

An Introduction To The Operating System

What is an Operating System?

An **operating system** is a piece of software that manages all the resources of a computer system, both hardware and software, and provides an environment in which the user can execute his/her programs in a convenient and efficient manner.

Operating system objectives:

- Execute user programs and make solving user problems easier
- Make the computer system convenient to use
- Use the computer hardware in an efficient manner

Design terms

- Easy (ease of use)
- Personal computers
- Efficiency (allocation of appropriate resources)
- High performance computers
- Energy saving
- Minor user interruptions
- Device is installed

Tasks offered by an Operating System

- **Program implementation**
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 Performance**
I/O means any file or any specific I/O device. Program may require any I/O device while running. So the 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 time. The both processes are on the one computer or on different computers 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.

Operating System Types

- **Single process operating system**

A computer system that allows only one user to use the computer at a given time is known as a single-user system. The goals of such systems are maximizing user convenience and responsiveness, instead of maximizing the utilization of the CPU and peripheral devices.

Example: Windows, Apple Mac OS, etc.

- **Batch-processing 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.

Example: Payroll System, Bank Statements

- **Time-Sharing Operating System**

The **Time Shared Operating System** is also known as the Multitasking Operating System. Time-sharing operating systems implement CPU scheduling and multi-programming systems which deliver to every user a small piece of operating time.

Example: UNIX, Multics, Linux, Windows 2000 server, etc.

- **Distributed Operating System**

Distributed operating system allows distributing of entire systems on the couples of center processors, and it serves on the multiple real time products as well as multiple users.

Example: Windows Server 2003, Windows Server 2008, Windows Server 2012, Ubuntu, Linux(Apache Server), etc.

- **Real Time Operating System**

Real time systems are used when strict time requirements are placed on the operation of a processor or the flow of data. These are used to control a device in a dedicated application.

Example: Scientific experiments, medical imaging systems, industrial control systems, weapon systems, robots, air traffic control systems, etc.

- **Network Operating System**

Network Operating System is a computer operating system that facilitates to connect and communicate various autonomous computers over a network. An Autonomous computer is an independent computer that has its own local memory, hardware, and O.S. It is self capable to perform operations and processing for a single user. They can either run the same or different O.S.

Example: Microsoft Windows Server 2003, Microsoft Windows Server 2008, UNIX, Linux, Mac OS X, Novell NetWare, and BSD, etc