives the various positional values: 1, 2, 4, 8, 16, 32, 64.... Just as there is a decimal point there is binary point too. The positional values on both sides of the binary point are given in the table hereunder:

|                                        |       |       |       |       |       |          |          |          |          |
|----------------------------------------|-------|-------|-------|-------|-------|----------|----------|----------|----------|
| Position                               | 4     | 3     | 2     | 1     | 0     | -1       | -2       | -3       | -4       |
| Position Value                         | $2^4$ | $2^3$ | $2^2$ | $2^1$ | $2^0$ | $2^{-1}$ | $2^{-2}$ | $2^{-3}$ | $2^{-4}$ |
| Quantity represented by Position Value | 16    | 8     | 4     | 2     | 1     | 1/2      | 1/4      | 1/8      | 1/16     |

The table can, of course, be extended infinitely on both sides. The decimal equivalent of a number written in binary is found by adding the products of the absolute and positional values as illustrated in the above example where 1267 was got back from 10011110011. This procedure also applies to binary numbers containing binary point. You may want to verify as an exercise that the binary number 1001.011 is  $9^{3/8}$  in the decimal system by using the above table of positional values.

We saw that a whole decimal number can be converted to binary by successive division by 2. The remainder juxtaposed starting from bottom to top yields the binary equivalent. Below is the conversion of a decimal fraction, 0.3125 given to show the procedure, which consists of successive doubling of the fraction (i.e., multiplying by 2), retaining the integers and stopping when we get 0.

|  |   |       |       |
|--|---|-------|-------|
|  |   | .3125 |       |
|  |   | x 2   |       |
|  |   | <hr/> |       |
|  | 0 | .6250 |       |
|  |   | x 2   |       |
|  | 1 | .2500 |       |
|  |   | x 2   |       |
|  | 0 | .5000 |       |
|  |   | x 2   |       |
|  | 1 | .0000 | Stop. |

Integers  
resulting  
from  
doubling

Thus,  $0.3125 = 0.0101$ , the bits having been arranged from top to bottom.

And  $9.3125 = 1001.0101$ .

**Binary Addition** is performed similar to decimal addition, i.e., we proceed from right to left with a carry over, if any. The following rules are for the carry-over.

$1 + 1 = 0$  and carry 1 to add to next column.

$1 + 0 = 1$

$0 + 1 = 1$

$0 + 0 = 0$

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Example :

### Binary addition

|            |   |   |   |   |   |   |   |   |   |   |   |
|------------|---|---|---|---|---|---|---|---|---|---|---|
| Carry over | 1 | 1 | 1 | 1 | 1 | 1 | 1 | x | x | 1 | x |
|            | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| +          | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
|            | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |

We shall stop here and would not take up binary subtraction, multiplication and division since computer performs these operations too in addition mode. For example, to multiply 9 by 5 it would add 1001 (equivalent of 9) 5 times. Therefore, computer is sometimes simply defined as a fast adder.

### 2.7.2 Octal Number System

It is seen that the length of binary numbers can become quite long and cumbersome to use. Octal system (base 8) is thus often used to convert binary numbers to a form requiring lesser number of digits. The octal system uses the eight symbols 0, 1, 2, ..... 7. As its radix 8 is a power of 2, it is fairly simple to convert binary to octal and *vice-versa*.

To convert a binary number into an octal number, we will group together successive three bits of the binary number starting with its least significant bit (i.e., the right-most). These three bit groups are then replaced by their octal equivalents. This mechanism works because all the digits in octal system, namely 0, 1, 2,.....7, may be represented by three bit groups. The table below illustrates this.

| Octal | Binary | Octal | Binary | Octal | Binary |
|-------|--------|-------|--------|-------|--------|
| 0     | 000    | 3     | 011    | 6     | 110    |
| 1     | 001    | 4     | 100    | 7     | 111    |
| 2     | 010    | 5     | 101    |       |        |

Example : Binary numbers      001      100      111      001

Octal equivalent      1      4      7      1

Decimal equivalent       $1 \times 8^3 + 4 \times 8^2 + 7 \times 8^1 + 1 \times 8^0$   
 $= 512 + 256 + 56 + 1$   
 $= 825$

### 2.7.3 Binary Coded Decimal (BCD) System

The pure binary system discussed above is more appropriate for scientific applications where the bulk of work consists of arithmetic computations. Business applications entail reading and writing of voluminous amount of plain English, *viz.*, names and address of customers and suppliers, employees, descriptions of stock items, etc. and comparatively less arithmetic. Therefore, most business computers employ a version of the pure binary system, the BCD system that is a hybrid of the pure binary system and the decimal system.

In this system, the decimal weighting is maintained, but the digit is represented by a combination of the binary digits 0 and 1. Since ten digits 0....9 have to be represented, a minimum of four bits must be used to encode each digit. Hence, each digit is represented by its binary equivalent using four bits, e.g., the digit 5 is equivalent to binary 0101 and the digit 9 is equivalent to binary 1001. By this method, the number 59 is represented as 0101 1001. The pure binary equivalents of the decimal digits 0 through 9 are given in Table 2.2 below.

| <i>Digit</i> | <i>Pure Binary Equivalents<br/>(or BCD's)</i> |
|--------------|-----------------------------------------------|
| 0            | 0000                                          |
| 1            | 0001                                          |
| 2            | 0010                                          |
| 3            | 0011                                          |
| 4            | 0100                                          |
| 5            | 0101                                          |
| 6            | 0110                                          |
| 7            | 0111                                          |
| 8            | 1000                                          |
| 9            | 1001                                          |

**Table 2.2**

The BCD equivalents of longer numbers are simply derived by appropriate juxtaposition of the equivalents in the above table. For example, the BCD equivalent of 951 is got by juxtaposing the individual equivalents of 9, 5 and 1 from this table as below:

BCD equivalent of 951 : 1001 0101 0001.

This codification scheme has been extended to cover the alphabets

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and special symbols by adding two more bits (known as the zone bits) on the left of the 4 bit sets in the above table. By permuting the two zones bits, the representations for alphabets and special symbols as shown in Table. 2.3 can be obtained, those for the alphabets as hereunder:

| Character | BCD representation | Character | BCD representation |
|-----------|--------------------|-----------|--------------------|
| 0         | 00 0000            | J         | 10 0001            |
| 1         | 00 0001            | K         | 10 0010            |
| 2         | 00 0010            | L         | 10 0011            |
| 3         | 00 0011            | M         | 10 0100            |
| 4         | 00 0100            | N         | 10 0101            |
| 5         | 00 0101            | O         | 10 0110            |
| 6         | 00 0110            | P         | 10 0111            |
| 7         | 00 0111            | Q         | 10 1000            |
| 8         | 00 1000            | R         | 10 1001            |
| 9         | 00 1001            |           |                    |
| A         | 11 0001            |           |                    |
| B         | 11 0010            | S         | 01 0010            |
| C         | 11 0011            | T         | 01 0011            |
| D         | 11 0100            | U         | 01 0100            |
| E         | 11 0101            | V         | 01 0101            |
| F         | 11 0110            | W         | 01 0110            |
| G         | 11 0111            | X         | 01 0111            |
| H         | 11 1000            | Y         | 01 1000            |
| I         | 11 1001            | Z         | 01 1001            |

**Table. 2.3**

With the 6 bits, it is possible to have  $2^6 = 64$  codes and this suffices to represent all the digits (10), alphabets (26, only upper case) and special symbols (around 15).

#### 2.7.4 Hexadecimal System

Although the BCD system increases the flexibility and ease of programming numeric data, it does require more computer space to record each number. The hexadecimal (hex) system, using base 16, incorporates the convenience of the BCD system with the full stor-

age capabilities. It is base 16 that uses the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F. Each hex place value is expressed in binary by a group of four bits, as shown in Table 2.4.

| Decimal | Hexadecimal | Binary |
|---------|-------------|--------|
| 0       | 0           | 0000   |
| 1       | 1           | 0001   |
| 2       | 2           | 0010   |
| 3       | 3           | 0011   |
| 4       | 4           | 0100   |
| 5       | 5           | 0110   |
| 6       | 6           | 0111   |
| 7       | 7           | 1000   |
| 8       | 8           | 1001   |
| 9       | 9           | 1010   |
| 10      | A           | 1011   |
| 11      | B           | 1100   |
| 12      | C           | 1101   |
| 13      | D           | 1110   |
| 14      | E           | 1111   |
| 15      | F           | 1111   |

**Table 2.4**

For example, consider a string (0010 1111 0001 1110 1100). This can be converted into hexadecimal system as follows.

|      |      |      |      |      |                         |
|------|------|------|------|------|-------------------------|
| 0010 | 1111 | 0001 | 1110 | 1100 |                         |
| 2    | F    | 1    | E    | C    | = (2F1EC) <sub>16</sub> |

We take few examples for demonstrating the conversion procedure from one number system to another system.

**Example 1:** Convert the following numbers into decimal system:

- (i) 101011010 (Binary)
  - (ii) 765 (Octal)
  - (iii) 125F (Hexadecimal)
-

**Solution:**

(i) 10101010 (binary)

$$= 1 \times 2^7 + 0 \times 2^6 + 1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$$

$$= 1 \times 128 + 1 \times 32 + 1 \times 8 + 1 \times 2$$

$$= 128 + 32 + 8 + 2 = 170$$

Hence 10101010 (binary) = 170 (decimal)

(ii) 765 (octal)

$$= 7 \times 8^2 + 6 \times 8^1 + 5 \times 8^0$$

$$= 7 \times 64 + 6 \times 8 + 5 \times 1$$

$$= 448 + 48 + 5 = 501$$

Hence 765 (octal) = 501 (decimal)

(iii) 125F (Hexadecimal)

$$= 1 \times 16^3 + 2 \times 16^2 + 5 \times 16^1 + 15 \times 16^0$$

$$= 1 \times 4096 + 2 \times 256 + 5 \times 16 + 15 \times 1$$

$$= 4096 + 512 + 80 + 15$$

$$= 4703$$

Hence 125F (Hexadecimal) = 4703 (decimal).

The number (2F1EC)<sub>16</sub> can be converted into decimal system as follows:

|                      |                    |               |        |               |             |
|----------------------|--------------------|---------------|--------|---------------|-------------|
| Positional           | $16^4$             | $16^3$        | $16^2$ | $16^1$        | $16^0$      |
| Value                | 2                  | F             | 1      | E             | C           |
|                      |                    |               |        |               | 12 x 1 = 12 |
|                      |                    |               |        | 14 x 16 = 224 |             |
|                      |                    | 1 x 256 = 256 |        |               |             |
|                      | 15 x 4096 = 61,440 |               |        |               |             |
| 2 x 65536 = 1,31,072 |                    |               |        |               |             |
| = 1,93,004           |                    |               |        |               |             |

Thus (0010 1111 0001 1110 1100)<sub>2</sub> = (2F1EC)<sub>16</sub> = (193004)<sub>10</sub>

**Example 2:** Write the BCD equivalent of the following binary numbers:

- (i) 110101
- (ii) 10111
- (iii) 1010110

Solution:

- (i)  $110101 = 1 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$   
 $= 32 + 16 + 4 + 1 = 53$   
 $= 0101\ 0011$  (in BCD)
- (ii)  $10111 = 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$   
 $= 16 + 4 + 2 + 1 = 23$   
 $= 0010\ 0011$  (in BCD)
- (iii)  $1010110 = 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$   
 $= 64 + 16 + 4 + 2 = 86$   
 $= 1000\ 0110$  (in BCD)

**Example 3:** Convert the following from one number system to another number system:

- (i) (123) decimal = ( ) binary
- (ii) (1011010) binary = ( ) decimal
- (iii) (4567) octal = ( ) decimal
- (iv) (BABA) hexadecimal = ( ) decimal
- (v) (1357) octal = ( ) binary

**Solution :**

- (i) (123) decimal = ( ) binary

|   |     |           |
|---|-----|-----------|
| 2 | 123 | Remainder |
| 2 | 61  | 1         |
| 2 | 30  | 1         |
| 2 | 15  | 0         |
| 2 | 7   | 1         |
| 2 | 3   | 1         |
| 2 | 1   | 1         |
|   | 0   | 1         |

---

Hence, (123) decimal = (1111011) binary

$$\begin{aligned}
 \text{(ii) } (1011010) \text{ binary} &= ( \quad ) \text{ decimal} \\
 (1011010)_2 &= 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 \\
 &\quad + 1 \times 2^1 + 0 \times 2^0 \\
 &= 64 + 16 + 8 + 2 \\
 &= 90
 \end{aligned}$$

$$(1011010) \text{ binary} = (90) \text{ decimal}$$

$$\begin{aligned}
 \text{(iii) } (4567) \text{ octal} &= ( \quad ) \text{ decimal} \\
 (4567)_8 &= 4 \times 8^3 + 5 \times 8^2 + 6 \times 8^1 + 7 \times 8^0 \\
 &= 4 \times 512 + 5 \times 64 + 6 \times 8 + 7 \\
 &= 2048 + 320 + 48 + 7 \\
 &= 2423
 \end{aligned}$$

$$\text{Hence, } (4567) \text{ octal} = (2423) \text{ decimal}$$

$$\begin{aligned}
 \text{(iv) } (\text{BABA}) \text{ hexadecimal} &= ( \quad ) \text{ decimal} \\
 (\text{BABA})_{16} &= 11 \times 16^3 + 10 \times 16^2 + 11 \times 16^1 + 10 \times 16^0 \\
 &= 11 \times 4096 + 10 \times 256 + 11 \times 16 + 10 \\
 &= 45056 + 2560 + 176 + 10 \\
 &= 47802
 \end{aligned}$$

$$\text{Hence, } (\text{BABA}) \text{ hexadecimal} = (47802) \text{ decimal}$$

$$\text{(v) } (1357) \text{ octal} = ( \quad ) \text{ hexadecimal}$$

To convert the given number from octal to hexadecimal, let us first represent each digit by a group of three binary bits. Thereafter, we combine these bits in groups of four, starting from right to left and adding significant zeros if required.

$$\begin{aligned}
 (1357) \text{ octal} &= 001 \quad 011 \quad 101 \quad 111 \\
 &= 0010 \quad 1110 \quad 1111 \\
 &= (2 \quad \text{E} \quad \text{F}) \\
 (1357) \text{ octal} &= (2\text{EF}) \text{ hexadecimal}
 \end{aligned}$$

### 2.7.5 Byte

A single bit which can only be 'off' or 'on' cannot be used to represent the decimal digit 0-9, nor can single bit represent the letters of the alphabets or special characters. For a computer memory to be useful, it must be able to store numbers, letters of the alphabets and special characters. To accomplish such a task, computer designers utilize a series of bits. Codes are assigned to the various combinations, which can be obtained from the series of bits being 'on' or 'off'. The various combinations represent letters of the alphabet, numbers, and special characters as shown in Table 2.5.

Many computers use a combination of *eight bits* as a unit for storing data. These eight bits are called a byte. Thus, byte is a location in the main computer memory consisting of eight adjacent bits.

| <i>Character</i> | <i>BCD</i> | <i>EBCDIC</i> | <i>ASCII-8</i> |
|------------------|------------|---------------|----------------|
| 0                | 00 0000    | 1111 0000     | 0011 0000      |
| 1                | 00 0001    | 1111 0001     | 0011 0001      |
| 2                | 00 0010    | 1111 0010     | 0011 0010      |
| 3                | 00 0011    | 1111 0011     | 0011 0011      |
| 4                | 00 0100    | 1111 0100     | 0011 0100      |
| 5                | 00 0101    | 1111 0101     | 0011 0101      |
| 6                | 00 0110    | 1111 0110     | 0011 0110      |
| 7                | 00 0111    | 1111 0111     | 0011 0111      |
| 8                | 00 1000    | 1111 1000     | 0011 1000      |
| 9                | 00 1001    | 1111 1001     | 0011 1001      |
| A                | 11 0001    | 1100 0001     | 0100 0001      |
| B                | 11 0010    | 1100 0010     | 0100 0010      |
| C                | 11 0011    | 1100 0100     | 0100 0100      |
| D                | 11 0100    | 1100 0101     | 0100 0101      |
| E                | 11 0101    | 1100 0101     | 0100 0101      |
| F                | 11 0110    | 11 00 0110    | 01 00 0110     |
| G                | 11 0111    | 11 00 0111    | 01 00 0111     |
| H                | 11 1000    | 1100 1000     | 0100 1000      |
| I                | 11 1001    | 1100 1001     | 0100 1001      |

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|   |         |           |           |
|---|---------|-----------|-----------|
| J | 10 0001 | 1101 0001 | 0100 1010 |
| K | 10 0010 | 1101 0010 | 0100 1011 |
| L | 10 0011 | 1101 0011 | 0100 1100 |
| M | 10 0100 | 1101 0100 | 0100 1101 |
| N | 10 0101 | 1101 0101 | 0100 1110 |
| O | 10 0110 | 1101 0111 | 0101 1111 |
| P | 10 0111 | 1101 0111 | 0101 0000 |
| Q | 10 1000 | 1101 1000 | 0101 0001 |
| R | 10 1001 | 1101 1001 | 0101 0010 |
| S | 01 0010 | 1110 0010 | 0101 0011 |
| T | 01 0011 | 1110 0011 | 0101 0100 |
| U | 01 0100 | 1110 0100 | 0101 0101 |
| V | 01 0101 | 1110 0101 | 0101 0110 |
| W | 01 0110 | 1110 0110 | 0101 0111 |
| X | 01 0111 | 1110 0111 | 0101 1000 |
| Y | 01 1000 | 1110 1000 | 0101 1001 |
| Z | 01 1001 | 1110 1001 | 0101 1010 |

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**Table 2.5: Common methods of representing data**

**2.7.6 ASCII Code :** One of the most widely used coding systems to represent data in main computer memory is the American Standard Code for Information Interchange, called the ASCII Code. In ASCII system, each digit in a numeric value is stored in a single byte. For example, the numeric value 4263 would require four bytes of memory when stored using the ASCII code. The ASCII code uses the right most seven bits of the 8-bits = one byte to represent number, letters of the alphabet, and special characters. This provides for the representation of a maximum of 128 individual characters. With the ASCII code, the left most bit is not used to represent characters.

Each letter of the alphabet is represented by a unique combination of bits being 'on' or off. Table 2.5 above illustrates the representation of the letters of the alphabet A-Z.

### 2.7.7 EBCDIC System

While the ASCII code is widely used on personal computer and many

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minicomputers, it is not the only coding format used on computers. One of the most commonly used coding schemes for mainframes is the **Extended Binary Coded Decimal Interchange Code** (EBCDIC). With EBCDIC, each byte (eight bits) is divided into two portions - zone portion and the digit portion. The bits in both the zone portion and the digit portion are assigned numeric values based upon the binary number system, forming the basis for a logical representation of data in storage. Numeric values are represented in EBCDIC with all zone bits “on” and the proper combination of bits in the digit portion of the byte “on” to represent the particular value. For example value 4 is represented in the following manner.

|              |               |
|--------------|---------------|
| <u>1111</u>  | <u>0100</u>   |
| Zone portion | digit portion |

Alphabetic data is represented using EBCDIC with a combination of bits “on” and “off” in both the zone and digit portions of the byte as shown in Table 2.5.

**2.7.8 Parity bit** is an additional or redundant bit that is used to provide a check on the integrity of a representation. Consider, for example, Z which is represented by 01 1001 in the 6 bit BCD code (see Table 2.5). The parity bit is derived from this representation itself. Since the number of 1’s in this representation is 3 and 3 is an odd number, 1 is placed usually to the left of this representation so that the number of 1’s in the 7-bits are even. Likewise, another representation with even number of 1’s (viz. 100001 for J) would have 0 bit to its left. Thus by the addition of the parity bit, the representation for Z and J in 7-bit would appear as follows.

|   |         |
|---|---------|
| Z | 1011001 |
| J | 0100001 |

The parity bit is put to use each time the computer processes a representation. The number of 1’s in the 6-bits set of a representation is compounded and is ascertained if they correspond to the parity bit placed on the left. If they correspond, the representation is accepted and processed, otherwise, an error signal is given by the computer meaning that there is something wrong with the computer circuitry. For example, suppose because of improper working of the computer circuit, Z is being mis-represented as 1011000. In the 6-bits of the mis-representation, there are two 1’s meaning that parity bit should be 0 whereas actually it is 1.

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The above type of parity bit is known as the even parity bit since the number of 1's in the 7-bits set for a representation is always even. Similarly, the odd parity check can be employed but the two checks are mutually exclusive, i.e., only one of them is performed.

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### INTEXT QUESTIONS

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7. Convert the following numbers into decimal system:
    - (a)  $(1100001)_2$
    - (b)  $(2315)_8$
    - (c)  $(121A)_{16}$
  8. Convert the following from one number system to another number system.
    - (a)  $(572)_{10} = ( )_8$
    - (b)  $(A = 29)_{16} = ( )_{10}$
    - (c)  $(101101.01)_2 = ( )_{10}$
    - (d)  $(3572)_8 = ( )_{16}$
    - (e)  $(256)_8 = ( )_2$
- 

## 2.8 INPUT-OUTPUT (I/O) DEVICES

A computer is useful only when it is able to communicate with the external environment. When you work with the computer you feed your data and instructions through some device to the computer. These devices are called Input devices. Similarly computer after processing gives output through other devices called output devices.

For a particular application one form of device is more desirable compared to others. We will discuss various types of Input-Output devices that are used for different types of applications. They are also known as peripheral devices because they surround the CPU and make a communication between computer and the outer world.

### 2.8.1 Input Devices

Input devices are necessary to convert our information or data into a form, which can be understood by the computer. A good input device should provide timely, accurate and useful data to the main memory of the computer for processing. Following are the most useful input devices.

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1. **Keyboard:** This is the standard input device attached to all computers. The layout of keyboard is just like the traditional typewriter of the type QWERTY. It also contains some extra command keys and function keys. It contains a total of 101 to 104 keys. A typical keyboard used in a computer is shown in Fig. 2.6. You have to press correct combination of keys to input data. The computer can recognize the electrical signals corresponding to the correct key combination and processing is done accordingly.

***Fig. 2.6: Keyboard***

2. **Mouse:** Mouse is an input device shown in Fig. 2.7 that is used with your personal computer. It rolls on a small ball and has two or three buttons on the top. When you roll the mouse across a flat surface, the cursor on the screen moves in the direction of mouse movement. The cursor moves very fast with mouse giving you more freedom to work in any direction. It is easier and faster to move through a mouse.

***Fig. 2.7: Mouse***

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3. **Trackball:** Trackball is another pointing device. Essentially, a trackball is a mouse lying on its back. To move the pointer, you rotate the ball with your thumb, your fingers, or the palm of your hand. There are usually one to three buttons next to the ball, which you use just like mouse buttons.

The advantage of trackball over **mouse** is that the trackball is stationary so it does not require much space to use it. In addition, you can place a trackball on any type of surface, including your lap. For both these reasons, trackballs are popular pointing devices for portable computers.

*Fig. 2.8*

4. **Joystick:** A Joystick consists of a lever that moves in all directions and controls the movement of a pointer or some other display symbols. It is similar to a mouse, except that with a mouse the cursor stops moving as soon as you stop moving the mouse. With a joystick, the pointer continues moving in the direction the joystick is pointing. To stop the pointer, you must return the joystick to its upright position. Most joysticks include two buttons called triggers.

Joysticks are used mostly for computer games, but they are also used occasionally for CAD/CAM systems and other applications.

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***Fig. 2.9 Joystick***

5. **Digitizing Tablet:** This is an input device that enables you to enter drawings and sketches into a computer. A digitizing tablet consists of an electronic tablet and a cursor or pen.

A cursor (also called a puck) is similar to a mouse, except that it has a window with cross hairs for pinpoint placement, and it can have as many as 16 buttons.

***Fig. 2.10 Digitizer and Stylus***

***Fig. 2.11 Puck***

A pen (also called a stylus), looks like a simple ballpoint pen but uses an electronic head instead of ink. The tablet contains electronic

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signals that enable it to (i) detect movements of the cursor or pen, and (ii) translate the movements into digital signals that it sends to the computer.

For digitizing tablet, each point on the tablet represents a point on the display screen in a fixed manner. Thus it differs from mouse, in which all movement is relative to the current cursor position. The static nature of digitizing tablets makes them particularly effective for tracing drawings. Most modern digitizing tablets also support a 'mouse emulation mode', in which the pen or cursor acts like a mouse.

Digitizing tablets are also called digitizers, graphics tablets, touch tablets, or simply tablets.

6. **Light Pen:** Light pen is an input device that utilizes a light sensitive detector to select objects on a display screen. A light pen is similar to a mouse, except that with a light pen you can move the pointer and select objects on the display screen by directly pointing to the objects with the pen.

**Fig. 2.12**

7. **Scanner:** The keyboard can input only text through keys provided in it. If we want to input a picture, the keyboard cannot help us. Scanner is an optical device that can input any graphical chart or picture and display it back. The common optical scanning devices are Magnetic Ink Character Recognition (MICR), Optical Mark Reader (OMR) and Optical Character Reader (OCR).
    - **Magnetic Ink Character Recognition (MICR):** This is widely used by banks to process large volumes of cheques and drafts.
-

The cheque numbers and other related information is printed with specialized magnetic ink. As the cheques enter the reading unit, the cheques pass through the magnetic field which causes the 'read head' to recognize the cheque number and branch data.

- **Optical Mark Reader (OMR):** This technique is used when students have appeared in objective type tests and they had to mark their answer by darkening a square or circular space by pencil. These answers are directly read and made available to a computer for grading.
- **Optical Character Recognition (OCR):** This technique allows the direct reading of any printed or typed character. Suppose you have a set of hand written or typed text on a piece of paper, the same can be read by the computer. This pattern is compared with a site of patterns stored inside the computer. Whichever pattern is matched is called a character read. Patterns that cannot be identified are rejected.

### 2.8.2 Output Devices

1. **Visual Display Unit :** The most popular output device is the Visual Display Unit (VDU). It is also called the monitor. A Keyboard is used to input data and Monitor is used to display the input data and to receive messages from the computer. A monitor has its own box which is separated from the main computer system and is connected to the computer by cable. In some systems it is compact with the system unit. It can be color or monochrome.
2. **Terminals :** It is a very popular interactive unit. It can be divided into two types: hard copy terminals and soft copy terminals. A hard copy terminal provides a printout on paper whereas soft copy terminals provide visual copy on monitor. A terminal when connected to a CPU sends instructions directly to the computer. Terminals are also classified as dumb terminals or intelligent terminals depending upon the work situation.
3. **Printers :** Printer is a device that prints text or illustrations on paper and in many cases on transparencies and other media. There are different kinds of printers. In terms of the technology utilized, printers fall into the following categories.

#### Daisy-wheel Printer

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Daisy-wheel printers are a type of printer that produces letter-quality print. A daisy wheel printer works on the same principle as a ball-head typewriter. The daisy wheel is a disk made of plastic or metal on which characters stand out in relief along the outer edge. To print a character, the printer rotates the disk until the desired letter is facing the paper. Then a hammer strikes the disk, forcing the character to hit an ink ribbon, leaving an impression of the character on the paper. You can change the daisy wheel to print different fonts.

Daisy-wheel printers cannot print graphics, and in general they are noisy and slow, printing from 10 to about 75 characters per second. As the price of laser and ink-jet printers has declined, and the quality of dot-matrix printers has improved, daisy-wheel printers have become almost obsolete.

### **Dot-matrix Printer**

Dot-matrix printers create characters by striking pins against an ink ribbon. Each pin makes a dot, and combinations of dots form characters and illustrations.

Dot-matrix printers are inexpensive and relatively faster than daisy wheel printers, but they do not produce high-quality output.

Dot-matrix printers vary in two important characteristics:

**Speed** – Given in characters per second (cps), the speed can vary from about 50 to over 500 cps. Most dot-matrix printers offer different speeds depending on the quality of print desired.

**Print quality** – Determined by the number of pins (the mechanism that prints the dots), it can vary from 9 to 24. The best dot-matrix printer (24 pins) can produce near letter-quality type, although you can still see a difference if you look closely.

***Fig. 2.13***

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In addition to these characteristics, you should also consider the noise factor. Compared to laser and ink-jet printers, dot-matrix printer is more noisy. Although the prices of laser and ink-jet printers are dropping rapidly, dot-matrix printers are still cheaper to operate. In addition, since they are impact printers, the dot-matrix printers can print to multi-page forms (that is, carbon copies), something laser and ink-jet printers cannot do.

### **Ink-jet Printer**

Ink-jet printers work by spraying ionized ink at a sheet of paper. Magnetized plates in the ink's path direct the ink onto the paper in the desired shapes. Ink-jet printers are capable of producing high quality print approaching to that produced by laser printers. A typical ink-jet printer provides a resolution of 300 dots per inch, although some newer models offer higher resolutions.

#### ***Fig. 2.14***

In general, the price of ink-jet printers is lower than that of laser printers. However, they are also considerably slower. Another drawback of ink-jet printers is that they require a special type of ink that is apt to smudge on inexpensive copier paper.

Because ink-jet printers require smaller mechanical parts than laser printers, they are especially popular as portable printers. In addition, colour ink-jet printers provide an inexpensive way to print full-colour documents.

### **Laser Printer**

Laser printer utilizes a laser beam to produce an image on a drum.

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The light of the laser alters the electrical charge on the drum wherever it hits. The drum is then rolled through a reservoir of toner, which is picked up by the charged portions of the drum. Finally, the toner is transferred to the paper through a combination of heat and pressure. This is also the way photocopy machines work.

***Fig. 2.15***

Because an entire page is transmitted to a drum before the toner is applied, laser printers are sometimes called page printers. There are two other types of page printers that fall under the category of laser printers even though they do not use laser beam at all. One uses an array of LEDs to expose the drum, and the other uses LCDs. Once the drum is charged, however, they both operate like a real laser printer.

One of the chief characteristics of laser printer is its resolution – how many dots per inch (dpi) it lays down. The available resolutions range from 300 dpi at the low end to 1,200 dpi at the high end. By comparison, offset printing usually prints at 1,200 or 2,400 dpi. Some laser printers achieve higher resolutions with special techniques generally known as resolution enhancement technology (RET).

In addition to the standard monochrome laser printer, which uses a single toner, there also exist colour laser printers that use four toners to print in full colour. Colour laser printers tend to be about five to ten times as expensive as monochrome.

Laser printers produce very high-quality print and are capable of printing an almost unlimited variety of fonts. Most laser printers come with a basic set of fonts, called internal or resident fonts, but you can add additional fonts in one of two ways:

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**Font cartridges** – Laser printers have slots in which you can insert font cartridges, ROM boards on which fonts have been recorded. The advantage of font cartridges is that they use none of the printer's memory.

**Soft fonts** – All laser printers come with a certain amount of RAM memory, and you can usually increase the amount of memory by adding memory boards in the printer's expansion slots. You can then copy fonts from a disk to the printer's RAM. This is called downloading fonts. A font that has been downloaded is often referred to as a soft font, to distinguish it from the hard fonts available on font cartridges. The more RAM a printer has, more fonts can be downloaded at one time.

In addition to text, laser printers are very adept at printing graphics. However, you need significant amounts of memory in the printer to print high-resolution graphics. To print a full-page graphics at 300 dpi, for example, you need at least 1 MB (megabyte) of printer RAM. For a 600-dpi graphics, you need at least 4 MB RAM.

Because laser printers are non-impact printers, they are much quieter than dot matrix or daisy wheel printers. They are also relatively fast, although not as fast as some dot-matrix printers. The speed of laser printers ranges from about 4 to 25 pages of text per minute (ppm). A typical rate of 6 ppm is equivalent to about 40 characters per second (cps).

### **LCD and LED Printers**

Similar to a laser printer but uses liquid crystals or light-emitting diodes rather than a laser to produce an image on the drum.

### **Line Printer**

Line printers are high-speed printers capable of printing an entire line at one time. A fast line printer can print as many as 3,000 lines per minute. The disadvantage of line printers is that they can print only one font, they cannot print graphics, the print quality is low and they are very noisy.

### **Thermal Printer**

Thermal printers produce images by pushing electrically heated pins against special heat-sensitive paper. Thermal printers are inexpensive and are used in most calculators and many fax machines. They produce low-quality print and the paper tends to curl and fade after a few weeks or months.

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Printers are also classified according to the following characteristics:

**Quality of type** - The output produced by printers is said to be either letter quality (as good as a typewriter), near letter quality, or draft quality. Only daisy-wheel, ink-jet, and laser printers produce letter-quality type. Some dot-matrix printers claim letter-quality print, but if you look closely, you can see the difference.

**Speed** – Measured in characters per second (cps) or pages per minute (ppm), the speed of printers varies widely. Daisy-wheel printers tend to be the slowest, printing about 30 cps. Line printers are fastest (up to 3,000 lines per minute). Dot-matrix printers can print up to 500 cps, and laser printers range from about 4 to 25 text pages per minute.

**Impact or non-impact** – Impact printers include all printers that work by striking an ink ribbon. Daisy wheel, dot matrix, and line printers are impact printers. Non-impact printers include laser printers and ink-jet printers. The important difference between impact and non-impact printers is that impact printers are much noisier but are useful for making multiple copies like carbon copies.

**Graphics** – Some printers (daisy-wheel and line printers) can print only text. Other printers can print both text and graphics.

**Fonts** – Some printers, notably dot-matrix printers, are limited to one or a few fonts. In contrast, laser and ink-jet printers are capable of printing an almost unlimited variety of fonts. Daisy-wheel printers can also print different fonts, but you need to change the daisy wheel, making it difficult to mix fonts in the same document.

#### 4. **Plotter**

Plotter is a device that draws pictures on paper based on commands from a computer. Plotters differ from printers in that they draw lines using a pen. As a result, they can produce continuous lines, whereas printers can only simulate lines by printing a closely spaced series of dots. Multicolour plotters use different-coloured pens to draw different colours.

In general, plotters are considerably more expensive than printers. They are used in engineering applications where precision is mandatory.

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**Fig. 2.16**

## **5. Sound Cards and Speakers**

The sound or audio output can also be produced from a computer system. An expansion board that enables a computer to manipulate and output sounds is called Sound Card. Sound cards are necessary for nearly all systems having CD-ROMs and have become commonplace on modern personal computers making them a multimedia system. Sound cards enable the computer to output sound through speakers connected in the board, to record sound input from a microphone connected to the computer and manipulate sound stored on a disk.

Nearly all sound cards support MIDI (Musical Instrument Data Interchange), a standard for representing music electronically. In addition, most sound cards are sound blaster-compatible, which means that they can process commands written for a Sound Blaster Card, the de facto standards for PC sound.

Sound cards use two basic methods to translate digital data into analog sounds.

- FM (Frequency Modulation) Synthesis mimics different musical instruments according to built-in formulas.
  - Wavetable Synthesis relies on recordings of actual instruments to produce sound. Wavetable synthesis produces more accurate sound, but is also more expensive.
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## 6. 3D-Audio

3D audio is a technique for giving more depth to traditional stereo sound. Typically 3D sound or 3D audio is produced by placing a device in a room with stereo speakers. The device dynamically analyzes the sound coming from the speakers and sends feedback to the sound system so that it can readjust the sound to give the impression that the speakers are further apart.

3D audio devices are particularly popular for improving computer audio where the speakers tend to be small and close together. There are a number of 3D audio devices that attach to a computer's sound card.

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### INTEXT QUESTIONS

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9. Distinguish between impact and non-impact printers.
10. Define soft copy and hard copy.
11. Write True or False:
  - (a) In addition to text, laser printers are very adapt at printing graphics.
  - (b) The magnetic tapes and magnetic disk are primary memories.
  - (c) A CD-ROM is read only memory.
  - (d) Mouse is an output device.
  - (e) Daisy wheel printer cannot print graphics.

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## 2.9 WHAT YOU HAVE LEARNT

In this lesson we discussed five basic operations that a computer performs. These are input, storage, processing, output and control. A computer accepts data as input, stores it, processes it as the user requires and provides the output in a desired format. The storage unit of a computer is divided into two parts: primary storage and secondary storage. We have discussed the devices used for these two types of storage and their usefulness.

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### 2.10 TERMINAL QUESTIONS

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1. Define the five basic operations performed by any computer system.
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2. Draw a block diagram to illustrate the basic organization of computer system and explain the function of various units.
3. What is an input device? How does it differ from output device?
4. Differentiate between
  - (a) RAM and ROM.
  - (b) PROM and EPROM.
  - (c) Primary memory and Secondary memory
6. Explain cache memory. How is it different from primary memory?
7. Write short notes on
  - (a) Control Unit
  - (b) Random Access Memory
  - (c) Laser printer
  - (d) Ink-jet printer
  - (e) Thermal printer

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### **2.11 KEY TO INTEXT QUESTIONS**

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1. The five basic operations that a computer performs are input, storage, processing, output and control.
  2. ALU : Arithmetic Logic Unit  
CU : Control Unit  
CPU : Central Processing Unit
  3. (a) i (b) iii (c) i
  4. A bit is an acronym for binary digit, which stands for one binary piece of information. This can be either 0 or 1. A byte is equal to 8 bits.
  5. The memories, which are erased if there is a power failure, are known as volatile memories. RAM is an example of volatile memory. The memories, which do not lose their content on failure of power supply, are known as non-volatile memories. ROM is non-volatile memory.
  6. (a) True (b) True (c) False  
(d) False (e) True
-

7. (a) 97            (b) 1229            (c) 4234
8. (a)  $(1074)_8$     (b)  $(41001)_{10}$     (c)  $(45.25)_{10}$   
    (d)  $(77A)_{16}$     (e)  $(10101110)_2$
9. Impact printers use the familiar typewriter approach of hammering a typeface against the paper and inked ribbon. Non-impact printer do not hit or impact a ribbon to print. They use electro-static chemicals and ink-jet technologies.
10. A hard copy terminal provides a printout on paper whereas soft copy terminal provides visual copy on monitor.
11. (a) True   (b) False   (c) True   (d) False   (e) True
-

# 3

## SOFTWARE AND PROGRAMMING LANGUAGES

### 3.1 INTRODUCTION

In the previous lesson we discussed about the different parts and configurations of computer. It has been mentioned that programs or instructions have to be fed into the computer to perform specific task. It is therefore necessary to provide instructions to the computer in a systematic order to complete our task. We can divide the computer components into two major areas, namely, hardware and software. Hardware is the machine itself and its various individual equipment. It includes all mechanical, electronic and magnetic devices such as monitor, printer, electronic circuit, floppy and hard disk. In this lesson we will discuss about the other part, namely, software that makes use of hardware for performing various functions.

### 3.2 OBJECTIVES

After going through this lesson you would be able to:

- explain the concept of software
  - distinguish between different types of software
  - differentiate application software from system software
  - differentiate between different types of language
  - distinguish between compiler and interpreter
-

### 3.3 WHAT IS SOFTWARE?

As you know computer cannot do anything on its own and has to be guided by the user. In order to do any specific job you have to give a sequence of instructions to the computer. This set of instructions is called a computer program. Software refers to the set of computer programs, procedures that describe the programs and how they are to be used. We can say that it is the collection of programs, which increases the capabilities of the hardware. Software guides the computer at every step where to start and stop during a particular job. The process of software development is called programming.

You should keep in mind that software and hardware are complementary to each other. Both have to work together to produce meaningful result. Another important point you should know that developing software is difficult, time consuming and expensive.

### 3.4 SOFTWARE TYPES

Computer software is normally classified into two broad categories.

- Application Software
- System Software

**3.4.1 Application Software:** Application software is a set of programs, which are written to perform specific tasks of the users of computers such as Accounts, Stores, Payroll, etc. These software are developed in high level language to help the user to get the computer perform the tasks. For example, you can develop a package to print mark sheet of every student of your class or generate accounts of a company, etc. Application software can be classified into two types:

- (a) Customized Packages      (b) Generalized Packages.

**Customized Packages:** These are developed especially for the user by a program using high-level computer languages. For example, when you develop a package to prepare a status report of your school i.e., name of the students, their addresses, Parent's name, Fee paid, marks obtained, etc., you are developing a customized package because the package developed for your school may not be of any use for other school.

**Generalized Package:** These packages are written for the people who have to perform common task on a computer system. DBase, Lotus 1-2-3, FoxPro, MS Office, etc. are the names of the Generalized Packages. Any person can use these packages because they

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can be used for different application and purposes. These are meant for mass consumption.

Another example of application software is programming language. Among the programming languages COBOL (Common Business Oriented Language) is more suitable for business application whereas FORTRAN (Formula Translation) is useful for scientific application. We will discuss about these languages in next section.

**3.4.2 System Software:** You know that an instruction is a set of programs that has to be fed to the computer for operation of computer system as a whole. When you switch on the computer the programs stored or written in ROM is executed which activates different units of your computer and makes it ready for you to work on it. This set of program can be called System Software. Therefore system software may be defined as a set of one or more programs designed to control the operations of computer system.

System Software are general purpose programs designed for performing tasks such as controlling all operations required to move data into and out of the computer. It communicates with keyboard, printer, card reader, disk, tapes etc. It also monitors the use of various hardware like memory, CPU etc. System software acts as an interface between hardware and application software. System software allows application packages to be run on the computer with less time and effort. *Remember that it is not possible to run application software without system software.*

***Fig. 3.1: Hardware, Software and user***

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Development of system software is a complex task and it requires extensive knowledge of computer technology. Due to its complexity, the users cannot develop it. Computer manufactures build and supply this system software with the computer. DOS, UNIX, WINDOWS, Language Compilers and Interpreters are some of the widely used system software. Out of these UNIX is a multi-user operating system whereas DOS and WINDOWS are PC-based. We will discuss in detail about DOS and WINDOWS in the next module.

So without system software it is impossible to operate your computer. The fig.3.1 shows relation between hardware, software and you as a user of computer system.

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### **INTEXT QUESTIONS**

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1. What are program, programming and software?
  2. Differentiate between System Software and Application Software.
  3. Write True or False.
    - (a) The set of instructions given to the computer is called programming.
    - (b) Application Software is a set of programs to carry out operations for a specific application.
    - (c) UNIX is a multi-user operating system.
- 

### **3.5 PROGRAMMING LANGUAGE**

You are aware with the term language. It is a system of communication between two persons. Some of the basic natural languages that we are familiar with are English, Hindi, Oriya, etc. These are the languages used to communicate among various categories of persons. But how will you communicate with your computer. Your computer will not understand any of these natural languages for transfer of data and instruction. So there are computer-programming languages specially developed so that you could pass your data and instructions to the computer to do specific job. You must have heard names like FORTRAN, BASIC, COBOL, etc. These are programming languages. So instructions for performing a task are written in a particular computer programming language based on the type of job. As an example, for scientific application FORTRAN and C languages are used. On the other hand, COBOL is used mainly for business application.

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### 3.5.1 Types of Programming Languages

There are two major types of programming languages. These are Low Level Languages and High Level Languages. Low Level languages are further divided into Machine language and Assembly language.

### 3.5.2 Low level languages

The term low level means closeness to the way in which the machine has been built. Low Level languages are machine oriented and require extensive knowledge of computer hardware and its configuration. The low level languages are:

**Machine Language:** Machine Language is the language of the computer and is the only language that is directly understood by the computer. We also call it machine code and it is written as strings of 1's and 0's. It is on this basis that the computer is designed. When this sequence of codes is fed to the computer, it recognizes the codes and converts it in to electrical signals needed to run it. For example, a program instruction may look like this:

1011000111101

It is not an easy language for you to learn because of its complexity as it consists of 1's and 0's. It is most efficient for the computer as the instructions are directly executed. It is considered to the first generation language. It is also difficult to debug the program written in this language.

#### **Advantage**

The only advantage is that program of machine language run very fast because no translation program is required for the CPU.

#### **Disadvantages**

1. It is very difficult to program in machine language. The programmer has to know details of hardware to write program.
2. Machine language is hardware dependent.
3. The programmer has to remember a lot of codes to write a program, which results in program errors.
4. It is difficult to debug the program.

**Assembly Language:** It is the first step to improve the programming

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structure. In this language, the machine codes comprising of 1's and 0's are substituted by symbolic codes (called mnemonic codes) to improve their understanding.

The set of symbols and letters forms the assembly language and a translator program (called Assembler) is required to translate the programs written in assembly language into machine language for execution by the computer. It is considered to be a second-generation language.

**Advantages:**

1. The symbolic programming of Assembly Language is easier to understand and saves a lot of time and effort of the programmer.
2. It is relatively easier to correct errors and modify program instructions.
3. Assembly Language has almost the same efficiency of execution as the machine level language because this is one-to-one translator between assembly language program and its corresponding machine language program.

**Disadvantages:**

One of the major disadvantage is that assembly language is machine dependent. A program written for one computer might not run on other computers with different hardware configuration.

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**INTEXT QUESTIONS**

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4. What is the difference between FORTRAN and COBOL?
5. Differentiate between Machine Language and Assembly Language.
6. Write True or False.
  - (a) Low Level language and High-level language are two major types of programming languages.
  - (b) Machine language is the only language that is indirectly understood by the computer.
  - (c) Assembly language is second-generation language.

---

**3.5.3 High Level Languages**

You know that assembly language and machine language require

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extensive knowledge of computer hardware. To overcome this limitation, a user writes the instructions in English like sentences to perform the logic of the problem irrespective of the type of computer you are using. The language used for this is referred to as high-level language.

High-level languages are simple language that use English and mathematical symbols like +, -, %, /, etc. for its program construction.

You should know that any higher-level language has to be converted to machine language for the computer to understand.

Higher-level languages are problem-oriented languages because the instructions are suitable for solving a particular problem. For example COBOL (Common Business Oriented Language) is mostly suitable for business oriented language where there is very little processing and huge output. There are mathematical oriented languages like FORTRAN (Formula Translation) and BASIC (Beginners All-purpose Symbolic Instructions Code) where very large processing is required.

Thus a problem-oriented language is designed in such a way that its instruction may be written more like the language of the problem. For example, businessmen use business term and scientists use scientific terms in their respective languages.

### **Advantages of High Level Languages**

Higher-level languages have a major advantage over machine and assembly languages that higher-level languages are easy to learn and use. It is because that they are similar to the languages used by us in our day-to-day life. The programs can easily be debugged and are machine independent.

### **3.6 COMPILER**

It is a program that translates the instructions of higher-level languages to machine language. It is called compiler because it compiles every program instruction given in higher-level languages into machine language. Thus compiler is a program translator like assembler but more sophisticated. It scans the entire program first and then translates it into machine code.

The program written by the programmer in higher-level language is called source program. After this program is converted to machine language by the compiler it is called object program.

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***Fig. 3.2: Computer Program***

A compiler can translate only those source programs, which have been written, in that language for which the compiler is meant for. For example, FORTRAN compiler will not compile source code written in COBOL language.

Object program generated by compiler is machine dependent. It means programs compiled for one type of machine will not run in another type. Therefore every type of machine must have its personal compiler for a particular language. Machine independence is achieved by using standard higher-level language on different machines and converting them for use on specific machines through a compiler.

### **3.7 INTERPRETER**

An interpreter is another type of program translator used for translating higher-level language instructions into machine language instructions. It takes one statement of higher-level language at a time, translates it into machine language and executes it immediately. Translation and execution are carried out for each statement. It differs from compiler, which translate the entire source program into machine code and then involve in its execution.

The advantage of interpreter compared to compiler is its fast response to changes in source program. It eliminates the need for a separate compilation after changes to each program. Interpreters are easy to write and do not require large memory in computer. The

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disadvantage of interpreter is that it is time-consuming method because each time a statement in a program is executed, it is first translated. Thus compiled machine language program runs much faster than an interpreted program.

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**INTEXT QUESTIONS**

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7. What is the difference between interpreter and compiler?
  8. Give some examples of high-level language.
  9. Write True and False for the following statements
    - (a) High level languages are problem-oriented language.
    - (b) Object program generated by compiler is machine independent.
    - (c) The disadvantage of interpreter is that it is time consuming.
- 

**3.8 WHAT YOU HAVE LEARNT**

In this lesson we discussed about two types of software, namely, system software and application software. System software controls the hardware part of the computer. It is designed for performing tasks such as controlling all operations required to move data into and out of the computer. It communicates with printer, card reader, disk, tapes, etc. and monitors the use of various components like memory, CPU, etc. Application software is a set of programs written for specific purpose. Examples of application software are MS WORD, Lotus 1-2-3, Tally Accounting software, etc. We also discussed about levels of computer language.

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**3.9 TERMINAL QUESTIONS**

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1. Describe the concept of software and hardware.
  2. Define computer Language.
  3. State the three different categories of computer languages.
  4. What is machine language? Why is it required?
  5. Describe the advantages and disadvantages of machine languages.
  6. What is assembly language? Explain its advantages over machine languages.
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7. Differentiate between
  - (a) Source program and object program
  - (b) Higher level language and machine language
  - (c) Compiler and Interpreter

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### **3.10 KEY TO INTEXT QUESTIONS**

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1. Program is a set of instructions given to the computer by the user. Software is a set of computer programs and procedure that describe the programs. Programming is the process of software development.
  2. Application Software is a set of programs to carry out operations for a specific application. System software is a set of programs written for performing tasks such as controlling all operations required to move data into and out of the computer.
  3. (a) False      (b) True      (c) True
  4. FORTRAN is used for scientific applications whereas COBOL is used for business applications.
  5. Machine language is the only language that is directly understood by the computer. It is written in binary form that is 0 and 1. The set of symbols and letters forms the Assembly Language.
  6. (a) True      (b) False      (c) True
  7. Both compiler and interpreter are program translators used for translating higher-level language into machine language. While compiler scans the entire program first and then translates it into machine code, an Interpreter translates and executes the program line by line.
  8. FORTRAN (Formula Translation) and BASIC (Beginners All-Purpose Symbolic Instruction Code) are some of the high level languages.
  9. (a) True      (b) False      (c) True
-

# 4

## COMMUNICATION AND COMPUTER NETWORK

### 4.1 INTRODUCTION

Today computer is available in many offices and homes and therefore there is a need to share data and programs among various computers. With the advancement of data communication facilities, the communication between computers has increased and thus it has extended the power of computer beyond the computer room. Now a user sitting at one place can communicate with computers of any remote sites through communication channel. The aim of this lesson is to introduce you to various aspects of communication and computer network.

### 4.2 OBJECTIVES

After going through this lesson you would be in a position to:

- explain the concept of data communication
  - identify different components of computer network
  - define types of network
  - explain communication protocols
  - differentiate between Internet and Intranet,
  - appreciate the use of satellite communication.
  - explain the utility of EDI, E-commerce, voice messaging and teleconferencing
-

### 4.3 DATA COMMUNICATION

We all are acquainted with some sorts of communication in our day to day life. For communication of messages we use telephone and postal communication systems. Similarly data and information from one computer system can be transmitted to other systems across wide geographical areas. Thus data transmission is the movement of information using some standard methods. These methods include electrical signals carried along a conductor, optical signals along an optical fiber and electromagnetic waves.

Suppose a manager has to write several letters to various clients. First he has to use his PC and Word Processing package to prepare the letter. If the PC is connected to all the client's PCs through networking, he can send the letters to all the clients within seconds. Thus irrespective of geographical areas, if PCs are connected through communication channel, the data and information, computer files and any other program can be transmitted to other computer systems within a short time. The modern form of communication like e-mail and Internet is possible only because of computer networking.

#### Basic Elements of a Communication System

The following are the basic requirements for working of a communication system.

1. A *sender* (source), which creates the message to be transmitted.
2. A *medium* that carries the message.
3. A *receiver* (sink), which receives the message.

In data communication four basic terms are frequently used. They are

- **Data:** A collection of facts in raw form that become information after processing.
- **Signals:** Electric or electromagnetic encoding of data.
- **Signaling:** Propagation of signals across a communication medium.
- **Transmission:** Communication of data achieved by the processing of signals.

#### (a) Communication Protocols

You may be wondering how do the computers send and receive data across communication links. The answer is data communication soft-

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ware. It is this software that enables us to communicate with other systems. The data communication software instructs computer systems and devices as to how exactly data is to be transferred from one place to another. The procedure of data transmission in the form of software is commonly called protocol.

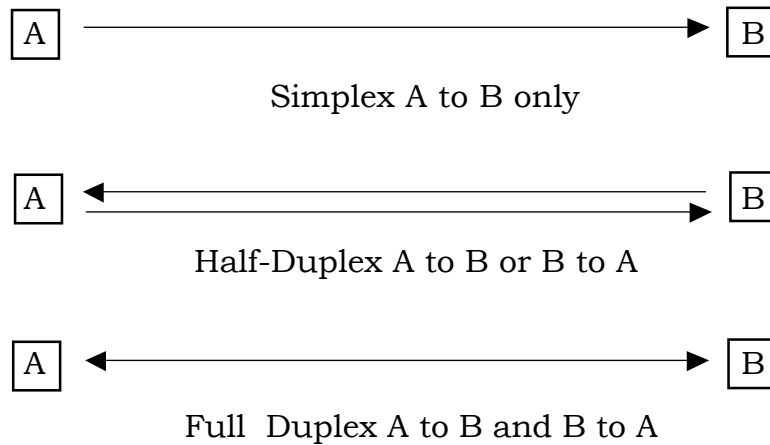
The data transmission software or protocols perform the following functions for efficient and error free transmission of data.

1. **Data sequencing:** A long message to be transmitted is broken into smaller packets of fixed size for error free data transmission.
2. **Data routing:** It is the process of finding the most efficient route between source and destination before sending the data.
3. **Flow control:** All machines are not equally efficient in terms of speed. Hence the flow control regulates the process of sending data between fast sender and slow receiver.
4. **Error control:** Error detection and recovery is one of the main function of communication software. It ensures that data are transmitted without any error.

#### **(b) Data Transmission Modes**

Based on the direction of transmission, there are three ways for transmitting data from one point to another.

1. **Simplex:** In simplex mode the communication can take place only in one direction. The receiver receives the signal from the transmitting device. This mode of flow of information is Unidirectional. Example: Radio, T.V., Pager transmission.
  2. **Half-duplex:** In half-duplex mode the communication channel is used in both directions, but one direction at a time. Thus a half-duplex line can alternately send and receive data. Example is the wireless communication.
  3. **Full-duplex:** In full duplex mode, the communication channel is used in both directions at the same time. Use of full-duplex line improves the efficiency as the line turn around time required in half-duplex arrangement is eliminated. Example of this mode of transmission is the telephone line.
-



**Fig. 4.1: Simplex, Half-duplex and Full-Duplex**

### **(c) Digital and Analog Transmission**

Data is transmitted from one point to another point by means of electrical signals that may be in digital and analog form. So one should know the fundamental difference between analog and digital signal. The transmission pattern, which is in continuous waveform, is analog signal. It varies over a continuous range with respect to sound, light and radio waves. On the other hand, a digital signal may assume only discrete set of values within a given range. (Fig. 4.2 and 4.3) Examples are computer and computer related equipment. Analog signal is measured in Volts and its frequency in Hertz (Hz). A digital signal is a sequence of voltage represented in binary form. When digital data are to be sent over an analog form the digital signal must be converted to analog form. So the technique by which a digital signal is converted to analog form is known as modulation. And the reverse process, that is the conversion of analog signal to its digital form, is known as demodulation. The device, which converts digital signal into analog, and vice-versa is known as Modem.

### **(d) Asynchronous and Synchronous Transmission**

Data transmission through a medium can be either asynchronous or synchronous. In asynchronous transmission data is transmitted character by character as you go on typing on a keyboard. Hence there are irregular gaps between characters in transmission. However, it is cheaper to implement, as you do not have to save the data before sending. On the other hand, in the synchronous mode, the saved data is transmitted block by block. Each block can contain many characters. Synchronous transmission is well suited for re-

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note communication between a computer and related devices like card reader and printers.

***Fig. 4.2 : Analog Signal***

***Fig. 4.3 : Digital Signal***

**(e) Communication Media**

Following are the major communication channels used today.

1. **Twisted-Wire Pair:** Twisted wire pairs are commonly used in local telephone communication and for short distance digital data communication. These are usually made up of copper and the pair of wires is twisted together. Data transmission speed is

normally 9600 bits per second in a distance of 100 meter. They are affected by noise. They get weakened over long distances and therefore need to be boosted.

2. **Coaxial Cables:** Coaxial cable is a group of specially wrapped and insulated wires that are able to transfer data at higher rate. They consist of a central copper wire surrounded by an insulation over which copper mesh is placed. They are used for long distance telephone lines and local area network for their noise immunity and faster data transfer.
3. **Microwave:** Microwave system uses very high frequency radio signals to transmit data through space. The transmitter and receiver of a microwave system should be in line-of-sight because the radio signal cannot bend. With microwave very long distance transmission is not possible. In order to overcome the problem of line of sight and power amplification of weak signal, repeaters are used at intervals of 25 to 30 kilometers between the transmitting and receiving end. This is a non-physical or un-guided communication media.
4. **Communication Satellite:** The problem of line-sight and repeaters are overcome by using satellites, which are the most widely used data transmission media in modern days. A communication satellite is a microwave relay station placed in outer space. INSAT-IB is such a satellite that is accessible from anywhere in India. In satellite communication, microwave signal is transmitted from a transmitter on earth to the satellite in space. The satellite amplifies the weak signal and transmits it back to the receiver. The main advantage of satellite communication is that it is a single microwave relay station visible from any point of a very large area. In microwave the data transmission rate is 16 giga byte per second. They are mostly used to link big metropolitan cities.

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### INTEXT QUESTIONS

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1. Define communication protocol.
  2. What is the difference between asynchronous and synchronous transmission?
  3. State whether True or False.
    - (a) The basic requirements for working of a communication system are sender, medium and receiver.
-

- (b) Electric or Electromagnetic encoding of data is called Transmission.
  - (c) In full duplex the communication channel is used in both directions at the same time.
  - (d) Analog signal is measured in Volts and its frequency in Hertz.
  - (e) The technique by which a digital signal is converted to analog form is known as modulation.
- 

#### **4.4 COMPUTER NETWORK**

A computer network is an interconnection of various computer systems located at different places. In computer network two or more computers are linked together with a medium and data communication devices for the purpose of communicating data and sharing resources. The computer that provides resources to other computers on a network is known as server. In the network the individual computers, which access shared network resources, are known as workstations or nodes.

Computer networks may be classified on the basis of geographical area in three broad categories.

1. Local Area Network (LAN)
2. Metropolitan Area Network (MAN)
3. Wide Area Network (WAN)

##### **(a) Local Area Network**

Network used to interconnect computers in a single room or rooms within a building or nearby buildings is called Local Area Network (LAN). LAN transmits data with a speed of several megabyte per second ( $10^6$  bytes per second). The transmission medium is normally coaxial or twisted-pair cables. This usually spans about 0-5 kms and is generally a private network owned by an organization. For example: Office LAN, Hospital LAN, Campus-wide LAN, etc.

LAN links computers through software and hardware in the same area for the purpose of sharing information. Usually LAN links computers within a limited geographical area and are therefore connected by a cable. Addition of a new computer in the network therefore requires cabling to be done. People working in LAN get more capabilities in data processing, work processing and other informa-

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tion exchange compared to stand-alone computers. Because of this information exchange capability most of the business and government organizations are using LAN.

### **Major Characteristics of LAN**

- Each computer has the potential to communicate with any other computer of the network.
- High degree of interconnection between computers
- Easy physical connection of computers in a network.
- Inexpensive medium of data transmission
- High data transmission rate

### **Advantages**

- The reliability of network is high because the failure of one computer in the network does not effect the functioning of other computers.
- Addition of new computer to network is easy.
- High rate of data transmission is possible.
- Peripheral devices like magnetic disk and printer can be shared by other computers.

### **Disadvantages**

If the communication line fails, the entire network system breaks down.

### **Use of LAN**

Following are the major areas where LAN is normally used

- File transfers and Access
  - Word and text processing
  - Electronic message handling
  - Remote database access
  - Personal computing
  - Digital voice transmission and storage
-

**(b) Metropolitan Area Network**

The MAN is used to describe a network of computers spanning a metropolitan city usually 5-50 kms of range. A company having multiple offices in various parts of a city generally uses this type of network. Example is the Cellular or mobile Phone network.

**(c) Wide Area Network**

The term Wide Area Network (WAN) is used to describe a computer network spanning a regional, national or global area. For example, for a large company the head quarters might be at Delhi and regional branches at Bombay, Madras, Bangalore and Calcutta. Here regional centers are connected to head quarters through WAN. The distance between computers connected to WAN is quite large. Therefore the transmission medium used is normally telephone lines, microwaves and satellite links. Internet is an example of a WAN.

**Characteristics of WAN**

Followings are the major characteristics of WAN.

1. **Communication Facility:** For a big company spanning over different parts of the country the employees can save long distance phone calls and it overcomes the time lag in overseas communication. Computer conferencing is another use of WAN where users communicate with each other through their computer system.
2. **Remote Data Entry:** Remote data entry is possible in WAN. It means sitting at any location you can enter data, update data and query other information of any computer attached to the WAN but located in other cities or country. For example, suppose you are sitting at Madras and want to see some data of a computer located at Delhi, you can do it through WAN.
3. **Centralised Information:** In modern computerized environment you will find that big organizations go for centralized data storage. This means if the organization is spread over many cities, they keep their important business data in a single place. As the data are generated at different cities, WAN permits collection of this data from different sites and save at a single site.

**Examples of WAN**

1. **Ethernet:** Ethernet developed by Xerox Corporation is a famous example of WAN. This network uses coaxial cables for data trans-
-

mission. Special integrated circuit chips called controllers are used to connect equipment to the cable.

2. **Arpanet:** The Arpanet is another example of WAN. It was developed at Advanced Research Projects Agency of U.S. Department. This Network connects more than 40 universities and institutions throughout USA and Europe.

### **Difference between LAN and WAN**

- LAN is restricted to limited geographical area of few kilometers, but WAN covers long distance and operates nationwide or even worldwide.
- In LAN, the computer terminals and peripheral devices are connected with wires and coaxial cables. In WAN there may or may not be a physical connection. Communication is done through telephone lines and satellite links.
- Cost of data transmission in LAN is less because the transmission medium is owned by a single organization. In the case of WAN the cost of data transmission is very high because the transmission medium used is hired, either telephone lines or satellite links.
- The speed of data transmission is much higher in LAN than in WAN. The transmission speed in LAN varies from 0.1 to 100 megabyte per second. In case of WAN the speed ranges from 1800 to 9600 byte per second (bps).
- Few data transmission errors occur in LAN compared to WAN. It is because in LAN the distance covered is negligible.

### **4.5 NETWORK TOPOLOGY**

The term topology in the context of communication network refers to the way the computers or workstations in the network are linked together. According to the physical arrangement of workstations and nature of work, there are three major types of network topology. They are bus topology, star topology and ring topology.

#### **(a) Bus Topology**

In bus topology all workstations are connected to a single communication line called bus. In this type of network topology there is no central server and all the computers can talk or communicate to all other systems connected to the cable. Transmission from any station

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travels the length of the bus in both directions and can be received by all workstations. The advantage of the bus topology is that

- It is quite easy to set up.
- If one station of the topology fails it does not affect the entire system.

The disadvantage of bus topology is that any break in the bus is difficult to identify and addition of more computers (nodes) slows down the network performance.

***Fig. 4.4 : Bus Topology***

#### **(b) Star topology**

In star topology a number of workstations (or nodes) are directly linked to a central server (see, Fig.4.5). Any communication between stations in a star LAN must pass through the central server. There is bi-directional communication between various nodes. The central server controls all the activities of the nodes. The advantages of the star topology are:

- It offers flexibility of adding or deleting of workstations from the network.
  - Breakdown of one station does not affect any other device on the network.
-

The major disadvantage of star topology is that failure of the central node disables communication throughout the whole network.

***Fig. 4.5: Star Topology***

### **(c) Ring Topology**

In ring topology each station is attached to nearby stations on a point-to-point basis so that the entire system is in the form of a ring. In this topology data is transmitted in one direction only. Thus the data packets circulate along the ring in either clockwise or anticlockwise direction. The advantage of this topology is that any signal transmitted on the network passes through all the LAN stations. The disadvantage of ring network is that the breakdown of any one station on the ring can disable the entire system. The communication of data takes longer time as flow is only in one direction.

***Fig. 4.6 : Ring Topology***

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**INTEXT QUESTIONS**

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4. Differentiate between LAN, MAN and WAN.
  5. What are the different types of network topology?
  6. State True or False.
    - (a) Networks used to interconnect computers in a single room, rooms within a building or buildings on one site are called Wide Area Network (WAN).
    - (b) The term Wide Area Network (WAN) is used to describe a computer network spanning a regional, national or global area.
    - (c) The speed of data transmission is much higher in WAN than in LAN.
- 

**4.6 INTERNET**

The Internet is a network of networks. Millions of computers all over the world are connected through the Internet. Computer users on the Internet can contact one another anywhere in the world. If your computer is connected to the Internet, you can connect to millions of computers. You can gather information and distribute your data. It is very much similar to the telephone connection where you can talk with any person anywhere in the world.

In Internet a huge source of information is accessible to people across the world. Information in every field starting from education, science, health, medicine, history and geography to business, news, etc. can be retrieved through Internet. You can also download programs and software packages from anywhere in the world. Due to the tremendous information resources the Internet provides, it is now indispensable to every organization.

**Origin of Internet**

In 1969 Department of Defence (DOD) of USA started a network called ARPANET (Advanced Research Projects Administration Network) with one computer at California and three at Utah. Later on other universities and R & D institutions were allowed to connect to the Network. ARPANET quickly grew to encompass the entire American continent and became a huge success. Every university in the country wanted to become a part of ARPANET. So the network was broken into two smaller parts MILNET for managing military sites

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and ARPANET (smaller) for managing non-military sites. Around 1980, NSFNET (National Science Foundation Network) was created. With the advancement of modern communication facilities, other computers were also allowed to be linked up with any computer of NSFNET. By 1990 many computers were looking up to NSFNET giving birth to Internet.

### **How Internet functions?**

Internet is not a government organization. The ultimate authority of the Internet is the Internet Society. This is a voluntary membership organization whose purpose is to promote global information exchange. Internet has several million computers attached to it.

### **E-mail**

E-mail stands for electronic mail. This is probably one of the fastest and most convenient ways of communicating. It is also fast becoming the cheapest mode of communication. The burden on the ever so popular khakhi uniform clad Postman has been reduced considerably with the availability of the E-mail facility to Indians in most cities and parts of the world.

All the Internet subscribers in India get the E-mail facility free with each subscription from their Internet Service Provider such as VSNL, MTNL, Satyam, etc. Thus all Internet subscribers in India have unique and separate E-mail address. This E-mail account can be accessed by the subscriber from anywhere in the world.

The facility of E-mail has several features that are of immense help to us. One can send common circulars/letters to all those clients or other recipients who have E-mail facilities. This would result in saving a lot of stationary as well as postage charges. By creating Address Books in the computer, one does not have to remember the E-mail addresses of others. Further a lot of time, energy and money can be saved by creating a Mailing List of all clients and using it to send common letters/notices/circulars. Another advantage of using E-mail is that as long as the sender has keyed the correct E-mail address of the addressee, the chances of the addressee not receiving the message without the sender being aware of this are remote. Also only the person to whom it has been sent can read the e-mail message. In addition, the transmission of messages to the server of the addressee is virtually instantaneous. Thus, E-mail beats the Postman and the Courier boy in the race by miles; E-mail transcends all time zones and barriers.

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We can also send files created in any application such as say, a Word Processor or a Spreadsheet, or a Picture File as attachments with the E-mail messages. For example, if we have created a spreadsheet containing the computation of total Income of a client, then we can write a letter to him in E-mail and inform him that his computation is ready and also attach the spreadsheet and send it to him for verification. Of course, care must be taken to ensure that the attachments are not very large files; otherwise, the recipient's mailbox is likely to get jammed. Further, the recipient, to be able to open the file at his place, must also have the same application software in his computer. In certain cases, the recipient must also have the same version of the software that was used for preparing the attachment.

The E-mail software supplied with Internet connection comprises of some important and useful features, which are as follows:

**Composing messages:** With the help of the Internet Browsers, it is possible to compose messages in an attractive way with the help of various fonts. It is also possible to spell check the message before finalizing it.

**Replying to the mail received:** It is possible to reply to any mail received by merely using the "Reply" facility available on the Internet Browsers. This facility also allows one to send the same reply to all the recipients of the original message. This facility results in saving of a lot of time in terms of remembering addresses, typing the subject matter etc.

**Address Book:** This is an electronic form of Address Book wherein the following features can be saved: Name, full name, E-mail address, name of organization to which the person belongs, the designation of such person, telephone numbers, etc. When one has to send an E-mail, by merely typing the first name, for example, it would be possible to recall the E-mail address of the recipient. It is also possible to store addresses on the basis of categories. Thus, a group containing addresses of all clients, one has to merely type in the name of the category in place of the addresses. This would automatically send the letter to all persons listed in that category. This does away with the tedious task of retyping or reprinting the same letter again and again and putting the letters in envelopes, addressing and stamping the envelopes and finally, mailing the same.

**Printing of messages:** It is possible to print messages received as well as sent. Thus, if a person wants to keep a hard copy of any message, it would be possible for him to do so.

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**Offline Editing/Composing/Reading:** One does not have to be connected to the Internet all the time to be able to read/edit/compose messages. This is a very important feature which many people do not make use of. Ideally, one should log into the Internet, download all the messages into one's own hard disk and then disconnect from the Internet. Once the user is offline, he should read all the messages that have been received. Even composing one's own messages, editing the same or replying to messages received ought to be done when one is off-line. This results in saving of Internet time as also helps in keeping telephone lines free. It is also possible to compose messages and save them as drafts so that at a later stage, the same can be edited or continued and then sent.

**Forwarding of messages:** It is possible to forward any message received from, say, Mr. A to Mrs. B without retyping the message.

**Transfer of Data Files:** An important use of the E-mail is the ability to send/receive data files to/from a client. For example, at the time of consolidation of accounts of a client, the data files containing final accounts of the branches of that client can be obtained via E-mail and after consolidation and finalization, the same can be sent back to the client's branches for closing entries etc. This would result in considerable saving of time, energy and money.

**Greeting Cards:** On the Internet, there are several sites which offer free greeting cards for thousands of occasions to anybody who wants to send greeting differently. To send an electronic greeting card, one has to simply visit a site offering this facility, select a card from amongst the several available, type in one's message, name and E-mail address of the recipient, name of the sender and with a simple click, send the card. The recipient is notified by E-mail that he has been sent a greeting card. He can then access the card by simply clicking on the web-site address of the site, which has provided the facility of the greeting card. Most such cards also come with animation i.e. music and video with movements. This makes the card extremely attractive, interesting and many times better than the traditional printed cards.

#### **4.7 VOICE MESSAGING**

Voice messaging is a new communication approach, which is similar to electronic mail except that it is audio message, rather than text messages that are processed. A sender speaks into a telephone rather than typing, giving the name of the recipient and the message and the sender's voice signal is then digitized and stored. The system can then either deliver the message at a specified time in the future or the recipient can retrieve it from a database. The message is

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converted back into its analog format when it is delivered or retrieved so that the recipient hears it as the original sender's voice on a telephone.

Voice messaging (or mail) requires a computer with an ability to store the audio messages in digital form and then convert them back in an audio retrieval. Each user has a voice mailbox in secondary storage, and special equipment converts the audio messages to and from the digital form. The main advantage of voice mail over electronic mail is that the sender does not have to type. Voice mail also makes it easy to include people in the firm's environment in a communication network.

Several types of voice messaging products and services are available. Some are standalone systems while others are integrated into PABX telephone exchange, etc.

#### **4.8 ELECTRONIC DATA INTERCHANGE**

The term electronic data interchange has many definitions. American National Standards Institute (ANSI) has defined it as:

*Electronic Data Interchange (EDI) is the transmission, in a standard syntax, of unambiguous information of business or strategic significance between computers of independent organizations. The users of EDI do not have to change their internal databases. However, users must translate this information to or from their own computer system formats, but this translation software has to be prepared only once.*

In simple terms, EDI is computer-to-computer communication using a standard data format to exchange business information electronically between independent organizations.

It is not a glamorous technology but EDI is helping many businesses cut the costs associated with shipping, receiving and maintaining paper communication.

The principle of EDI is simple. It is set of standards that define the way the paper forms should be rendered electronically. EDI can be used to send an invoice, for example, or an order form from one company to another. A sending computer, usually located at a customer's premises uses telecommunication technology to transfer order data instantly to the "receiving computer", usually located at the suppliers distribution center. Software on each company's computer translates the item into standard codes, so it would not matter if one company calls product a cog and the order calls the

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same thing a sprocket, EDI will make sure that the right part is ordered. After the received order data is manipulated and formatted to match the order entry files, in the “order data base” of the supplier, the information is transferred into the database and appropriate error messages, and/or exception reports are generated. The “sending computer” stores the order and follows up on it. The “receiving computer” automatically transfers the data to the warehouse of the factory, the accounting and billing department, and the shipping department.

#### **4.8.1 Advantages of EDI**

- (i) **Issue and receive orders faster:** Since most purchasing transactions are routine, they can be handled automatically, utilizing the staff for more demanding and less routine tasks.
- (ii) **Make sales more easily:** Quotes, estimates, order entry and invoicing will proceed more smoothly and efficiently. Orders received electronically ensure that information is available immediately, so that an organization can respond faster and be more competitive.
- (iii) **Get paid sooner:** Invoices received electronically can be reconciled automatically, which means they are earmarked for payment in one’s trading partner’s accounting department sooner. And, in turn, your own purchasing department is in a position to negotiate for better terms including faster payment.
- (iv) **Minimise capital tied up in inventory:** For manufacturing organizations with a just-in-time (JIT) strategy, the right balance is crucial but every organization stands to benefit from reducing order lead times.
- (v) **Reduce letters and memos:** Letters and memos do not follow rigid rules for formatting. They can be handled by an electronic mail system.
- (vi) **Decrease enquiries:** Customers or suppliers can make direct on-line enquiries on product availability, or other non-sensitive information instead of consuming the staff’s precious time.
- (vii) **Make bulk updates of catalogues and parts listings:** One can provide updates of data files, such as catalogues to customers or part listings to franchisees.

EDI is vastly implemented in the trucking, marine shipping and air

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cargo industries in developed countries. Implementation need not be expensive. All that a small firm needs to have is a personal computer, a modem and telephone line and the necessary software.

#### **4.9 E-COMMERCE**

Electronic Commerce or E-Commerce as it is popularly known is a natural development, which has followed in the footsteps of the Internet. The Internet is like a shop, which is permanently open, all 24 hours and all 365 days in a year. This makes the Internet the ideal place to do business in. In this kind of an electronic shop, there is no requirement of a shopkeeper or a cashier or a security guard. Further, the shop can be accessed by anybody in any part of the world. It also does away with the necessity of having an expensive piece of real estate and furnishing the same. All these attractive features have made the Internet an immensely popular place to set up shops.

In India, E-commerce is not as widely popular or prevalent as in the western countries. The main reason for this is that at present, it is not possible to make payments by credit card through the Internet. Once the credit card companies are in a position to offer the cardholders some kind of assurance about the security aspect of making payments via the Internet, the volcano of E-commerce will erupt with a force that will shake the entire Indian business scenario. Even today, there are already several outlets that have set up their own web sites and who accept purchase orders through the Internet. A popular super market in New Delhi, several cinema halls in Mumbai, numerous book shops in many cities are some such examples of businesses which have already started making use of Internet for commercial purposes. Thus, for example, one can book tickets of a film running at a particular cinema hall through the internet and then go to the hall a few minutes before the show, identify one's self and get the tickets without having to wait for hours in a queue.

E-commerce throws up several new challenges. The most important issue that is thrown up by such commerce is that of taxation. For taxation purposes, the first question that has to be addressed is where did the sale take place? Since there is no physical form of the place of business in case of E-commerce, it becomes difficult to determine the country/state/city from where the sale was concluded. Accordingly, jurisdictional disputes arise about the taxation of the same especially with respect to indirect taxes. Even the most advanced nations such as U.S.A, Japan, France, and U.K have not yet been able to satisfactorily solve this problem.

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Similarly, another problem that arises is about the transaction escaping the tax net all together. Since there is no paper work involved and all the interaction between the buyer and the seller is done electronically, there is a possibility of the transaction being kept out of the books of account of either or both sides of the transaction. As auditors, Chartered Accountants would have to deal with this problem increasingly as E-commerce takes firm roots in India.

Another problem area of E-commerce is regarding fraud detection. E-commerce comes to us along with the in-built dangers of electronic crimes and frauds. Detection and Prevention of such frauds would be an area of great concern.

Some more areas where Chartered Accountants would be called upon to lend their expertise would be:

- (a) Internet web site security-web trust audit;
- (b) Knowledge of encryption techniques;
- (c) Attesting integrity of databases;
- (d) Interpretation of new tax laws covering E-commerce.

#### **4.10 THE INTRANET**

The driving force behind the first data communication networks was the need to transmit data and information within the organization. This internal focus was then broadened to include the firm's business partners, such as customers and suppliers; eventually, the electronic data interchange (EDI) became a reality. Then, came the Internet, with its user-friendly protocol for retrieving information on an almost limitless number of topics from a seemingly limitless number of sources.

The success of the Internet in tapping into entirely new information sources, however, did not blind data communication experts to the potential for applying the technology to a more local level. If the Internet is good for communicating with individuals and organizations outside the firm's scope of operations, it should be good for internal communications as well. This is the reasoning that gave rise to the Intranet. Intranet is the use of the Internet Technology for communication within the firm and between the firm and those organizations and individuals with whom the firm does business.

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## **4.11 TELECONFERENCING**

The term teleconferencing refers to electronic meetings that involve people who are at physically different sites. Telecommunication technology system allows meeting participants to interact with one another without traveling to the same location. Three different types of teleconferencing exist: audio teleconferencing, video teleconferencing and computer conferencing.

### **4.11.1 Audio Conferencing**

Audio conferencing is the use of voice communications equipments to establish an audio link between geographically dispersed persons, one that allows them to conduct a conference. The conference call was the first form of audio conferencing and is still in use. Some firms install more elaborate systems consisting of private, high-quality audio communications circuits that can be activated with the flip of a switch.

Audio conferencing does not require a computer. It only requires a two-way audio communications facility, as illustrated in figure below.

Audio conferencing is best suited for firms that are spread over a wide area. However, since it is a form of synchronous communication that requires all participants to be present at the same time, it is difficult to schedule conferences when time zones are far apart.

### **4.11.2 Video Conferencing:**

Video conferencing is the use of television equipment to link geographically dispersed conference participants. The equipment provides both sound and picture. Like audio conferencing, video conferencing also does not necessarily require a computer.

With video conferencing, participants can see and hear each other. Generally, participants gather in relatively expensive, specially equipped rooms that can handle the complexities of simultaneous video and audio transmission.

There are three possible video conferencing configurations.

**One-Way Video and Audio:** Video and audio signals are sent from a single transmitting site to one or more receiving sites. This is a good way for a project leader to disseminate information to team members at remote locations.

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**One-Way Video and Two-Way Audio:** People at the receiving sites can talk to people at the transmitting site, while everyone views the same video images.

**Two-Way Video and Audio:** The video and audio communications between all sites are two-way. Although this is the most effective of the electronically aided conferencing approaches, it can be the most expensive.

#### **4.11.3 Computer Conferencing**

A third form of electronic conferencing is computer conferencing. There is a fine line between this system and E-mail. Both use the same software and hardware. Two factors determine the application-Who uses the system, and the subject matter.

E-mail is available to anyone who has access to the network-and that includes practically everyone in the office. Also, the E-mail system can be used for any purpose. Computer conferencing, on the other hand, is the use of a networked computer that allows particular topic. Computer conferencing is more disciplined form of E-mail.

Unlike an audio conference, a computer conference group can consist of large number of participants. One of the largest computer conferences was formed within IBM to include anyone who had an interest in the IBM PC. Its members exceeded 40,000, and there were over 4,000 separate topic areas.

Computer conferencing differs from audio or video conferencing because it can be used within a single geographic site. A person can use computer conferencing to communicate with someone in the office next door. Such use would not be practical with audio or video.

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#### **INTEXT QUESTIONS**

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7. Differentiate between Internet and Intranet
  8. Define the following terms briefly:
    - (a) E-mail
    - (b) EDI
    - (c) Teleconferencing
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#### **4.12 WHAT YOU HAVE LEARNT**

In this lesson we discussed the importance and modes of communication through computers. Computers can communicate with one another through computer networking. There are three types of computer network: LAN, MAN and WAN. We discussed about the physical arrangements of computer and peripherals in network topology. There are three types of network topology: star topology, bus topology and ring topology. Also we discussed about Internet and Intranet, E-mail, Voice messaging, EDI, E-Commerce and Teleconferencing.

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#### **4.13 TERMINAL QUESTIONS**

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1. Define computer Network. What are its main objectives?
2. Differentiate between analog and digital transmission of data.
3. Explain in brief different communication media.
4. Differentiate between
  - (a) Simplex and Full-duplex transmission
  - (b) Audio and Video conferencing

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#### **4.14 KEY TO INTEXT QUESTIONS**

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1. The data communication software instructs computer systems and devices as to how exactly data is to be transferred from one place to another. The procedure of data transmission in the form of software is commonly called protocol.
  2. In asynchronous transmission data is transmitted character by character as you go on typing on a keyboard. On the other hand, in the synchronous mode, the saved data is transmitted block by block.
  3. (a) True      (b) False      (c) True      (d) True      (e) True
  4. LAN is a private network restricted to limited geographical area. MAN is restricted to a city (5-50 km range), whereas WAN covers great distance usually a country or the world. In LAN the computer terminals and peripheral devices are connected with wires and coaxial cables whereas in WAN communication is done through telephone lines and satellite links. The speed of data transmission is much higher in LAN than in MAN or WAN.
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5. There are three major types of network topology. They are star topology, bus topology and ring topology.
  6. (a) False      (b) True      (c) False
  7. The Internet is a network of networks. Information in every field starting from education, science, health, medicine, history, and geography to business, news, etc, can be retrieved through Internet. Intranet is the use of Internet technology for communication within the firm and between the firm and those organization and individuals with whom the firm does business.
  8. (a) E-mail stands for electronic mail. Through e-mail we can transfer data anywhere in the world within seconds.  
(b) EDI stands for Electronic Data Interchange. In simple terms, EDI is computer to-computer communication using a standard data format to exchange business information electronically between independent organizations.  
(c) It refers to electronic meetings that involve people who are at physically different sites.
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# 5

## OPERATING SYSTEM

### 5.1 INTRODUCTION

Most well accepted operating system used by the computer users world wide was Disk Operating System or DOS. Over the years, lots of features were added to DOS, which was initially introduced to be used with PC with Intel's 8088 chip set. However, recent introduction of Windows operating system with Graphical User Interface build into it, a computer user need not remember all the operating system commands by heart. This has been possible with the introduction of windows Operating system by Microsoft, which provides major improvements such as graphical operating environment, networking of computers, in build multimedia capabilities and performance enhancement to DOS.

Most of the personal computers you see today comes with Microsoft Windows operating system. It is an operating system meant for IBM compatible PCs. Operating system is the software that makes it possible for you to work on your computer and have it perform the tasks you need. Windows98 is an updated version of Window95.

### 5.2 OBJECTIVES

After going through this lesson, you would be in a position to

- explain various features of Windows98

- explain various icons and their features
- define file management features of Windows98

### **5.3 MAIN FEATURES OF WINDOWS98**

The following are the main features of Windows98 operating system.

- Creates the link between the user, and the computer by providing an interface in which the user can communicate with the computer
- Serves as the base software on which a variety of programs can operate. Examples include MS Word, MS Excel, MS Power Point, and MS Access
- Handles internal functions, such as managing the computer memory, input and output operations
- Provides a series of utilities - specialized programs to manage your system - and commands that you can use to manage your files, folders, and disks
- A Graphical User Interface (GUI), which uses pictures, symbols, windows, and words on your screen that you control with the mouse
- Built-in programs, or accessoires like, WordPad, Notepad, Calculator, Paint program etc.
- The ability to display several documents and run a number of programs in their own windows, all at the same time.
- The World Wide Web (WWW) is easily accessible from anywhere in windows. You can communicate over the Internet. Using Internet tools included with windows, you can send e-mail, chat, and view news.
- Supports DVD and digital audio, so that you can play high quality digital movies and audio on your computer. You can also watch TV.

#### **5.3.1 Using the Mouse**

Windows98 is designed for use with a mouse. Although, you can use the keyboard for most actions in Windows 98, many of these actions are easier to do with a mouse. You will use four basic mouse actions throughout this course.

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1. **Pointing:** Moving the mouse to place the pointer on an item is called pointing.
2. **Clicking:** Pointing to an item on your screen and then quickly pressing and releasing the left or right mouse button is called clicking. You select items on the screen by clicking. Occasionally there are operations you perform by clicking the right mouse button, but unless you are instructed click the left mouse button.
3. **Double-clicking:** Pointing to an item and then quickly pressing and releasing the mouse button twice is called double-clicking. Whenever you are unsure of the command to use for an operation, try clicking the item you want to affect. If you get no result, try double-clicking. This often displays a dialog box in which you can make changes to the item you double-clicked.
4. **Dragging:** Pointing to an item and then holding down the mouse button as you move the mouse is called dragging. You can use this action to select data, and to move or copy text or objects.

## 5.4 SYMBOL FOR MENU COMMANDS

As a shortcut, we have used a special convention to indicate menu commands throughout this course. When you want to choose a command from the menu bar, it will follow this pattern: menu name command. For example, “Choose File Open” is a shorter way of saying “Choose the File command from the menu bar, then choose the Open command from the File menu”. Sometimes you will see a sequence of menu selections that goes three or more levels.

### 5.4.1 Desktop

When you turn on your computer, the screen first displays Basic Input Output Information about your computer. Few seconds later, Windows takes control and the Windows logo flashes on your screen with the cloudy sky. You could see “Microsoft Windows98”. The first thing that always appears after loading is that you will be asked to type your password to enter Windows (it is the password you typed the first time Windows was launched). The Desktop is where you might place useful things always accessible to you. Depending on which options you choose during installations, you will see some or all the objects in Figure 5.1

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**Fig. 5.1: The Windows Desktop**

### 5.4.2 Desktop Icons

1. **My Computer:** My Computer is the most important Desktop item (see fig. 5.1). This is where everything is present: your hard drive, floppy, CDROM, computer's main control (Control Panel). All the computer resources can be accessed from My Computer - it is the gateway to your computer. To access My Computer, double-click on its icon in the Desktop.

My computer contains:

- (i) Hard Drive (s) (C: D:)
- (ii) 3.5 Floppy Drive (A: )  
CD\_ROM Drive (E: )
- (i) Printers
- (ii) Control Panel
- (iii) Dial-up Networking (used especially for Internet Connection)
- (iv) Scheduled Tasks (give your computer jobs to perform when you are out)

My Computer window (see fig. 5.2) looks just like any window you open, you can minimize, this Window with -, maximum with and close by clicking on x.

In My Computer you are forbidden to Delete, Copy, Rename anything, try to press delete key and nothing will happen. The items in My Computer window are so crucial that you cannot run your computer without them. For example, if you remove the hard drive where would

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you store your files. Since, My Computer items are related to the computer system they should remain intact.

***Fig. 5.2: My Computer***

Suppose you want to use My Computer to view your hard disk. On the Desktop double-click My Computer. The My Computer window (see Figure 5.2) with different icons will appear.

Double-click the icon (see fig. 5.2) that represents your hard disk. Your hard disk window appears, and the contents of your hard disk.

Similarly you can double-click the other icons in My Computer.

To view the contents of the floppy disk, which is usually designated drive A:

To view the contents of the hard disk, which is usually designated drive C:

To view the contents of the hard disk, which is usually designated drive D:

To view the contents of compact disk in the CD-ROM drive designated as E:

To set up printer and view information about available printers and print job status.

To view tools you can use to modify your computer settings.

To schedule or view tasks for computer maintenance

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To view web folder contents

To view shared information on another computer by using a modem.

### 5.4.3 The Properties Window in My Computer

To learn more about each item, just choose one icon, right-click and select Properties from menu. The Properties window is divided into four tabs: General, Tools, Sharing and Compression. If you select the Floppy icon, the General tab shows information about your floppy, storage device. It tells you how much space you still have on your disc, and the total size in KB or MB. You should have a total of 1.45,664KB if you're using a 1.44 MB floppy. At the top of the window is the floppy label, usually it is blank. The pie chart shows clearly the Used Space and Free Space (see Figure 5.3)

***Fig. 5.3: The Properties Window***

The Tools tab in fig. 5.3 features the following three important Windows utilities:

**Error-checking status:** It is a utility that let you check your computer for errors. If you accidentally turned your computer off without properly shutting down, it will run when you restart your computer and perform a scan on your hard drive.

**Backup status:** This utility lets you backup important stuff so you will never lose anything in case your computer was damaged. You should always keep two copies of your work you store in computer.

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**Defragmentation status:** Use this utility to make your computer run faster. The more you use the computer the more “it gets tired and old”. Defragmentation will refresh it.

The Sharing tab will tell you whether your hard disk is shared by other network users or not.

The Compression tab is almost never used. Suppose one day you run out of disk space, you can use the Compression utility to squeeze your files and generate more room.

Beside My Computer there are quite a few icon on the Desktop. These are as follows:

1. **My Documents:** This is where you store all your personal stuff like files, anything you create with your computer. You can put your things somewhere else also. Think of My Documents as your Desktop drawer where you can put your papers.
2. **Recycle Bin:** Provides space for deleted files from folders or Desktop, and provides a second chance to recover files deleted.
3. **Internet Explorer:** It is a piece of software called a browser that lets you explore the Internet. You might have another icon like “Internet Connection” that will help you configure your computer to access the Internet.
4. **Network Neighborhood:** Provides access to shared resources on your computer and other computers on your local and wide area networks. If your computer is connected to a network, you can use Network Neighborhood to browse network resources in the same way you browse the contents of your computer.

To open network resources follow the steps given below:

- i. On the Desktop, double-click **Network Neighborhood**. The computers in your workgroup will appear. If you want to view all of the resources available on the network, double-click **Entire Network**.
  - ii. Double-click the servers and folders you want to open.
5. **Online Services:** As online services is a subscription computer service you can see it to access a wide variety of information and exchange messages with other users. With online services, you can obtain information on news, sports, weather, the stocks

market, and more. You can get access to different libraries and databases. You can send mail to other users of the online service. Examples of online services include America Online, CompuServe, Prodigy, and MSN.

6. **Date, Time, Volume:** At the bottom right corner of the screen, you can tell what time is it. By clicking your mouse over the clock icon, you'll get the date. You can also control the sound by clicking on the speaker icon.
7. **Start Button:** This button lies at the bottom left of your screen. It provides an easy way to start different programs and other applications.
8. **Taskbar:** This lies at the bottom of your screen. This displays all open applications and windows. The Start button and the Taskbar work together and help you in managing your applications open or close windows easier.

You will learn more about these Desktop icons in the next few sections of this lesson.

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## INTEXT QUESTIONS

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1. Write any five main features of Windows98.
  2. Explain the following terms used in application of mouse: (a) Pointing, (b) Clicking, (c) Double-clicking, (d) dragging
  3. What is Desktop? What are the main items you see on a Desktop?
  4. What are the main components of My Computer?
- 

## 5.5 START BUTTON AND TASKBAR

At the bottom left corner is the Start button. Place the mouse over Start and you will see "click here to begin". Start gives you access to all applications on your computer, every time you install a software on your system, you can easily have access through the Start button. Click on Start and the Start menu appears. Figure 4.4 shows the main menu items available when you click on the Start button.

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***Fig. 5.4***

### **5.5.1 Programs Submenu**

Every program on your computer can be accessed from Programs submenu, you can also access the Computer Accessories like System Tools, Communication and Entertainment features. Move your mouse pointer over the programs items on the Start menu, and another menu will pop up. In fig 4.5 we clicked on programs and then on accessories. In the next column we clicked on games and then on Hearts.

***Fig. 5.5: Programs Submenus***

When you open programs and files on top of other programs and files on the Desktop, Windows 98 keeps track of all your open windows and lists them on the Taskbar. The advantage of the Taskbar is that when you have multiple applications open at the same time,

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you can see all of them listed in the foreground, whether or not they are hidden by another windows. Even if an application window is minimized on the Desktop, it can still be accessed from the Taskbar. By clicking on the applications window on the Taskbar, you can bring that application to the front of other windows, and restore if it was minimized. The more windows you open, the more items will be listed on the Taskbar. You can increase the height of the Taskbar, place the mouse pointer over its top border, the pointer will turn into double-headed sizing arrow (↕). Then, click and hold your left mouse button and drag up.

### **5.5.2 Favorites Submenu**

While surfing the internet you can store your favorite addresses in this folder so that you don't have to memorize them. This feature is very useful for Internet users. You can also quickly get to documents or folders or to other computers on your network.

### **5.5.3 Documents Submenu**

Windows keeps track of recent documents used. The Documents option of the Start menu makes available the last 15 documents you had opened in any application. Click on Documents in fig. 4.4 and you will see a list of documents you have been working on recently. The documents are listed alphabetically, not by use, and will be listed whether you open them from within an application or from the folder where they are stored. If you find these documents irrelevant and don't want to access, you can clear the list: Right click on the Taskbar. In a small Window you will find 'properties'. On Clicking there, another Window will open up. Click on the 'Start Menu Programs'. There at the documents menu, click on the 'Clear' button.

### **5.5.4 Settings**

From here you have access to the Control Panel (see Figure 4.5 Printers, Taskbar and Start menu, Folder Options, Active Desktop, and Windows update. You can add/delete programs, change monitor settings, connect to networks, create a Startup Disk, Customize Desktop display properties, and set up Dialup Networking. The main features of Control Panel are:

1. You can do most of your customizing of your Windows environment., You can display pictures, patterns, or even scanned photographs as your wallpaper, the background of your Desktop. Using the different tabs in the Display Properties dialog
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box, you can also change items such as the icons on your Desktop, the colors of individual windows, and the size of the objects on your screen. You can even add items to your Active Desktop or set up a screen saver.

2. You can quickly install Programs, such as MS Word or a game, using the Add/Remove Programs features in Control Panel.
3. You can also connect your computer to a network using Network features in Control Panel. To connect your computer to a network follow the steps given below:
  - i. Click **Start**, select **Settings** → **Control Panel**, and then double-click Network dialog box appears. Click Add. Select Network **Network**. Component Type dialog box appears. Click Client, and then click **Add**. A list of client software appears.
  - ii. In the **Manufactures** list, click the name of the manufacture of your network software.
  - iii. In the **Network Clients** list, select the client software you are using, and then click **OK**. The client software is added to your computer.
  - iv. On the **Configuration** tab, select your client, and then click Properties. Enter configuration options for your network, and then click **OK**. (If you don't know the options for your network, contact your network administrator).
  - v. Click **OK** and then click **OK** again. The client software is installed and your computer restarts.
4. If you have problems with Setup or have trouble in starting Windows98, you can use a Startup Disk to start your computer and run Setup or gain access to your system files. If you have problems with your hard disk, for example, you can use a Startup Disk to start your computer and troubleshoot your hard disk.

To create a Startup Disk from within Windows98 follow the steps given below:

- i. Click **Start**, point to **Setting**, click **Control Panel**, and then double-click **Add/Remove** Programs. The Add/Remove Programs Properties dialog box appears.
  - ii. Click the **Startup Disk**, tab, and then click Create Disk.
-

- iii. Label a floppy disk “Windows 98 Startup Disk” insert it into your floppy disk drive, and then click **OK**.

To start your computer using Startup Disk follow the steps given below:

- i. Insert the Startup Disk in the floppy disk drive.
  - ii. Restart your computer. The Windows 98 Startup menu appears. Type the number of the appropriate CD-ROM option, and press ENTER. Follow instructions on your screen. After a series of scans, the MS-DOS prompt appears. From this prompt, you can gain access to the system files on the Startup Disk.
5. You can Add Printer wizard to quickly set up printers, select default printers, and change printer settings. The wizard guides you step-by-step through printer set up.

### **5.5.5 Find**

When you are looking for a particular folder or file, you can use the Find command instead of opening numerous folders. The Find command lets you quickly search a specific drive or your entire computer or a computer on your network.

### **5.5.6 Help**

When you are stuck, Windows can give you a hand, just go to START HELP or press F1 on your Keyboard.

### **5.5.7 Run**

This is the fastest way to start a program or install software on your computer or start programs or open folders or connect to network resources. With Run you will have instant access to everything. However, the Run option is for more experienced user. Selecting Run brings up the RUN window where you can type the name of a file or folder that you wish to open. If you don't know the entire path of folders within which a specific file or folder can be found, you can click on the Browse button within this window to find what you are looking for. Although, this is generally not the quickest way to open a document or run a program, sometimes it simply seems more direct than opening a sequence of folders to get the one you need.

### **5.5.8 Shut Down**

You should Shut Down Windows at the end of a session never turn

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the power off close all applications and click START, select Shut Down and press OK. Many new computers automatically turn the power off once you have Shut Down. In case your computer do not have this feature turn the power off.

### **5.5.9 Log Off**

This feature is used only when you share your computer with others. If you are the only one using the computer you need not choose this feature.

## **5.6 WINDOWS EXPLORER**

Windows Explorer is a feature that you can use to view the contents of your computer and network drives in a hierarchical structure. Instead of opening drives and folders in separate windows, you can browse through them in a single window. The left side of the Windows Explorer window contains a list of your drives and folders, and the right side displays the contents of a selected folder. To use Windows Explorer, click on Start button and then click Programs Windows Explorer.

***Fig. 5.6: Explorer Window***

Windows Explorer has the following features:

- You can copy a file or folder containing a number of files from one folder to another folder or one drive to another drive by simply placing the cursor on the source file or folder and dragging it to the destination folder or drive. You can also do this using **Copy** and **Paste**.
-

- You can delete a file or folder by selecting the file or folder and then clicking on the **Delete** on the Toolbar. Windows will send it to the **Recycle Bin**.
- You can move a file or folder from one folder or drive to another folder or drive using **Cut** and **Paste**.
- By mistake if you have deleted, or moved or copied a file or folder and want the file or folder in its original place, you can do it pointing the cursor on Undo and then clicking.
- You can open a file its program by double clicking a file.

### **5.7 MANAGING FILES, FOLDER AND WINDOWS**

To use Windows, you need to know two things: files and folders. The following first three icons represents different folders and the next three icons represent different types of files.

***Fig. 5.7***

Files always lies in folders. In Windows98, you can organize your documents and programs to suite your preferences. You can store these files in folders, and you can move, copy, rename, and even search for files and folders.

---

File names in Windows 98 can be up to 255 characters, including spaces. However, file name cannot contain any of the following characters: \ / : ? < > | .

### 5.7.1 Creating Folders

When you use a program and save your work, or when you install a program, you are creating files. You can store files in many location - on the hard disk, a network drive, a floppy disk, and so on. To better organize files, you can also store them in folders.

To create a folder follow the steps given below:

1. On the Desktop, double-click **My Computer**. My Computer Window opens.
2. Double-click disk drive or folder in which you want to create a folder. The drive or folder window opens.
3. On the File menu, point to New, and then click **Folder**. Type a folder name, and then on press **ENTER**. The new folder appears in the location you selected.

To find a file or folder follow the steps given below:

1. Click the **Start** button, point to **Find**, and then click **Files** or **Folders**. The Find dialog box appears.
2. Type the file or folder name you want to find. Click the Look in down arrow, or click **Browse** to specify where to search. Click **Find Now**. After a moment, the results of the search appear.

To open a file or folder follow the steps given below:

1. On the Desktop, double-click **My Computer**. The My Computer window opens. Otherwise, you click on **Start** and Choose **Programs Windows Explorer**.
2. Double click the drive that contains the file or folder you want to open.
3. Double click the file or folder you want to open.

To rename a file or folder follow the steps given below:

1. On the Desktop, double-click **My Computer**. The My Computer window opens. Otherwise, you can click on **Start** and choose **Programs→Windows Explorer**.
-

2. Double click the drive that contains the file or folder you want to rename. Select the file or folder you want to rename.
3. On the File menu, click **Rename**. Type a name, and then press ENTER.

To copy or move a file or folder from one location to another location follow the steps given below:

1. On the Desktop, double-click **My Computer**. The My Computer window opens. Or click on **Start** and **Choose** Programs Windows Explorer.
2. Double click the drive that contains the file or folder you want to move. Select the file or folder you want to copy or move.
3. On the Edit menu, click **Copy** to copy the file, or click Cut to move the file. Double-click the folder in which you want to place the file or folder. On the **Edit** menu, click **Paste**. The file appears in its new location.

To delete a file or folder follow the steps given below:

1. On the Desktop, double-click **My Computer**. The My Computer window opens. Or click on Start and Choose **Programs→Windows Explorer**.
2. Double click the drive that contains the file or folder you want to delete. Select the file or folder you want to delete.
3. On the File menu, click **Delete**. The 'Confirm File Delete' dialog box appears. Click **Yes**. The file is moved to the Recycle Bin.

To permanently delete a file or folder follow the steps given below:

1. On the Desktop, double-click **Recycle Bin**. The Recycle Bin window opens. Select the file or folder you want to permanently delete.
2. On the Toolbar click on **Delete**. The Confirm File Delete dialog box appears. Click **Yes**. The file is permanently deleted. (If you want all files and folders in Recycle Bin are to be deleted, then on the **File menu**, click **Empty Recycle Bin**. The Confirm File Delete dialog box appears. Click **Yes**. The file is deleted from to the Recycle Bin.)

### 5.7.2 Shortcuts

For an easy access to a file that you use frequently, you can create a

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shortcut to it. A shortcut does not change the location of a file - the shortcut is just a pointer that lets you open the file quickly. If you delete a shortcut, the original file is not deleted. There are a number of ways to create a shortcut to a file. The most direct approach is to:

1. On the Desktop, double-click **My Computer**. The My Computer window opens. Or Click on Start and Choose **Programs** → **Windows Explorer**.
2. Double click the drive that contains the file or folder you want to create a shortcut.
3. Select the file or folder you want to create shortcut. Right-click on the file or folder. On the menu that appears, click **Create Shortcut**. The shortcut appears on the selected drive or folder. (If you want to place the shortcut on the Desktop right-click on the file or folder. On the menu that appears, click **Send To** → **Desktop** (create shortcut). The shortcut appears on the Desktop.)

To remove a shortcut from your Desktop, drag the shortcut to the Recycle Bin icon or use the right mouse button pointing the shortcut to be deleted and click Delete. To rename a shortcut, close all other open windows, click the right mouse button pointing a file or folder icon to be renamed, click **Rename** on the menubar that appears. Type the new name to replace old name and then press ENTER.

### 5.7.3 Windows Most Common Tasks

Every Folder in Windows has a layout as shown in Figure 4.6. This layout is called a window. The Menu Bar, Title Bar, Taskbar, Scroll Box, and three squares- x) at top right are common to all windows, whether you have a Folder or File - Open or Close. To start an application or access a file/folder you have to Open, when you finish you should Close. You have already learned about Taskbar. We will discuss the other parts of window now.

#### 1. Minimize, Maximize/Restore, and Close

Every window has 3 squares at the top right of screen - x. The minus sign is Minimize. A minimized window is still open, and a window button appears on the Taskbar. The double-square is Maximize/Restore. You can maximize the window of your file to fit the entire screen. If you click again the application takes the usual size (you can see the Desktop behind) If you have several files opened, “maximizing” put them on top of each other so you can see only one file at the top, by “restoring” you will have all the files visible on the desktop, just choose one and

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start working: you can write and draw at the same time very easily. To close anything just press on x.

## 2. Title Bar

The Title bar resides at the top of the screen. It displays the name of the program in which you are working. It also displays the name of the file or folder or drive you are working with. You can also use Title bar for enlarging and reducing the window by double-clicking on the Title bar. Suppose you opened two or more windows (file, folder), to see in which one you are working, look at the Title bar and the title bar shows the active window. The advantage of Windows is that you can move the window and place it wherever you want; it is like moving a piece of paper on your actual desktop. Just click the mouse on the Title bar (the window should not be maximized; if it fits the screen you will not be able to move it) hold it and drag. To drag an item you need to click on the Title bar, hold it, then move the mouse. The whole process is called Drag and Drop. You can also move a window (if window is not Maximum) by right clicking on Title bar and selecting Move. By using the mouse you can even change the size of the window: (not maximized) take the mouse.

Pointer to the border of the window, a double-edged arrow will appear:

 lets you change the height while  is for the Width.  at the edge of the window lets you change the ratio between Height and Width.

## 3. The Scroll Bar

When you exceed the size of the Window, a vertical rectangle - Scroll bar - appears at your right. The same applies if you went over the Width limit, an horizontal Scroll box appears. To go through the text, just Drag the scroll bar until you reach the location, you can also click on the arrows at the edges of scroll bar to browse. A Window cannot extend beyond the size of your screen, therefore the scroll bar is the perfect solution to extend beyond the boundaries. The size of the scroll bar (rectangle) indicates the length of the document.

## 4. Menu Bar

Windows 98 provides a variety of menus you can use to choose

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and perform different tasks. The most frequently used menu in Window 98 is Start menu, which you have already learned. In addition to Start menu, there are many windows and programs that have their own sets of menus and commands.

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### INTEXT QUESTIONS

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5. What are the features of Windows Explorer?
  6. What are the steps for permanently deleting a file?
- 

### 5.8 SHARING FOLDERS AND PRINTERS

You can share your documents (files) and printers attached to your computer with other people on the network. To use file and print sharing, you must first choose which of the following two types of access you want to give to other users:

- a. **Share-level access control** is the default access setting. It lets you require a password for each shared resource.
- b. **User-level access control** lets you specify who has access to each shared resources, but it does not require a password.

By default you will be having a Share-level access control. To change it to User-level access control, follow the steps given below:

- i. Click **Start**, select **Settings** → **Control Panel**, and then double-click **Network**. Click the **Access Control** tab. The **Network** dialog box appears. Click on **User-level access control**.
- ii. In **Obtain list of users and groups from**, type the name of the domain or server you want to use, and then click **OK**. You may be prompted to supply additional information about the domain or server you specified.
- iii. Restart your computer.

To set up file-sharing and print sharing services, follow the steps given below:

- i. Click **Start**, select, **Settings** → **Control Panel**, and then double-click **Network**. Click the **Access Control** tab. The **Network** dialog box appears. Click on **File and Print Sharing**.
-

- ii. Select the check box(es) the sharing options you want, click **OK**, and then click **OK** again. A message prompts you to insert your Windows 98 CD or Setup disk so that File and Print Sharing can be installed. You must restart your computer before the new settings will take effect. After you have set up file-sharing services, you can share a folder or printer.

To share a folder with share-level access control, follow the steps given below:

- i. In My Computer, right-click the folder you want to share, and then click Sharing in the submenu. **Properties** dialog box will appear. Click on the Sharing tab, and then click **Shared As**.
- ii. In **Share Name**, type a name for the folder. In Comment, you can type a brief comment or description of the folder.
- iii. In Access Type, click Read Only, Full, or Depends on Password. Regardless of which type of access you select, you have the option of adding a password.
- iv. Type a password if you want to use one, and then click OK. Retype the password and then click OK. The folder or printer icon changes to a folder or printer with a hand, indicating that the item is now shared.

To share a folder with User-level access control, follow the step given below:

- i. Follow the steps i. and ii. Given above.
- ii. Click **Add**. In the **Add Users** dialog box, click the name(s) of the person(s) to whom you want to grant permission(s). You can scroll the list of users, or you can type the name and the list will scroll automatically. If you want to grant the same permissions to everyone connected to your network, leave **The World** selected.
- iii. Click the type of access permissions you want to give to the selected user(s). **Read Only** means the user has the ability to read, but not change, files. **Full Access** means the user has the ability to read, delete, and change file. **Custom** means the user has a combination of privileges that you specify.
- iv. When you are finished adding users permission, click **OK**.

To share a printer with share-level access control, follow the steps given below:

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- i. In **My Computer**, double-click the **Printers** folder. Right-click the printer you want to share, and then click **Sharing**. On Sharing tab, click **Shared As**.
- ii. In-Share Name, type a name for the printer. In Comment, you can type a brief comment or a description of the printer.
- iii. In **Password**, you can type a password, retype the password to verify it. Click **OK**.
- iv. Click **OK**. If you typed a password, retype the password to verify it. Click **OK**.

To share a printer with User-level access control, follow the steps given below:

- i. Follow the steps i. And ii. Given above.
- ii. Click **Add**. In the **Add Users** dialog box, click the name (s) of the person(s) to whom you want to grant permissions. You can scroll the list of users, or you can simply type the name and the list will scroll automatically. If you want to grant the same permissions to everyone connected to your network, leave The World selected.
- iii. Click **Full Access**. The name(s) of the persons(s) you have chosen will be moved to the box on the right side of the screen. When you are finished adding users and permissions, click **OK**.

If you have correct permissions, you can use files and printers that are shared on the other computers. To use a shared folder or printer, follow the steps given below:

- i. Double-click **Network Neighborhood**
- ii. Double-click the icon for the computer that controls the folder or printer you want to use. If the computer you are looking for is not in your workgroup or domain, first click **Entire Network**, and then double-click the appropriate workgroup or domain.
- iii. To use a shared folder or printer, double-click its icon.

## 5.9 MS-DOS-BASED PROGRAM

You can run MS-DOS-based programs by using the MS-DOS Prompt command in the Programs menu. Click on Start and then choose **Programs**→**MS-DOS** Prompt. This opens an MS-DOS command window in which you can run your MS-DOS-based programs.

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Using **MS-DOS Commands**: We have given some examples below to know how to use MS-DOS based commands:

1. Be sure that the MS-DOS window is active.
2. At the MS-DOS prompt (c:/), type DIR and press Enter. The files and folders stored in your open folder on the hard disk appear in a list. The DIR command means “directory,” and lists all files and folders in your current directory (folder).
3. At the next MS-DOS prompt, type “CD \Windows” and then press ENTER. The folder changes to the Windows folder in the same drive (if it exists). The CD command means “change directory”. The backslash (\) and Windows indicates the directory path for your Windows folder.

The following Table gives a list of MS-DOS commands.

**Table 5.1**  
**List of DOS Commands**

|                        |                                                                    |
|------------------------|--------------------------------------------------------------------|
| Command /?             | list switches for the DOS command “command”                        |
| Path=c:\windows;c:\dos | specify in which directories DOS searches for commands or programs |
| Prompt \$p\$g          | make the DOS prompt display the current directory                  |
| Dir                    | list files in the current directory in one column                  |
| Dir /w                 | list files in five columns                                         |
| Dir /p                 | list files one page at a time                                      |
| Dir *.exe              | list all files with an “EXE” extension                             |
| Dir z?????.exe         | list “EXE” files that have five letters and start with z           |
| Dir winsock.dll/s      | searches for the file “winsock.dll” in the current directory       |
| Type file.ext          | view the contents of the text file “file.ext”                      |
| Edit file.ext          | use the DOS 5 editor to edit the file “file.ext”                   |

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|                        |                                                                                  |
|------------------------|----------------------------------------------------------------------------------|
| A:                     | change to the A: drive                                                           |
| Md c:\myfiles          | make a new subdirectory named "myfiles"                                          |
| Cd c:\myfiles          | change to subdirectory "myfiles"                                                 |
| Rd c:\myfiles          | remove the existing subdirectory named "myfiles"                                 |
| Del file.ext           | delete a file named "file.ext"                                                   |
| Ren f1 f2              | rename file "f1" to "f2"                                                         |
| Copy f1 f2             | copy file "f1" to "f2"                                                           |
| Verify on              | turn on verification of copy commands                                            |
| Verify off             | turn off verification of copy commands                                           |
| Xcopy d1 d2 /s         | copy all files and subdirectories in directory "d1"                              |
| Xcopy d1 d2 /p         | ask for confirmation of each file before copying                                 |
| Diskcopy a: b:         | duplicate a disk using two floppy drives                                         |
| Diskcopy a: a:         | duplicate a disk using the same floppy drive                                     |
| Format a:              | format floppy disk in drive a:                                                   |
| Format a: /s:          | format a bootable floppy disk (include system)                                   |
| Backup c:\d1\*.txt a:  | back up all files with the extension ".TXT" in "c:\d1\" to the "a:" floppy drive |
| Backup c:\ a: /s       | back up the entire C: drive to floppy drive a:                                   |
| Restore a: c:\d1\*.txt | restore certain files to C: from A:                                              |
| Restore a: c:\ /s      | restore back-up files and subdirectories                                         |
| Ver                    | check the version of DOS                                                         |
| Time                   | check or correct the system time                                                 |
| Date                   | check or correct the system date                                                 |
| Cls                    | clear the screen                                                                 |
| Scandisk               | scan and check the disk C: for errors                                            |

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|                 |                                                    |
|-----------------|----------------------------------------------------|
| Chkdsk          | check disk and memory usage of the current disk    |
| Chkdsk /f       | fix errors reported by chkdsk                      |
| Chkdsk filename | check a particular file                            |
| Chkdsk a:       | check a particular disk (a floppy in the a: drive) |
| Mem             | check memory usage                                 |

**Note:** Replace the drive letter as needed for your own computer. Also, you can type these commands in either upper or lower case letter, because DOS does not distinguish case.

### 5.10 WHAT YOU HAVE LEARNT

In this lesson you learnt about the need and functions of operating system. In particular, you learnt the basic features of Windows98. Windows is a GUI which use pictures, symbols and words on the computer monitor and can be controlled by a mouse. It handles internal function of the computer and manages computer memory input and output operations. Now you will be in a position to operate the computer.

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### 5.11 TERMINAL QUESTIONS

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1. Write the utilities of the following Tools tab options of the Properties Window in My Computer:
    - (a) Error-checking status,
    - (b) Backup status, and Defragmentation status.
  2. What are the utilities of the following in Windows 98?
    - (a) My Document
    - (b) Recycle Bin
    - (c) Internet Explorer, and
    - (d) Network Neighborhood
  3. Explain briefly the functions of Start button and Taskbar.
  4. Explain the steps in creating a folder.
  5. Explain the steps in opening a file or folder.
-

6. Explain the following
  - (a) Minimize, Maximize/Restore, and Close
  - (b) Title Bar
  - (c) The Scroll Box, and
  - (d) Menu Bar.
7. Explain the steps in using files and printers controlled by others?
8. What is a shortcut. How do you create shortcut.

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### **5.12 KEY TO INTEXT QUESTIONS**

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1. Creates the link between the user and computer. Handles internal function such as managing the computer memory. It is a graphical user interface. The world wide web is easily accessible from anywhere through Windows. Supports DVD and digital audio.
  2.
    - (a) Moving the mouse to place the pointer on an item is called pointing.
    - (b) Pointing to an item on the screen and the quickly pressing and releasing the left mouse button is called clicking.
    - (c) Pointing to an item and then quickly pressing and releasing the mouse button twice is called double clicking.
    - (d) Pointing to an item and then holding down the mouse button is called dragging.
  3. The Desktop is placing where useful things are accessible by the user, depending on which options you choose during installations.
  4. My Computer contains  
hard drives 'C', floppy drive CD ROM drive, printers, control panel, Dial up Networking and Scheduled task.
  5. Instead of opening drives and folders in separate windows, the user can browse the content in a single Window in a hierarchical structure.
  6. On the desktop double click Recycle Bin. In Recycle Bin select the file or folder you want to permanently delete. On the toolbar click delete. The confirm file delete dialog box appears. Then click yes, the file is permanently deleted from the computer.
-

# 6

## USING WINDOWS XP

### 6.1 INTRODUCTION

The windows operating system started with the introduction of Windows OS and Windows for work group for networking. Since then it has come a long way and Windows 95, 98 and 2000 family of operating systems were introduced. It provided the computer user with the most integrated and easy to use operating system with all the facilities in built. The Windows XP is the new born baby in the Windows family. It is build on the windows 2000 concept and framework. It has more features to provide the user with greater stability, security and enhanced performance.

### 6.2 OBJECTIVES

After gong through this lesson you would be able to

- explain the basics of operating system.
- describe XP desktop elements.
- create file or folder in XP.
- change system settings
- work on windows explorer

### 6.3 ELEMENTS OF WINDOWS XP

One of the most significant areas of improvement in Windows XP over Windows 2000 is management and administration of desktop. Features such as 'system restore' and remote assistance definitely reduce the windows administrative cost, by eliminating the need for desktop support visits and manual restoration of the system. It also

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provides a series of new group policy levels to provide higher stability and manageability as compared to Windows 2000.

### **6.3.1 Logging On**

When the computer system loaded with Windows XP is started, it will present a log-in screen to log on to windows or to network, if the system is part of a computer network.

To be able to log on, do the following:

1. Enter the password (if it is password protected)
2. click on the → key or hit the Enter key

*Fig. 6.1*

### **6.3.2 XP Desktop Elements**

#### **Task Bar**

When you start the computer system, the start button and task bar appears on the bottom of the screen and by default remains visible when Windows is running.

Whenever a program is run or a window is opened, an icon representing the program appears on the taskbar. To switch between windows or program, click on the icon representing the window on the task bar. When the program or window is closed, the icon disappears from the task bar.

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**Fig. 6.2**

### Start Menu

When clicked on the start button, the followings menu appears on the screen giving all the available options to start using the Windows.

**Fig. 6.3**

Overview of all the options:

| Task                | Description                                                         |
|---------------------|---------------------------------------------------------------------|
| All Programs        | Displays a list of installed program, which a user can start or use |
| My Documents        | Displays a list of document used by the current user                |
| My Recent Documents | Displays a list of recently used documents by the current user      |

|                    |                                                                                                                                                |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| My Picture         | Displays a list of pictures/photos used by the current user                                                                                    |
| My Music           | Displays a list of music/songs used by the current user                                                                                        |
| Control Panel      | Displays a list of utility to configure the computer system and install software and hardware                                                  |
| Printers and Faxes | Displays a list of currently installed printers and faxes in the current computer system                                                       |
| Help and Support   | Starts the XP Help and Support program to find how to do a task in windows.                                                                    |
| Search             | Helps the user to find. Displays a list of document used by the current user files, folder, and other networked computer and shared resources. |
| Run                | Starts an application program or execute a DOS command                                                                                         |
| Log Off            | Logs off the current user.                                                                                                                     |
| Turn Off Computer  | Close currently opened program, log of the current user and switch off the computer system.                                                    |

### ***Start a Program***

To start a program do the followings:

1. Click on the **Start** Button
2. Click on the **All Programs**
3. Point to the desired folder say “**Accessories**” and select the desired program to run such as ‘**Paint**’.

### ***Quitting a Program***

To quit a program, select the close button (✕) in the upper-right corner of the window OR

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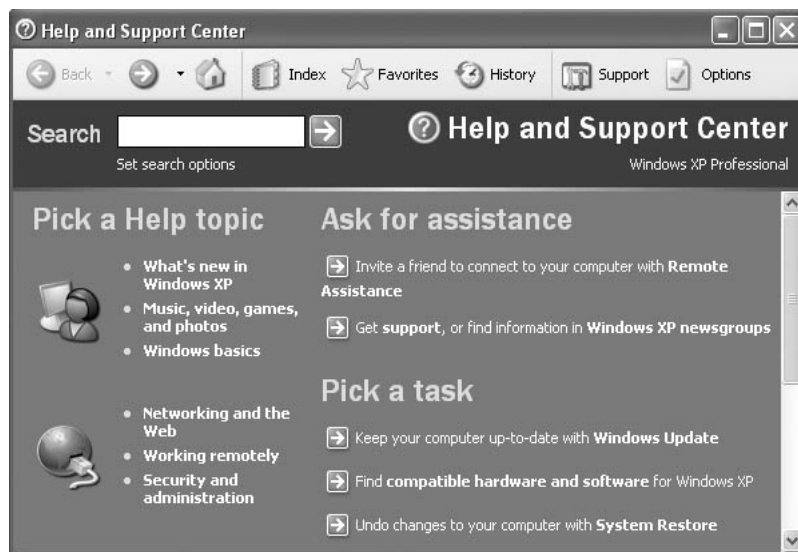
Click on **File** menu and select '**Close**' option.

### **Getting Help**

Online help and support provided is of great help in using and learning windows. One can get help on a specific topic or current task being executed. To start help you have to

- click on the Start button
- click on 'Help and Tutorial' option

A list of help and support topics and online tutorial is displayed on the screen. You can use the tabs in the screen to search for the desired information in several ways.



**Fig. 6.4**

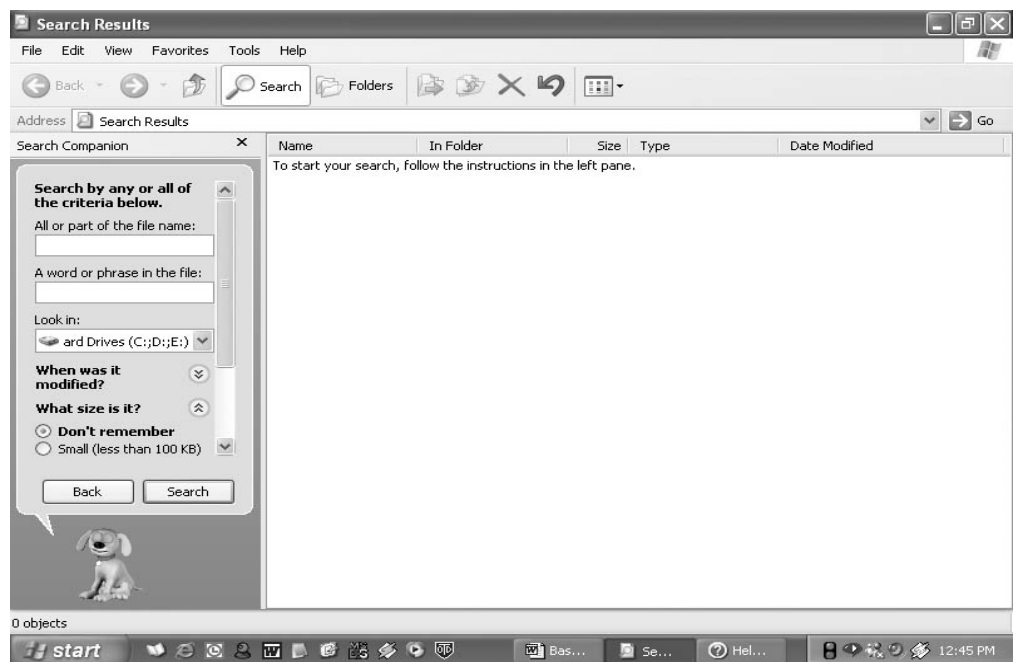
- Click on a topic or task to know more about how to get the job done or type in a search word to locate the help on a specific topic.
- Click on the 'Index' tab to locate specific topic listed alphabetically and the follow the instructions displayed on the screen.
- Click on 'Favourites' tab to add Help Topics, search results to your Favourites list to make them easy to locate in the future
- Click on 'History' to pick from a list of Help and Support pages that you have read in the past.

- Click on 'Support' to get various kind of online support such as Microsoft online support, News Group on Windows.
- Click on 'Options' to configure the help and support center as per your requirement.

To close Help and Support windows, select the close button (×) in the upper-right corner of the window.

### 6.3.3 Locating Files and Folders

If you do not know where a document or folder is located, you can use the Search companion to locate it in the local storage such as Hard Disk, Floppy, CD or in the network drive (if the system is part of a network). The Indexing Service provided by the Search maintains an index of all the files on your computer, making searches faster.



**Fig. 6.5**

To search for a file or folder

1. Click on **Start**, and click on **Search**.
  2. Select **All files and folders** from the left hand side of the windows.
-

3. Type the name of the file or folder in part or full, or type a word or phrase that exists in the file to be searched.
4. If you do not have any of the above information select one or more of the remaining options:
  - In **Look in**, click the drive, folder, or network you want to search.
  - Click on **When was it modified?** to look for files that were created or modified on or between specific dates.
  - To look for files of a specific size, click on **What size is it?** Select a size.
  - Click on **More advanced options** to specify additional search criteria.
5. Once you finish specifying the search criteria, click on **Search** to locate the file.

Similarly you can search for specific information on Internet, or people in your address book, search for a printer or a computer on your network.

### 6.3.4 Changing System Settings

By using Control Panel's tools you can customize the way Windows look and work! Also you can install new hardware, add and remove (install/uninstall) software programs, change the look and feel of your desktop and much more. It also includes a number of administrative tools in Administrative Tools option for better administration of Windows in terms of User Management, Event viewer, Component Service etc.

To start Control Panel and use the available tool, do the following;

- Click on 'Start'
- Click on 'Control Panel'
- Select the desired tool to use

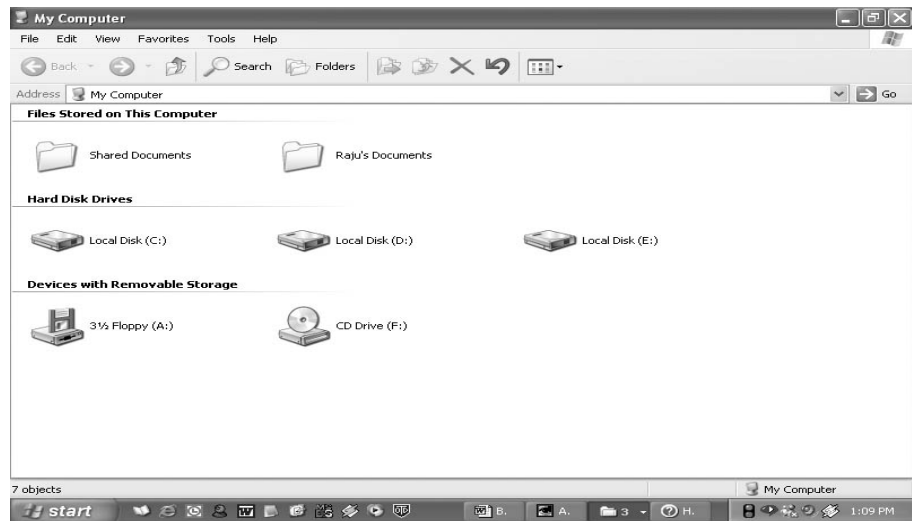
For example, to create a new setting or modify the settings for an existing user click on 'User Account' icon in the control panel.

### 6.3.5 Using My Computer

My Computer displays the contents of floppy, hard disk, CD-ROM, and network drives. You can also search for and open files and folders, and use options in Control Panel to modify computer's settings.

---

- To use My Computer, click on **Start**, and then click on **My Computer**.



**Fig. 6.6**

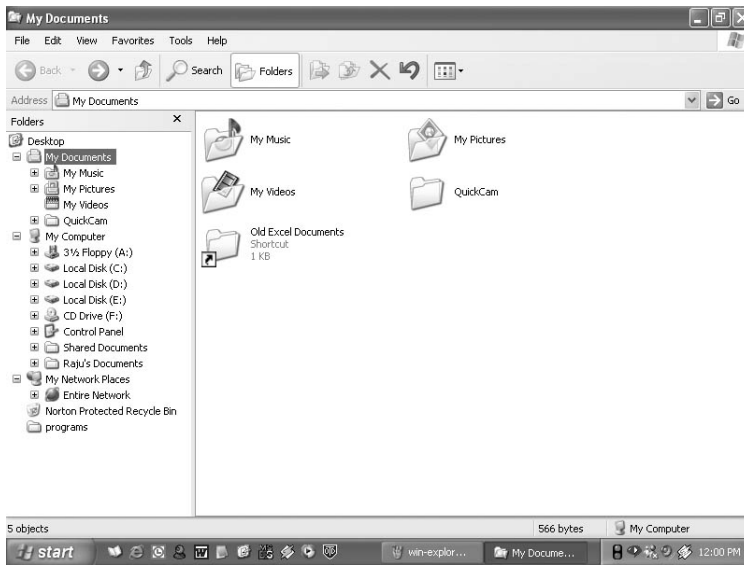
### **Display the storage Contents**

- To see the contents of your hard disk, under **Hard Disk Drives**, double-click the drive you want to see such as C:, D: etc.
- To find a file or folder on a floppy disk, CD-ROM, or other media, under **Devices with Removable Storage**, double-click on the respective storage media you want to see.
- To find a file in a folder, under **Files Stored on This Computer**, double-click a folder.

## **6.4 FILE MANAGEMENT IN WINDOWS**

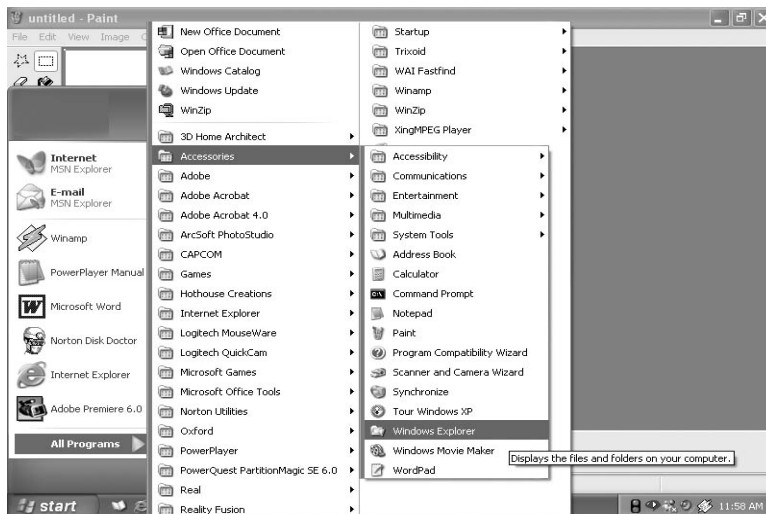
File management in windows can be done through Windows Explorer or My Computer. Windows Explorer displays the hierarchical list of files, folders, and storage drives (both fixed and removable) on your computer. It also lists any network drives that have been mapped to as a drive letters on your computer. Windows Explorer can be used to copy, move, rename, and search for files and folders. For example, to copy a file, you can open a folder that contains the file to be copied or moved, and then just drag and drop the file to target folder or drive.

---

**Fig. 6.7**

When files or folders are deleted from hard disk, Windows places them in the Recycle Bin, where they can be retrieved, until the Recycle Bin is made empty. Whereas files or folders deleted from a removable storage media such as floppy disk or a network drive are permanently deleted and are not sent to the Recycle Bin.

#### 6.4.1 Using Windows Explorer

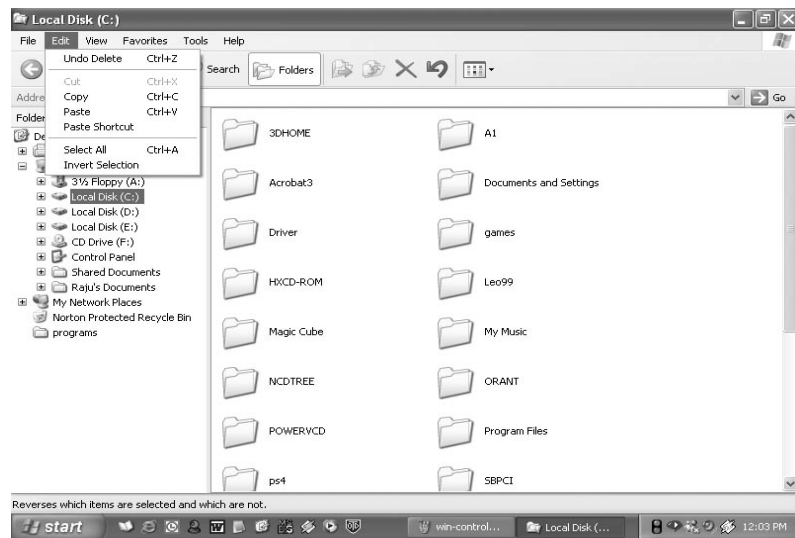
**Fig. 6.8**

To open Windows Explorer,

- Click on **Start**,
- Point to **All Programs**,
- Point to **Accessories**, and then click on **Windows Explorer**

*Copying or Moving a file or Folder using My Document*

- Click on **Start**, and then click on **My Documents**.
- Click the file or folder to be copied. More than one file or folder can be copied at a time.

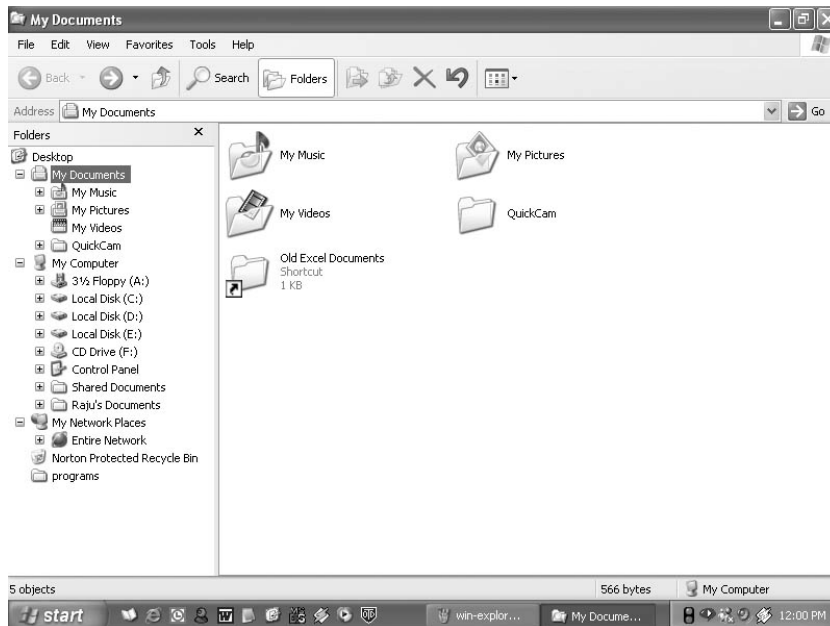


**Fig. 6.9**

- To select more than one file or folder, click the first file or folder, press and hold down SHIFT key, and then click on the last file or folder.
  - To select non-consecutive files or folders, press and hold down CTRL key, and then click each of the files or folders to be copied.
  - Under **Edit**, select **Copy**.
  - Select the target drive or folder to which you want to copy the files.
  - Under **Edit**, select **Paste** to copy the desired file or folder to the target drive.
-

### 6.4.2 Copying and Moving files using Explorer

- Click **Start**, point to **All Programs**, point to **Accessories**, and then click **Windows Explorer**.
- Make sure that the destination for the file or folder you want to move is visible.
- Drag the file or folder to the destination.



**Fig. 6.10**

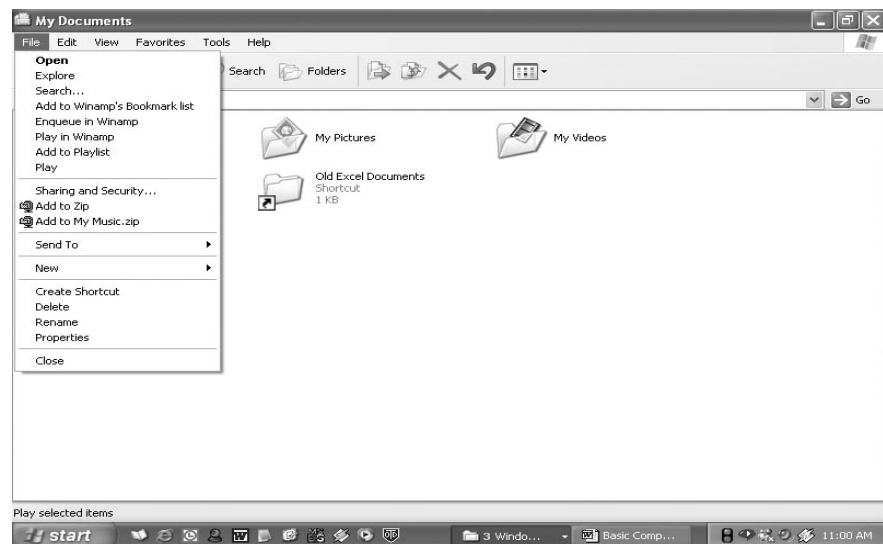
- If you drag an item while pressing the right mouse button, you can move, copy, or create a shortcut to the file in its new location.
- To copy the item instead of moving it, press and hold down CTRL while dragging.
- If you drag an item to another disk, it is copied, not moved. To move the item, press and hold down SHIFT while dragging.
- Dragging a program to a new location creates a shortcut to that program. To move a program, right-click and then drag the program to the new location. You must be logged on as an administrator to move a program.

### 6.4.3 Rename a File or Folder

1. Click on **Start**, and then click on **My Documents**
2. Click on the file or folder you want to rename.
3. Under **File**, click **Rename**.
4. Type the new name, and then press ENTER key.
- File or folder can also be renamed by right-clicking it and then clicking **Rename**.

### 6.4.4 Delete a File or Folder

1. Click on **Start**, and then click on **My Documents**
2. Click on the file or folder you want to delete.
3. Under **File**, click **Delete**.
4. Files or folders can also be deleted by right-clicking the file or folder and then clicking **Delete**.
5. Deleted files or folders are stored in the **Recycle Bin**, till they are permanently removed from the Recycle Bin.
6. To retrieve a deleted file, double-click the **Recycle Bin** icon on the desktop. Right-click on the file to retrieved, and then click **Restore**.
7. To permanently delete a file, press and hold down SHIFT and drag it to the Recycle Bin.

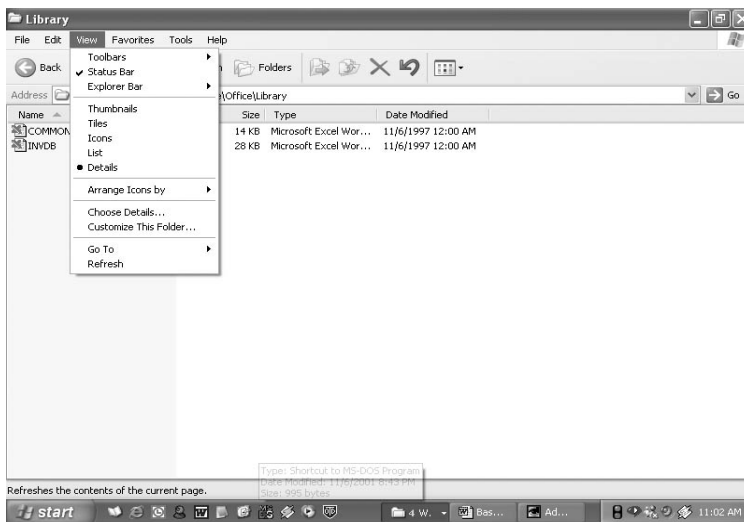


**Fig. 6.11**

---

### 6.4.5 Create a new Folder

1. Click on **Start**, and then click on **My Documents**
2. Under **File**, click **New** and select **Folder**.
3. A new folder is displayed with the default name, **New Folder**.
4. Type a name for the new folder, and then press ENTER.
5. A new folder can also be created by right-clicking a blank area in a folder window or on the desktop, pointing to **New**, and then clicking **Folder**.



**Fig. 6.12**

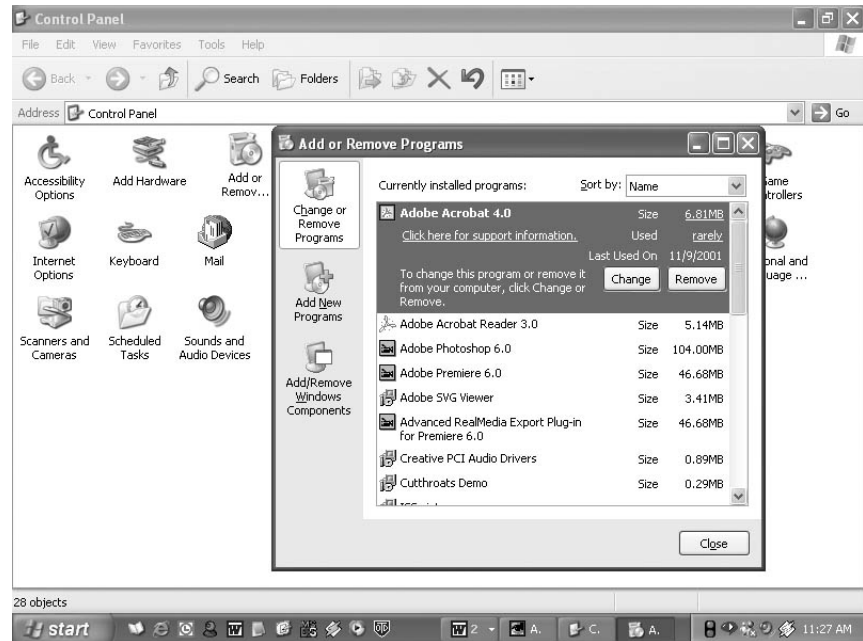
### 6.4.6 View File details

1. Click on **Start**, and then click on **My Documents**
2. Double-click the folder that contains the files to be viewed.
3. On the **View** menu, click **Details**.
4. It will display all the details about the files such as Name, Type, size etc.

## 6.5 INSTALL SOFTWARE/HARDWARE

Windows provides a quick and easy way to install new software. Add or Remove Programs utility in Control Panel help to manage programs and components on the computer system computer. Using it

one can install software packages such as Microsoft Word or Access etc. from a CD-ROM, floppy disk, or a network drive, or add or remove Windows updates and new features from the Internet. This can also be used to add or remove Windows components which are not included in the original installation.



**Fig. 6.13**

### 6.5.1 Install Software

- Click **Start**, click **Control Panel**,
- Double-click **Add or Remove Programs**.
- Click on **Add New Programs**, and then select the source where the software to be installed is located such as **CD or Floppy** drive
- Follow the instructions on your screen to install the software.

#### *Change or remove software*

1. Click **Start**, click **Control Panel**,
  2. Double-click **Add or Remove Programs**.
  3. Click on **Change or Remove Programs**, and then select the program you want to change or remove.
-

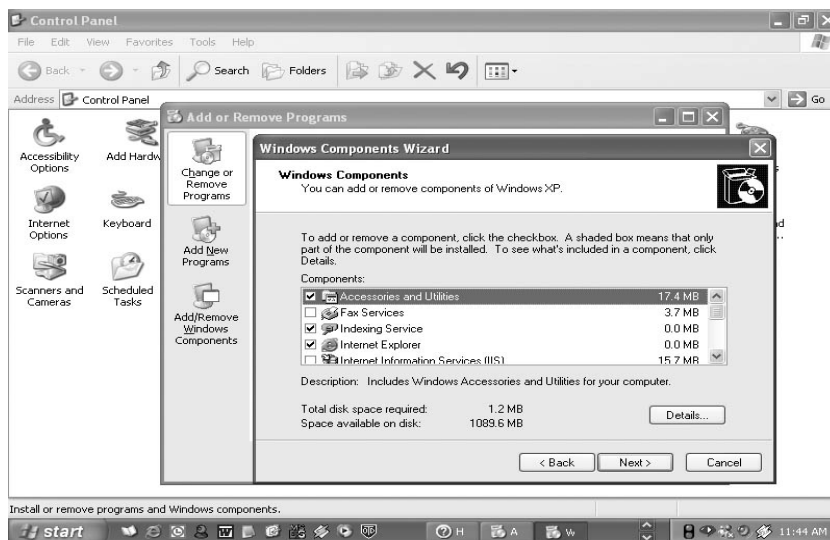
- To change a program, click on **Change** button.
- To remove a program, click on **Remove** button.

#### *Add new features from Windows Update*

1. Click **Start**, click **Control Panel**,
2. Double-click **Add or Remove Programs**.
3. Click **Windows Update**.
4. Follow the instructions to locate and install new Windows features or updates

#### *Add or remove a Windows component*

To be able to use this feature of Windows, the user must log in as an administrator or a member of the Administrators group.

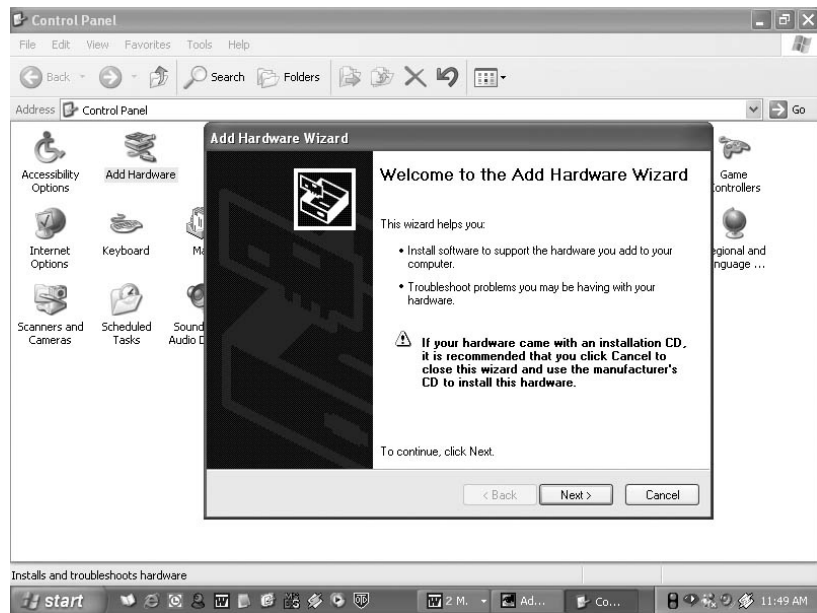


**Fig. 6.14**

1. Click **Start**, click **Control Panel**,
2. Double-click **Add or Remove Programs**.
3. Follow the instructions in the Windows Components Wizard.

### **6.5.2 Install Hardware**

Windows can help you set up new hardware component such as sound card, video card or network card etc. to your computer.



1. Click **Start**, click **Control Panel**,
2. Double-click **Add Hardware**.
3. Follow the instructions on the screen.

---

### INTEXT QUESTIONS

---

1. Write True or False for the following statements.
    - (a) Deleted Files or folders are stored in the recycle bin.
    - (b) Under Edit menu you can rename the file.
    - (c) Windows provides a quick and easy way to install new software.
  2. Fill in the blanks.
    - (a) Under file, click ..... and select folder.
    - (b) If you drag an item while pressing the ..... you can create a shortcut to the file.
    - (c) When you start the computer system, the task bar appears ..... on the screen.
    - (d) When files or folders are deleted from ..... windows places them in the recycle bin.
    - (e) To select non-consecutive file or folder press and hold down ..... key.
-

## **6.6 WHAT YOU HAVE LEARNT**

In this lesson you learnt about important features of Windows XP. Now you are in a position to locate a file or folder and use windows explorer to manage files. Moreover, you can install software and hardware in the system. You can change system settings also.

---

## **6.7 TERMINAL QUESTIONS**

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1. Explain the steps to search for a file or folder.
2. Describe the following
  - (a) Recycle bin
  - (b) Task bar
  - (c) Quitting a program
  - (d) File Management in Windows
3. What are the steps to delete a file or folder from the computer.
4. Explain the steps to install software in the computer.
5. Describe the steps to rename a file or folder.

---

## **6.8 KEY TO INTEXT QUESTIONS**

---

1.
    - (a) True
    - (b) False
    - (c) True
  2.
    - (a) Right mouse button
    - (b) Right
    - (c) Bottom
    - (d) Hard disk
    - (e) CTRL key
-

# 7

## BASICS OF MS WORD

### 7.1 INTRODUCTION

MS Word 2000 is an application program that allows you to create letters, reports, newsletters, tables, form letters, brochures, and Web pages. Using Word you can add pictures, tables, and charts to your documents. You can also check spelling and grammar.

### 7.2 OBJECTIVES

After going through this lesson you would be able to

- explain basic features of MS Word 2000
- define word's document defaults
- create a new Word document
- move around in a document more quickly and efficiently
- manage word files and their printing

### 7.3 MAIN FEATURES OF MS WORD

- You can create documents fast, using built-in and custom templates.
  - You can easily manage large documents using various features, like the ability to create table of contents, index, and cross-references.
  - With the help of mail merge, you can quickly create merge documents like mass mailings or mailing labels.
  - You can easily create and format tables using the features like AutoFormat.
  - AutoCorrect and AutoFormat features rectify typographical errors
-

automatically and allow you to use predefined shortcuts and typing patterns to quickly format your documents.

- The print zoom facility scales a document on different paper sizes, and allows you to print out multiple pages on a single sheet of paper.
- The nested tables feature supports putting one table inside another table.
- The picture bullets make it easy to insert tiny pictures before each item in a list.
- Collect and paste lets you copy more than one item to the clipboard at a time. You can collect information from many sources and paste it into one place.
- By putting your word documents on the Web server, you can share your information with other people.
- The multilingual features of Word allows to type different languages in the same document.
- You can save your documents in HTML format. You can also create Web Pages using Web Page Wizard.

## 7.4 STARTING WORD PROGRAM

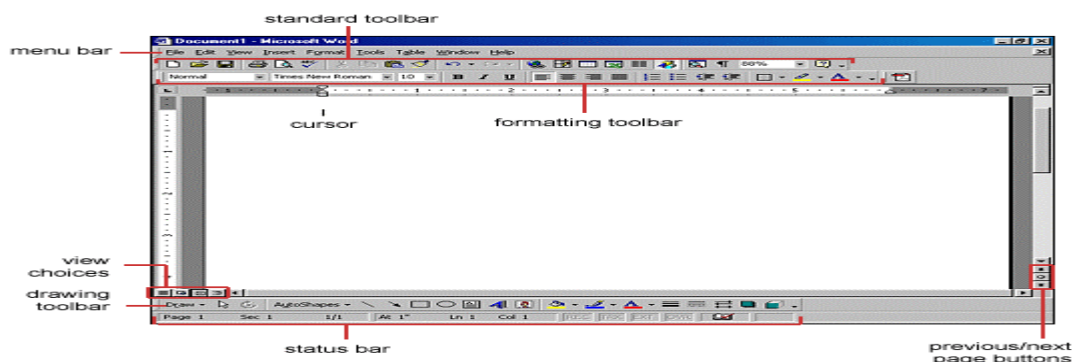
You can start your Word program different ways. One way is through Start button:

1. Click on the **Start** button.
2. In the menu that appears select **Programs → Microsoft Word**. In few seconds you will see Word screen on the monitor.

You can also start your MS Word program by simply clicking on **Microsoft Word** icon, which lies on the Microsoft Office Shortcut Bar (MOSB).

## 7.5 WORD SCREEN LAYOUT

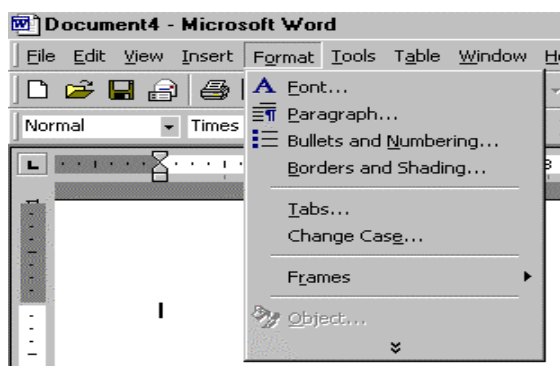
The Word screen (Window) contains a number of objects. We will discuss the Word's default screen layout (shown in Figure 7.1) here.



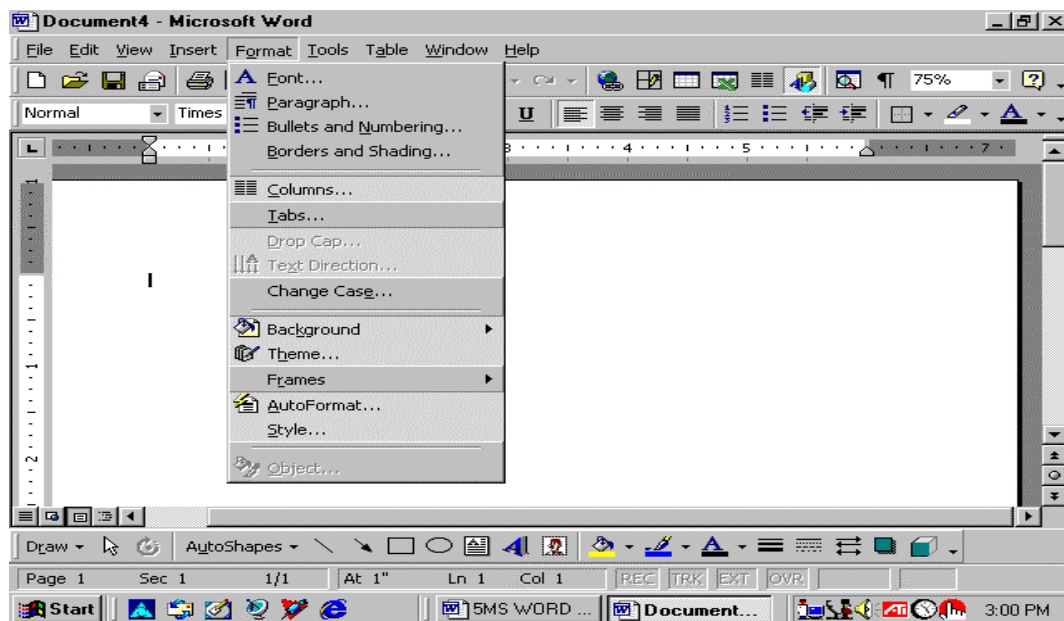
**Fig. 7.1: Screen Layout**

## 7.6 MENUS

If you are familiar with previous versions of Word you will notice a significant change in the menu structure. The menus in Word 2000 display only the commands you have recently used (collapsed form). To view all options (expanded form) in each menu, you must click the double arrows at the bottom of the menu. The images in Figure 7.2 show the Format menu in collapsed form (Figure 7.2a) and in expanded form (Figure 7.2b).



**Fig. 7.2a: Collapsed Format menu**

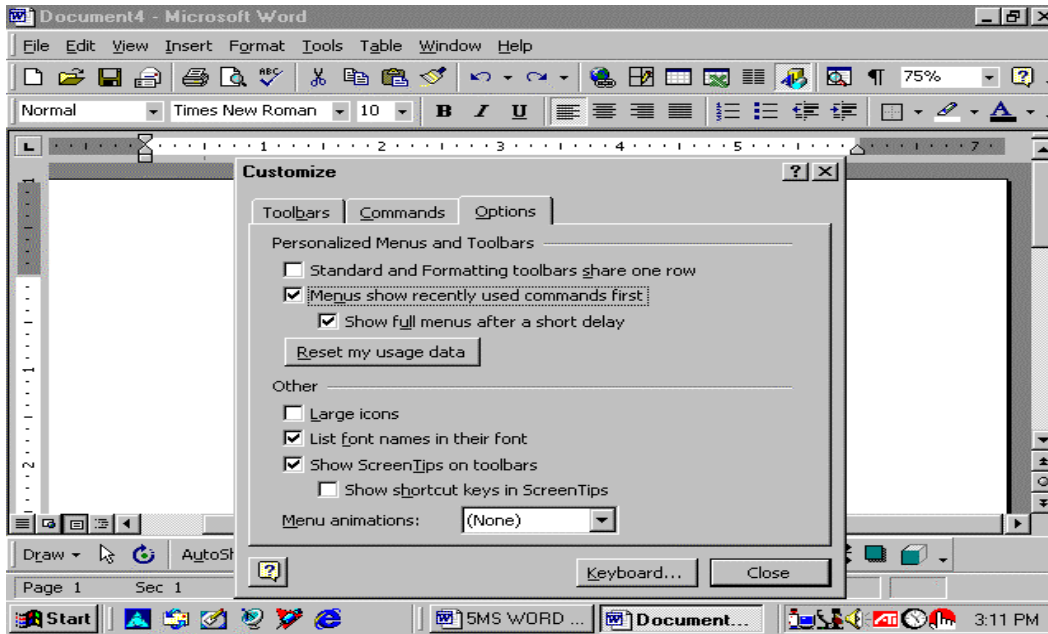


**Fig. 7.2b: Expanded Format menu**

You can also display menus similar to previous versions of Word (like MS Word 97) with all the choices listed initially:

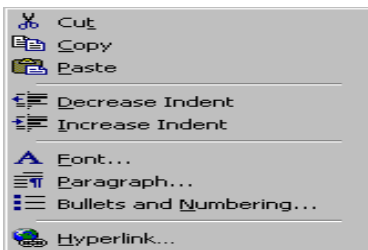
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1. Select **View→Toolbars→Customize** commands on the menu bar from the menu bar. The Customize dialog (see Figure 7.3) box will appear.
2. Click on the **Options** tab.
3. Uncheck the **Menus show recently used commands first** check box.
4. Click on **Close** to close the **Customize** dialog box.



**Fig. 7.3**

### 7.6.1 Shortcut Menus



**Fig. 7.4**

These features allow you to access various Word commands faster than using the options on the menu bar. View shortcut menus by right-clicking the mouse. The options on this menu will vary depending on the element that was right-clicked. For example, the shortcut menu below is produced by right-clicking on a bulleted list.

Actions such as “Decrease Indent” and “Increase Indent” are only applicable to lists and therefore only appear on the list shortcut menu. The shortcut menus are helpful because they display only those options that can be applied to the item that was right-clicked and, therefore, prevent searching through the many menu options.

## 7.6.2 Toolbars



**Fig. 7.5**

Many toolbars displaying shortcut buttons are also available to make editing and formatting quicker and easier. Select **View→Toolbars** command on the menu bar from the menu bar to select the toolbars. The toolbars that are already displayed on the screen are checked. Add a toolbar by simply clicking on the name.

## 7.6.3 Rulers

The rulers display horizontal and vertical scales that reflect the width and height of your typing area. The horizontal scale is invaluable when you want to quickly set tabs, margins, and indents. If you do not see the rulers select **View→Ruler**. If you are in normal view, you will see only horizontal ruler. To see both the rulers you should be in **Page Layout** view. If you don't want to see the ruler select **View→Ruler** to turn off the ruler.

## 7.7 TYPING SCREEN OBJECTS

The open area below the rulers and toolbars is writing or typing area. There are certain objects that are a permanent part of the typing area. These are: (a) Insertion Point, (b) Mouse Pointer, and (c) End-of-Document Marker.

**7.7.1 Insertion Point:** The black vertical blinking line is the insertion point, that is initially at the top left side of the typing area. It indicates the place where your typing is inserted into the document. As you type, the blinking line continuously moves along. When you use the up, down, left, or right arrows of the keyboard, the insertion point moves accordingly. When you move and place the cursor any where in the text and click, you will see the insertion point indicating that it is ready to accept your typing.

---

**7.7.2 Mouse Pointer:** When you move the mouse around in the typing area, the mouse pointer is in the shape of a thin I-beam. As you move the mouse near the menu bar and toolbars, the mouse pointer becomes a pointing arrow. If you move the mouse pointer to some existing piece of text and click the mouse, you will see the insertion point in that spot of the text.

**7.7.3 End-of-Document Marker:** The horizontal line (like a short underline) at the end of the document (seen only when Word is in Normal view) is called end-of-document marker. This marker lets you know where the end of document occurs. If you don't see the end-of-document marker on the screen, choose **View→Normal** from the menu to see the marker.

#### **7.7.4 Vertical and Horizontal Scrollbars**

The typing area is bordered on the right side by the vertical scroll bar with a scroll button and arrows. The single down arrow scrolls through the document line by line. The double down arrow allows you to move to the top of the next page. The double up arrow allows you to move to the top of the previous page. The double down arrow allows you to move to the top of the next page. You can also drag the vertical scroll button up and down the scroll bar to move up and down through the document.

The first bar along the bottom of the typing area is the horizontal scroll bar. To see the text that is off the right side of the screen, use the left arrow button. To see the text that is off the left side of the screen, use the right arrow button. You can also drag the horizontal scroll button to move left or right of the document.

---

### **INTEXT QUESTIONS**

---

1. Write True or False for the following statements
    - (a) Shortcut menu feature allows access to various Word commands faster than using options on the menu bar.
    - (b) In the collapsed menu, all the commands will be displayed.
    - (c) For both Show and Hide Rules, the command is View →Ruler.
    - (d) The black vertical blinking line in the typing area in a word document is the insertion point.
    - (e) The use of Scrollbars is to set margins in a document.
-

2. To view shortcut menu, we need to:
    - (a) Click the mouse
    - (b) Right click the mouse
    - (c) First click and then right click the mouse
  3. Horizontal scale is useful to quickly set:
    - (a) Margins
    - (b) Tabs
    - (c) Indents
    - (d) All of the above
  4. What is the command to start the Word Program using Start button?
- 

## 7.8 MANAGING DOCUMENTS

This section of the lesson explains how to open a new/existing document, save a document, renaming a document, working with multiple documents, protecting a document, finding a document, and closing a opened document. There are several ways to create a new document, open existing documents, and save documents in Word.

### 7.8.1 Create a New Document

To create a new document, follow any one of the following methods:

1. Click the **New Document** button on the menu bar.
2. Choose **File→New** command from the menu bar.
3. Press **CTRL+N** keys on the keyboard.

### 7.8.2 Open an Existing Document

To open an existing document, follow any one of the following methods:

1. Click the **Open File** button on the menu bar. 
2. Choose **File→Open** command from the menu bar.
3. Press **CTRL+O** keys on the keyboard.

Each of the above method will show the **Open** dialog box. Choose the file and click the **Open** button.

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### 7.8.3 Save a New/Existing Document

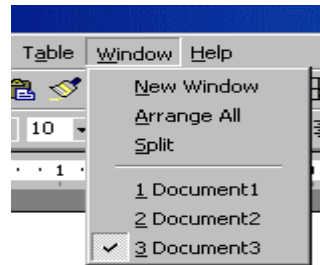
To save a new/existing document that is opened, follow any one of the following methods:

1. Click the Save button on the menu bar. 
2. Select **File→Save** commands on the menu bar from the menu bar.
3. Press **CTRL+S** keys on the keyboard.

If the document is already named and saved earlier, it will simply save the document. On the other hand, if the file is a new document then it will prompt you by opening **Save As** dialog box. Select the folder where you want to place your document in **Save In:** box, type the name of the document in **File Name:** box, and then click **OK**. You can also save a new document by choosing **File→Save As** commands on the menu bar and then selecting the above actions in **Save As** dialog box.

### 7.8.4 Working on Multiple Documents

Several documents can be opened simultaneously if you are typing or editing multiple documents at once. All open documents are listed under the **Window** menu as shown below. The current document has a check-mark beside the file name. Select another name to view another open document or click the button on the Windows taskbar at the bottom of the screen.



**Fig. 7.6**

### 7.8.5 Protecting a Document

You can protect your document from being accidentally changed its format and text or from other users to get access to it.

#### Protecting a Document from Accessing

If you want to protect a document from other users accessing to it, give a password to your file. Follow the steps given below:

1. When the file is open, select **File→Save As** command on the menu bar. The **Save As** dialog box appears. Move the cursor on the **Tools** tab on the top right side of **Save As** dialog box and click. A submenu will appear (see Figure 7.7).

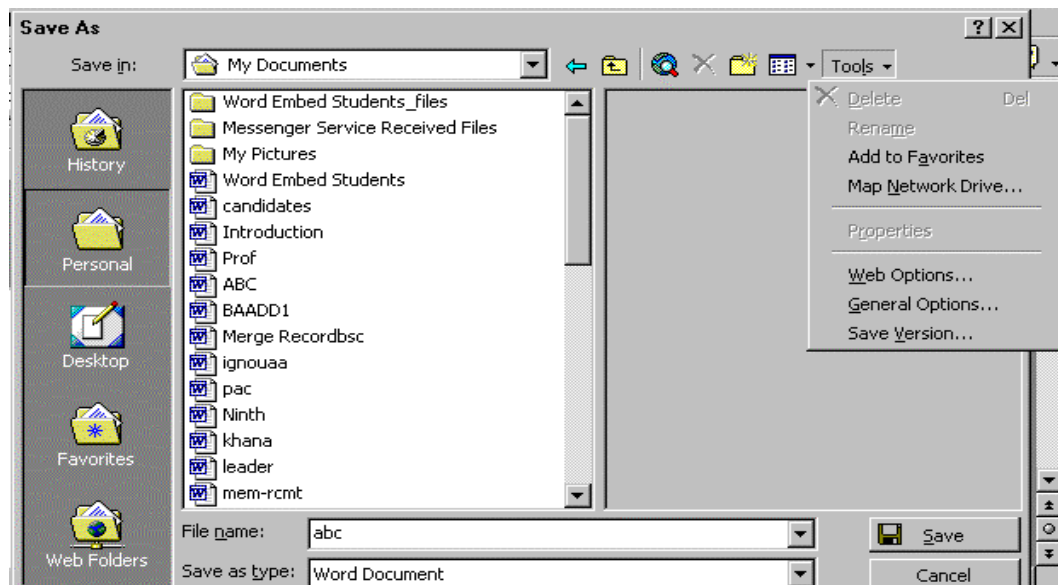


Fig. 7.7

2. Click on **General Options**. The **Save** dialog box opens. You will see two boxes: **Password to open** and **Password to modify**.
3. Type a password in **Password to open** box. (A password can be up to 15 character case-sensitive letters, numerals, spaces and symbols. As you type the password, **Word** displays an asterisk (\*) for each character you type.)
4. Click **OK**. The **Confirm Password** dialog box appears (see Save dialog box and Confirm Password dialog box in Figure 7.7a). Retype the password you typed earlier. Click **OK** on **Confirm Password** dialog box and then click **OK** on **Save** dialog box and then click **OK** on **Save As** dialog box.



Fig. 7.7a

**Fig. 7.7b**

- When you open the file next time it will ask you to type the password (see Figure 7.7b). Remember, you will not be able to open that file without the password. Also, don't forget that the passwords are case sensitive; that is, 'XYZ' and 'xyz' are two different passwords.

### Modifying a Password Given to Protect a Document

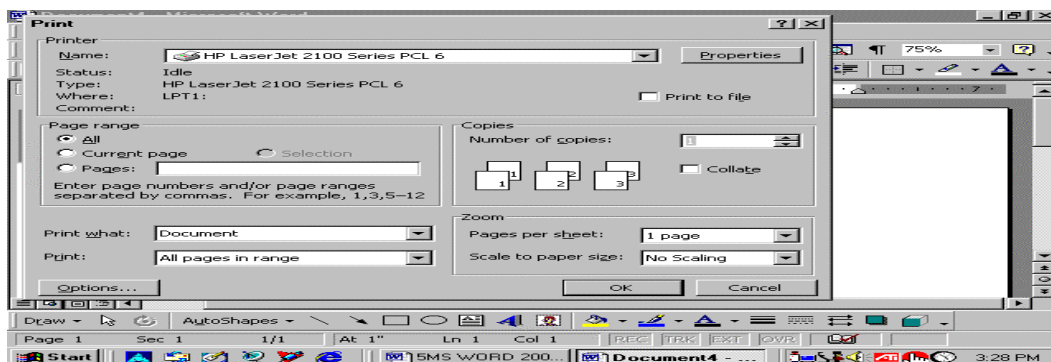
If you suspect that some one knows your password you can change it or modify it by typing present password in **Password to open:** box and new password in **Password to modify:** box in the Save dialog box.

## 7.9 CLOSE A DOCUMENT

Close the current document by selecting **File→Close** command on the menu bar or click the **Close** icon if it is visible on the Standard toolbar.

## 7.10 PRINTING DOCUMENTS

While printing a document you have the following options in **Print** dialog box: (see Figure 7.8).

**Fig. 7.8**

1. Name of the printer (if you have more than one printers).
2. Choose paper size, orientations, resolution etc. by pressing Properties button.
3. Print the entire document or only current page or specific pages
4. Print a draft copy, which omits graphics to allow faster printing.
5. Number of copies to be printed, etc.

#### **7.10.1 Printing a Document**

To print a document or selected pages follow the steps given below:

1. Open the document to be printed.
2. Choose **File → Print** command on the menu bar. The **Print** dialog box will open. Select the Options like print range, Number of copies, Printer name etc. See that printer is switched on and the paper is available in the printer tray.
3. Click **OK**.

#### **7.10.2 Printing a Document on a Different Paper Size**

You might have created a document using some selected paper size. You may want to print that document in a different paper size or multiple pages in a single sheet of paper without disturbing the general format. You can do it using Zoom feature in Print dialog box. Follow the steps given below to resize your document to fit into a new paper size.

If you want to print a document in a different paper size, follow the steps given below:

1. Open the document to be printed.
2. Choose **File → print** command on the menu bar. The **Print** dialog box will open. Select the Options like print range, Number of copies, Printer name etc. See that printer is switched on and the paper is available in the printer tray.
3. Select the appropriate paper size in **Scale to paper size:** under **Zoom** in Print dialog box.
4. Click **OK**.

#### **7.10.3 Printing a Document's Multiple Pages in a Single Sheet of Paper**

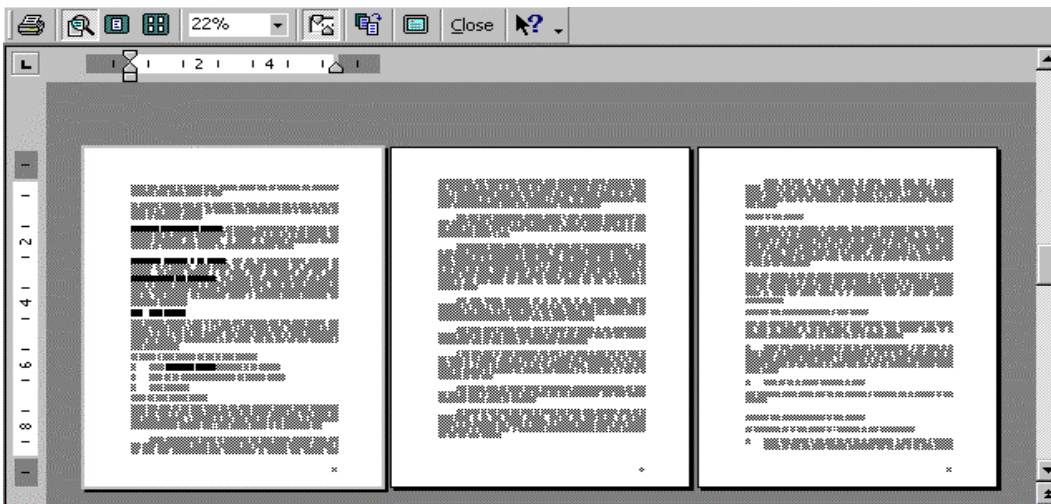
If you want to print multiple pages of a document in a single sheet of paper, follow the steps given below:

---

1. Open the document to be printed.
2. Choose **File** → **print** command on the menu bar. The **Print** dialog box will open. Select the Options like print range, Number of copies, Printer name etc. See that printer is switched on and the paper is available in the printer tray.
3. Select the appropriate paper size in **pages per sheet**: under **Zoom** in Print dialog box.
4. Click OK

#### 7.10.4 Print Preview

Print preview provides a way to see how your document will look when printed. You can see several pages at once. It is similar to **Print Layout** View. An advantage of Print preview is that it has its own toolbar. The toolbar allows you to easily view multiple pages and change the magnification of the screen. You can also edit your document in print preview mode.



**Fig. 7.9**

To switch to print preview, use one of these methods:

1. Click on the Print preview button on the Standard toolbar.
2. Press **CTRL+F2** keys.

#### 7.10.5 Using the Print Preview Toolbar

When you click on the Print button on the Print Preview toolbar, Word immediately prints one copy of your entire document with the default options (the Print dialog box will not be displayed). If you want to print more than one copy, or want to print specific pages,

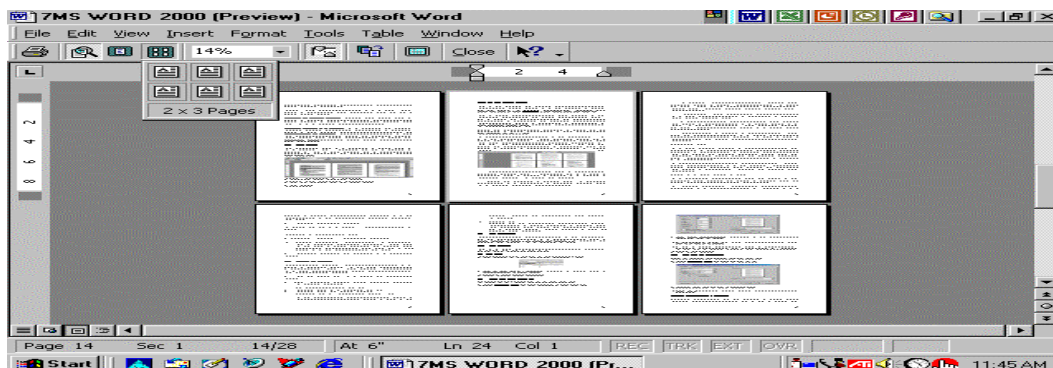
press **Ctrl+P** keys or choose **File→Print** command on the menu bar to make choices in the Print dialog box.

**Fig. 7.10**

When the Magnifier button is depressed, the view toggles between 10% and 100% magnification. With the magnifier button depressed, pause the mouse over the page of text, and the mouse pointer turns into a magnifying glass with a plus sign, which means you can increase the magnification. Click on the mouse button once, and the magnification increases to 100%. The magnifying glass will then show a minus sign, which means you can decrease the magnification. Click on the mouse button once, and the magnification decreases to 10%.

Clicking on one Page button shows a single page at a time. Use the vertical scroll bar or press the PgUp and PgDn keys to move backward and forward through the pages of your document, one page at a time.

The Multiple Pages button allows you to decide how many pages you can see at a time on the screen. Click on the **Multiple Pages** button, and drag the mouse down and over the number of pages to be shown at one time; when you release the mouse button, you will see a display of miniature pages.



**Fig. 7.11**

The zoom control drop-down list (to the right of the Multiple Pages button) functions the same in Print Preview as it does in the other

views. You can click on the drop-down list arrow on the right side of the zoom control box and choose from the different zoom percentages, or you can type in a zoom percentage. The View Ruler button allows you to toggle the display of the horizontal and vertical rulers on and off. These rulers allow you to see margin and tab stop settings.

If the last page of your document has only a few lines of text, you can click on the Shrink to Fit button. This tells Word to try to shrink the document so that the line of text stuck on a page by themselves fit on the previous page. Sometimes you can do a better job yourself by changing the left and right margins to fit more text on a line or by changing the font size. Full Screen view is a toggle button that switches between a screen with the menu bar and the ruler (if you have the ruler turned on) and one without. The Print Preview toolbar will always remain on the screen.

To return to the view you were in before you chose Print Preview, click on the Close button on the Print Preview toolbar.

#### **7.10.6 Editing in Print Preview**

You can type in Print Preview at any time. The typing will appear where your pointer was positioned in the document before you switched to Print Preview. To start typing elsewhere in the document, make sure you are viewing at 100% magnification, and then click on the Magnifier button on the Print Preview toolbar (so that it does not appear pushed down). The mouse turns into an I-beam. Click anywhere on your document screen to reposition the insertion point. You can use this method to type additional text or edit the text on the page.

Now that you are in full edit mode, you may want to use your Standard or Formatting toolbars. Right-click in the toolbar area and select the Standard or Formatting toolbar from the pop-up menu. When you have finished editing, click on the Magnifier button again to return the mouse pointer to a magnifying glass that toggles between magnifications.

#### **7.11 EXIT WORD PROGRAM**

When finished you can close all the files, and quite the Word program by selecting File→Exit command on the menu bar.

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| Action                      | Keystroke           |
|-----------------------------|---------------------|
| <b>Document actions</b>     |                     |
| Open a file                 | CTRL+O              |
| New file                    | CTRL+N              |
| Close a file                | CTRL+W              |
| Save As                     | F12                 |
| Save                        | CTRL+S or SHIFT+F12 |
| Print Preview               | CTRL+F2             |
| Print                       | CTRL+P              |
| Show/Hide paragraph symbols | CTRL+*              |
| Spelling and grammar        | F7                  |
| Help                        | F1                  |
| Find                        | CTRL+F              |
| Replace                     | CTRL+H              |
| Go To                       | CTRL+G              |

| <b>Cursor movement</b>                  |            |
|-----------------------------------------|------------|
| Select all - entire document            | CTRL+A     |
| Select from cursor to beginning of line | SHIFT+Home |
| Select from cursor to end of line       | SHIFT+END  |
| Go to beginning of line                 | HOME       |
| Go to end of line                       | END        |
| Go to beginning of document             | CTRL+Home  |
| Go to end of document                   | CTRL+End   |

| <b>Formatting</b>    |                |
|----------------------|----------------|
| Cut                  | CTRL+V         |
| Copy                 | CTRL+C         |
| Paste                | CTRL+P         |
| Undo                 | CTRL+Z         |
| Redo                 | CTRL+Y         |
| Format painter       | CTRL+SHIFT+C   |
| Left alignment       | CTRL+L         |
| Center alignment     | CTRL+E         |
| Right alignment      | CTRL+R         |
| Justified            | CTRL+J         |
| Delete previous word | CTRL+Backspace |
| Apply bulleted list  | CTRL+SHIFT+L   |
| Indent               | CTRL+M         |
| Page break           | CTRL+Enter     |

| <b>Text Style</b>  |              |
|--------------------|--------------|
| Font face          | CTRL+SHIFT+F |
| Font size          | CTRL+SHIFT+P |
| Bold               | CTRL+B       |
| Italics            | CTRL+I       |
| Underline          | CTRL+U       |
| Double underline   | CTRL+SHIFT+D |
| Word underline     | CTRL+SHIFT+W |
| All caps           | CTRL+SHIFT+A |
| Change case        | SHIFT+F3     |
| Subscript          | CTRL+=       |
| Superscript        | CTRL+SHIFT+= |
| Make web hyperlink | CTRL+K       |

| <b>Tables</b>                    |                    |
|----------------------------------|--------------------|
| Go to next cell                  | Tab                |
| Go to previous cell              | SHIFT+Tab          |
| Go to beginning of column        | ALT+PageUp         |
| Highlight to beginning of column | ALT+SHIFT+PageUp   |
| Go to end of column              | ALT+PageDown       |
| Highlight to end of column       | ALT+SHIFT+PageDown |
| Go to beginning of row           | ALT+Home           |
| Highlight to beginning of row    | ALT+SHIFT+Home     |
| Go to end of row                 | ALT+End            |
| Highlight to end of row          | ALT+SHIFT+End      |
| Column break                     | CTRL+SHIFT+Enter   |

| <b>Miscellaneous</b> |              |
|----------------------|--------------|
| Copyright ©          | ALT+CTRL+C   |
| Date field           | ALT+SHIFT+D  |
| Go to footnotes      | ALT+CTRL+F   |
| Show/Hide ¶          | CTRL+SHIFT+8 |
| Thesaurus            | SHIFT+F7     |

**Note: A plus sign indicates that the keys need to be pressed at the same time.**

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**INTEXT QUESTIONS**

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5. What are the shortcut keys using keyboard for opening a new document?
6. What is the command on the menu bar to save:  
(a) a new file,            (b) existing file
7. What are the steps to print a document on a different paper size in Print dialog box.
8. State True or False.  
(a) Window menu allows you to work with two documents simultaneously.  
(b) A pass word can be up to 10 characters and not is case sensitive.  
(c) You can open the file even without using the password once you have protected it.
9. CTRL+F is the keyboard shortcut for  
(a) Help  
(b) Save  
(c) Find  
(d) Replace

**7.12 WHAT YOU HAVE LEARNT**

In this lesson you learnt about Mainfeatures of MS-Word like create, format and Print. Apart from that you learnt about how to add pictures, tables and charts to the documents. You can save documents in HTML format and create web pages using web page wizard.

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**7.13 TERMINAL QUESTIONS**

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1. Write any two uses of rulers in Word Program.
  2. What is a mouse pointer?
  3. What is an end-of-document marker?
  4. What are the keyboard shortcuts for open, new, close and save file commands?
  5. Define the steps in protecting a document from accessing.
  6. How do you modify a password given to protect a document?
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7. Explain the steps in printing a document's multiple pages in a single sheet of paper?
8. Write any three options available in the Print dialog box.

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#### **7.14 KEY TO INTEXT QUESTIONS**

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1. (a) True, (b) False, (c) True, (d) True, (e) False
  2. (b) (right click the mouse)
  3. (d) (all of the above)
  4. Programs→Microsoft Word
  5. CTRL+N keys
  6. (a) File→Save As, (b) File→Save
  7. Select the appropriate paper size in Scale to paper size: under Zoom and then click OK.
  8. (a) True, (b) False, (c) False
  9. C
-

# 8

## WORKING WITH TEXT

### 8.1 INTRODUCTION

This lesson covers various features of text processing such as moving text from one place to another place in the document, creating bulleted and numbered lists, creating and applying styles, and spelling and grammar corrections that are important to enrich your document. Also, enriching a document's appearance is Word's specialty. Word's formatting features allow you to create beautiful documents without doing much more than typing headings and text. Word will do the rest. Word offers a great amount of formatting options: multiply typefaces and point sizes; easy-to-apply character styles such as bold, italic, normal, single and double underline; subscript and superscript; and paragraph formats such as alignment, spacing and indentation.

### 8.2 OBJECTIVES

After going through this lesson you would be able to

- explain basic text processing tips
  - define character and paragraph formats
  - create bulleted and numbered lists
  - explain spelling and grammar features
-

### 8.3 WORKING WITH TEXT

While using Word program, there are certain concepts, tips, and commands you should learn sooner, rather than later. This section deals with most common Word concepts, tips, and commands you should know regardless your skills in using Word program.

#### 8.3.1 Typing Text

To enter text, just start typing! The text will appear where the blinking cursor is located. Unlike with a typewriter, you need not press ENTER key at the end of each line. Continue to let your text wrap around until you are ready to start a new paragraph. Press ENTER key at the end of a paragraph.

#### 8.3.2 Wrapping Words Together

If you want that two words (such as name of a place or person having more than one word), always wrap to the next line together, put a nonbreaking space between them. The keyboard combination for a nonbreaking space is **CTRL+SHIFT+ SPACEBAR**. For example, if you want the word 'New Delhi', should appear in the same line, press **CTRL+SHIFT+SPACEBAR** between 'New' and 'Delhi'. Similarly, you can press the above key combination to wrap dates ( day and month & month and year).

#### 8.3.3 Inserting Text.

To insert the text in an existing document, follow the steps given below:

1. Move the cursor by using the arrow buttons on the keyboard or positioning the mouse and clicking the left button where you want to insert the text. The keyboard shortcuts listed below are also helpful when moving through the text of a document.

Beginning of the line **HOME**

End of the line **END**

Top of the document **CTRL+HOME**

End of the document **CTRL+END**

2. Type the text you want to insert.

#### 8.3.4 Spacebar and Tabs

Use the spacebar as a separator for your words and sentences. Don't

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use the spacebar to move the insertion point across a line of text - known as “spacing across a line”. The spacebar method works in a typewriter as a way of moving across a line, but it does not work in word processing. If you use the spacebar to move around, word will make additional spaces, which you will then have to delete. Avoid using the spacebar to create columns of text. Instead you can use the **Tab** key.

### 8.3.5 Paragraph Markers

You may find it easier to type when you can see the returns, spaces, and tabs in your document. If so, click on the **Show/Hide** button on the Standard toolbar to display, the marks. Click on the symbol again to hide them.

### 8.3.6 Selecting (Highlighting) Text

To change any attributes of text it must be highlighted first. Select the text by dragging the mouse over the desired text while keeping the left mouse button depressed, or hold down the **SHIFT** key on the keyboard while using the arrow buttons to highlights the text. The shortcuts for selecting a portion of the text are:

- a. To select whole word double-click within the word.
- b. To select whole paragraph triple-click within the paragraph.
- c. To select several words or lines drag the mouse over the words, or hold, down **SHIFT** key while using the arrow keys.
- d. To select entire document choose **Edit → Select All** command on the menu bar, or press **CTRL+A** keys.
- e. To deselect the text click anywhere outside of the selection on the page or press an arrow key on the keyboard.

### 8.3.7 Deleting Text

Use the **BACKSPACE** and **DELETE** keys on the keyboard to delete text. Backspace will delete the text to the left of the cursor and Delete will erase the text to the right. To delete a large selection of text, highlight it using any of the methods outlined above and press the **DELETE** key.

### 8.3.8 Caps Lock

When Caps Lock (a key on the keyboard) is off, any text you type will be lowercase, and the text you type holding down the **Shift** key

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will be in upper case. On the other hand, when Caps Lock is on, any text you type will be in uppercase, and the text you type holding down the **Shift** key will be in lowercase. If you inadvertently type a bit of text with the Caps Lock on, select the text and choose **Format → Change Case → TOGGLE cASE** command on the menu bar to change the case back to normal.

If you inadvertently type a bit of text with only uppercase text and want to change it to lowercase text, select the text and choose **Format → Change Case → lowercase** command on the menu bar. On the other hand, if you want to change lowercase text to uppercase, select the text and choose **Format → Change Case → UPPER CASE** command on the menu bar to change the case back to normal.

### 8.3.9 Replacing Text

Word can combine the steps of deleting unwanted text, positioning the insertion point, and inserting replacement text. To replace text, follow the steps given below:

1. Select the text to be removed.
2. Start typing the new text. Observe that the new text is replacing the selected text.

You can also replace the text by selecting the text, then deleting it using DELETE key, and then start typing new text.

## 8.4 CLICK AND TYPE

This feature allows you to insert text any where in a page. Move the cursor in a page where you want to insert the text. Double-click and start typing. Click and Type is also useful for inserting tables, charts and other graphics in a blank area of a document. When you insert an item, Click and Type automatically formats the item according to where you insert it.

### 8.4.1 Inserting (Typing) Special Characters (Symbols)

Word supports a set of special characters and symbols, which cannot be entered through the keyboard. To insert these special characters and symbols, follow the steps given below:

1. Move the cursor where you want to place the symbol and click. Observe that the insertion pointer appears at the point.
  2. Choose **Insert → Symbol** command on the menu bar. The Symbol dialog box appears. The dialog box displays all available symbols for respective fonts.
-

3. Click on **Symbols** tab if it is not highlighted. Click on the symbol you want to insert, the symbol displays an enlarged version of the symbols. Press **Insert** to place the symbols at the present cursor position in the document. You can also do this action by simply pointing the cursor on the symbol and the double-clicking.
4. Click on **Close** to close the Symbol dialog box.

The **Special Characters** tab includes additional characters such as Em and En spaces, Em and En dashes, nonbreaking hyphens, nonbreaking spaces, C,R etc. To insert special characters, follow the steps given below:

1. Repeat step 1 and 2 above.
2. Click on **Special Characters** tab to see the special characters available in the symbol dialog box. Click on the special character you want to insert. Press **Insert button** to place the special character at the present cursor position in the document. You can also do this action by simply pointing the cursor on the special character and the double-clicking.
3. Click on **Close** to close the Symbol dialog box.

## 8.5 UNDO AND REDO

Feel free to experiment with various text styles. You can always undo your last action by clicking the **Undo** button on the Standard toolbar or selecting **Edit → Undo** command on the menu bar. Click the **Redo** button on the standard toolbar or select **Edit → Redo** command on the menu bar to erase the undo action.

## 8.6 FORMATTING TEXT

Using the **Formatting** toolbar is the easiest way to change many attributes of text. If the toolbar as shown below is not displayed on the screen, select **View → Toolbars** command on the menu bar and choose **Formatting** command.

**Style Menu** - Styles are explained in detail later in this lesson.

**Font Type** - Font is the basic typeface in which your words are displayed. Font comes in families such as Times New Roman or Ariel. Each font family has a specific way of formatting individual letters. Click the arrowhead to the right of the font name box in the Formatting toolbar to view the list of fonts available. Scroll down to the font you want and select it by clicking on the name once with the mouse.

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**Font size** - It determines how large each letter will appear. The font size is measured in points (1/72 of an inch). Click on the white part of the font size box in the Formatting toolbar to enter a value for a font size or click the arrowhead to the right of the box in the Formatting toolbar to view a list of font sizes available. Select a size by clicking on it once. A font size of 10 or 12 is best for paragraphs of text.

**Font Style** - Font style determines the emphasis or weight that the letters have when they are displayed. Each font can be displayed as **bold**, **italicize**, and **underline**.

**Alignment** - Text can be aligned to the left, center, or right side of the page or it can be justified across the page.

**Numbered and Bulleted Lists.**

**Increase/Decrease Indent** - Change the indentation of a paragraph in relation to the side of the page.

**Out side Border** - Add a border around a text selection.

**Highlights Color** - Use this option to change the color behind a text selection. The color shown on the button is the last color used. To select a different color, click the arrowhead next to the image on the button.

**Text Color** - This option changes the color of the text. The color shown on the button is the last color chosen. Click the arrowhead next to the button image to select another color.

### **8.6.1 The Font Dialog Box**

The **Font** dialog box allows you to choose from a larger selection of formatting and using Formatting toolbar is the easiest way to format text. If you cannot format text using Formatting toolbar, then use **Font** dialog box options. Select **Format → Font** command on the menu bar to access the **Font** dialog box.

### **8.6.2 Format Painter**

A handy feature for formatting text is the **Format Painter** located on the Standard toolbar, For example, if you have formatted a paragraph heading with a certain font face, size, and style and you want to format another heading the same way, you do not need to manually add each attribute to the new headline, use the Format Painter by following these steps:

---

1. Place the cursor within the text that contains the formatting you want to copy.
2. Click the **Format Painter** button in the standard toolbar. Notice that your pointer now has a paintbrush beside it.
3. Highlight the text you want to add the same format to with the mouse and release the mouse button.

To add the formatting to multiple selections of text, double-click the Format Painter button instead of clicking once. The format painter then stays active until you press the **ESC** key to turn it off.

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### INTEXT QUESTIONS

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1. The keyboard combination for a non-breaking space between two words:
    - (a) ALT+SHIFT
    - (b) SHIFT+ENTER
    - (c) CTRL+SHIFT+SPACEBAR
  2. What will happen to the cursor when you use the following keyboard shortcuts?
    - (a) HOME,
    - (b) END,
    - (c) CTRL+HOME,
    - (d) CTRL+END
  3. What are the shortcuts for selecting:
    - (a) a whole word,
    - (b) whole paragraph,
    - (c) several words or lines,
    - (d) entire document
  4. State True or False
    - (a) It is a good practice to insert many spaces you need to move a text across a line.
    - (b) We can use BACKSPACE key to delete smaller selection of text.
    - (c) Ariel is a style menu name.
    - (d) The font size is measured in points.
-

## 8.7 FORMATTING PARAGRAPHS

In Word, a paragraph is any amount of text, graphics, object or other items that are followed by a paragraph mark. A paragraph mark is inserted each time while pressing the ENTER key. In order to change the formatting of a paragraph, select the paragraph and then apply the formats. Paragraph format affects the entire paragraph and new paragraphs keep the formatting of the preceding paragraph. Paragraph marks store the format of each paragraph. If the paragraph mark is deleted, the text in that paragraph becomes part of the next paragraph.

You can format a paragraph by placing the cursor within the paragraph and selecting **Format → Paragraph** command on the menu bar.

### 8.7.1 Line Markers

To insert a new line mark in the same paragraph, press **SHIFT+ENTER** keys. This action pushes the text down to the next line, but does not create a new paragraph. To modify the appearance of paragraph, use the Ruler, the Formatting toolbar and the Paragraph dialog box or one of Word's paragraph formatting short-cut key combinations. The various ways in which the paragraph formatting can be done is described in the following subsections:

### 8.7.2 Centering, Right Alignment and Left Alignment

By default, the text in Word is left aligned. But these alignments can be changed as described earlier.

### 8.7.3 Indenting Text

Indenting a paragraph enables it to set off from other text.

- To indent paragraphs automatically, drag the top half of the triangular indent mark of the horizontal ruler to the right of the desired position. Alternatively, you can select **Format → Paragraph** command on the menu bar. The **Paragraph** dialog box appears. Select **First line** under **Special:** drop down submenu and then type indent-length in inches in the box under **By:** in the Paragraph dialog box to indent only the first line of a paragraph.
  - To increase or decrease indents by one Tab stop, use the Increase Indent and Decrease Indent button on the Formatting toolbar.
-

- To create a hanging indent (that indents all lines but the first line of a paragraph, drag the top half of the triangular indent marker in the horizontal ruler to the left of the desired position. You can also select **Format → Paragraph** command on the menu bar. The paragraph dialog box appears. Select **Hanging** under **Special:** drop down submenu and then type indent length in inches in the box under **By:** in the Paragraph dialog box to indent all but the first line of a paragraph.
- If you have earlier indented either First line or Hanging all lines but the first line and now want to remove the indentation, select (none) under **Special:** drop down submenu in the Paragraph dialog box. You can also use drag-and drop method explained above.

#### 8.7.4 Tab Stops

By default, the tab Stops are set at 0.5-inch intervals from the left margin. To increase or decrease the tab length Choose **Format → Tabs** command on the menu bar. The tab dialog box appears. Type the length of the tab in inches in the box under Tab stop position of Tabs dialog box. Click on **OK**. The insertion point can be moved to the next tab stop in the current paragraph by pressing the **Tab** key.

You can also use the horizontal ruler to set a tab stop at a particular position or to change the way text lines up at a tab stop by simply moving the cursor to a place on the horizontal ruler and clicking.

To set tab stops:

1. Select the paragraph in which you want to set or change tab stops.
2. To set or change the tab alignment, click the **Tab Alignment** button at the far left of the horizontal ruler until the tab alignment is the way you want to be.

To select the respective Tabs click on:

Left-aligned tab stops

Centered tab stops

Right-aligned tab stops

Decimal tab stops

To move a tab stop, point to the tab marker and drag it to a new position. To clear a tab stop, drag the tab marker off the ruler.

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Also, you can set precise measurements for tab stops by using the **Tabs** command on the Format menu.

The spacing between the default Tab Stops can also be changed but this will affect only the active document. To do this, type or select the distance you want between the tab stops in the **Default Tab Stops** box and then click the **OK** button in the Tabs dialog box.

### 8.7.5 Line Spacing

Line Spacing determines the height of each line of text in the paragraph. The default (single line spacing) depends on the size of the font characters. Individuals line spacing is easy to change.

Choose **Format → Paragraph** command on the menu bar. The **Paragraph** dialog box appears. The **Indents and Spacing** tab of the Paragraph dialog box provides a drop-down under **Line spacing:** for simple but effective control of the space between lines under most circumstances. The preview area demonstrates the relative effects of single, one-and-a-half and double line spacing. Single spacing causes 12-point line spacing, 112 line spacing is 18 points and double spaced lines will be 24 points apart.

All these line spacing settings can be made by choosing the appropriate from the **Line spacing** menu in the **Paragraph** dialog box.

When you use these choices, Word will compensate for graphics, superscript and large or small type sizes.

### 8.7.6 Paragraph Spacing

Word enables each paragraph to give unique before and after spacing if you wish. The spacing settings can be in points (pt), inches (in), centimetres (cm), or lines (li). Headings often have different spacing requirements for body text. For instance, you may require different before and after spacing designs for figures and figure captions as well. Also you can have unique spacing specification as part of a style, making it easy to keep the look of your documents consistent.

Choose **Format → Paragraph** command on the menu bar. The Paragraph dialog box appears. Use drop down submenu in **Before:** and **After:** under **Spacing** of the Paragraph dialog box to set the paragraph spacing.

The advantages of using the Paragraph command are:

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1. Spacing before and after paragraphs does not change the point size of your text.
2. You can use different spacing combinations for different purposes.
3. You can make precise adjustments to the spacing between the various text elements. For example, you can use paragraph spacing to clarify the relationship between headings and body text.
4. If the paragraph is moved or deleted, its spacing goes with it. The paragraph doesn't leave behind extra blank lines.
5. If you include spacing in the paragraph styles you use to format text, Word adds the space along with the other formatting. You need not add blank lines manually.

## **8.8 BORDERS AND SHADING**

you can add borders to any side of a paragraph and you can add background shading also you can also add borders and shading to ordinary text and to the paragraphs in table cells and frames. Choose **Format → Borders and Shading** command on the menu bar. The Borders and Shading dialog box appears. Click on the appropriate borders box after selecting Borders tab to select border, select **Paragraph** under **Apply to:** drop down submenu, Click **OK**. To shade a paragraph, click on **Shading** tab in Borders and Shading dialog box, select appropriate shade under Fill, and select **Paragraph** under **Apply to:** drop down submenu, click **OK**.

### **8.8.1 Columns**

To quickly place text of a paragraph in a column format, click the **Columns** button on the Standard toolbar and select the number of columns by dragging the mouse over the diagram. Using this feature of the Standard tool bar and can have up to 4 columns in a paragraph. To format the paragraph into more than one column, follow the steps given below.

1. Select the paragraph you want to have more than one column.
2. Move the cursor on columns button on the Standard command on the menu bar. The Columns dialog box allows you to choose the properties of the columns. Select the number and width of the columns from the dialog box.

For more column options, select **Format → Columns** command on the menu bar. The **Columns** dialog box allows you to choose the

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properties of the columns. Select the number and which of the columns from the dialog box.

### 8.8.2 Drop Caps

A drop cap is a large letter that begins a paragraph and drops through several lines of text as shown below.

Add a drop cap to a paragraph by following these steps:

1. Place the cursor within the paragraph whose first letter will be dropped.
2. Select **Format → Drop Cap** command on the menu bar.
3. The **Drop Cap** dialog box allows you to select the position of the drop Cap. The font, the number of lines of drop, and the distance from the body text.
4. Click **OK** when all selections have been made.

To modify a drop cap, select **Format → Drop Cap** again to change the attributes, or click on the letter and use the handles to move the and resize the letter.

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### INTEXT QUESTIONS

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5. The shortcut key to insert a new line:
    - (a) ENTER
    - (b) SHIFT+ENTER
    - (c) ALT+ENTER
  6. By default, the Tab stops are set at:
    - (a) 0.3 inch intervals
    - (b) 0.4 inch intervals
    - (c) 0.5 inch intervals
  7. What is a drop cap?
  8. State True or False
    - (a) One and half line spacing causes 16 points.
    - (b) Using Standard toolbar, you can have up to 4 columns in a paragraph.
    - (c) Format Painter button on the Standard toolbar is useful in applying a style.
    - (d) Single spacing causes 12 point line spacing.
-

## 8.9 BULLETED AND NUMBERED LISTS

Bulleted lists and Numbered lists are often used to bring main points to a reader's attention.

### 8.9.1 Creating a Bulleted and Numbered Lists

To create a bulleted or numbered list, use the list features provided by Word. In this section you will learn how to create format bulleted and numbered lists.

1. Click the **Bulleted List** button or **Numbered List** button on the formatting toolbar.
2. Type the first entry and press **ENTER**. This will create a new bullet or number on the next line. If you want to start a new line without adding bullet or number, or hold down the **SHIFT** key while pressing **ENTER**.
3. Continue to type entries and press **ENTER** twice when you are finished typing to end the list.

Use the **Increase Indent** and **Decrease Indent** buttons on the formatting toolbar to create lists of multiple levels.

You can also type the text first, highlights the section, and press the **Bulleted List** or **Numbered List** buttons to add the bullets or numbers.

### 8.9.2 Creating Nested Lists

To create a nested list, such as a numbered list inside of a bulleted list, follow these steps:

1. Type the list and increase the indentation of the items that will make up the nested list by clicking the **Increase Indent** button for each item.
    - Lists
    - Bulleted and Numbered Lists
    - Nested Lists
    - Formatting Lists
    - Tables
    - Create a Table
  2. Highlights the items and click the **Numbered List** button on the formatting toolbar.
-

### 8.9.3 Formatting Bulleted and Numbered Lists

The bullet image and numbering format can be changed by using the **Bullets and Numbering** dialog box.

1. Highlight the entire list to change all the bullets or numbers, or Place the cursor on one line within the list to change a single bullet.
2. Access the dialog box by selecting **Format → Bullets and Numbering** command on the menu bar or by right-clicking within the list and selecting **Bullets and Numbering** command from the shortcut menu.
3. Select the list style from one of the seven choices given, or click the **Picture...** button to choose a different icon. Click the **Numbered** tab to choose a numbered list style.
4. Click **OK** when finished.

### 8.10 COPYING TEXT AND MOVING (CUTTING) TEXT

Part of editing process of text is copying or moving text to other locations of your document. You can use the copy and cut commands to avoid retyping text in your document. This deals with the use of clipboard in copying and moving text within a document or into other documents. When you copy or cut text, the text is stored in an area of memory called clipboard and can be pasted back into the document or into any other document. The last 12 elements that were cut or copied are placed onto Word's clipboard. You can view the elements on the clipboard by selecting. **View → Toolbars → Clipboards** command on the menu bar.

Place the mouse arrow over the each element in the clipboard to view the contents of each item and click on an element to add its contents to the document. Click **Paste All** to add all of the items to the document at once. Click the **Clear Clipboard** button (the icon with an "X" over the clipboard image) to clear the contents of the clipboard.

#### 8.10.1 Moving (Cutting) Text

Moving text means to remove (cut) the selected text from the one location and insert it in another location. To move text follow the steps given below:

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1. Select the text that will be moved.
2. Select **Edit→Cut** command on the menu bar, or click the **Cut** button on the standard tool bar, or press **CTRL +X**. This will move the text to a clipboard.
3. To paste cut text move the cursor to the location you want to move the text to and select **Edit→Paste** command on the menu bar, click the **Paste** button on the standard toolbar, or press **CTRL+V**.

To move a small amount of text a short distance, the drag-and-drop method may be quicker. Highlight the text you want to move, click the selection with the mouse, drag the selection of the new location, and release the mouse button.

### 8.10.2 Copying Text

Copying means to make a copy of the selected text and insert in another location, leaving the original text unchanged in layman's language it is same as duplication. To copy text, follow the steps given below:

1. Select the text that will be moved.
2. Select **Edit → Cut** command on the menu bar, or click the **Cut** button but button picture on the standard toolbar, or press **CTRL+X**. This will move the text to a clipboard.
3. Choose **Edit → Copy** command on the menu bar, Click the **Copy** button on the standard toolbar, or press **CTRL+C** to copy the text to the clipboard.

## 8.11 SPELLING AND GRAMMAR

The spelling and grammar checkers check for misspelled words or grammar errors. The red wavy lines will appear underneath misspelled words. The green wavy lines will appear underneath grammatical errors. This section deals with the concepts and commands of spelling and grammar corrections of yours document.

### 8.11.1 AutoCorrect

Word automatically corrects many commonly misspelled words and punctuation marks with the AutoCorrect feature. To view the list of words that are automatically corrected, select **Tools → Auto Cor-**

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**rect** command on the menu bar. This may be a hidden feature so click the double arrows at the bottom of the **Tools** menu listing if the AutoCorrect choice is not listed.

Many options including the accidental capitalization of the first two letters of a word and capitalization of the first word of the sentence can be automatically corrected from this page. If there are words you often misspell, enter the wrong and correct spellings in the **Replace** and **With** fields.

### 8.11.2 Spelling and Grammar Check

Word will automatically check for spelling and grammar errors as you type unless you turn this feature off. Spelling errors are noted in the documents with red underline. Grammar errors are indicated by a green underline. To disable this feature, select **Tools → Options** command on the menu bar and click the **Spelling and Grammar tab** on the dialog box. Uncheck “**Check spelling as you type**” and “**Check grammar as you type**”, and click **OK**.

To use the spelling and grammar checker, follow these steps:

1. Select **Tools → Spelling and Grammar** command on the menu bar.
2. The **Spelling and Grammar** dialog box will notify you of the first mistake in the documents and misspelled words will be highlighted in red.
3. If the word is spelled correctly, click the **Ignore** button or click the **Ignore All** button if the word appears more than once in the document.
4. If the word is spelled incorrectly, choose one of the suggested spellings in the **Suggestions** box and click the **Change** button or **Change All** button to correct all occurrences of the word in the document. If the correct spelling is not suggested, enter the correct spelling in the **Not In Dictionary** box and click the **Change** button.
5. If the word is spelled correctly and will appear in many documents you type (such as your name), click the **Add** button to add the word to the dictionary so its will no longer appear as misspelled word.

As long as the **Check Grammar** box is checked in the **Spelling and Grammar** dialog box, Word will check the grammar of the document

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in addition to the spelling. If you do not want to grammar checked, remove the checkmark from this box. Otherwise, follow these steps for correcting grammar:

1. If Word finds a grammatical mistake, it will be shown in the box as the spelling errors. The mistake is highlighted in green text.
2. Several suggestions may be given in the **Suggestions** box. Select the correction that best applies and click **Change**.
3. If no correction is needed (Word is often wrong more than it is right), click the **Ignore** button.

### 8.11.3 Add a New Word to Custom Dictionary

To add a word a Custom dictionary that is not in Dictionary follow the steps given below:

1. Open the file you want to check Spelling and Grammar.
2. Activate the Spelling and Grammar checker by pressing **F7** Key on the keyboard or click on the Spelling and Grammar button on the standard toolbar on the standard toolbar or choose **Tools spelling and Grammar...** command on the menu bar.
3. When the **Spelling and Grammar** checker pauses on a word that is not in its dictionary that you think should be part of the **Custom** dictionary, click on the **Add** button on the right side of the dialog box.

### 8.11.4 Remove a Word from Custom Dictionary

If you have inadvertently added a word, you can edit the Custom dictionary and remove the word. To remove a word from Custom dictionary follow the steps given below:

1. Open any existing file to remove word (s) from the Custom dictionary.
  2. Choose **Tools → Options**: The Options dialog box appears.
  3. Click the **Spelling & Grammar** tab if it is not highlighted. Click on the Dictionaries button. When the dictionary appear, **CUSTOM.DIC** will be selected, because the custom dictionary is currently open in memory and being used in conjunction with Word's propriety dictionary.
  4. Click on the **Edit** button at the bottom of the dialog box (do not choose the Remove bottom).
-

5. Word shows the contents of the Custom dictionary in a Document. Scroll down and look at the words. Delete or edit the words you do not wish to have in the dictionary.
6. Save the Custom dictionary by clicking on the Save button on the Standard toolbar or choose **File → Save** command on the menu bar.
7. Select **File → Close** command on the menu bar to return to your document.

#### **8.11.5 Synonyms**

Word 2000 has a new feature for finding synonyms. Simply right-click on the word and select **Synonyms** from the shortcut menu. From the list of suggest words, highlights the word you would like to use or click **Thesaurus...** for more options.

#### **8.11.6 Thesaurus**

To use the thesaurus, select **Tools → Language → Thesaurus** from the menu bar or select it from the **Synonyms** shortcut menu as detailed above.

A list of meanings and synonyms are given on the windows. Double-click on the words in the **Meanings** box or click the **Look Up** Button to view similar words. Double-click words in the **Replace with Synonyms** box to view synonyms of those words. Highlights the word you would like to add and click the **Replace** button.

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### **INTEXT QUESTIONS**

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9. The \_\_\_\_\_ command in the menu bar is used in access the Bullets and Numbering dialog box.
  10. What is the difference between copying text and moving text?
  11. To view the elements on a clipboard, you select \_\_\_\_\_ command from the menu bar.
  12. State True or False
    - (a) Choosing **Edit → Copy** command on the menu bar and pressing **CTRL+C** keys are different actions.
    - (b) You cannot use Custom dictionary to remove a word.
    - (c) You can select synonyms of a word from shortcut menu by right click.
-

- (d) The **Spelling and Grammar** checker can be activated by pressing **F7** on the keyboard.
- 

### 8.12 WHAT YOU HAVE LEARNT

In this lesson you learnt about various features of formatting text. You are now in a position to move text from one place to another and apply different font and character styles. Also you can apply the grammar and spell-check features of MS-Word.

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### 8.13 TERMINAL QUESTIONS.

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1. What is the command in the menu bar to change text to Title Case?
  2. What is the advantage of click and type?
  3. Describe the various steps in inserting a symbol.
  4. What is a font type? Mention any two font families.
  5. How do you set line spacing in a paragraph?
  6. Write steps in moving text.
  7. Write steps in copying text.
  8. Explain use of AutoCorrect feature in Word.
- 

### 8.14 KEY TO INTEXT QUESTIONS

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1. (c) (CTRL+SHIFT+SPACEN/BAR)
  2. (a) Beginning of the line  
(b) End of the line  
(c) Top of the document  
(d) End of the document
  3. (a) Double-click within the word  
(b) Triple-click within the paragraph  
(c) Drag the mouse over the words, or hold down **SHIFT** key while using the arrow keys.  
(d) Choose **Edit → Select All** command on the menu bar or press **CTRL+A** keys.
  4. (a) False, (b) True, (c) False, (d) True
-

5. (b) (SHIFT + ENTER keys)
  6. (c) 0.5 inch intervals
  7. A drop cap is a large letter that begins a paragraph and drops through several lines of text.
  8. (a) False, (b) True, (c) True, (d) False
  9. Format Bullets and Numbering
  10. Copying means to make a copy of the selected text and the insert in another location, leaving the original text unchanged. Moving text means to remove the selected text from one location and insert it in another location.
  11. View → Toolbars → Clipboard
  12. (a) False, (b) False, (c) True, (d) True
-

# 9

## WORKING WITH TABLES, GRAPHICS AND PAGES

### 9.1 INTRODUCTION

In the last lesson you have learned different text processing tips and commands. In this lesson you will learn about creating tables and their formatting, adding graphics to the text, and various page formatting features and page views that will enhance your skills in producing a good document.

### 9.2 OBJECTIVES

After going this lesson you would be able to

- format a document
- insert or delete pages in a document
- create tables and adding graphics
- type repeated information on each page using headers and footers

### 9.3 TABLES

Word's Table features, enables you to arrange columns of numbers and text in a document without using tabs. It helps you to organize complex columnar information. Tables also provide a convenient way to present text in side-by-side paragraphs as in a resume, or to arrange text beside graphics. You can insert tables anywhere you

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need them in Word documents. Word tables consist of rows, columns, and cells. You do typing in cells. Cells can contain text, numbers, or graphics.

### 9.3.1 Insert a Table

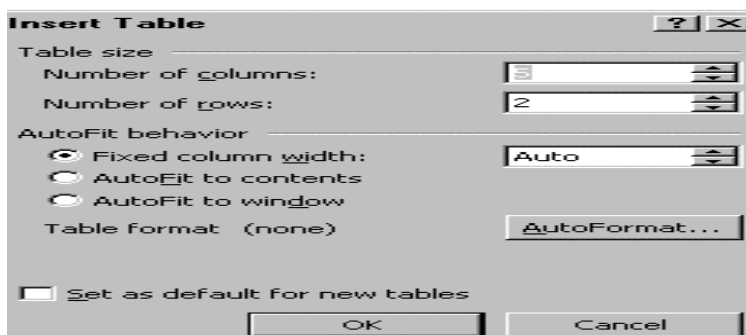
There are two ways to add a table to the document using the Insert feature:

1. Click the **Insert Table** button  on the standard toolbar. Drag the mouse along the grid, highlighting the number of rows and columns for the table.



**Fig. 9.1**

2. Or, select **Table→Insert→Table** from the menu bar. Select the number of rows and columns for the table and click **OK**.



**Fig. 9.2**

### 9.3.2 Draw a Table

You can also draw a table in a document:

1. Draw a table by selecting **View→Toolbars→Tables and Borders** from the menu bar. The Tables and Borders toolbar appears on the screen. Click on the Draw Table  button on the toolbar. The cursor is now the image of a pencil.
2. Draw the cells of the table with the mouse. If you make a mistake, click the Eraser button  and drag the mouse over the area to be deleted.
3. To draw more cells, click on the **Draw Table** button .

### 9.3.3 Inserting/Deleting Rows and Columns in a Table

Once the table is drawn, insert additional rows by placing the cur-

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cursor in the row you want to be adjacent to. Select **Table→Insert→Rows Above** or **Rows Below** command on the menu bar, or select an entire row and right-click with the mouse. Choose **Insert Rows** from the shortcut menu.

To delete a row place the cursor on a row cell to be deleted. Select **Table→Select→Row** command on the menu bar. The row will be selected. Select **Table→Delete→Rows** command on the menu bar to delete the selected row.

Much like inserting a row, add a new column by placing the cursor in a cell adjacent to where the new column will be added. Select **Table→Insert→Columns to the Left** or **Columns to the Right** command on the menu bar, or select the column, right-click with the mouse, and select **Insert Columns**.

To delete a column place the cursor on a column cell to be deleted. Select **Table→Select→Column** command on the menu bar. The column will be selected. Select **Table→Delete→Columns** command on the menu bar to delete the selected column.

### 9.3.4 Moving and Resizing a Table

A four-sided moving arrow and open box resizing handle will appear on the corners of the table if the mouse is placed over the table. Click and drag the four-sided arrow to move the table and release the mouse button when the table is positioned where you want it. Click and drag the open box handle to resize the table. Change the column widths and row heights by clicking the cell dividers and dragging them with the mouse.



### 9.3.5 Tables and Borders Toolbar

The Tables and Borders toolbar allows you to add border styles, shading, text effects, alignment, and more options to your table. Access the toolbar by clicking **Table→Draw Table** or **View→Toolbars→Tables and Borders** command on the menu bar.



**Fig. 9.3**

You will need to select the cells of the table you want to format. Click and drag the mouse over the cells, or use the following short-cuts:

1. To select one cell, place the cursor on a cell you want to select and choose **Table→Select→Cell** commands from the menu bar. The cell will be selected. Or click the bottom, left corner of the cell when a black arrow appears.
2. To select several cells, first click the bottom left corner of the first cell when a black arrow appears and drag the mouse across the other cells that you want to select.
3. To select one row, place the cursor on a row you want to select and choose **Table→Select→Row** commands from the menu bar. The row will be selected. Or click outside the table to the left of the row when a white arrow appears.
4. To select one column, place the cursor on a column you want to select and choose **Table→Select→Column** commands from the menu bar. The column will be selected. Or click outside the table above the column when a black arrow appears.
5. To select several rows, first select at least one cell in each row using the above method for selecting several cells and choose **Table→Select→Row** commands from the menu bar. The rows will be selected. Or click outside the table to the left of the row when white arrow appears and drag the mouse to the direction down or up where the intended rows lies.
6. To select several columns, first select at least one cell in each column using the above method for selecting several cells and choose **Table→Select→Column** commands from the menu bar. The columns will be selected. Or click outside the table above the column when a black arrow appears and drag the mouse to the direction left or right where the intended columns lies.
7. Entire table **Table→Select→Table** commands from the menu bar. The entire table will be selected. Or move the cursor to the left edge of the top row and observe the four-sided arrow appear on the edge. Place the cursor on the four-sided arrow and click. The entire table will be selected.

### 9.3.6 Table Properties

Use the **Table Properties** dialog box to modify the alignment of the table with the body text and the text within the table. Access the

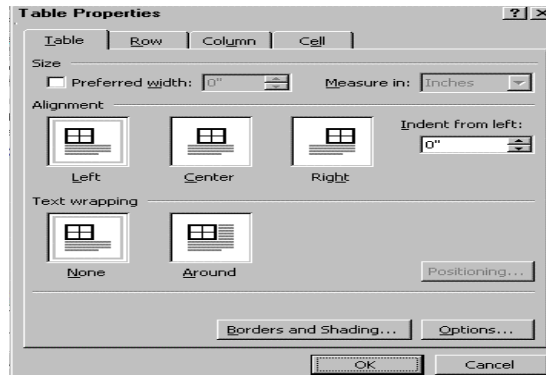
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box by selecting **Tables→Table Properties**. Use the following options after clicking Table or Row or Column or Cell tab that you want to modify.

**Size** - Check the **Preferred width** box and enter a value if the table should be an exact width

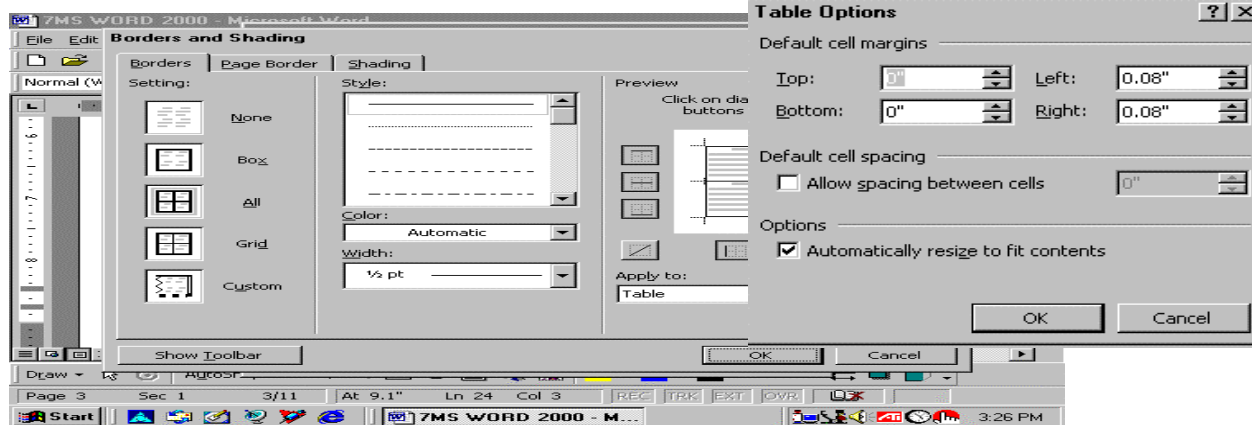
**Alignment** - Highlight the illustration that represents the alignment of the table in relation to the text of the document.

**Text wrapping** - Highlight “None” if the table should appear on a separate line from the text or choose “Around” if the text should wrap around the table.



**Fig. 9.4**

**Borders and Shading** - Select from a number of border styles, colors, and widths. Click the **Shading** tab to change the background color and pattern.



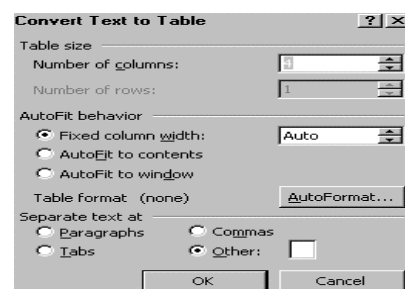
**Fig. 9.5**

**Options** - Click the **Options** button on the **Table Properties** window to change the spacing between the document text and the table borders under **Default cell margins**. Check the **Allow spacing between cells** box and enter a value to add space between the table cells.

**Fig. 9.6**

### 9.3.7 Converting Text to Tables

You can convert text separated by paragraph marks, commas, or tab characters into cells in a table. To convert text to a table, highlight the text you want to turn into a table. Choose **Table→Convert Text to Table** command on the menu bar and click the appropriate option button in the Convert



**Fig. 9.7**

Text to Table dialog box. You have the option of specifying the Table Size (number of columns and rows), AutoFit (to column width, or contents, or window), Separate text at (Paragraphs, or Commas, or Tabs, or any other character specified by you in the text). The following explanation will give you an idea of selecting Paragraphs, or Commas, or Tabs, or any other character specified by you for deciding the layout of columns and rows.

**Tabs:** Lines of text separated by paragraph marks or line breaks will become rows in your table. Tab-separated strings of text within those lines will become cell entries in the row.

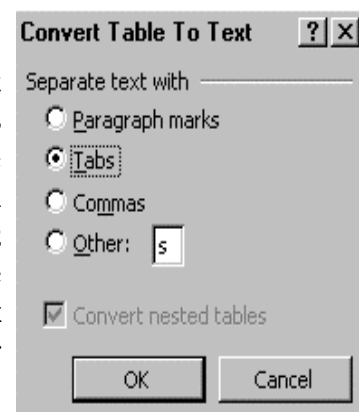
**Commas:** Lines of text separated by paragraph marks or line breaks will become rows in your table. Comma-separated strings of text within those lines will become cell entries in the row.

**Paragraphs:** Word will propose a single column and create as many rows as you have paragraphs. Changing the number of columns will distribute paragraphs among the columns from left to right.

**Other:** Lines of text separated by paragraph marks or line breaks will become rows in your table. The character (specified by you)-separated strings of text within those lines will become cell entries in the row.

### 9.3.8 Converting Tables to Text

To convert an existing table to text, select **Table→Select→Table** or **Rows** or **Columns** or **Cells** you wish to convert to text. Choose **Table→Convert Table to Text** command on the menu bar. Word will display a **Convert Table to Text** dialog box. Choose one of the options by check-marking appropriate box (Paragraphs, or Commas, or Tabs, or any other character specified by you in the text).



**Fig. 9.8**

Choosing Paragraph option will convert each table cell into one paragraph. If you pick the Comma or Tab options, Word will convert each row of your table into a paragraph.

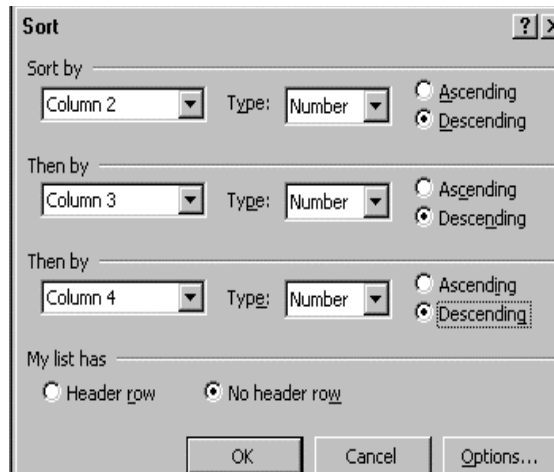
### 9.3.9 Sorting Text or Numbers in Tables

Word's **Table→Sort Text** command will attempt to sort selected text alphabetically, numerically, or chronologically (date) at your request. Sort can be up to three levels 'deep'. To sort a table with Sort command, follow these steps:

1. It is a good practice to save your file containing the table so that if you don't like the sorting pattern of your table you can go back to the original table.

| Classwise Number of Students in XYZ School |      |       |       |
|--------------------------------------------|------|-------|-------|
| Class                                      | Boys | Girls | Total |
| Class-I                                    | 25   | 35    | 60    |
| Class-II                                   | 30   | 25    | 55    |
| Class-III                                  | 20   | 30    | 50    |
| Class-IV                                   | 40   | 28    | 68    |
| Class-V                                    | 34   | 32    | 66    |

2. Suppose you want to sort the classwise boys in descending order, select all the rows excluding title row (in the example, top row 1 and 2).
3. Choose **Table→Sort**. You will see the Sort dialog box.
4. If you have labels at the top of your table, choose the option **My list has** Header row. There will be up to three drop-down lists containing the column labels or column numbers or column text.
5. Specify the sort order by choosing the desired column for each sort level. In the example we have selected first sort level as column 2 (Boys), second sort level as column 3 (Girls), and third sort level as column 4 (Total).



**Fig. 9.9**

6. Choose a sort order for each column. In the example the sort order for each column is Descending.
7. Click and select the data type for each column from **type** drop-down lists. In the example the **Type** is Number.
8. Click **OK** and Word will sort.

| Classwise Number of Students in XYZ School |      |       |       |
|--------------------------------------------|------|-------|-------|
| Class                                      | Boys | Girls | Total |
| Class-IV                                   | 40   | 28    | 68    |
| Class-V                                    | 34   | 32    | 66    |
| Class-II                                   | 30   | 25    | 55    |
| Class-I                                    | 25   | 35    | 60    |
| Class-III                                  | 20   | 30    | 50    |

## 9.4 ADDING GRAPHICS

Good artwork can really help to communicate your message and make your document unique. Word accepts most popular graphic file formats in use today, and it comes with large collection of ready-to-use clip art. You can also import your own graphic files from any source such as scanners and digital cameras. You can also create your own artwork by

### 9.4.1 Adding Clip Art

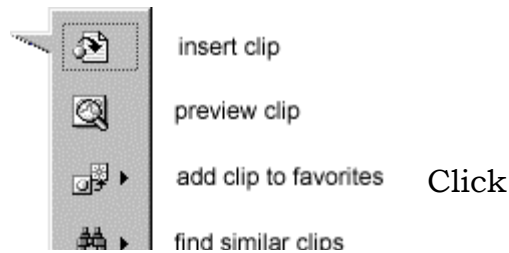
To add a clip art in Word, follow these steps:

1. Select **Insert→P**



**Fig. 9.10**

2. To find an image, click in the white box following **Search for clips**. Delete the words “Type one or more words. . .” and enter keywords describing the image you want to use. Or click one of the category icons.
3. Click once on the image you want to add to the document and the following popup menu will appear:



**Fig. 9.11**

- **Insert Clip** to add the image to the document.
  - **Preview Clip** to view the image full-size before adding it to the document. Drag the bottom, right corner of the preview window to resize the image and click the “**x**” close button to end the preview.
  - **Add Clip to Favourites** will add the selected image to your favourites directory that can be chosen from the **Insert ClipArt** dialog box.
  - **Find Similar Clips** will retrieve images similar to the one you have chosen.
4. Continue selecting images to add to the document and click the **Close** button in the top, right corner of the **Insert ClipArt** window to stop adding clip art to the document.

#### **9.4.2 Adding An Image from a File**

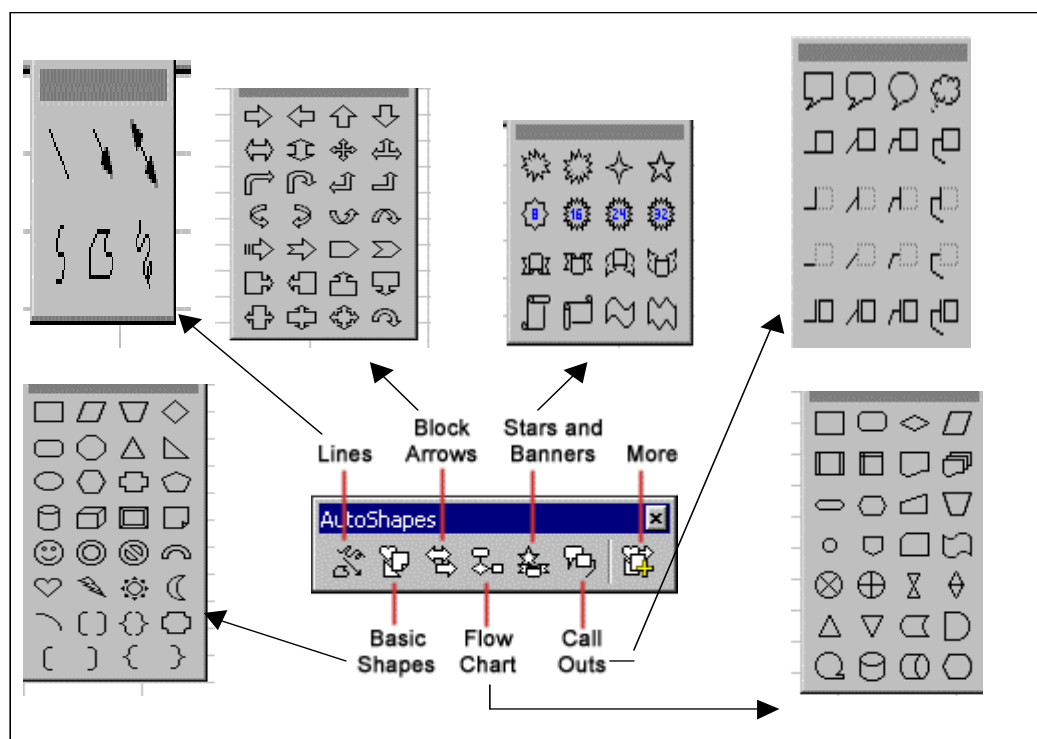
Follow these steps to add a photo or graphic from an existing file:

1. Select **Insert→Picture→From File** on the menu bar.
2. Click the down arrow button on the right of the **Look in:** window to find the image on your computer.
3. Highlight the file name from the list and click the Insert button.

#### **9.4.3 Auto Shapes**

The AutoShapes toolbar will allow you to draw many different geo-

metrical shapes, arrows, flow chart symbols, stars, and banners on the document. Activate the AutoShapes toolbar by selecting **Insert→Picture→AutoShapes** or **View→Toolbars→AutoShapes** from the menu bar, or clicking the AutoShapes button on the Drawing toolbar. Click each button on the toolbar to view the options for drawing the shape.



**Fig. 9.12**

1. **Lines** - After clicking the Lines button on the AutoShapes toolbar, draw a **straight line**, **arrow**, or **double-ended arrow** from the first row of options by clicking the respective button. Click in the document where you would like the line to begin and click again where it should end. To draw a curved line or freeform shape, select curved lines from the menu (first and second buttons of second row), click in the document where the line should appear, and click the mouse every time a curve should begin. End creating the graphic by clicking on the starting end or pressing the ESC key. To scribble, click the last button in the second row, click the mouse in the document and hold down the left button while you draw the design. Let go of the mouse button to stop drawing.

2. **Basic Shapes** - Click the Basic Shapes button on the AutoShapes toolbar to select from many two- and three-dimensional shapes, icons, braces, and brackets. Use the drag-and-drop method to draw the shape in the document. When the shape has been made, it can be resized using the open box handles and other adjustments specific to each shape can be modified using the yellow diamond handles.
3. **Block Arrows** - Select Block Arrows to choose from many types of ***two- and three-dimensional arrows***. Drag-and-drop the arrow in the document and use the open box and yellow diamond handles to adjust the arrowheads. Each AutoShape can also be rotated by first clicking the **Free Rotate** button on the drawing toolbar . Click and drag the green handles around the image to rotate it.
4. **Flow Chart** - Choose from the flow chart menu to add ***flow chart elements*** to the document and use the line menu to draw connections between the elements.
5. **Stars and Banners** - Click the button to select ***stars, bursts, banners, and scrolls***.
6. **Call Outs** - Select from the ***speech and thought bubbles, and line call outs***. Enter the call out text in the text box that is made.
7. **More AutoShapes** - Click this button to choose from a list of clip art categories.

Each of the submenus on the AutoShapes toolbar can become a separate toolbar. Just click and drag the gray bar across the top of the submenus off of the toolbar and it will become a separate floating toolbar. Some illustrations on how to draw graphics and diagrams are given in Excel lessons. You may refer to them.

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## INTEXT QUESTIONS

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1. State True or False
    - (a) It is not possible to convert text into table.
    - (b) AutoShapes feature is not for drawing different geometrical shapes.
    - (c) You can sort a table by maximum 3 columns.
-

- (d) The table sort feature in word is only to sort numbers and not for sorting text.
- 2. The command on menu bar to add an image from a file\_\_\_\_\_
- 3. The command on menu bar to edit a graphic\_\_\_\_\_
- 4. The command on menu bar to insert auto shapes\_\_\_\_\_

### **9.5 WHAT YOU HEAVE LEARNT**

In this lesson you learnt about creation and formatting of tables and graphics in a text document. Now you are in a position to insert a table of desired number of rows and columns in a document. Also you can insert any graphics in the text to make it more appealing. You can change the size and location of tables and graphics.

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### **9.6 TERMINAL QUESTIONS.**

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- 1. Explain the following
  - (a) Inserting rows and columns
  - (b) Resizing a Table
  - (c) Sorting text
- 2. What do you mean by adding clipart.
- 3. Define Auto shapes.
- 4. Explain Table properties in word.
- 5. What is the difference between text wrapping and alignment.

---

### **9.7 KEY TO INTEXT QUESTIONS.**

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- 1. ( a) False, (b) False, (c) True, (d) False
  - 2. Insert→Picture→From File
  - 3. View→Toolbars→Picture
  - 4. **Insert→Picture→AutoShapes** or **View →Toolbars→AutoShapes**
-

# 10

## DOCUMENT VIEWS AND FORMATTING

### 10.1 INTRODUCTION

After typing the text you need to make some formatting so that the typed material is brought to a presentable form. In previous lessons you have learnt about making text bold or italics. Also you are in a position to insert charts or pictures inside the text. In this lesson we will explain further designing of the text such as giving a border or a background shade.

### 10.2 OBJECTIVES

After going through this lesson you would be able to:

- explain the views options
- format border and shading in a document
- create a bookmark in the text
- find and replace specific text with another
- use news paper columns

### 10.3 PAGE VIEWS

MS-Word provides several ways to view documents: (a) Normal view (b) Outline view (c) Zoom in and out (d) Print layout view (e) Full screen view, and (f) Print preview.

---

### 10.3.1 Normal View

This feature displays the text in a simplified format that allows for faster typing and navigation through your document. It is the best all purpose view for typing, editing, and formatting text. In this view, you can see all character formats (such as bolded text and font size changes) and all paragraph formats (such as indents, tabs and alignments). Tables are visible and print as shown.

The major advantage of Normal view is that the screen scrolled faster while in Normal view than it did Print Layout view. However, this advantage is not significant today because of availability of faster Pentium Computers. Normal view, however, is not a graphical view. Specific page formats such as margins, page numbering, headers and footers, and

whole page zoom are not available in Normal view. Multiple columns are displayed as a single set up of text, not as multiple columns.

To switch to Normal View, follow one of these methods:

1. Choose **View→Normal** commands from menu bar.

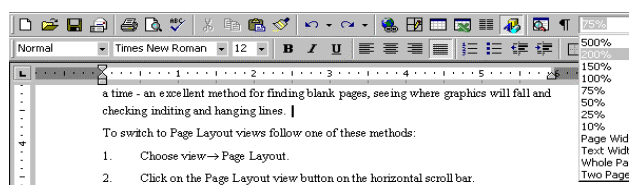


**Fig. 10.2**

2. Click on the Normal View button on the horizontal scroll bar.
3. Use the keyboard shortcut ALT+CTRL+N.

### 10.3.2 Print Layout View

It is the preferred typing view, because it gives you a sense of how your document is laying out on the page. Margins, page breaks, headers and footers, page numbering, and graphics are visible in Print Layout View. Another advantage of this view is that it allows you to view your pages in Page Width, or Text Width, or Whole Page, or Two Pages at a time. It allows you to change the magnifications to change the zoom from 10% to 500%, or view multiple pages at 10% zoom - an excellent method for finding blank pages, seeing where graphics will fall and checking indenting and hanging lines



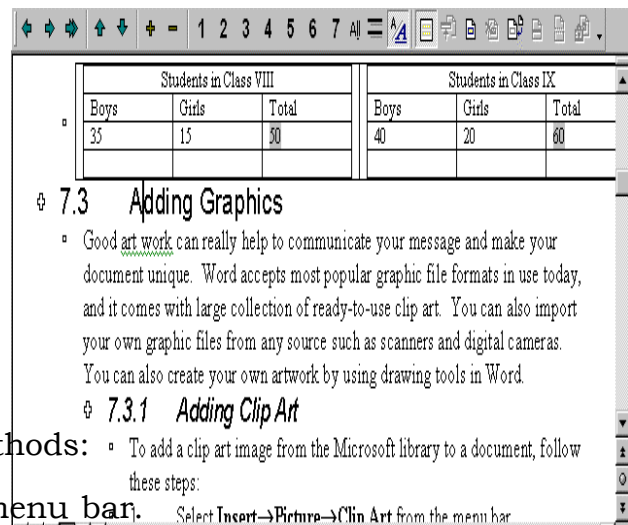
**Fig. 10.3**

To switch to Print Layout view, follow one of these methods:

1. Choose **View→Print Layout** commands from menu bar.
2. Click on the **Print Layout View** button on the horizontal scroll bar.
3. Use the keyboard shortcut **ALT+CTRL+P**.

### 10.3.3 Outline View

If the document is properly formatted, switching to outline view allows to quickly navigate and reorganize even large and complex documents. Outline view allows you to see the entire contents of the document, or just chapter headings, or just section headings, and so on. You can also indent or outdent the headings, and subheadings of your document - up to eight levels. Outline view also makes it easy to reorganise documents by allowing you to copy or move entire section of text up and down levels.



**Fig. 10.4**

To switch to outline view, use one of these methods:

1. Select **View→Outline** commands on the menu bar.
2. Click on the Outline **View** button on the horizontal scroll bar.
3. Use the keyboard shortcut **ALT+CTRL+O**.

When you switch to Outline view, Outline toolbar will be Indenting and Outdenting Headings in an outline instead of ruler.

To indent a heading, click on the heading, then press the **TAB** key or click on the right arrow on the Outline toolbar. To outdent, press **SHIFT+TAB** keys or click on the left arrow on the Outline Toolbar.

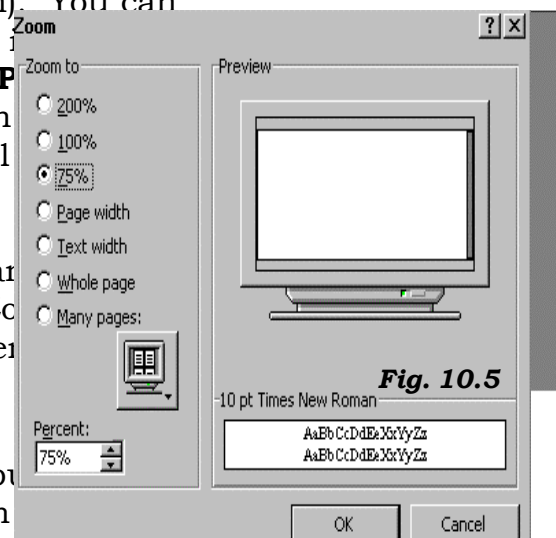
**Collapsing and Expanding Outlines:** To collapse a heading so that the indented sub-headings are not showing, double-click on the plus sign to the left of the heading. The indented subheadings will disappear. To expand the collapsed subheadings, double-click on the plus sign again to make the indented subheadings visible.

**Numbering Headings in an Outline:** You can automatically assign numbers the headings in an Outline. Word updates the numbers whenever you restructure the outline. To number headings in an outline, select the outlined text, then select **Format→Bullets and Numbering**. The Bullets and Numbering dialog box appears. Click on Outline Numbered to layout numbering styles. You can also customize the Outline numbering style by clicking on Customise tab in Bullets and Numbering dialog box and then selecting the appropriate options in Customize Outline Numbered List dialog box that appears.

### 10.3.4 Zoom

Zoom helps to view a document at different magnifications. You may zoom-in your document for a closer look at the details (as small as 10% magnifications) or zoom-out to see more of the page at a reduced size (as large as 500% magnification). You can type in your own magnifications or to the increments listed in the **Percent** of the Zoom dialog box. Click on the down arrow on the zoom control end of the Standard toolbar.

**View→Zoom** commands from menu bar. The Zoom dialog box appears showing the predefined zoom size from Zoom size decided by you in the Percent



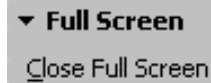
**Fig. 10.5**

### 10.3.5 Full Screen View

Full Screen view is a toggle button that switches between a screen with a taskbar and the ruler (if you have the ruler turned on) and one without. The Print Layout View or Outline View or Normal View that you have selected before choosing Full Screen command will always remain on the screen. To view Full Screen, select **View→Full Screen** commands from menu bar.

**Fig. 10.6**

The advantage of Full Screen is that it hides most screen elements so that you can view more of your document. To switch back to your previous view, click on **Close Full Screen** that appears on the screen, or press ESC.



**Fig. 10.7**

## 10.4 PAGE FORMATTING

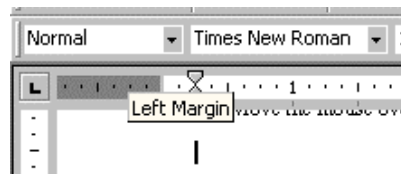
In this section, you will learn designing pages suiting to your needs. For instance, the page setup options which included paper size and page orientation etc. are normally set either by you or by default at the beginning of the opening a new document. These options can easily be changed at any time according to your needs.

### 10.4.1 Page Margins

There are two methods by which you can change the page margins of your document: (a) using ruler and (b) using Page Setup dial box.

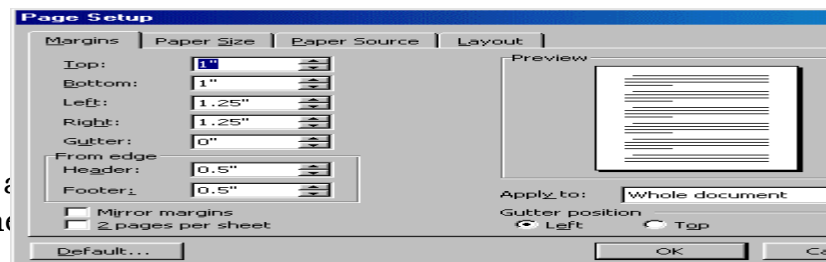
#### (a) Using Ruler

1. Move the mouse over the area where the white ruler changes to grey.



**Fig. 10.8**

2. When the cursor becomes a double-ended arrow, click the mouse and drag the margin indicator to the desired position.
3. Release the mouse when the margin is set.



#### (b) Using Page Set-up Dialog Box

The margins can also be changed using the Page Setup dialog box:

1. Select **File→Page Setup** command on the menu bar and choose the **Margins** tab in the dialog box.

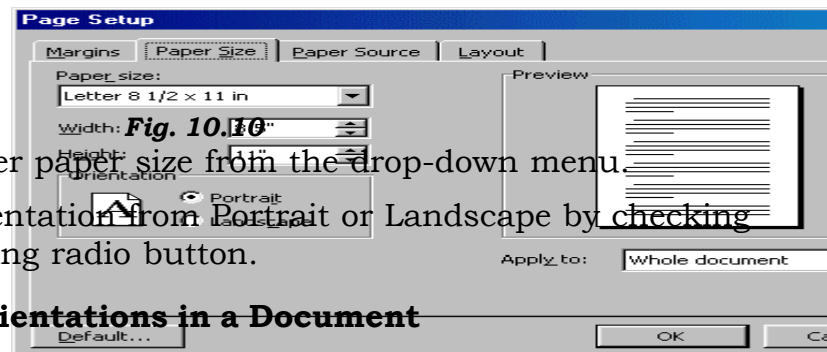
**Fig. 10.9**

2. Enter margin values in the Top, Bottom, Left, and Right boxes. The Preview window will reflect the changes.
3. If the document has Headers and/or Footers, the distance this text appears from the edge of the page can be changed.
4. To apply the changes to the whole document click on the drop-down arrow next to the **Apply to:** list box and change the option to Whole document if it do not appear.
5. Click **OK** when finished.

#### 10.4.2 Page Size and Orientation

Change the orientation page within the Page Setup dialog box.

1. Select **File→Page Setup** command on the menu bar and choose the **Paper Size** tab.

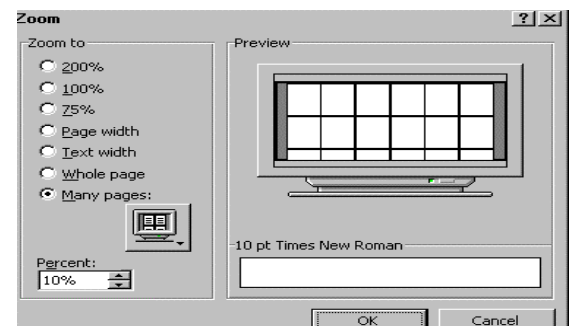


2. Select the proper paper size from the drop-down menu.
3. Change the orientation from Portrait or Landscape by checking the corresponding radio button.

#### 10.4.3 Multiple Orientations in a Document

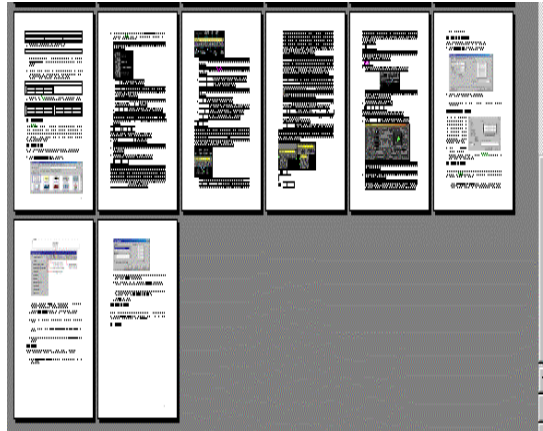
You can mix orientations with some pages in portrait and others in landscape orientation. Word will insert section breaks above and below the pages that have a different orientation. Follow the steps given below to change the orientation of selected pages:

1. Select **View→Zoom** commands on the menu bar. The Zoom dialog box will appear on the screen. Check-mark the **Many pages:** box under Zoom to in the Zoom dialog box. Click OK.



**Fig. 10.11**

2. You will see displaying multiple pages of your document on the screen. Select the pages to change the orientation.
3. Choose **File→Page Setup**, and click on the Paper Size tab. Then click on the orientation option (Landscape or Portriat) you need for those selected pages.



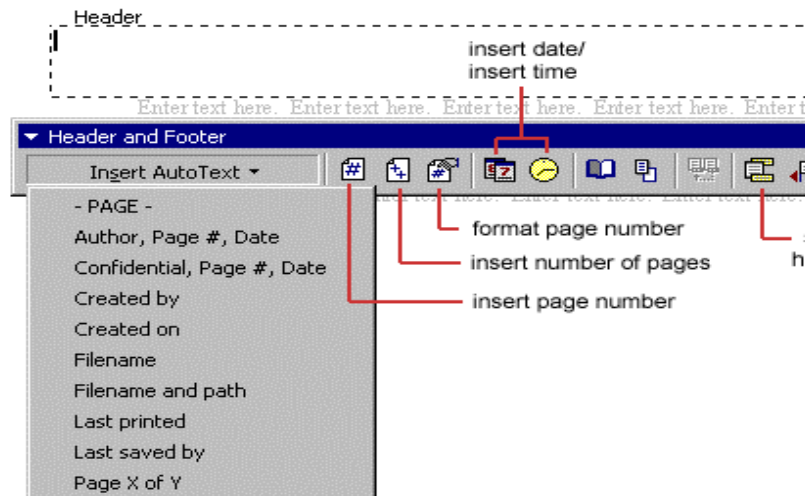
**Fig. 10.12**

4. Select **Apply to:** option in the drop-down box as Selected text. Click on **OK** when finished.

#### 10.4.4 Headers and Footers

A header is text that is added to the top margin of every page such as a document title or page number and footer is text added to the bottom margin. Follow these steps to add or edit headers and footers in the document:

1. Select **View→Header and Footer** command on the menu bar. The Header and Footer toolbar will appear page will be highlighted as shown below.



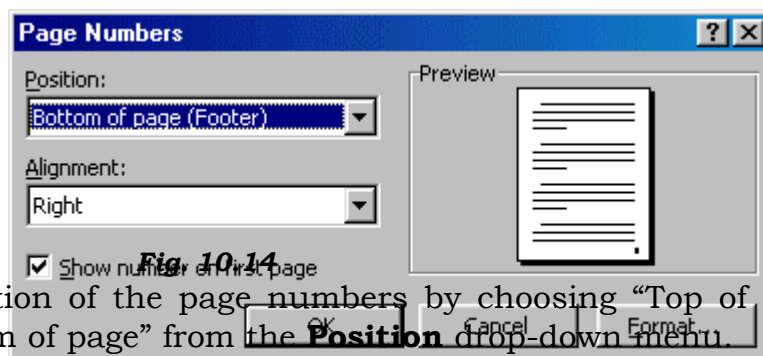
**Fig. 10.13**

2. Type the heading in the **Header** box. You may use many of the standard text formatting options such as font face, size, bold, italics, etc.
3. Click the **Insert AutoText** button to view a list of quick options available.
4. Use the other options on the toolbar to add page numbers, the current date and time.
5. To edit the footer, click the **Switch Between Header and Footer button** on the toolbar.
6. When you are finished adding headers and footers, click the **Close button** on the toolbar.

### 10.5 PAGE NUMBERS

Follow these instructions to add page numbers to a document.

1. Select **Insert→Page Numbers** from the menu bar and the following dialog box will appear.



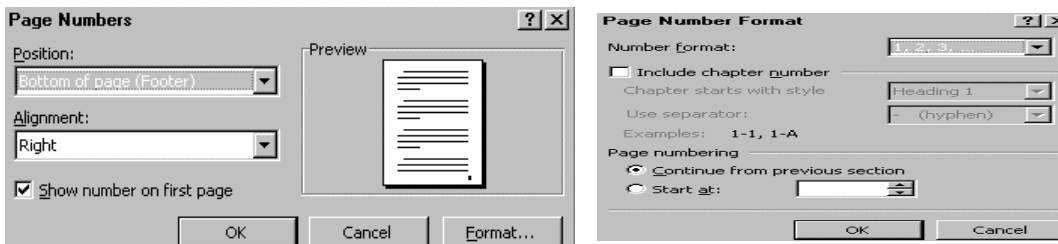
2. Select the Position of the page numbers by choosing “Top of page” or “Bottom of page” from the **Position** drop-down menu.
3. Select the alignment of the page numbers in the **Alignment** drop-down menu.
4. If you do not want the page number to show on the first page (if it is a title page, for example), uncheck the **Show number of first page** box.
5. Click **OK** when finished.

#### 10.5.1 Changing Start Value of Page Numbers in a Document or in a Particular Section of a Document

To change the starting value of page numbers of a document, follow the steps given below:

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1. Place the cursor on a page of the document. (If your document consists two or more sections, you may have to place the cursor on a page in that particular section to change the page numbers from the beginning page of that section.).
2. Select **Insert→Page Numbers** command on the menu bar and the Page Numbers dialog box appears.
3. Uncheck Show number on first page and click on Format in Page Numbers dialog box. The Page Number Format dialog box appears.

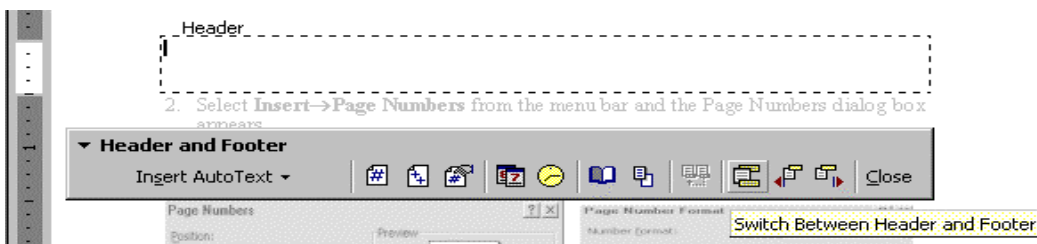
**Fig. 10.15**

4. At the bottom of the Page Number Format dialog box, click on the **Start at** option box and increase or decrease the page number value or simply type a number in the Start at box.
5. Click **OK** to close Page Number Format dialog box and then click **OK** to close Page Numbers dialog box.

### 10.5.2 Deleting Page Numbers in a Document or a Particular Section in a Document

To delete page numbers within a document or section of the document, follow the steps given below:

1. Select **View→Print Layout** to change screen view to Print Layout view if you are not already in this view.
2. Choose **View→Header and Footer** command on the menu bar. The Header and Footer toolbar appears. The header is shown first. If you can see your page number in the Header, skip to step 4.

**Fig. 10.16**

3. If do not see your page number in the Header, it may be suppressed and not showing on the first page. Click on the **Show Next** button to display the next Header. Still if you face the problem in seeing the page number in Header it may be in Footer. Click on the Switch between Header and Footer button in the Header and Footer toolbar. Still if you face the problem in seeing the page number in Footer it may be in Footer but suppressed. Click on the **Show Next** button to display the next Footer.



**Fig. 10.17**

4. When you see the page number, pause the mouse over the number and the mouse will turn into a four-headed arrow.
5. Click on the page number when the mouse is four-headed arrow. Object markers will display in a rectangular box around the number in declaring that the page number is selected.



**Fig. 10.18**

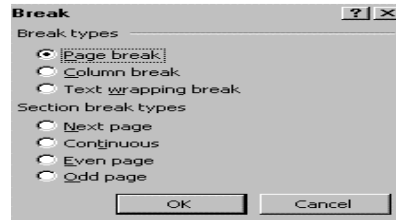
6. Press the Delete key on your keyboard to delete the number. It will disappear within the document or within the current section if the document has many sections.

### 10.5.3 Inserting a Page Break

When you are typing along and reach the bottom of a page in a Word document, a page break will be inserted automatically. The paper size will determine where automatic page breaks occur. If you wish to end one page and start another page before the natural page breaks, you should not press the ENTER key repeatedly in order to move to the next page. Instead, follow one of the ways given below:

---

1. Position the insertion point at the line where the page should end. Choose **Insert→Break** command from menu bar. The Break dialog box appears. Check-mark Page break under Break types in Break dialog box. Click **OK** to insert a page break.



**Fig. 10.19**

2. Position the insertion point at the line where the page should end. Press **CTRL+ENTER** keys to insert a page break.

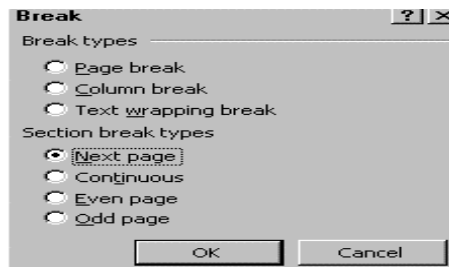
#### 10.5.4 Deleting a Page Break

The easiest way to delete page breaks is to find and remove the extra page break indicator in the document. To do this switch over to Normal view, click on the Page Break line and press **DELETE** key to remove the page break.

#### 10.5.5 Inserting a Section Break

You can also insert a new section in order to give different page numbers or orientation etc. You can use Break dialog box for this purpose. Follow the steps given below to insert a section break:

1. Position the insertion point at the line where the page should end. Choose **Insert→Break** commands from menu bar. The Break dialog box appears. Check-mark the option under Section break types in Break dialog box. Click **OK** to insert a section break.



**Fig. 10.20**

#### 10.5.6 Deleting a Section Break

The easiest way to delete section breaks is to find and remove the extra section break indicator in the document. To do this switch over to the Normal view, click on the **Section Break** line and press **DELETE** key to remove the section break.

#### 10.5.7 Adding Borders and Shading to Pages

One of the effective formatting option in Word is the ability to apply

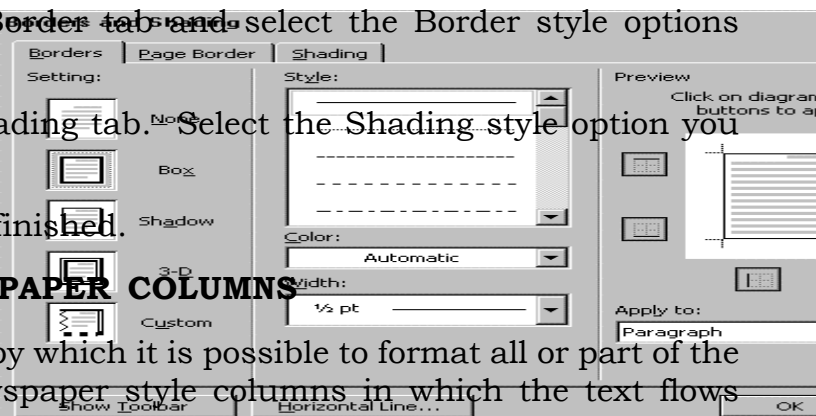
borders and shading to parts of your document. To apply borders and shading to pages, follow the steps given below:

1. Select the pages to receive borders or shading.

**Fig. 10.21**

Choose **Format→Borders and Shading** command on the menu bar. The Borders and Shading dialog box appears, which has three tabs: Borders, Page Border, and Shading.

2. Click on Page Border tab and select the Border style options you prefer.
3. Click on the Shading tab. Select the Shading style option you prefer.
4. Click OK when finished.



## 10.6 USING NEWSPAPER COLUMNS

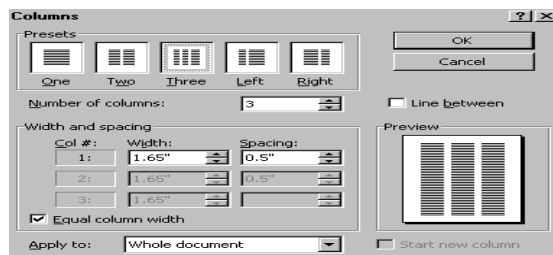
Word has a feature by which it is possible to format all or part of the document with newspaper style columns in which the text flows from the bottom of one column to the top of the next. These columns can be equal or unequal width. You can also vary the number of columns in a document or on a page. Newspapers, newsletters, brochures, and magazines use this style of text layout.

### 10.6.1 Creating Columns of Equal or Unequal Width

The Figure shows the Columns dialog box with different column choices. Word's columns feature allow you to create up to 45 columns (actual number of columns is affected by page size and margin settings), define different column layouts on the same page, and

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quickly draw lines or rules between the columns. Follow these steps to create columns in your document:

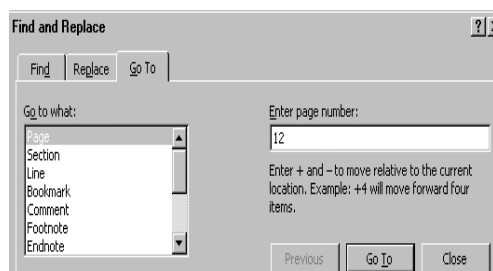


**Fig. 10.22**

1. Place the insertion point where the columns should begin. If you want to include a heading that spans across all the columns at the top of the page or section, type this heading first before defining columns. You can also select existing text to be formatted as columns.
2. Select **Format → Columns** commands from menu bar.
3. In the preset area, select the type of column layout you prefer. The first three layouts are for equally spaced columns; the last two will produce unequal columns (Left preset layout makes the left column narrower than the right column. The Right preset layout makes right column narrower). In both formats, the wide column is twice as wide as the narrow column.
4. You can add columns in the Numbers of columns box, and change the width of each column in the Width and Spacing area. Word will show you a preview of how the columns will look.
5. To add a line or rule between the columns, check the Line Between option, which is above the preview area.
5. Column layouts can apply to selected text or to the whole document or from a particular point forward in the document. In the **Apply to:** drop-down list box at the bottom of the dialog box, choose the appropriate setting.

## 10.7 USING THE GO TO COMMAND

If the document being edited is huge and the user knows the page numbers, MS-Word provides a feature **Go To** that will make navigation easier. Choose **Edit→Go To**. A Find and Replace dialog box appears. Use this to specify the page, section, line, bookmark, footnote or annotations to which you desire to go. Use the text box to enter the number and press the GoTo button. The following gives a list of samples that can be typed in the text box.



**Fig. 10.22**

|           |                                        |
|-----------|----------------------------------------|
| 0         | Move to the beginning of the document. |
| Blank     | Move to the next page.                 |
| 20 or P20 | Move to page 20                        |
| S5        | Move to section 5                      |
| P4S2      | Move to section 2 in page4.            |
| -2        | Move back by 2 pages.                  |
| +4        | Move forward by 4 pages.               |

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## INTEXT QUESTIONS

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1. What is a Header and Footer?
  2. The shortcut key to insert a page break:\_\_\_\_\_
  3. How do you delete a Page break?
  4. State True and False
    - (a) You cannot change Start value of page numbers in a particular section of a document.
    - (b) Word's columns feature allows you to create upto 45 columns
    - (c) You cannot remove a section break once inserted.
- 

## 10.8 BOOKMARKS

Bookmarks are used to mark items and locations in a document—for example, a passage in a document that you want to refer to with a cross-reference or an index entry. When a bookmark is inserted, a unique name is given to a selected item or location, which is later used to locate the marked items.

A cross-reference is a reference to an item that appears in another location in a document — for example, “See Figure 1 on page 3.” You can create cross-references to headings, footnotes, bookmarks,

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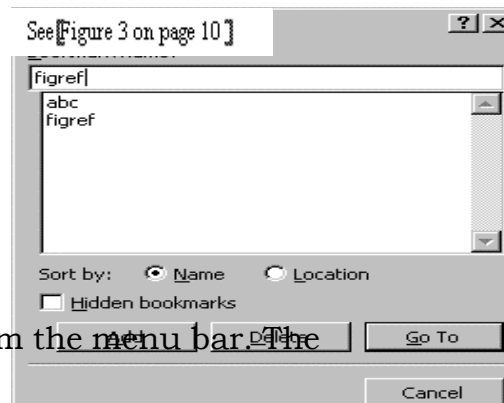
captions, numbered paragraphs, and so on. If you are creating an online document, you can use hyperlinks for cross-references so that users can jump to the appropriate reference. If you later add, delete, or move an item you have referred to in a cross-reference, you can easily update the cross-references all at once.

A caption is a numbered label, such as “Figure 1,” that you can add to a table, figure, equation, or other item. You can vary the caption label and number format for different types of items — for example, “Table II” and “Equation 1-A.” If you later add, delete, or move captions, you can easily update the caption numbers all at once.

To create a bookmark, follow these steps:

1. Select the text, item or location that has to be marked. For example, you have typed ‘See Figure 3 on page 10’, and want ‘Figure 3 on page 10’ as bookmark then select this text.

**Fig. 10.23**



2. Choose **Insert→Bookmark** commands from the menu bar. The Bookmark dialog box appears.
3. Type a name for the bookmark in the Bookmark Name box, which must begin with a letter. This name can contain letters, numbers and underscore characters. Also, it should not have more than 40 characters and no spaces in between. In our example we have given the name as ‘figref’.
4. Click the Add button. The text will be book marked.

See Figure 3 on page 10

To view or hide bookmark click **Tools →Option** and

select the **View** tab. Under **Show**, select or clear the **Bookmark** check box.

To locate a bookmark, click **Edit→Bookmark** and then select the bookmark name you want to locate and then choose the **Go To** button.

To add text to the end of a bookmark, type the additional text at the end of the marked text, select the added text and the existing bookmark and then choose **Bookmark** from the Insert menu. Select the existing bookmark name, and then choose the **Add** button.

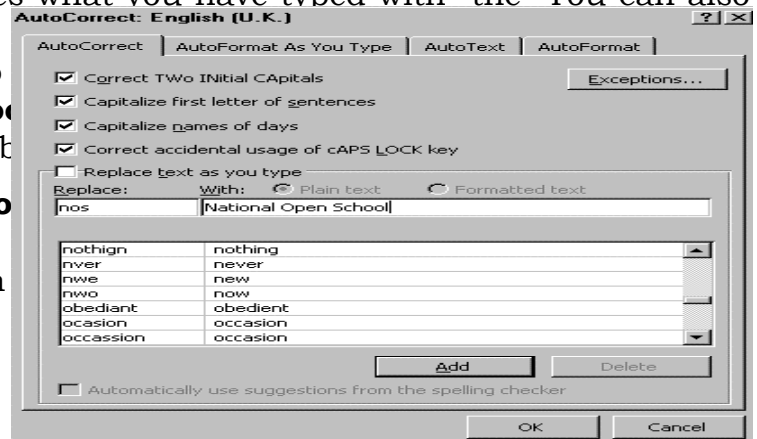
## 10.9 REUSING TEXT AND GRAPHICS

Word enables you to store frequently used text, graphics and other items and quickly insert them into documents. This is made possible by the two features of Word - **AutoCorrect** and **AutoText**. Both these features help to reuse text with or without its original formatting.

### 10.9.1 Using AutoCorrect

You can use the AutoCorrect feature to automatically detect and correct typos, misspelled words, grammatical errors, and incorrect capitalization. For example, if you type **teh** plus a space, then AutoCorrect replaces what you have typed with “the” You can also use AutoCorrect to correct capitalization. For example, if you type **(c)** to start a sentence, AutoCorrect changes it to **(C)**. The AutoCorrect dialog box is shown in Figure 10.24.

Choose **Tools→AutoCorrect** to open the AutoCorrect dialog box. The dialog box appears. The **AutoCorrect** tab is selected. The **AutoCorrect** tab contains the following options:



**Fig. 10.24**

### 10.9.2 Creating your Own AutoCorrect Entries

When creating your own AutoCorrect entries, there is one potential landmine, which is that AutoCorrect will always blindly replace certain text strings with other text strings. So, try to use names that are uncommon yet easy to remember. Here are the steps for creating an AutoCorrect entry:

1. Open the AutoCorrect dialog box with the **Tools → AutoCorrect** command on the menu bar .
2. Type the “name” (the text string you wish to replace) in the Replace box.
3. Type the replacement in the With box.
4. Click Add.
5. Make any other entries or changes.
6. Click OK when done

#### Automatic Correction

In addition to fixing mistakes as you type them, you can run the AutoCorrect feature at any time to inspect and clean up documents. Use the AutoCorrect dialog box to choose the options you wish Word to use from AutoCorrect dialog box.

### 10.9.3 Using Auto Text

AutoText is an easy way to store and retrieve “boilerplate” text, graphics, addresses, letter closings, memo distribution lists, tables, logos and just about anything else that you can create with Word.

#### Creating AutoText Entries

To create AutoText entries, follow these steps:

1. Simply select the text you want as AutoText.
  2. Choose **Insert→ AutoText→AutoText** commands from menu bar. The AutoCorrect dialog box appears. If you want to store the paragraph formatting with the entry, be sure to include paragraph marks in your selection. (Even if you store an entry with paragraph formatting, you can later insert the entry without formatting if you wish).
-

**Fig. 10.25**

3. Click **Add**. Click **OK** when you finished.

### Using Auto Text Entries

Once you have created AutoText entries, you can insert them in the text. To do this, follow these steps:

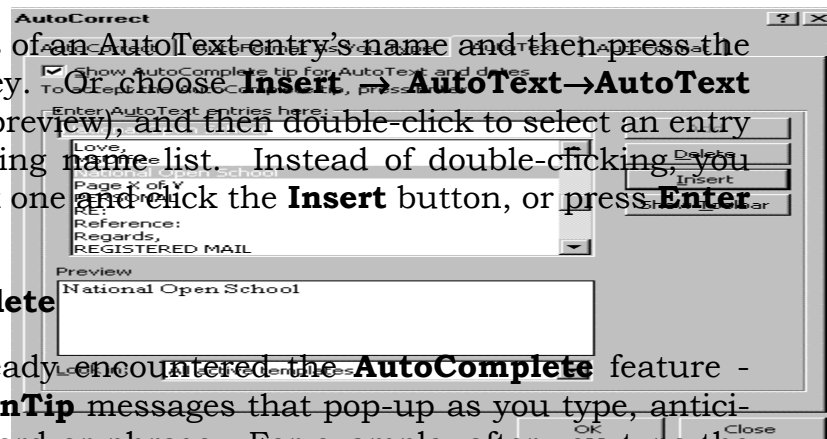
1. Place the insertion point where you want the entry to be placed.
2. Type few letters of an AutoText entry's name and then press the **F3** function key. Or choose **Insert** → **AutoText** → **AutoText** (you will see a preview), and then double-click to select an entry from the scrolling name list. Instead of double-clicking you could also click one and click the **Insert** button, or press **Enter** key.

#### 10.9.4 Auto Complete

You may have already encountered the **AutoComplete** feature - small, yellow **ScreenTip** messages that pop-up as you type, anticipating your next word or phrase. For example, after you type the first three letters of a phrase that is stored as an **AutoText** entry. Word will suggest the rest of the phrase. When you see the suggested pop-up phrase, press the **Enter** key or press F3 to have Word complete the phrase for you. To reject the suggestion, just keep typing and the suggestion goes away.

**AutoComplete** provides suggestions for both pre-programmed Items and AutoText Items you create. Here are the items that are automatically completed: the current date, a day of the week, a month of

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the year, and AutoText entries. For example, if type **Dec.**, AutoComplete will suggest “December”; press the **Enter** Key or press **F3** to take the suggestion. If you are a very fast typist, you may never see AutoComplete suggestions - you will have completely typed a phrase before Word can offer to finish it for you.

To get the most out of AutoComplete, you should store your frequently used text as AutoText. An AutoComplete suggestion won't be offered until you type the first three letters of a phrase. But if you have stored as AutoText two or more phrases that start with the same three letters, AutoComplete won't offer a suggestion until you type enough for it to recognise which phrase you are typing. For example, if you have stored the phrases *Yours faithfully* and *Yours sincerely* as AutoText entries, you will need to type Yours plus the first letter of the next word (say *f* for *Yours faithfully* or *s* for *Yours sincerely*) before AutoComplete will be able to suggest the correct text. To solve this problem you can also assign unique two-character abbreviations to phrases that start with the same letters. For example, you could assign the abbreviation *yf* to the phrase *Yours faithfully* and *ys* to the phrase *Yours sincerely*.

AutoComplete uses the text of the AutoText feature. Microsoft created a few frequently typed phrases so that there would be some existing AutoComplete items.

To turn AutoComplete feature on or off:

1. Select **Insert→AutoText→AutoText** commands from the menu bar. The AutoCorrect dialog box appears.
2. Check-mark (or uncheck-mark) the **Show AutoComplete tip for AutoText and dates** option on the **AutoText** tab to turn AutoComplete feature on (or off).
3. Click on **OK**.

---

## INTEXT QUESTIONS

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5. Define book-mark.
  6. The name for a bookmark can contain upto——characters.
  7. To access Mark Index Entry dialog box , press———keys.
  8. State True or False
    - (a) Word enables you to store frequently used text, graphics and other items and quickly insert them into documents.
-

- (b) Each time you visit and close the Index tab in the **Index and Tables** dialog box, Word will not ask you whether you want to replace the selected index.

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### 10.9.5 Finding and Replacing Text and Formatting

To find a particular text in a document and replace it with some other text:

1. Choose the **Edit→Find** option. The Find and Replace dialog box appears. This dialog box can be used to specify the text to be found. The text found by this option can be changed, by clicking the mouse at the position required, in the document. The dialog box can be reused to fetch the next instance of the text.



**Fig. 10.26**

2. The Find and Replace dialog box can be used to replace a word on its first occurrence or all occurrences. If you click on Replace, Word replaces the selected instance of the search criteria, finds the next occurrence, and then stops. If you want Word to automatically replace all occurrences of the search criteria in your document, click Replace All.

### 10.10 WHAT YOU HAVE LEARNT

In this lesson you learnt various techniques of formatting a document such as placing a border around the page or giving a shade. You also learnt different options that MS-Word offers to view a document. Now you are in a position to format a page by giving required margin, paper size, header and footer and page number.

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### 10.11 TERMINAL QUESTIONS

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1. What are the steps to create a Bookmark in a document?
  2. What is the advantage of using AutoCorrect feature in Word?
  3. Explain the steps in creating AutoText entries.
  4. What is the advantage of AutoComplete feature in Word?
  5. Explain the steps in finding and replacing text?
  6. Write steps in creating columns of unequal width in a Word document.
  7. Write steps in inserting a page number.
  8. How do you delete a section break?
  9. How do you add Borders and Shading to pages in a document?
  10. Write steps in inserting a chapter heading in a Header.
  11. Explain any three uses of editing a graphic.
  12. Write steps in converting tables to text.
- 

### 10.12 KEY TO INTEXT QUESTIONS

1. A Header is text that is added to the top margin of every page such as a document title or page number and Footer is text added to the bottom margin.
  2. CTRL+ENTER
  3. Switch over to **Normal View**, click on the **Page Break line** and press **DELETE** key.
  4. (a) False, (b) True, (c) False
  5. Bookmarks are used to mark items and locations in a document.
  6. 40
  7. ALT+SHIFT+X keys
  8. (a) True, (b) False, (c) False
-

# **11**

## **MAIL MERGE**

### **11.1 INTRODUCTION**

A common word processing task is to produce periodic mailings to send to different people or agencies connected to you or your profession or your business. The mailing features in Word can help you to organize your address data, get it into a document, and print it out in the desired format. The main uses of Word's Mail Merge features are: You can merge a list of names and addresses to a single letter that can be sent to different people in their names and addresses. Create categories, a single letter with variable information fields in it, or labels. Produce merged documents such as directory lists, invoices, print address lists, or print addresses on envelopes and mailing labels.

### **11.2 OBJECTIVES**

After going through this lesson you would be able to

- create form letters, mailing labels, envelopes, or catalogs
- organize address data and merging it into a generic document
- customize a mail merge

### **11.3 TYPES OF DOCUMENTS IN MAIL MERGE**

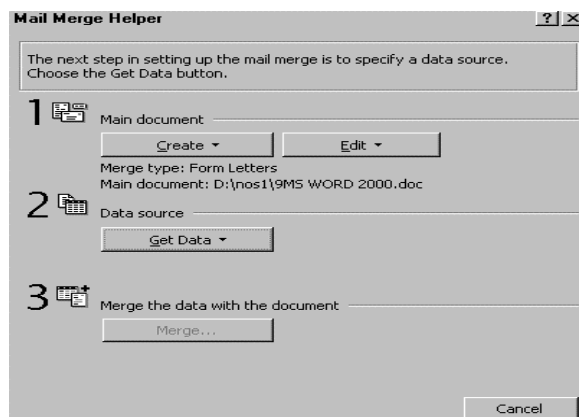
Mail Merge requires three types of documents: (a) Main Document, (b) Data Source, and (c) Merge Document.

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- (a) **Main Document:** In a Mail Merge operation, the personalized document (such as, a standard letter, or envelope, or mailing label) is known as the main document. It is the document containing the text and graphics that stay the same for each version of the merged document - for example, the return address and body of a form letter.
- (b) **Data Source:** Data source is a file that contains the names and addresses or any other information that vary with each version of a mail-merge document. For example, a list of names and addresses for a form letter you want to send to a list of clients or other people.
- (c) **Merge Document:** When you merge the main document with data source, a third document called merge document will be produced. The merge document can be merged to the screen to view letters along with addresses; or directly to the printer to print the letters along with addresses and print addresses on envelopes or labels; or save as some other file that can be used later for printing. Inserting the data or information from the data source in the main document creates the merge document. For example, insert the merge field «City» in a letter document to have Word insert a city name, such as “New Delhi” that is stored in the City data field.

### 11.3.1 Mail Merge Helper

The Mail Merge Helper guides you through the process of doing a mail merge. This involves creating and editing main document; creating a new data source or opening an existing data file; and merging the data source with main document. To use Mail Merge Helper, select **Tools→Mail Merge** command on the menu bar. The **Mail Merge Helper** dialog box appears.



**Fig. 11.1**

## 11.4 CREATING A MAIN DOCUMENT

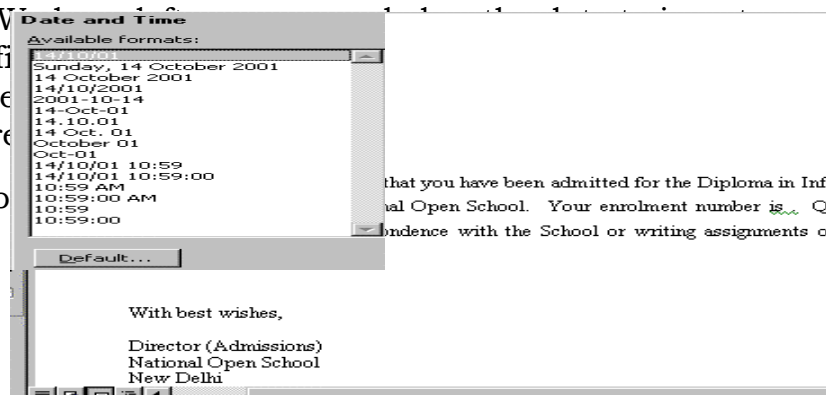
In this section you will learn how to create a main document using Mail Merge Helper, or in your own way. The main document is most often a form letter. However, it can also be a mailing label, an envelope etc. To create a simple letter with variable (current) date, follow these steps:

1. Open a new document. Select **Insert→Date and Time** command on the menu bar. The **Date and Time** dialog box appears, Select date format and click **OK** in the Date and Time dialog box.

**Fig. 11.2**

2. Leave some space (approximately 6 to 7 lines by pressing ENTER key) to insert addresses through merge fields later. Do not type any thing in this space. We will tell you how to insert addresses from data source through data fields later. You can also insert fields anywhere in the body of the letter. The following Figure shows an example of form letter created to send the letters to all the students admitted for DIT programme offered by National Open School. Variable fields like name, address field etc. also can be inserted. The data source is ready.

3. Type the body of the letter.



**Fig. 11.3**

4. Save your document.

You can also use Mail Merge Helper to create Main Document. Follow these steps to do it:

---

1. Select **Tools→Mail Merge** command on the menu bar. The **Mail Merge Helper** dialog box appears.
2. Under **Main document**, click **Create**, and then click **Form Letters**. The **Microsoft Word** dialog box appears



**Fig. 11.4**

3. Click **Active Window**. The active window becomes the main document.

Observe that when you choose this helper, the action will be same as opening a new document to create main document.

## **11.5 CREATING A DATA SOURCE**

If you do not have existing database information, you must create your own data source of the fields of information that will be inserted into the letter or any other main document. For example, a Mail Merge letter you have created earlier might require that you have the following fields in address list of students as data source: Name, Address1, Address2, City, State, and PIN Code. In this lesson, you will learn on creating a data source using Mail Merge Helper or using a Word table or importing your Excel Worksheet.

### **11.5.1 Creating a Data Source Using Mail Merge Helper**

You can use the Mail Merge Helper to create a Microsoft Word data source with up to 63 data fields.

Follow these steps to create a data source using Mail Merge Helper: Open a new blank document if you have not yet created the main document or open your existing main document.

1. Select **Tools→Mail Merge** command on the menu bar. The **Mail Merge Helper** dialog box appears.
  - If you have opened a new blank document observe that **Get Data** under **Data source** in the Mail Merge dialog box will not be highlighted. Click on **Create** drop-down menu under **Main document** and then choose **Form Letters** in the drop-down menu. The Word will ask you whether you want to use the **Active Window** or **New Main Document**. Click on **Active Window**. Observe that **Get Data** under **Data source** in the Mail Merge dialog box will be highlighted now.

- If you have opened an existing main document observe that Get Data under Data source in the Mail Merge dialog box will be highlighted.
2. Under Data source, click **Get Data**, and then click **Create Data Source**. The **Create Data Source** dialog box appears.
  3. In the Field names in header row box, specify the data fields that you want to include in the data source:
    - To delete a data field, click the field name in the **Field names in header row** box, and then click **Remove Field Name**.
    - To add a data field, type a new field name in the **Field name:** box, and then click **Add Field Name**.

- To change the field name in the **Field name:** box, click the field name in the **Field names in header row** box, and then click one of the buttons: **Add New**, **Delete**, **Restore**, **Find...**, or **View Source**.
4. When you finish specifying the data fields, click **OK**. The **Save As** dialog box appears.

5. Locate the folder that you want to save the data source in, type a file name, and then click **Save As** in the Save As dialog box. The **Microsoft Word** dialog box appears.
6. Click **Edit Data Source** in the Microsoft Word dialog box. The **Data Form** dialog box appears.

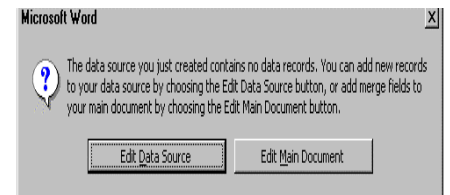
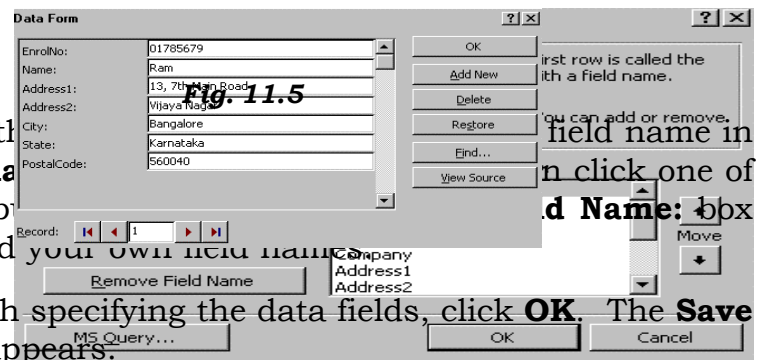
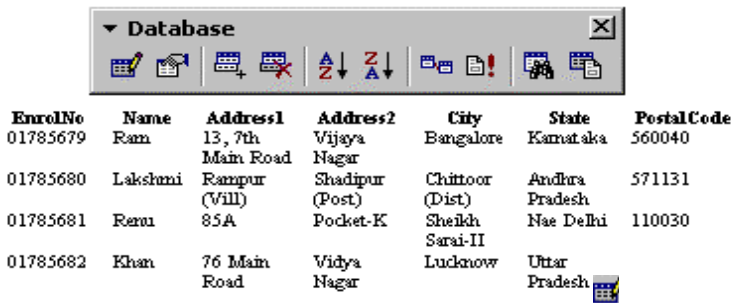


Fig. 11.6

Fig. 11.7

7. In the Data Form dialog box, fill in the information for each data record:
  - o To fill in a record, type information for a data field, and then press ENTER to move to the next field. If you don't want to include information for a particular field, press ENTER to skip the field. Don't type spaces in the box.
  - o To start a new data record, click **Add New**.
8. When you finish entering data records, click the **View Source** in the Data Form dialog box. Observe that the data records created will appear in a table format along with **Database** toolbar similar to the one shown in the Figure. Save the data source by clicking **Save** on the Standard toolbar.



The screenshot shows a 'Database' toolbar with icons for adding, deleting, and navigating records. Below the toolbar is a table with the following data:

| EnrolNo  | Name    | Address1          | Address2        | City            | State          | PostalCode |
|----------|---------|-------------------|-----------------|-----------------|----------------|------------|
| 01785679 | Ram     | 13, 7th Main Road | Vijaya Nagar    | Bangalore       | Karnataka      | 560040     |
| 01785680 | Lakshmi | Rampur (Vill)     | Shadipur (Post) | Chittoor (Dist) | Andhra Pradesh | 571131     |
| 01785681 | Renu    | 85A               | Pocket-K        | Sheikh Sarai-II | Nae Delhi      | 110030     |
| 01785682 | Khan    | 76 Main Road      | Vidya Nagar     | Lucknow         | Uttar Pradesh  |            |

**Fig. 11.8**

9. To return to the main document, click **Mail Merge Main Document** button on the Database toolbar.

### 11.5.2 Editing Existing Data Records

To edit the existing data records in the data source file, follow these steps:

1. Open the data source file and then select **View→Toolbars→Database** command on the menu bar. The **Database** toolbar will appear on the screen.
2. Click on **Data Form** button. The Word will display the data source in the **Data Form** dialog box.
3. To locate a data record that you want to change, move to the record number you want change its contents by clicking the arrow keys or typing the record number; or click **Find**, and then search for information that you know the record contains.
4. Edit the records that you want to change.

5. When you finish editing records, click **View Source** in the Data Form dialog box, and then click **Save** button on the Standard toolbar to save changes to the data source.

### 11.5.3 Add New Data Records

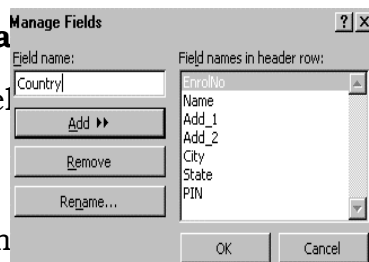
To add new data records in the existing data source file, follow these steps:

1. Open the data source file and then select **View→Toolbars→Database** command on the menu bar. The **Database** toolbar will appear on the screen.
2. Click on **Data Form** button. The Word will display the data source in the **Data Form** dialog box.
3. Click **Add New** button.
4. To fill in a record, type information for a data field, and then press **ENTER** to move to the next field.
5. Repeat steps 3 and 4 for each new record.
6. When you finish adding records, click **View Source** on the Data Form dialog box, and then click **Save** on the Standard toolbar.

### 11.5.4 Add New Data Fields

To add new data fields in the existing data source file, follow these steps:

1. Open the data source file and then select **View→Toolbars→Database** command on the menu bar. The **Database** toolbar will appear on the screen.
2. Click on **Manage Fields** button. The Word will display the data source in the **Data Form** dialog box.
3. In the **Field name** box, type a name for the new data field, and then click **Add**. When you finish adding fields, click **OK**.
4. To add the new field information to each record, click **Data Form**, and then edit the records in the **Data Form** dialog box.



**Fig. 11.9**

### 11.5.5 Creating a Data Source Using Word Table

In fact, the Mail Merge Helper guides you step by step through

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setting up a Word table that contains your names, addresses, and other data. Instead of taking advantage of Mail Merge Helper, you can also create a data source by entering field names and data directly in a Word table. Follow these steps to do this:

1. Insert a table by selecting **Table→Insert→Table** command on the menu bar as explained in an earlier lesson on Tables.
2. Type the data field names on the top row of the table. Start typing the data records from the second row.

| EnrolNo  | Name    | Add 1                         | Add 2           | City            | State          | PIN    |
|----------|---------|-------------------------------|-----------------|-----------------|----------------|--------|
| 01785679 | Ram     | 13, 7 <sup>th</sup> Main Road | Vijaya Nagar    | Bangalore       | Karnataka      | 560040 |
| 01785680 | Lakshmi | Rampur (Vill),                | Shadipur (Post) | Chittoor (Dist) | Andhra Pradesh | 571131 |
| 01785681 | Renu    | 85A                           | Pocket-K        | Sheikh Sarai-II | New Delhi      | 110030 |
| 01785682 | Khan    | 76 Main Road                  | Vidya Nagar     | Lucknow         | Uttar Pradesh  |        |

3. When you finish entering all the data records, save the table as a Word document. Your data source document is ready.

### 11.5.6 Using Excel Worksheet to Create a Data Source

You can use Excel program to create a data source. Follow these steps do this.

1. Start Excel program. Open Worksheet.
2. Type the data field names on the top row of the worksheet. Start typing the data records from the second row.
3. When you finish entering all the data records, save the worksheet.
4. Select the data field names and data records you typed in the worksheet, and then click on **Copy** button in the standard toolbar. Close the file and then exit Excel program.
5. Open Word program. Open a new document and then click on Paste button. The data will be copied to word document in a table form. Save the document. Your data source document is ready.

## 11.6 MERGING DOCUMENTS

Once if you have created your main document and data source docu-

ment, the next two steps in mail merge are to insert merge fields in the main document and then merge data in the main document. You will learn these two steps in this section:

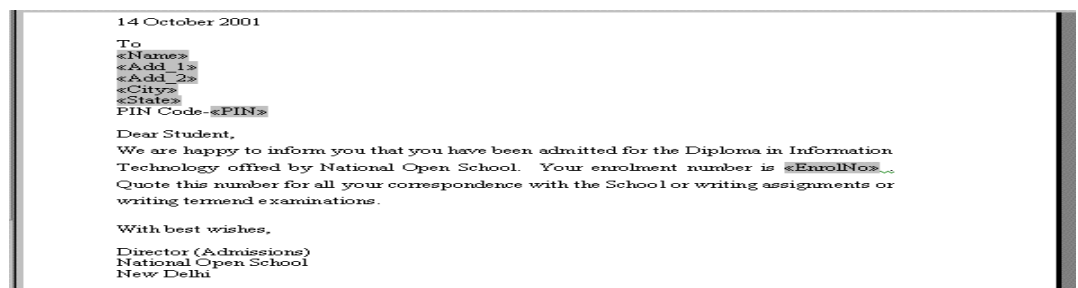
### 11.6.1 Editing the Main Document and Merging (Inserting) Fields in the Main Document

To merge the fields in the main document you may have to do some editing in the main document. Follow these steps to do this:

1. Open the main document.
2. Select **Tools→Mail Merge** command on the menu bar. The **Mail Merge Helper** dialog box appears.
3. Under **Main document**, click **Create**, and then click **Form Letters**. The **Microsoft Word** dialog box appears
4. Click **Active Window**. The active document becomes the main document.
5. To open the data source document, click **Get Data**, and then click **Open Data Source**. The **Open Data Source** dialog box will appear. Choose the data source file that you have earlier created and then click **Open**. The **Microsoft Word** dialog box will appear. Click **Edit Main Document**. Observe that the **Mail Merge** toolbar will appear on the screen.
6. In the main document, place the cursor where you want to merge names, addresses, and other data from the data source. Insert the merge fields by clicking **Insert Merge Field** on the **Mail Merge** toolbar, and then click the field name you want. In our example of student admission letters we have inserted the fields in the space provided for address of students and enrolment number.



**Fig. 11.10**



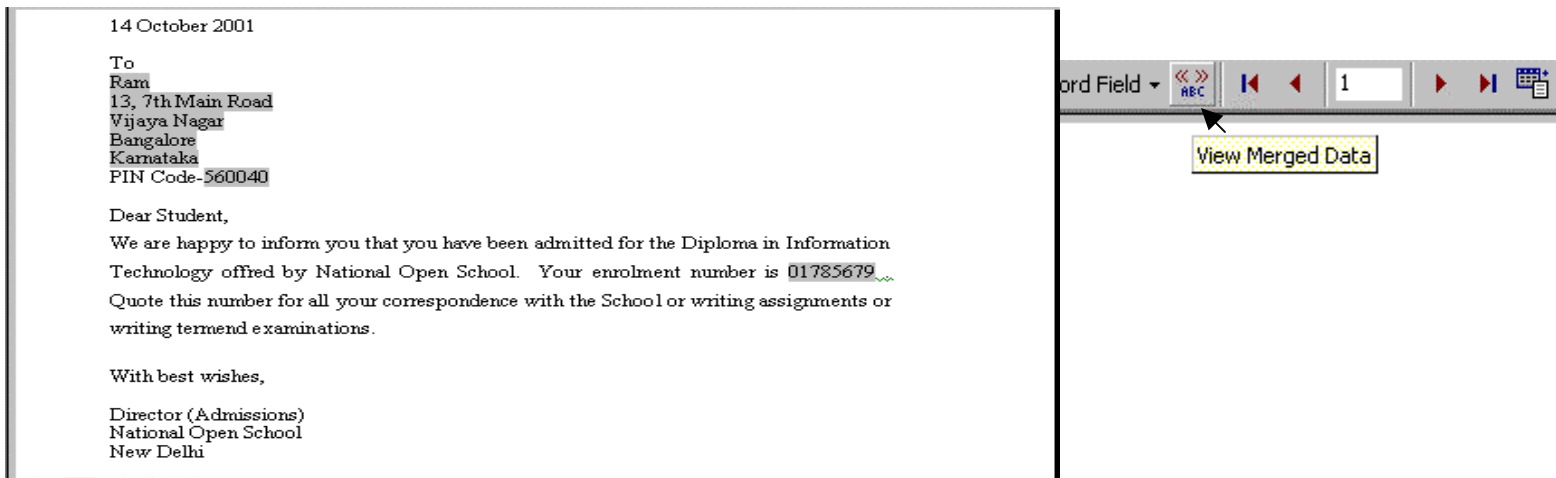
**Fig. 11.11**

- After you complete the main document and insert all of the merge fields, click **Save As** on the **File** menu. Name the document, and then click **Save**. Now your main document will work as merge document.

### 11.6.2 Merging the Data into the Main Document

To merge the data in the main document, follow these steps:

- Open the merge document. If the Mail merge toolbar is not on the screen, select **View→Toolbars→Mail Merge** command on the menu bar.
- Click **View Merged Data** in the Mail Merge toolbar. The merged fields will turn to first data record.



**Fig. 11.12**

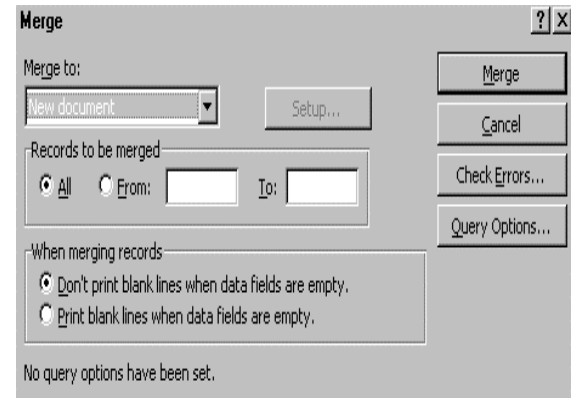
- If you want to see any other merged record, choose the record number either typing the respective number or clicking the arrow marks on the Mail Merge toolbar.

### 11.6.3 Merging the Data and Main Document as a New Document or to Printer/ Electronic Mail/Fax Using Mail Merge Helper

You can also merge the data records to a new document that can be used for printing later or to a printer directly for printing or to send

the merged documents for electronic mailing (or fax) if your computer has the Internet (or Fax) connections. To merge the data to a new document or printer, follow these steps:

1. Open the merge document. Select **Tools→Mail Merge** command on the menu bar.
2. If you want to specify the order in which data is merged, or to merge only part of the data, then you can sort and select data records to merge.
3. Click **Merge** under **Merge the data with the document** in the Mail Merge Helper dialog box. The Merge dialog box will appear.
4. Check-mark **All** if you want all records be merged or type the data range in **From** and **To** boxes under **Records to be merged**.
  - Click **New document** in the drop-down box that appears on clicking drop-down button under **Merge To:** in the Merge dialog box. Click **Merge** to store the merged letters in a new document, so that you can review, edit, and print them later. Save this in one of your folders for future use.
  - Click **Printer** button in the drop-down box that appear on clicking drop-down button under **Merge To:** in the Merge dialog box. Click **Merge** to send the selected the merged letters directly to a printer. See that the printer is on to print the letters.
  - Click **Electronic mail** in the drop-down box that appears on clicking drop-down button under **Merge To:** in the Merge dialog box.
  - Click **Setup**. In the **Data field with Mail/Fax address** box, click the data field that contains the e-mail addresses or fax numbers.
  - If you are sending merged documents to e-mail addresses, do one or more of the following:



**Fig. 11.13**

- o In the **Mail message subject line** box, type the subject of your e-mail message.
- o If you want to preserve the formatting of a merged document, select the **Send document as an attachment** check box. In this case, Word sends each merged document as a separate Word document that's attached to an e-mail message. If this check box is cleared, Word inserts the text of the resulting merged document in the e-mail message.
- Click **OK**. In the **Merge** dialog box, click **Merge**.

#### **11.6.4 Merging the Data and Main Document as a New Document or to Printer Using Mail Merge Toolbar**

You can merge the data records to a new document that can be used for printing later or to a printer directly for printing or to send the merged documents for electronic mailing (or fax) if your computer has the Internet (or Fax) connections. To merge the data to a new document or printer, follow these steps using the Mail Merge toolbar:

Open the merge document. If the Mail merge toolbar is not on the screen, select **View** → **Toolbars** → **Mail Merge** command on the menu bar.

- Click **Merge to New Document** button on the Mail Merge toolbar to store the merged letters in a new document, so that you can review, edit, and print them later.
- Click **Merge to Printer** button on the Mail Merge toolbar to send all the merged letters directly to a printer.
- Click **Merge...** button on the Mail Merge toolbar to view Merge dialog box. Choose the data range and the document to be merged (new document or printer or electronic mail), and then click **Merge** button on the Merge dialog box.

#### **11.7 CREATING MAILING LABELS BY MERGING AN ADDRESS LIST**

If you have already created a data source (say address list) as explained earlier, it is easier to merge this address list with your main document that can be used as mailing labels. You can do this in 4 steps:

---

1. **Create the Main Document:**

Click **New Blank Document** on the Standard toolbar. Select **Tools→Mail Merge** command on the menu bar. Under **Main document**, click **Create**, and then click **Mailing Labels**. The **Microsoft Word** dialog box appears. Click **Active Window**. The active document becomes the main document.

*Fig. 11.14*2. **Open the Data Source:**

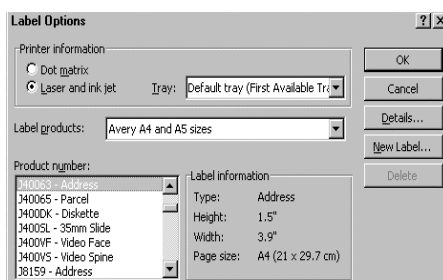
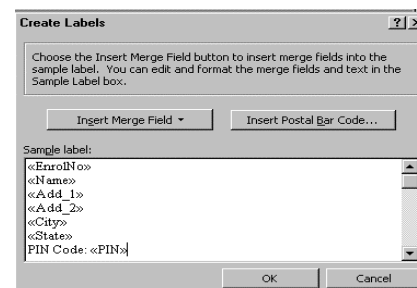
In the **Mail Merge Helper** dialog box, Under **Data source**, click **Get Data**, and then click **Open Data Source**. Select the Word document where you have created your data source (address list), and then click **Open**. The Microsoft Word dialog box appears. Click **Set Up Main Document**. The **Label Options** dialog box appears. (If you don't see the

*Fig. 11.15*

**Label Options** dialog box, click anywhere in the main document, and then select **Tools→Mail Merge** command on the menu bar. The Mail Merge dialog box appears. Under **Main document**, click **Setup**. The Label Options dialog box appears.)

3. **Select the Label Type and Insert Merge Fields:**

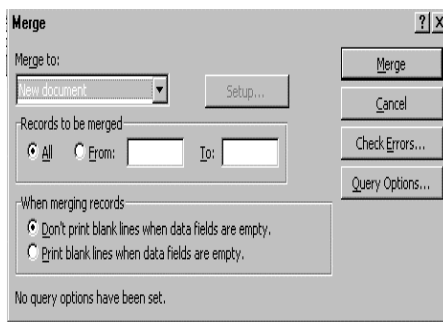
In the **Label Options** dialog box, Select the type of printer and labels you want to use, and then click **OK**. (If the type of labels that you want to use is not listed in the **Product number** box, you can create your own custom labels.) The **Create Labels** dialog box appears.

*Fig. 11.16**Fig. 11.17*

In the **Create Labels** dialog box, insert merge fields where you want to merge addresses from the data source. To insert a merge

field, click **Insert Merge Field**, and then click the field name you want. Click **OK**. The Mail Merge Dialog box appears.

4. **Merge the Data into the Main Document:** In the **Mail Merge Helper** dialog box, click **Merge** under **Merge the data with the document**. The **Merge** dialog box appears. If you want to send the merged labels directly to a printer, click **Printer** in the Merge to box, and then click **Merge**. On the other hand, if you want to store the merged labels in a new document, (so that you can review, edit, and print them later) click **New Document** in the Merge to box, and then click **Merge**.



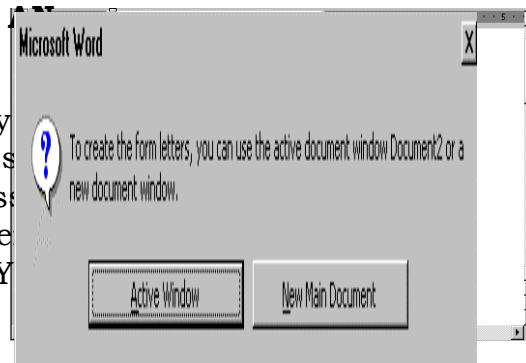
**Fig. 11.18**

**Fig. 11.19**

## 11.8 CREATING ENVELOPES BY MERGING AN ADDRESS LIST

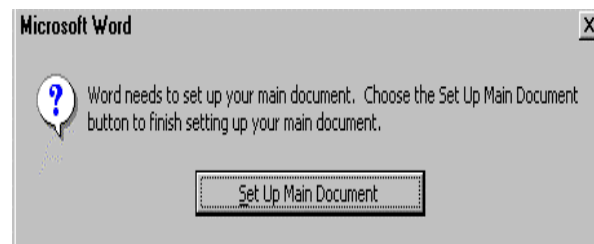
If you have already created a data source (say explained earlier, it is easier to merge this address list so that you can directly print the addresses (instead of printing the address labels on stickers them on the envelopes) for mailing purpose. You follow the following steps:

1. **Create the Main Document:** Click **New Blank Document** on the **Standard toolbar**. Select **Tools→Mail Merge** command on the **menu bar**. Under **Main document**, click **Create**, and then click **Envelopes**. The Microsoft Word dialog box appears. Click **Active Window**. The active document becomes the main document.

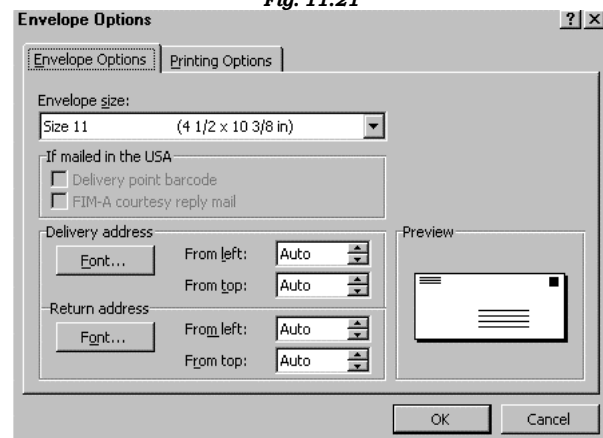


**Fig. 11.20**

2. **Open the Data Source:** In the **Mail Merge Helper** dialog box, Under **Data source**, click **Get Data**, and then click **Open Data Source**. Select the Word document where you have created your data source (address list), and then click **Open**. The **Microsoft Word** dialog box appears. Click **Set Up Main Document**. The **Envelope Options** dialog box appears. (If you don't see the **Envelope Options** dialog box, click anywhere in the main document, and then select **Tools→Mail Merge** command on the menu bar. The Mail Merge dialog box appears. Under **Main document**, click **Setup**. The Label Options dialog box appears.)



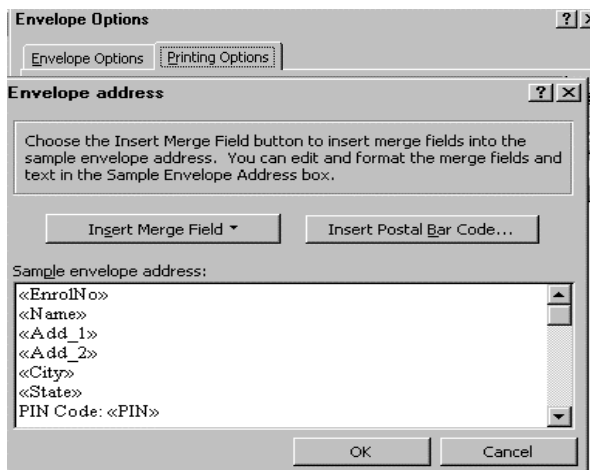
*Fig. 11.21*



*Fig. 11.22*

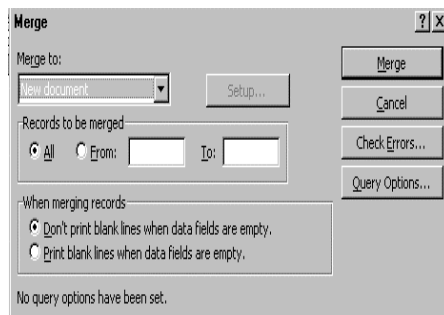
3. **Select the Envelope Options and Insert Merge Fields:** On the **Envelope Options** tab, select the envelope size you want from a variety of predefined sizes given under **Envelope size:** drop down box, and adjust the address format and position on the envelope. (If the envelope size that you want to use is not listed in the **Envelope size:** box, you can create your own custom envelope by selecting **Custom size** under **Envelope size:** drop down box in the Envelope Options dialog box.) Click on the **Printing Options** tab, and make sure that the selected envelope feed options are correct for your printer, and then click **OK**. The **Envelope address** dialog box appears.
-

In the **Envelope address** dialog box, insert merge fields where you want to merge addresses from the data source. To insert a merge field, click **Insert Merge Field**, and then click the field name you want. Click **OK**. The **Mail Merge Dialog** box appears. In the Mail Merge Helper dialog box, under **Main document**, click **Edit**, and then click the envelope main document. Type the return address in an appropriate place by inserting **Text Box** that lies on the **Drawing** toolbar. (If you don't see the Drawing toolbar, select **View→Toolbars→Drawing** command on the menu bar. The Drawing toolbar appears). Verify the return address, or delete it if the envelopes have a pre-printed return address.



**Fig. 11.23**

4. **Merge the Data into the Main Document:** In the **Mail Merge Helper** dialog box, click **Merge** under **Merge the data with the document**. The **Merge** dialog box appears. If you want to send the merged envelopes directly to a printer, click **Printer** in the **Merge to:** box, and then click **Merge**. On the other hand, if you want to store the merged envelopes in a new document, (so that you can review, edit, and print them later) click **New Document** in the **Merge to:** box, and then click **Merge**.



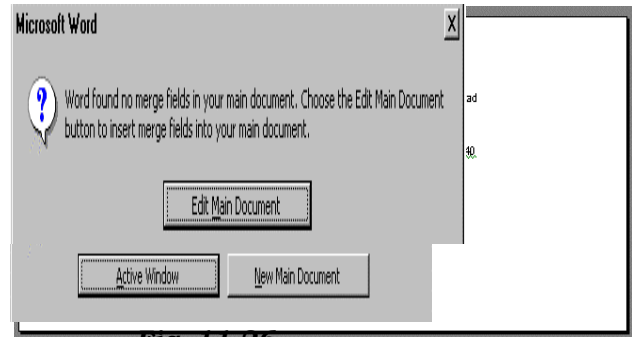
**Fig. 11.24**

*Fig. 11.25*

### 11.9 CREATING A CATALOG

If you have already created a data source (say address list) as explained earlier, it is easier to merge data to a single document, such as a catalog, membership directory, etc. You can do this in 4 steps:

1. **Create the Main Document:** Click **New Blank Document** on the Standard toolbar. Select **Tools**→**Mail Merge** command on the menu bar. Under **Main document**, click **Create**, and then click **Catalog**. The **Microsoft Word** dialog box appears. Click **Active Window**. The active document becomes the main document.

*Fig. 11.26*

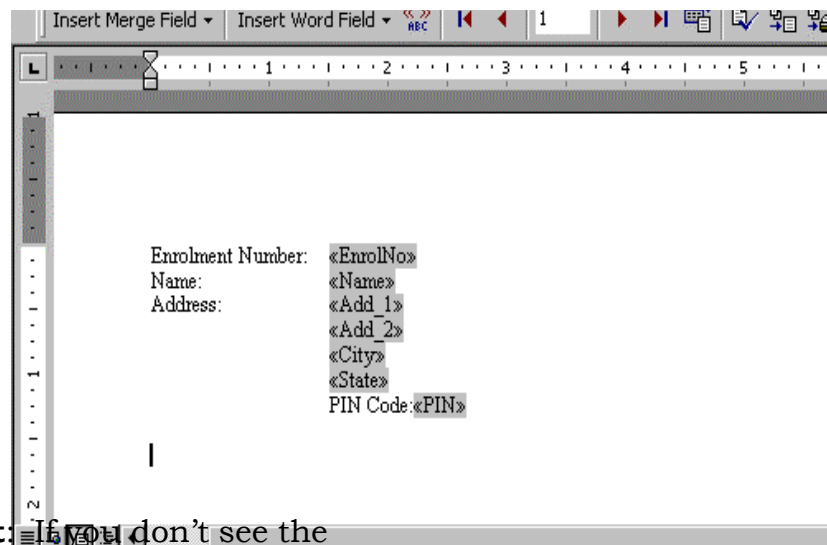
2. **Open the Data Source:** In the **Mail Merge Helper** dialog box, Under **Data source**, click **Get Data**, and then click **Open Data Source**. Select the Word document where you have created your data source (address list), and then click **Open**. The **Microsoft Word** dialog box appears. Click **Edit Main Document**.

---

*Fig. 11.27*

3. **Edit the Main Document and Insert Merge Fields:** In the main document, type any text that you want to repeat for each item in the catalog. For example, include labels such as Enrolment Number. At this point, don't include text (such as headers, footers, and table column headings) that you want to print only once in the resulting catalog document.

Insert merge fields where you want to merge data from the data source. To insert a merge field, click in the main document, click **Insert Merge Field** on the **Mail Merge** toolbar, and then click the field name you want. For example, insert a merge field after an item label, such as Enrolment Number: «EnrolNo». Leave some space (say one or two lines by pressing ENTER key) to differentiate between two records when they are actually merged in the main document. After you complete the main document and insert all of the merge fields, click **Save As** on the **File** menu. Name the document, and then click **Save**.



**Fig. 11.28**

4. **Merge the Data into the Main Document:** If you don't see the **Mail Merge** toolbar, select **View→Toolbars→Mail Merge** command on the menu bar. The **Mail Merge** toolbar appears. Click on **Merge to New Document** button on the **Mail Merge** toolbar.

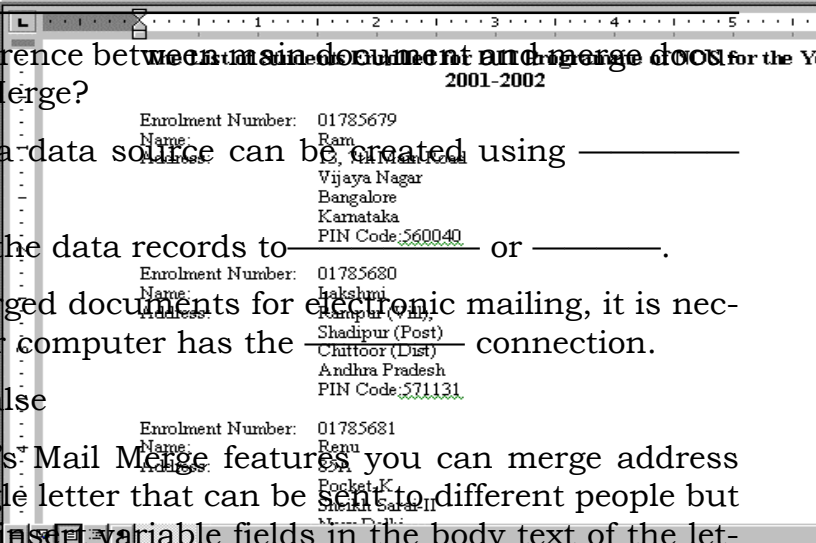
In the resulting catalog document, add headers, footers, and any other text that you want. For example, you can add the heading 'The List of Students Enrolled for DIT Programme of

NOS for the Year 2001-2002'. To print the catalog document, click **Print** on the **Standard** toolbar.

**Fig. 11.29**

### INTEXT QUESTIONS

1. What is the difference between main document and merge document in Main Merge?
2. In Mail Merge, a data source can be created using \_\_\_\_\_ or \_\_\_\_\_.
3. You can merge the data records to \_\_\_\_\_ or \_\_\_\_\_.
4. To send the merged documents for electronic mailing, it is necessary that your computer has the \_\_\_\_\_ connection.
5. State True or False
  - a. Using Word's Mail Merge features you can merge address list in a single letter that can be sent to different people but you cannot insert variable fields in the body text of the letter.
  - b. It is not possible to send the merged documents for fax without Fax machine connected to your computer.
  - c. The data records created in a worksheet using Excel cannot be used as a data source for Mail Merge.



### **11.10 WHAT YOU HAVE LEARNT**

In this lesson you learnt about the use of mail-merge in MS-Word environment. Now you can merge a list of names and addresses to a single letter that can be sent to different people in their names and address. Secondly, you can create categories, a single letter with variable information fields in it, or labels. Finally, you can produce merged documents such as directory lists, invoices and address lists. These addresses can be printed on envelopes or mailing labels.

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### **11.11 TERMINAL QUESTIONS**

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1. Briefly explain the following: (a) Main document, (b) Data source, and (c) Merge document.
  2. Write any two features of Mail Merge.
  3. Write steps in creating a main document for form letter.
  4. Explain steps in editing existing data records in Mail Merge.
  5. How do you create a data source using Word table?
  6. Write steps in using Excel worksheet as a data source for your Mail Merge.
- 

### **11.12 KEY TO INTEXT QUESTIONS**

1. In a Mail Merge operation, the personalized document (such as a letter) is called as the main document. When you merge the main document with data source, a third document called merge document will be produced.
  2. Mail Merge Helper or Word Table.
  3. A new document or printer.
  4. Internet
  5. (a) False, (b) True, (c) False
-

# 12

## BASICS OF MS-EXCEL

### 12.1 INTRODUCTION

MS-Excel 2000 is a Windows based application package. It is quite useful in entering, editing, analysis and storing of data. Arithmetic operations with numerical data such as addition, subtraction, multiplication and division can also be done with Excel. You can sort the numbers/characters according to some given criteria (like ascending, descending etc.)and solve simple financial, mathematical and statistical formulas.

### 12.2 OBJECTIVES

After going through this lesson you would be in a position to

- explain the basic features of MS Excel
  - set pages and their printing
  - modify a worksheet
  - enter and edit data in a worksheet
  - work on keyboard shortcuts
-

## 12.3 EXCEL FEATURES

There are a number of features that are available in Excel to make your task easier. Some of the main features are:

AutoFormat - lets you to choose many preset table formatting options.

- 1 **AutoSum** - helps you to add the contents of a cluster of adjacent cells.
- 2 **List AutoFill** - automatically extends cell formatting when a new item is added to the end of a list.
- 3 **AutoFill** - feature allows you to quickly fill cells with repetitive or sequential data such as chronological dates or numbers, and repeated text. AutoFill can also be used to copy functions. You can also alter text and numbers with this feature.
- 4 **AutoShapes** toolbar will allow you to draw a number of geometrical shapes, arrows, flowchart elements, stars and more. With these shapes you can draw your own graphs.
- 5 **Wizard** - guides you to work effectively while you work by displaying various helpful tips and techniques based on what you are doing.  
**Drag and Drop** - feature will help you to reposition the data and text by simply dragging the data with the help of mouse.
- 6 **Charts** - features will help you in presenting a graphical representation of your data in the form of Pie, Bar, Line charts and more.
- 7 **PivotTable** - flips and sums data in seconds and allows you to perform data analysis and generating reports like periodic financial statements, statistical reports, etc. You can also analyse complex data relationships graphically.
- 8 **Shortcut Menus** - commands that are appropriate to the task that you are doing appear by clicking the right mouse button.

## 12.4 STARTING EXCEL

1. Click on (with the help of mouse) the **Start** button on the Windows 98 Taskbar at the bottom of the Screen
  2. Highlight the **Programs** item. The program menu will open.
-

3. Select **Microsoft Excel** from the list of programs. (these steps are shown Figure 12.1)
4. Click on Microsoft Excel

Symbolically these actions are shown below.

**Select Start→Programs→Microsoft Excel** commands from your menu bar.



**Fig. 12.1**

Throughout the text of your lessons on MS Excel we will be showing the symbol → to indicate the direction (steps) you have to follow.

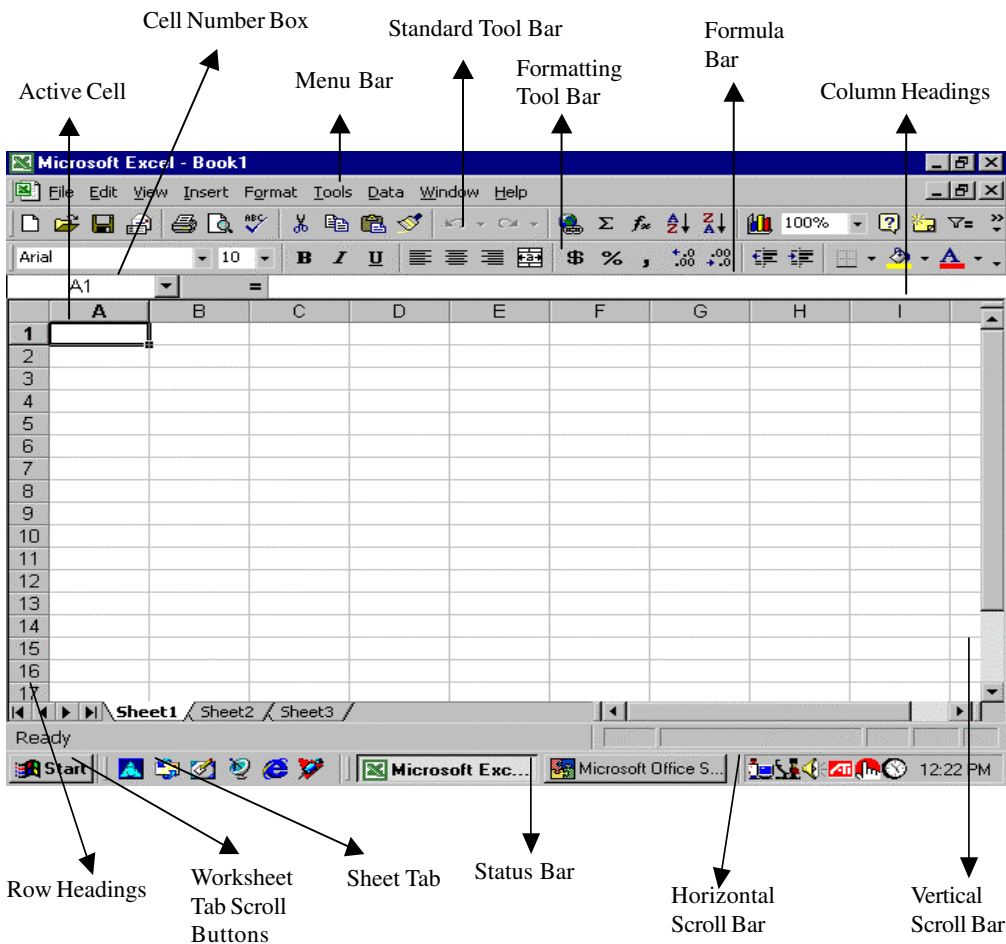
You can also use the Microsoft Office Shortcut Bar (MSOB) as shown in figure 12.1 to start your work on Excel.

## **12.5 EXCEL WORKSHEET**

Excel allows you to create worksheets much like paper ledgers that can perform automatic calculations. Each Excel file is a workbook that can hold many worksheets. The worksheet is a grid of columns (designated by letters) and rows (designated by

---

numbers). The letters and numbers of the columns and rows (called labels) are displayed in gray buttons across the top and left side of the worksheet. The intersection of a column and a row is called a cell. Each cell on the spreadsheet has a cell address that is the column letter and the row number. Cells can contain either text, numbers, or mathematical formulas.



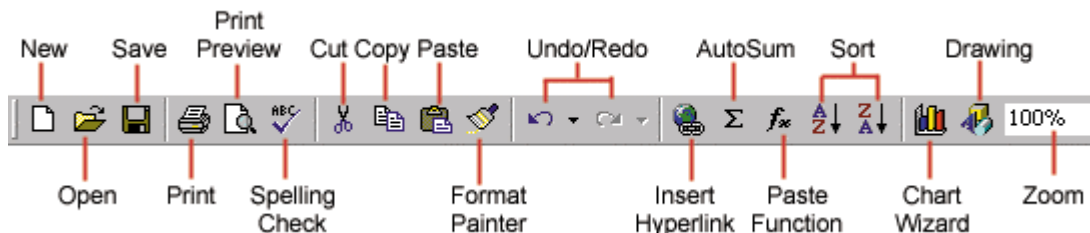
**Fig. 12.2**

### 12.5.1 Selecting, Adding and Renaming Worksheets

The worksheets in a workbook are accessible by clicking the worksheet tabs just above the status bar. By default, three worksheets are included in each workbook. To add a sheet, select **Insert→Worksheet** from the menu bar. To rename the worksheet tab, move the cursor to sheet tab, right-click on the tab with the mouse and select **Rename** from the shortcut menu. Type the new name and press the **ENTER** key.

### 12.5.2 Standard Toolbar

This toolbar is located just below the menu bar at the top of the screen and allows you to quickly access basic Excel commands.



**Fig. 12.3**

1. **New** - Select **File→New** from the menu bar, or press **CTRL+N**, or click the **New** button to create a new workbook.
  2. **Open** - Click **File→Open** from the menu bar, or press **CTRL+O**, or click the **Open** folder button to open an existing workbook.
  3. **Save** - The first time you save a workbook, select **File→Save As** and name the file. After the file is named click **File→Save**, or **CTRL+S**, or the Save button on the standard toolbar.
  4. **Print** - Click the Print button to print the worksheet.
  5. **Print Preview** - This feature will allow you to preview the worksheet before it prints.
  6. **Spell Check** - Use the spell checker to correct spelling errors on the worksheet.
  7. **Cut, Copy, Paste, and Format Painter** - These actions will be explained to you later in this lesson.
  8. **Undo and Redo** - Click the backward **Undo** arrow to cancel the last action you performed like entering data into a cell, formatting a cell, entering a function, etc. Click the forward **Redo** arrow to cancel the undo action.
  9. **Insert Hyperlink** - To insert a hyperlink to a web site on the Internet, type the text into a cell you want to be the link that can be clicked with the mouse. Then, click the Insert Hyperlink button and enter the web address you want the text to link to and click **OK**.
  10. **AutoSum, Function Wizard, and Sorting** - These features are discussed in lesson 15.
-

11. **Chart and Drawing** - These feature are discussed in lesson 16.
12. **Zoom** - To change the size that the worksheet appears on the screen, choose a different percentage from the Zoom menu.

## 12.6 SELECTING CELLS AND RANGES

To enter data into your worksheet you must first have a cell or range selected. When you open an Excel worksheet, cell A1 is already active. An active cell will appear to have a darker border around it than other cells on the worksheet. The simplest way to select a cell is with your mouse pointer. Move your mouse to the desired cell and click on it with right button. Whatever you type goes into the cell. To select a range of cells, click on one cell, hold down the left mouse button and drag the mouse pointer to the last cell of the range you want to select. You can also use keyboard shortcuts given at the end of this lesson for selecting cells.

## 12.7 NAVIGATING THE WORKSHEET

You can advance through your worksheet by rows with the vertical scrollbar or by columns with the horizontal scrollbar (see Figure 13.2). when you click and drag the thumb tab on the scrollbar, a Screen Tip will appear alongside the bar identifying the row or column to which your view is advancing. You can also use keyboard shortcuts given at the end of this lesson for navigating the worksheet.

## 12.8 DATA ENTRY

You can enter various kinds of data in a cell.

1. **Numbers:** Your numbers can be from the entire range of numeric values: whole numbers (example, 25), decimals (example, 25.67) and scientific notation (example, 0.2567E+2). Excel displays scientific notation automatically if you enter a number that is too long to be viewed in its entirety in a cell. You may also see number signs (# # # # #) when a cell entry is too long. Widening the column that contains the cell with the above signs will allow you to read the number.
  2. **Text:** First select the cell in which data has to be entered and type the text. Press ENTER key to finish your text entry.
-

The text will be displayed in the active cell as well as in the Formula bar. If you have numbers to be treated as text use an apostrophe (') as the first character. You cannot do calculations with these kind of data entry.

3. **Date and Time:** When you enter dates and times, Excel converts these entries into serial numbers and kept as background information. However, the dates and times will be displayed to you on the worksheet in a format opted by you. You will learn about date and time formats later in lesson 10.
4. **Data in Series:** You can fill a range of cells either with the same value or with a series of values with the help of AutoFill.

## 12.9 EDITING DATA

Editing your Excel worksheet data is very easy. You can edit your data by any of the following ways:

1. Select the cell containing data to be edited. Press F2. Use Backspace key and erase the wrong entry. Retype the correct entry.
2. Select the cell and simply retype the correct entry.
3. If you want only to clear the contents of the cell, select the cell and press Delete key.
4. To bring back the previous entry, either click on **Undo** button on standard Toolbar or select **Edit→Undo** command or use keyboard shortcuts **CTRL+Z**.

## 12.10 CELL REFERENCES

Each worksheet contains a number of columns and rows. Each cell of the worksheet has a unique reference. For example, D5, refers to the cell containing column number D and row number 5.

## 12.11 FIND AND REPLACE DATA IN A WORKSHEET

You may want to locate a number or text that is already typed in the worksheet. This is done through **Edit→Find**. You can also locate your data and replace with new data with **Edit→Find→Replace**.

## 12.12 MODIFYING A WORKSHEET

### 12.12.1 Adding Worksheets, Rows, and Columns

1. **Worksheets** - Add a worksheet to a workbook by selecting **Insert→Worksheet** from the menu bar.
-

2. **Row** - To add a row to a worksheet, select **Insert→Rows** from the menu bar, or highlight the row by clicking on the row label, right-click with the mouse, and choose **Insert**.
3. **Column** - Add a column by selecting **Insert→Columns** from the menu bar, or highlight the column by click on the column label, right-click with the mouse, and choose **Insert**.

### 12.12.2 Resizing Rows and Columns

There are two ways to resize rows and columns.

1. **Resize a row** by dragging the line below the label of the row you would like to resize. **Resize a column** in a similar manner by dragging the line to the right of the label corresponding to the column you want to resize.
2. Click the row or column label and select **Format→Row→Height** or **Format→Column→Width** from the menu bar to enter a numerical value for the height of the row or width of the column.

### 12.12.3 Selecting Cells

Before a cell can be modified or formatted, it must first be selected (highlighted). Refer to the table below for selecting groups of cells.

| Cells to select  | Mouse action:                                                                          |
|------------------|----------------------------------------------------------------------------------------|
| One cell         | click once in the cell                                                                 |
| Entire row       | click the row label                                                                    |
| Entire column    | click the column label                                                                 |
| Entire worksheet | click the whole sheet button (at the intersection of rows and columns)                 |
| Cluster of cells | drag mouse over the cells or hold down the <b>SHIFT</b> key while using the arrow keys |

To activate the contents of a cell, double-click on the cell or click once and press **F2**.

### 12.12.4 Moving and Copying Cells

#### 1. **Moving Cells**

To cut cell contents that will be moved to another cell select **Edit→Cut** from the menu bar or click the **Cut** button on the standard toolbar.

#### 2. **Copying Cells**

To copy the cell contents, select **Edit→Copy** from the menu bar or click the **Copy** button on the standard toolbar.

#### 3. **Pasting Cut and Copied Cells**

Highlight the cell you want to paste the cut or copied content into and select **Edit→Paste** from the menu bar or click the **Paste** button on the standard toolbar.

#### 4. **Drag and Drop**

If you are moving the cell contents only a short distance, the drag-and-drop method may be easier. Simply drag the highlighted border of the selected cell to the destination cell with the mouse.

#### 5. **Freeze Panes**

If you have a large worksheet with column and row headings, those headings will disappear as the worksheet is scrolled. By using the Freeze Panes feature, the headings can be visible at all times.

1. Click the label of the row below the row that should remain frozen at the top of the worksheet.
  2. Select **Window→Freeze** Panes from the menu bar.
  3. To remove the frozen panes, select **Window→Unfreeze** Panes.
-

|    | A         | B            | C       | D       | E     | J | K | L | M |
|----|-----------|--------------|---------|---------|-------|---|---|---|---|
| 1  |           | Marks Scored |         |         |       |   |   |   |   |
| 2  | Name      | Maths        | Science | English | Hindi |   |   |   |   |
| 9  | Ram       | 55           | 65      | 69      | 60    |   |   |   |   |
| 10 | Suneeta   | 40           | 35      | 25      | 65    |   |   |   |   |
| 11 | Rahim     | 70           | 78      | 85      | 75    |   |   |   |   |
| 12 | John      | 50           | 45      | 42      | 58    |   |   |   |   |
| 13 | Lalita    | 92           | 86      | 85      | 90    |   |   |   |   |
| 14 | Lakshmi   | 58           | 63      | 65      | 55    |   |   |   |   |
| 15 | Alisa     | 65           | 69      | 78      | 63    |   |   |   |   |
| 16 | Kapoor    | 65           | 76      | 58      | 85    |   |   |   |   |
| 17 | Singh     | 55           | 35      | 45      | 53    |   |   |   |   |
| 18 | Saxena    | 25           | 32      | 54      | 45    |   |   |   |   |
| 19 | Sunil Ray | 98           | 95      | 65      | 87    |   |   |   |   |
| 20 | Mahendra  | 54           | 52      | 56      | 54    |   |   |   |   |
| 21 | Bhatia    | 80           | 68      | 74      | 75    |   |   |   |   |
| 22 | Rawat     | 25           | 15      | 32      | 45    |   |   |   |   |
| 23 | Sharma    | 92           | 85      | 79      | 78    |   |   |   |   |
| 24 | Sunil     | 95           | 87      | 65      | 78    |   |   |   |   |
| 25 | Powar     | 56           | 53      | 50      | 56    |   |   |   |   |
| 26 | Rajat     | 87           | 90      | 76      | 87    |   |   |   |   |

**Fig. 12.4**

Freeze panes has been added to row 2 in the image above. Notice that the row numbers skip from 3 to 8. As the worksheet is scrolled, rows 1 and 2 will remain stationary while the remaining rows will move. Following similar steps you can Freeze or Unfreeze selected columns.

### 12.13 PAGE BREAKS

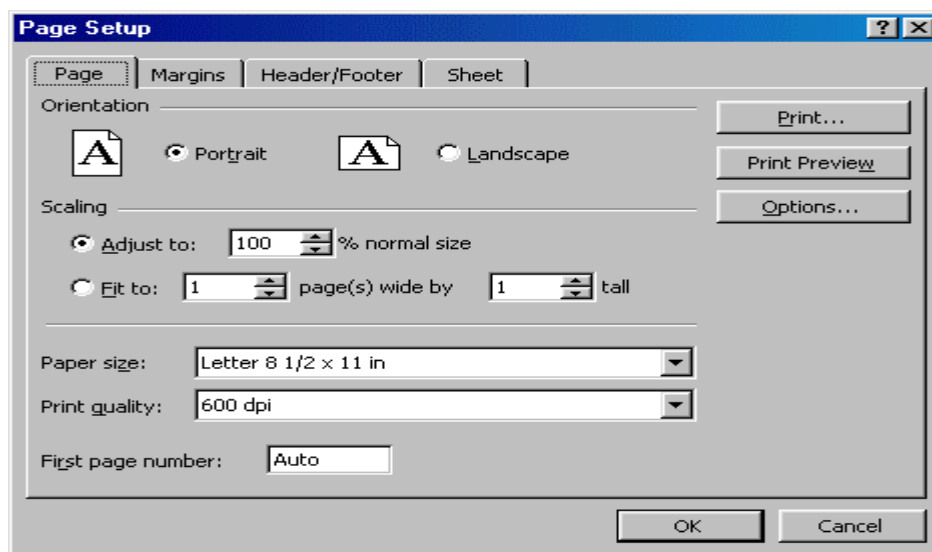
To set page breaks within the worksheet, select the row you want to appear just below the page break by clicking the row's label. Then choose **Insert→Page Break** from the menu bar. You may need to click the double down arrow at the bottom of the menu list to view this option.

### 12.14 PAGE SETUP

Select **File→Page Setup** from the menu bar to format the page, set margins, and add headers and footers.

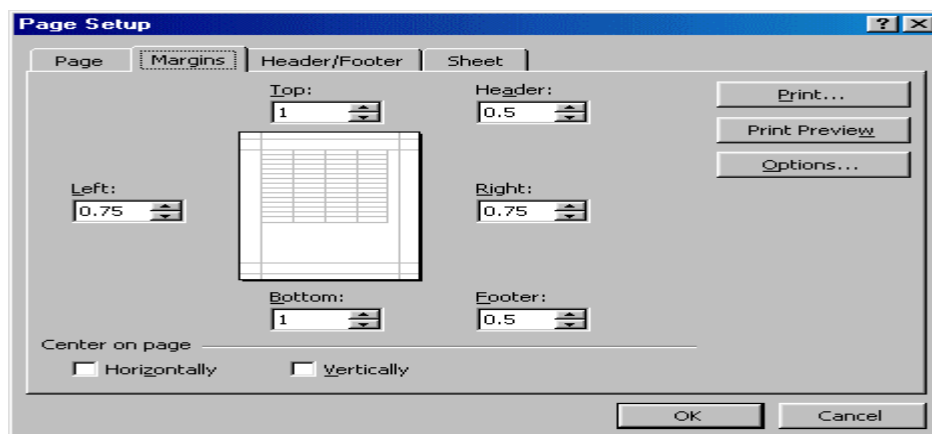
1. **Page:** The page option allows you to set the paper size, orientation of the data, scaling of the area, print quality, etc. Select the **Orientation** under the **Page** tab in the Page Setup

window to make the page Landscape or Portrait. The size of the worksheet on the page can also be formatted using **Scaling**. To force a worksheet to print only one page wide so that all the columns appear on the same page, select **Fit to 1 page(s) wide**.



**Fig. 12.5**

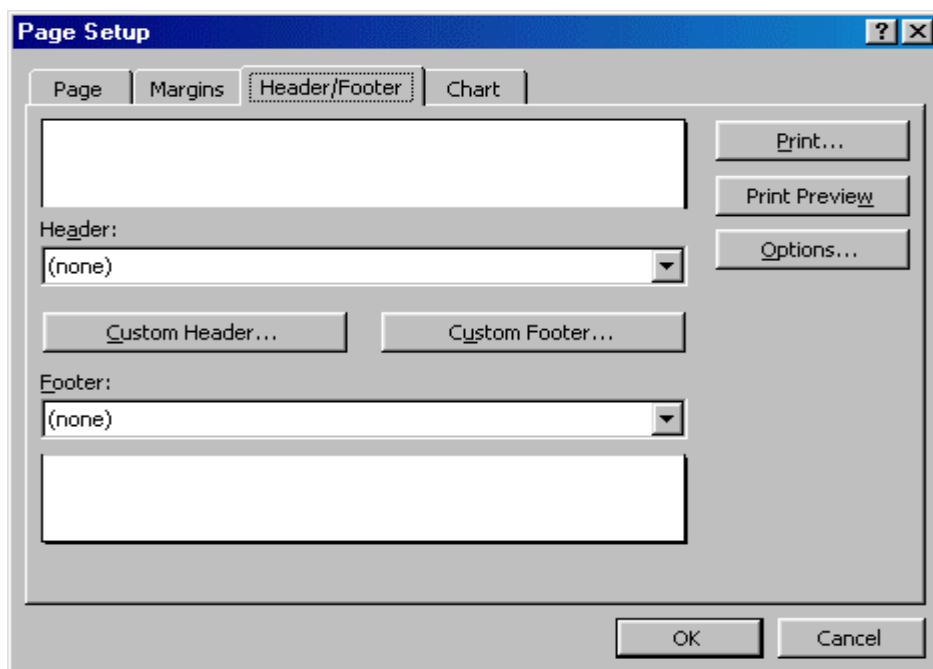
2. **Margins** Change the top, bottom, left, and right margins under the **Margins** tab. Enter values in the header and footer fields to indicate how far from the edge of the page this text should appear. Check the boxes for centering horizontally or vertically on the page.



**Fig. 12.6**

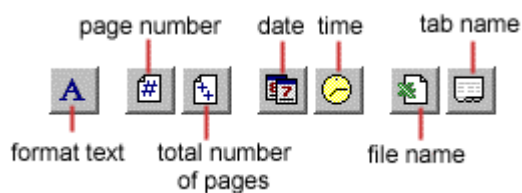
---

3. **Header/Footer** tab gives you the option to set the Header (which will be displayed on the top of every page) and the Footer (which will be displayed on the bottom of every page). Add preset headers and footers to the page by clicking the drop-down menus under the Header/Footer tab.



**Fig. 12.7**

To modify a preset header or footer, or to make your own, click the **Custom Header** and **Custom Footer** buttons. A new window will open allowing you to enter text in the left, center, or right on the page.



**Fig. 12.8**

**Format Text** - Click this button after highlighting the text to change the font, size, and style.

**Page Number** - Insert the page number of each page.

**Total Number of Pages** - Use this feature along with the page number to create strings such as “page 5 of 10”.

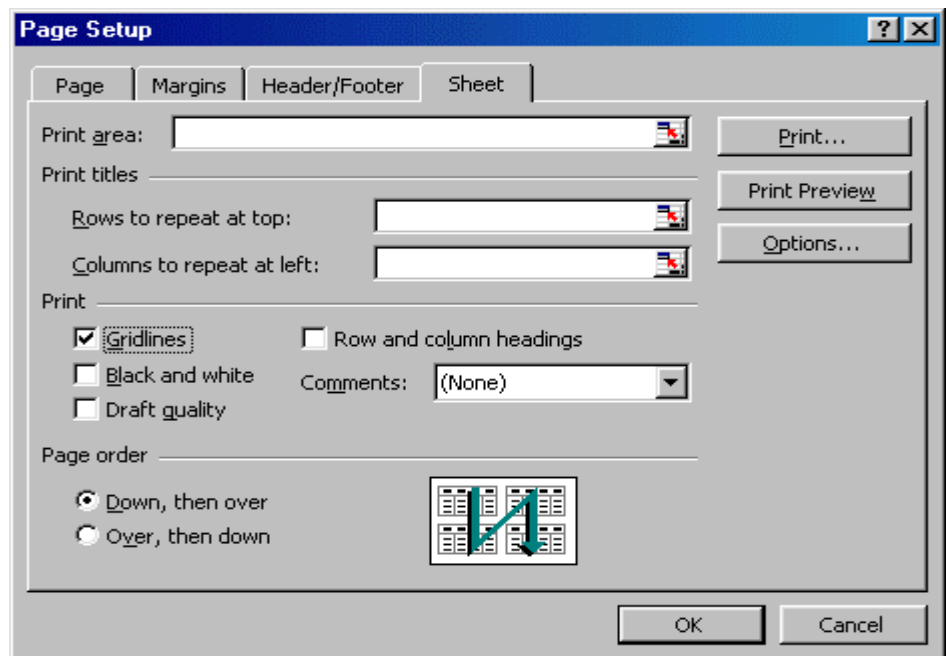
**Date** - Add the current date.

**Time** - Add the current time.

**File Name** - Add the name of the workbook file.

**Tab Name** - Add the name of the worksheet’s tab.

4. **Sheet** tab has the option to select the area to be printed (that is, range of cells). Check **Gridlines** if you want the gridlines dividing the cells to be printed on the page. If the worksheet is several pages long and only the first page includes titles for the columns, select **Rows to repeat at top** to choose a title row that will be printed at the top of each page.



**Fig. 12.9**

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## INTEXT QUESTIONS

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1. Write True or False for the following statements
    - (a) To modify a preset header or footer click the custom header and custom footer buttons.
    - (b) Autofill helps you to add the contents of a cluster of adjacent cells.
-

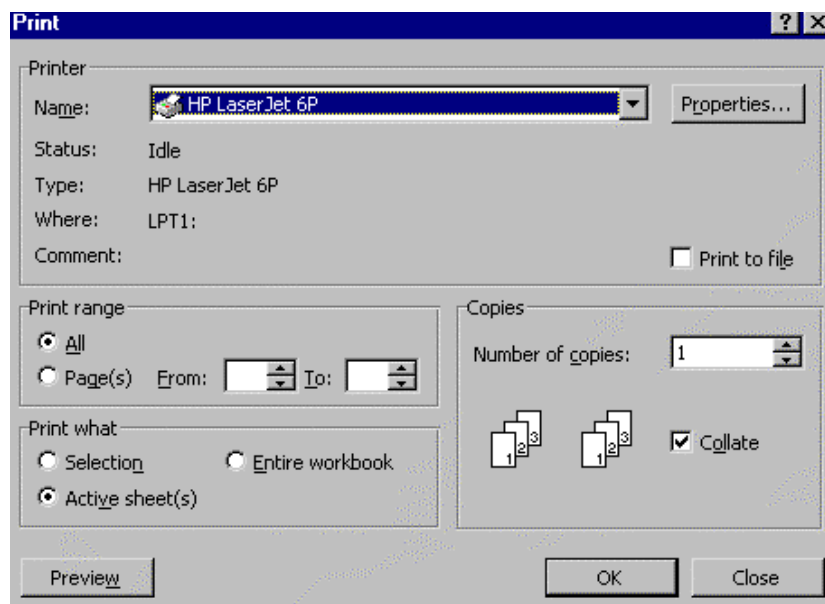
- (c) Charts features help you in presenting a graphical representation of data.
- (d) Click the edit button to print the worksheet.
- (e) Pivot table allows you to perform data analysis.

## 12.15 PRINT PREVIEW

Select **File→Print Preview** from the menu bar to view how the worksheet will print. Click the **Next** and **Previous** buttons at the top of the window to display the pages and click the **Zoom** button to view the pages closer. Make page layout modifications needed by clicking the **Page Setup** button. Click **Close** to return to the worksheet or **Print** to continue printing.

## 12.16 PRINT

To print the worksheet, select **File→Print** from the menu bar.



**Fig. 12.10**

1. **Print Range** - Select either all pages or a range of pages to print.
2. **Print What** - Select selection of cells highlighted on the worksheet, the active worksheet, or all the worksheets in the entire workbook.

3. **Copies** - Choose the number of copies that should be printed. Check the **Collate** box if the pages should remain in order.
4. Click **OK** to print.

### 12.17 FILE CLOSE AND EXIT EXCEL

When your work is finished and it has been saved properly:

1. Select **File→Close** command and then click mouse to close your file
2. Select **File→Exit** command and then click mouse to close your file

### 12.18 WORKBOOK PROTECTION

You have learned how to save your workbook as a file. Some times your data can be very confidential which you would like to protect from unauthorised people. Protection prevents changes to all or part of a document. You can also assign a password so that other users can be limited in accessing protected information. A password is case sensitive, can be up to 255 characters long, and can contain any combination of letters, numbers, and symbols. When a document is protected, this command changes to Unprotect Document.

You can restrict access to your workbook in three ways.

1. **Protect Sheet:** Select **Tools→Protect Sheet** commands and click. This feature prevents changes to cells on worksheets, items in a chart, graphic objects on a worksheet or chart sheet. When the active document is protected, the command name changes to **Unprotect Sheet**. If you want to unprotect a sheet that has been already protected. Select **Tools→Unprotect Sheet** commands and click.
  2. **Protect Workbook:** Select **Tools→Protect Workbook** commands and click. This feature protects a workbook's structure and windows. You can prevent changes to the structure of a workbook so that sheets can't be deleted, moved, hidden, unhidden, or renamed, and new sheets can't be inserted. You can also protect windows from being moved or resized. When the active document is protected, the command name changes to **Unprotect Workbook**. If you want to unprotect a workbook that has been already protected. Select **Tools→Unprotect Workbook** commands and click.
-

3. **Protect for Sharing:** Select **Tools→Protect and Share Workbook** commands and click. This feature protects the sharing and change history tracking in a shared workbook so the features can't be turned off. If you select this check box and click **OK** when the workbook isn't a shared workbook, you are asked if you want to save it as a shared workbook. In a workbook that is already shared, you can turn on protection for sharing and the change history, but you can't assign a password for this protection. To assign a password, you must first remove the workbook from shared use. When the active shared workbook is protected, the command name changes to **Unprotect for Sharing**. If you want to unprotect a share workbook that has been already protected. Select **Tools→Unprotect Workbook** commands and click.

## 12.19 KEYBOARD SHORTCUTS

Keyboard shortcuts can save time and the effort of switching from the keyboard to the mouse to execute simple commands. Print this list of Excel keyboard shortcuts and keep it at your computer desk for a quick reference.

| Action | Keystroke |
|--------|-----------|
|--------|-----------|

### *Document Actions*

|             |        |
|-------------|--------|
| Open a file | CTRL+O |
| New file    | CTRL+N |
| Save As     | F12    |
| Save        | CTRL+S |
| Print       | CTRL+P |
| Find        | CTRL+F |
| Replace     | CTRL+H |
| Go to       | F5     |

### *Cursor Movement*

|               |            |
|---------------|------------|
| One cell up   | up arrow   |
| One cell down | down arrow |

---

|                                           |                 |
|-------------------------------------------|-----------------|
| One cell right                            | Tab             |
| One cell left                             | SHIFT+Tab       |
| Top of worksheet (cell A1)                | CTRL+Home       |
| End of worksheet<br>(last cell with data) | CTRL+End        |
| End of row                                | Home            |
| End of column                             | CTRL+left arrow |
| Move to next worksheet                    | CTRL+PageDown   |

### *Formulas*

|               |        |
|---------------|--------|
| Apply AutoSum | ALT+=  |
| Current date  | CTRL+; |
| Current time  | CTRL+: |
| Spelling      | F7     |
| Help          | F1     |
| Macros        | ALT+F8 |

### *Selecting Cells*

|                                 |                   |
|---------------------------------|-------------------|
| All cells left of current cell  | SHIFT+left arrow  |
| All cells right of current cell | SHIFT+right arrow |
| Entire column                   | CTRL+Spacebar     |
| Entire row                      | SHIFT+Spacebar    |
| Entire worksheet                | CTRL+A            |

### *Text Style*

|               |        |
|---------------|--------|
| Bold          | CTRL+B |
| Italics       | CTRL+I |
| Underline     | CTRL+U |
| Strikethrough | CTRL+5 |

### *Formatting*

|                  |    |
|------------------|----|
| Edit active cell | F2 |
|------------------|----|

---

|                                          |               |
|------------------------------------------|---------------|
| Format as currency with 2 decimal places | SHIFT+CTRL+\$ |
| Format as percent with no decimal places | SHIFT+CTRL+%  |
| CTRL+X                                   | Cut           |
| CTRL+C                                   | Copy          |
| CTRL+V                                   | Paste         |
| CTRL+Z                                   | Undo          |
| CTRL+Y                                   | Redo          |
| Format cells dialog box                  | CTRL+1        |

*Note: A plus sign in the above list indicates that the keys need to be pressed at the same time.*

---

## INTEXT QUESTIONS

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Fill in the blanks

- (a) When the active document is protected the command name changes to \_\_\_\_\_ workbook.
- (b) Select \_\_\_\_\_ from the menu bar to view how the worksheet will print.
- (c) A password can be upto \_\_\_\_\_ characters long.
- (d) You can restrict access to your workbook in \_\_\_\_\_ ways
- (e) Check \_\_\_\_\_ if you want the gridlines dividing the cells to be printed on the page.

## 12.20 WHAT YOU HAVE LEARNT

In this lesson you learnt about starting Excel and working on a worksheet. You can select a cell or a range of cells. Also you can enter data in a worksheet. You can define the size of a page by going to page set up and insert a page break. You have learnt about page-preview which gives an idea on how the print out will look like.

---

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### **12.21 TERMINAL QUESTIONS**

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1. List any four applications of MS Excel.
2. What are the main features of MS Excel?
3. Differentiate between a worksheet and a workbook?
4. What are the different types of data that can be entered into worksheet cells?
5. Explain three different ways you protect your workbook.
6. What are the three different ways you save your workbook?
7. How do you find a single number or name you want in a large worksheet containing thousands of numbers and names? Is it possible to replace a name or number with some other name or number? How?
8. How do you select a single cell, a single column, a single row, a cluster of cells, and a entire worksheet?
9. Difference between Move cells and Copy cells
10. Explain the use of Freeze Panes
11. What are the different features available in Page setting command?
12. Describe different features available in Print command

---

### **12.22 KEY TO INTEXT QUESTIONS**

---

1. (a) True  
(b) False  
(c) True  
(d) False  
(e) True
-

2. (a) Unprotect  
(b) Print preview  
(c) 255  
(d) three  
(e) gridlines

# 13

## FORMATTING WORKSHEETS

### 13.1 INTRODUCTION

Excel has a number of formatting options to give your worksheets a polished look. You can change the size, colour and angle of fonts, add colour to the borders and backgrounds of cells, and have the format of a cell change, based on its value. You may remember some of the formatting features in MS Excel are same as you have used in MS Word.

### 13.2 OBJECTIVES

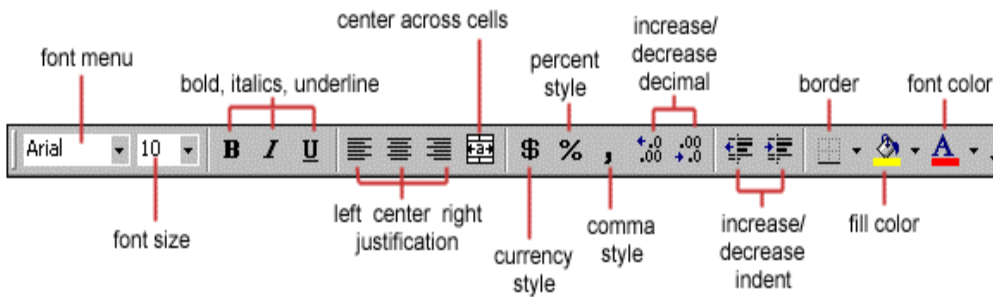
After going through this lesson you would be able to

- use autoformat features
- format data and worksheets
- explain format painter

### 13.3 USING FORMATTING TOOLBAR TO FORMAT CELLS

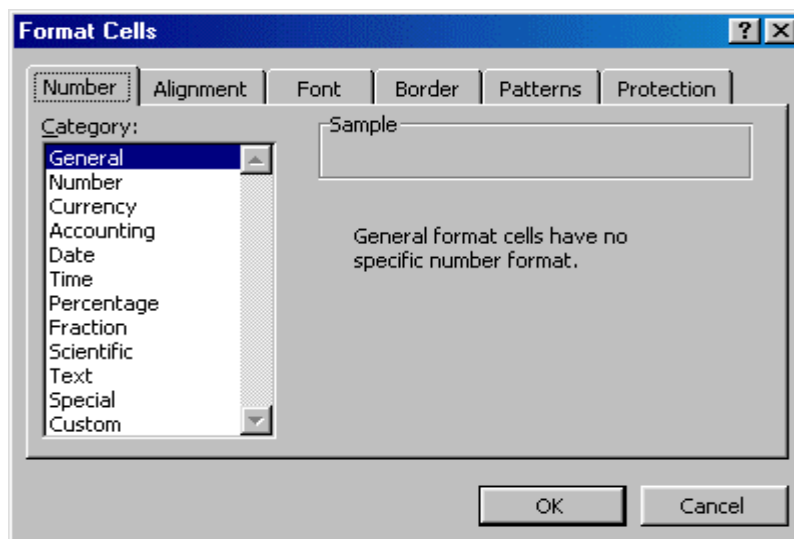
The contents of a highlighted cell can be formatted in many ways. Font and cell attributes can be added from shortcut buttons on the formatting bar. If this toolbar is not already visible on the screen in your computer, select **View→Toolbars→ Formatting** from the menu bar.

---



**Fig. 13.1**

**13.3.1 Formatting Cells Using Dialog Box** For a complete list of formatting options, right-click on the highlighted cells and choose **Format Cells** from the shortcut menu or select **Format→Cells** from the menu bar.



**Fig. 13.2**

### 13.3.2 Number tab

The data type can be selected from the options on this tab. Select the range you would like to format and click on one of the Category number as shown in Figure 13.2 to apply that style to your numbers. Select General if the cell contains text and number and it does not have any specific number format. If you select Number Category you can represent numbers as integers, decimals with number of decimal as option etc. For exam-

ple, if you want to restrict the number of decimals to 2, choose Number Category and then decimal places as 2. You may try the other options in your computer.

### **13.3.3 Alignment tab**

These options allow you to change the position and alignment of the data with the cell. You have already seen some of these options in Figure 13.1. The Format Cells dialog box offers you more options than the alignment buttons on the Formatting toolbar. For example, you can change the orientation of the text.

### **13.3.4 Font tab**

All of the font attributes are displayed in this tab including font face, size, style, and effects. Using Formatting toolbar you can bold, italicize, and underline your cell entries. For even more formatting options you can use the Format Cells dialog box.

### **13.3.5 Border and Pattern tabs**

You can also use the Formatting toolbar for adding borders, cell shading, and font colour. These buttons are actually tear-off palettes. When you click on the picture portion of the button, the format of the picture displayed will be applied to the contents of the cell(s) you have selected in the worksheet. You can change the picture displayed on the button by clicking on the button's small drop-down arrow to access the palette of samples from which to choose.

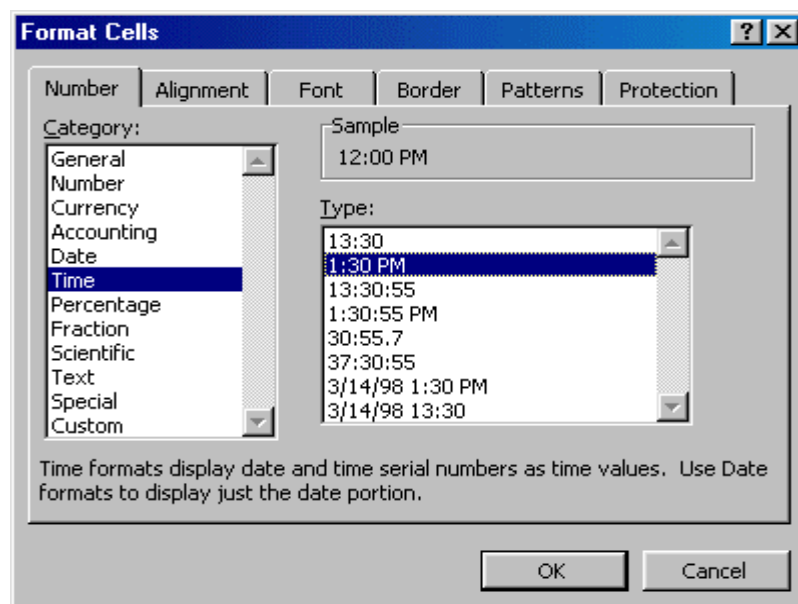
Follow these steps to apply a border and colour to a selection using the options in the Format Cells dialog box.

1. Select **Format→Cells** to display the Format Cells dialog box.
  2. Select the Border tab.
  3. In the Presets area, choose None, Outline, or Inside to specify the location for the border.
  4. Choose any of the following options for the border:
    - In the Border area, click on any of the buttons to toggle its border.
    - Choose the border's line style in the Style area.
    - If necessary, select a colour for the border in the Color Palette.
-

5. Select the Patterns tab, and then choose any of the following options:
  - Select a colour for the background of the selection in the Color palette.
  - If necessary, select a pattern for the background of the selection in the Pattern palette.
6. Choose OK to apply the border and colour.

### 13.3.6 Dates and Times

If you enter the date “January 1, 2001” into a cell on the worksheet, Excel will automatically recognize the text as a date and change the format to “1-Jan-01”. To change the date format, select the Number tab from the Format Cells window. Select “Date” from the Category box and choose the format for the date from the Type box. If the field is a time, select “Time” from the Category box and select the type in the right box. Date and time combinations are also listed. Press OK when finished.



**Fig. 13.3**

### 13.3.7 Formatting Columns and Rows

You have learned how to resize columns and rows. You can also use AutoFit Selection feature. It adjusts a column width or a row

height according to the widest entry of a column or tallest height of a row. To use this feature select **Format→Columns→AutoFit Selection** commands. It adjusts the width of the column according to the widest entry in that column. Similarly, you can select **Format→Rows→AutoFit Selection** commands. It increases the height of the row(s) to accommodate the tallest character in a row.

Another way of automatically adjusting columns and rows is by way of best fit. To do this:

1. Place your pointer on or near the right edge of a column header of the column you wish to adjust. Notice that in this area your pointer changes to a double-headed arrow.
2. Double click your pointer, and the column to the left of it will automatically adjust to fit the data entries within it.

Similarly, pointing to a row header changes pointer to a double-headed arrow. Double clicking results in a best fit (taller or shorter rows).

**Hide** - Hides the selected column(s) or row(s), though the data is still there. Hiding column(s) or row(s) will help you to prevent unwanted changes. To hide a column, follow these steps:

1. Select the column you want to hide by clicking on the column header.
2. Select **Format→Column→Hide** from the menu bar or right click within the selected columns and choose **Hide** from the shortcut menu that pops up. The columns should be hidden.

**Unhide** - To unhide the column follow these steps:

1. Select the visible range of columns that includes the hidden column(s).
2. Select **Format→Column→Unhide** from the menu bar or right click within the selected columns and choose **Unhide** from the shortcut menu that pops up. The columns should now reappear.

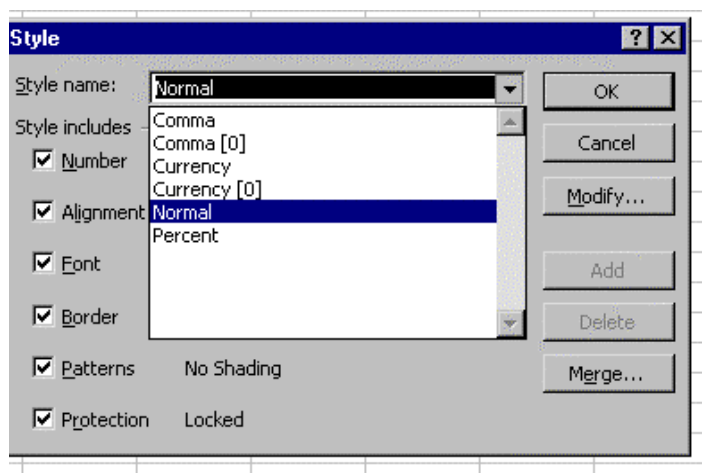
You can follow the same procedures to **Hide** and **Unhide** rows.

### **13.4 FORMATTING WORKSHEETS USING STYLES TOOLBAR**

The use of styles in Excel allow you to quickly format your worksheet, provide consistency, and create a professional look.

---

In Excel, all styles are cell styles. However, a defined style can be applied to an entire worksheet. Cell styles can include any of the formatting that can be applied to a cell using the options on the tabs in the Format Cells dialog box. Select the Styles drop-down box from the formatting toolbar (it can be added by customizing the toolbar). Excel provides several preset styles:



**Fig. 13.4**

1. **Comma** - Adds commas to the number and two digits beyond a decimal point.
2. **Comma [0]** - Comma style that rounds to a whole number.
3. **Currency** - Formats the number as currency with a dollar sign, commas, and two digits beyond the decimal point.
4. **Currency [0]** - Currency style that rounds to a whole number.
5. **Normal** - Reverts any changes to general number format.
6. **Percent** - Changes the number to a percent and adds a percent sign.

### 13.4.1 Applying a Style in an Excel Worksheet

In order to apply an existing style in Excel, follow the steps given below:

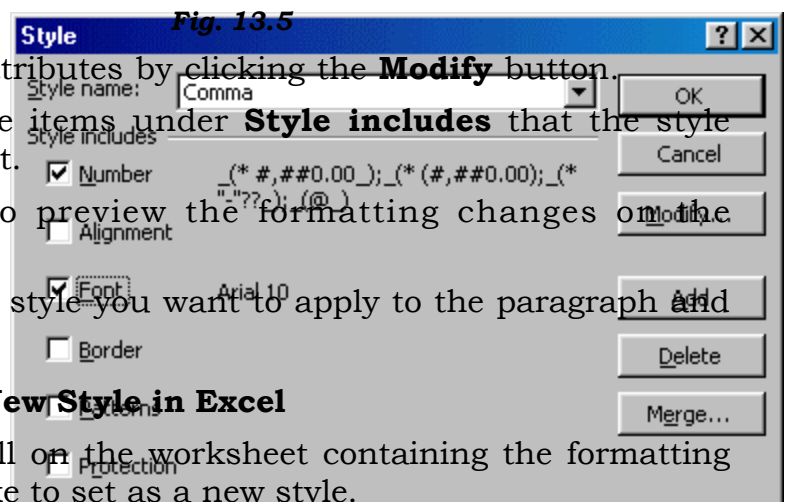
- 1 Select the cells to which you want to apply a defined style.
- 2 Choose **Format→Style** to display the Style dialog box.
- 3 Select the name of the style to apply in the Style Name drop-down list.
- 4 Select OK.

### 13.4.2 Creating or Modifying a Style in Excel

You can create your own styles or modify an existing style using Style dialog box. Follow the steps given below:

1. Highlight the cell(s) you want to add a style to.
2. Select **Format→Style...** from the menu bar.

3. Modify the attributes by clicking the **Modify** button.
4. Check all the items under **Style includes** that the style should format.
5. Click **Add** to preview the formatting changes on the worksheet.
6. Highlight the style you want to apply to the paragraph and click **Apply**.



### 13.4.3 Name a New Style in Excel

1. Select the cell on the worksheet containing the formatting you would like to set as a new style.
2. Click the **Style** box on the Formatting toolbar so the style name is highlighted (see Figure 13.4).
3. Delete the text in the Style box and type the name of the new style.
4. Press **ENTER** when finished.

### 13.4.4 Copying Styles in Excel

You can copy styles from one open workbook file to another:

---

1. Activate the workbook to which the styles are to be copied.
2. Choose **Format→Style**, and then choose **Merge** to display the Merge Styles dialog box.
3. Highlight the name of the workbook that contains the styles to be copied in the Merge Styles from list box.
4. Choose **OK** in the Merge dialog box.
5. Choose **OK** in the Style dialog box to return to the workbook.

### 13.4.5 Deleting Styles Other Than Excel's Built-in Styles

To delete a style other than one of Excel's built-in styles, select **Format→Style** to display the Style dialog box, select the name of the style in the Style name drop-down list, and then choose Delete.

## 13.5 FORMAT PAINTER

A handy feature on the standard toolbar for formatting text is the Format Painter. If you have formatted a cell with a certain font style, date format, number format, border, and other formatting options, and want to format another cell or group of cells the same way, place the cursor within the cell containing the formatting you want to copy. Click the **Format Painter** button in the standard toolbar (notice that your pointer now has a paintbrush beside it). Highlight the cells you want to apply the same formatting. The formatting will change accordingly.

Also, to copy the formatting to many groups of cells, double-click the **Format Painter** button. The format painter remains active until you press the **ESC** key to turn it off.

## 13.6 AUTOFORMAT

Excel's AutoFormat feature uses table styles, which are predefined collections of number formats, fonts, cell alignments, patterns, shading, column widths, and row heights to have a polished look of ranges of cells you specify. You can use these styles as-is or over rule some of their characteristics.

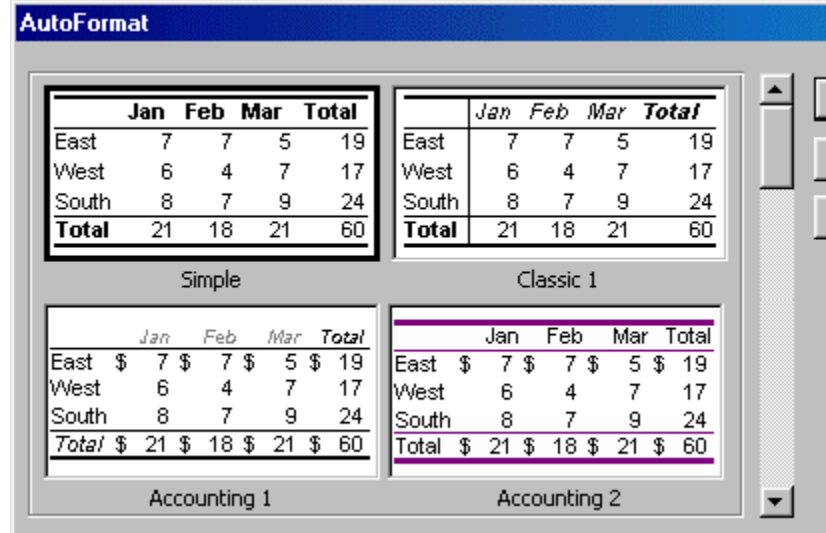
Excel has many preset table formatting options. Add these styles by following these steps:

1. Highlight the cells that will be formatted.
-

|    | A       | B            | C       | D       | E     | F |
|----|---------|--------------|---------|---------|-------|---|
| 1  |         | Marks Scored |         |         |       |   |
| 2  | Name    | Maths        | Science | English | Hindi |   |
| 3  | Ram     | 55           | 65      | 69      | 60    |   |
| 4  | Suneeta | 40           | 35      | 25      | 65    |   |
| 5  | Rahim   | 70           | 78      | 85      | 75    |   |
| 6  | John    | 50           | 45      | 42      | 58    |   |
| 7  | Lalita  | 92           | 86      | 85      | 90    |   |
| 8  | Lakshmi | 58           | 63      | 65      | 55    |   |
| 9  |         |              |         |         |       |   |
| 10 |         |              |         |         |       |   |
| 11 |         |              |         |         |       |   |
| 12 |         |              |         |         |       |   |

**Fig. 13.6**

2. Select **Format→AutoFormat** from the Excel's menu bar. A dialog box will open with many table formats to choose from and apply.
3. On the AutoFormat dialog box, select the format you want to apply to the table by clicking on it with the mouse. Use the scroll bar to view all of the formats available. Some of the styles are shown in Figure 13.7.

**Fig. 13.7**

4. Click the **Options...** button to select the elements that the formatting will apply to.

5. Select from the many table styles. If you like one of the formats but don't want to apply every aspect of it, click on the **Options** button. Choose from the **Formats to apply** option box.
6. Click **OK** when finished.

**Fig. 13.8**

### 13.7 HIDING/UNHIDING WORKSHEETS AND WORKBOOKS

If you want to hide or unhide all row or columns on a worksheet, select the whole worksheet by clicking the block at the intersection of the first row and first column headings. Once the whole worksheet is selected, follow the same steps that you have followed for hiding/unhiding columns and rows.

To hide an active workbook, you don't need to select anything, simply select Window→Hide from the menu bar. Select Window→Unhide to bring it back into view using the Unhide dialog box that opens and then name the workbook name you want to unhide.

|    | A       | B            | C       | D       | E     | F |
|----|---------|--------------|---------|---------|-------|---|
| 1  |         | Marks Scored |         |         |       |   |
| 2  |         | Maths        | Science | English | Hindi |   |
| 3  | Ram     | 55           | 65      | 69      | 60    |   |
| 4  | Suneeta | 40           | 35      | 25      | 65    |   |
| 5  | Rahim   | 70           | 78      | 85      | 75    |   |
| 6  | John    | 50           | 45      | 42      | 58    |   |
| 7  | Laila   | 92           | 86      | 85      | 90    |   |
| 8  | Lakshmi | 58           | 63      | 65      | 55    |   |
| 9  |         |              |         |         |       |   |
| 10 |         |              |         |         |       |   |
| 11 |         |              |         |         |       |   |

### INTEXT QUESTIONS

1. Write True or False for the following statements.
  - (a) Format cells dialog box offers you more option than the alignment buttons on the formatting toolbar.
  - (b) Click Edit to perview the formatting changes on the worksheet.
  - (c) If the field is a time select "time" from the category box.

- (d) To unhide the column select format → column → unhide from the menu bar.
  - (e) Choose Edit → style to display the style dialog box.
2. Fill in the blanks
- (a) Modify the \_\_\_\_\_ by clicking the modify button.
  - (b) In Excel all style are \_\_\_\_\_.
  - (c) Hiding columns or rows will help you to \_\_\_\_\_ unwanted changes.
  - (d) If the tool bar is not already visible on the screen select \_\_\_\_\_.
  - (e) To change the data format select the \_\_\_\_\_ from the format cells window.
- 

### **13.8 WHAT YOU HAVE LEARNT**

In this you learnt about various tools available in Excel to format a worksheet. You can align text and change font size, style and effects. Also you learnt how to put a border or shade to the text in the cells selected by you. Also you learnt about applying style to a worksheet and modify the style.

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### **13.9 TERMINAL QUESTIONS**

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1. Explain the following terms in brief.
    - (a) AutoFit      (b) AutoFormat.
  2. What is Format Painter? When do you think Format Painter is useful in Excel?
  3. Explain different preset styles available in Excel.
  4. Explain steps to create a new style.
  5. How to copy styles from one open workbook file to another?
  6. What are the different tabs available in Format Cells dialog box?
  7. What are the different features available in:
    - (a) Number tab, (b) Border tab and (c) Patterns tab in Excel's Format Cells dialog box?
  8. How do you: (a) Hide a column, (b) Unhide a column, (c) Hide a worksheet, (d) Unhide a worksheet?
  9. How do you resize your worksheet columns or rows?
-

### 13.10 KEY TO INTEXT QUESTIONS

1. (a) True  
(b) False  
(c) True  
(d) True  
(e) False
2. (a) attributes  
(b) cell style  
(c) prevent  
(d) view toolbar formatting  
(e) number tab

# 14

## FORMULAS AND FUNCTIONS

### 14.1 INTRODUCTION

The distinguishing feature of a spreadsheet program such as Excel is that it allows you to create mathematical formulas and execute functions. Otherwise, it is not much more than a large table for displaying text. This lesson will show you how to create these calculations.

### 14.2 OBJECTIVES

After going through this lesson you would be able to

- use formulas and functions features for data analysis
- create or edit or sort a database
- explain the features of pivot table for generating report

### 14.3 FORMULAS

In excel you can specify mathematical relationship between the numbers in various cells. You can do this by means of formula. An example of a simple formula would be calculating a percentage of marks obtained in a subject by a student: 'marks obtained' divided by 'total maximum marks' and then multiplied by '100' equals the percentage of marks obtained by a student. Formulas are used in: (a) simple addition, subtraction, multipli-

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cation and division, and (b) complex formulas involving a combination of arithmetic operators.

**14.3.1 Operators:** An operator is a special symbol that tells a programme what action to take on a series of numbers. There are two kinds of operators: (a) mathematical operators and (b) comparison or logical operators.

#### (a) Mathematical Operators

We use these operators to add, subtract, multiply, and divide numbers. The following are the 5 mathematical operators.

| Operator symbol | Explanation    | Example |
|-----------------|----------------|---------|
| ^               | Exponential    | = 5^2   |
| *               | Multiplication | = 5*2   |
| /               | Division       | = 6/2   |
| +               | Addition       | = 6+2   |
| -               | Subtraction    | = 6-2   |

In Excel, you can enter up to 255 characters in a single cell. This amount will allow for multiple operators and numbers to be used in a calculation or formula. All spreadsheet programmes perform mathematical operations in a specific order. This order of operations is called precedence. Excel uses standard mathematical rules which give precedence to certain operators over others. When Excel encounters more than one operator in a formula or calculations, it performs exponentiation operator first and then multiplication or division which ever comes first and lastly addition or subtraction which ever comes first. It is a good practice to separate two operations with the use of parentheses ( ). When parentheses are used, the number of opening parentheses must be equal to the number of closing parentheses. Parentheses help to clarify complicated formulas or expressions. The use of parentheses will also minimize the error in writing formulas and the order of the execution of the operations. When parentheses are used in an expression their contents are evaluated first following the rules of precedence. Look at the following example:

$$= (A1 + ((B1+C1)*D1/E1) - F1*G1)$$

The diagram illustrates the order of operations for the formula  $= (A1 + ((B1+C1)*D1/E1) - F1*G1)$ . It uses numbered brackets to show the sequence of evaluation:
 

- (1) The innermost parentheses:  $B1 + C1$ .
- (2) The next level:  $(B1 + C1) * D1 / E1$ .
- (3) The outermost parentheses:  $A1 + ((B1 + C1) * D1 / E1) - F1 * G1$ .

- (1) First B1 and C1 will be added. Let the resulting value be X
- (2) The resulting value X will be multiplied with D1 and then divided by E1. Let the resulting value be Y.
- (3) F1 will be multiplied by G1. Let the resulting value be Z. Then A1 will be added to Y. Then Z will be subtracted from the resulting value.

For example, if A1=2, B1=3, C1=4, D1=5, E1=1, F1=7, G1=8.

Then, your formula given above will execute the following way.

1.  $B1+C1 = 3+4 = 7$ . Let  $X = 7$ .
2.  $X*D1 = 7*5 = 35$ ;  $35/E1=35/1 = 35$ . Let  $Y = 35$ .
3.  $F1*G1 = 7*8 = 56$ ;  $A1+Y = 2+35 = 37$ ;  $37-56 = -19$ .

After executing the formula, you will get the value -19.

### **(b) Comparison Operators**

These operators are used to compare one value to the other. These operators are also called logical operators because the resulted answer in the cell is always either True or False. The following are the comparison operators.

| <b>Operator Symbol</b> | <b>Explanation</b>       | <b>Example</b> |
|------------------------|--------------------------|----------------|
| =                      | Equal to                 | = A1=5         |
| >                      | Greater than             | = C1>50        |
| >=                     | Greater than or equal to | = D1>=20       |
| <                      | Less than                | =E1<10         |
| <=                     | Less than or equal to    | = F1<=15       |
| <>                     | Not equal to             | =G1<>10        |

Comparison operators are used extensively within the =IF function, which we will explore in more detail later in this lesson.

### **14.3.2 Basic Properties of a Formula**

1. A formula may consist of operators, cell references, range names, values and functions.
  2. A formula always start with an equal to (=) sign.
  3. When a formula is entered in the cell, and then the ENTER key is pressed, only the calculated result is displayed in the cell and not the formula.
-

- If we make a cell, containing formula, as an active cell, though it still shows the value, but in the formula bar, the formula is displayed.

### 14.3.3 Creating a Formula

Formulas are entered in the worksheet cell and must begin with an equal sign “=”. The formula then includes the addresses of the cells whose values will be manipulated with appropriate operands placed in between. After the formula is typed into the cell, the calculation executes immediately and the formula itself is visible in the formula bar. See the example below to view the formula for calculating the total cost of five vegetables you might have bought in the market. The formula multiplies the quantity and price of each vegetable and adds the total cost for all vegetables.

| C6 |             | =             |             | =SUM((B2*C2)+(B3*C3)+(B4*C4)+(B5*C5)) |   |  |
|----|-------------|---------------|-------------|---------------------------------------|---|--|
|    | A           | B             | C           | D                                     | E |  |
| 1  | Vegetable   | Quantity (Kg) | Price (Rs.) |                                       |   |  |
| 2  | Potato      | 5             | 8.50        |                                       |   |  |
| 3  | Onion       | 12            | 10.00       |                                       |   |  |
| 4  | Brinjal     | 4             | 12.50       |                                       |   |  |
| 5  | Cauliflower | 2             | 7.50        |                                       |   |  |
| 6  |             | Total         | 227.50      |                                       |   |  |
| 7  |             |               |             |                                       |   |  |

**Fig. 14.1**

Suppose you have employed 4 people in your workshop on a daily wage basis and want to calculate the amount to be paid at the end of the week. First enter their names, number of days worked in that week and the wage rate in a worksheet as shown in Figure 14.2. And then follow the steps given below:

- With the cursor in cell D2, type = to signal the start of a formula.
- Click on Ram's Days Worked. The address of the cell B2 shows up in the formula bar.
- Type \* (the multiplication symbol).
- Finally, click on the cell with Ram's Daily Wage. The address of this cell C2 shows up in the formula bar.
- Click on the green check mark (✓) on the formula bar and press enter. The formula calculates the total weekend

amount to be paid to Ram using the cells specified, and the result (600) is shown in the originally selected cell D2.

**Fig. 14.2**

#### **14.3.4 Copying Formulas**

When same formula is needed in multiple cells, you can copy the original formula to the other cells that need the formula. In our example of calculating weekend wages, Ram's weekend wages was calculated using the formula 'Days Worked \* Daily Wage'. To other workers will need the same formula. Instead of manually entering same formula for every worker, copy existing formula and Excel will automatically change the row numbers to reflect the appropriate rows needed for each new location. The formula change is because formulas are calculated relative to their positions on the worksheet to data being calculated. For example, the original formula you created was  $=B2*C2$ . The answer that appeared in cell D2 was referencing the cell two columns to the left of the formula and multiplying that number by the contents in the cell one column to the left of the formula. The formula that will calculate John's weekend wages, on the other hand, will be  $=B3*C3$ . Notice that the same relationship exists between the column references (B and C) but row references are different (2 in case of Ram and 3 in case of John).

The copy command will change each copy of the original formula to reflect the correct row of the new formula. This property of the Copy command is called *relative referencing*. Excel takes the original formula being copied and makes each copy relate to the new row. To use the Copy formula feature in Excel, follow the steps given below:

1. Click on cell D2, where the original formula produced the first weekend wages.
  2. Click on the copy button on the Standard toolbar, or right
-

click on the selected cell area and select copy from the shortcut menu. The Copy command is not going to copy the value (600). It will copy the formula (=B2\*C2).

3. Select cells D3 through D5 (drag the mouse over these cells to select the destination for copy).
4. Click on the Paste button on the Standard toolbar or choose Paste on the shortcut menu or press ENTER key.
5. Excel copies the formula into the designated cells, but each copy uses the row number for the row on which it resides. The values calculated in each cell are different indicating that the formula is using different values in each location.
6. Make the decimal places the same for each of the weekend wages by clicking and dragging to select all four weekend wages (D2 through D5) and clicking twice on the Increase Decimal button on the Formatting toolbar.

**Fig. 14.3**

| D2 |         | =B2*C2      |                  |                    |
|----|---------|-------------|------------------|--------------------|
|    | A       | B           | C                | D                  |
| 1  | Name    | Days Worked | Daily Wage (Rs.) | Weekend Total(Rs.) |
| 2  | Ram     | 4           | 150.00           | 600.00             |
| 3  | John    | 6           | 100.00           | 600.00             |
| 4  | Rahim   | 3           | 120.00           | 360.00             |
| 5  | Bhaskar | 5           | 90.00            | 450.00             |

Excel has a number of copy and paste methods available, including the Edit menu, the Standard toolbar, shortcut keys (CTRL+C to copy and CTRL+V to paste), and the shortcut menu that appears by right clicking the mouse. In addition to these approaches, Excel allows you to press ENTER key instead of using the Paste command.

### 14.3.5 Copying Data and Formulas to Other Worksheets

Copying your data and formulas to other worksheets is a three-step process:

1. Select the range of data or formulas to be copied and click on the Copy button on the Standard toolbar, or choose Copy command from the right-click shortcut menu.
2. Select the worksheet where the copy will be placed (click on

the worksheet number or name on the bottom of the screen).  
Select the cell where you want to paste.

3. Press ENTER key or click on the Paste button. Remember you can click on the Undo button if the copy does not perform correctly.

#### **14.3.6 Converting Formulas and Functions to their Values**

By default, the worksheet area of the Excel displays the results of your formulas and functions, whereas the formula bar shows the actual formula and/or function. There may be times when you want to use the values from a formula or function as the basis of another set of calculations. And you may need only the actual values and not the formula or function that produced the value. Excel has a feature on the Copy command that copies a formula or function but, when pasted, converts the formula or function to the actual value. Here are the general steps to convert a formula's result or function result to an actual value:

1. Select the cells containing the formulas or function results.
2. Click on the Copy button on the Standard toolbar.
3. Click on the new location where the copy will be placed
4. Choose **Edit→Paste Special**, or right-click with the mouse and choose Paste Special from the short-cut menu, and click on the Values radio button. Click on OK.
5. The result of the formula appears. When you look in the formula bar, the actual value shows, not the formula references.

#### **14.3.7 Formula Error Messaging**

There are a number of error messages that can occur when creating formulas. Although these are Excel's attempts to be helpful in explaining the error, the messages are rather cryptic. The following are the error messages that occur and their meanings.

| <b>Error Message</b> | <b>Meaning</b>                                 |
|----------------------|------------------------------------------------|
| #DIV/0!              | A division by zero has occurred in the formula |
| # N/A                | A value is not available to the formula        |

---

|          |                                                                       |
|----------|-----------------------------------------------------------------------|
| # NAME?  | An unrecognisable range name is used in the formula                   |
| # NULL!  | A reference in the formula specifies an invalid intersection of cells |
| # NUM!   | An incorrect number is used in the formula                            |
| # REF!   | An invalid cell is referenced in the formula                          |
| # VALUE! | An incorrect argument or operator is used in the formula              |

#### 14.3.8 Linking Worksheets

You may want to use the value from a cell in another worksheet within the same workbook in a formula. For example, the value of cell A1 in the current worksheet and cell A2 in the second worksheet can be added using the format “sheetname!celladdress”. The formula for this example would be “=A1+Sheet2!A2” where the value of cell A1 in the current worksheet is added to the value of cell A2 in the worksheet named “Sheet2”.

#### 14.3.9 Relative, Absolute, and Mixed Referencing

Calling cells by just their column and row labels (such as “A1”) is called *relative referencing*. When a formula contains relative referencing and it is copied from one cell to another, Excel does not create an exact copy of the formula. It will change cell addresses relative to the row and column they are moved to. For example, if a simple addition formula in cell C1 “=(A1+B1)” is copied to cell C2, the formula would change to “=(A2+B2)” to reflect the new row. To prevent this change, cells must be called by *absolute referencing* and this is accomplished by placing dollar signs “\$” within the cell addresses in the formula. Continuing the previous example, the formula in cell C1 would read “=(\$A\$1+\$B\$1)” if the value of cell C2 should be the sum of cells A1 and B1. Both the column and row of both cells are absolute and will not change when copied. *Mixed referencing* can also be used where only the row or column fixed. For example, in the formula “=(A\$1+\$B2)”, the row of cell A1 is fixed and the column of cell B2 is fixed.

#### 14.3.10 Autosum

Use the Autosum function to add the contents of a cluster of adjacent cells. Follow the steps given below:

---

- 1. Select the cell that the sum will appear in that is outside the cluster of cells whose values will be added. Cell D2 was used in this example.
- 2. Click the Autosum button (Greek letter sigma) on the Standard toolbar.
- 3. Highlight the group of cells that will be summed (cells B2 through C2 in this example).
- 4. Press the ENTER key on the keyboard or click the green check mark button on the formula bar .

|      |         |                                                                                   |                                                                                    |             |             |  |
|------|---------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------|-------------|--|
| IPMT |         |  |  | =           | =SUM(B2:C2) |  |
|      | A       | B                                                                                 | C                                                                                  | D           | E           |  |
| 1    | Class   | Girls                                                                             | Boys                                                                               | Total       |             |  |
| 2    | Class 1 | 14                                                                                | 16                                                                                 | =SUM(B2:C2) |             |  |
| 3    | Class 2 | 18                                                                                | 17                                                                                 |             |             |  |
| 4    | Class 3 | 15                                                                                | 15                                                                                 |             |             |  |
| 5    | Class 4 | 12                                                                                | 18                                                                                 |             |             |  |
| 6    | Class 5 | 21                                                                                | 10                                                                                 |             |             |  |
| 7    |         |                                                                                   |                                                                                    |             |             |  |

Table 14.4

14.4 FUNCTIONS

The built-in formulas are called functions. The users have to provide the cell references or addresses only. These are called arguments of the functions that are given between a pair of parentheses ( ). The functions perform the operations on the given values and return the result that is displayed in the same cell where the function was entered. Functions can be a more efficient way of performing mathematical operations than formulas. For example, if you wanted to add the values of cells D1 through D10, you would type the formula “=D1+D2+D3+D4+D5+D6+D7 +D8+D9+D10”. A shorter way would be to use the SUM function and simply type “=SUM(D1:D10)”. Several other functions and examples are given in the table below:

Function

Example

Description

SUM

=SUM (A1:100)

finds the sum of cells A1 through A100

AVERAGE

=AVERAGE(B1:B10)

finds the average of cells B1 through B10

MAX

=MAX(C1:C100)

returns the highest number from cells C1 through C100

MIN

=MIN(D1:D100)

returns the lowest number from cells D1 through D100

SQRT

=SQRT(D10)

finds the square root of the value in cell D10

TODAY

=TODAY()

returns the current date (leave the parentheses empty)

#### **14.4.1 The Syntax of a Function**

The syntax of a function consists of the following:

1. The equals sign (=)
2. The name of the function (for example, SUM)
3. An opening, left parenthesis (
4. The arguments or ranges needed (for example, D1: D10)
5. A closing, right parenthesis )

For example, =SUM (D1:D10)

#### **14.4.2 Categories of Functions**

Excel has over 250 functions, which perform a variety of calculations. The functions fall into 10 categories. These are:

1. Financial
  2. Date & Time
  3. Math&Trig
  4. Statistical
  5. Look up & Reference
  6. Database
  7. Text
  8. Logical
-

## 9. Information

## 10. User Defined

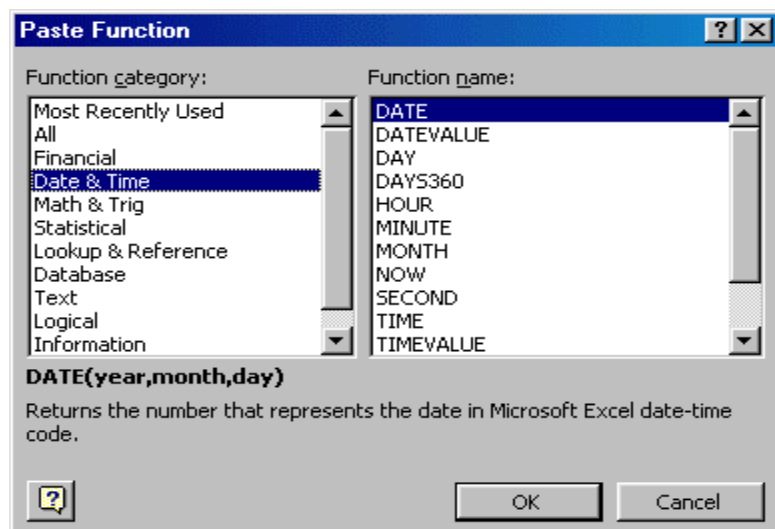
The most commonly used functions are in the categories Math&Trig, Statistical and Financial. Each of the categories have a number of function names. For example, SUM function falls within the Math&Trig category, the AVERAGE function falls within statistical category and PMT (payment function) falls within the Financial category.

The Function Wizard lists all the functions, their uses and meanings, and what arguments are needed by each. Click on **Insert→Function** to activate the Paste Function, or click on the Paste Function button on the Standard toolbar. We will explain this in the next sub section on Function Wizard.

**14.4.3 Function Wizard**

View all functions available in Excel by using the Function Wizard.

1. Activate the cell where the function will be placed and click the Function Wizard button on the Standard toolbar.
2. From the Paste Function dialog box, browse through the functions by clicking in the Function category menu on the left and select the function from the Function name choices on the right. As each function name is highlighted a description and example of use is provided below the two boxes.



**Fig. 14.5**

---

3. Click OK to select a function.
4. The next window allows you to choose the cells that will be included in the function. In Figure 14.6 shown below, cells B4 and C4 were automatically selected for the sum function by Excel. The cell values {2, 3} are located to the right of the Number 1 field where the cell addresses are listed. If another set of cells, such as B5 and C5, needed to be added to the function, those cells would be added in the format “B5:C5” to the Number 2 field.

**Fig. 14.6**

5. Click OK when all the cells for the function have been selected.

#### 14.4.4 The COUNTIF and SUMIF Functions

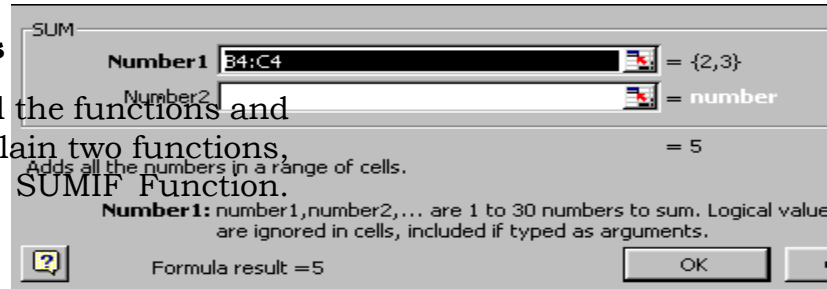
It may not be possible for us to explain you all the functions and examples. In this subsection we will only explain two functions, namely, (a) the COUNTIF Function and (b) SUMIF Function. Try the other functions on your own.

##### (a) The COUNTIF Function

If you specify the range and wish to count only the number of values contained in the range. The COUNTIF function allows you to use criteria to focus in on the specific values you want to be counted. The syntax of the COUNTIF function is in the following form:

=COUNTIF (range, criteria)

Where range is the location of all the values from which the COUNTIF will choose and criteria are the expressions, text, or values that define which cells will be counted. For example, you can find the number of employees drawing the monthly salary over Rs 10000 with the formula:



=COUNTIF (C2:C10, ">10000")

In this formula the range C2:C10 is the range of monthly salary of 9 employees and the criteria is specified in quotes using comparison operator.

**(b) The SUMIF Function**

Like COUNTIF function, the SUMIF function can be done for a range of data and a given criteria. For example, you can find the total salary paid to employees drawing more than Rs. 10000 for a month. You can use the following formula:

=SUMIF (C2:C10, ">10000")

In this formula the range C2:C10 is the monthly salary of 9 employees and the criteria is specified in quotes using comparison operator.

**14.4.5 Changing your Functions**

You can change your functions in Excel. There are three different ways to activate the Edit mode.

- (a)**
1. Double-click on the cell you wish to edit
  2. Press F2
  3. Click on the formula bar.
- (b)** You can also use the Paste Function, so that you can see the descriptions of the arguments. This method offers the advantage of letting you see if you are changing the appropriate arguments.
1. Click on the cell that has the function you wish to edit.
  2. Click on the Paste Function button on the Standard toolbar or choose **Insert→Function** from the menu bar.
  3. When the dialog box appears, click on the argument whose reference you wish to change. When you have finished, click on the OK button.
- (c)** Also, to activate the Paste Function button, right click the mouse button to see the shortcut menu. Click on Paste Function button. Follow step 3 given above in (b).
-

### 14.4.6 Auto/Manual Recalculation

Some times you may want to change the values on cells and see the changes in calculated values using formulas and functions. There are two options available to you for recalculations:

- (a) **Automatic:** This is the default mode in which the change in the value of the cell causes the recalculations of the whole worksheet automatically.
- (b) **Manual:** On selecting this option, the recalculations of the complete worksheet is done only on pressing F9 Key. This option can be selected by choosing **Tools→Option** and then click on calculation tab.

---

### INTEXT QUESTIONS

---

1. Write True or False for the following statements.
  - (a) In Excel you can enter up to 255 characters in a single cell.
  - (b) The syntax function consists of equal sign.
  - (c) In Excel formulas must begin with Plus sign.]
  - (d) Calling cells by just their column and row labels is called non relative referencing.
  - (e) Range is the location of all the values from which the COUNTIF will choose.

---

## 14.5 DATA HANDLING

Excel gives you some very sophisticated data handling capabilities. You can sort by either single column or multiple columns using the Basic Sorts or Complex Sorts features. You can generate a Data Form to make data entry easier. You can filter data with AutoFilter and then subtotal your filtered lists by any column categories you designate. And finally, you can create sophisticated summary reports with the PivotTable Report command.

### 14.5.1 Creating a Data Base

In Excel, a database can be created in two ways:

- (a) Enter the data in the form of a Table in the worksheet, you can enter the data as shown below:
-

**Fig. 14.7****(b) Generate a Data Form**

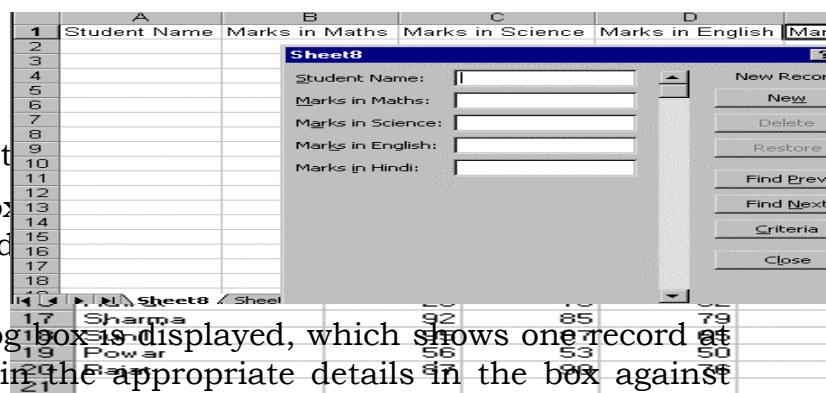
To create a database using Data Form command, follow the given steps below:

1. Enter the column headings in the first row of a worksheet.

2. Choose **Data** field name act

3. The dialog box of the selected on OK.

4. Another dialog box is displayed, which shows one record at a time. Fill in the appropriate details in the box against each field name.

**Fig. 14.9**

---

5. Click on New. This will add the entered record in the database.
6. To finish the entry of records, click on Close.

### 14.5.2 Adding Records

The records can be added in two different ways:

**(a)**

1. Type the new record entries in the blank row next to the database list.
2. The new records can be added in the way that is similar to the steps of creating a database.

**(b)**

1. Activate any cell of the database list.
2. Choose **Data→Form** command
3. Go to the last record and click on New
4. Type-in the new record details in the boxes against fields.
5. Click on OK.

### 14.5.3 Deleting Records

You can delete the records in two ways:

**(a)** The records can be deleted by simply selecting the entire cell range of the record to be deleted and press the Delete key. Move the rest of the records on row up.

**(b)** Another way of deleting the records is as follows:

1. Activate any cell from the database list.
2. Choose **Data →Form** command.
3. Get the record to be deleted by clicking on the Find Prev or Find Next button
4. Click on the Delete button.

### 14.5.4 Editing Records

You can edit records in two ways:

**(a)** The records once entered in the database list can be changed or modified. This can be done by selecting the cell and re-typing the data.

**(b)** Another way of doing this is by Data form:

---

1. Scroll up or down to select the desired record.
2. Edit the field value.
3. Click on New button to update the modification in the record.
4. Click on the Close button once you have finished up the task of modification or records.

### 14.5.5 Sorting

#### (a) Basic Sorts

Arranging the records in either ascending or descending order of a field (column) is called sorting. To execute a basic descending or ascending sort based on one column, highlight the cells that will be sorted and click the Sort Ascending (A-Z) button or Sort Descending (Z-A) button on S toolbar. In Figure 14.10 the student names are sorted in ascending and descending order.

|    | A            |
|----|--------------|
| 1  |              |
| 2  | Student Name |
| 3  | Sunil Ray    |
| 4  | Sunil        |
| 5  | Suneeta      |
| 6  | Singh        |
| 7  | Sharma       |
| 8  | Saxena       |
| 9  | Rawat        |
| 10 | Ram          |
| 11 | Rajat        |
| 12 | Rahim        |
| 13 | Power        |
| 14 | Mahendra     |
| 15 | Lalita       |
| 16 | Lakshmi      |
| 17 | Kapoor       |
| 18 | John         |
| 19 | Bhatia       |
| 20 | Alisa        |
| 21 |              |

#### (b) Complex Sorts

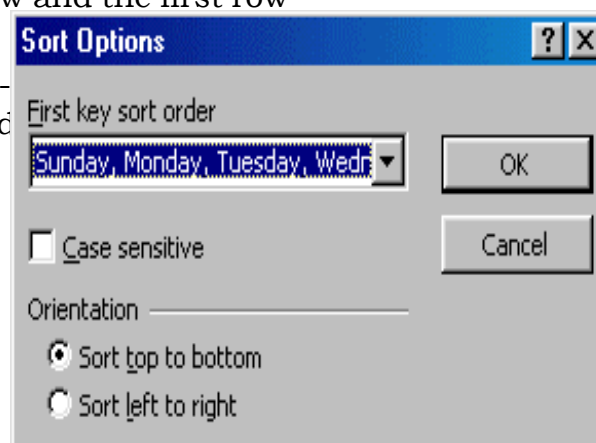
To sort by multiple columns, follow these steps:

1. Highlight the cells, rows, or columns that will be sorted.
  2. Select **Data→Sort** from the menu bar.
  3. From the Sort dialog box, select the first column for sorting from the Sort By drop-down menu and choose either ascending or descending.
-

4. Select the second and third columns, if necessary, for sorting from the Then By drop-down menus. In the example, we have selected the first column as Maths, second column as Science and the third column as English and all columns by descending order.

**Fig. 14.11**

5. If the cells you highlighted included the text headings in the first row, mark My list has...Header row and the first row will remain at the top of the worksheet.
6. Click the Options button for special non-numeric sorts such as months of the year and



**Fig. 14.12**

7. Click OK to execute the sort. See Figure 14.13 how the marks are sorted and compare them with Figure 14.7.

Fig. 14.13

#### 14.5.6 Filtering a Database

Excel's unique AutoFilter feature allows you to display only those records that match a particular criteria of values. Once records are filtered, you can edit or copy them to another worksheet or workbook, subtotal them using the subtotal feature. There are two ways to filter a database: (a) using AutoFilters, and (b) using Advanced Filters:

##### (a) Using AutoFilters

This is an easier and quick method to filter the database. To filter a database follow the given steps below:

1. Select any cell of the database range you want to filter and choose **Data → Filter → AutoFilter** command. Excel inserts drop down arrows next to each column label in the list.
2. Click the arrow in the column that contains the data you want to display.
3. Select the item you want to display.

Various options are available for each column to filter:

1. **(All)** - Shows all records.

|    | Student Name | Maths | Science | English | Hindi |
|----|--------------|-------|---------|---------|-------|
| 1  | Sunil        | 85    | 87      | 85      | 85    |
| 2  | Sunil        | 95    | 87      | 65      | 85    |
| 3  | Sunil        | 85    | 86      | 85      | 85    |
| 4  | Sharma       | 82    | 85      | 79      | 85    |
| 5  | Raj          | 87    | 80      | 78      | 85    |
| 6  | Bhatia       | 80    | 68      | 74      | 85    |
| 7  | Rahim        | 70    | 78      | 85      | 85    |
| 8  | Kapoor       | 65    | 76      | 58      | 85    |
| 9  | Alisa        | 65    | 69      | 78      | 85    |
| 10 | Lakshmi      | 58    | 63      | 65      | 85    |
| 11 | Raj          | 56    | 53      | 50      | 85    |
| 12 | Ram          | 55    | 65      | 69      | 85    |
| 13 | Raj          | 55    | 65      | 69      | 85    |
| 14 | Mahendra     | 54    | 52      | 56      | 85    |
| 15 | Raj          | 50    | 45      | 42      | 85    |
| 16 | Suneeta      | 40    | 35      | 25      | 85    |
| 17 | Raj          | 35    | 35      | 35      | 85    |
| 18 | Raj          | 25    | 15      | 32      | 85    |

2. **(Custom...)** - Shows all those records that meets a criteria specified by you for filtering a column.
3. **(Top10...)** - Shows all those top or bottom records that meets a criteria specified by you for filtering a column.
4. You can also select any one of the name, date, or number depending on the column characteristics and select records that matches the selected name, date or number.

To remove AutoFilter, again choose **Data→Filter→AutoFilter**.

### **(b) Using Advanced Filters**

These filters are used to filter the data on the basis of more than one field. This feature filters data in a list so that only the rows that meet a condition you specify by using a criteria range are displayed. Using the same database, suppose you want to view only those records where the marks was more than 70 in Maths and Science and more than 60 in English and Hindi. To get the results, follow the given steps:

1. Enter the data as given below.

| L     | M       | N       | O     |
|-------|---------|---------|-------|
| Maths | Science | English | Hindi |
| >70   | >70     | >60     | >60   |

**Fig. 14.14**

2. Select **Data→Filter→Advanced Filter...** command.
3. A message dialog box is displayed that indicates two Actions: (a) Filter the list, in-place, and (b) Copy to another location for a specified range and criteria. To filter the records select the Action option - Filter the list, in-place and indicate the List range and Criteria range for filtering. And then click on OK. To copy the filtered records to another location select the Action option - Copy to another location and indicate the List range, Criteria range, and Copy to range for filtering and copying the records and then click on OK. In our example, for a criteria given in Figure 14.14 and for a range of records as indicated in Figure 14.15a, the records are filtered as shown in Figure 14.15b.

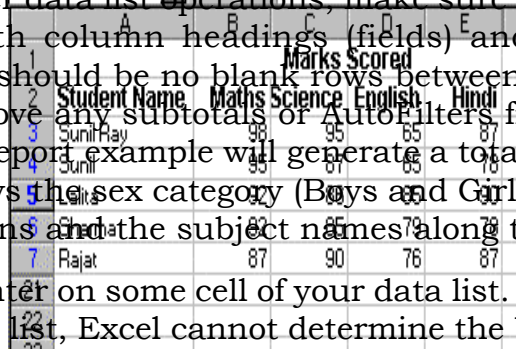
**Fig. 14.15a****Fig. 14.15b**

### 14.5.7 PivotTable Report

A pivot table is an interactive worksheet table you use to summarise and analyse data from an existing list or table. You can update a pivot table whenever changes occur in the original source data. The original data remains intact, and the pivot table stays on the worksheet you created it on.

#### Creating a simple PivotTable Report

As with your other data list operations, make sure that you have a simple list with column headings (fields) and row values (records). There should be no blank rows between the columns or the row. Remove any subtotals or AutoFilters from the data. Our PivotTable Report example will generate a total marks summary that displays the sex category (Boys and Girls) of students across the columns and the subject names along the rows.

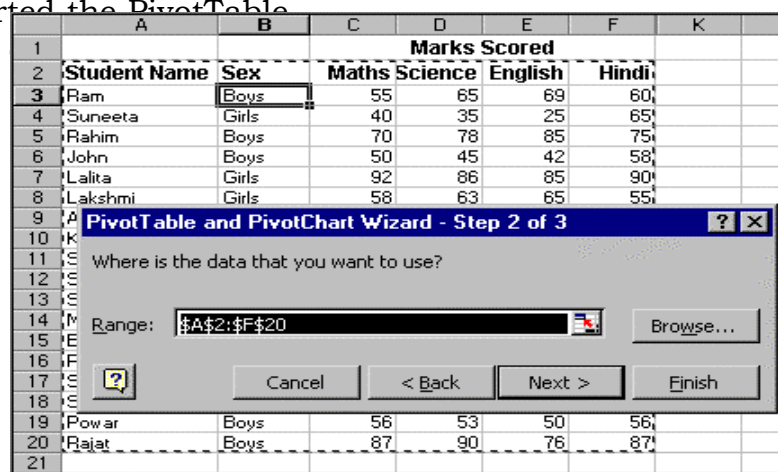


|   | A            | B     | C       | D       | E     |
|---|--------------|-------|---------|---------|-------|
| 1 |              |       |         |         |       |
| 2 | Student Name | Maths | Science | English | Hindi |
| 3 | Sunil Ray    | 98    | 95      | 65      | 87    |
| 4 | Sunil        | 95    | 87      | 65      | 78    |
| 5 | Leela        | 82    | 85      | 75      | 78    |
| 6 | Shruti       | 85    | 85      | 75      | 78    |
| 7 | Rajat        | 87    | 90      | 76      | 87    |

1. Click the pointer on some cell of your data list. If the pointer is outside the list, Excel cannot determine the boundaries of the list.
  2. Choose **Data→PivotTable and PivotChart Report** from the menu bar. Step 1 of the PivotTable Wizard appears.
-

**Fig. 14.16**

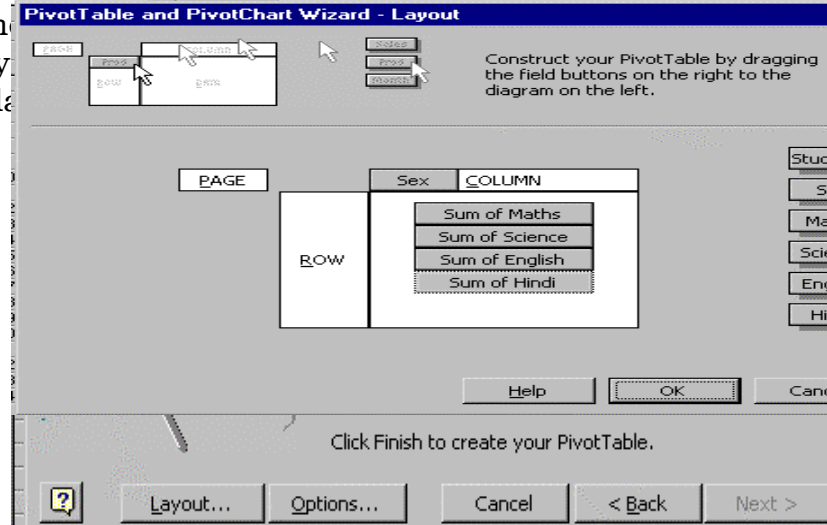
3. Make sure the Excel list or database radio button is selected, and click on Next. The Step 2 of the dialog box will appear on the screen.
4. Define the range of your list. The correct range should be displayed if your pointer was already within the boundaries of your worksheet data list when you started the PivotTable Report option. If the range is not correct, the dialog box . Click on Next.

**Fig. 14.17**

5. The Step 3 of the dialog box will appear on the screen.

**Fig. 14.18**

6. Now format your layout, which defines the fields to be displayed in the table. On the right side of the dialog box are the different field name of your data (see Figure 14.19). Drag the field name to the layout area to define exactly. The layout area displays the layout of the PivotTable.



**Fig. 14.19**

- Drag the Maths field to the Data area
  - Drag the Science field to the Data area
  - Drag the English field to the Data area
  - Drag the Hindi field to the Data area
  - Drag the Sex field to the Column area
-

You can have multiple fields on the columns and rows of the PivotTable layout. Whichever field is first determines the primary grouping. After completing Layout click on OK.

7. The last step of the PivotTable Wizard (see Figure 14.18) provides an Options button which opens a PivotTable Options dialog box. Here you can customize some last-minute Format and Data options, such as whether you want row or column grand totals, whether you want Excel to AutoFormat the PivotTable, and whether you want to save the underlying data with your PivotTable.
8. Specify where you want the PivotTable Report to start on the worksheet (see, Figure 14.18). Designate a cell within a range that does not contain current data. Leave this option blank for Excel to create a new sheet. Click on Finish.
9. The new PivotTable Report is displayed on a new sheet. Notice the generic sheet name at the bottom of the screen on the sheet tab. If you wish, you can double-click on the name and create a more descriptive name for this sheet containing the PivotTable. Excel also activates the PivotTable toolbar (see Figure 14.20) that will now be handy when working with this PivotTable. If you do not see the PivotTable toolbar floating on the screen, choose **View→Toolbars→PivotTable** that the PivotTable toolbar is checked.
10. The layout of the PivotTable Report adheres to the arrangement you created during the PivotTable Wizard. Figure 14.20 shows the total marks scored by students and total students in different subjects.

|   | A                     | B    | C    | D           | E | F |
|---|-----------------------|------|------|-------------|---|---|
| 1 | Drop Page Fields Here |      |      |             |   |   |
| 2 |                       |      |      |             |   |   |
| 3 |                       | Sex  |      |             |   |   |
| 4 | Data                  | Boys | Girl | Grand Total |   |   |
| 5 | Sum of Maths          | 762  | 400  | 1162        |   |   |
| 6 | Sum of Science        | 733  | 396  | 1129        |   |   |
| 7 | Sum of English        | 693  | 410  | 1103        |   |   |
| 8 | Sum of Hindi          | 753  | 456  | 1209        |   |   |

| Student... | Sex | Maths | Science | English |
|------------|-----|-------|---------|---------|
| Hindi      |     |       |         |         |

**Fig. 14.20**

**Changing the Default PivotTable Sum Function**

The default calculation for a numeric field that is dragged to the Data section (centre) of the PivotTable layout screen is the Sum function. If you drag the text field to the centre, the default calculation is the count function, since Excel cannot “add” words. The summary functions available for the PivotTable are Sum, Count, Average, Max, Min, Product, Count Nums, StdDev, Var, and Varp.

To change the type of function that Excel uses, follow these steps:

- 1. Click on a cell in the PivotTable that contains numeric data.
- 2. Choose **Data→PivotTable** Report from the menu bar or right-click and choose Wizard from the shortcut menu. You can also click on the PivotTable button on the PivotTable toolbar and select Wizard to redisplay the PivotTable Layout screen (Step 3 of the PivtoTable Wizard). Double-Click on the Sum of Sales field in the middle of the layout. The PivotTable Field dialog box appears.
- 3. In the Summarise By list box, select another function to summarise the data. If you choose Average and you get a Division by Zero error, you have a zero value in the PivotTable. For this exercise

- 4. Choose OK or screen of the l

|    | A                  | B     | C     | D           |
|----|--------------------|-------|-------|-------------|
| 2  |                    |       |       |             |
| 3  |                    | Sex   |       |             |
| 4  | Data               | Boys  | Girls | Grand Total |
| 5  | Average of Maths   | 69.27 | 57.14 | 64.56       |
| 6  | Average of Science | 66.64 | 56.57 | 62.72       |
| 7  | Average of English | 63.00 | 58.57 | 61.28       |
| 8  | Average of Hindi   | 68.45 | 65.14 | 67.17       |
| 9  |                    |       |       |             |
| 10 |                    |       |       |             |
| 11 |                    |       |       |             |
| 12 | Student...         | Sex   | Maths | Science     |
| 13 |                    |       |       | English     |
| 14 |                    |       |       |             |
| 15 |                    |       |       |             |
| 16 |                    |       |       |             |

ith the Step 3 h.

**Fig. 14.21**

**Fig. 14.22**

## Refreshing PivotTable Data

Do not make direct changes to the data in the PivotTable; rather, make changes to the original data and then refresh the PivotTable's data. For example, suppose if you want to add the marks of another student, at that student record the original data sheet and redefine the Range in Step 2. On the other hand, if you have wrongly entered the marks for student in some subject, edit that record in the original data. When you view the PivotTable, however, it still reflects the old data. You must issue the Refresh command to tell Excel to generate the table. Follow the steps given below:

1. Click on the sheet tab that contains the original data list and correct or change the data.
2. Return to the sheet where the PivotTable Report resides. Change the Range in Step 2 if necessary.
3. Click on the Refresh button on the PivotTable toolbar. (Alternatively, right-click and select Refresh Data or select **Data→ Refresh Data**). Excel refreshes the data.

---

## INTEXT QUESTIONS

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2. Fill in the blanks
  - (a) Choose \_\_\_\_\_ command while keeping one the field name active.
  - (b) A pivot table is an interactive \_\_\_\_\_ to summarise and analyse data from an existing list or table.
  - (c) There are \_\_\_\_\_ ways to filter a database.
  - (d) If you donot see the pivot table tool-bar choose \_\_\_\_\_.
  - (e) If the range is not correct enter the range in the \_\_\_\_\_.

---

## 14.6 WHAT YOU HAVE LEARNT

In this lesson you learnt about the use of statistical and mathematical formulars and functions in a worksheet. You can enter a formula in a cell and copy it to other cells. Moreover, you learnt about creation of database, editing of the database and addition/deletion of records from a database.

---

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**14.7 TERMINAL QUESTIONS**

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1. What is the use of Parentheses in writing formulas?
2. Write a formula in Excel to execute the following equations:
  - (a) The values of P,T and R are stored in A1, B1 and C1 cells respectively. You are requested to find the values of  $I = (PTR)/100$  and store it in D1
  - (b) The values of X and Y are stored in A10 and B10 respectively. You are requested to find the value of  $Z = X^Y$  and store it in C10.
3. Write the basic properties of formulas.
4. While working on Excel, the following error messages have appeared in your worksheet. What do you mean by this?
  - (a) #Value! (b) #DIV/0! (c) # NUM!
5. Explain the following terms in Excel: (a) relative referencing, (b) absolute referencing, and (c) mixed referencing.
6. Describe the steps in using AutoSum formula.
7. Write the syntax of the following functions in Excel
  - (a) SUM, (b) AVERAGE (c) TODAY
8. Write any two function names in each of the following categories: (a) Financial, (b) Math & Trig, (c) Statistical.
9. What is Function Wizard?
10. Explain the following terms in Excel: (a) manual recalculation, (b) automatic recalculation.
11. Explain the steps in generating a Data Form.
12. What is the difference between : (a) Basic Sorts and (b) Complex Sorts?
13. What is PivotTable Report?
14. Write the steps in using AutoFilters.

**14.8 KEY TO INTEXT QUESTIONS**

1.
    - (a) True
    - (b) True
    - (c) False
-

(d) False

(e) True

- 2
- (a) Data → form
  - (b) worksheet table
  - (c) two
  - (d) view Tool bars
  - (e) dialog box
-

# 15

## CHARTS AND GRAPHICS

### 15.1 INTRODUCTION

Data is just data until you have organised it usefully. When you present your data informatively, you are providing far more than just data; you are offering information. One of the best ways to convey information is with graphics and charts. Charts and Graphics makes the data effective, interesting, easy to understand, easy to analyse and compare. Excel helps you to create chart as either two-dimensional or three-dimensional. After creating a chart, you can enhance the information by adding chart items, such as data labels, a legend, titles, axes, and gridlines. You can also format these items using patterns, colours, alignment, fonts, and other formatting attributes. With the help of AutoShapes you can draw your own diagrams add additional features to your Charts. You can also add Clip Art images to your charts and diagrams to make them more attractive and presentable.

### 15.2 OBJECTIVES

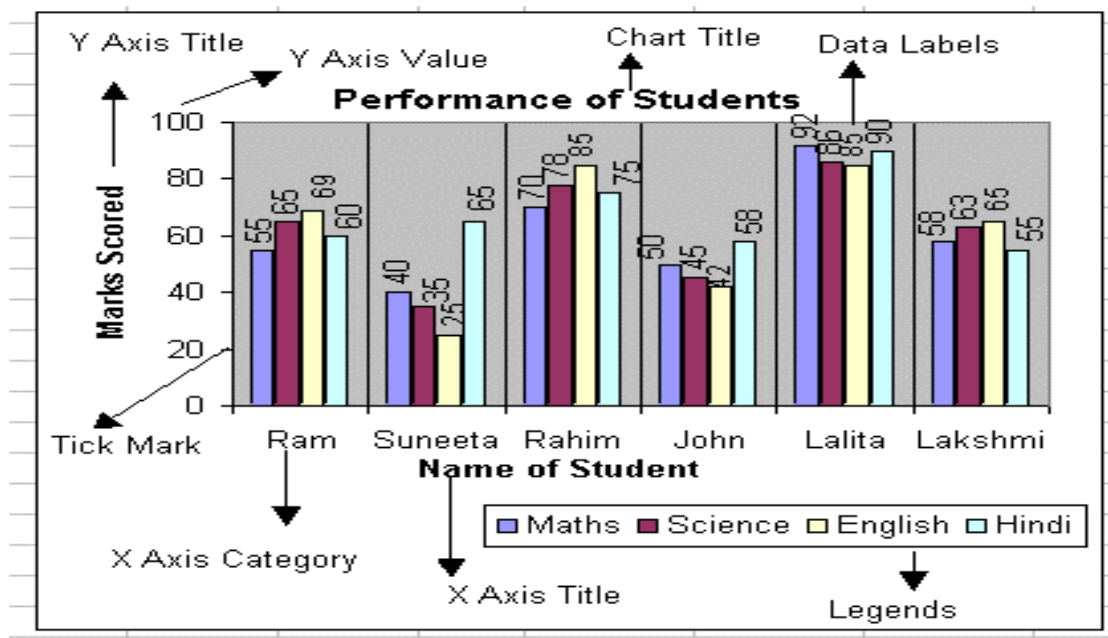
After going through this lesson you would be able to

- prepare charts from data for better presentation
  - draw own graphs and diagrams
  - add clip art images to your charts and diagrams
-

## 15.3 CHARTS

Charts allow you to present data entered into the worksheet in a visual format using a variety of graph types. Before you can make a chart, you must first enter data into a worksheet. This section explains how you can create simple charts from the data.

### 15.3.1 Components of a Chart



**Fig. 15.1**

There are a number of components of a chart. Some of the major components are illustrated in Figure 15.1. We will briefly discuss them.

**Chart Title** - A title given to the whole chart.

**X-Axis Title** - A title given to the X-axis data range.

**Y-Axis Title** - A title given to the Y-axis data range.

**X-Axis Category** - These are the categories of the data which have been plotted. These are taken from the first column or first row of your data range.

**Y-Axis Value** - This is the data range marked to plot the data series.

**Data Labels** - The values of the data series plotted.

**Legends** - Specifies the colour, symbol or pattern used to mark data series.

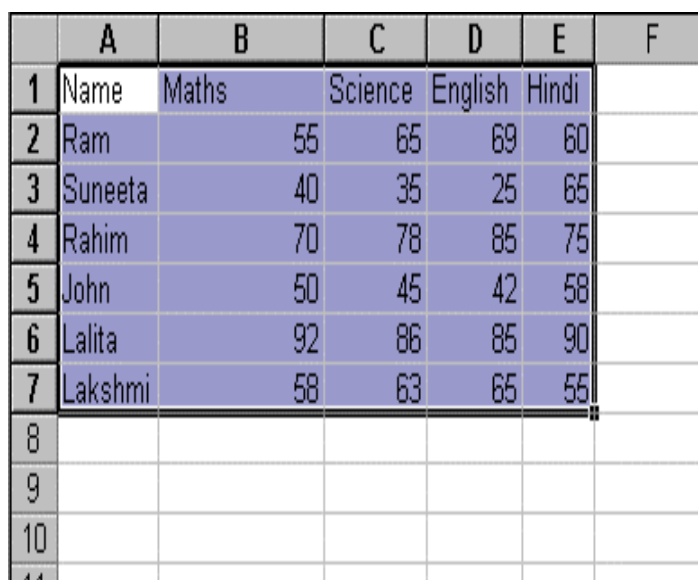
**Tick Marks** - These marks are used to show the scaling of X-axis and Y-axis.

**Grid Lines** - Displays lines at the major intervals on the category X-axis and/or Y-axis

### 15.3.2 Drawing Your Own Charts Using Chart Wizard

The Chart Wizard brings you through the process of creating a chart by displaying a series of dialog boxes.

1. Enter the data into the worksheet and highlight all the cells that will be included in the chart including headers.



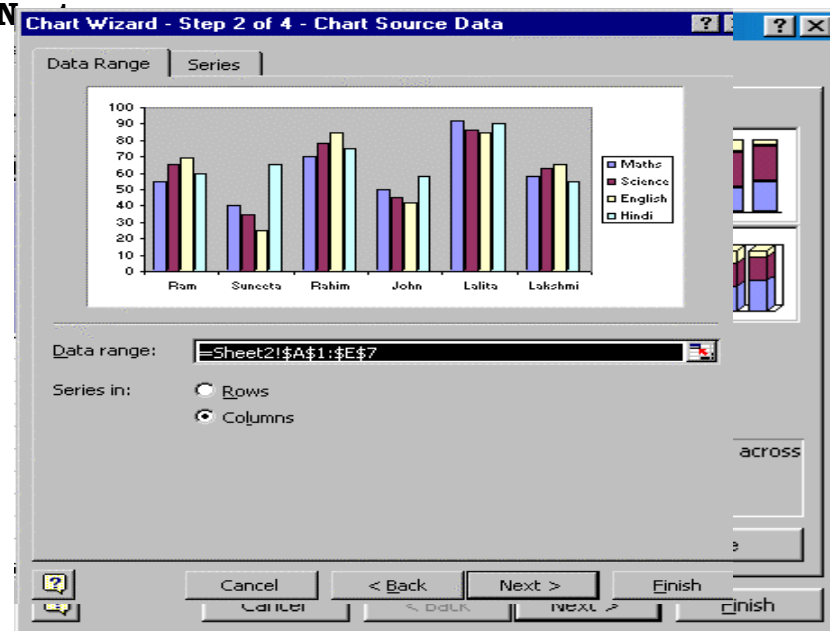
|    | A       | B     | C       | D       | E     | F |
|----|---------|-------|---------|---------|-------|---|
| 1  | Name    | Maths | Science | English | Hindi |   |
| 2  | Ram     | 55    | 65      | 69      | 60    |   |
| 3  | Suneeta | 40    | 35      | 25      | 65    |   |
| 4  | Rahim   | 70    | 78      | 85      | 75    |   |
| 5  | John    | 50    | 45      | 42      | 58    |   |
| 6  | Lalita  | 92    | 86      | 85      | 90    |   |
| 7  | Lakshmi | 58    | 63      | 65      | 55    |   |
| 8  |         |       |         |         |       |   |
| 9  |         |       |         |         |       |   |
| 10 |         |       |         |         |       |   |
| 11 |         |       |         |         |       |   |

**Fig. 15.2**

2. Click the Chart Wizard button on the standard toolbar to view the first **Chart Wizard** dialog box.
  3. **Chart Type** - Choose the **Chart type** and the **Chart subtype** if necessary. Click **Next**.
-

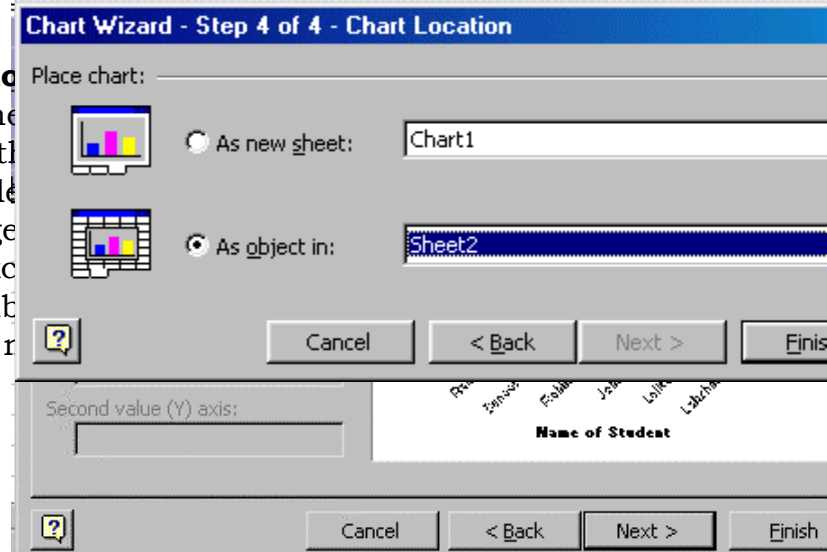
**Fig. 15.3**

4. **Chart Source Data** - Select the data range (if different from the area highlighted in step 1) and click **N**

**Fig. 15.4**

5. **Chart Options** - Enter the name of the chart and titles for the X- and Y-axes. Other options for the axes, grid lines, legend, data labels, and data table can be changed by clicking on the tabs. Press **Next** to move to the next set of options.

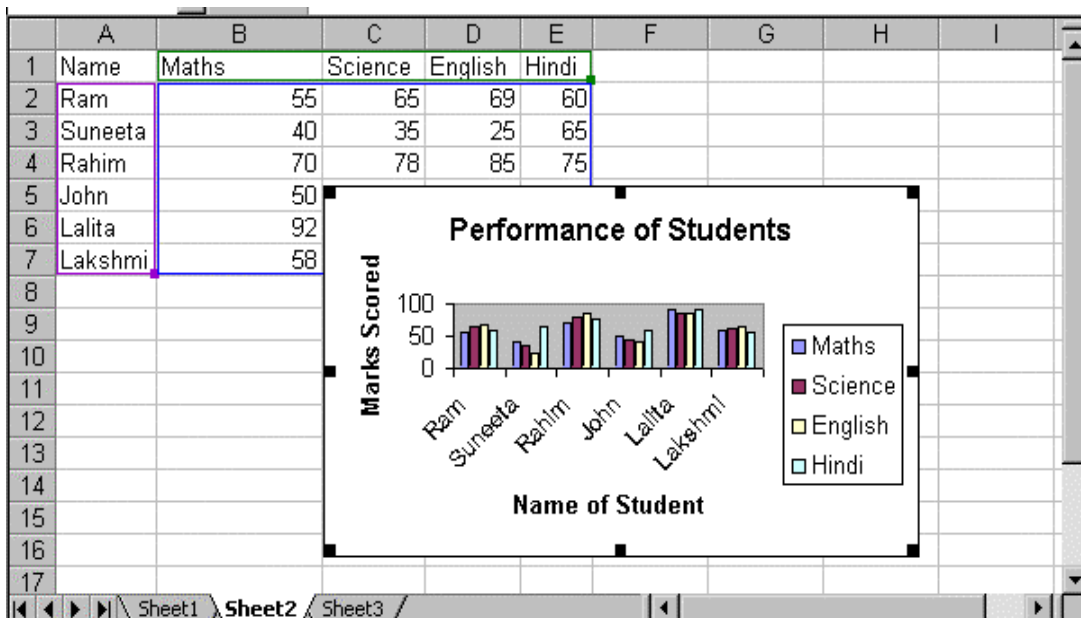
6. **Chart Location** - The chart can be placed on a new sheet or as an object in an existing sheet. The advantage of placing the chart as an object in the data and results sheet is that the chart is always visible and can be moved and resized at any time.



**Fig: 15. 6**

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7. Click **Finish** to create the chart.



**Fig. 15.7**

### 15.3.3 Chart Types

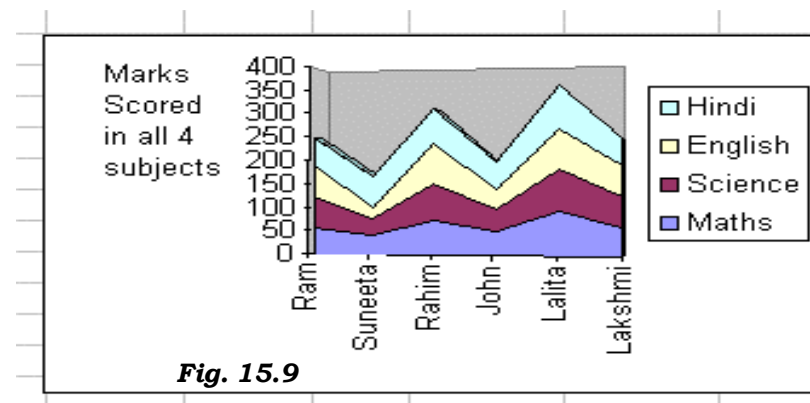
You can select a wide range of charts from a whole palette of chart types in step 1 of the Chart Wizard. The following paragraphs describe some of the chart types represented on the Chart Wizard's palette.

**Column Charts** - The column charts compare distinct items. In this chart category axis is horizontal (X-axis) and value axis is vertical (Y-axis). It is important to keep the number of series in a column chart to a minimum. Too many series cause the column to become too narrow and difficult to analyse. We can use column charts to compare the results. A column chart is illustrated in Figure 15.7.

**Bar Charts** - Compare distinct items or show single items at distinct intervals. It is similar to column chart except that in this chart value axis is horizontal (X-axis) and category axis is vertical (Y-axis). Figure 15.8 illustrates a bar chart.

**Fig. 15.8**

**Area Charts** - Show the relative contributions that each data series takes up. The greater the data series takes up, the greater its contribution to the whole. An area chart has been illustrated in Figure 15.9.

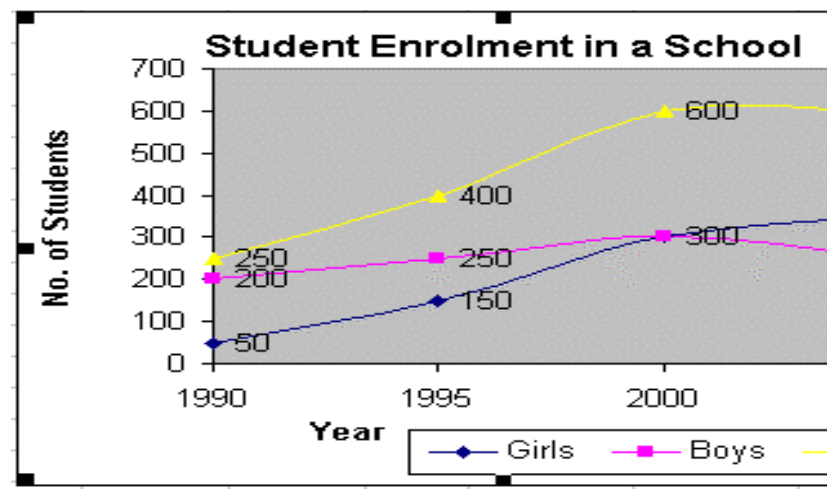
**Fig. 15.9**

**Stacked Column Charts** - These charts can be created by selecting the data range and then choosing a column chart that has a stacked style. This chart combines the advantages of both area charts and column charts. Series values are stacked to show the relative contribution of each series and then reflected at discrete intervals. Figure 15.10 illustrates a stacked column chart.

---

**Fig. 15.10**

**Line Charts** - These charts are useful to compare the trends over time. Figure 15.11 illustrates a line chart.

**Fig. 15.11**

**Pie Charts** - These charts show the proportion of each component value to the total value in a data series. Pie charts are useful for showing proportional sales figures, or representation of different categories of population like male/female, adults/children, workers/non-workers, etc.

**Fig. 15.12**

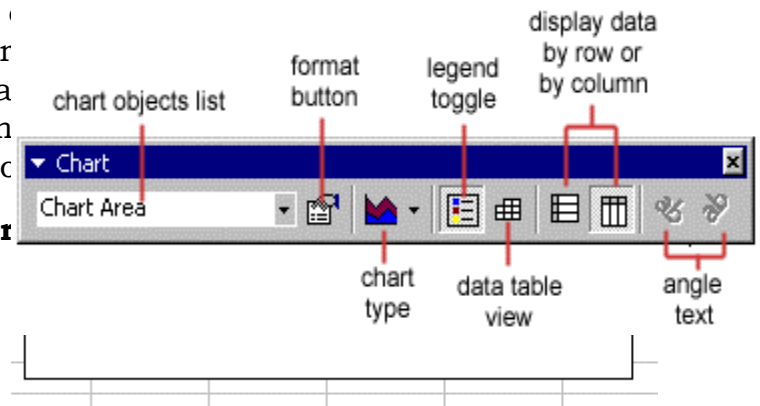
### 15.3.4 Resizing the Chart

To resize the chart, click on its border and drag any of the eight black handles to change the size. Handles on the corners will resize the chart proportionally while handles along the lines will stretch the chart.

### 15.3.5 Moving the Chart

Select the border  
and drag the char  
such as the title a  
Click on the elem  
the element to mc

### 15.3.6 Chart For

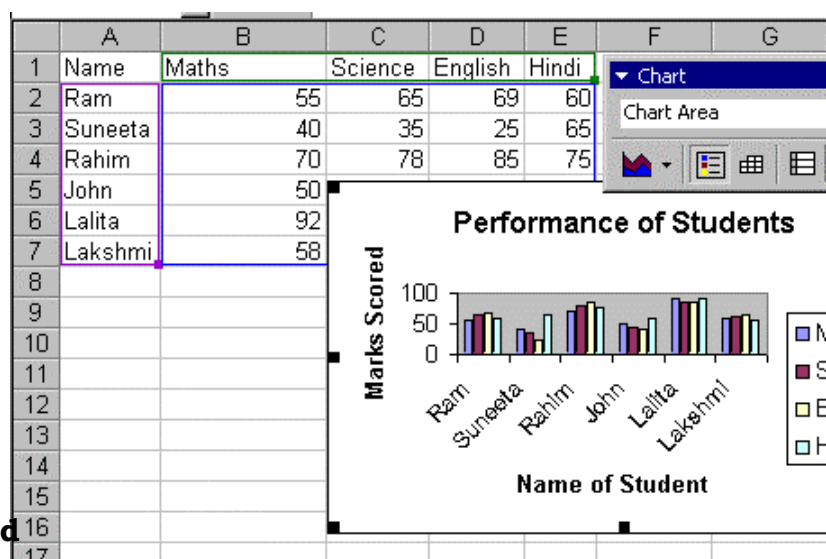


**Fig. 15.13**

1. **Chart Objects List** - To select an object on the chart to format,

click the object on the chart or select the object from the **Chart Objects List** and click the **Format** button. A window containing the properties of that object will then appear to make formatting changes.

2. **Chart Type** - Click the arrowhead on the chart type button to select a different type of chart.
3. **Legend Toggle** - Show or hide the chart legend by clicking this toggle button.
4. **Data Table view** - Display the data table instead of the chart by clicking the Data Table toggle button.
5. **Display Data by Column or Row** - Charts the data by columns or rows according to the data sheet.
6. **Angle Text** - Select the category or value axis and click the **Angle Downward** or **Angle Upward** button to angle the selected by +/- 45 degrees.



*Fig. 15.14*

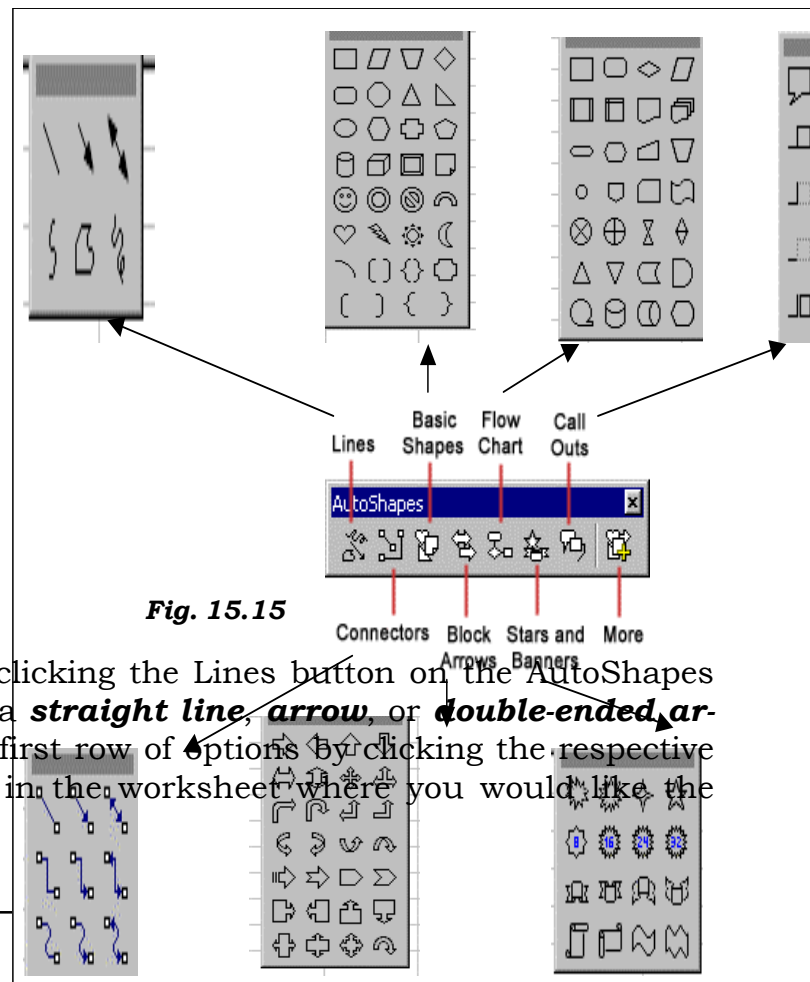
### 15.3.7 Copying the Chart to Microsoft Word

A finished chart can be copied into a Microsoft Word document. Select the chart and click **Copy**. Open the destination document in Word and click **Paste**.

## 15.4 GRAPHICS - AUTOSHAPES

The AutoShapes toolbar will allow you to draw a number of

geometrical shapes, arrows, flow chart elements, stars, and more on the worksheet. Activate the AutoShapes toolbar by selecting **Insert→Picture→AutoShapes** or **View→Toolbars→Drawing** from the menu bar. Click the button on the toolbar to view the options for drawing the shape. Different categories of AutoShapes available in Excel are shown in Figure 15.15. We will briefly discuss some of the here.

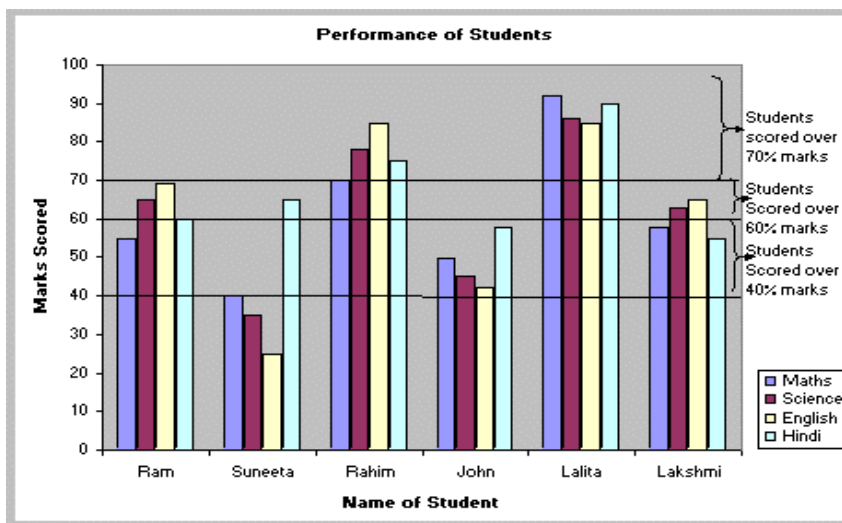


**Fig. 15.15**

1. **Lines** - After clicking the Lines button on the AutoShapes toolbar, draw a **straight line, arrow, or double-headed arrow** from the first row of options by clicking the respective button. Click in the worksheet where you would like the

line to begin and click again where it should end. To draw a **curved line** or **freeform shape**, select curved lines from the menu (first and second buttons of second row), click in the worksheet where the line should appear, and click the mouse every time a curve should begin. End creating the graphic by clicking on the starting end or pressing the **ESC** key. To **scribble**, click the last button in the second row, click the mouse in the worksheet and hold down the left button while you draw the design. Let go of the mouse button to stop drawing.

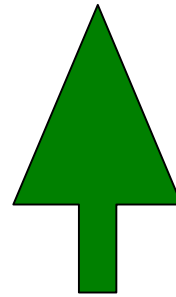
2. **Connectors** - These lines can be used to connect flow chart elements.
3. **Basic Shapes** - Click the Basic Shapes button on the AutoShapes toolbar to select from many **two- and three-dimensional shapes, icons, braces, and brackets**. Use the drag-and-drop method to draw the shape in the worksheet. When the shape has been made, it can be resized using the open box handles and other adjustments specific to each shape can be modified using the yellow diamond handles. For example, we have used (see, Figure 15.16) some of the basic shapes and lines to the chart showing the performance of students in an examination.



**Fig. 15.16**

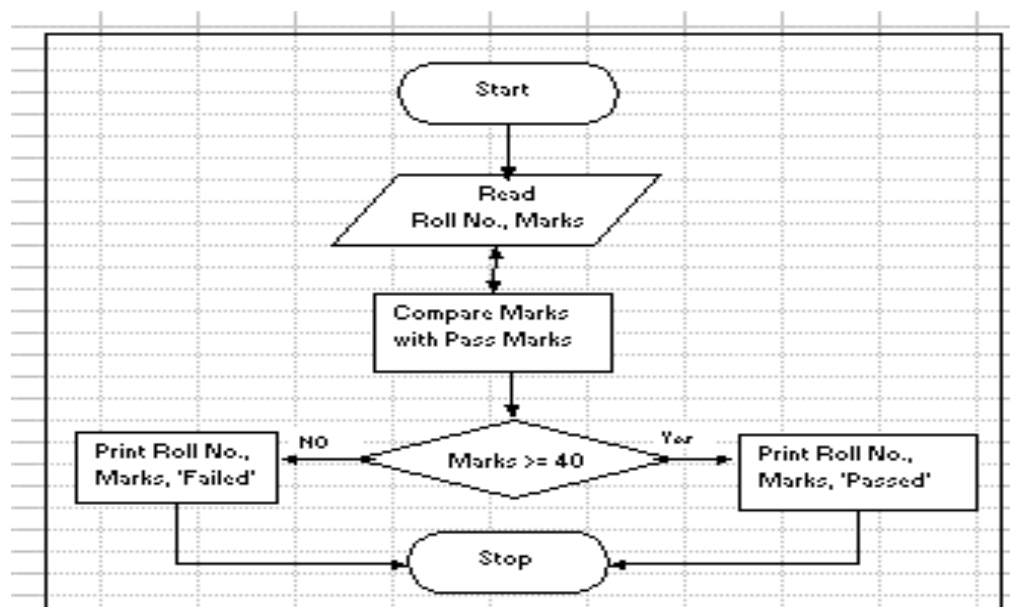
4. **Block Arrows** - Select Block Arrows to choose from many types of **two- and three-dimensional arrows**. Drag-and-drop the arrow in the worksheet and use the open box and

yellow diamond handles to adjust the arrowheads. Each AutoShape can also be rotated by first clicking the **Free Rotate** button on the drawing toolbar . Click and drag the green handles around the image to rotate it. The tree image below was created from an up arrow



**Fig. 15.17**

5. **Flow Chart** - Choose from the flow chart menu to add **flow chart elements** to the worksheet and use the lines menu to draw connections between the elements. We have drawn a flowchart using lines, flow chart elements and connectors as shown in figure 15.13. You may try more such flow chart graphics using different categories of AutoShapes listed in Figure 15.10. 



**Fig. 15.18**

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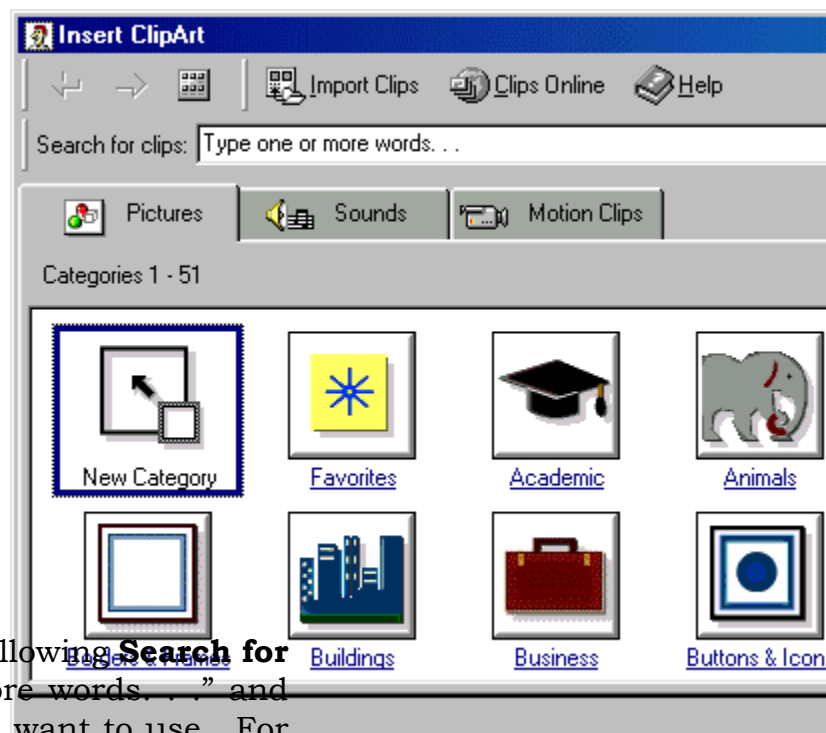
6. **Stars and Banners** - Click the button to select **stars**, **bursts**, **banners**, and **scrolls**.
7. **Call Outs** - Select from the **speech and thought bubbles**, and **line call outs**. Enter the call out text in the text box that is made.
8. **More AutoShapes** - Click this button to choose from a list of clip art categories.

## 15.5 GRAPHICS - CLIP ART

### 15.5.1 Adding Clip Art

To add a clip art image to the worksheet, follow these steps:

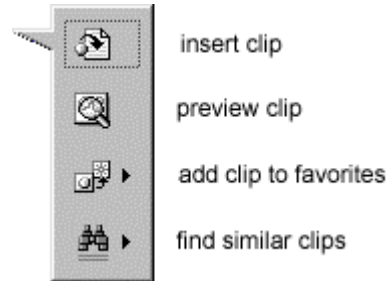
1. Select **Insert→Picture→Clip Art** from the menu bar.



**Fig. 15.19**

2. To find an image, click in the white box following **Search for clips**. Delete the words "Type one or more words. . ." and enter keywords describing the image you want to use. For example, by entering words like **Animals**, you will get all those Clip Arts on animals that comes with Excel or added by you earlier.

3. Click one of the category icons.
4. Click once on the image you want to add to the worksheet and the following popup menu will appear:



**Fig. 15.20**

- **Insert Clip** to add the image to the worksheet.
- **Preview Clip** to view the image full-size before adding it to the worksheet. Drag the bottom, right corner of the preview window to resize the image and click the “**x**” close button to end the preview. In the following Figure we have shown a Clip Art indicating a School.



**Fig. 15.21**

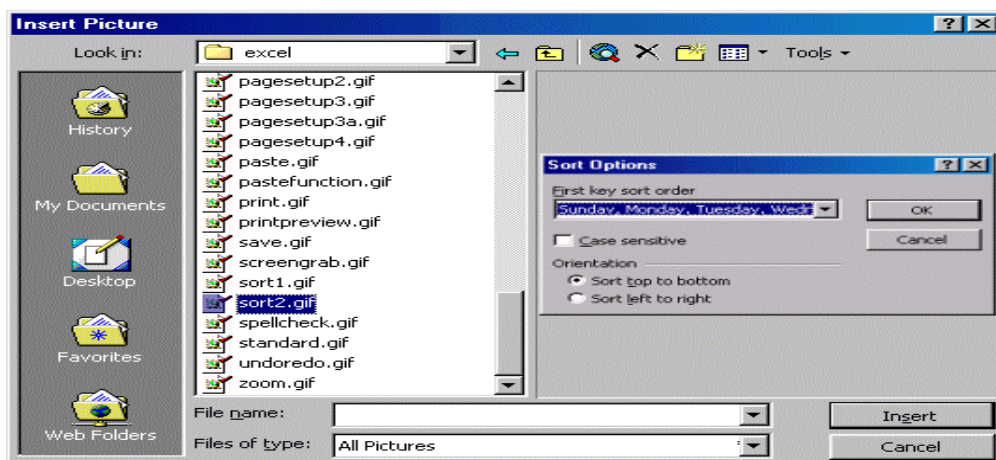
- **Add Clip to Favorites** will add the selected image to your favorites directory that can be chosen from the **Insert ClipArt** dialog box.
  - **Find Similar Clips** will retrieve images similar to the one you have chosen.
5. Continue selecting images to add to the worksheet and click the **Close** button in the top, right corner of the **Insert ClipArt** window to stop adding clip art to the worksheet.

### **15.5.2 Add an Image from a File**

Follow these steps to add a photo or graphic from an existing file:

---

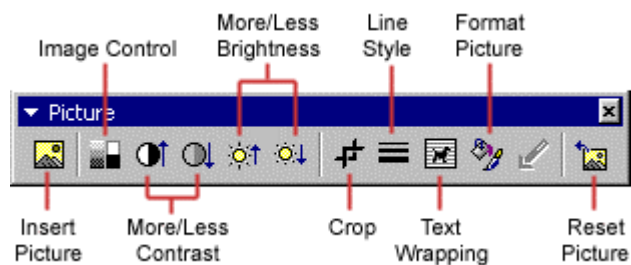
1. Select **Insert ---> Picture ---> From File** on the menu bar.
2. Click the down arrow button on the right of the **Look in:** window to find the image on your computer.
3. Highlight the file name from the list and click the **Insert** button.



**Fig. 15.22**

### 15.5.3 Editing A Graphic

Activate the image you wish to edit by clicking on it once with the mouse. Eight handles will appear around the graphic. Click and drag these handles to resize the image. The handles on the corners will resize proportionally while the handles on the straight lines will stretch the image. More picture effects can be changed using the Picture toolbar. The **Picture toolbar** should appear when you click on the image. Otherwise, select **View→Toolbars→Picture** from the menu bar to activate it.



**Fig. 15.23**

- **Insert Picture** will display the image selection window and allows you to change the image.
- **Image Control** allows to to make the image gray scale, black and white, or a watermark.
- **More/Less Contrast** modifies the contrast between the colors of the image.
- **More/Less Brightness** will darken or brighten the image.
- Click **Crop** and drag the handles on the activated image to delete outer portions of the image.
- **Line Style** will add a variety of borders to the graphic.
- **Text Wrapping** will modify the way the worksheet text wraps around the graphic.
- **Format Picture** displays all the image properties in a separate window.
- **Reset Picture** will delete all the modifications made to the image.

---

### INTEXT QUESTIONS

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1. Write True or False for the following statements
    - (a) Format picture displays all the images properties in a separate window.
    - (b) Activate the image you wish to edit by clickign on it once with the mouse.
    - (c) Line charts show the proportion of each component value to the total value in a data series.
    - (d) Connectors can be used to connect flow chart elements.
    - (e) Pie charts are useful to compare the trends over time.
  2. Fill in the blanks
    - (a) Each autoshape can be rotated by first clicking \_\_\_\_\_ button on the drawing tool bar.
    - (b) More \_\_\_\_\_ effects can be changes using the picture toolbar.
-

- (c) \_\_\_\_\_ displays all the image properties in a separate window.
  - (d) \_\_\_\_\_ show the relative contributions that each data series takes up.
  - (e) Enter the name of the chart and titles for \_\_\_\_\_.
- 

## **15.6 WHAT YOU HAVE LEARNT**

In this lesson you learnt about the creation of charts and graphics. On the basis of data entered in a worksheet you can create a bar chart, area chart, stacked column chart, line chart or pie chart, you can add title, legend, data labels and grid lines to the chart. Moreover, you learnt about autoshapes and clip art also.

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## **15.7 TERMINAL QUESTIONS**

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1. What is the importance of charts and graphics in providing information?
2. Briefly explain any 5 different components of a chart?
3. Explain the process of creating a chart using Chart Wizard dialog box.
4. Briefly explain the following:
  - (a) Chart sheet, (b) Embedded chart
5. Briefly explain the following:
  - (a) Bar charts, (b) Pie charts, (c) Stacked column charts
6. List any four features of Chart Formatting toolbar.
7. How do you copy a chart to MS Word created in MS Excel?
8. List any 5 categories of AutoShapes in Excel.
9. You are asked to prepare a flow chart. What kind of AutoShapes you would like to use?
10. Explain the steps in adding a Clip Art to your worksheet?

## **15.8 KEY TO INTEXT QUESTIONS**

1. (a) True
    - (b) True
-

- (c) False
  - (d) True
  - (e) False
2. (a) free rotate
- (b) picture
  - (c) format picture
  - (d) Area charts
  - (e) X,Y axes

# 16

## PREPARING SLIDES

### 16.1 INTRODUCTION

The Microsoft PowerPoint is a presentation graphics program. It helps you to present your ideas to other people, give speeches, give classroom lectures, organize computer conferences etc. Even if you are not a multimedia expert, PowerPoint helps you create and present exciting slide shows. It provides you helpful suggestions on the layout, design, and formats of your slides. It enhances your presentations with pictures, sound effects, tables, and charts.

### 16.2 OBJECTIVES

After going through this lesson you would be in a position to

- explain features of PowerPoint
- create presentations
- generate slides
- add text to slides
- save and printing presentations

### 16.3 STARTING A POWERPOINT PROGRAM

You can start your PowerPoint program different ways. One way is using Start button:

---

1. Click on the **Start** button.
2. In the menu that appears select **Programs→Microsoft PowerPoint**. In few seconds you will see PowerPoint screen on the monitor.

You can also start your MS PowerPoint program by simply clicking on **Microsoft PowerPoint** icon, which lies on the Microsoft Office Shortcut Bar (MOSB).

The main features of MS PowerPoint are:

- PowerPoint gives you several ways to create a presentation.
- Creating slides is the root of all your work with PowerPoint. You can get your ideas across with a series of slides.
- Adding text will help you put your ideas into words.
- The multimedia features make your slides sparkle. You can add clip art, sound effects, music, video clips etc.
- Preparing a presentation is easy in PowerPoint. Once you have created slides, you can put them in order, time your slide show, and present them to your audience.

## 16.4 CREATING PRESENTATIONS

PowerPoint gives you several ways to create a presentation. When you start your PowerPoint Program, you see a dialog box that asks whether you want to open an existing presentation, or create a new presentation using AutoContent Wizard, or Design Template, or Blank presentation. If the PowerPoint dialog box does not appear, select **File→New** command on the menu bar.

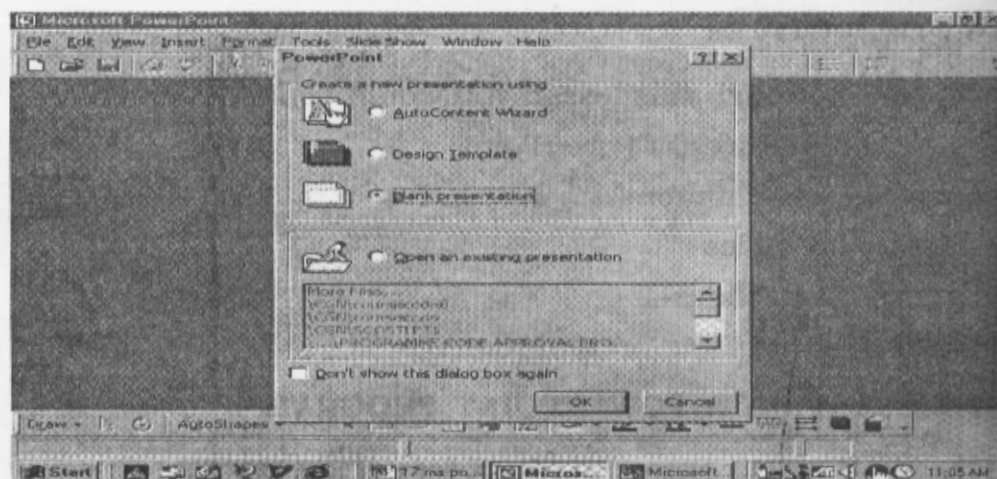
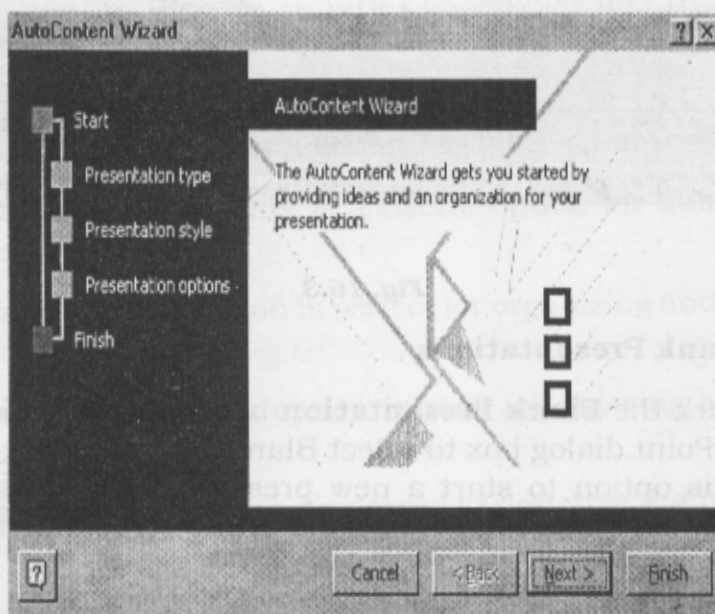


Fig. 16.1

### 16.4.1 AutoContent Wizard

Check-mark the **Auto Content Wizard** box, and then click **OK** in the PowerPoint dialog box to select Auto Content Wizard. The AutoContent Wizard provides templates and ideas for a variety of presentation types. Page through the wizard by clicking **Next** button on the bottom of each page after making necessary choices. Choose the type of presentation you would like to create, answer the questions posed by the Wizard, add your own content, and click **Finish** on the Wizard when finished.



*Fig. 16.2*

Your presentation is ready for show.

### 16.4.2 Design Template

Check mark the **Design Template** box, and then click **OK** in the PowerPoint dialog box to select Design Template. **New Presentation** dialog box appears. Click on Design Templates button in the New Presentation dialog box. A number of template names will appear in the white box. These **Design Templates** gives you different backgrounds and text formatting to begin your presentation. Preview each design by highlighting the template name on the list. Press **OK** after you have chosen the design.

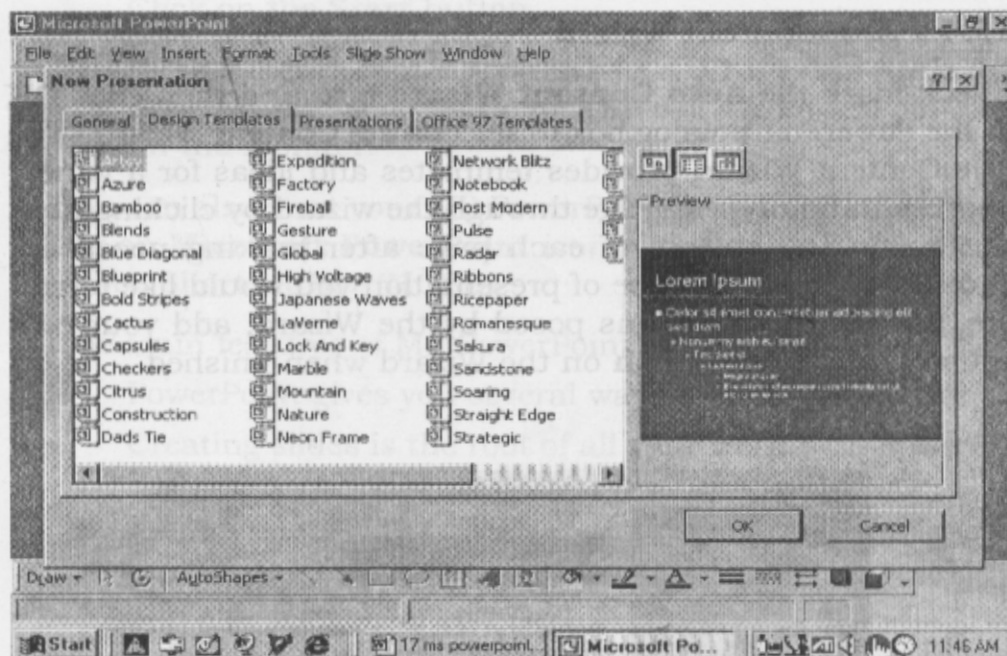


Fig. 16.3

### 16.4.3 Blank Presentations

Check-mark the **Blank Presentation** box, and then click **OK** in the PowerPoint dialog box to select Blank Presentation. You can choose this option to start a new presentation from scratch if you have a new approach or if none of the templates suit your needs.

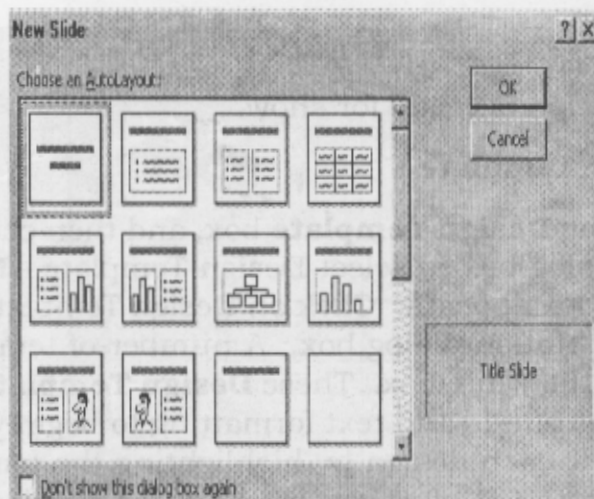


Fig. 16.4

### 16.4.4 AutoLayouts

Once you have chosen a blank form for your new presentation, the **New Slide** dialog box appears. Again, PowerPoint helps you to choose how you want the first slide of your presentation to appear. There are 24 different slide layouts from which to choose. These layouts are called **AutoLayouts**. Each Autolayout provides a unique way to arrange information such as text, graphs, and tables. You simply make your selection and click on **OK**. Each choice described below, dictates how your completed slides will appear.

1. **Title Slide:** This option is useful for beginning a presentation or a major section of a presentation; use this slide if you want to include subtitles or smaller text underneath a title.
2. **Bulleted List:** Anytime you need to make to list of things that fall underneath a general subject, choose this layout.
3. **2 Column Text:** This is a useful option for doing pro/con lists.
4. **Table:** This option is perfect for organizing and classifying things.
5. **Text & Chart:** This option is good for showing a chart with explanatory text.
6. **Chart & Text:** This is a reversed variation of the Text & Chart layout.
7. **Organization Chart:** This is a great option for corporate hierarchical structures or flows of command.
8. **Chart:** Use this layout if you want to include a graph or chart.
9. **Text & Clip Art:** Use this layout to show a graphic with text.
10. **Clip Art & Text:** This is a reversed variation of the Text & Clip Art layout.
11. **Title Only:** This option is great for the beginning of a presentation. No subtitles are included in this layout.
12. **Blank:** Use this layout if you want a blank slide formatted according to the master Slide.

13. **Text & Object:** If you want to include text with a linked object, such as a worksheet, graph, or database, choose this layout. It is the perfect choice to take advantage of Object Linking and Embedding (OLE).
14. **Object & Text:** This is a reversed variation of Text & Object layout.
15. **Large Object:** This layout allows a large object to be linked to the slide without any text. This format is ideal for worksheets from Excel.
16. **Object:** Use this option to place title over one linked object.
17. **Text & Media Clip:** This layout uses media clips embedded in a slide. Media clips can be animation, sound, or video files that you want to embed in a presentation.
18. **Media Clip & Text:** This is a reversed variation of the Text & Media Clip layout.
19. **Object over Text:** Use this option to place one linked object over text.
20. **2 Objects over Text:** This option is a combination of Object over Text and Text & 2 Object layouts.
21. **Text over Object:** This is a reversed variation of Object over Text layout.
22. **Text & 2 Objects:** This is a variation of Text & Object layout, but with two embedded objects.
23. **2 Objects & Text:** This is a reversed variation of Text & 2 Objects layout.
24. **4 Objects:** This is a very useful layout if you need to include multiple objects from one or more applications.

#### **16.4.5 Open an Existing Presentation**

Check-mark the **Open an Existing Presentation** box, and then click **OK** in the PowerPoint dialog box to select an existing Presentation. You can choose this option to open a PowerPoint presentation that already exists. Select the folder the file is located in from the **Look in:** drop-down menu and highlight the file on the list. Click **Open** to open the presentation.

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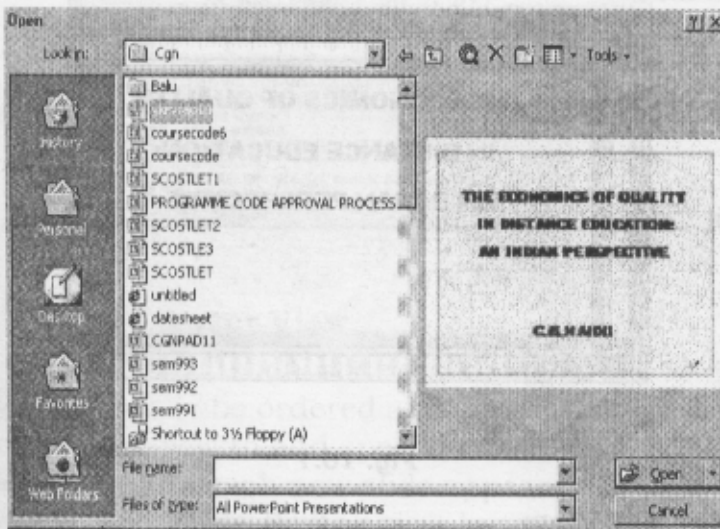


Fig. 16.5

## 16.5 VIEWING SLIDES

PowerPoint consists of multiple views to help you in the creation and presentation of your slides. These views are Normal, Outline, Slide, Slide Sorter, and Slide Show. The first four views are for creating your presentation and the last one is for presentation of slide show. You can access these views by clicking the respective view buttons at the bottom left of the PowerPoint window. Or select the View and then the respective command on the menu bar. For example, if you want to choose Normal view, select **View→Normal** command on the menu bar.

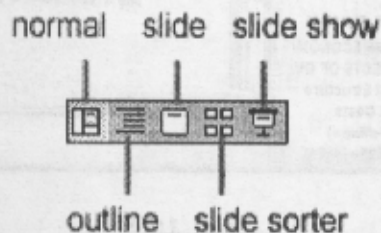


Fig. 16.6

### 16.5.1 Slide View

Slide View is the default view when you open PowerPoint. Only one slide is visible at a time in Slide View. This view is helpful for adding images, formatting text, and adding background styles. To access slide view, click on **Slide View** button at the bottom left of the window or select **View→Slide** command on the menu bar.

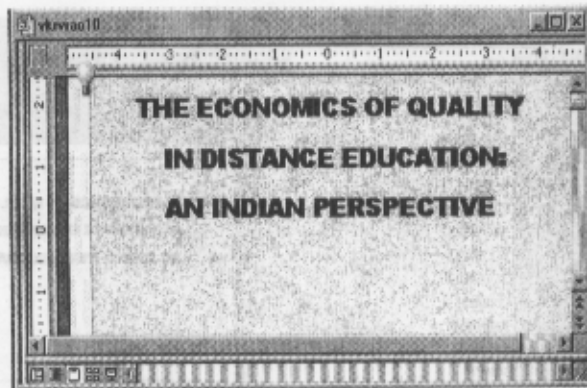


Fig. 16.7

### 16.5.2 Normal View

The Normal View divides the screen into three sections: the main window, where the current slide is displayed; the outline pane on the left; and the notes pane at the bottom. This is where you will do most of your work. You can resize each pane by clicking its border and dragging it to the size that you want it to be. To access Normal view, click on **Normal** view button at the bottom left of the window or select **View**→**Normal** command on the menu bar.

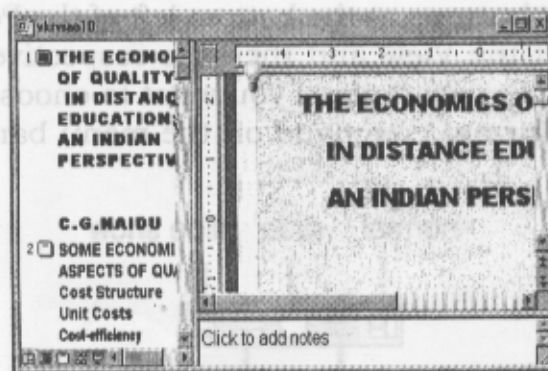


Fig. 16.8

### 16.5.3 Outline View

The Outline View divides the screen into three sections: the main window, where the outline is displayed; and two small windows for the current slide and notes. This view is recommended for editing text. Like Normal view, you can resize each window by clicking its border and dragging it to the size that you want it to be. To access Outline view, click on Outline View button at the bottom left of the window or select **View**→**Outline** command on the menu bar.

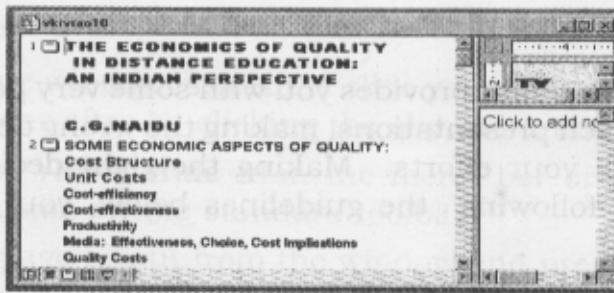


Fig. 16.9

#### 16.5.4 Slide Sorter View

A small image of each slide is displayed on Slide Sorter View. Slides can easily be ordered and sorted using this view. You can also use this view to add special effect, such as the transactions that occur when each new slide appears. To access **Slide Sorter** view, click on **Slide Sorter** view button at the bottom left of the window or select **View**→**Slide Sorter** command on the menu bar.



Fig. 16.10

#### 16.5.5 Slide Show View

The Slide Show View is the view to use when you preview your presentation to make sure every thing is in place, or when you deliver a presentation to an audience. Because all sounds, animations, hyperlinks, and action settings of your presentation will be working, you can see exactly how your show will turn out. To access Slide Show view, click on **Slide Show** button at the bottom left of the window or select **View**→**Slide Show** command on the menu bar.

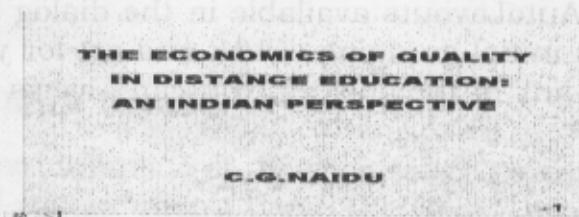


Fig. 16.10a

## 16.6 DESIGN TIPS

Although, PowerPoint provides you with some very powerful tools to give top-notch presentations, making the wrong design choices can defeat all your efforts. Making the right decisions is not difficult. By following the guidelines below, you can prepare best slides.

1. Use contrasting colors for the text and the background so the text will be easy to read.
2. Use font size large enough to be seen from the back of the room where the presentation will be held. A font size of 24-point or larger is recommended.
3. Use short phrases and sentences to convey your message.
4. Use simple slide transitions. Too many different transitions will distract your audience from the subject of the presentation.
5. Avoid cluttering the slides with too much text or graphics. Your audience should hear what you have to say and not be distracted by a busy screen.
6. Keep text simple and easy to read by not using many different text effects such as **bold**, *italics*, underlining, larger font size for emphasis within a sentence, or a different font all on the same slide.

## 16.7 WORKING WITH SLIDES

Slides are the building blocks of your presentation. You can also create or use layouts and designs, add notes and create handouts, and customize the look of your slides. You can create new slides by inserting them into your show. When you create a new slide, you can use any of the 24 AutoLayouts available in the **New Slide** dialog box or choose a blank slide. Once you have created a new slide, you can insert various elements such as text, pictures, graphs, tables etc.

### 16.7.1 Inserting a New Slide

The **New Slide** dialog box inserts a new slide into your presentation. The 24 AutoLayouts available in the dialog box will help you choose an initial grouping of text and art for your slide. If you don't like any of the choices, you can always begin with a blank slide.

---

Follow these steps to insert a new slide into the presentation:

1. In the Outline window, select the slide you want as the new slide to appear after by clicking the slide's number.
2. Select **Insert→New Slide** from the menu bar or click the new slide button on the standard toolbar.
3. Choose the page layout from the window and press **OK**.

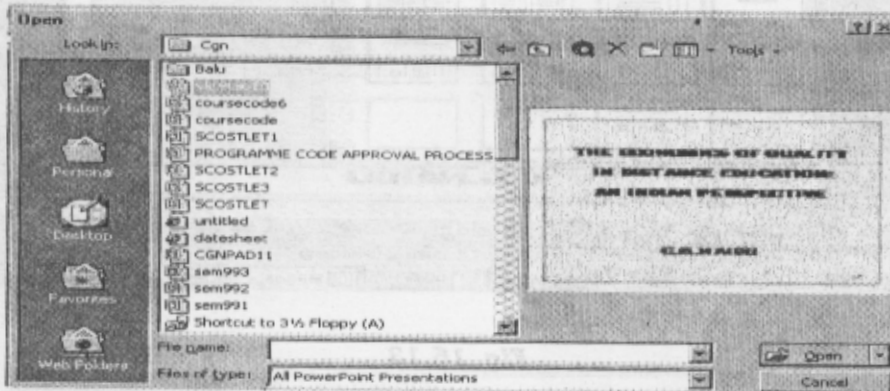


Fig. 16.11

### 16.7.2 Applying a Design Template

To add a design template or change the existing one, select **Format→Apply Design Template** command on the menu bar. Select the template and click **Apply**.

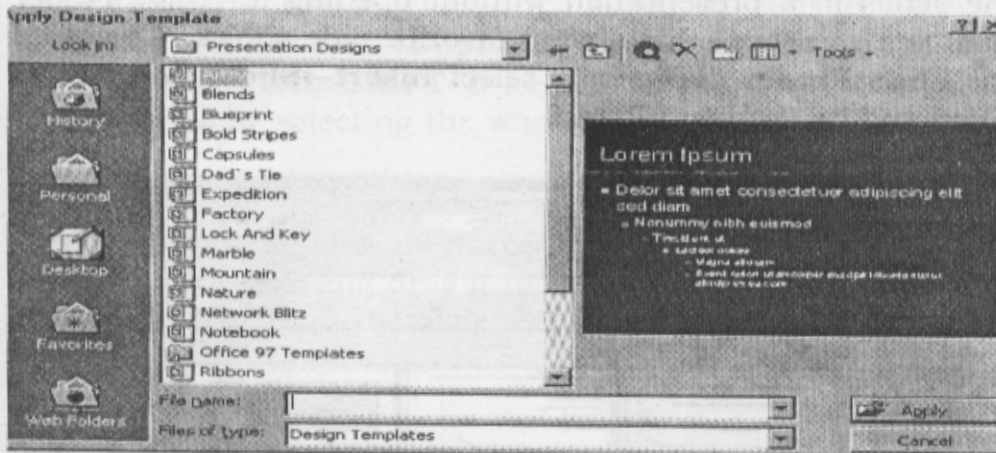


Fig. 16.12

### 16.7.3 Changing Slide Layouts

To change the layout template of the slide select **Format→Slide Layout** command on the menu bar. The Slide Layout dialog

box appears with 24 AutoLayouts. Select one of the layout thumbnail images and click **Apply**.



Fig. 16.13

#### 16.7.4 Inserting and Editing the Existing Slides as Your New Slides

You can insert slides and then edit them from other files; Outline files; Cut, Copy and Paste slides; and duplicate slides.

**Slides from files:** The **Slide Finder** lets you insert slides from another PowerPoint Presentation. It helps you to browse through the slides in a presentation without opening it. Slide Finder even lets you save a list of your favorite slide shows. To access the **Slide Finder** dialog box, select **Insert**→**Slides from Files** command on the menu bar.

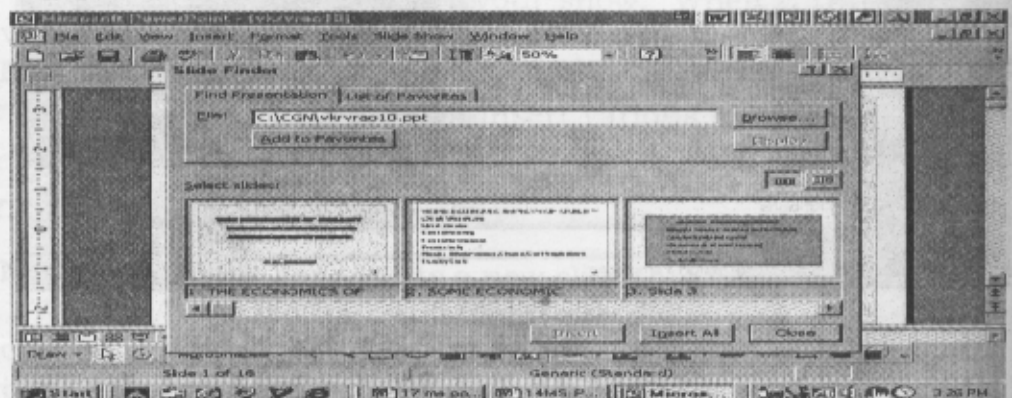


Fig. 16.14

**Insert from Outline** provides a way to create slides from text file outlines. You can use this feature to create a group of slides that contain a lot of text. You can also create new slides by typing text in the outline pane. To access the **Insert Outline** dialog box, select **Insert→Slides from Outline** command on the menu bar.

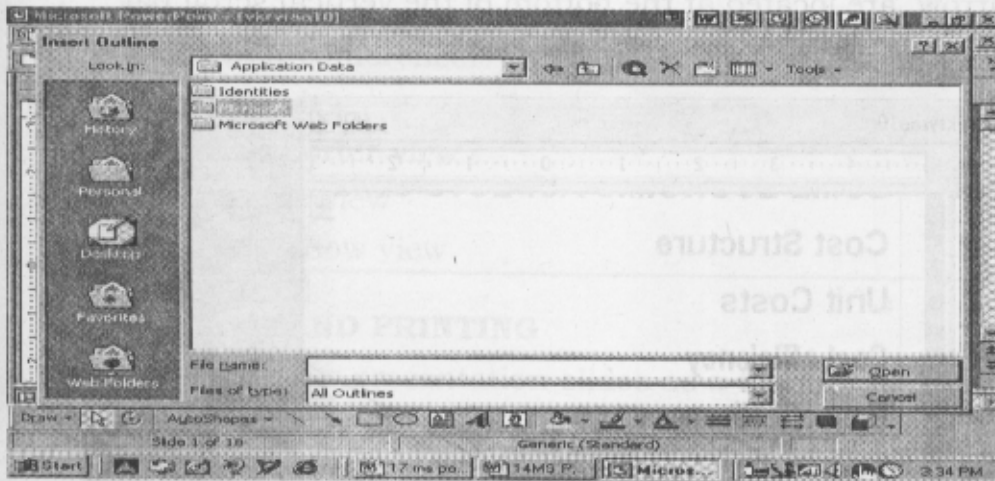


Fig. 16.15

**Duplicate Slide** gives you a duplicate of a slide when you need to create similar slides. To insert a copy of the current slide after the current slide, choose the slide you want to duplicate, and then select **Insert→Duplicate Slide** command on the menu bar or press **CTRL+SHIFT+D** keys. You can also cut, copy and paste slides by selecting the whole slide.

#### 16.7.5 Reordering Slides

To reorder a slide in **Slide Sorter View**, simply click on the slide you wish to move and drag it to the new location. In **Normal** or **Outline View**, click the slide icon  beside the number of the slide you want to move and drag the icon to a new location.

#### 16.7.6 Hide Slides

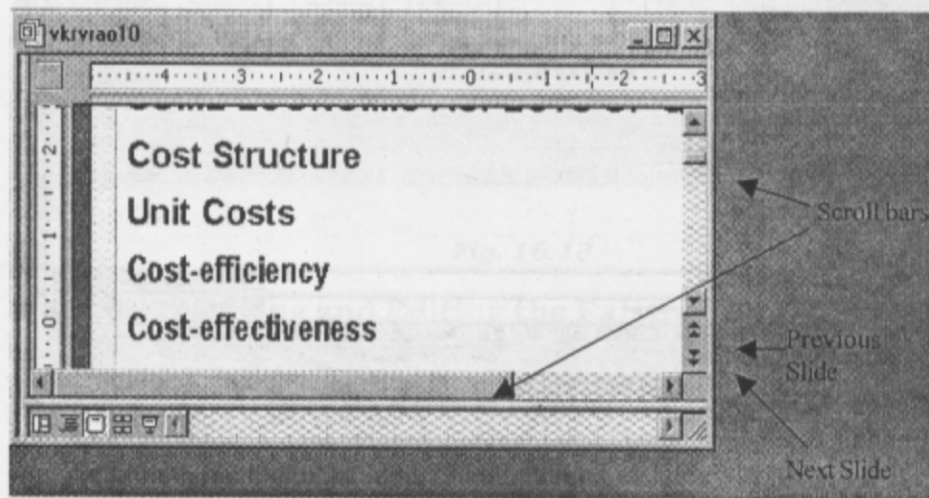
If you do not want a slide to appear during the slide show, but do not want to delete the slide as it may be used later, the slide can be hidden by selecting **Slide Show→Hide Slide** command on the menu bar. To add the slide back to the slide show, select **Slide Show→Hide Slide** again.

### 16.8 MOVING BETWEEN SLIDES

You can move from one slide to another slide by using the following tools:

**Scroll Bars:** Use the Scroll Bars to move from one slide to another slide or through the text that is displayed in the notes pane and the outline pane.

**Next Slide and Previous Slide Buttons:** The **Next Slide** and **Previous Slide** buttons move you to the next slide or previous slide in a slide show. These buttons, indicated by a double-arrow, are located at the bottom of the vertical scroll bar.



**Fig. 16.16**

**Using Outline Pane:** Change to Outline view and then click on the slide that you want to view. You can move around in the outline pane by using your mouse, or by using up and down arrow keys.

### INTEXT QUESTIONS

1. State True or False for the following statements.
  - (a) In both Normal view and Outline view you can see: current slide, slide outline, and notes.
  - (b) Using the contrasting colors for the text and background to slides is not a good practice.
  - (c) While preparing slides use long phrases sentences to convey your message.
2. How many slide layouts are available in New Slide dialog box?
  - (a) 14, (b), 26, (c) 24, (d) 17

3. The PowerPoint dialog box is useful to create a new presentation using:
  - (a) AutoContent Wizard
  - (b) AutoContent Wizard and Design Template
  - (c) Design Template and Blank Presentation
  - (d) both (a) and (c) above
4. Which of the following views is shown in the presentation of slides in a conference?
  - (a) Slide view
  - (b) Slide Sorter view
  - (c) Outline view
  - (d) Slide Show view

## 16.9 SAVING AND PRINTING

You can save your presentation slides as a file in a folder. You can also save the slides as Web page so that you can post them on Internet. Printing is similar to what you have done in Word and Excel. Remember to set up your page before saving or printing your presentation slides.

### 16.9.1 Page Setup

Select **File→Page Setup** from the menu bar to access options for printing the presentation slides. Select the format the printed slides will be used for from the **Slides sized for** drop-down menu or enter a specific print size using the **Width** and **Height** boxes. Select the page orientation for the slides and for other print material from the presentation in the **Orientation** section.

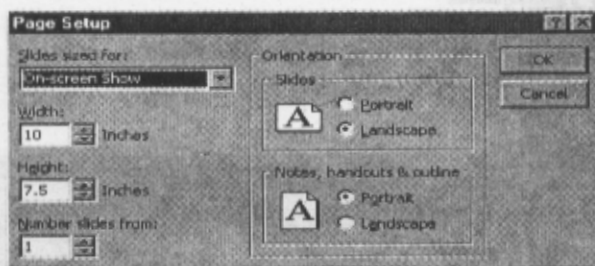


Fig. 16.17

### 16.9.2 Save as File

To save your presentation slides as a file, select **File→Save As** command on the menu bar or simply click on the **Save** button

on the Standard toolbar. The Save As dialog box appears. Choose the folder and drive that your file will be located, type the name of the file, and then click **OK** in the Save As dialog box.

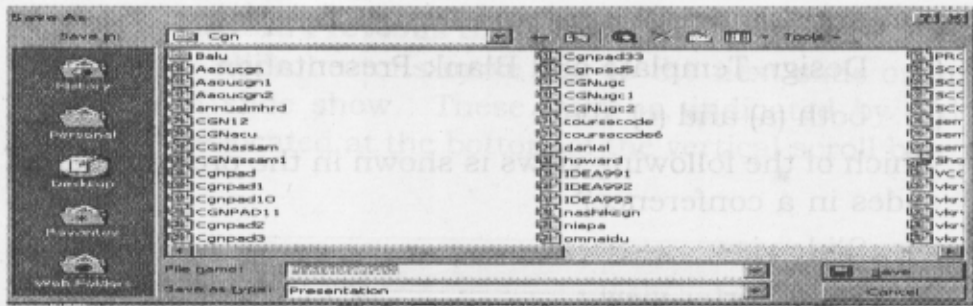


Fig. 16.18

16.9.3 Save as Web Page

Presentations can be saved by selecting **File→Save** command on the menu bar as explained earlier. However, if you want to post PowerPoint presentations on the Internet, you may want to save them as Web pages so that the visitors to your web site can view the presentation even if they do not have PowerPoint installed on their computers. Select **File→Save As Web Page** command on the menu bar. Choose your web page directory on the network from the **Look in:** drop-down menu and name the file in the **File name:** box. Click **Save** to save the presentation in web format.

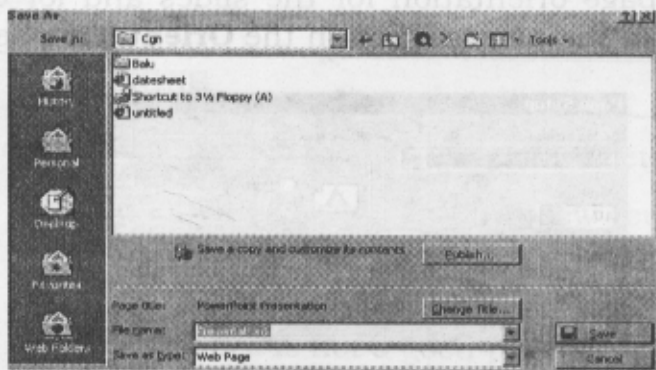


Fig. 16.19

16.9.4 Print

Select **File→Print** command on the menu bar to print the presentation. The Print dialog box appears. Choose the following

options in the Print dialog box.

**Print range** - Select **All** to print all the slides in the presentation, **Current slide** to print only the current slide, or enter slide numbers in the **Slides** field to print only certain slides.

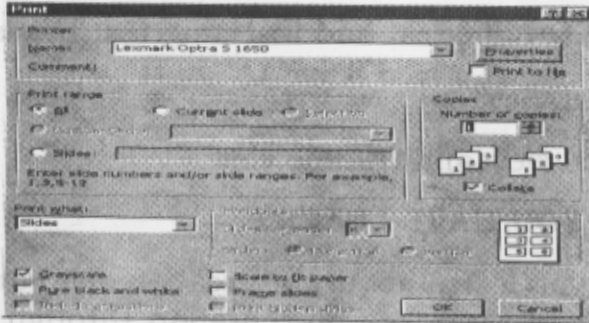


Fig. 16.20

**Copies** - Enter the number of copies of each slide specified in Print range and check the **Collate** box if necessary.

**Print What** -

- **Slides** - prints a full-page slide on each page.
- **Handouts** - prints as many slides as you designate on each page.
- **Notes Page** - prints one slide with that slide's notes on each page
- **Outline view** - prints the outline of the presentation

Click **OK** to print.

## 16.10 CLOSE A DOCUMENT

To close the current presentation slides file, select **File→Close** command on the menu bar. If the file contains any unsaved changes, you will be prompted to save the file before closing.

## 16.11 EXIT POWERPOINT PROGRAM

When finished your work in PowerPoint and closed all the files, you can quite the PowerPoint program by selecting **File→Exit** command on the menu bar.

## INTEXT QUESTIONS

1. (a) True, (b) False, (c) False

2. (c) 24
3. (d) AutoContent Wizard, Design Template, and Blank Presentation
4. (d) Slide Show View
5. (d) Using Outline text and inserting text boxes.
6. (b) Normal View.  
(d) Normal view and Outline view.

### **16.12 WHAT YOU HAVE LEARNT**

In this lesson you learnt about the creation of a PowerPoint presentation. You can create a presentation through Autocontent Wizard or Design Template or blank presentation. The first two types allow you to present text in a standard format. On the other hand Blank Presentation is more flexible and you can make your own design. After creation of the presentation slides, you can go for a slide show and take a print out also.

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### **16.13 TERMINAL QUESTIONS**

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1. Write three important features of PowerPoint.
  2. Explain any one method of creating a presentation.
  3. Write two methods of changing the view to slide show view.
-

# 17

## FUNDAMENTALS OF INTERNET

### 17.1 INTRODUCTION

The latest buzzword in computer world is 'Internet'. It has taken the entire world by surprise with its cutting edge technology to connect people and computers throughout the world. Using Internet, organizations all over the world can exchange data, people can communicate with each other in a faster and effective way, and researchers can gather information in their respective areas of research. With the help of video conferencing over Internet, it has become possible that people can even see each other while communicating. Even one can do all his shopping sitting back at home. He does not bother to go to the crowded market place. Slowly shopkeepers are also opting for electronic commerce, which provides them greater reach and fastest way to do business over Internet. Don't get surprised, if you come to know that the Paanwalla in your locality has started selling his paan over Internet.

### 17.2 OBJECTIVES

After going through this lesson you would be able to

- define Internet
  - explain various terminology used in Internet
-

- use various services provided by Internet
- search for information over Internet
- enjoy Internet surfing
- send E-mail and do FTP

### **17.3 INTERNET – THE HISTORY**

In 1969, the U.S. Defence Department funded a project to develop a network, which can withstand the bombing. Basically the idea was to develop a very secure network which can work even after a nuclear attack. This project was known as ARPANET. The proposed network was not supposed to have a central control – which would be an obvious target. Ten years of research brought Local Area Ethernet Networks (LANs) and workstations were developed to get connected to LAN. These workstations and LANs were then connected to the ARPANET. For next decade the ARPANET grew and its decentralized features helped its rapid expansion. Computers connected to ARPANET used to standard or rule to communicate with each other. This standard used by ARPANET is known as NCP (National Control Protocol). Protocol is a network term used to indicate the standard used by a network for communication. But the passing time and rapid change in information technology suppressed NCP and brought TCP/IP (Transmission Control Protocol/Internet Protocol) in to the world of networking. TCP converts messages into streams of packets at the source, and they are reassembled back into messages at the destination. IP handles the dispatch of these packets. It handles the addressing, and makes sure that a packet reaches its destination through multiple nodes and even across multiple networks with multiple standards. This flexibility of TCP/IP to handle multiple networks with multiple protocols encourages other networks to get connected to ARPANET. Slowly the ARPANET became a massive network of networks and now it is known as 'Internet'.

Why do people want to get connected to Internet? May be because of freedom it provides. The Internet is a rare example of a large democracy with no state of head, no official censors, no bosses, no board of directors. Nobody controls the Internet and in principle, any computer can speak to any other computer, as long as it obeys the technical rules of the TCP/IP protocol. This freedom of Internet helped it to move out of its original base in military and research institutions, into elementary and high schools, colleges, public libraries, commercial sectors even into the shop of a vegetable ven-

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dor.

## **17.4 SERVICES OF INTERNET –E-mail, FTP, Telnet, WWW**

But what does one do with the Internet? May be four things, basically: mail, discussion groups, long-distance computing, and file transfers. Internet mail is (e-mail or electronic mail), much faster as compared to normal postal mail. One can also send software and certain forms of compressed digital image as an attachment. News groups or discussion groups facilitate Internet user to join for various kinds of debate, discussion and news sharing. Long-distance computing was an original inspiration for development of ARPANET and does still provide a very useful service on Internet. Programmers can maintain accounts on distant, powerful computers, execute programs. File transfer service allows Internet users to access remote machines and retrieve programs, data or text.

### **(a) E-Mail (Electronic Mail)**

E-mail or Electronic mail is a paperless method of sending messages, notes or letters from one person to another or even many people at the same time via Internet. E-mail is very fast compared to the normal post. E-mail messages usually take only few seconds to arrive at their destination. One can send messages anytime of the day or night and it will get delivered immediately. You need not to wait for the post office to open and you don't have to get worried about holidays. It works 24 hours a day and seven days a week. What's more, the copy of the message you have sent will be available whenever you want to look at it even in the middle of the night. You have the privilege of sending something extra such as a file, graphics, images etc. along with your e-mail. The biggest advantage of using e-mail is that it is cheap, especially when sending messages to other states or countries and at the same time it can be delivered to a number of people around the world.

Although e-mail is faster and cheaper, it has many of the components of regular mail. It allows you to compose note, get the address of the recipient and send it. Once the mail is received and read, it can be forwarded, replied. One can even store it for later use, or delete. In a-mail even the sender can request for delivery receipt and read receipt from the recipient.

### **(i) Features of E-mail:**

---

- One-to-one or one-to-many communications
- Instant communications
- Physical presence of recipient is not required
- Most inexpensive mail services, 24-hours a day and seven days a week
- Encourages informal communications

### **(ii) Components of an E-mail Address**

As in the case of normal mail system, e-mail is also based upon the concept of a recipient address. The email address provides all of the information required to get a message to the recipient from anywhere in the world. Consider the e-mail ID

[john@hotmail.com](mailto:john@hotmail.com)

In the example above, “john” is the local part, which is the name of a mailbox on the destination computer, where finally the mail will be delivered. Hotmail is the mail server where the mailbox “john” exist, .com is the type of organization on net, which is hosting the mail server.

There are six main categories;

|            |                                         |
|------------|-----------------------------------------|
| <b>com</b> | Commercial institutions or organization |
| <b>edu</b> | Educational institutions                |
| <b>gov</b> | Government site                         |
| <b>mil</b> | Military site                           |
| <b>net</b> | Gateways and administrative hosts       |
| <b>org</b> | Private organizations                   |

### **(b) FTP (File Transfer Protocol)**

File Transfer Protocol, is an Internet utility software used to upload and download files. It gives access to directories or folders on remote computers and allows software, data and text files to be transferred between different kinds of computers. FTP works on the basis of same principle as that of Client/Server. FTP “Client” is a program running on the your computer that enables you to talk to, and get

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stuff from, remote computers. The FTP client takes FTP commands and send them as requests for information from the remote computer or known as FTP servers. To access remote FTP server it is required but not necessary to have an account in the FTP server. When the FTP client gets connected, FTP server asks for the identification in-terms of User Login name and password of the FTP client. If one does not have an account in the remote FTP server, still he can connect to the server using anonymous login.

Using anonymous login anyone can login in to a FTP server and can access public file archives, anywhere in the world, without having an account. One can easily Login to the FTP site with the username anonymous and e-mail address as password.

**The basic objectives of FTP are**

- to give flexibility and promote sharing of computer programs, files and data
- to transfer data reliably and more efficiently over network
- to encourage implicit or indirect use of remote computers using Internet
- to shield a user from variations in file storage systems among hosts.

***Fig. 16.1***

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**The basic steps in an FTP session are:**

- Start up your FTP client, by typing ftp on your system's command line/'C>' prompt (or, if you are in a Windows, double-click on the FTP icon)
- Give the FTP client an address to connect to. This is the FTP server address to which the FTP client will get connected
- Identify yourself to the FTP remote site by giving the Login Name
- Give the remote site a password
- Remote site will verify the Login Name/Password to allow the FTP client to access its files
- Look directory for files in FTP server
- Change Directories if required
- Set the transfer mode (optional);
- Get the file(s) you want, and
- Quit.

**(c) Telnet (Remote Computing)**

**Telnet** or remote computing is telecommunication utility software, which uses available telecommunication facility and allows you to become a user on a remote computer. Once you gain access to the remote computer, you can use it for the intended purpose. The TELNET works in a very step by step procedure. The commands typed on the client computer are sent to the local Internet Service Provider (ISP), and then from the ISP to the remote computer that you have gained access. Most of the ISP provides facility to TELENET into your own account from another city and check your e-mail while you are traveling or away on business.

**The following steps are required for a TELNET session**

- Start up the TELNET program,
  - Give the TELNET program an address to connect to (some really nifty TELNET packages allow you to combine steps 1 and 2 into one simple step!),
-

- Make a note of what the “escape character” is;
- Log in to the remote computer,
- Set the “terminal emulation,”
- Play around on the remote computer, and
- Quit.

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## INTEXT QUESTIONS

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1. Fill in the blanks.
  - (a) ..... is a network term used to indicate the standard used by a network for communication.
  - (b) File Transfer Protocol, is a ..... software used to upload and download file.
  - (c) Hotmail is the .....
  - (d) The commands typed on the client computer are sent to the .....
  - (e) The basic objective of FTP are to give flexibility and promote sharing of files and .....

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## 17.5 WORLD WIDE WEB (WWW)

WWW is the acronym for the World Wide Web. It is also commonly known as ‘The Web’. The WWW is hypertext based information retrieval tool. One can easily surf the Web by jumping from one document to another using the links in those documents. These documents can be in many formats, such as text, graphics, animation, sound and latest is video. They may also be a combination of all these. All the information on Internet are presented to the user as a document or more popularly known as Web Page. All these Web Pages are link to each other or even to section within a Web Page. And these links are known as Hyper Links.

The tool used to view these Web Pages on Internet is known as Internet browser or simply browser. It is a software program specifically developed to extract information on user request from the Internet and present them as a Web Page to the viewer. There are several browsers available in the market. However the most popular are Internet Explorer from Microsoft and Netscape from Netscape

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Inc. The process of using browser to view information on Internet is known as Browsing or Surfing.

***Fig. 17.2***

**(a) Internet Address**

Just like every house, every office, every location has an address, every page on the Internet has a unique address. This address is used to get the web page for user from Internet.

Just as the address of a house or office is known as its postal address, the address on the Internet is known as URL (Uniform Resource Locator). A typical Internet address or URL would look like;

`http//www.nos.org/computers/internet/url.htm`

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The URL locates a particular web Page, among all the computers connected to the Internet. The URL contains the components that specify the protocol, server, and pathname of an item. Let us examine the URL given above (<http://www.nos.org/computers/internet/url.htm>).

The protocol is followed by a colon (**http:**), the server is preceded by two slashes (**//www.nios.ac.cn.org**), and each segment of the pathname is preceded by a single slash (**/computers/internet/url.htm**). A protocol is set of rules that tells the computer know how to interpret the information at that address.

**Fig. 17.3**

The first component, the protocol, defines the manner for interpreting computer information. Many Internet pages use **HTTP** (HyperText

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Transfer Protocol). Other common Internet protocols that one might come across are **FTP** (File Transfer Protocol), **NEWS** (Usenet news groups protocol), and **GOPHER** (an alternative transfer protocol). Gopher protocol is mostly out of date now. Some examples are:

- **http://**-Used to access HTML documents, or web pages.
- **gopher://**-Used to connect to a gopher menu of access gopher documents.
- **ftp://**-Used to connect to an FTP site or download a particular file via FTP.
- **telnet://**-Used to connect to a remote Internet site using Telnet.

The second component, the server (**www.nios.ac.cnedu**), identifies the computer system that stores the information you seek and is always preceded by two slashes. A server is a computer that has information stored on it and sends it to the client, when a request is made. Each server on the Internet has a unique address name whose text refers to the organization maintaining the server.

The last component (**/computers/internet/**), defines the path within the Server where the requested item (url.htm) will be found. Most of the Web page will have.htm or .html as their secondary or extension name.

### **(b) How to get connected to Internet**

There are various type of connectivity to get hook on to Internet. They all can be broadly classified into following category.

#### **(i) Gateway Access**

Gateway Access is also known as Level-One connection. It is the access to the Internet from a network, which is not on the Internet. The gateway allows the two different types of networks to “talk” to each other. But the users of the Gateway Internet have limited access to the Internet. They might not be able to use all the tools available on Internet. The local Internet Service Provider (ISP) normally defines this limitation.

Good example of network with Level One connectivity within India is that of VSNL (Videsh Sanchar Nigam Limited). All access to Internet from India are through VSNL gateway.

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**Fig. 17.4**

## **(ii) Dial-up Connection**

'Dial-up' connection is also known as Level Two connection. This provides connection to Internet through a dial-up terminal connection. The computer, which provides Internet access is known as 'Host' and the computer that receives the access, is 'Client' or 'Terminal'. The client computer uses modem to access a "host" and acts as if it is a terminal directly connected to that host. 56K modem access is now widely available and supported by most ISPs. It allows user to surf the Web at 56 Kbps with graphics. So this type of connection is also known as 'Remote Modem Access' connection. And the host to which the client gets connected is actually connected to the Internet by a full time connection (See Leased Connection).

**Fig. 17.5**

In dial-up connection to Internet, Host carries all the command that are typed on a client machine and forward them to Internet. It also receives the data or information from the Internet on behalf of the

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‘Client’ and passes it to them. The client computer acts as a ‘dumb’ terminal connected to remote host.

This type of connection can further be divided into three categories.

- **Shell Connection**

In this type of Internet Connection, the user will get only textual matter of a Web Page. This connection does not support Graphics display. However the user will be able to surf the Internet, do FTP, receive mail. Shell Accounts were the only type of Internet access available for many years before the Internet entered in to the world of graphics and became more users friendly.

- **TCP/IP Connection**

Today’s graphical World Wide Web browsers provide easier access with multimedia sound and pictures. The major difference between Shell and TCP/IP account is that, Shell account can only display text and does not support graphics display, whereas TCP/IP can display both. Hence it is more popular Internet connection. Shell accounts are slowly phasing out from the Internet scenario.

- **ISDN**

ISDN (Integrated Services Digital Network) offers Internet connectivity at speeds of up to 128 Kbps through the use of digital phone lines. ISDN is a dial-up service that has been provided by telephone companies for many years. This line combines two 64 Kbps channels to offer 128 Kbps band width broken into three bands: one band for the ringing signal of your phone, one band for your telephone conversation, and one band for data.

To use ISDN, you will need a serial communications port, an ISDN modem, and ISDN telephone line from telephone company operating in your areas.

**To access any of these dial-up accounts you need the followings;**

- Computer
  - Modem
  - Telephone Connection
  - Shell or TCP/IP/ISDN account from the ISP
  - Internet client software such as Internet browser
-

**(iii) Leased Connection**

Leased connection is also known as direct Internet access or Level Three connection. It is the secure, dedicated and most expensive, level of Internet connection. With leased connection, your computer is dedicatedly and directly connected to the Internet using high-speed transmission lines. It is on-line twenty-four hours a day, seven days a week. Leased Internet connections are limited to large corporations and universities who could afford the cost.

***Fig. 17.6***

**(iv) DSL**

Digital Subscriber Line (DSL) is the newest technology being used for Internet access. DSL connects your home or office to the Internet through the same telephone wire that comes from the telephone pole on the street. Like ISDN, with DSL, user can make and receive telephone calls while connected simultaneously to the Internet. However, DSL service is limited in the distance that you can be from the provider's point of presence (POP).

To use DSL you will need a DSL modem (also called a router), a Network Interface Card (NIC), and a telephone line. DSL is also relatively new technology that is just being introduced in many places. Hardware developers are working with service providers to make the service cost affordable for consumers. As time goes by, the service should become more widely available at a reasonable price.

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**(v) Cable Modem Connection**

The connection speed can be up to 10 times that of a dial-up and the cost is about twice that of an ISP's dial-up account, with no phone company charges. Many people who have cable TV can now get a high – speed connection to the internet from their cable provider.

***Fig.17.7***

Cable lines offer an extremely high bandwidth connection to the Internet. It divides the connection into lots of bands, and translates the data in the bands into signals that can be carried through cable lines. Cable modems change these signals into IP packets that your computer can understand.

To use cable modems you will need a cable splitter, a cable modem, and the service from a cable company. The installation process can be complex and is better left to a professional.

**17.6 SEARCHING ON THE WEB**

One of the most common problems all Internet users face is the fact that it can be quite difficult to find what you want on the Internet. There is no central “main menu” that users can access to navigate through the Internet. Although there might not be an official menu, there are several resources available – both on-line and off-line – that can make “surfing the net” easier. The Internet is a terrific resource. It contains hundreds of web sites dedicated to thousands of topics. There are some web sites, which are used to search information on the web. There are more than 2,500 search services presently on the Web.

Search services on the Internet come in two main flavours:

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- 1) 'search engine' that index words or terms in Internet documents; and
- 2) 'directories' that classify Web documents or locations into an arbitrary subject classification scheme or taxonomy.

Most search engines take one or more words entered by the user, search the contents of every Web page stored in their databases and display the result. Search engines tend to "index" (record by word) all of the terms on a given Web document. Or they may index all of the terms within the first few sentences, the Web site title, or the document's metatags.

Internet directories are on-line Web sites that place Web page into one or more categories. Web pages are usually listed with a brief description and their URL. Depending on the Internet directory you are using, a search engine may also be available, as well as a Random URL link. Directories operate on a different principle. They require people to view the individual Web site and determine its placement into a subject classification scheme or taxonomy. Once done, certain keywords associated with those sites can be used for searching the directory's data banks to find Web sites of interest some popular search engines are:-

- **Google-** <http://www.google.com>
- **Infoseek-** <http://guide.infoseek.com>
- **Alta Vista** – <http://www.altavista.digital.com>
- **Lycos** – <http://www.lycos.com>
- **Yahoo!** – <http://www.yahoo.com>

Your ability to find the information you seek on the Internet is a function of how precise your queries are and how effectively you use search services. Poor queries return poor results; good queries return great results.

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## INTEXT QUESTIONS

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### 2. State whether the following statements are True or False.

- (a) WWW is the acronym for the World Wide Web
  - (b) In TCP/IP connection, the user will get only textual matter of a Web Page.
-

- (c) Gateway Access is also known as Level-One connection.
  - (d) Good example of network with Level One connectivity within India is that of VSNL.
  - (e) E-mail is known as URL (Uniform Resource Locator)
  - (f) Leased connection is also known as direct Internet access or Level Three connection.
  - (g) With DSL, user can make and receive telephone calls while connected simultaneously to Internet.
  - (h) Cable connection has slower speed than dial up connection.
- 

### **17.7 WHAT YOU HAVE LEARNT**

In this lesson you learnt the history of Internet. Also you learnt the various types of services provided by Internet. In the process you could understand the concept of e-mail and file transfer protocol. By now you should be in a position to access Internet and put it to various uses.

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### **17.8 TERMINAL QUESTIONS**

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1. Explain in brief the concept of e-mail.
  2. What are the basic objectives of FTP?
  3. What is the difference between Leased connection and Dialup connection?
  4. Explain in brief
    - (a) TCP/IP connection
    - (b) Telnet
    - (c) Gateway Access
    - (d) Shell connection
  5. Explain in brief the working principle of cable modem connection.
  6. How does a search engine gets the required information from the web? Write the names of 2 popular search engines.
  7. Explain the following terms.
-

- a) DSL                                      b) ISDN

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**17.9 FEEDBACK TO INTEXT QUESTIONS**

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1.    (a)    protocol  
      (b)    internet utility  
      (c)    mailserver  
      (d)    local internet service provider  
      (e)    data
2.    (a) True   (b) False   (c) True   (d) True   (e) False   (f) True  
  
      (g) True        (h)    False.