

Operating system

An operating system can be defined as a software program that is responsible for managing and controlling the operations of the computer, programs, and hardware.

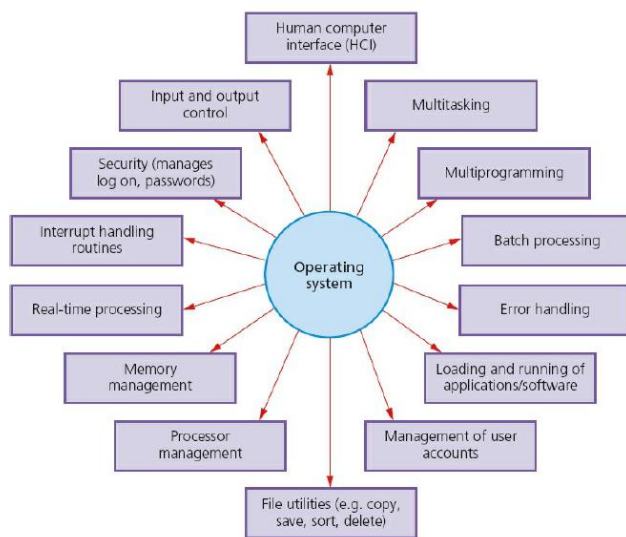
An operating system (OS) is the program that, after being initially loaded into the computer by a boot program, manages all of the other application programs in a computer.

- It also acts as an interface that allows the user to run an application using a hardware device.
- Without an operating system, a computer working with a computer system will be impossible for most users.

Examples of Operating System

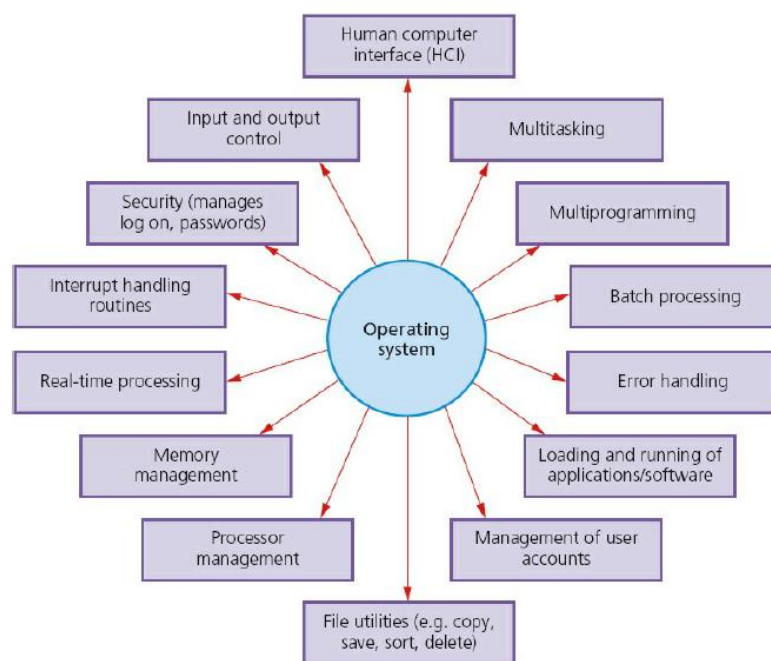
1. MS Windows
2. MS DOS
3. Ubuntu OS
4. Mac OS
5. Apple IOS
6. Linux OS
7. UNIX OS
8. Android OS
9. Chrome OS
10. Fedora OS

Functions of OS



- It provides security to user data by using password protection and other security techniques.
- It also protects user data from unauthorized access.

- It monitors and controls the system's performance by analyzing response time i.e. the time between system response and service request to help troubleshoot performance issues.
- It also performs the job accounting for a particular user or group of users by tracking the resources and time used.
- It also monitors the system performance to avoid system malfunctioning.
- It is responsible for assigning software such as compilers, interpreters, assemblers, etc. to perform various tasks.
- It is also responsible for managing the Main Memory by keeping track of the bytes that are utilized by a program, tracking used and unused memory addresses.
- The OS also allocates and de-allocates the memory to processes.
- The operating system also performs process scheduling i.e. in a multi-programming environment, it controls the order of processes and their processing time.
- It also controls the communication of devices to their respective driver by tracking the devices that are connected to the system and designating the I/O controller.
- It also controls the file system by tracking where user data is stored as well as manages the user access settings.



Buffer

The buffer is an area in the main memory used to store or hold the data temporarily. It is usually located in the RAM. The act of storing data temporarily in the buffer is called buffering.

Computer Architecture:-

First, an input device is utilized to input certain data or commands. This input can be many things but is most commonly keyboard inputs. That input is then processed through a central processing unit, which consists of a control unit, a logic unit, and any number of register units. That information is stored in a memory unit. When the right inputs are put into the computer, a program is run, and the results of that program are then viewable on an output device. That output device is most commonly a computer monitor or printer.

The major components of CPU are

- (1) Arithmetic and Logic Unit (ALU),
- (2) Control Unit (CU)

(1) A memory unit is a collection of storage cells together with associated circuits needed to transfer information in and out of the storage. The memory stores binary information in groups of bits called words. The internal structure of a memory unit is specified by the number of words it contains and the number of bits in each word.

Two major types of memories are used in computer systems:

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

2) The Central Processing Unit (CPU) has the following characteristics:

The CPU is regarded as the computer's brain.

The CPU is responsible for all data processing operations.

It saves information such as data, intermediate results, and instructions (program).

It directs the operation of all computer components.

3) Control Unit

The Control Unit of a computer system controls the operations of components like ALU, memory and input/output devices. The Control Unit consists of a program counter that contains the address of the instructions to be fetched and an instruction register into which instructions are fetched from memory for execution.

4) The i/o unit essentially encompasses all i/o the computer could possibly do (printing to a monitor, to paper, inputs from a mouse or keyboard, etc.)

Components of the Von Neumann Model

Memory: Storage of information (data/program)

Processing Unit: Computation/Processing of Information

Input: Means of getting information into the computer. e.g. keyboard, mouse

Output: Means of getting information out of the computer. e.g. printer, monitor.

Control Unit: Makes sure that all the other parts perform their tasks correctly.

The Fetch execute model:- The fetch execute cycle is the basic operation (instruction) cycle of a computer (also known as the fetch decode execute cycle)

. The processor fetches the instruction value from this memory location. Once the instruction has been fetched, it needs to be decoded and executed.