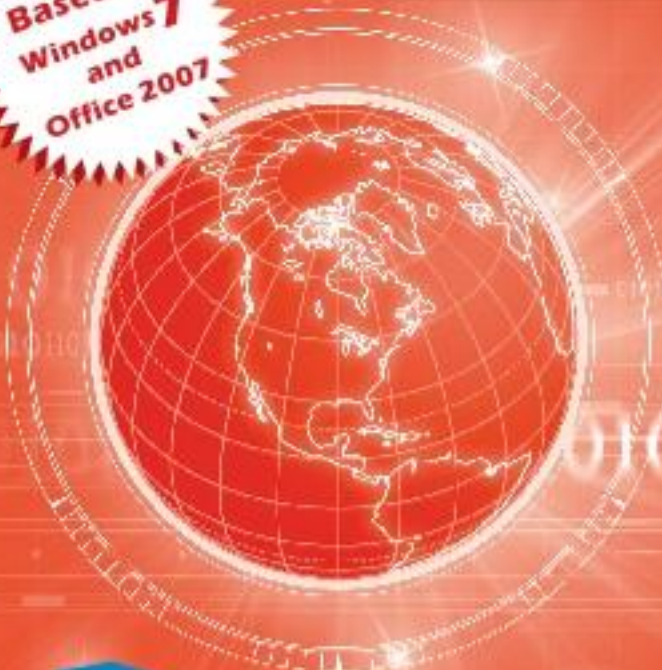


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New and Revised

6

Based on  
Windows 7  
and  
Office 2007



# Information Technology

Step by Step Approach to Computer Studies



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New and Revised

# INFORMATION TECHNOLOGY

Step by Step Approach to Computer Studies

## Standard 6

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## PREFACE

Computer education is imperative for success today. Hence it has become a vital part in the present day curriculum. Information Technology is a dynamic subject that arouses the student's interest, enthusiasm and creativity.

Our primary aim in creating this series has been to teach computers step by step using pictures and examples to explain the concept and usage. These books have been designed to provide theoretical as well as practical knowledge to the students.

Each chapter in this book has separate explanation of the contents, plenty of illustrations and text supported by MS Office 2007 screen shots on a Windows 7 base. The language used in these books is so simple and conversational avoiding the technical jargon to the possible extent.

Based on the **Fun 'N' Learn** concept, this series aims at developing a strong foundation in the subject, without overburdening the child.

Sincerely hoping that, this series will go a long way in equipping a child to face the cut-throat competition ahead.

Views and valued suggestions of teachers for further improvement for the series shall be gracefully acknowledged and implemented.

*Publisher*

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### Introduction

Nowadays computers are extremely important in the modern world. Computers hold a tremendous significance in the fast moving life of this modern world.

A computer is an **electronic machine** that works under instructions given by us. It can accept data (input), manipulate the data according to specified rules (process), produce results (output), and store the results for future use.

This chapter discusses how a computer accomplishes these tasks. Then discusses some of the peripheral devices (input and output devices) that a computer requires for its functioning. This chapter also discusses the **Central Processing Unit, Computer Memory** and **Various Storage Devices**.

### Definition of Computer

Computer is an electronic device designed to accept **data** (input), and perform mathematical and logical operations at **high speed** (processing), and **display** the result (output) and also **save** (store) the results for future use.

### Working of a Computer

A Computer is an **information processing machine**. It consists of a number of interrelated components that work together to convert data into information in a step-by-step process. This is an electronic machine that performs operations to solve various problems very quickly. Basically computer system performs the following steps :

1. **Input:** Any data or instructions entered into a computer is known as Input. e.g. contents typed and fed to a computer through the keyboard gets processed with the help of CPU.
2. **Processing:** The computer processes data according to the given instructions. The processing is completed when the data entered gets converted into information through a processor with the help of CPU.
3. **Output:** The computer produces useful information which gets **displayed** in the monitor. This information is called output. e.g. The material displayed on the **monitor** which we typed.



### Input Devices

Any machine that feeds data into a computer is referred to as an **Input Device**. The data or instructions entered with the help of different input devices is accepted by the input unit that converts them into the acceptable form and supplies them to the computer system for further processing. Some of the commonly used input devices are **keyboard, mouse, joystick, light pen, trackball, scanner, digital camera and graphics tablet**.

### Mouse

A mouse is an **input device** popularly known as **pointing device** as it allows us to point to images on the screen, select and click items instead of typing commands. It **controls** the movement of the **cursor** or pointer on a display screen.

The top of a mouse usually has two buttons, a **right button** and a **left button** and a small wheel called **scroll button** that is used to scroll the window up and down. The bottom of a mouse is flat and contains a mechanism that detects the movement of the mouse.

### Types of Mouse

**Optical Mouse:** An Optical mouse uses **laser** to detect the mouse's movement. It has a wheel with a number of tiny holes in it. On one side of the wheel is a source of light and on the other side is a light sensor. As the wheel turns, the light flashes through the holes and the light sensor sends corresponding information to the computer. It comes in **wired** as well as **wireless** form.



## Computer Fundamentals

**Mechanical Mouse:** A mechanical mouse is a computer mouse that contains a metal or rubber ball on its underside. When the ball is rolled in any direction, sensors inside the mouse detect this motion and move the on-screen mouse pointer in the same direction. In addition to that, there are three rollers in the ball slot. As the ball rotates, it moves the rollers. These movements generate electrical signals that indicate the distance and direction in which the mouse is moving. It is the popular and least expensive pointing device. This is connected with the CPU through a wire.



## Keyboard

A keyboard is an input device that contains the keys. We press those keys to type information and enter instructions for the computer to follow. It is one of the most popular and widely used input device. The keys have numbers, letters and special characters marked on them. The keys with numbers and letters marked on them are called Number keys and Alphabet keys respectively. It comprises of numeric keys (1 to 9 and 0), Alphabetic keys (A-Z & a-z), Function keys (F1-F12), Symbolic keys (% , # , < , > , @ , ? , \* , etc.) and Special keys (Enter key, Spacebar, Caps lock, Tab key, Shift key, etc.). This is also connected with the CPU like the mouse. However cordless keyboards are also available these days.



### Light Pen

A **Light Pen** is also a pointing device that looks like a simple writing pen. We can **hold** it like a pen and directly **point** at objects on the screen. It utilizes a **light-sensitive detector** to select objects on a display screen.

It is very useful for **drawing images** on the screen.



### Trackball

A trackball is a pointing device consisting of a **ball** held by a **socket** containing sensors to detect the **rotation** of the ball. The ball can be rotated in any direction by using fingers. The movement of the ball controls the movement of the pointer on the screen. If compared with a mouse, it requires **lesser space**, as the whole device is not moved, only the ball is rotated.



### Joystick

A joystick is also a pointing device that is used to **move** an object on a screen. It is popular among the gaming freaks. A joystick has a **vertical lever** that sticks out from the main mechanism, which is moved by the user in different directions to **control** the actions of the **game**. A simple joystick has only one or two buttons and a trigger. However, some have many buttons and advanced capabilities.



### Scanner

Scanner is an input device that is used to **enter** images, texts, drawings and photographs and **store** them in the computer as **electronic files**. A Scanner is very much like a copying machine except that it creates a file of the document in computer memory instead of a paper copy.

### Types of Scanners

There are various types of scanners, namely, flatbed scanners, sheet-fed scanners, hand-held scanners, drum scanners, etc.

### Flatbed Scanners

This scanner is larger than the hand-held scanner. It scans the **document, image** or **text** in **one go**. It is a type of optical scanner that consists of a flat surface on which we lay documents to be scanned. Flatbed scanners are particularly effective for bound documents. Flatbed scanners produce **higher quality images** and are costlier than the hand-held scanners.



## Sheet-fed Scanners

This scanner is similar to a flatbed scanner. A sheet fed scanner is a type of scanner that scans **only one piece of paper at a time**. The paper is moved **automatically** through the scanner across a stationary scan head. The scanned image is then sent to the computer for processing.



**Hand-held Scanner :** This scanner is **small in size** and is available in **different resolutions** (measures the quality of an image). While scanning a document, this scanner is **moved** a number of times over the document to obtain the best results. It is not frequently used for scanning images as it produces **low quality** images. These scanners are **cost less**.



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## Computer Fundamentals

**Drum Scanner :** This scanner is used to capture the **highest resolution** from an image. This scanner is **very costly**. It has a scanning **photomultiplier tube**. While scanning a document, a drum **rolls** over the entire document around the tube. Since drum scanners provide high resolution, they are used when a scanned image has to be **enlarged**.



## Graphics Tablet

A graphics tablet is an input device that enables a user to **hand-draw** images and graphics, similar to the way a person draws images with a **pencil and paper**. These tablets may also be used to **capture data** or **handwritten signatures**. It consists of a flat surface and a pen-like device used for drawing known as **stylus**. Artists usually draw picture on the graphic tablet which is displayed on the computer screen.



### Digital Camera

A digital camera is a camera that takes videos or still photographs by recording images on an electronic image sensor. A digital camera stores images in the memory card while the simple camera stores images on a film roll, thus making it different from a simple camera.

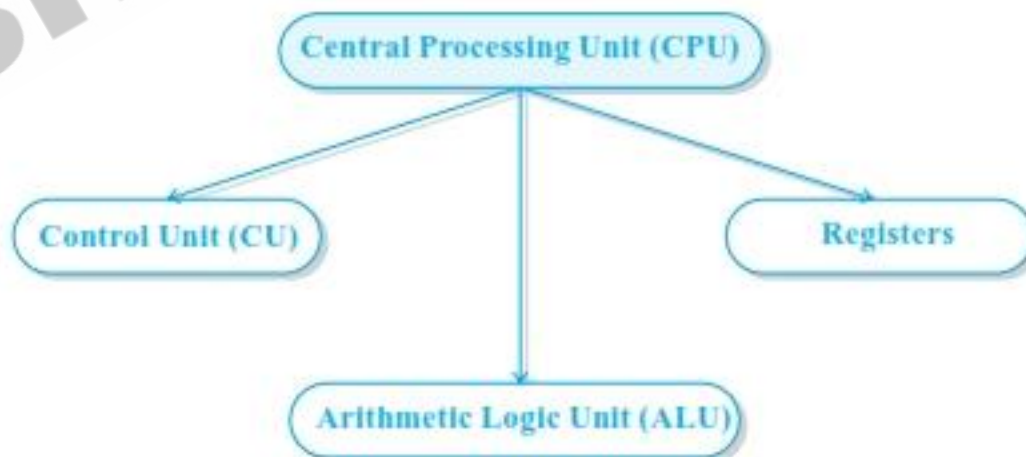


A digital camera provides quality images, hence it is used more widely these days. Such images can be downloaded from the memory card of the camera to a computer through a data cable and saved on the hard disk. Many digital cameras can also record moving videos with sound. Some digital cameras can crop and merge pictures and perform other elementary image editing. There are various imaging softwares which let us edit images obtained from the digital camera, for example, CorelDRAW, Photoshop, Photo Editor, Picture It, etc.

### CPU (Central Processing Unit)

The Central processing unit is also known as Microprocessor but more commonly called as Processor. It is the brain of the computer where most calculations take place. CPU is the most important element of the computer system. It is the main hardware component of a computer as all the processing is done inside it. The speed of a computer depends mainly upon its microprocessor.

The central processing unit consists of three main parts, namely, the Arithmetic Logic Unit, Registers and the Control Unit. All these parts jointly work together to process the data in a computer.



## Computer Fundamentals

1. **Control Unit** : The control unit coordinates the components of a computer system. The CU **controls** the movement of data inside as well as outside the CPU. It **directs the operation** of the other units by providing **timing** and **control signals**. It communicates between registers and the Arithmetic Logic Unit and between the CPU and all the input, output and storage devices.
2. **Arithmetic Logic Unit** : The ALU is a fundamental building block of the **Central Processing Unit** of a computer, and even the simplest microprocessors contain one for purposes such as maintaining timers. It handles all the **mathematical calculations** and **logical comparisons** such as addition, subtraction, less than, equal to, etc., which are to be performed on the data.
3. **Registers** : Registers are a small amount of **storage** available as part of a **CPU** or other **digital processor**. In other words, they hold the **information** on which the CPU is currently working.

## Output Devices

An output device is any piece of computer **hardware** equipment used to communicate the **results** of data processing carried out by an information processing system (such as a computer) which converts the **electronically generated information** into **human-readable form**. Some of the commonly used output devices are plotter, monitor and printer. Modem is used both as an input and output device.

### Plotter

A plotter is used to generate **graphical outputs** made of a series of straight lines such as images, charts, graphs, blueprints, maps, circuit diagrams and other line-based diagrams. **Plotters** differ from printers in such a way 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**.



### Monitor

The **Electronic Visual Display** of the Computer is called the monitor. It shows the output by displaying the **text** and **graphics** on its screen. The screen of the monitor comprises of tiny dots known as **pixels** that combines to form an image. A single pixel has three components each for three basic colours : **Red, Green** and **Blue** (RGB). Monitors often look similar to televisions. The main difference between a monitor and a television is that the monitor does not have a television tuner to change channels. Monitors often have higher display resolution than televisions. A high display resolution makes it easier to see smaller letters and fine graphics.

### Types of Monitors

Monitors are generally classified as per the technology used. They are of three types.

- CRT (Cathode Ray Tube)
- LCD (Liquid Crystal Display)
- LED (Light Emitting Diode)



*Cathode Ray Tube (CRT)*



*Liquid Crystal Display (LCD)*



*Light Emitting Diode (LED)*

The differences between an CRT, LCD and LED monitor are listed in the following table :

Criteria	CRT	LCD	LED
Cost	Cheaper	Costlier	Costliest
Weight	Bulky	Lighter and compact	Lighter, Compact and Latest Technology
Power consumption	Requires more power	Requires less power	Can be used as a regular Light source

### Printers

A printer is used to produce the **printout** or the hard copy of the output. It is a device that prints text or illustrations on paper. There are many different types of printers. Basically printers are classified into two categories, namely, **Impact** and **Non-Impact** printers.

**Impact printers :** Impact printers refers to a class of printers that work by banging a needle or a head against an ink ribbon to make a mark on the paper. Impact printers are classified into **line printers** and **character printers**. Line printers are those printers which prints a single line at a time and the printing speed varies from **300-3000 lines per minute** approximately. Character printers are those printers which prints a single character at a time and the printing speed varies from **30-600 characters per second** approximately. Impact printers include Daisy wheel printers, Dot Matrix printers, Drum printers, etc.

**Daisy wheel printers :** Daisy wheel printers are those printers that produces **letter quality documents**. A daisy wheel printer works on the same principle as a ball-head typewriter. In daisy wheel printers, the **print head** is like a daisy flower and is made up of **metallic or plastic wheels**. A raised character is placed on the tip of the arms of the wheel. 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. We can change the daisy wheel to print different fonts.



**Dot matrix printers :** Dot matrix printers are those printers which prints **one character at a time** and the speed of which is measured in characters per second (cps). They are **cheaper** and have **low operating costs**. Dot matrix printing is a type of computer printing which uses a print head that runs back and forth, or in an up and down motion, on the page and prints by impact, striking an ink-soaked cloth ribbon against the paper, much like the print mechanism on a typewriter. However, unlike a typewriter or daisy wheel printer, letters are drawn out of a dot matrix, and thus, varied fonts and arbitrary graphics can be produced. They are very noisy, print only in black and produces low quality printouts.



**Drum printers :** Drum printers are much **faster** than the dot matrix and daisy wheel printers as they print a line in a single operation. Drum printers are printer in which the character type is mounted on a rotating drum that contains a full character set for each printing position. For a 132-column printer, there are 132 character sets wrapped around the circumference of the drum. This drum revolves continuously and when a character is required to be printed, the hammer strikes on the character. However, drum printers are quite loud, produce **low quality** print and are **very costly**.



**Non-impact printers :** These are the type of printer that does not operate by striking a head against a ribbon. These printers do not involve any contact between the print head and the surface on which it prints. They provide a **higher speed** in terms of characters per second. Examples of non-impact printers include laser and ink-jet printers. The term non-impact is important primarily that it distinguishes **quiet printers** from noisy (impact) printers.

## Computer Fundamentals

**Laser printers :** Laser printers are those printers that utilizes a **laser beam** to produce an image on a drum. A laser printer works like a photocopier to produce **high quality** images on a page. A laser beam draws images on a **light-sensitive drum**. The drum picks up a fine powdered ink, called **toner**, and then transfers the toner to the paper to create the images. A laser printer is a non-impact **high speed** printer.



**Inkjet printer:** An inkjet printer outputs text and images by spraying ink on the paper, an inkjet printer is **slower** and is not as crisp as a laser printer, but it offers **colour output** for far **less amount**. An inkjet printer is a non impact printer that forms characters and graphics.



An inkjet printer produces a character by shooting small droplets of ink onto the paper. Various techniques are used for spraying the droplets of ink onto the paper. The simplest technique is the **thermal heating process** or the **bubble inkjet technology**. In this technology, the ink is heated and the vaporized ink forms a bubble. When the bubble expands, a drop of ink is forced out onto the print head and it hits the paper.

## Computer Memory

The computer memory is a **temporary storage area**. It holds the data and instructions that the CPU (Central Processing Unit) needs. Before a program can be run, the program is loaded from some storage medium into the memory. This allows the CPU direct access to the program. Memory is a need for any computer. The memory of a computer can be considered to be made up of cells, each containing a small unit of information. This information is stored in the form of **binary digits**, that is 0s and 1s. These digits are the smallest unit of information on a computer and are called **Bits**. Following table lists the units used to measure memory.



Unit	Description
terabyte	1 terabyte = 1024 gigabytes. Terabyte memory is usually associated with super computer.
bit	It is the basic unit of memory. It can hold one of the two values: a '0' or a '1'. It is represented by 'b' (in lower case).
byte	1 byte = 8 bits. It is represented by 'B' (in upper case).
kilobyte	1 kilobyte = 1024 bytes. It is represented by KB.
gigabyte	1 gigabyte = 1024 megabytes. Gigabyte is the standard unit of measurement for hard disk. It is represented by GB.
nibble	1 nibble = 4 bits
word	It is the number of bits treated as a single unit by the central processing unit. In an 8-bit machine, the word length is 8 bits; in a 16-bit machine, it is sixteen bits.
megabyte	1 megabyte = 1024 kilobytes. It is represented by MB. Megabyte is the standard unit of measurement for RAM.

Memory can be broadly categorized into primary memory and secondary memory

### Primary Memory

Primary memory is the **computer memory** that is accessed directly by the CPU. The primary memory, also known as the **main memory**, stores the system software and application programs on which the CPU is currently working. The primary memory can be further categorized into:

- **Random Access Memory (RAM)**
- **Read Only Memory (ROM)**

## Random Access Memory (RAM)

RAM (Random Access Memory) is a form of computer data storage. A random-access device allows stored data to be accessed directly in any **random order**. The RAM is volatile in nature as the contents in it are lost as soon as the computer is switched off. There are several types of the RAM which are listed in the following table.

Types	Description
DRAM (Dynamic Random Access Memory)	Type of Random Access Memory that stores each bit of data in a separate capacitor within an integrated circuit. It stores data for a short period of time, that is, data is lost after a short interval of time. Even if the power is supplied constantly there is a continuous need to refresh memory
SDRAM (Synchronous Dynamic Random Access Memory)	Delivers a large volume of data at a very high speed.
DDR (Double Data Rate Memory)	Uses less power and is used in Intel's Pentium 4 machines, has double speed as compared to the SDRAM
SRAM (Static Random Access Memory)	Retains the stored data as long as continuous power supply is available, is fast and expensive as compared to the DRAM

**ROM (Read Only Memory)** The ROM is a class of storage medium used in computers and other electronic devices. The contents of the ROM can be written during **manufacturing**. Data stored in ROM **cannot be modified**. It can only be read and used.

There are several types of ROM which are given as follows :

**Flash Memory :** Flash memory is an electronic non-volatile computer storage device that can be **electrically erased** and **reprogrammed**. The contents of flash memory are organized in such a manner that a section of memory is erased in a single action of 'flash'. Flash memory are commonly used in mobile phones, computers, notebooks and so on. They are **very small in size**.

**PROM (Programmable Read Only Memory) :** It is a form of digital memory where the setting of each bit is **locked** by a fuse or anti fuse. Such PROMs are used to store programs **permanently**.

**EEPROM (Electrically Erasable Programmable Read Only Memory) :** Contents can be **erased** and **reprogrammed** repeatedly. The contents can be erased with the help of electrical signals.

**EPROM (Erasable Programmable Read Only Memory) :** PROM chips have to be exposed to the **ultraviolet light** for a specified period of time in order to **erase** the contents stored in it. The contents of EPROM can be erased and reprogrammed repeatedly.

### Secondary Memory

The storage capacity of secondary storage devices is very large as compared to primary memory. The Secondary Memory is also known as **Auxiliary Memory** because the main memory is temporary and limited in size. It is needed for storing instructions and data permanently. There are various types of secondary memory such as pen drive, hard disk, blu-ray, optical disc, etc.

**Pen Drive :** Pen Drive is a **small** and **portable** storage device very often used these days. It is used to quickly transfer audio, video and data files from the hard disc of one computer to another. Its storage capacity is much higher than other removable storage devices such as CD and DVD. It is **compact**, **lightweight** and has a storage capacity ranging from 16 MB to 64 GB.



**Hard Disk :** A hard disk is also called as a **Hard Disk Drive** or **Hard Drive**. It is a storage device that contains one or more inflexible, circular platters that use magnetic particles to store data, instructions and information. The hard disk is kept inside the computer case and it stores programs and documents. It's storage capacity is much more than optical discs.



It is important to keep it away from **magnets** and magnetic devices. It is sealed in a metallic box, called the hard drive, which is fixed in the system unit.

**Optical Disc :** An optical disc is an **electronic data** storage medium that can be written to and read using a low-powered **laser beam**. It is made up of plastic with a **highly reflective metal coating**, usually of aluminium. An optical disc includes two laser beams out of which one is used for reading data and the other is used for writing data.



**Blu-Ray :** Blu-ray is an **optical disc** storage medium designed to supersede the DVD format. It is also known as **Blu-ray Disc**. The appearance of Blu ray disc is similar to CD and DVD, but its storage capacity is much **higher** than the CD and the DVD. The plastic disc is 120 mm in diameter and 1.2 mm thick, the same size as DVDs and CDs. It facilitates recording large amount of data and high-definition video to provide better picture quality.



### CDs and DVDs are examples of optical discs

**CD (Compact Disc) :** CD (Compact Disc) is a circular-shaped optical disc used to store **digital data**. Now-a-days, CD is used to carry most of the music and softwares sold to the general public. Standard CDs have a diameter of 120 millimetres (4.7 inch) and can hold up to 80 minutes of uncompressed audio or 700 MiB (actually about 703 MiB or 737 MB) of data. To read information from a CD, it is placed inside the CD drive, which is fixed inside the system unit.



**DVD (Digital Versatile Disc) :** A DVD looks like a CD. DVDs contain **higher** storage capacity than compact discs (CDs) while having the same dimensions. As compared to a CD, a DVD can hold much more data. It can store about 8.5 GB of data, which makes it a very useful storage medium.

### Exercise

#### I. Fill in the blanks:

1. The \_\_\_\_\_ is referred to as the brain of the computer.
2. A \_\_\_\_\_ is very useful for drawing images on the screen.
3. \_\_\_\_\_ devices transform data and instructions into a form that is understood by the computer.
4. The two categories of printers are \_\_\_\_\_ and \_\_\_\_\_.
5. An \_\_\_\_\_ uses a laser to detect the mouse's movement.
6. \_\_\_\_\_ is a type of optical scanner that consists of a flat surface on which we lay documents to be scanned. \_\_\_\_\_

## II. State whether the following are 'True' or 'False':

1. A daisy wheel printer is a type of non-impact printer. \_\_\_\_\_
2. A joystick is an example of an input device. \_\_\_\_\_
3. A light pen is used to draw images and graphics manually just like one draws images using pencil and paper. \_\_\_\_\_
4. A monitor or a display is an electronic visual display for computers. \_\_\_\_\_
5. The control unit handles all the mathematical calculations and logical comparisons. \_\_\_\_\_
6. The ROM is a class of storage medium used in computers and other electronic devices. \_\_\_\_\_

## III. Answer in brief:

1. Explain the working of a Computer System in short.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Why are Secondary Storage Devices required?

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Mention any three Input and Output devices.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. What is the difference between RAM and ROM?

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Write short notes on the following :

a. Blu-ray : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b. Trackball : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

c. DVD : \_\_\_\_\_

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d. Graphics Tablet : \_\_\_\_\_

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e. Plotter : \_\_\_\_\_

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f. Mouse : \_\_\_\_\_

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6. Differentiate between the items in each pair.

a. CRT and LCD monitors

Ans. \_\_\_\_\_

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b. Impact and Non-Impact printers

Ans. \_\_\_\_\_  
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\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_

c. SRAM and DRAM

Ans. \_\_\_\_\_  
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7. What is the Central Processing Unit? Define its parts.

Ans. \_\_\_\_\_  
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\_\_\_\_\_  
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\_\_\_\_\_



### Introduction

We use the decimal number system on a daily basis. The decimal number system starts from 0 to 9. No matter in which from the input and output of number happens in a digital computer, all operation are carried out in **binary number system** on a computer because computers only understand 0s and 1s which is known as the **machine language**.

### Binary Number System

Computers perform arithmetic functions working at the **Bit Level** (in a binary system). Now, let us study the number system used by the computers. The base of the binary number system is 2 as it uses only two digits 0 and 1. The binary number 0 or 1 is called a bit which is the short form of binary digit. In this system, all numbers are a group of bits. Like other number systems, the value of a binary number depends on the position of each digit in a group of bits.

The basic arithmetic operations include:

- **Binary Addition** follows same basic rules for decimal addition, except only 1 and 0 are the allowed digits.
- **Binary Subtraction** is more complicated as it involves using two's compliment and binary addition.
- **Binary Multiplication** is actually much simpler than decimal multiplication. In the case of decimal multiplication, we need to remember  $3 \times 9 = 27$ ,  $7 \times 8 = 56$ , and so on. In binary multiplication, we only need to remember the following,

$$0 \times 0 = 0$$

$$0 \times 1 = 0$$

$$1 \times 0 = 0$$

$$1 \times 1 = 1$$

- **Binary Division** is similar to long divisions in decimal system. It uses what it called a **Shift and Subtract Method**. Note that since binary operates in base 2, the multiplication rules we need to remember are those that involve 0 and 1 only. Binary arithmetic division is by successive subtraction.

Computer multiplication and division comes down to the successive addition and subtraction. These operation in a binary numeral system are not different from decimal number system. Nowadays computers can easily understand the language of decimal numbers, alphabet and special characters like + = \* ? etc. The computer processes this languages and converts them into 0s and 1s so that it can understand what the user has instructed to do.

### Base or Radix

The number system uses a specific **Radix (Base)**. The base of a number system is the number of digits it uses to represent the numbers in the system. These Radices include **binary** (base 2), **quaternary** (base 4), **octagonal** (base 8) and **hexagonal** (base 16). The base 2 binary system is dominant in computer system.

We know that decimal number system has 10 digits i.e. from 0 to 9, so its base is 10. Because electronic logic deals with currents that are **ON** or **OFF**, it has found convenient to represent quantities in binary form to perform arithmetic on a computer. Thus, instead of having ten different digits, in binary arithmetic, there are only two different digits, **0** and **1**.

The weight of each digit of a decimal number system depends upon its relative position (place value) with in the number. e.g. the number  $(3256)_{10}$ .

$$(3256)_{10} = 3000 + 200 + 50 + 6 \quad \text{or}$$
$$(3256)_{10} = 3 \times 10^3 + 2 \times 10^2 + 5 \times 10^1 + 6 \times 10^0$$

In binary system, the values are based on the right to left position of digits using the power of 2 as position values. e.g. the binary number  $(10100)_2$ .

$$(10100)_2 = 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0$$
$$= 16 + 0 + 4 + 0 + 0 = (20)_{10}$$

i.e. Binary number 10100 is equal to 20 in decimal number.

$$\text{or } (10100)_2 = (20)_{10}$$

This means that the number 20 in decimal system is equal to  $(10100)_2$  in binary system.

### Convert a Decimal Number to Binary

**Conversions :-**

1. Decimal Number System to Binary Number System.

**Example :**  $(5)_{10}$  to be converted to base 2.

## Computer Arithmetic

To convert a decimal numeral into a binary numeral:

**Method :**

- Divide the numeral by 2 and the successive quotients by 2.
- The successive remainders shall be 0 or 1.
- These remainders are written in the reverse order for the binary equivalent.

Let us now understand this with the help of an example:

To convert  $(5)_{10}$  into binary

2	5		Remainder
2	2	-	1
2	1	-	0
	0	-	1

$(5)_{10} = (101)_2$

To convert  $(12)_{10}$  into binary

2	12		Remainder
2	6	-	0
2	3	-	0
2	1	-	1
	0	-	1

$(12)_{10} = (1100)_2$

To convert  $(25)_{10}$  into binary

2	25		Remainder
2	12	-	1
2	6	-	0
2	3	-	0
2	1	-	1
	0	-	1

$(25)_{10} = (11001)_2$

### Convert a Binary Number to Decimal

To convert a binary numeral into decimal system : e.g.  $(101)_2$

**Method :**

- Expand the digits in this way :  
 $1 \times 2 + 0 \times 2 + 1 \times 2$   
 (Multiply each digit by 2 and put a plus '+' sign in between.)

2. Now assign the powers starting from the right to left in ascending order.

$$1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$

3. Now, solve the powers and add the numbers.

$$1 \times 4 + 0 \times 2 + 1 \times 1 = 4 + 0 + 1 = (5)_{10}$$

**Note:**  $2^0 = 1$ . Your answer is incomplete without writing the base of the number.

**To convert  $(1100)_2$  into decimal system :**

$$(1100)_2 = 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0$$

$$= 1 \times 8 + 1 \times 4 + 0 \times 2 + 0 \times 1$$

$$= 8 + 4 + 0 + 0$$

$$= (12)_{10}$$

**To convert  $(10101)_2$  into decimal system :**

$$(10101)_2 = 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$

$$= 1 \times 16 + 0 \times 8 + 1 \times 4 + 0 \times 2 + 1 \times 1$$

$$= 16 + 0 + 4 + 0 + 1$$

$$= (21)_{10}$$

The table below gives the binary equivalents of the decimal numbers from 0 to 20.

Decimal	Binary	Decimal	Binary
0	00	11	1011
1	01	12	1100
2	10	13	1101
3	11	14	1110
4	100	15	1111
5	101	16	10000
6	110	17	10001
7	111	18	10010
8	1000	19	10011
9	1001	20	10100
10	1010		

## Arithmetic Operations

Let us perform the following **Mathematical Operations** using **Binary Numbers**.

a.  $15 + 5 = 20$

c.  $15 \times 5 = 25$

b.  $15 - 5 = 10$

d.  $15 \div 5 = 3$

The binary numbers of  $15_{10}$  is  $1111_2$  and  $5_{10}$  is  $101_2$

### a. Addition

$$\begin{array}{r} 1111 \\ + 101 \\ \hline 10100 \end{array}_2 = 2^4 + 2^2 = 16 + 4 = 20_{10}$$

### b. Subtraction

$$\begin{array}{r} 1111 \\ - 101 \\ \hline 1010 \end{array}_2 = 2^3 + 2^1 = 8 + 2 = 10_{10}$$

### c. Multiplication

$$\begin{array}{r} 1111 \times 101 \\ 1111 \\ \hline 0000 \\ + 1111 \\ \hline 100101 \end{array}_2 = 2^6 + 2^3 + 2^1 + 2^0 = 64 + 8 + 2 + 1 = 75_{10}$$

### d. Division

$$\begin{array}{r} 101 \overline{) 1111} \quad (11_2 \\ \underline{101} \\ 101 \\ \underline{101} \\ 000 \end{array}$$

$11_2 = 2^1 + 2^0 = 3_{10}$

## Exercise

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### I. Fill in the blanks:

1. The Binary number system has \_\_\_\_\_ as its base.
2. In the Binary system the number  $(5)_{10}$  is written as \_\_\_\_\_.
3. The \_\_\_\_\_ number system uses digits from 0 - 9.
4. The decimal number 15 is represented as \_\_\_\_\_ in the binary system.
5. \_\_\_\_\_ system is used by the computers.

### II. Answer in brief:

1. Write a few lines on the Decimal Number System.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Explain what is the Binary Number System with examples.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



3. Try Yourself: Convert the Decimal Numbers from 1 to 20 into the Binary Number system.

Decimal	Binary	Decimal	Binary
0		11	
1		12	
2		13	
3		14	
4		15	
5		16	
6		17	
7		18	
8		19	
9		20	
10			

III. Perform the following Mathematical Calculation using Binary Number System:

1.  $11 + 8$

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2.  $12 \times 9$

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3.  $16 - 12$

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4.  $18 \div 9$

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## Practicals

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1. Switch on the Computer.
2. Observe the Desktop, icons and Taskbar.
3. Click Start button ∨ Program ∨ Accessories.
4. Click on Calculator.
5. Now perform the conversions of decimal numbers from 10 to 20 into Binary System, using calculator.

**Hint :** Click on 'View' ∨ Select 'Scientific'. Now enter the decimal number and choose the Binary option to get the binary equivalent of the decimal number.

6. Write down the answer in your notebook.
7. Close the calculator by clicking on 'File' menu ∨ 'Close'.

## Activity

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Browse through computer magazines and journals and collect information and pictures about the various / latest digital devices and stick them below. (Ex. Digital diaries, scanning machines etc.)



### Introduction to problem solving with computers

Today, man can handle varied problems that are tedious and difficult in nature, with the help of computers.

That is why computers are being used in all spheres of life. For example Industries, educational institutions, communications, aviations, etc.

At the same time, computer cannot be used to solve a problem until a method of solution has been evolved and a detailed procedure has been prepared by the programmer.

This introduces the importance of Algorithms and flow charts.

**Algorithm:** An algorithm is a set of **instructions**. The algorithm comprises of a series of **steps** necessary to find the solution to a problem. It is a set of instructions to perform a specific job and is written in a **logical sequence**.

An algorithm can be called as an outline of the job to be performed. It can be compared to the blueprint that an engineer prepares before the construction of a building. An algorithm can be prepared for doing any kind of work. An example of algorithm is given below.

**Work to be done :** Prepare a cup of tea

#### Algorithm

1. Go to the kitchen.
2. Pour 3/4th cup of water in a utensil.
3. Turn 'ON' the gas stove.
4. Put the utensil on the gas stove.
5. Wait for the water to boil.
6. Add tea powder, sugar and milk.
7. Wait for the mixture to boil properly.
8. Turn 'OFF' the gas stove.



## Flowchart

9. Pour the tea into a cup and serve or drink.

In this manner an outline must be prepared and then when actually performing the job, the details must be kept in mind i.e. how many spoons of sugar, tea powder etc. This was an example for daily work. When working in BASIC the same method may be used as in the example below:

**If the user wants to multiply three numbers, the algorithms will be as follows :**

1. Take the first number from right side to be multiplied.
2. Take the second number to be multiplied.
3. Take the third number to be multiplied.
4. Multiply all the three numbers and store the product as a variable.
5. Print the product.

### The Advantages of Algorithms :

1. It determines the correctness of each step of problem solving technique or method.
2. It reduces the number of steps, if possible.
3. It increases the speed of solving the problem.

## Flowchart

Flowchart is a **diagram** or map showing the **steps** taken to reach a certain result. Flowcharts can show how information moves from one step to another. Flowchart is a **diagrammatic** or graphical **representation** of an algorithm. Flowchart uses different **symbols** and **figures** to show the steps involved in solving a particular problem. The steps involved are represented by certain kinds of symbols.

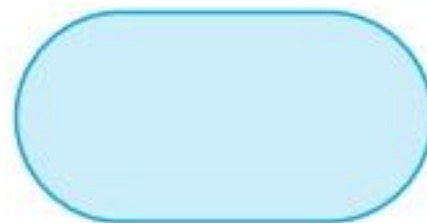
Flowcharts are created by the programmer to plan the steps in sequential order so that it becomes simple to execute the job or program. Flowcharts help a person to see the steps involved in performing a job or creating a program at a glance. The types of commands used can also be seen in a flowchart.

Flowcharts help a programmer or an expert to communicate the plan or logic of a program to a person who is not familiar to computer languages. It also helps in correcting errors conveniently.

### Symbols used in Flowcharts

#### 1. Terminal Symbol (Oval Shape)

The terminal box is used to mark the beginning and the end of the flowchart. Each flowchart has only one beginning point and one ending point. In the beginning, the symbol with



## Flowchart

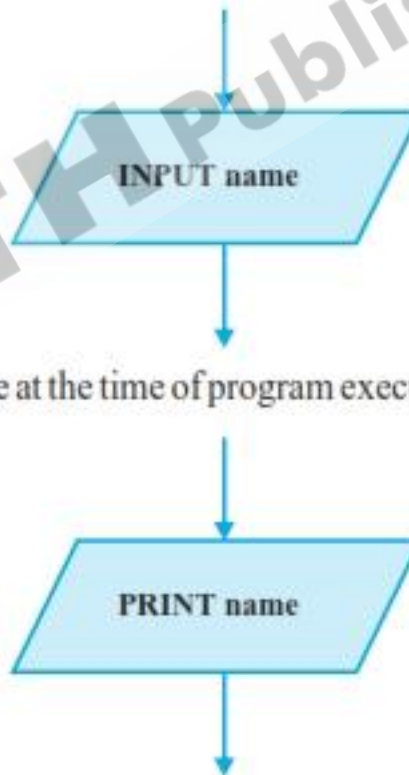
'START' written in it is drawn and at the end, the same symbol with 'STOP' written in it is drawn.



Every flowchart should have START symbol as the first symbol and the STOP symbol as the last symbol. And joining them with arrow keys draws the rest of the symbols. Only one flow line can come out of START symbol and any number of flow lines.

## 2. Input-Output Symbol (Parallelogram Shape)

This symbol is used for two purposes, first for showing the **INPUT** from the user and the second for showing the **Result**. For showing the input data, **INPUT** is written on the symbol and for showing the output, **PRINT** is written on the symbol.



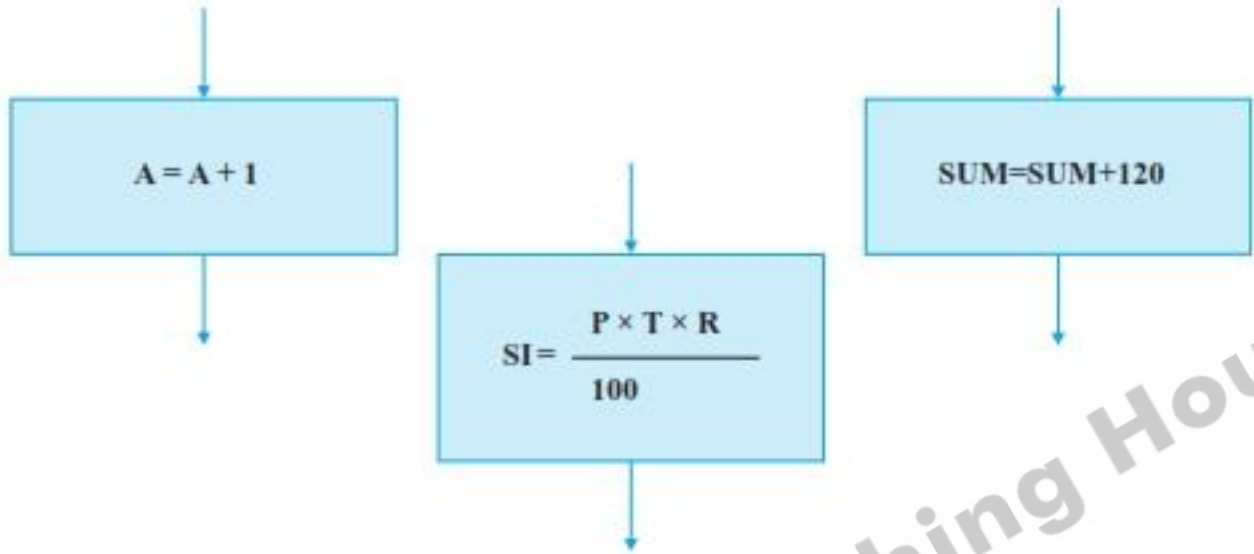
This symbol allows to input name at the time of program execution.

This symbol is used to display the name on the monitor. Maximum **four** flow lines can enter into it but only **one** can come out of it.



### 3. Process Box (Rectangular Shape)

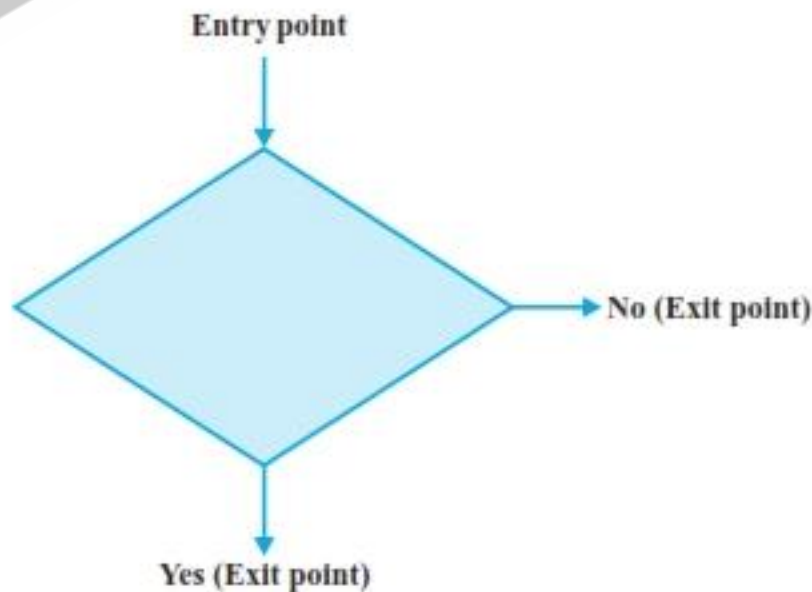
This symbol allows showing the processing point. It is used to show various **computations** or **calculations**.



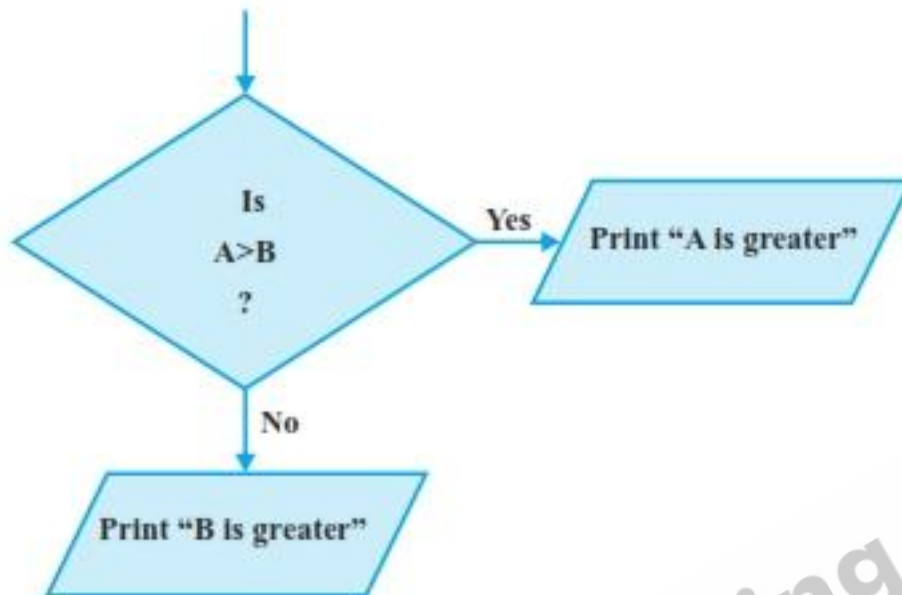
So, all the calculation part is shown in this process symbol. Here, maximum **four** flow lines can enter into it but only **one** can come out of it.

### 4. Decision Box (Rhombus or Diamond Shape)

Decision box is used in the times when some condition is to be **checked**. That is why, this box is called **Check Box** also. For each condition there can be only two answers, **Yes** or **No**. The decision box has **two** exit points and **one** entry point. For example :



For checking which value has bigger value, we draw the following symbol :



Through entry point the values of A and B are sent and they are checked in decision box. If A is having greater value, 'A is greater' is printed and if B is bigger, then 'B is Greater' is printed.

### 5. Flow Lines (Directional Arrows)

A flowchart shows the complete logic in sequence (step-by-step). For all these steps, symbols are connected to each other by using arrow keys. There are four directional arrows - up, down, left and right.



### Rules for drawing a Flowchart :

The following rules must be kept in mind while preparing a flowchart.

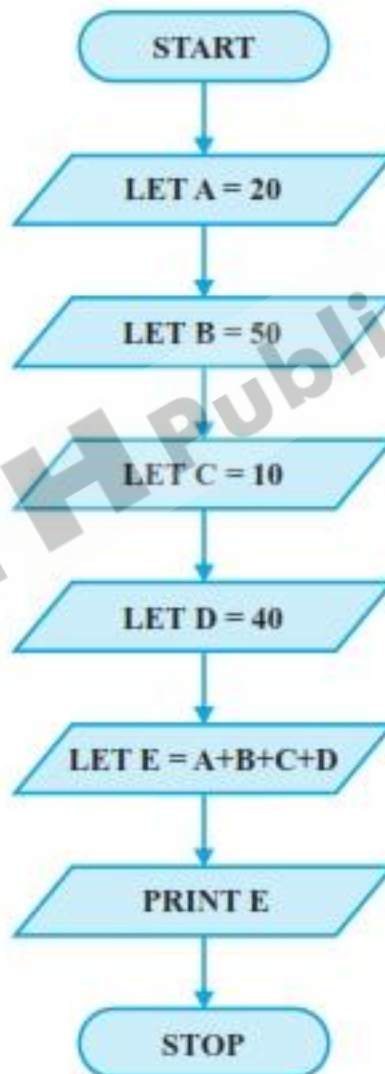
1. Only symbols that have been discussed above must be used for drawing a flowchart. Other symbols or shapes must not be used.
2. The flow symbols must not cross each other.
3. The flow symbol i.e. the arrows must not be excluded as they depict the logical flow of the flow chart.
4. The flow of the programs must be from top to bottom.

### The Advantages of flowchart :

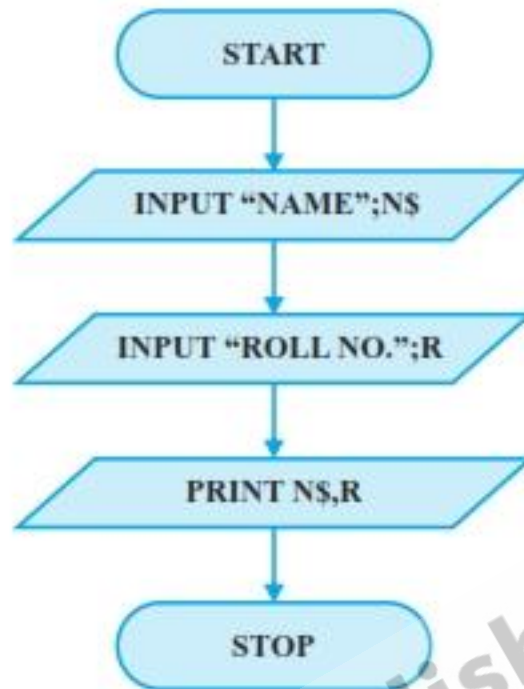
1. Flow charts help in explaining the program to others who are not aware of programming languages.
2. Flowcharts assist in reviewing and debugging of a program.
3. Flowcharts are easy to understand at a glance.

### Examples of Flowchart

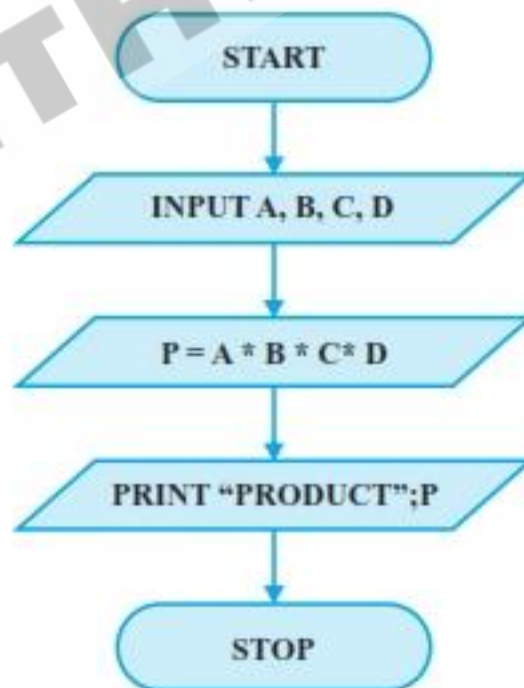
1. Adding four numbers :



2. Accepting name, roll no. and printing them :



3. Product of 4 numbers :



## Exercise

### I. Fill in the blanks:

1. The \_\_\_\_\_ symbol indicates the flow of a program.
2. The \_\_\_\_\_ symbol is used for START.
3. \_\_\_\_\_ is a step-by-step method of creating a program.
4. The \_\_\_\_\_ symbol is used for Print.
5. An \_\_\_\_\_ is a set of instructions.
6. The \_\_\_\_\_ box is used to input data into a Flowchart.

### II. State the following statements are 'True' or 'False'. If 'False', rewrite the correct statement:

1. Flowchart complicates the program.

Ans. \_\_\_\_\_

2. The process symbol is indicated by the diamond shaped box.

Ans. \_\_\_\_\_

3. Flow symbols are not required in a Flowchart.

Ans. \_\_\_\_\_

4. Flowchart is a diagrammatic representation of an Algorithm.

Ans. \_\_\_\_\_

5. The parallelogram represents the process symbol.

Ans. \_\_\_\_\_



### III. Answer in brief:

1. What is an Algorithm?

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Write a short note on Flowchart.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. List out the various symbols used in a Flowchart and explain them.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. What are the four rules to be followed while drawing a Flowchart?

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Flowchart



5. Write an Algorithm on how to make a cup of coffee.

Ans. \_\_\_\_\_

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6. What is the difference between Algorithm and Flowchart?

Ans. \_\_\_\_\_

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## Practicals

1. Switch on the Computer.
2. Observe the Desktop.
3. Click Start  $\Rightarrow$  Programs  $\Rightarrow$  Accessories.
4. Choose Notepad.
5. Type the algorithms for the following :
  - a. Add 3 numbers.
  - b. Calculate area of a square.
6. Save your file.
7. Close Notepad.

## Activity

Log on the Internet and find out information about the usage of Flowcharts and Algorithms in solving complicated areas like space research, defence, etc.



### Introduction

Nowadays almost all institutions are having computer facility. Computers are used for various purposes as we studied earlier. We have our datas in it. Sometimes we need to share our datas to some others. For this purpose we had been using Pendrives, Optical discs etc. But sharing through these is very time taking and also not fully security proof. It was experienced if a system would be there that computers are interlinked, datas could be transferred easily and also without loss of time. Gradually networking system was developed. This inter linked computer system that provide easy transfer of datas from one computer to another is called **Networking**. Let us know more about this in upcoming paragraphs.

### Computer Networking

A computer network is a collection of computers and communication hardwares and softwares linked together to allow sharing of resources and provide a facility for communication. It can also be refered to as data **network** or a telecommunications **network** that allows **computers** to exchange data.



## Networking

In **computer networks**, networked computing devices pass data to each other through data connections. The computers and devices which are part of the network can 'talk' to each other and exchange information.

Data is transferred in the form of packets. The network links or connections between nodes are established using either **cable media** or **wireless media**. The best-known computer network is the **Internet**.

A **computer network** or simply a network, is a collection of computers and other hardware components interconnected by communication channels that allows **sharing** of resources and information.

A computer network facilitates interpersonal communications allowing people to communicate efficiently and easily via email, instant messaging, chat rooms, telephone, video telephone calls, and video conferencing. Providing access to information on shared storage devices is an important feature of many networks. A network allows sharing of files, data, and other types of information giving authorized users the ability to access information stored on other computers on the network. A network allows sharing of network and computing resources. Users may access and use resources provided by devices on the network, such as printing a document on a shared network printer.

The communication media used to link devices to form a computer network include **electrical cable**, **optical fiber** and **radio waves** (wireless networking).

### Purpose of Networking

A computer network can serve several distinct purposes:

- Sharing **resources** (files, applications or hardware, an Internet connection, etc.)
- Communication between **people** (email, live discussions, etc.)
- Communication between **processes** (such as between industrial computers)
- Guaranteeing full access to **information** for a specified group of people (networked databases)
- Multiplayer **video games**

### Advantages of Computer Networking

1. Sharing of **devices** such as printer and scanner.
2. Sharing of **programs/ softwares**.
3. Sharing of **files**.

4. Sharing of **data and information**.
5. Sharing of **single high speed internet connection**.
6. Can access server centered **database**.
7. **Better communication** using internet services such as e-mail, mailing list and chats.
8. Overall **speed** of the procedure increases.
9. **Cost** of a network version of software is comparatively **less**.
10. **Centralised** Software Management.

### Networking Components

Computer networks share common devices, functions, and features including servers, clients, transmission media, shared data, shared printers and other hardware and software resources, Network Interface Card (NIC), Local Operating System (LOS), and the Network Operating System (NOS).

1. **Servers** - Servers are computers that hold shared files, programs, and the network operating system. Servers provide access to network resources for all the users of the network. There are many different kinds of servers, and each server can provide several functions. For example, there are file servers, print servers, mail servers, communication servers, database servers, fax servers and web servers, to name a few.
2. **Clients** - Clients are computers that access and use the network and shared network resources. Client computers are basically the customers(users) of the network, as they request and receive services from the servers.
3. **Transmission Media** - Transmission media are the facilities used to interconnect computers in a network, such as twisted-pair wire, coaxial cable, and optical fiber cable. Transmission media are sometimes called channels, links or lines.
4. **Shared data** - Shared datas are datas that file servers provide to clients such as data files, printer access programs and e-mail.
5. **Shared printers and other peripherals** - Shared printers and peripherals are hardware resources provided to the users of the network by servers. Resources provided include data files, printers, softwares or any other items used by the the clients on the network.
6. **Network Interface Card** - Each computer in a network has a special expansion card called a Network Interface Card (NIC). The NIC prepares(formats) and sends data, receives data and controls data flow between the computer and the network. On the

transmission side, the NIC passes frames of data on to the physical layer, which transmits the data to the physical link. On the receiver's side, the NIC processes bits received from the physical layer and processes the message based on its contents.

7. **Local Operating System** - A local operating system allows personal computers to access files, print to a local printer, and have and use one or more disk and CD drives that are located on the computer. Examples are MS-DOS, Unix, Linux, Windows 2000, Windows 98, Windows XP etc.
8. **Network Operating System** - The network operating system is a program that runs on computers and servers, and allows the computers to communicate over the network.
9. **Hub** - Hub is a device that splits a network connection into multiple computers. It is like a distribution center. When a computer request information from a network or a specific computer, it sends the request to the hub through a cable. The hub will receive the request and transmit it to the entire network. Each computer in the network should then figure out whether the broadcast data is for them or not.
10. **Switch** - Switch is a telecommunication device grouped as one of the computer network components. Switch is like a Hub but built in with advanced features. It uses physical device addresses in each incoming messages so that it can deliver the message to the right destination or port.
11. **Network Cable** - It is the cable which physically connects a user's computer to a network. The cable provides a path for the information to follow from one computer to another. There are three principle types of cables used in local area networks (LANs):

- **Unshielded/shielded twisted pair (UTP or STP)**, like those used for telephone lines, is the cheapest and easiest to install; it has the lowest message carrying capacity of the three types.
- **Coaxial cable (coax)**, like those used for cable TV, has higher capacity than UTP or STP but is also more expensive.
- **Fibre Optic Cable** carries messages in the form of light and has the highest message carrying capacity; but it is also the costliest and is difficult to install.



### Types of Networks

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

1. **LAN (Local Area Network):** This network is a system in which more than one computer are functioning **interlinked**, that enables data transferring without applying any outer means such as Pendrives or Optical discs. This inter link system is formed by linking the computers through wires. This system is applicable for a very short distance.

This system is used for such large offices where many computers are working and needs to share datas with each other. The computers are not installed at far places from each others and connecting them through wires is not difficult. This type of network is normally indicated as LAN (Local Area Network).

This system needs a circuit board which is called NIC (Network Interface Card). Through this circuit board, all the computer under LAN (Local Area Network) are connected through wires. This system works well in sharing datas between each other. Its maintenance cost is also marginal.

2. **MAN (Metropolitan Area Network):** This network is **larger** than LAN (Local Area Network). This needs better quality of connecting systems. Since this system is normally used within a large city it requires a high quality speedy connection that obstructs to a zero level. In this system many computers work together and share datas smoothly.

This network also provides connections in a limited number, though the numbers are very high. In comparison to LAN(Local Area Network) more number of computers are connected in this system. Naturally this costs more than that of LAN (Local Area Network).

3. **WAN (Wide Area Network):** As we know that we are now passing through globalisation. '*Kar lo duniya muthi mein*' is the slogan of the present time. We need to reachout worldwide, that becomes possible with the computers. We are sharing our contents through internet, we are sending e-mails from one part of the world to another part of the world. This facility is established by connecting computers worldwide. This is not possible by connecting them through wires. This connection is made possible by applying wireless systems through satellites and other modes. By using frequency spectrums the computers in indefinite numbers are connected worldwide between each other.

Banking transactions, Railway reservations, Air tickets, Hotel bookings, sending e-mails etc. worldwide have now become so easy by using WAN (Wide Area Network). For this every individual networking institutions control their networks through their hubs. They are connected through networks topology, which will be discussed later in the chapter.

### Server and Client

There are two main types of computers on a network: Server and Client. A server is a network computer that contains resources that are shared with other computers within the network. In other words, a server is a computer that serves information to other computers. These other computers, called clients, can connect to a server either through a local area network (LAN) or a wide area network (WAN), such as the Internet.

### Types of Servers

#### Database Server:

A **database server** is a computer program that provides **database services** to other computer programs or computers. The term may also refer to a computer dedicated to running such a program.

It provides database services to other computer programs or computers. A Database Server is a computer in a LAN that is dedicated to database storage and retrieval.

#### Application Server:

It is a server dedicated to running certain software applications.

In a computer territory, application servers have the lion's share between database servers and end users. They are often referred as middleware. Middleware is that software that establishes a connection between two separate applications that are otherwise apart.

#### List Server:

To improve the management of mailing lists, list servers are used. It could be interactive debates open for public or one way lists that deliver newsletters, announcements or advertising.

#### Chat Server:

This server enables a number of people to share the information in the environment of an internet newsgroup that offer realtime discussion capabilities. It is used to refer to a number of different features of computer.

#### Fax Servers:

Those organizations that want to reduce the incoming and outgoing telephone resources, a fax server is an idle solution.

### Mail Servers:

Mail server is as important as Web server. It is used to send and store mails on the corporate networks through LAN's and WAN's and across the internet.

### News Servers:

They work as a source of distribution and delivery of hundreds of available public news groups accessible over the USENET news network. USENET is a global bulletin board system that can be approached via internet or via a variety of online services.

### Groupware Servers:

This is a software that is designed to make the users able to work together, regardless of their location through internet.

### Disadvantages of Computer Networking

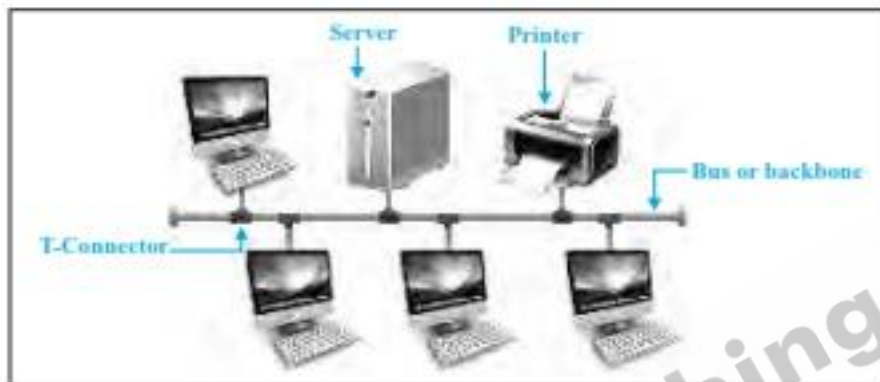
1. If a network file server develops a fault, then users may not be able to run the application programs.
2. A fault on the network can cause users to lose data (if the files being worked upon are not saved).
3. If the network stops operating, then it may not be possible to access various resources.
4. Users work-throughout becomes dependent upon network and the skill of the systems manager.
5. Decisions on resource planning tend to become centralized, for example, what word processor is used, what printers are bought, etc.
6. As traffic increases on a network, the performance degrades unless it is designed properly.
7. Resources may be located too far away from some users.
8. The larger the network becomes, the more difficult it is to manage.

### Network Topology

Network Topology is the arrangement of various elements (servers, printers, scanners, computers, links, nodes etc.) of a computer network. It refers to the layout or map of connected devices on a local area network. There are three basic types of network topologies employed in designing a LAN. These are known as bus, ring and star. Hybrid and mesh topologies employ two or all of these basic types. Each topology is suited to specific tasks and has its own advantages and disadvantages.

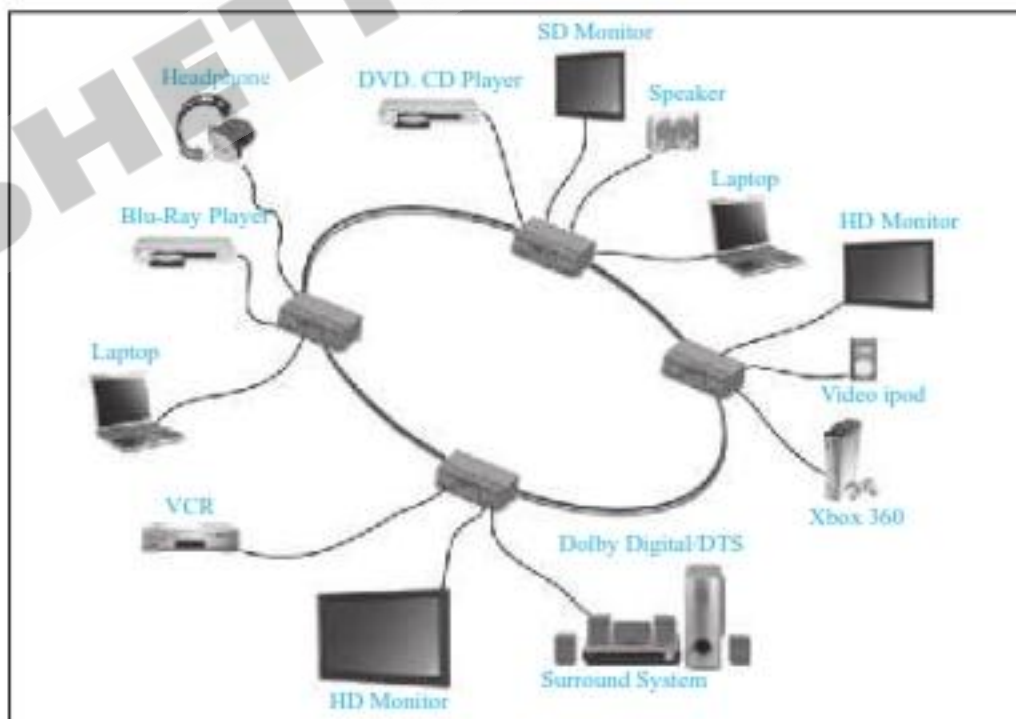
### Bus Topology:

Bus Topology is the simplest of network topologies. In this type of topology, all the nodes (computers and peripheral devices) are connected to the **single cable** (called bus), by the help of **connectors**. This central cable is the backbone of the network and is known as **Bus** (thus the name). Every workstation communicates with the other device through this Bus. Bus networks are useful in small networks (like those setup in a small offices) and have the advantage of using less cable.



### Ring Topology:

In Ring Topology, all the nodes are **connected** to each-other in such a way that they make a **closed loop**. Each workstation is connected to two other components on either side, and it communicates with these two adjacent neighbours. Data travels around the network in one direction. Today, the ring topology is seldom used.



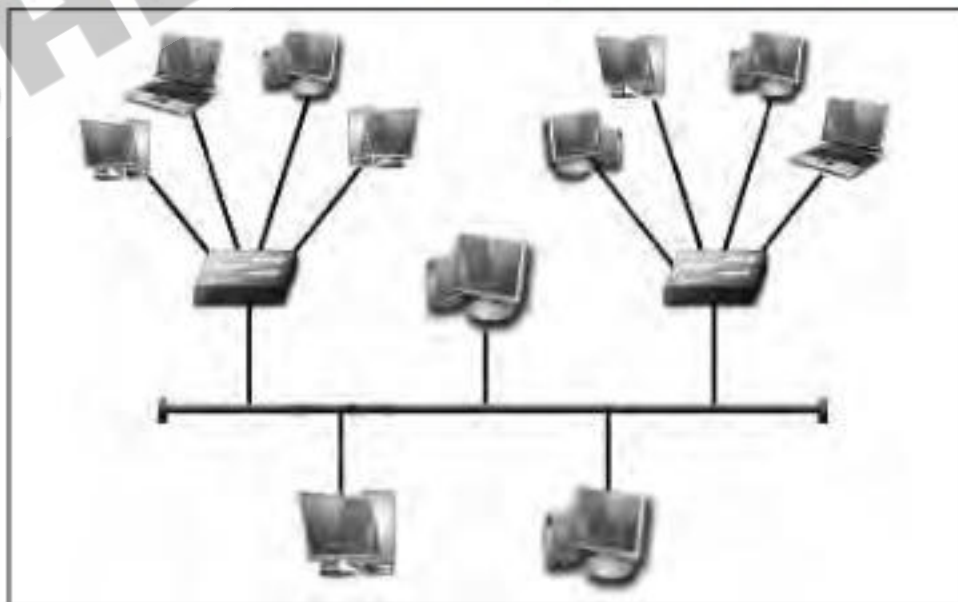
### Star Topology:

Alternatively referred to as a **star network**, **star topology** is one of the most common network setups. In this arrangement, every node connects to a **central hub**, switch or computer; the hub acting as a server and the peripheral devices as clients. The attachment of these network pieces to the central component is visually represented in a form similar to a star. A major disadvantage of this network topology is that if the central hub fails, all of the connected devices are disconnected.



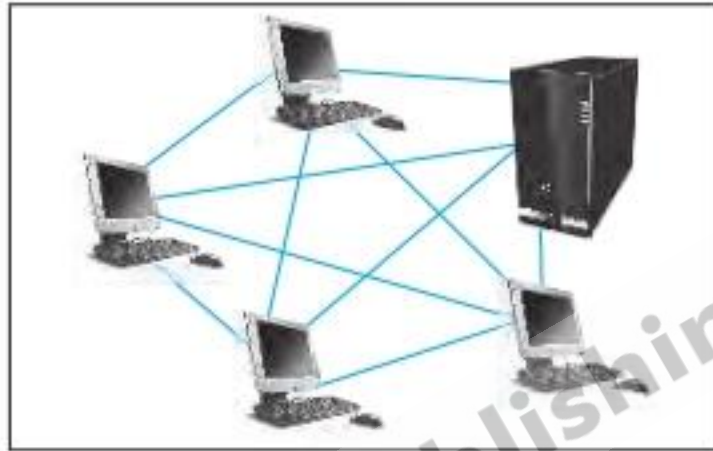
### Hybrid Topology:

Hybrid, as the name suggests, is a mixture of two different types. The **combination** of two or more **different topologies** makes for a hybrid topology. When different topologies are connected to one another, they do not display characteristics of any one specific topology. Two common examples for Hybrid network are: Star Ring network and Star Bus network.



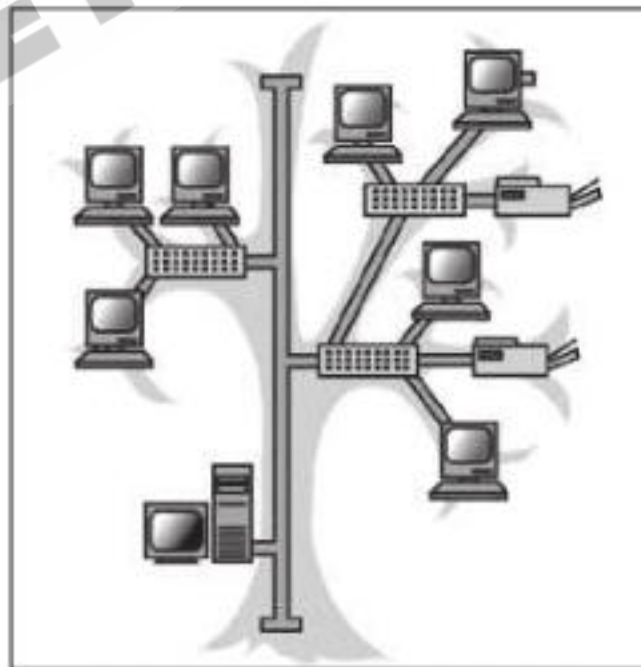
### Mesh Topology:

The topology of a network whose components are all **connected directly** to every other component is called as a mesh topology. In Mesh topology, every network device is connected to other network devices. Mesh topology is **costly** because of the extra cables needed and it is very **complex** and difficult to manage. The main advantage of mesh topology is multiple paths to the destination computer. If one link is down, we have another path to reach the destination. Mesh Topology is not commonly used these days.



### Tree Topology:

Tree topologies integrate **multiple star** topologies together onto a bus. In its simplest form, only hub devices connect directly to the tree bus, and each hub functions as the root of a tree of devices. This bus/star hybrid approach supports future expandability of the network much better than a bus or a star alone.



## Exercise

### I. Fill in the blanks:

1. When two or more PCs connected together such that they can share data between each other is called a \_\_\_\_\_.
2. LAN stands for \_\_\_\_\_.
3. Types of network topology are \_\_\_\_\_ and \_\_\_\_\_.
4. File, print, mail, fax and back-ups are all \_\_\_\_\_.
5. Types of networks are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
6. Two benefits of networking are \_\_\_\_\_ and \_\_\_\_\_.
7. A \_\_\_\_\_ cable has higher capacity than UTP or STP but lower than that of a fibre optic cable.
8. For two devices on a network to communicate, they must follow the same \_\_\_\_\_.
9. \_\_\_\_\_ create nationwide and worldwide data communication networks.
10. A \_\_\_\_\_ is a computer on a network that requests and receives services from a server.

### II. Answer the following:

1. Name the different types of Networking Cables.

Ans. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



2. State the disadvantages of Networking Computers.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Differentiate between LAN and MAN.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Types of Network Topology.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. State five benefits of Networking Computers.

Ans. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



### III. Name the following:

1. A network topology which use both bus and ring topologies.
2. The central cable in the bus topology.
3. It splits a network connection in to multiple computers.
4. It is a server dedicated to run certain software applications.
5. These are the computers that hold shared files, programs and the network operating system.

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### IV. State whether the given statements are True or False :

#### Statement

#### Answer

1. A combination of star and ring topology is called a mesh topology.
2. A fibre optic cable has the lowest message carrying capacity.
3. Sharing of peripheral devices saves both on office space and cost.
4. NOC is also called a network driver.
5. Information can be efficiently shared by networking computers.

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### Activity

Open a website. Find the list of all the wonders of the world. Download the list, also save it in the folder 'My documents' with the name 'Wonders of the World'.



### Introduction

A spreadsheet is a software made up of sheet with many rows and columns. It is a program that is used to record and handle large amounts of numerical information.

Some example for spreadsheet are LOTUS123, VP Planner and MS Excel. We can create reports in MS Excel. MS Excel is a part of MS Office package. It has 10,48,576 rows and 16,384 Columns.

### Advantages of Spreadsheet

The advantages of using spreadsheet program are as follows:

1. We can store large spreadsheets effortlessly on the computer.
2. We can make changes easily.
3. Calculations are almost error free.
4. Once data value has been changed, the formulae automatically recalculates the end result
5. Charts can be shown in a spreadsheet.
6. Reports can be generated in the form of chart.
7. Entering, editing and formatting data is easy in a spreadsheet as it includes rows and columns.
8. It can be used as our day to day planner to organize our routines and schedules.

### Features of spreadsheet:

The basic features of this program are same as in other Microsoft Office programs, but it has many advantages for working with large amount of data.

#### 1. Functions:

Mathematical: Add, subtract, divide, multiply.  
Logical: average, sum, mod, product

2. **Charts & Graphs:** With charts, we can clearly show products' evaluation to the clients. For example which product's sale is more or less in this month.

## Introduction to Excel

3. **Sorting and Filter:** In sorting we can sort our data and also filter our data (alphabetically or numerically) so that repetitions could be scrutinised.
4. **Formulae:** Excel has a range of formulas that perform a variety of calculations. Any changes in numeric values, automatically recalculate the end result
5. **Clip Art:** In this we can add images and also audio, video clips can be added here.
6. **Tables:** Tables are created with different fields. E.g. -name, age, address, roll no., so we add a table to fill these values.
7. **Images and Backgrounds:** In this we add images and backgrounds in sheet.


## Starting With MS Excel

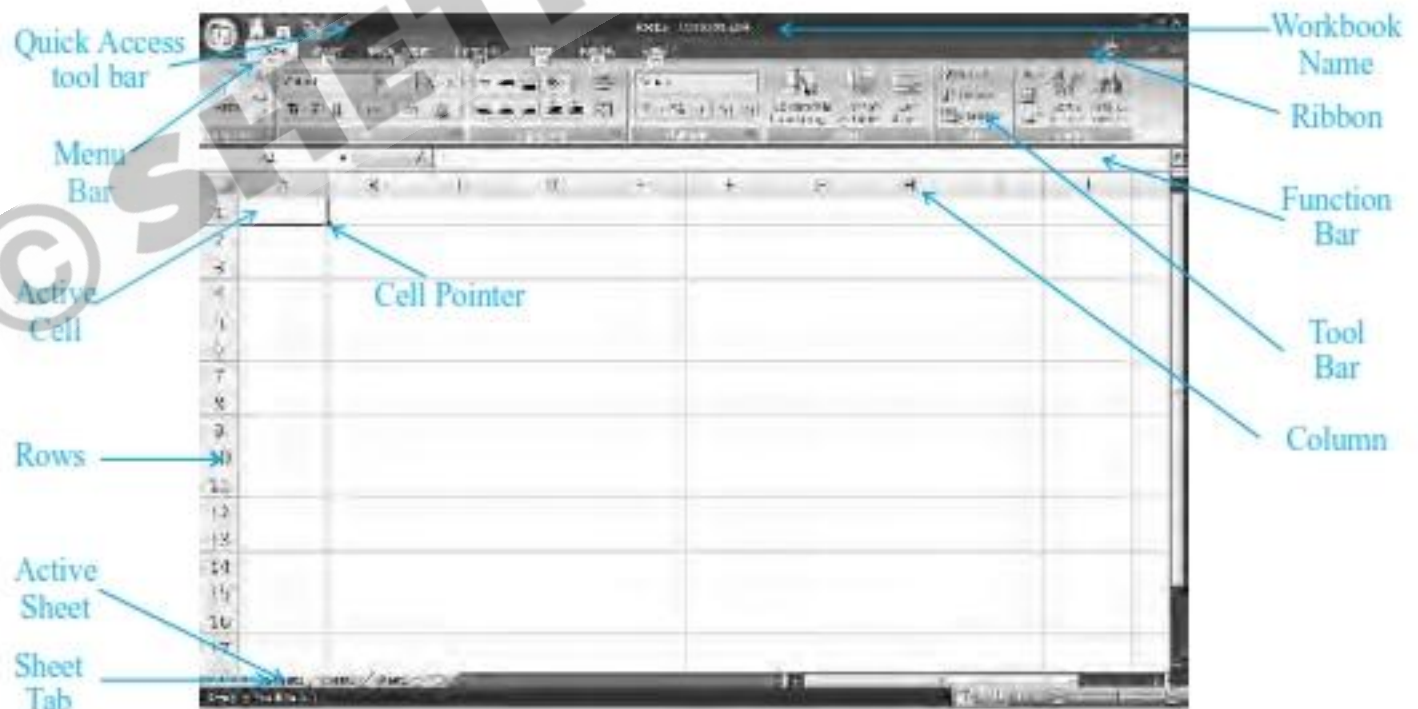
MS-Excel can be started in two ways.

### Steps for starting MS Excel.

1. Click on **Start** button on the Taskbar.
2. Click on **All Programs**.
3. Click on **Microsoft Office**.
4. Click on **Microsoft Office Excel**.

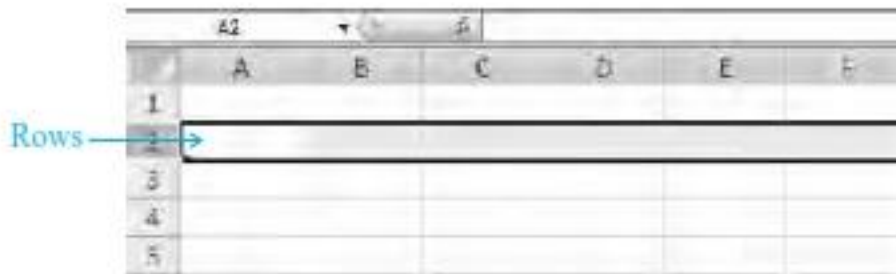
Or

Click on  button of shortcut bar on desktop.

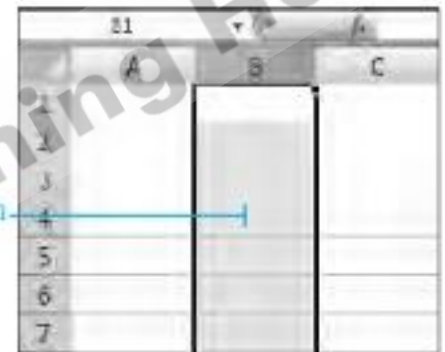


### Components of MS Excel 2007

1. **Rows:** In Excel, a row is a grouping of cells that run from the left to right of a page. Rows run horizontally in an Excel worksheet. They are identified by a number in the row header. There are 10,48,576 rows in each Excel worksheet.



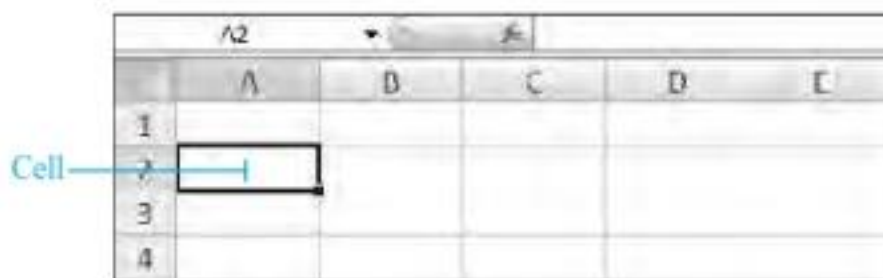
2. **Column:** The vertical lines of cell are called columns. An excel worksheet has 16384 columns. The columns are labelled from left to right and are named A, B,..... These are called column headers.



3. **Cell:** In Excel, each rectangular box in a row worksheet is referred to as a cell. A cell is the intersection point of a column and a row.

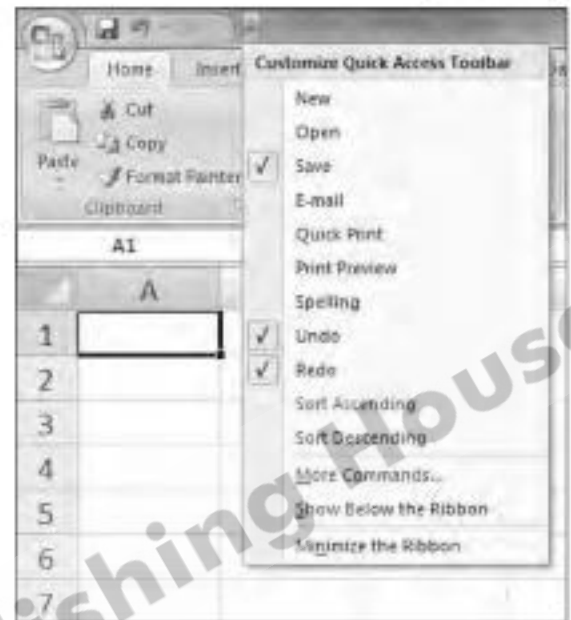
Data entered into Excel is always stored in a cell. In the newest versions of Excel there are over 17 billion cells in each worksheet.

To keep track of where data is stored, each cell has a cell reference consisting of the column letter and row number of where the cell is located.





- Office button:** The office button is a round button on the top most left corner of the window with Microsoft Office logo on it. It includes options similar to the options on file menu in the earlier versions of Microsoft Excel such as New, Open, Save, Print, etc.
- Quick Access Toolbar:** The Quick Access Toolbar is found above the ribbon to the right of the Office button. The toolbar contains shortcuts to a number of commonly performed tasks such as open, save, undo and quick print.
- Workbook:** A workbook is a spreadsheet file. Each workbook in Excel contains three pages or worksheets.



The term spreadsheet is often used to refer to a workbook, but in fact, spreadsheet refers to the computer program, such as Excel. When we open the excel spreadsheet program, it loads an empty workbook file consisting of three blank worksheets for us to use.

- Ribbon:** The Ribbon is designed to help us quickly to find the commands that we need to complete a task. Commands are organized in logical groups, which are collected together under tabs. Each tab relates to a type of activity, such as writing or laying out a page. It includes various tools to format, edit, calculate and present data as required.



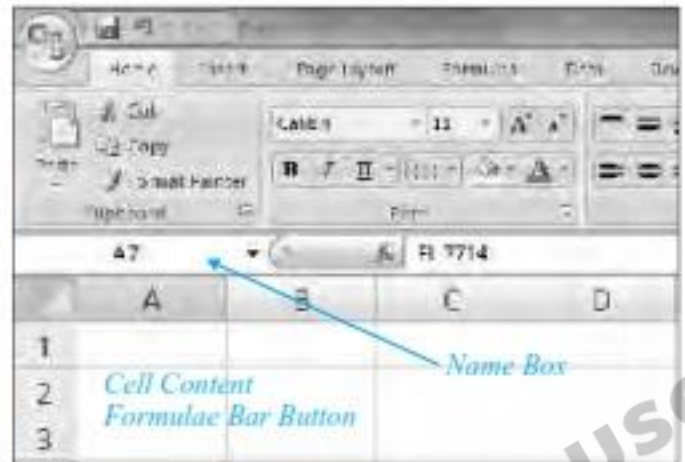
- Formula Bar:** The formula bar in Excel is located above the work area of the spreadsheet. The formula bar displays the data or formula stored in the active cell. The formula bar can be used to enter or edit a formula, a function, or data in a cell.

**Formula Bar** appears just below the ribbon and is divided into three sections:

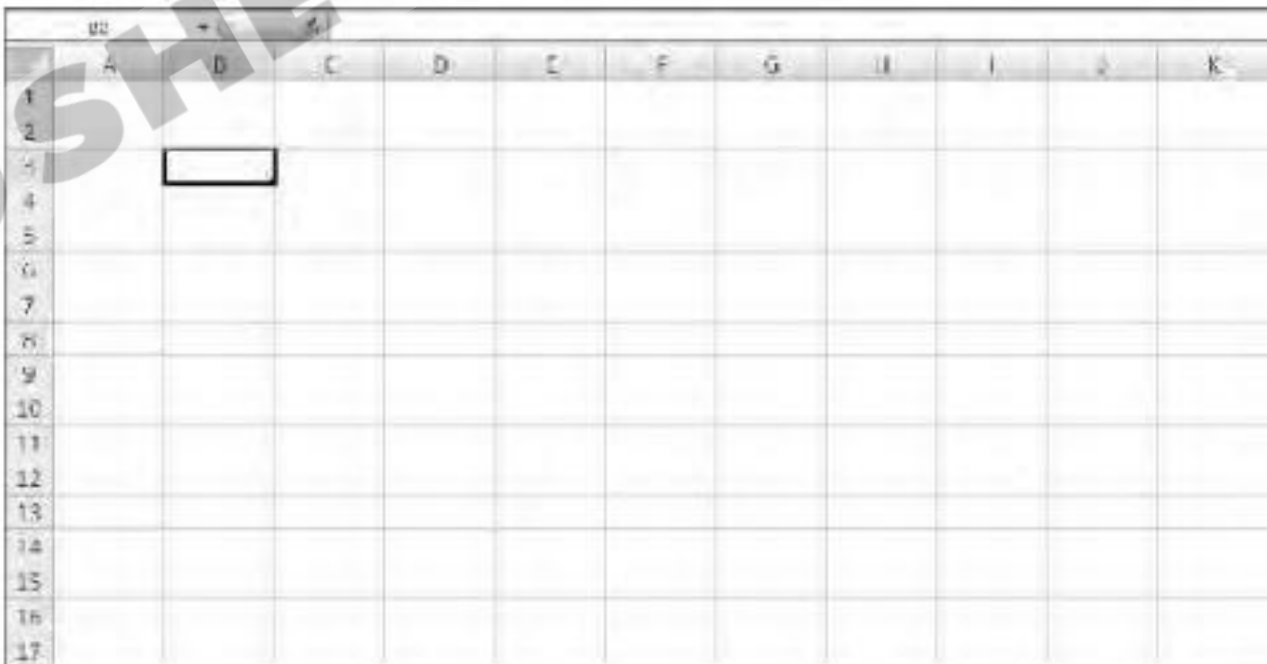
**Name Box:** This box is on the left side which displays the address of the current cell or active cell.

**Cell Content:** The last area to the immediate right of the Function Wizard button displays the content of the active cell.

**Formulae Bar Button:** The middle section displays the Function Wizard button which displays a check and 'X' marks when we enter or edit cell data.



- Active Cell:** In a spreadsheet program such as Excel, the active cell is identified by a black border or outline surrounding the cell. The active cell is also known as the current cell or the cell that is in focus.
- Spreadsheet (Worksheet):** A spreadsheet application is a computer such as Excel, open Office Calc, or Google docs spreadsheet. It has a number of built in feature and tools, such as functions, formulas, charts, and data analysis tools that make it easier to work with large amounts of data. The term is also used to refer to the computer file created by the above mentioned programs.



### How to enter Data in the Worksheet

To enter data in worksheet, we have to follow these steps:

1. Click on cell **B2** and type 'Company Secretaries Examination, December 2014'.
2. Take cursor onto the other cell with the cursor control keys or by using the mouse. The cell becomes active and we can now enter data on this cell.
3. Type the data as shown below.

	Date	Day	Professional Programs	Practicals/Other (View Syllabus)
6	20.12.2014	Fri	Company Secretarial Practice	Company Law
7	21.12.2014	Sat	Drafting, Appearance and Pleading	Costs and Money Accounts
8	22.12.2014	Sun		
9	23.12.2014	Mon	Financial, Treasury and Forex Management	Economic, Commercial Law
10	24.12.2014	Tue	Corporate Restructuring and Insolvency	Tax Law
11	25.12.2014	Wed		
12	26.12.2014	Thu	Strategic Management, Alliance and International	Company Accounts and Auditing, practice
13	27.12.2014	Fri	Advanced Tax Laws and Practice	Capital Markets and Securities laws
14	28.12.2014	Sat	Due Diligence and Corporate Compliance	Industrial, Labour and General Law
15	29.12.2014	Sun	Governance, Business Ethics and Sustainability	

4. Cell selection:

It is vital to select a cell or range of cells before we perform various activities like:

- Moving or copying data from one position to another.
- Formatting the text.
- Calculations of numeric data.
- Adding and deleting rows and columns.
- Editing the text.

### Selecting a Cell and Ranging cells:

To select cells use the mouse pointer to click on a cell or cells. It is known as **highlighting**. Before we can perform work on data such as formatting or including it in a function or formulate the cell(s), the data reside in must first be selected.



There are a number of ways to select cells including: Drag and select, Typing a range in the Name Box and using arrow keys on the keyboard.

### Steps to select a range of cells (For example from B4 to E15)

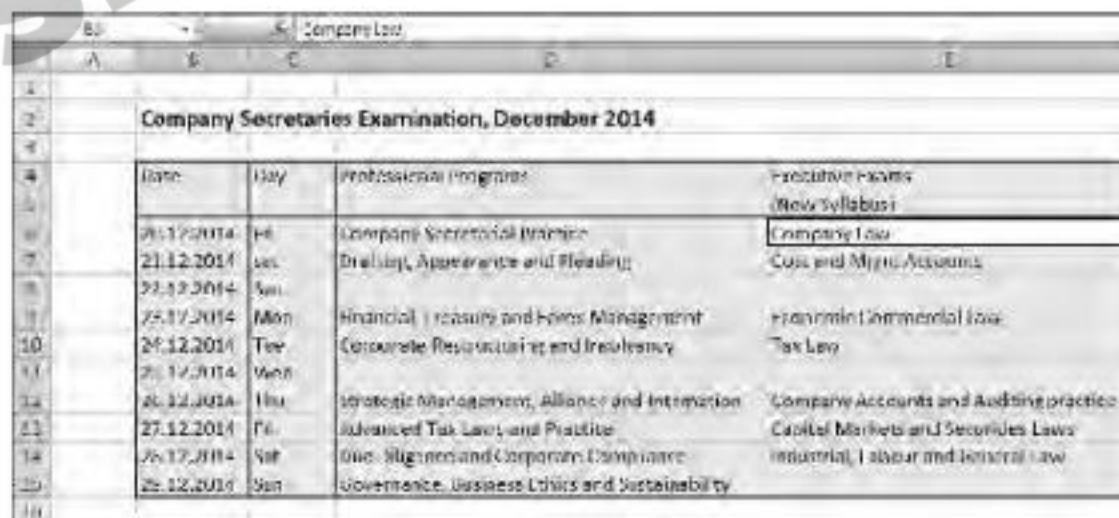
1. Click on the cell B4.
2. Hold the mouse and drag till E15 towards the right.



Date	Day	Professional Programs	Executive Exams (New Syllabus)
20.12.2014	Fri	Company Secretarial Practice	Company Law
21.12.2014	Sat	Drafting, Appearance and Pleading	Cost and Mgmt Accounts
22.12.2014	Sun		
23.12.2014	Mon	Financial Treasury and Funds Management	Exam in Commercial Law
24.12.2014	Tue	Corporate Restructuring and Insolvency	Tax Law
25.12.2014	Wed		
26.12.2014	Thu	Strategic Management, Alliance and Information	Company Accounts and Auditing practice
27.12.2014	Fri	Advanced Tax Laws and Practice	Capital Markets and Securities Laws
28.12.2014	Sat	Due Diligence and Corporate Compliance	Industrial, Labour and General Law
29.12.2014	Sun	Governance, Business Ethics and Sustainability	

### Alternate method to select a range of cells

1. Click on the cell B4.
2. Press and hold Shift key and use the down and right arrow keys on the keyboard to select the range of cell till E15.



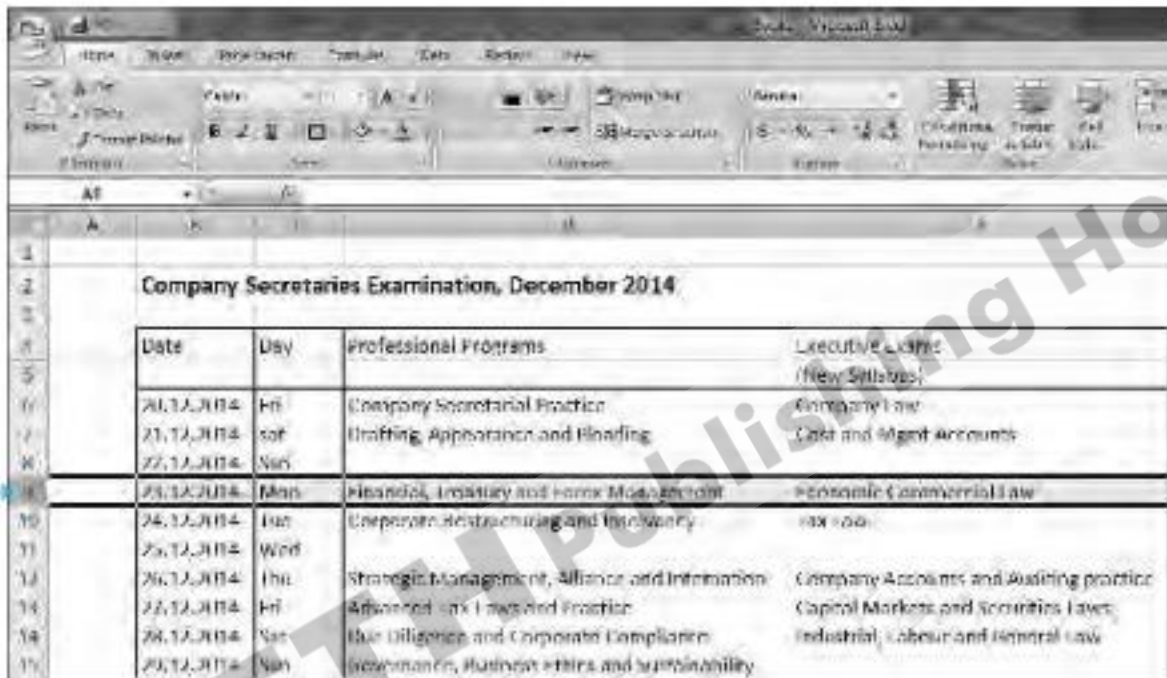
Date	Day	Professional Programs	Executive Exams (New Syllabus)
20.12.2014	Fri	Company Secretarial Practice	Company Law
21.12.2014	Sat	Drafting, Appearance and Pleading	Cost and Mgmt Accounts
22.12.2014	Sun		
23.12.2014	Mon	Financial Treasury and Funds Management	Exam in Commercial Law
24.12.2014	Tue	Corporate Restructuring and Insolvency	Tax Law
25.12.2014	Wed		
26.12.2014	Thu	Strategic Management, Alliance and Information	Company Accounts and Auditing practice
27.12.2014	Fri	Advanced Tax Laws and Practice	Capital Markets and Securities Laws
28.12.2014	Sat	Due Diligence and Corporate Compliance	Industrial, Labour and General Law
29.12.2014	Sun	Governance, Business Ethics and Sustainability	

### How to Select cells which are away from each other.

1. First click on, one of the cells we want to select.
2. Press and hold the control key and simultaneously click on the remaining cell to be selected.

### How to select an Entire Row:

Click on the row header of the row we want to select. The entire row is now selected.




The screenshot shows the Microsoft Excel interface with a table titled "Company Secretaries Examination, December 2014". The table has columns for Date, Day, Professional Programs, and Executive Exams (New Syllabus). Row 9 is selected, indicated by a blue arrow pointing to the row header "9".

Date	Day	Professional Programs	Executive Exams (New Syllabus)
20.12.2014	Fri	Company Secretarial Practice	Company Law
21.12.2014	Sat	Drafting, Appearance and Hearing	Cost and Mgmt Accounts
22.12.2014	Sun		
23.12.2014	Mon	Financial, Treasury and Risk Management	Personal Commercial Law
24.12.2014	Tue	Corporate Restructuring and Insolvency	Tax Law
25.12.2014	Wed		
26.12.2014	Thu	Strategic Management, Alliance and Information	Company Accounts and Auditing practice
27.12.2014	Fri	Advanced Tax Laws and Practice	Capital Markets and Securities Laws
28.12.2014	Sat	Due Diligence and Corporate Compliance	Industrial, Labour and General Law
29.12.2014	Sun	Governance, Business Ethics and Sustainability	

### How to select an Entire Column:

Click on the column header of the column we want to select. The entire column now gets selected.



The screenshot shows the Microsoft Excel interface with the same table as above. Column C, "Professional Programs", is selected, indicated by a blue arrow pointing to the column header "C".

Date	Day	Professional Programs	Executive Exams (New Syllabus)
20.12.2014	Fri	Company Secretarial Practice	Company Law
21.12.2014	Sat	Drafting, Appearance and Hearing	Cost and Mgmt Accounts
22.12.2014	Sun		
23.12.2014	Mon	Financial, Treasury and Risk Management	Personal Commercial Law
24.12.2014	Tue	Corporate Restructuring and Insolvency	Tax Law
25.12.2014	Wed		
26.12.2014	Thu	Strategic Management, Alliance and Information	Company Accounts and Auditing practice
27.12.2014	Fri	Advanced Tax Laws and Practice	Capital Markets and Securities Laws
28.12.2014	Sat	Due Diligence and Corporate Compliance	Industrial, Labour and General Law
29.12.2014	Sun	Governance, Business Ethics and Sustainability	

### How to Select an Entire Worksheet:

- Click on the square at the top left side of the spreadsheet
- The entire spreadsheet is now selected

	A	B	C	D	E
1					
2		Company Secretaries Examination, December 2014			
3					
4		Date	Day	Professional Programs	Executive Exams (New Syllabus)
5					
6		28.12.2014	Fr	Company Secretarial Practice	Company Law
7		29.12.2014	Sa	Drafting, Appearance and Filing	Cost and Management Accounts
8		30.12.2014	Sun		
9		31.12.2014	Mon	Taxation, Treasury and Financial Management	Financial Management & Finance
10		01.01.2015	Tue	Corporate Governance and Ethics	Tax Law
11		02.01.2015	Wed		
12		03.01.2015	Thu	Strategic Management, Human Resource Management	Company Accounts and Auditing (New Syllabus)
13		04.01.2015	Fri	Business Law and Practice	Capital Structure and Securities Issues
14		05.01.2015	Sat	Cost Accounting and Computer Applications	Industrial, Labour and Environmental Law
15		06.01.2015	Sun	Contract Law, Torts and Intellectual Property	

### How to deselecting the cell:

To deselect a cell, we need to click anywhere outside the selected area on the spreadsheet.

### How to delete the cells:

- Let us take an example of an Excel sheet showing a Time Table for Company Secretaries Examination.
- Select the rows 9 to 15 and click Delete.

	A	B	C	D	E
1					
2		Company Secretaries Examination, December 2014			
3					
4		Date	Day	Professional Programs	Executive Exams (New Syllabus)
5					
6		28.12.2014	Fr	Company Secretarial Practice	Company Law
7		29.12.2014	Sa	Drafting, Appearance and Filing	Cost and Management Accounts
8		30.12.2014	Sun		
9		31.12.2014	Mon	Taxation, Treasury and Financial Management	Financial Management & Finance
10		01.01.2015	Tue	Corporate Governance and Ethics	Tax Law
11		02.01.2015	Wed		
12		03.01.2015	Thu	Strategic Management, Human Resource Management	Company Accounts and Auditing (New Syllabus)
13		04.01.2015	Fri	Business Law and Practice	Capital Structure and Securities Issues
14		05.01.2015	Sat	Cost Accounting and Computer Applications	Industrial, Labour and Environmental Law
15		06.01.2015	Sun	Contract Law, Torts and Intellectual Property	

### Merging cells:

Merge cell is a function in database software that allows multiple adjacent cells to be combined into a single larger cell. This is done by selecting all cells to be merged and choosing the “Merge Cells” command.

### Steps for merging cell:

- Select the cells which we want to merge.
- Click on the merge option on Home menu of the Ribbon.

The selected cells are now merged.

## Exercise

### I. State whether the following statement are 'True' or 'False':

1. Vertical lines of cells are known as rows. \_\_\_\_\_
2. Grouping one or more cells together is known as deselecting Cells. \_\_\_\_\_
3. A workbook is a worksheet where data is arranged in tabular form. \_\_\_\_\_
4. The formula bar displays the address and contents of the current cell. \_\_\_\_\_
5. A cell defined as an intersection of rows and columns. \_\_\_\_\_
6. A spreadsheet is a consist of 16,384 rows and 10,48,576 columns. \_\_\_\_\_

### II. Fill in the Blanks:

1. \_\_\_\_\_ is a collection of worksheets.
2. MS Excel is used to record and manipulate large amount of \_\_\_\_\_ information.
3. We can create, edit, copy and paste data in \_\_\_\_\_.
4. A workbook includes \_\_\_\_\_ worksheets by default.
5. \_\_\_\_\_ is a document or file in which information is permanently stored in Microsoft Excel.
6. The horizontal lines of cells are called \_\_\_\_\_.
7. A single worksheet in Excel has maximum \_\_\_\_\_ rows and \_\_\_\_\_ columns.
8. Grouping one or more cells together is known as \_\_\_\_\_.
9. \_\_\_\_\_ is a bar located above the work area in MS Excel 2007 which includes various tools to format, edit, calculate and present data as required.
10. A \_\_\_\_\_ is defined as an intersection of a row and a column.
11. \_\_\_\_\_ is a box on the left side which displays the address of the current cell.
12. The vertical lines of cell are called \_\_\_\_\_.
13. Formatting cells helps to enhance the \_\_\_\_\_ of the spreadsheet.
14. The spreadsheet of excel is also known as \_\_\_\_\_.
15. We can type in a \_\_\_\_\_.



### III. Write the steps of the following:

1. To select a Range of Cells with an example.

Ans. \_\_\_\_\_

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2. To select an Entire Column.

Ans. \_\_\_\_\_

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3. To start MS Excel Program.

Ans. \_\_\_\_\_

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4. To select an Entire Row.

Ans. \_\_\_\_\_

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### IV. Re-arrange the jumbled –up letters to form the correct words:

1. SLEMXCE \_\_\_\_\_
2. SVAE \_\_\_\_\_
3. OKSERWHITE \_\_\_\_\_
4. PEDDHETEARS \_\_\_\_\_
5. WRO \_\_\_\_\_
6. ORBOKWOK \_\_\_\_\_
7. OLMUCN \_\_\_\_\_
8. SLX \_\_\_\_\_
9. UNEMCIR \_\_\_\_\_
10. RPOGRMAS \_\_\_\_\_

### Activity

#### I. Open a new spreadsheet and enter the data as shown:

Sr. No.	Name of the food	Amount in Grams (g)
1	Cereals	380-420
2	Pulses (Dals)	45
3	Green leafy Vegetable	50
4	Other Vegetables	80
5	Fruits	50
6	Milk	250
7	Oil and Fats	35-40
8	Sugar	45

1. Add a suitable border to the table.
2. Copy all the contents to another worksheet.
3. Move the data to another workbook.
4. Apply background colour for the first row.
5. Apply different font colour for names.
6. Insert one more row and add another food name.
7. Make the column and row headings to bold, Italics and font size to 10.

II. Open MS Excel software program and prepare a table using the following information.

April	School Events
6	PTA Meeting
12	Sports Day
28	Puppet show
29	Elocution competition
30	Creative Writing Competition

III. Perform the following operations for the above planner for the month of April.

- After sports day insert an event of going to a Field Trip on March 17.
- The Puppet show is postponed to April 31 and the Creative Writing Competition is postponed to March 27.

IV. Open a new workbook and enter the following data.

CRORE		LAKH		THOUSAND		ONE		
Ten Crore	One Crore	Ten Lakh	One Lakh	Ten Thousand	One Thousand	Hundred	Tens	Ones
1	1	1	1	1	1	1	1	1

- Apply borders to the specific column headings.
- Make use of merge cells.
- Select and copy the contents to another workbook.
- Apply a background colour for second row.
- Move the data to another workbook.
- Insert a row and a column.
- Delete a column.
- Apply different font colours for each row.

V. Perform the following operations for the bill summary provided.

- Insert two rows and add the following items in the list of stationery items and their cost.
- Insert two column and add the information given alongside.

Item	Cost
Pen	30
Pencil	12
Eraser	8
Bottle	50
Note Book	60
Bag	80
Crayons	30
Drawing Book	25
Tiffin Box	40
Ruler	10



### Introduction

This chapter introduces two important and powerful tools, namely **Control Panel** and **Windows Explorer**.



*Control Panel Icon*



*Windows Explorer Icon*

The **Control Panel** is a part of the Microsoft Windows graphical user interface which allows users to view and manipulate basic system settings and **controls** such as adding hardware, adding and removing software, controlling user accounts and changing accessibility options. It has two views, **Classic View** and **Category View**, and it is possible to switch between these through an option that appears on either left side or top of the window.

**Windows Explorer**, alternatively referred to as **File Explorer** is a file browser found in Microsoft Windows 95 and its above version to explore and manage the drives, folders and files on the computer. Although similar, Microsoft Windows Explorer is not the same as **My Computer** and is not **Microsoft Internet Explorer**, even though Internet Explorer is some times improperly referred to as Explorer. It displays the files, folders, and drives on our computer in a hierarchical manner. Using Windows Explorer, we can create copy, move, rename and search for files and folders.

### Control Panel

**Control Panel** is a section of **Microsoft Windows** that enables a user to change various computer hardware and software features. Settings for the **mouse**, **display**, **sound**, **network** and **keyboard** represent just a few examples of what may be modified in the **Control Panel**. Hence Control Panel is the place to go in Windows if we want to change something about how it looks or works.



Given below are few of the control panel icons and their uses.

- **Action Center** is a central place to view alerts and take actions that can help keep Windows running smoothly. Action Center notifies us when items need our attention.
- The **Backup and Restore Center** is used to create and restore backups of groups of files and folders using Windows Backup. Backup and Restore Center can also be used to create a Windows Complete PC Backup.
- The **Credential Manager** is used to store and manage credentials like user names and passwords so it's easier to log on to network resources and password protected websites.
- The **Desktop Gadgets** is used to add an installed Windows gadget to the desktop. The Desktop Gadgets applet can also be used to uninstall a gadget.
- The **Device Manager** is used to manage the hardware installed in Windows.
- The **Devices and Printers** is used to install, manage and view information about devices and printers connected to the computer.
- The **Display** is used to adjust display settings like screen resolution, multiple monitor arrangement and text size.
- The **Ease of Access Center** is used to configure the various accessibility options in Windows like Magnifier, On-Screen Keyboard, Narrator, and more.
- The **Folder Options** is used to make all sorts of simple and advanced changes to how folders look and act. One of the most common uses for 'Folder Options' is to configure Windows to either show or hide hidden files.
- The **Fonts** is used to add, remove and configure the fonts available to Windows and the other programs on our computer.
- The **Getting Started** is a collection of shortcuts to various other Control Panel applets and settings that might be useful right after we install Windows or setup a new Windows pre-installed computer.
- The **HomeGroup** is used to manage HomeGroup settings like the HomeGroup password, items we want to share, etc. We can also join and leave HomeGroups from the HomeGroup applet.
- The **Indexing Options** is used to change index settings in Windows like which folders are included in the index, which file types are included, and more.
- The **Internet Options** opens the Internet Properties window for the current version of Internet Explorer installed on our computer.

- The **Keyboard** is used to make keyboard changes character repeat rate/delay and cursor blink rate.
- The **Location and Other Sensors** is used to enable, disable, and manage location or other types of sensors installed in our computer.
- The **Mail** is used to manage Microsoft Office Outlook email accounts, data files, and more.
- The **Mouse** is used to make mouse changes like double-click speed, pointer speed and visibility, button and wheel configuration, and more.
- The **Network and Sharing Center** is used to connect and disconnect from networks, change network settings, troubleshoot network problems, and see real-time information about the state of the network.
- The **Notification Area Icons** is used to manage which, and in what situations, icons appear in the notification on the taskbar, near the date and time.
- The **Parental Controls** is used to set basic parental controls on a user account, presumably the account of a minor that uses the computer. Parental Controls lets us restrict access to certain programs, set time limits, and more.
- The **Performance Information and Tools** is used to show the results of the most current assessment of the computer hardware called the Windows Experience Index.
- The **Personalization** is used to configure the themes, desktop backgrounds, screen savers, sounds, and other personal preference types of aspects in Windows.
- The **Phone and Modem** is used to add, remove, and configure modems and other dialing devices.
- The **Power Options** contains all the settings regarding how our computer uses power. Power Options are most often used to change power plans which control things like sleep, display, dimming etc.
- The **Recovery** is used primarily to start System Restore but can also be used to start System Image Recovery or reinstall Windows via a parallel installation.
- The **Region and Language** is used to configure language and region specific information in Windows like date and time formats, currency and number formats, keyboard layout, etc.
- The **RemoteApp and Desktop Connections** is used to setup, remove, and manage the connection to RemoteApp and Desktop Connections in Windows.

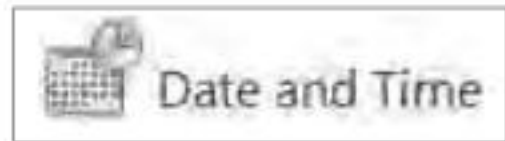
- The **Sound** is used to manage playback and recording devices, as well as the sounds applied to program events in Windows.
- The **Speech Recognition** options is used to manage the various speech recognition settings in Windows.
- The **Sync Center** is used to manage synchronization activity between the local computer and another location.
- The **System** is used to view basic information about our computer like the operating system version, current service pack, basic hardware statistics like CPU speed and amount of RAM, and more.
- The **Taskbar and Start Menu** is used to manage the various options available for the taskbar and Start menu. With Taskbar and Start Menu we can choose to auto-hide the task bar, change Aero Peek settings, set the default power button action, and much more.
- The **Troubleshooting** is a centralized place to access troubleshooting wizards that can help fix problems with software, sound playback, network and Internet connections, display problems, and more.
- The **User Accounts** is used to manage user accounts in Windows. With User Accounts, we can change and remove Windows passwords, change account names and pictures, and more.
- The **Windows Defender** is used to manage the Windows Defender antimalware tool.
- The **Color Management** is used to manage color profiles for monitors, printers, and other image devices. We can also perform basic display calibration from the Color Management applet.
- The **Date and Time** is used to configure the system time and data, set the time zone, configure daylight saving time, and manage Internet time synchronization.
  - The **Default Programs** is used to configure the default program used for a particular file extension and also to set default programs for certain activities like email, web browsing, etc.
  - The **Security Center** is used to manage Windows security settings like firewall protection, malware protection, and automatic updates.

To open any of these items, we click its **icon** or **category name**.

Let us learn the steps to change few features of our computer using **Control Panel** icons.

### To set **Date and Time** in the computer :

1. Double click on '**Date and Time**'.
2. Set the **current date, month, year and time**.
3. Click '**Change date and time...**'. (See figure below)
4. Click '**OK**'.



*Date / Time Properties*

### To change the **Desktop Background** :

1. Double click on '**Display**' in control panel.
2. Click on the '**Personalization**' tab.
3. Select a **background**.  
For example '**Desktop Background**'. (See figure)
4. Click '**Save changes**'.



*Display Icon*



Display Properties - Desktop



## Windows - Extension

### To set a Screen Saver :

1. Double click on **Display** in the Control Panel.
2. Click on **Personalize**.
3. Click on **Screen Saver**.



4. Choose a screen saver. For example **Bubbles**. (see figure below)
5. Click **Apply**.
6. Click **OK**.



## Windows Explorer

As the name suggests, this tool primarily allows us to view the file, folders and drives on our computer.

### To open Windows Explorer

1. Click on  in the taskbar.



2. The Windows Explorer window opens.



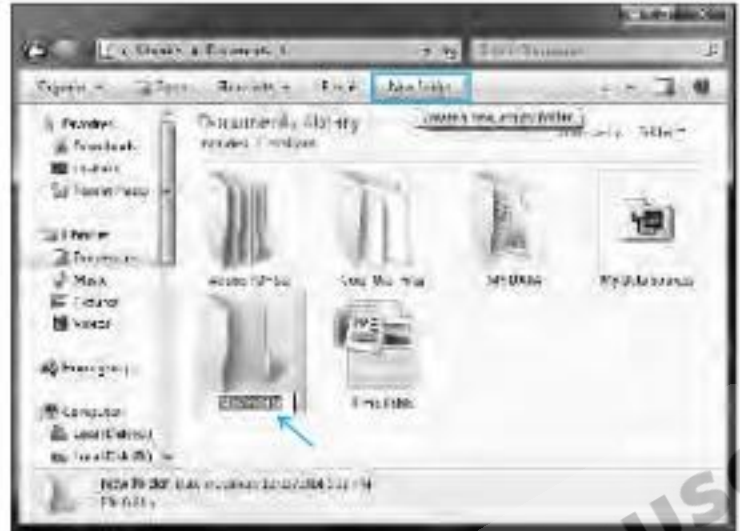
Windows Explorer window has two panels; the Left and the Right Panel.

The left panel displays the folders like Documents, Computer, Network, Desktop, Recent Places, Pictures, Videos, Music and Downloads. When we click on any of these folders, the right panel displays its contents. E.g. Music



### To create a folder in Window Explorer :

1. Select the folder on the left panel of Windows Explorer window under which we need to create a new folder.
2. Click on **New folder** tab in the menu bar on the top of the window.
3. A **New Folder** appears on the right panel of the window.
4. Give the name of our choice and click the **Enter** button.



### Alternative Method to Create a New Folder

1. **Right click** on the right panel of the **Windows Explorer** window.
2. A new window appears. Click on **New** and then on **Folder**.

A new folder gets created.



### Conclusion

In the Chapter, we learned about few important uses and guidelines of the **Control Panel** and **Windows Explorer**. These two softwares plays an integral part on the smooth working of a computer, without which the present generation of computer would have been a failure.

## Chapter 7

## Advanced MSW Logo



### Introduction

LOGO is a programming language developed for teaching young children elementary exercises involving drawing geometric shapes.

Your LOGO workspace looks like this.



### LOGO Turtle

Inside the output screen there is a small triangle called the **Turtle**. The head of triangle shows us which **direction** is its face. This small triangle obeys the **commands** typed in the **Commander Window** and moves around as per the instructions given. When the Turtle moves it draws a **line** behind it.

The Turtle only understands the language of LOGO. Just the way we know different languages like English, Hindi, French etc., we need to learn the language called LOGO to instruct the Turtle to move around the screen for creating various figures and designs.

### Primitives

Primitives are the instructions or **Commands** given on the screen of the Command Window of MS Logo. The turtle on the Graphics window moves around as per the instructions to draw or perform various functions.

We have already learnt earlier about MSW Logo. The command are the instructions given to the computer to do a task. These commands are **case sensitive**, that means it can be uppercase or lower case. It is essential to revise the primitives as we need to use them to create figures and designs.

INSTRUCTIONS	Shortcuts	Descriptions
SHOW TURTLE	ST	Shows the Turtle on the screen.
HIDE TURTLE	HT	Hides the Turtle from the screen.
FORWARD NUMBER	FD	Moves the Turtle forward according to the number indicated.
BACK NUMBER	BK	Moves the Turtle back according to the number indicated
RIGHT ANGLE	RT	Changes the direction of the Turtle by turning it to the right.
LEFT ANGLE	LT	Changes the direction of the Turtle by turning it to the left.
CLEAR SCREEN	CS	Erases the picture before a new picture is drawn.

Apart from the above given commands, there are more in the advanced level of MSW Logo. Few are listed below:

- **Home** - This command brings the turtle **back to** the position from where it had started moving from the beginning.
- **CT** - This command helps to **clear** the text in the commander window. We need not have to type any input for this command.
- **PU or PENUP** - This command sets the Turtle's pen to **lift up**. After this, the turtle moves without drawing any line behind it. After giving this primitive, the Turtle will move as per the number of steps in the next command without drawing a line.

For example: FD 70

PU

FD 50

FD 80



Here, the Turtle moves forward by 70 units and draws a line as it moves forward. Thereafter the Turtle's pen lifts up and then the Turtle moves forward by 50 units on the graphic window without drawing a line and again moves another 80 units without drawing the line.

**PD or PENDOWN** - This command allows the Turtle to **start drawing** a line again. This command is given after the PU command to put the pen down so that the Turtle starts drawing again. The PD command is followed by the FD primitives.

In the previous example, the Forward command moves the Turtle forward and then the PU command followed by Forward command moves the Turtle more ahead by 50 and then 80 units without drawing a line as the pen was lifted up. Now we continue giving PD Command followed by FD primitives.

For Example : FD 70

PU

FD 50

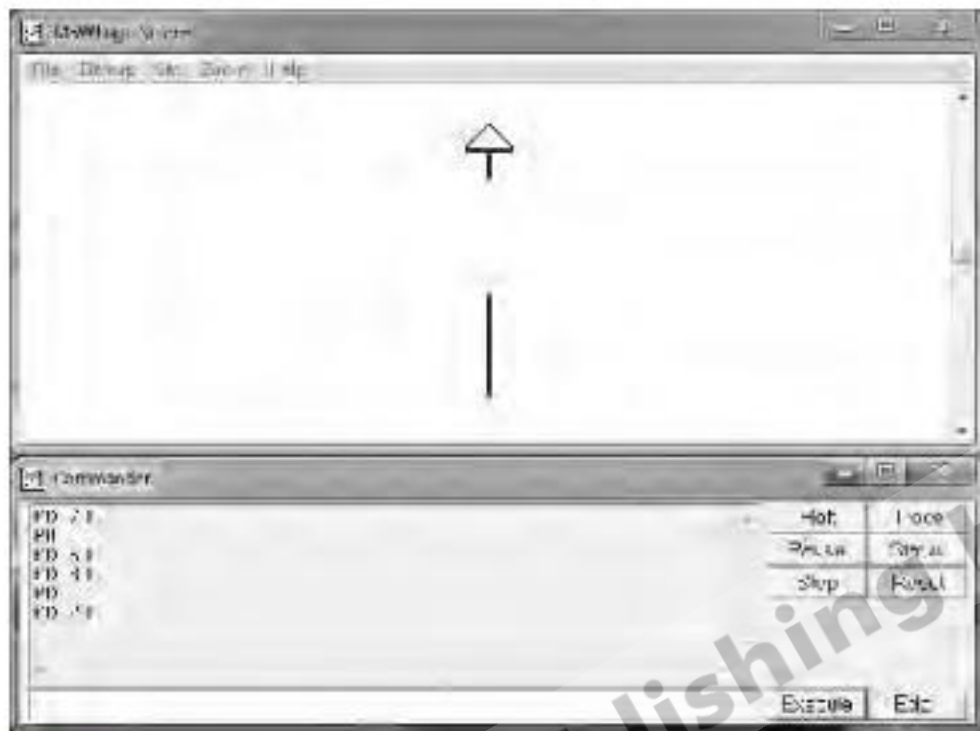
FD 80

PD

FD 20



Here the Turtle starts drawing again, moves forward by 20 units.



**PE or PENERASE** - This command is used to erase a line, once the PE command is given, will erase the lines in that direction, instead of drawing.



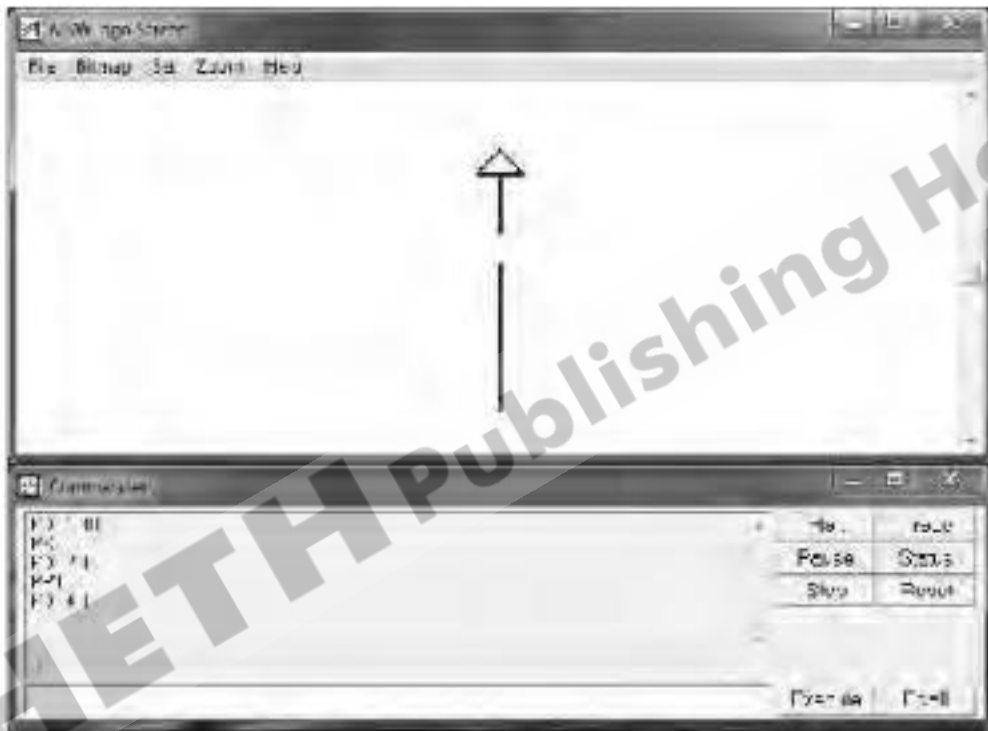


This command is also used to **edit** a given command.

e.g. FD 100  
PE  
BK 30

**PPT or PENPAINT** - This command is used after the PE or the PU command so the Turtle starts drawing again. The PPT command is given followed by another command. After giving PPT command the Turtle starts drawing again.

e.g. FD 100  
PE  
FD 20  
PPT  
FD 40



**PR or PRINT** - This command is used to display any word or sentence on the screen. Type PRINT and then the sentence in square brackets. The sentence gets displayed in the Command Box.

For example,  
Print [GOOD MORNING]



The output is displayed in the Command Box.

**SETPC:** This command is used to change the colour of the Turtle pen. Numbers from 0 to 15 represent different colours.

SETPC 1

FD 100

The Turtle changes its pen colour to blue and all the subsequent drawings are drawn in blue.



### Colour Codes in MSW Logo

0	Black	4	Red	8	Brown	12	Peach
1	Blue	5	Mauve	9	Light Brown	13	Violet
2	Light Green	6	Yellow	10	Green	14	Orange
3	Light Blue	7	White	11	Cyan	15	Grey

**Math's with Logo:** We must know, the Turtle is good at maths also. It can calculate and give answers quickly. But you need to give commands in Logo language for the Turtle to perform math's calculations. It can perform various calculations in LOGO.

1. Addition [+]
2. Subtraction [-]
3. Multiplication [\*]
4. Division [/]

**SUM:** The **SUM** command is used to add two numbers. We also need to give the PR command before the SUM command to display the result in the Command Box.

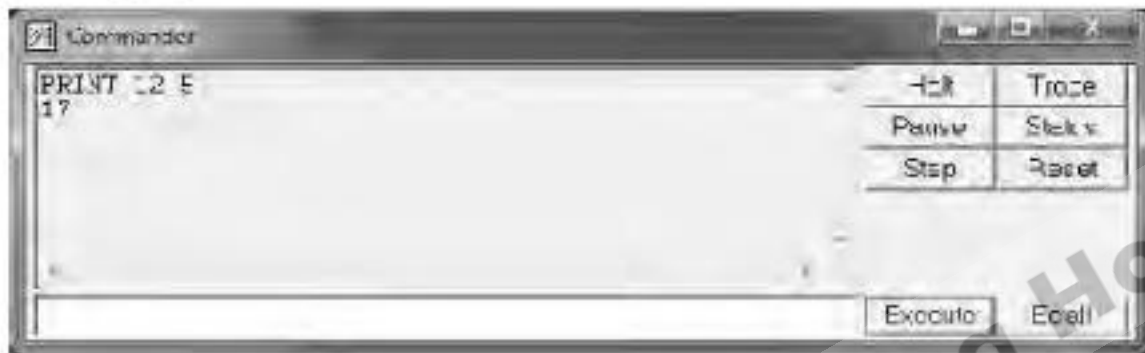
For example,

We need to find the sum of 12 and 5 using MSW logo.

For that, we can use the following command:

**PRINT 12 + 5**

The output is displayed in the Command Box.



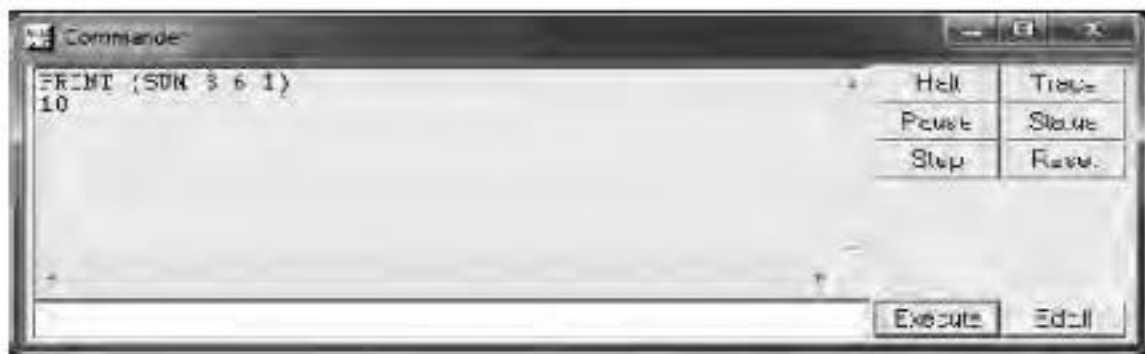
Alternatively, we may also use the following command for performing addition in MSW logo.

**PRINT (SUM 6 3) or PRINT SUM 6 3**



For adding more than two numbers, we need to give the following command:

**PRINT (SUM 3 6 1)**



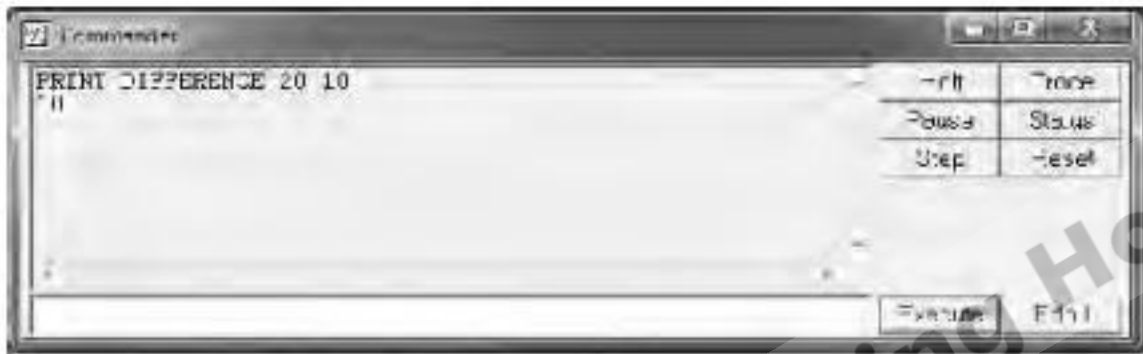


## DIFFERENCE:

The **DIFFERENCE** command is used to subtract one number from another. Here too, like the **SUM** command, we need to give the **PRINT** command before the **DIFFERENCE** command to display the output in the Command Box.

For example,

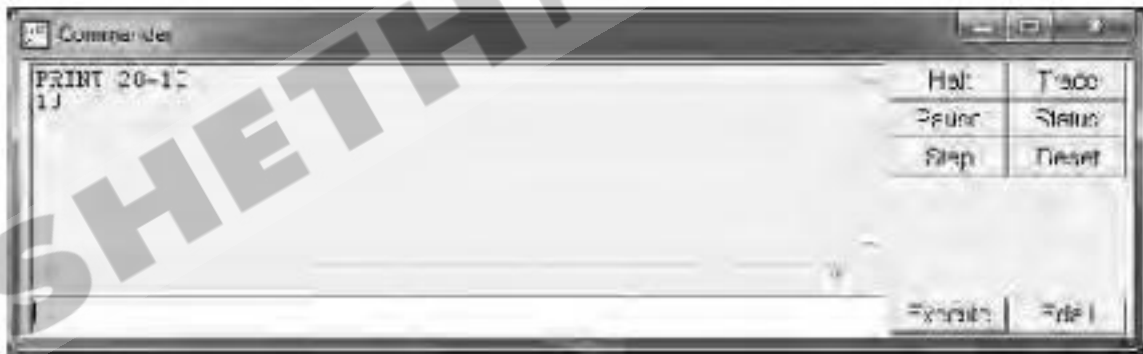
**PRINT DIFFERENCE 20 10**



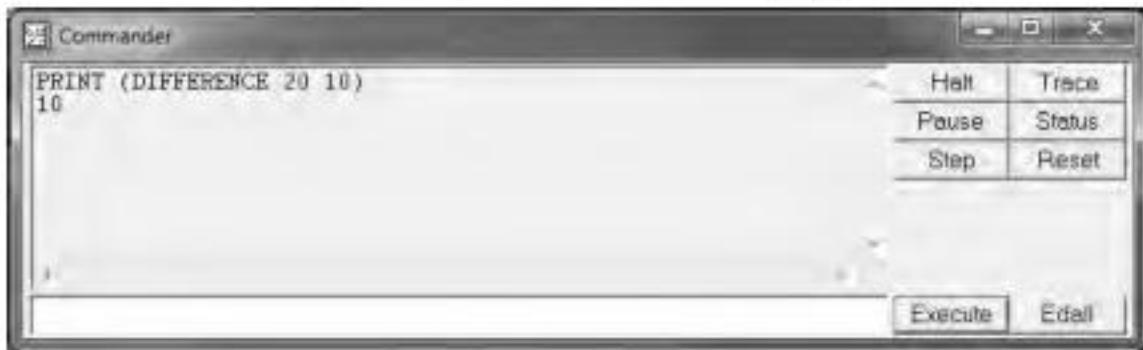
Alternatively, we can use the following command to perform the subtraction operation.

**PRINT 20-10**

The output is displayed in the Command Box:



We may also use the command **PRINT (DIFFERENCE 20 10)** to get the difference.



## PRODUCT:

The **PRODUCT** command is used to multiply two numbers.

For example,

**PRINT PRODUCT 5 2**



Alternatively, we can use the following command.

**PRINT 5 \* 2**

The output is displayed in the Command Box.



To multiply more than two numbers, we can use the following commands:

**PRINT (PRODUCT 5 5 10)**

The output is displayed in the Command Box.



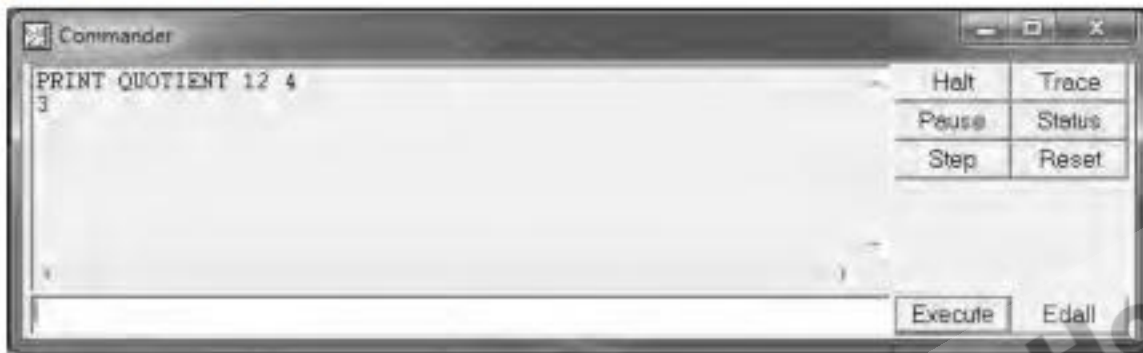


## QUOTIENT:

In MSW logo, the **QUOTIENT** command is used to divide one number by other.

For example,

**PRINT QUOTIENT 12 4**



Alternatively, we can use the following command:

**PRINT 12/4**

The output is displayed in the Command Box.



We may also use the command **PRINT (QUOTIENT 10 5)** to process the division of the above example.

## REPEAT Command

This command is used to instruct the computer to **repeat** a command several times. Thus, this command saves a lot of time as the command is given only once along with the number of time it is repeated.

For example,

The commands to draw a square are

FD 70

RT 90

FD 70

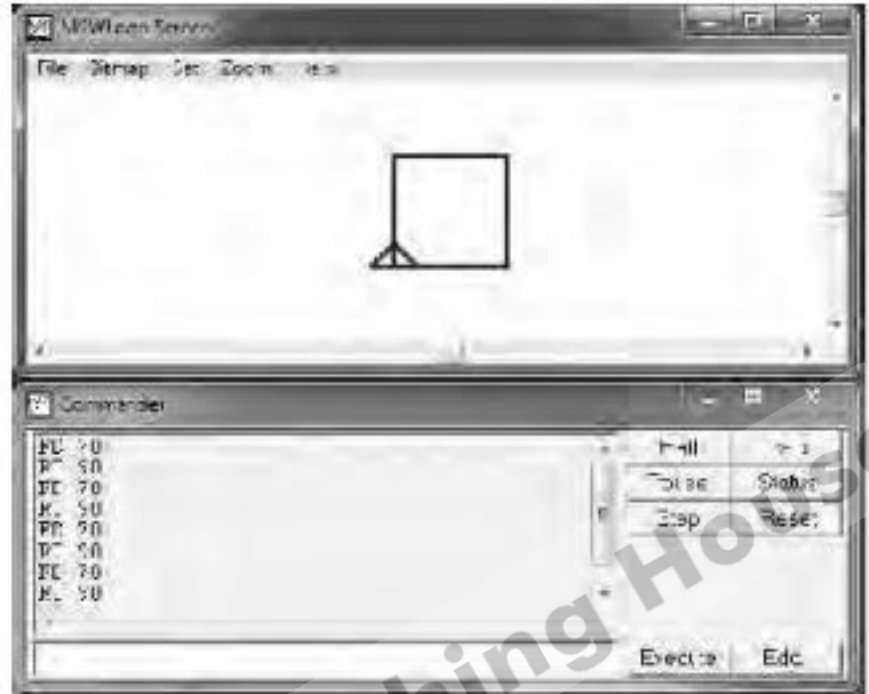
RT 90

FD 70

RT 90

FD 70

RT 90



While drawing the square, the command **FD 70** and **RT 90** is repeated four times. The same process can be performed in just one line using the **REPEAT** command.

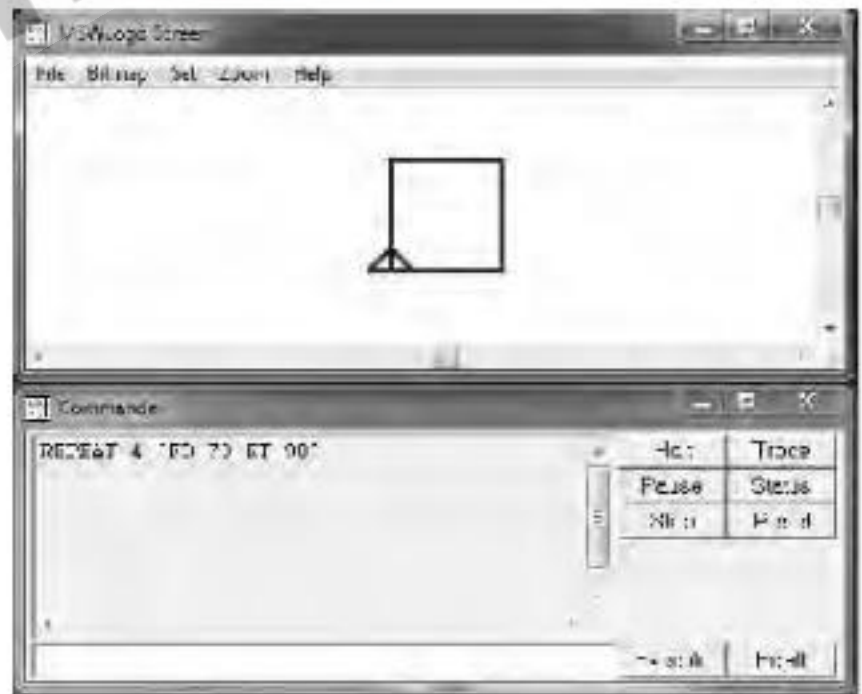
The syntax for the **REPEAT** command is:

**REPEAT** Number of times to repeat [Commands to be repeated]

For example, to draw a square, instead of the above commands we can now use the **REPEAT** command.

**REPEAT 4 [FD 70 RT 90]**

The number **4** after the **REPEAT** command instructs the computer to repeat 4 times the commands given within the square brackets.



Let us learn to draw some more polygons using the REPEAT command.

## 1. Triangle:

Number of sides of a Triangle = 3.

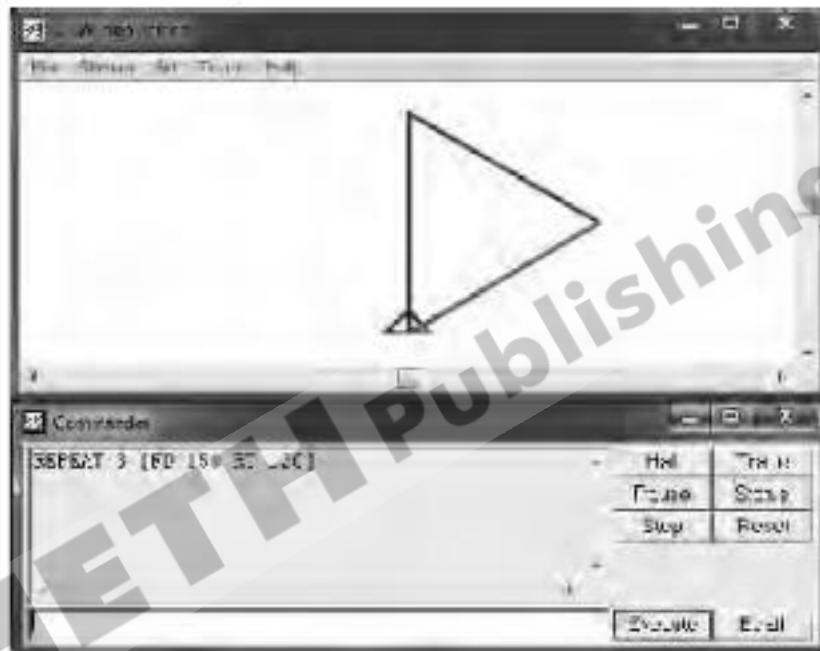
To draw a Triangle, the Turtle makes 3 turns, we need to divide the number of sides by 360.

$$360/3 = 120$$

Thus the angle of each turn is  $360/3 = 120^\circ$

To draw a Triangle using **REPEAT** command:

**REPEAT 3 [FD 150 RT 120]**



## 2. Pentagon:

Number of sides of a Pentagon = 5.

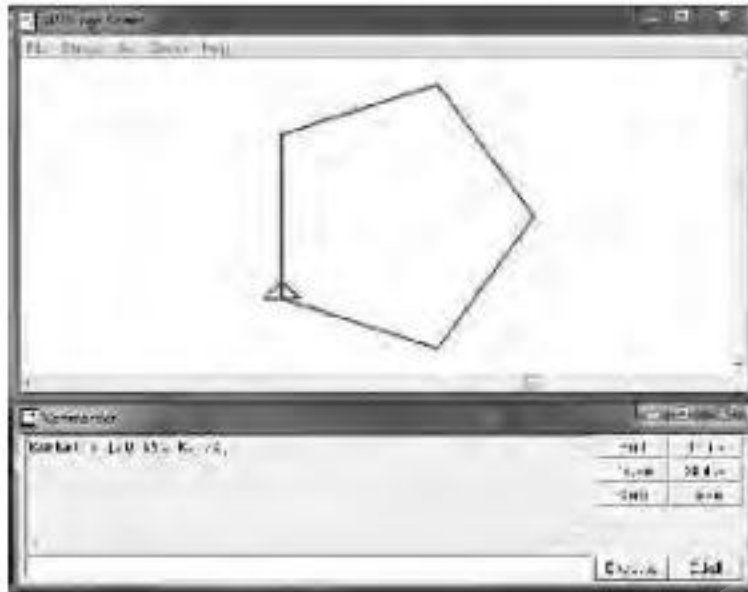
To draw a Pentagon, the Turtle makes 5 turns, we need to divide the number of sides by 360.

$$360/5 = 72$$

Thus the angle of each turn is  $360/5 = 72^\circ$

To draw a Pentagon using **REPEAT** command:

**REPEAT 5 [FD 150 RT 72]**



### 3. Hexagon:

Number of sides of a Hexagon = 6.

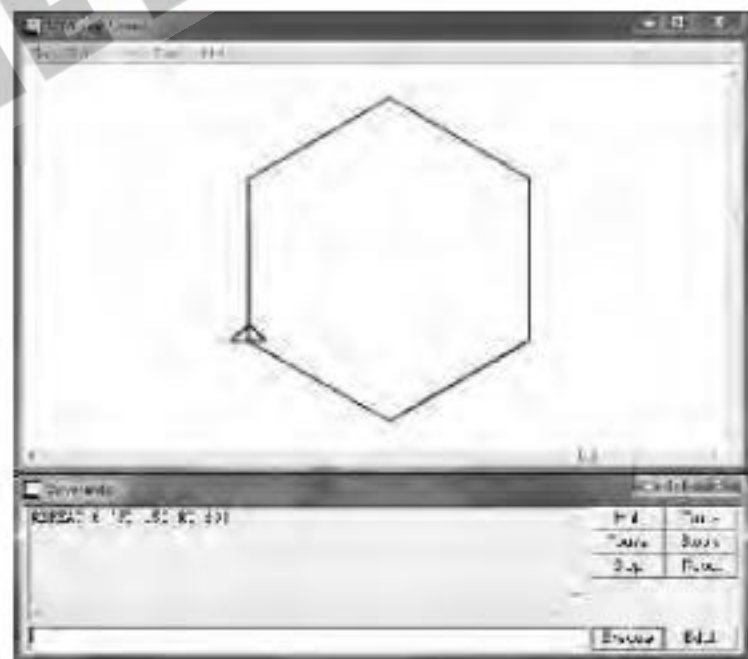
To draw a Hexagon, the Turtle makes 6 turns, we need to divide the number of sides by 360.

$$360/6 = 60$$

Thus the angle of each turn is  $360/6 = 60^\circ$

To draw a Hexagon using **REPEAT** command:

**REPEAT 6 [FD 150 RT 60]**





## 4. Decagon:

Number of sides of a Decagon = 10.

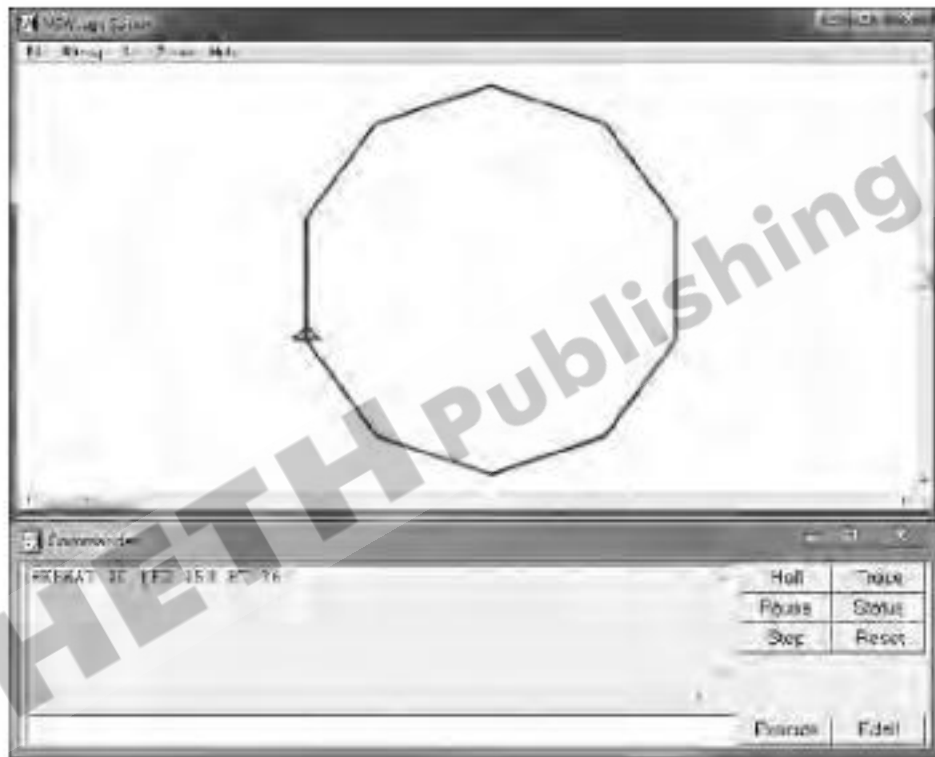
To draw a Decagon, the Turtle makes 10 turns, we need to divide the number of sides by 360.

$$360/10 = 36$$

Thus the angle of each turn is  $360/10 = 36^\circ$

To draw a Decagon using **REPEAT** command:

**REPEAT 10 [FD 150 RT 36]**



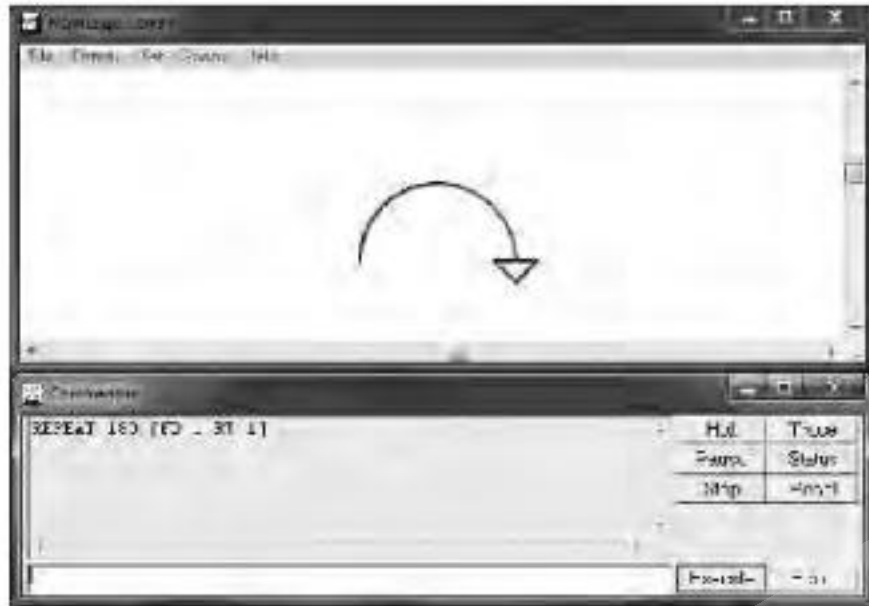
## 5. Semicircle:

Total angle of a Semicircle =  $180^\circ$

To draw a Semicircle, the Turtle makes a single turn.

To draw a Semicircle using **REPEAT** command:

**REPEAT 180 [FD 1 RT 1]**



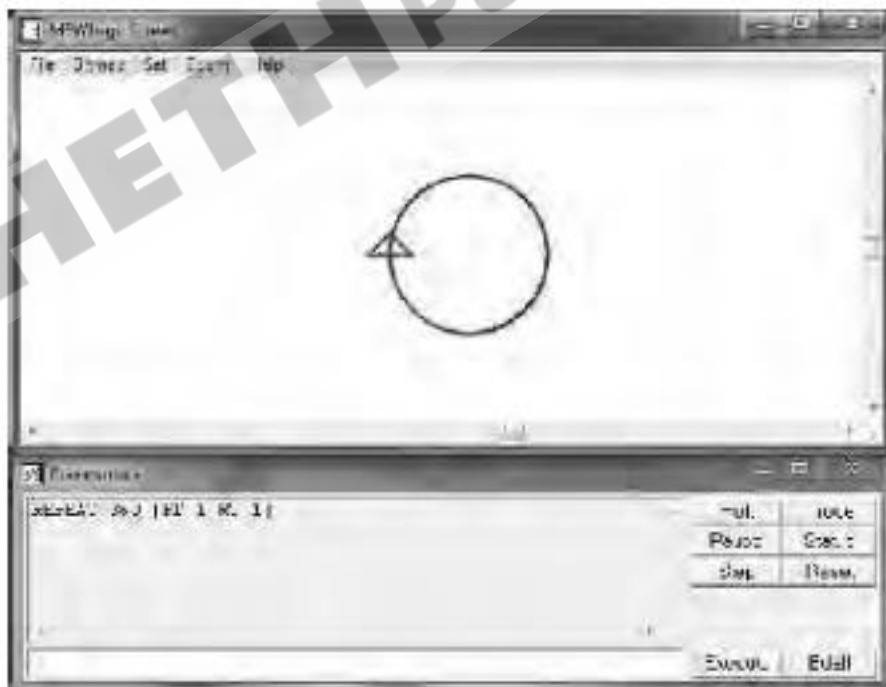
## 6. Circle:

Total angle of a Circle =  $360^\circ$

To draw a Circle, the Turtle makes a single turn.

To draw a Circle using **REPEAT** command:

**REPEAT 360 [FD 1 RT 1]**



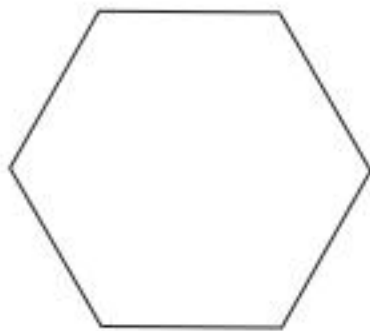
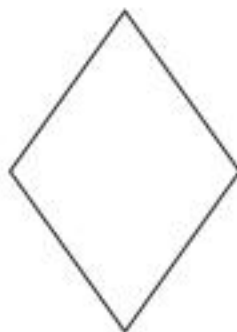
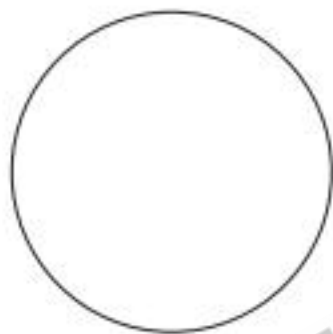
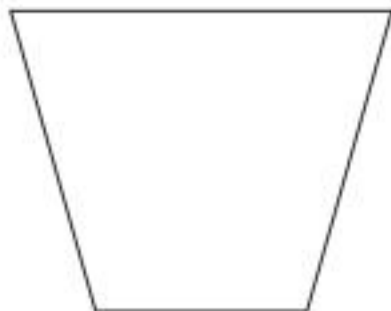
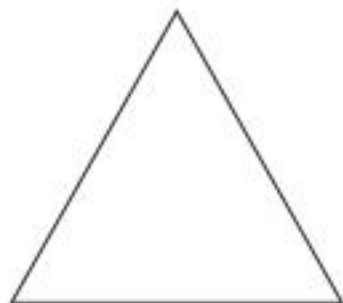
We may also draw the Circle using the following command:

**REPEAT 180 [FD 2 RT 2]**



## Activity

Draw the following shapes using LOGO commands:





**1. Create a document on the topic "Festivals" using Microsoft Word and perform the following operations.**

- a. Make use of bulleted and numbered lists.
- b. Make use of table properties to give information about the various festivals celebrated in India.
- c. Make use of Auto Format feature.
- d. Apply borders and shading to the table.
- e. Move the tables to the center of the screen.
- f. Center align the text and make the column headings bold.
- g. Resize the table.
- h. Add Clip Art related to the festivals.
- i. Add an image from the file and use edit option.
- j. Insert Auto Shapes in your document.
- k. Insert Word Art to give an artistic look to your document.

**2. Create a Spreadsheet of marks scored by the students in your class in the annual exam and perform the following operations.**

- a. Find the total of few students.
- b. Find the total of remaining students using AutoSum feature.
- c. Find the average of all the subjects in the average column.
- d. Observe and record the number of students in the class.
- e. Find the maximum marks scored by the student.
- f. Find the minimum marks scored by the student.
- g. Apply the conditional formatting for the above table using the following criteria:
  - i) The names of students who have scored less than 25 in maths should be highlighted in Red.



- ii) The names of students who have scored above 75 in Science should be highlighted in Purple.
  - iii) The names of students who have scored a total of 250 should be highlighted in Pink.
  - iv) The names of students with an average of more than 75 % should be in Bold and Yellow.
  - h. Display the "Result" as "Pass" if the student has scored marks  $\geq 30$  in each subject otherwise as "Fail". Display the class score according to the conditions given below:
    - i. If average  $\geq 35$  and average  $< 50$  then "Third class".
    - ii. If average  $\geq 55$  and average  $< 65$  then "Second class".
    - iii. If average  $\geq 65$  and average  $< 85$  then "First class".
    - iv. If average  $\geq 85$  then "Distinction" Otherwise display "Null".
3. Create a presentation on the topic "Solar System" and perform the following operations.
- a. Insert a minimum of 4-5 slides in the presentation.
  - b. Change the layout of the slide and observe the difference.
  - c. Apply a design template for the slides.
  - d. Apply a shaded background.
  - e. Make use of all the formatting tools.
  - f. Insert ClipArt that are relevant to the topic.
  - g. Insert AutoShapes.
  - h. Create decorative text using WordArt.
  - i. Give different font color to the contents.

# Certificate of Merit



*This is to certify that*

*Master/Miss \_\_\_\_\_*

*of Std. \_\_\_\_\_ Div. \_\_\_\_\_ Roll No.: \_\_\_\_\_ has successfully  
completed the course on Computer Education  
for the Academic Year \_\_\_\_\_.*

*Taking into consideration the theory and practical work,*

*He/she has been awarded \_\_\_\_\_ grade.*

*Teacher's Signature*

*Principal's Signature*

**Date:** \_\_\_\_\_

**School Stamp**