**Operating Systems**

An Operating System (OS) is a powerful program that **controls** the software and hardware on a computing device. In general sense, an OS is that software which **helps a user use other applications on his computing device**.

All the computers and computer-like devices **have Operating System**, including laptop, desktop, or any other smart computing system like a smart phone or a smart watch. Some of the popular OS are Linux, OS X, WINDOWS.

The OS **performs multiple functions and management**. It **manages** computer’s hardware resources **by performing services**: controls Input and Output devices such as a mouse, keyboard, display monitors, scanners and printers; **it manages network devices** such as routers, modems and network connections;

**Back end utilization** of software applications for managing hardware resources. It manages the allocation **of internal memory** between multiple applications. An OS sends message about the status of operation and any error that may have appeared to the interactive user.

**The functions** of an OS include:

*Memory Management*. One of the main functions of OS is to **manage the primary and secondary memory**. **Memory allocation** to the processes is also decided and checked by Operating System. It decides and checks **which process will have memory** and at what time.

Device Management. An OS manages device communication. It decides which **process** will get the device, when and for how long.

Processor Management. In a **multiprogramming environment**, it is OS which decides which process will get the processor when and for how long.

File Management. In a file system, generally **directories are organized for usage and easy navigation**. This collective is known as File System. It decides who will get the resources.

Security. An OS by using password and other similar techniques prevents and checks **unauthorized users to access the** data and program.

Error Detection. By using various **error detection methods** an operating system helps in prevention of errors.

**Types of Operating Systems**

The family of operating systems can be categorized into four types.

A **Real Time Operating System** (RTOS) needs **to provide** real time applications that process data without **buffer delays**. Examples of Real Time systems are **Air Traffic Control Systems**, Command Control Systems etc.

Real Time systems are classified **in three types depending on two factors** i.e. on factors **inside the computer system** and factors **outside the computer system**.

Command Control systems and *Air traffic control systems* are best examples of **Hard Real Time systems**. Online transaction systems, like booking a movie ticket or airline reservation systems are best examples of **Soft Real** Time systems. Multimedia applications is one example of Firm RTOS.

**Single User Single Task Operating Syste**m. As the name indicates, Single User Single Task OS is a system in which only **one program is executed at one time.** It manages the computer in a way that one user can successfully perform one thing at a time.

**Single User MultiTasking** Operating System. Most people use this Operating-System on their computers, laptop and desktops today. Best examples of these types of Operating System are A**pple’s Mac OS platform and Microsoft’s Windows**. This Operating System will allow a single user **to operate several programs at the same time**. For example, a Windows user may be writing an email while printing a word document while downloading a file from Internet.

Multi User Operating System allows various different users on different desktop or computer to access a single System.

The Operating System takes care of all the requirements of the various users in a balanced way.