Operating System

Software:

A set of programs is known as a software.

Software are of two types

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

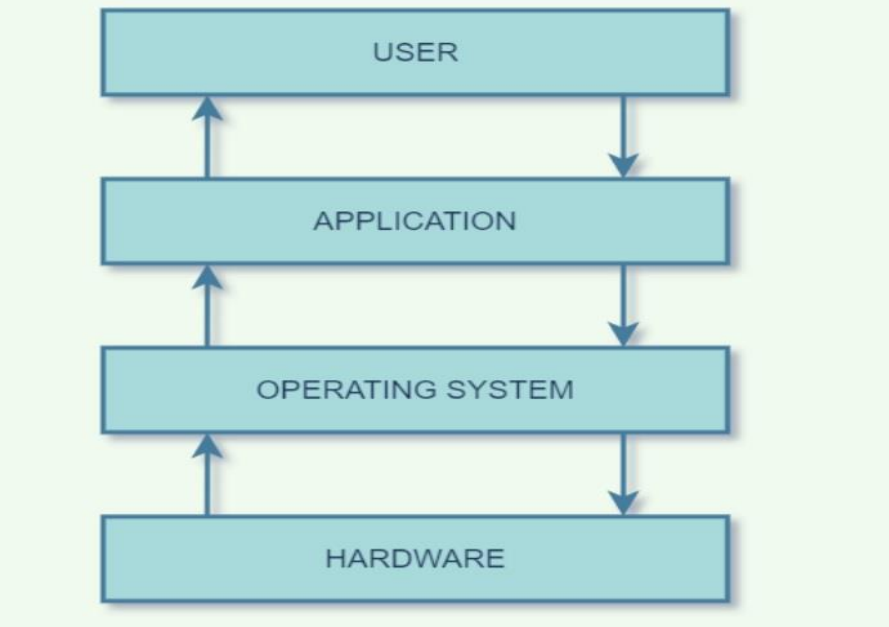
eg. Operating system etc.

Application Software: Application Software is the type of software that runs as per user request.

eg. MS-Office, Games etc.

Operating System Definition: It is a software that works as an interface between a user and the computer hardware. The primary objective of an *operating system* is to make computer system convenient to use and to utilize computer hardware in an efficient manner. it is a collection of system programs that controls the operations of the computer system.

- The operating system performs the basic tasks such as receiving input from the keyboard, processing instructions and sending output to the screen.



Functions of Operating System

- **Processor Management:** An operating system manages the processor's work by allocating various jobs to it and ensuring that each process receives enough time from the processor to function properly. **The operating system enables a user to execute more than one job at the same time to enhance productivity.**

- **Memory Management: An operating system manages the allocation and deallocation of the memory to various processes** and ensures that the other process does not consume the memory allocated to one process.
- **Device Management:** There are various input and output devices. **An OS controls the working of these input-output devices.** It receives the requests from these devices, performs a specific task, and communicates back to the requesting process.
- **File Management:** A**n operating system keeps track of information regarding the creation, deletion, transfer, copy, and storage of files in an organized way.** It also maintains the integrity of the data stored in these files, including the file directory structure, by protecting against unauthorized access.
- **Security:** The operating system provides various techniques which assure the integrity and confidentiality of user data. **It ensures that the data and files stored cannot be accessed by unauthorized user.** Following security measures are used to protect user data:
    - Protection against unauthorized access through login.
    - Protection against intrusion by keeping Firefall active.
    - Protecting the system memory against malicious access.
    - Displaying messages related to system vulnerabilities.
- **Error Detection:** From time to time, the operating system checks the system for any external threat or malicious software activity. It also checks the hardware for any type of damage. This process displays several alerts to the user so that the appropriate action can be taken against any damage caused to the system.
- **Job Scheduling:** In a multitasking OS where multiple programs run simultaneously, the operating system determines which applications should run in which order and how time should be allocated to each application.

Operating System Services

- An operating system provides services to programs and to the users of those programs. It provides an environment for the execution of programs. The services provided by one operating system is different than other operating system.
- Operating system makes the programming task easier. The common services provided by the operating system is listed below.
    - **Program execution**
    - **I/O operation**
    - **File system manipulation**
    - **Communications**
    - **Error detection.**
        - **Program execution:** Operating system loads a program into memory and executes the program. The program must be able to end its execution, either normally or abnormally.

- **I/O operation:** I/O means any file or any specific I/O device. Program may require any I/O device while running. So operating system must provide the required I/O.
- **File system manipulation:** Program needs to read a file or write a file. The operating system gives the permission to the program for operation on file.
- **Communication**: Data transfer between two processes is required for some lime. The both processes are on the one computer or on different computer but connected through computer network Communication may be implemented by two methods: shared memory and message passing.
- **Error detection:** Error may occur in CPU, in I/O device or in the memory hardware. The operating system constantly needs to be aware of possible errors. It should take the appropriate action to ensure correct and consistent computing.

Interfaces of Operating Sytem

Two types of interfaces

1. Graphical User Interface (GUI)
2. Command User Interface (CUI)

   GUI: It interacts with of visual environment to communicate with the computer. It uses windows, icons, menus and other graphical objects to issues commands. Eg. Windows, Android, Linux

   CUI: it provides an interface to communicate with the computer by typing commands. Eg. MS-DOS, UNIX

   LINUX: Linux is a very powerful, free, open source operating system based on Unix.

   UNIX: UNIX OS was first developed in 1960, and since then it has been under constant development. UNIX is a stable, multi-user, multi-tasking operating system for servers, desktops and laptop computers.

Different types of operating system

There are different types of operating system those are organized by their Working.

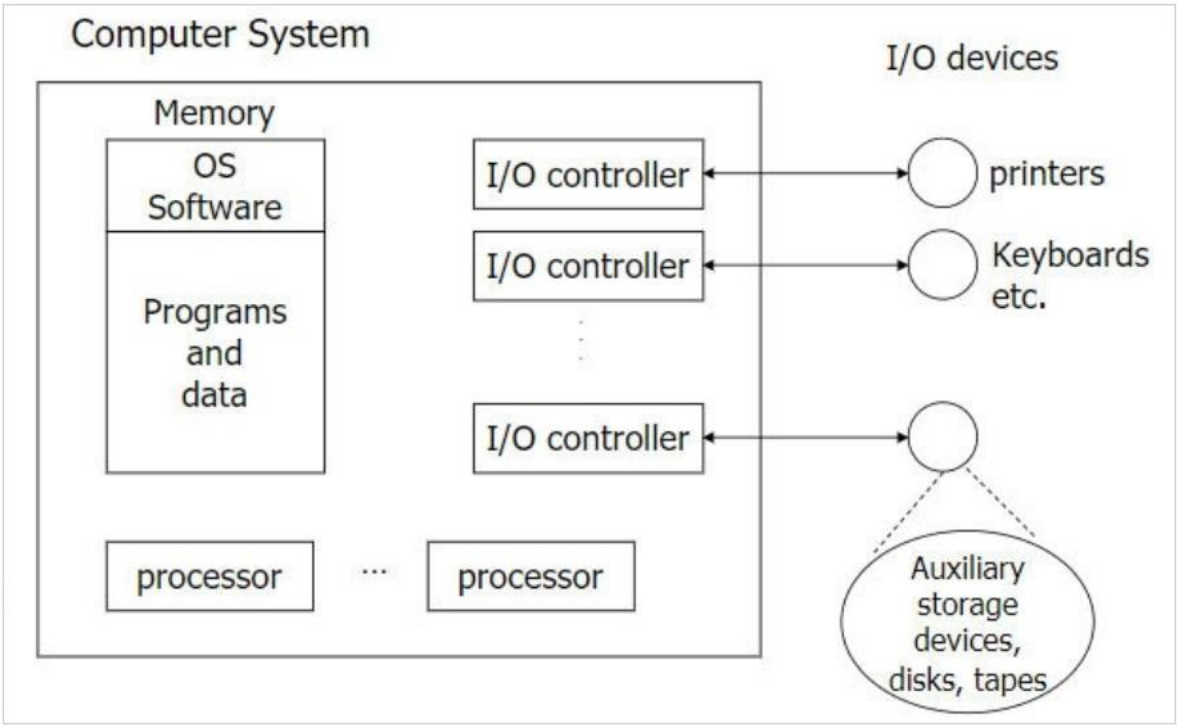
- **Serial Processing:** In Serial Processing operating system that use FIFO (First in First Out) technique for processing the process.
- **Batch Processing:** In batch processing a similar type of jobs prepared and processed.
- **Multi-Programming:** In Multi programming Operating System Multiple Programs are Executed on the System at a Time.
- **Real Time System:** Real Time System are used there Requires higher and Timely Response.

- **Distributed Operating System**: In this Operating system Data is Stored and Processed on Multiple Locations.
- **Multiprocessing**: In This type of operating system there are two or More CPU in a Single OS.
- **Parallel operating systems**: It manage parallely all running resources of the computer system.

Operating System acts as a resource manager

- All modern computers consist of processors, memories, timers, network interfaces, printers, and so many other devices.
- A computer has many resources (hardware and software), which may be required to complete a task. The commonly required resources are Input/Output devices, Memory file storage space, CPU time and so on.
- The operating system provides for an orderly and controlled allocation of the processors, memories, and I/O devices among the various programs in the bottom-up view.
- Operating system allows multiple programs to be in memory and run at the same time.
- The operating system acts as the manager of these resources and allocates them to specific programs and users as necessary for their tasks. Therefore, we can say an operating system is a resource allocator. This is the main features of an operating system.
- Resource management includes multiplexing or sharing resources in two different ways: in time and in space.

The diagram given below shows the functioning of OS as a resource manager −



Examples of operating system are

UNIX

Android

Ubuntu

MS-DOS

MS-Windows – 98/XP/Vista,

Windows-NT/2000,

OS/2 and Mac OS.