Module-1

What is a Computer?

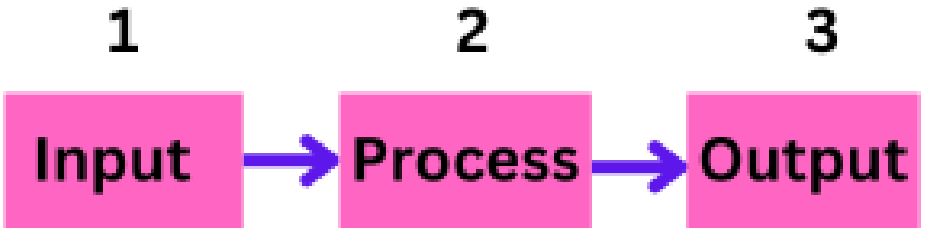
A computer is a programmable electronic device that takes data, perform instructed arithmetic and logical operations, and gives the output."

The full form of Computer is "Common Operating Machine Purposely Used for Technological and Educational Research".

- Computer is a machine that follows the instructions given by the user and provides output by processing these instructions.
- In other words, Computer is an electronic device that takes the instruction or command given by the user as input and processes this instruction and provides output."
- The main function of a computer is to calculate, store and process data.
- Origin of the word computer **compute** derived from the word meaning **to compute'**.
- invention of computer **Charles Babbage**' was did. So Charles Babbage' **father of computer'** is also called.

Data Processing-

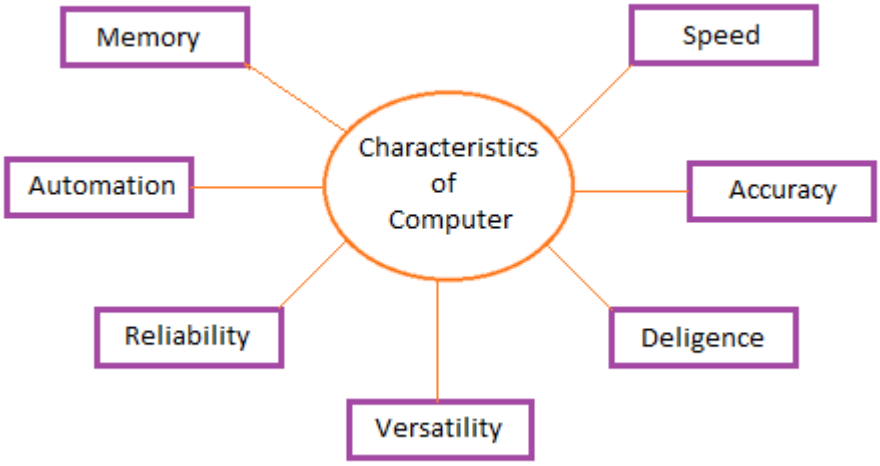
There are three steps in the functioning of a computer:-



1. **Input** - Input is the process in which instructions or commands are given to the computer by the user.
2. **Process** – In this step, the computer processes the instructions.
3. **Output (Output)** – In this step, the computer provides output to the user.
4.

Features of Computer or/ Characteristics of Computer System

The characteristics of the computer system are as follows −



Speed

A computer works with much higher speed and accuracy compared to humans while performing mathematical calculations.

The working speed of computer is very fast. Computers do tasks much faster than humans. It can complete more than one lakh tasks in a second. It takes 1 to 2 minutes for a human to do multiplication and division whereas a computer can complete multiplication and division in less than 1 second.

Accuracy

Computers perform calculations with 100% accuracy. Errors may occur due to data inconsistency or inaccuracy.

The computer completes any work without making any mistake. Man makes a lot of mistake while doing a work whereas the computer completes its work without making any mistake.

Diligence

A computer can perform millions of tasks or calculations with the same consistency and accuracy.

Computer can work for years without getting tired. Computer is very hard working. A person gets tired after working for a short time while a computer does not get tired.

Versatility

Versatility refers to the capability of a computer to perform different kinds of works with same accuracy and efficiency.

Reliable

Computer is very reliable. No matter how many times we give input to the computer, the computer will always give us the correct output. For this reason, we trust computers more than humans.

A computer is reliable as it gives consistent result for similar set of data i.e., if we give same set of input any number of times, we will get the same result.

Automation

Computer is an automatic machine. It completes its tasks by itself. Once it starts its work, it completes it without any human help.

Memory (Memory)

Computer memory is very powerful. We cannot remember all the things but computer remembers all the things without forgetting. There are two types of computer memory – the first is ' **primary memory'** and the second is ' **secondary memory'**

A computer has built-in memory called primary memory where it stores data. Secondary storage are removable devices such as CDs, pen drives, etc., which are also used to store data..

Types of Computer

1- Micro Computer (Micro Computer)

A microcomputer is a computer that can be used by only one person at a time. The size of this computer is very small.
It is much smaller than mini and mainframe computers. Apart from being light, it is also very cheap.
Microcomputer is multitasking, which means that the user can do many things at the same time in this computer, such as running the Internet, working in the word and listening to songs, etc. **Some popular examples are** laptops, smart phones, tablets, etc.

2- Mini Computer (Mini Computer)

Mini is a special type of computer whose size is neither too small nor too big. This computer is bigger than a microcomputer but smaller than a mainframe computer.
It is a multi -user computer. This means that one or more users can use this computer at a time. Apart from this, it is also a multi-tasking computer, that is, more than one task can be done in this computer at a time.
Examples of mini computers : - IBM AS/400, and Honeywell 200 etc.

3- Mainframe Computer (Mainframe Computer)

Mainframe computers are very large in size and are used to store large amounts of data. Mainframe computers have more working capacity. Its size is bigger than mini and micro computers.
It is a multi-user computer, so it can be used by more than one user at a time. This computer was invented in the 1950s by IBM (International Business Model).
This computer is used to store large amounts of data in large companies and government offices. Although these computers are also very expensive. **Examples of this:** – IBM zSeries, System z9 etc.

4- Analog Computer (Analog Computer)

An analog computer is a computer that is used to process analog data. It is useful for measuring physical quantities. It is used to measure electric current, intensity and resistance.
We also use this computer in our daily life. **For example** – refrigerator, speedometer etc.

5- Digital Computer (Digital Computer)

A computer that processes digital data is called a digital computer. It is a computer that uses binary numbers (0, 1) to do any work.
This computer is used to store large amount of data. The working speed of this computer is high and its performance is also very good.
In modern times, digital computers are used for many tasks such as: - to perform calculations, to store data, to transfer data, etc. **Some popular examples of this** – Calculator, Apple Mac, IBM PC etc.

6- Hybrid Computer (Hybrid Computer)

A computer that combines features of both digital and analog computers. It is called hybrid computer.

Hybrid computers are made by mixing digital and analog computers together. This computer is mostly used to solve complex calculations.
Hybrid computers are also used in petrol pumps, airplanes, hospitals and scientific works. **Examples of hybrid computer –** speedometer, thermometer, auto gasoline pump etc.

7- Super Computer (Super Computer)

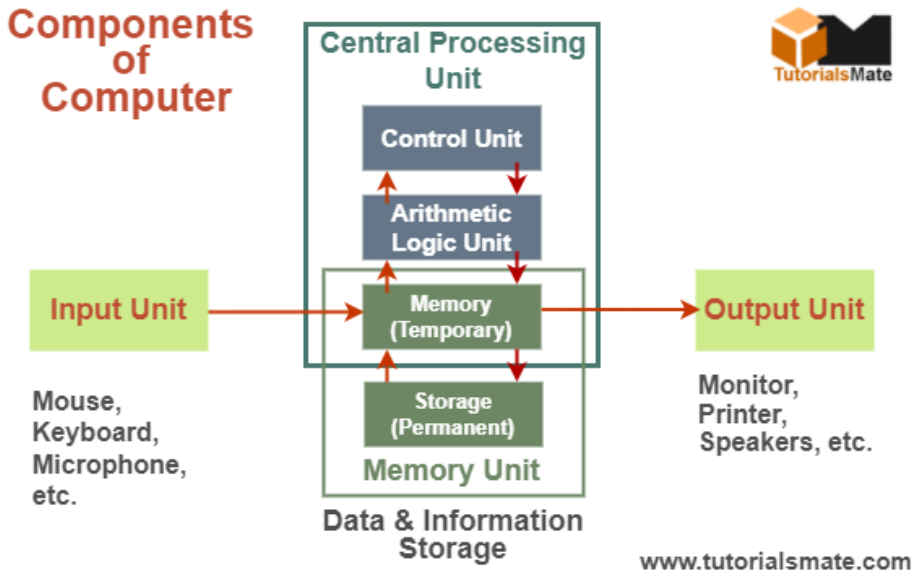
A supercomputer is a computer whose size is very large and it is considered the largest computer in the world. These computers are very fast, which complete their tasks in a very short time. Supercomputers are used to process large amounts of data. This computer is considered to be the most powerful computer in the world because the performance of the processor of this computer is very good.
Thousands of processors are interconnected in a super computer, due to which it can do any task at a fast speed.

Components of Computer

A computer is an electronic device that accepts data, performs operations, displays results, and stores the data or results as needed. It is a combination of **hardware and software** resources that integrate together and provides various functionalities to the user. Hardware is the physical components of a computer like a processor, memory devices, monitor, keyboard, etc., while software is a set of programs or instructions that are required by the hardware resources to function properly**. Computer components are those parts of the computer with the help of which the computer does all its work.**

There are mainly 5 components of a computer, which are given below: -

1. Input Unit (Input Unit)
2. Output Unit
3. Memory Unit (Memory Unit)
4. Control Unit (Control Unit)
5. ALU (ALU)



1- Input Unit (Input Unit)

- Input unit is the unit which is used by the user to give data and instructions to the computer.
- Input units include input devices through which the user gives commands or inputs to the computer and receives outputs in return.
- With the help of input devices, the user directly interacts with the computer and controls the computer. Some popular examples of input devices are keyboard, mouse, joystick, scanner etc.
- Without an input unit, the user cannot receive output from the computer. Input Unit acts as a medium between the user and the computer.

2- Output Unit (Output Unit)

- Output unit is the unit which displays the input given by the user.
- Output units include output devices using which the user receives output data from the computer.
- The function of an output device is to display the output data in front of the user. Output devices receive data from the computer and convert that data into the formats of text, video and audio.
- Some popular examples of output devices are monitors, printers, speakers, projectors, and plotters .

3- Control Unit (Control Unit)

- The control unit controls all the devices connected to the computer and their functions so that all the functions of the computer can be done correctly.
- The control unit helps to execute and control all the processes of the computer.
- The control unit is an important part of the CPU which receives the instructions from the main memory and decodes them and then executes all these instructions.
- The control unit is called CU in short form.
- There are two types of control unit – first Hardwire CU and second Micro-programmable CU.

4- Memory Unit (Memory Unit)

- Memory units are used to store data and instructions in a computer. It helps to store the data of the computer.
- The memory unit provides data to other units as per their requirements. The memory unit is also known as primary storage, main memory, or internal storage.
- There are two types of memory in a computer, the first primary memory (primary memory) and the second secondary memory (secondary memory).

Primary Memory (Primary Memory)

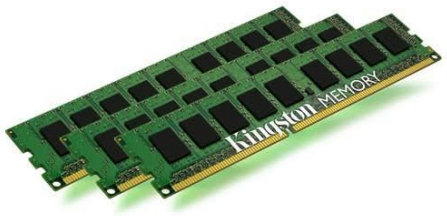
Primary memory is the memory that the CPU can access directly. Primary memory is also called internal memory because it is present inside the CPU.
Primary memory is the main memory of the computer which is used to store the data and instructions processed by the CPU.

The storage capacity of primary memory is very less due to which it can store very small amount of data.
There are four types of primary memory-

1. RAM9
2. ROM
3. Flash memory
4. Cache memory

1- RAM

The full name of RAM is Random Access Memory. It is a type of main memory that does not store permanent data.
The data in RAM is stored only till the computer is ON, the data present in it gets automatically deleted when the computer is OFF. That's why it is also called Volatile memory.
RAM is made using semiconductor (semiconductor) and flip-flops.
In other words, "RAM is a type of computer memory that is used to store temporary data. Temporary data is that which is going to be used immediately or say the data which cannot be used in future.
By using this memory, the computer is able to access the data at a faster speed, due to which the CPU performs its tasks even faster.
RAM is also known as system memory, read write memory and main memory. This memory requires power to access the data. If the computer is turned off and the power goes out, all the data on it is lost.



2- ROM (ROM)

The full name of ROM is Read only memory. It is a non volatile memory which means that it stores data forever.
It is called read only memory because in this we can only read the data, we cannot write the data in it.
This memory is used to store data in computers and other devices. In this, even if the power goes out and the computer system is turned off, the data is not deleted.

Secondary Memory (Secondary Memory)

Secondary memory is the memory that the CPU cannot access directly. The storage capacity of secondary memory is more due to which it can store more amount of data. It stores videos, images, audios, and files etc.
Secondary memory is also called external (external) memory because it is added separately to the computer.
Following are the types of secondary memory:-

1. hard disk
2. magnetic disk
3. memory card

4. pen drive
5. floppy disk
6. DVD
7. CD
8. flash drive

5- ALU

- The full name of ALU is Arithmetic Logic Unit . It is used to perform arithmetic and logical operations.
- Arithmetic operations include multiplication (×), division ((÷), addition (+), subtraction (-) and logic operations include selection of data, comparison of two numbers, etc.
- ALU is capable of solving the most difficult calculations. A CPU can have more than one ALU.
- ALU is also called the mathematical brain of the computer because it can easily perform mathematical calculations.

Cache Memory - What is cache memory?

- Cache memory is a fast working memory that is used to increase the speed and performance of CPU.
- In other words, "Cache memory is a memory whose size (size) is very small and it is placed between CPU and RAM."
- Cache memory is a volatile memory, that is, it does not store data forever, as soon as the computer is turned off, the data in it gets automatically deleted.
- Only those data or files are stored in the cache memory which are used regularly by the CPU. Whenever the CPU needs any data, the CPU first finds that data in the cache memory.
- Cache memory is easier to access than primary memory. This memory cannot be accessed by other devices. It can only be accessed by the CPU.
- Cache memory is made of semiconductor (semiconductor) material, it is also a hardware device like primary and secondary memory.
- Like RAM, cache memory is also temporary memory, in which data is stored only at the time of processing. The data contained in it is destroyed after the processing is over. That's why it is called **Volatile memory .**
- Cache Memory is the fastest memory of the computer. In this, data can be accessed at the fastest speed.

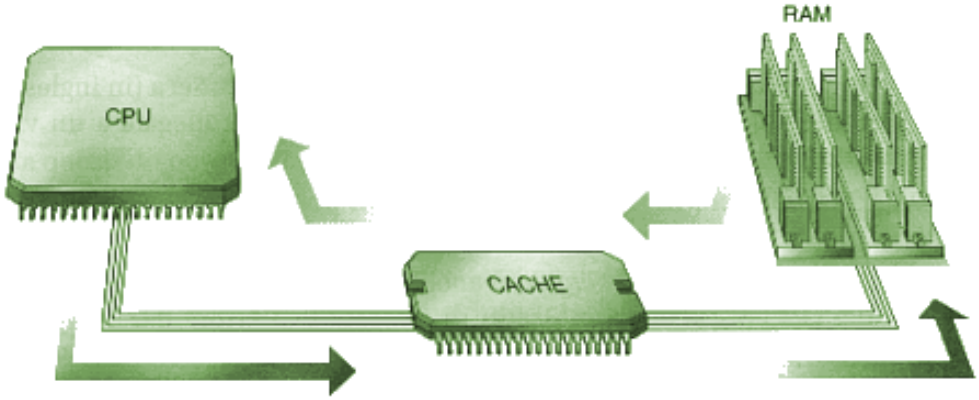


image of cache memory

Memory Hierarchy

The Computer memory hierarchy looks like a pyramid structure which is used to describe the differences among memory types. It separates the computer storage based on hierarchy.

In computer, memory is organized through Memory Hierarchy so that access time can be reduced.
In a system, memory organization is done by memory hierarchy. This gives fast memory to computer programs.
Memory hierarchy design is divided into two types:-
1: - External Memory or Secondary Memory - Secondary Memory can be accessed by the processor through Input/Output module. Magnetic Disk, Optical Disk, Magnetic Tape etc come in secondary memory.
2: - Internal Memory or Primary Memory - It is accessed directly by the processor. Main memory, cache memory and CPU registers come in this memory.

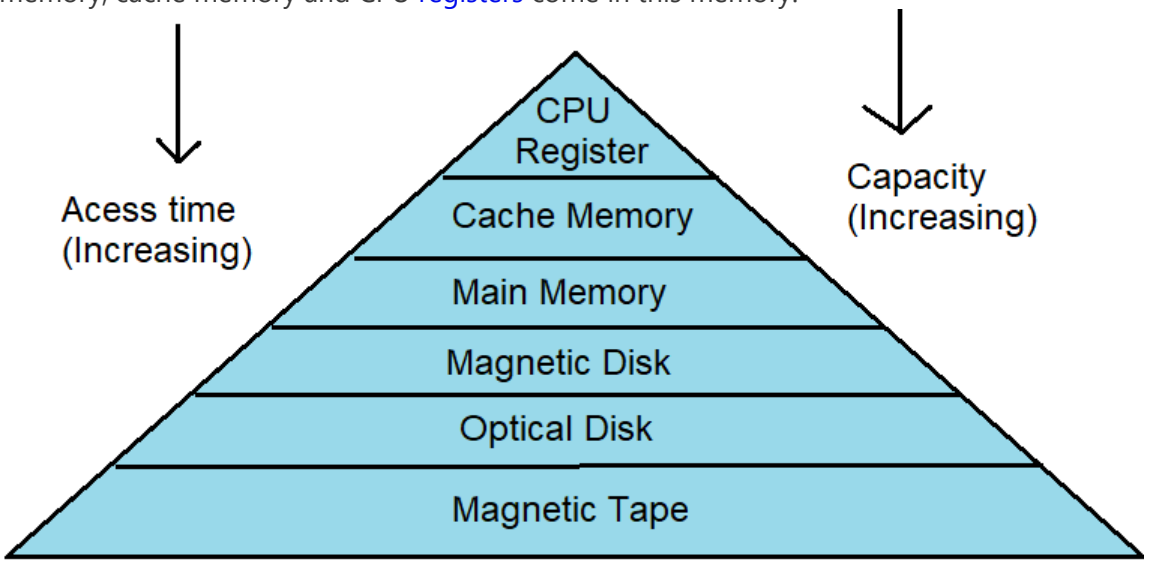


Fig:- Memory Hierarchy

What is buffering & spooling

A buffer is a temporary area where data is stored for some time before being transferred to the main memory.
Buffering is a very important service provided by the I/O subsystem of the kernel.
Buffering is done for three reasons:-

* To control the speed of data transfer between the sender and the receiver.
* To adjust data transfer between devices of different sizes.
* To support copy semantics for application I/O.

Copy semantics ensures that when data is transferred between the buffer and main memory, there will be no change in the data or contents of the buffer.

spooling (spooling):-

spool is a buffer or we can say that it is a temporary storage area which stores the data of i/o jobs. This storage area is accessible to I/O devices (eg: - Printer).
The full name of SPOOL is simultaneous peripheral operation line.
Spooling is a process in which data is sent to a temporary storage area called spool. Where it remains stored for some time.

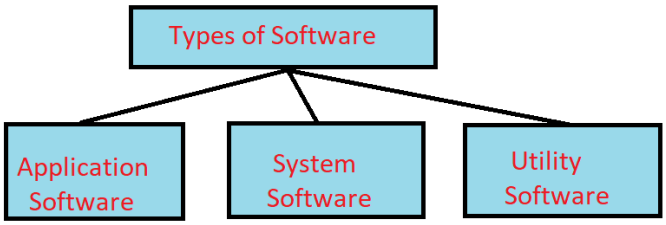
Software - What is software?

Computer Software is a sort of program that allows clients to work on different assignments or use them to work on their System. It tells the working and responsibilities of the System.

- Software is a set of instructions and programs that are used to run the computer and perform tasks in the computer.
- In other words, "Software is an important part of the computer with the help of which the user works on the computer."
- We can touch hardware with hands and see with eyes but we can neither touch nor see software. That is, hardware is the body of the computer and software is the soul of the computer.
- Without software, the computer cannot do any work. Software gives instructions to the computer, it tells the computer what task to do, when and how.
- Many programming languages are used to create software such as – Java, C language, .Net, JavaScript, Android and Python etc.

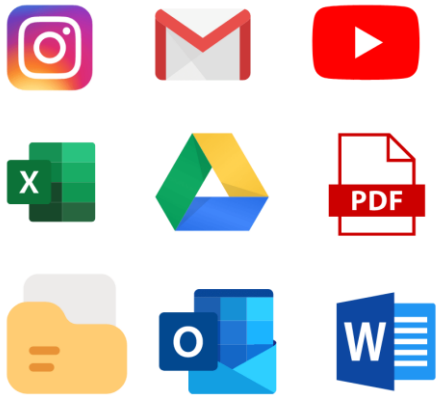
Software

Types of Software



1- Application Software

- Application software is software that is developed to perform specific tasks for the user.
- In other words, "Application software is a program designed for the end user. Through this program the end user can complete specific tasks.
- Application software is created for a specific purpose. For example – it is made for listening to songs, watching videos, playing games, and sending emails etc.
- Using application software, one can do online research, graphic designing, calculations and playing games. Also can set alarm, login account and write notes. There are many other functions that can be performed through application software.
- All the apps we see in our mobile phones and computers are examples of application software.
- We can easily install and uninstall Application Software in our computer or mobile phone.



- **application software**

- **Examples of Application Software**
- ● Photoshop
  ● Pagemaker
  ● Browser
  ● Whatsapp
  ● Telegram
  ● Power Point
  ● MS Word
  ● SS Excel

2- System Software (System Software)

System Software is the type of software that is the interface between application software and the system.

System software is software that controls and manages a computer.
System software is the main software of the computer. With its help the computer starts. Without it the computer cannot even start.
In other words, "System software is a type of computer program that acts as an interface between the computer and the user."

System software is called such a program whose job is to run the computer and make it workable.
System software is developed to run the hardware and application programs of the computer.
System software runs in the background of the computer and itself manages all the functions of the computer.
It is also known as low level software because this software is developed through low level language.
System software provides a platform to other software with the help of which other software can do their work easily.
Examples of System Software are – Operating System, Firmware, Antivirus Software, Disk Formatting Software and Computer Language Translator etc.

3- Utility Software (Utility Software)

Utility software is a type of computer software whose job is to organize (organize) computer hardware, operating system and application software.
In other words, "Utility software is software that is used to analyze, configure, monitor and manage a computer."
Utility software maintains the functioning of the computer.
Utility software performs a variety of tasks such as detecting viruses in the computer, backing up data, deleting bad files, and managing disks, etc.
Utility software includes components that tell the operating system how to act in certain situations.
Some popular examples of utility software are antivirus, file management systems, disk management tools, and disk cleanup tools, etc.

utility software

Input Device – What is Input Device?

An input device is a hardware device that is used by the user to give commands to the computer. With the help of this device, the user gives commands to the computer and receives output data from the computer.

In the input device, the user interacts directly with the computer and controls the computer. Keyboard and mouse are two such input devices which are used in large quantities.

Some examples of input devices – keyboard, mouse, scanner, microphone etc. Is.

Types of Input Device

There are many types of it which are given below-

1. Keyboard
2. Mouse
3. Scanner
4. Joystick
5. Light Pen
6. Digitizer
7. Microphone
8. MICR
9. OCR
10. Digital camera
11. Paddle
12. Steering wheel
13. Touchpad
14. Touchscreen
15. Remote
16. Webcam

1- Keyboard (What is keyboard?

It is a basic input device in which the user gives commands to the computer with the help of keys.

In this device, keys like letters, numbers, characters, and functions are present, by pressing which the user gives commands to the computer.

These devices connect to the computer via USB and Bluetooth.

2- Mouse (What is mouse?)

It is also an input device which is used to move the cursor or pointer on the screen. This device is used on a flat surface.

The mouse has buttons on the left and right sides and a scroll wheel in between. The mouse was invented in the year 1963 by Douglas C. Engelbart.

These devices can be connected to the computer with the help of wire and wireless technology. Although the mouse is not used in the laptop because it already has a touchpad which works like a mouse.

If a user wants to connect the mouse to the laptop, then he can easily connect the mouse.

3- Scanner (What is scanner?)

This input device scans images and documents and converts them into digital format. After this, the image and documents are displayed on the computer screen, which we can also call output data.

The scanner uses optical character recognition technology to convert image and text files into digital formats.

4- Joystick (What is Joystick?)

A joystick is a pointing device that is used to rotate the cursor around the screen. This device is like a mouse.

There is a kind of stick in the joystick, with the help of which the cursor can be moved in any direction.

Using this stick, the user controls the cursor. The joystick was built by CB Mirick (US Naval Research Laboratory).

It can be of different types like – (displacement joysticks, finger-operated joysticks, hand operated, and isometric joystick).

5- Light Pen (What is Light Pen?)

It is an input device whose structure is like a pen. There is a type of detector in this device, with the help of which the user can choose any object, file and program on the screen.
This device cannot be used with LCD screen. By using this pen the user can draw anything on the screen. The light pen was created in the year 1995 by MIT (Massachusetts Institute of Technology).

Output device

- An output device is a device whose job is to give output.
- An output device is a device that is used to display the result of a computer .
- It is the function of the output device to display the input given by the input device in the computer.
- In other words, "Output device is a hardware that receives data and transforms that data into another form."
- An output device is the inverse of an input device. Data is sent to the computer through the input device while the output device receives the data from the computer.

- Output device is a device that receives data from the computer and converts that data into the form of text, video and audio.

- Some good examples of output devices are monitors, projectors, headphones, speakers, and printers.

Types of Output Device

There are many types of it which are given below-

1. Monitor
2. Printer
3. Plotter
4. Projector
5. Speaker
6. Headphone
7. Sound Card (Sound Card)
8. Video Card (Video Card)
9. GPS
10. Speech Synthesizer (Speech Synthesizer)

Monitor (What is Monitor?)

- Monitor is a major output device of the computer. It is also sometimes called the visual display unit (VDU).

- The monitor displays video, audio, images and text on the computer.

- It is similar to a TV but its resolution is higher than television (TV).

- The first computer monitor was developed on March 1, 1963.

- When the monitor displays any data on its screen, then that data is known as pixel.

picture of monitor

Printer (What is printer?)

- Printer is an output device by which we can print the text and image present in the computer on the paper.

- It is an electronic device which works to convert soft copy of computer into hard copy.

Projector (What is Projector?)

- Projector is a kind of output device which helps to display video or picture in big screen or wall.
- In simple words, "Projector is an optical device by which we can show video or image in very large size."
- It is used in college to teach a lot of students. So that all the students can watch the video.

picture of projector

Speaker (What is speaker?)

- Speaker is an output device that produces sound.
- A sound card is required to run the speaker.

- Bluetooth, USB and wifi are used to connect the speaker with the computer.
- Speakers are very light devices which are available in different sizes.

picture of speaker

Headphone (What is headphone?)

- Headphone is an output device used for listening to voice or songs. It is also sometimes called earphone.
- It can be used by only one person at a time. There are two small speakers attached to it.
- The size of the headphone is very small. Apart from this, the weight of the headphones is very light. You can take the headphone to any place.

picture of headphones

Computer Language – What is computer language?

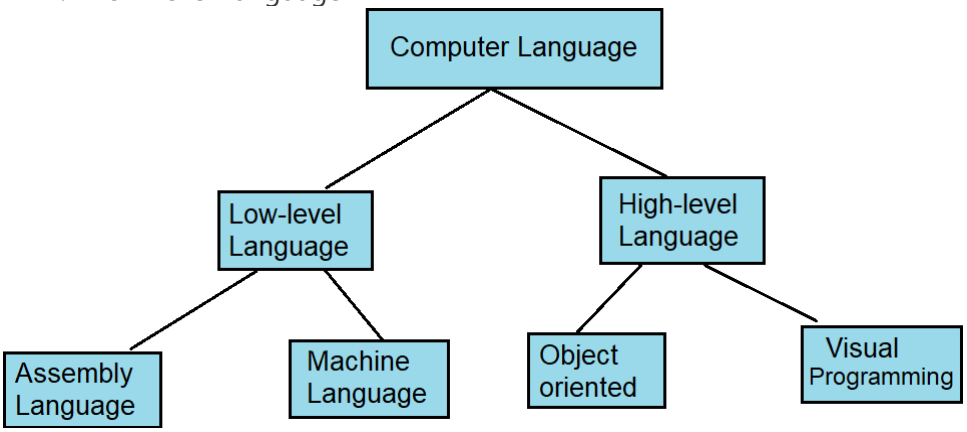
- Computer language is a language through which computers are communicated with.
- The way we humans use some or the other language to communicate with each other. In the same way, computers also use language to communicate. **Which we call computer language.**
- Computer language is a set of instructions (instructions) by which a particular task is accomplished.
- In other words, "Computer language is a code by which programs are written."

- Computer languages are used to create desktop applications, mobile applications and websites. For example, an app is created using Java , C++.
- Computer language is also called programming language and it is used by programmers to create computer programs.
- Some computer languages are not understood by humans, only computers can understand them.

Types of computer language – Types of computer language

Computer languages are mainly of two types which are as follows.

1. High Level Language
2. Low Level Language



High Level Language – What is High Level Language ?

- High Level Language is such a language, with the help of which computer programs can be easily understood and written.
- High level language is like English, so humans can easily understand this language.
- High level languages are used to create user-friendly software and websites.
- It is a language whose syntax is already determined.
- High level language requires compiler and interpreter so that the program can be converted into machine language.
- Examples of high-level languages are Python, Java, JavaScript , PHP, C#, C++, Cobol, Perl, Pascal, and FORTRAN etc.

Low Level Language - What is low level language?

- Low Level Language is such a language that we humans cannot understand, it can be understood only by computer.
- Computer can understand this language very easily. This language is exactly the opposite of high level language.

- This language is machine dependent, which means that this language runs on only a few computers.
- Compiler and interpreter are not required to run the program in this language.
- The program of this language executes very fast. Apart from this, the output also gives very quickly.
- This language is much more difficult than the high level language. Of course it is difficult to learn.

Types of Low level language – Types of low level language

1. Machine Language
2. Assembly Language

Machine Language ?

Machine language is the language in which only binary (0 and 1) digits are used.
In other words, "The language which the computer understands without any technology. We call it machine language.
The computer can only understand Binary (0 and 1). Binary digit is used by computer for every work. Which programs are from 0 to 1 digit. We call them machine language programs.

Assembly Language ?

Assembly language is a low-level programming language. To convert it into machine language, a software is required which is called assembler.
Assembly language is used in microprocessor based devices, and in real time systems.

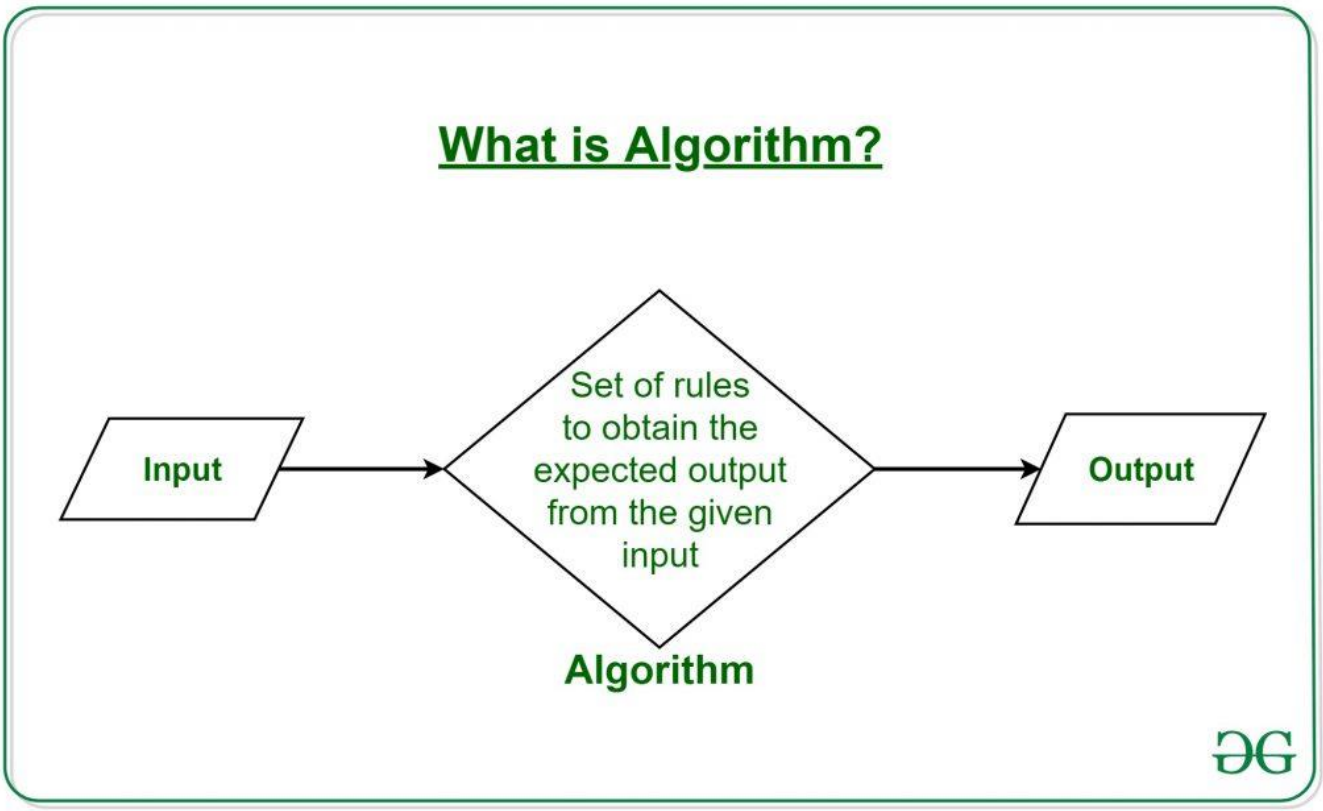
In this language, instead of 0 and 1 digit, alphanumeric is used. Such as- A-Z, 0-9.
Programs written in assembly language cannot be executed on any other computer. To write and understand this language, there should be knowledge of computer hardware.

What is an Algorithm?

*The word **Algorithm** means " A set of finite rules or instructions to be followed in calculations or other problem-solving operations " Or " A procedure for solving a mathematical problem in a finite number of steps that frequently involves recursive operations".*

Therefore Algorithm refers to a sequence of finite steps to solve a particular problem.

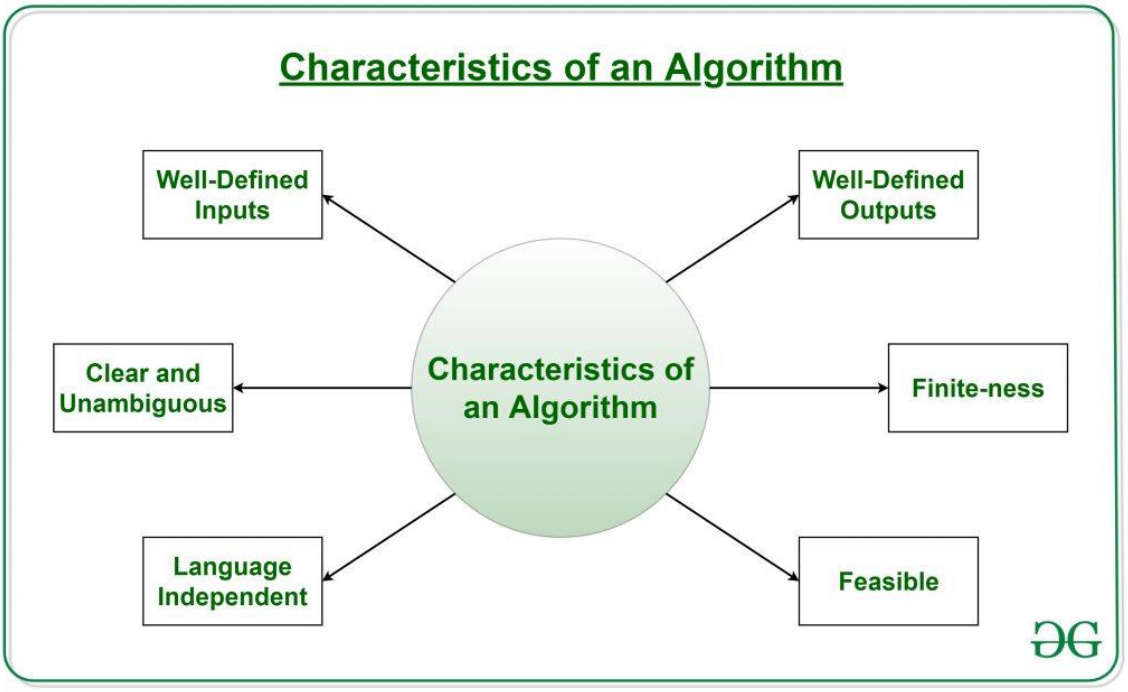
Algorithms can be simple and complex depending on what you want to achieve.



It can be understood by taking the example of cooking a new recipe. To cook a new recipe, one reads the instructions and steps and executes them one by one, in the given sequence. The result thus obtained is the new dish is cooked perfectly. Every time you use your phone, computer, laptop, or calculator you are using Algorithms. Similarly, algorithms help to do a task in programming to get the expected output.

The Algorithm designed are language-independent, i.e. they are just plain instructions that can be implemented in any language, and yet the output will be the same, as expected.

What are the Characteristics of an Algorithm?



As one would not follow any written instructions to cook the recipe, but only the standard one. Similarly, not all written instructions for programming is an algorithms. In order for some instructions to be an algorithm, it must have the following characteristics:

- **Clear and Unambiguous**: The algorithm should be clear and unambiguous. Each of its steps should be clear in all aspects and must lead to only one meaning.
- **Well-Defined Inputs**: If an algorithm says to take inputs, it should be well-defined inputs. It may or may not take input.
- **Well-Defined Outputs:** The algorithm must clearly define what output will be yielded and it should be well-defined as well. It should produce at least 1 output.
- **Finite-ness:** The algorithm must be finite, i.e. it should terminate after a finite time.
- **Feasible:** The algorithm must be simple, generic, and practical, such that it can be executed with the available resources. It must not contain some future technology or anything.
- **Language Independent:** The Algorithm designed must be language-independent, i.e. it must be just plain instructions that can be implemented in any language, and yet the output will be the same, as expected.

Properties of Algorithm:

- It should terminate after a finite time.
- It should produce at least one output.
- It should take zero or more input.

- It should be deterministic means giving the same output for the same input case.
- Every step in the algorithm must be effective i.e. every step should do some work.

Types of Algorithm

Its types are as follows:-

1- Search

This algorithm is used to find an item.

2- Sort

This algorithm is used to sort the items in a particular order.

3- Delete

This algorithm is used to delete items.

4- Insert

This algorithm is used to insert items.

5- Update

This algorithm is used to update the already existing items.

Example of Algorithm

Below you are given an example **of the algorithm to add two numbers : -**

Algorithm to add two numbers in C:

1) Start.
2) Accept Number one.
3) Accept Number two.
4) Add both the numbers.
5) Print the result.
6) End

Flowchart – What is flowchart?

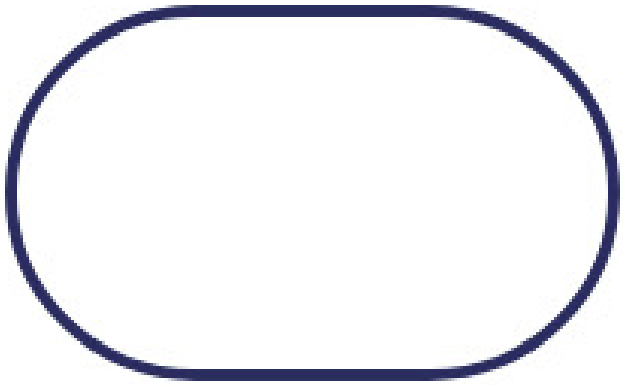
- Displaying an algorithm or program in the form of pictures is called Flowchart. That is, in the flowchart, the algorithm or program is displayed with the help of pictures.

- Flowcharts prove to be very useful in writing programs, through this we can understand difficult programs easily.
- Many symbols are used in the flowchart which show the flow of the program.
- It helps the user to understand complex processes. It helps to understand and solve a problem step by step.
- Flowcharts are used in programming to perform many tasks such as – in creating programs, debugging programs, and solving difficult programs.

Flowchart Symbols – Symbols of Flowchart

It has many symbols which are given below: -

Start/Stop Symbol - This symbol is used at the beginning and end of each algorithm. This is the first and last symbol of each flowchart. Its picture is oval. It is also known as terminal symbol.



start-stop symbol

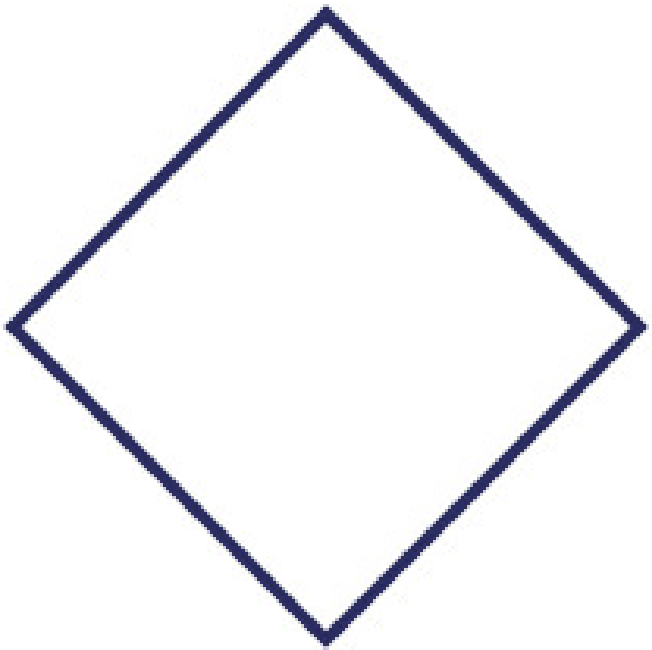
Input/Output Symbol – In this the input symbol is used to represent the input and the output symbol is used to represent the output. Its picture is a parallelogram (parallelogram).

input output symbol

Processing Symbol – It is used to represent mathematical operations such as – multiplying, dividing, adding, subtracting etc. Its picture is a rectangle.

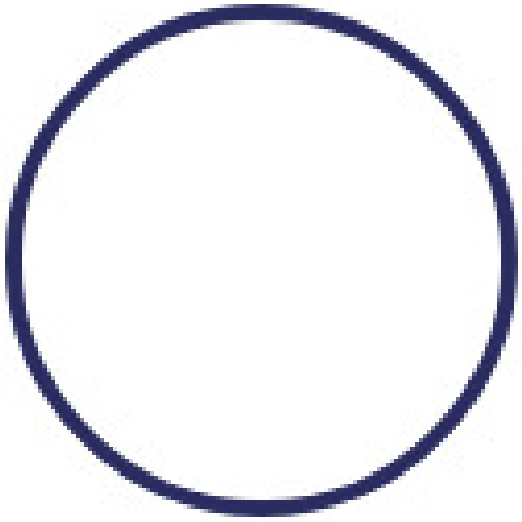
processing symbol

Decision Symbol – It is used to take a decision. There are decisions like true / false or yes / no. Its picture is diamond (rhombus).



decision symbol

Connector Symbol – This symbol is used to connect two or more parts of the flowchart. Its picture is circle.

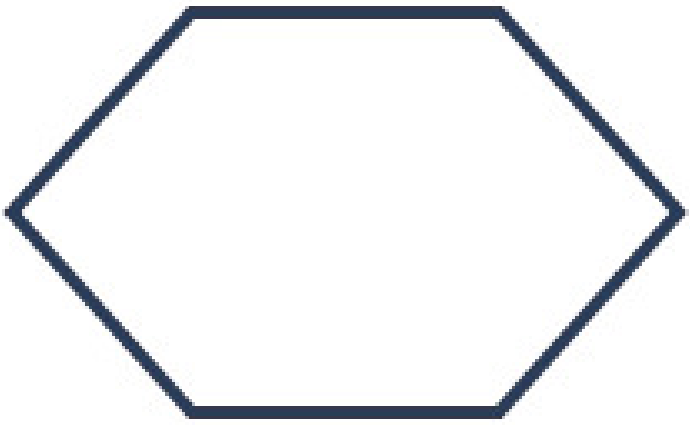


connector symbol

Flow Line Symbol - It is used to display the sequence of the flowchart. Its picture is arrow (arrow) and the direction of this arrow can be up, down, right, left.

flow line symbol

Hexagon Symbol – This symbol is also called preparation symbol. It is used to introduce for loop, while loop, or other loops. Its picture is a hexagon.



hexagon symbol

Document Symbol - It is used to display the document. Its picture is given below.

document symbol

Advantages of Flowchart

1- It helps to understand the logic of a program.
2- Through this we can easily design any program and software.
3- Flowchart helps in debugging.
4- Using this the program can be easily analyzed.
5- It helps the programmer to write the code of high-level language like- Java, C, C++ etc.
6- It helps in maintaining the documents.
7- Documents can be collected and stored using flowcharts.
8- It helps in testing of software .
9- With the help of flowchart, it is easy to maintain the program.

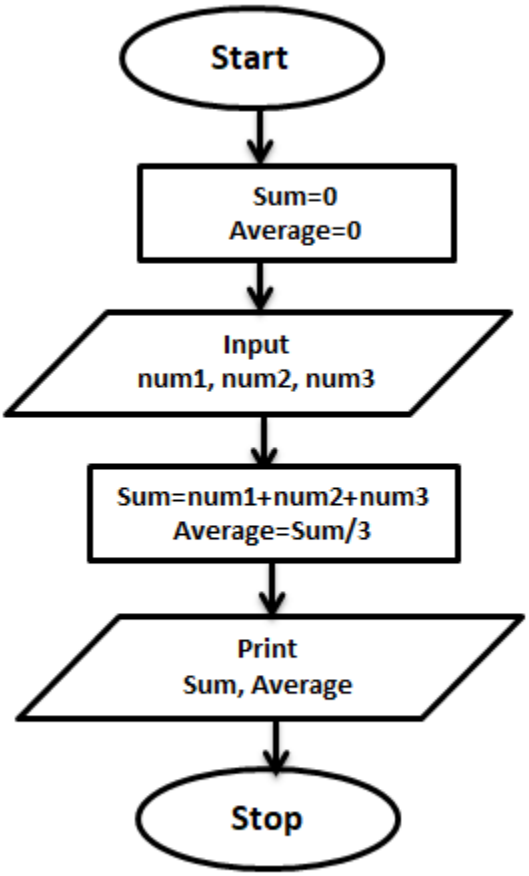
Rules for creating a flowchart

There are some rules for making flowchart which we should follow.

- There can be only one start and stop symbol in a flowchart.
- Only conventional symbols should be used in this.
- Name and variable should be used in flowchart.
- If the flowchart is large and difficult, then connector symbols should be used in it.

Example of flowchart –

The flowchart of sum and average of three numbers is given below:-



Flowchart to find sum and average of three numbers

Questions asked in the exam

What is flowchart?

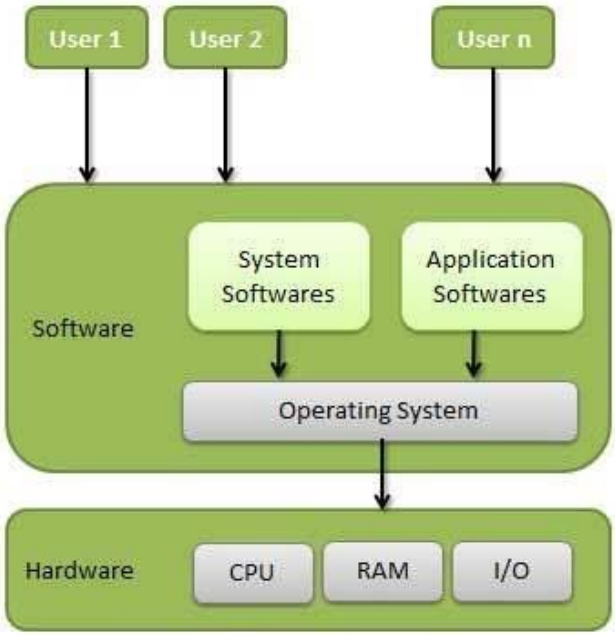
This is the graphical representation of the program. It is used to display the program through diagrams.

How many symbols are there in flowchart?

It has many symbols such as start/stop, rectangle etc.

What is Operating System (What is Operating System)

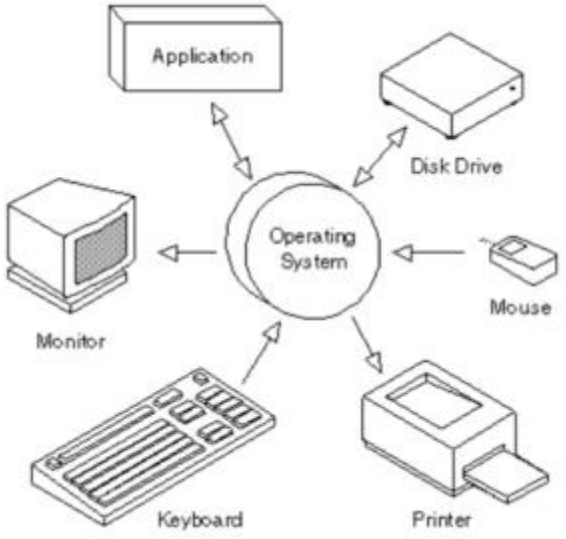
- Operating System (OS) is a software that acts as an interface between the computer and the user. This is called system software.
- An operating system is a set of instructions that is stored in a storage device. And it is a group of programs that manages the resources and operations of the computer.
- OS is the first program loaded into the computer. It is also called program of programs.
- OS manages all the operations of the computer.



- There are two types of operating system:-
  1:- character user interface (CUI)
  2:- Graphical user interface (GUI)

  character user interface (CUI) - CUI is not user-friendly and it is always necessary to run this OS. command has to be typed. **Eg: -** DOS is a CUI operating system.

  Graphical user interface (GUI) - The GUI operating system is user-friendly and to run this operating system, commands are not required to be given, but the program to be opened has to be clicked with the mouse. **For example,** Windows is a GUI operating system.
- The function of the OS is to run other programs and applications and it acts as a bridge between the hardware and software of the computer.
- A computer without an OS is useless.
- In multitask operating system many programs run at the same time. And the operating system determines which program will run when and for how long.



operating system diagram

Characteristics of Operating System

Its characteristics are as follows:-

- **Memory management: -** OS manages the memory, it keeps complete information about the primary memory and sees which part of the memory has been used by which program. Whenever a program requests it, it allocates memory.
- **Processor management (Processor Management): -** It allocates processor (CPU) to the program and also deallocates it when the need of cpu is over for a program.
- **Device management: -** OS keeps information about all devices, it is also called I/O controller. And the OS also decides which device should be given to which program, when it should be given and for how long.
- **File Management :-** It allocates and deallocates the resources and decides which program should be allocated.
- **Security :-** It protects any program or data from unauthorized access. Password and other techniques are used in this.
- **Reliability: -** It is very reliable because any virus and harmful codes can be detected in it.