**OPERATING SYSTEMS**

An Operating System (OS) is a powerful program that manages and controls the software and hardware on a computing device so as to make the device behave in a predictable but flexible way. An OS acts as an interface between a user and a device. Thus, in general sense, an OS is that software which helps a user to run other applications on his computing device.

The functions of an OS include: Memory Management, Device Management, Processor Management, File Management, Controls System Performance, Security, Error Detection, Coordination among Software and Users and Job accounting.

Memory Management keeps an eye on each and every memory location, in any case either it’s allocated or it’s not allocated. OS keeps track of all devices for device management. This task is performed by I/O controller, that decides which process will get the device when and for how long. OS keeps track of processor tasking and checks the status of process for processor management. Traffic controller allocates the processor and also de-allocates processor when a process is complete and not required. OS keeps track of location, information, status etc. under file management. This collective is known as File System. By using various error detecting aids an operating system helps in prevention of errors. Job accounting keeps track of resources and jobs used by different users all the time.

The broad family of operating systems can be categorized into 4 types based on their controlling and supporting systems: Real Time OS, Single User Single Task OS, Single User Multi-Tasking OS, Multi User OS.

A Real Time OS (RTOS) intends to provide real time applications that process data without buffer delays. A RTOS is a time bound operating system which has fixed time constraints. Processing has to be done within the defined time constraints or the system will definitely fail. Examples of Real Time systems are Air Traffic Control Systems, Command Control Systems etc.

Real Time systems are classified in 3 types depending on factors inside the computer system and factors outside the computer system. A missed deadline in Hard Real Time Systems is disastrous. In case of Soft Real Time Systems, it may lead to a significant loss. In Firm RTOS, the deadline is specified but missing it does not cause a big impact.

In the early 1980s, IBM designed the IBM PC and looked around for software to run on it. People from IBM contacted Bill Gates to license his BASIC interpreter. They also asked him if he knew of an operating system to run on the PC. Gates suggested that IBM contact Digital Research, then the world's dominant operating systems company. Consequently, IBM went back to Gates asking if he could provide them with an operating system.

One day, Steve Jobs, who co-invented the Apple computer in his garage, visited PARC, saw a GUI, and instantly realized its potential value, something Xerox management famously did not. Jobs then embarked on building an Apple with a GUI. This project led to the Lisa, which was too expensive and failed commercially. Jobs' second attempt, the Apple Macintosh, was a huge success, not only because it was much cheaper than the Lisa, but also because it was user friendly.

When Microsoft decided to build a successor to MS-DOS, it was strongly influenced by the success of the Macintosh. It produced a GUI-based system called Windows. For about 10 years, from 1985 to 1995, Windows was just a graphical environment on top of MS-DOS. However, starting in 1995 a freestanding version of Windows, Windows 95, was released that incorporated many operating system features into it. In 1998, a slightly modified version of this system, called Windows 98 was released.

On March 6, 2008, iPhone OS 1 was the first iOS for Apple's mobile operating system. No official name was given to the system. On September 23, 2008, Android was released. Android is a Mobile OS which was developed by Google. On October 22, 2009, Microsoft launched Windows 7 internationally to the public.

We are currently on the precipice of AI, robotics, and blockchain and these sectors will lead us towards different dimensions of Operating Systems.