

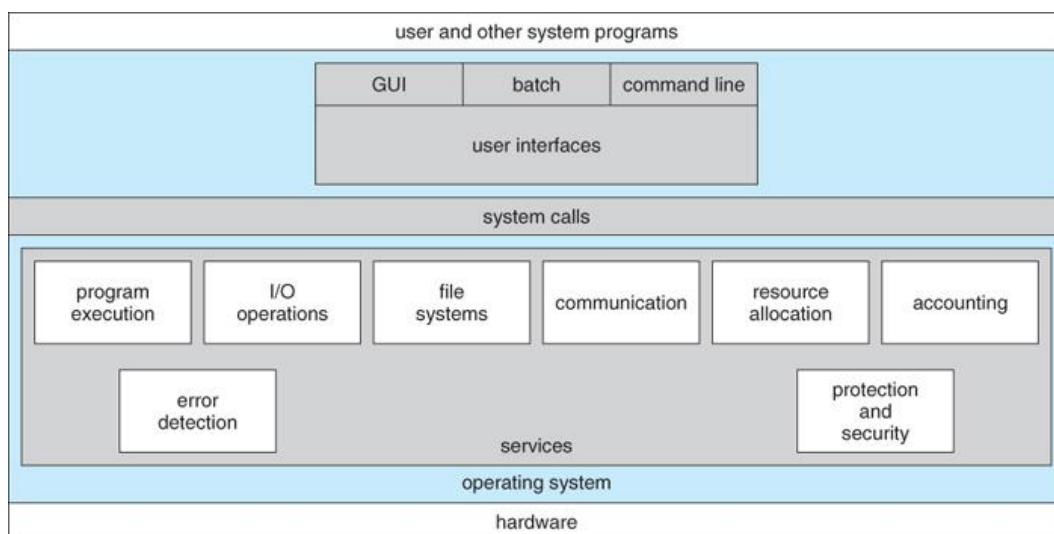
Operating systems

An operating system (OS) is a piece of software that serves as a bridge or interface between computer hardware and the user.

Objectives in operating systems

- To make the computer system convenient to use in an efficient manner.
- To hide the details of the hardware resources from the users.
- To provide users with a convenient interface to use the computer system.
- To act as an intermediary between the hardware and its users, making it easier for the users to access and use other resources.
- To manage the resources of a computer system.
- To keep track of who is using which resource, granting resource requests, and mediating conflicting requests from different programs and users.
- To provide efficient and fair sharing of resources among users and programs.

Operating-System Structure



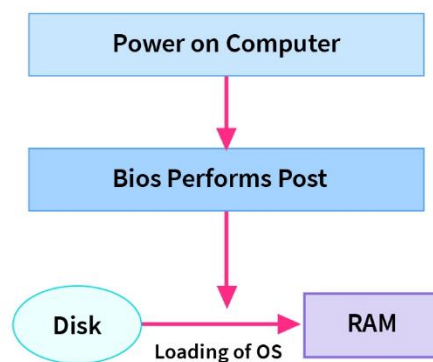
Computer Startup

Booting Up the Computer

- Booting is a process or set of operations that loads and hence starts the operating system, starting from the point when user switches on the power button.

Bootstrap program

- It is loaded at power-up or re-boot.
- Typically stored in ROM or EPROM, generally known as **firmware**.
- Initializes all aspects of system.
- Loads operating system kernel and starts execution.

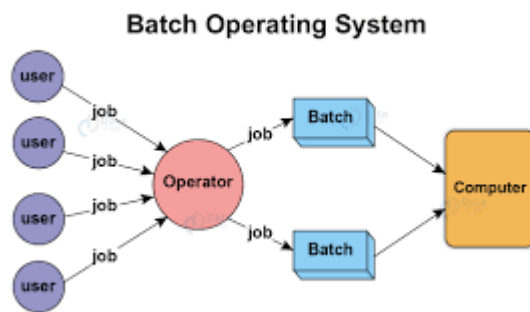


Types of operating system

Batch Operating System

This type of operating system does not interact with the computer directly. There is an operator which takes similar jobs having the same requirement and groups them into batches. It is the responsibility of the operator to sort jobs with similar needs.

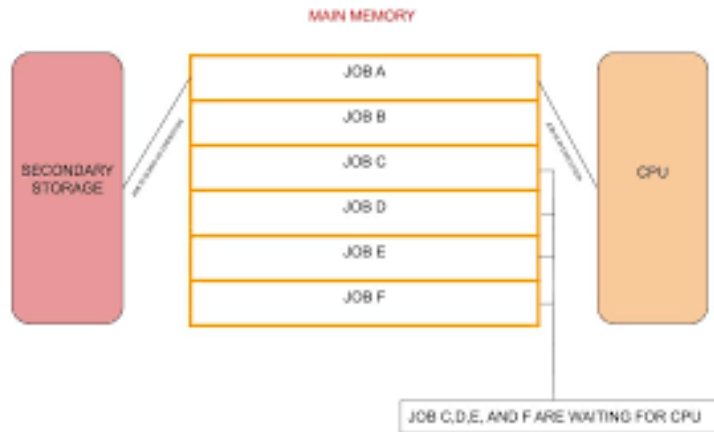
Advantages	Disadvantages
Multiple users can share the batch systems.	Expensive
It is easy to manage large work repeatedly in batch systems.	Hard to debug.
The idle time for the batch system is very less.	The other jobs will have to wait for an unknown time if any job fails



Multi-Programming Operating System

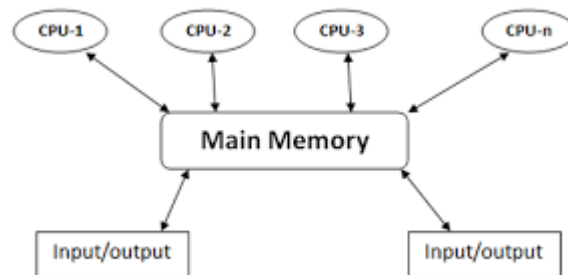
Multiprogramming Operating Systems can be simply illustrated as more than one program is present in the main memory and any one of them can be kept in execution. This is basically used for better execution of resources.

MULTI PROGRAMMING OPERATING SYSTEM



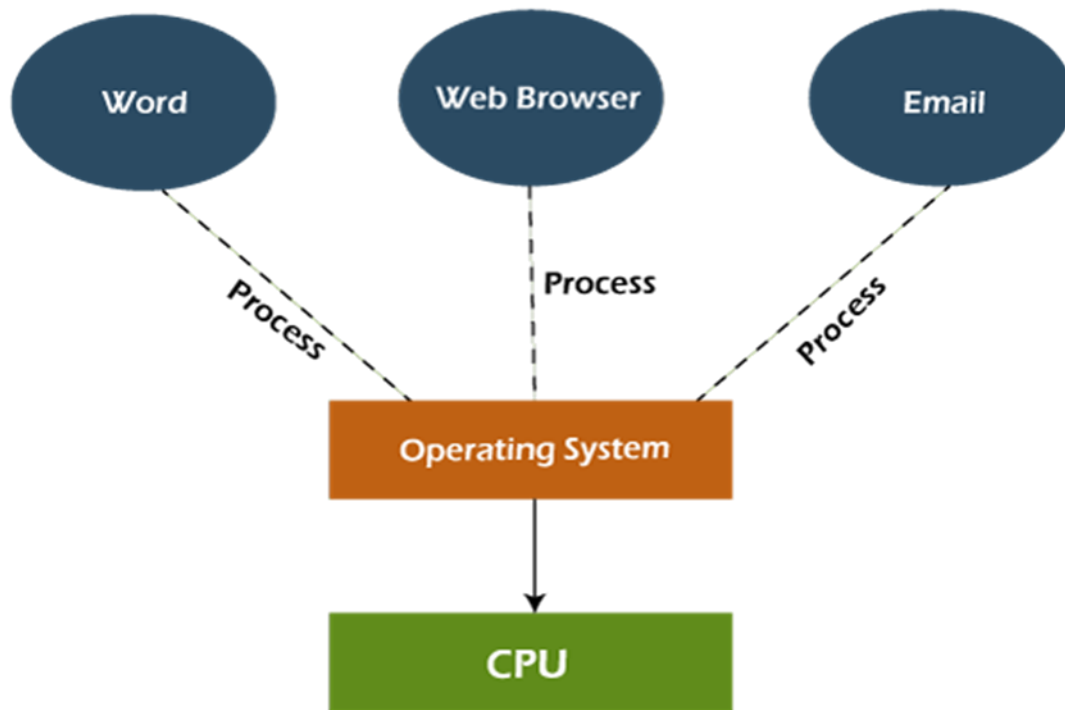
Multi-Processing Operating System

Multi-Processing Operating System is a type of Operating System in which more than one CPU is used for the execution of resources. It better the throughput of the System.



Multi-Tasking Operating System

Multitasking Operating System is simply a multiprogramming Operating System with having facility of a Round-Robin Scheduling Algorithm. It can run multiple programs simultaneously.



Operating System Components

- Process Management
- Main-memory management
- Secondary-storage management
- File Management
- I/O System Management
- Protection System
- Networking (Distributed Systems)
- Command- interpreter System

Operating System Operations

- Dual-mode operation allows OS to protect itself and other system components.
- Some machine instructions that may cause harm are designated (by hardware) as privileged instructions and they can be executed only in monitor mode.
- A System call is the way that a computer program requests a service from the kernel. This may include hardware-related services change mode to monitor/ kernel, return from call resets it to user.
- Manage interrupts.