**Operating Systems**

An Operating system acts as an intermediary between the user and the computer hardware, performing all the basic tasks like file management, memory management, process management, handling input and output and controlling peripheral devices like disk drives and printers.

A computer system has 4 components: Hardware, Operating System, Application Programs and Users.

The operating system coordinates usage of the computer hardware amongst the various application programs, in order to maintain the proper resource distribution of the computer system.

The operating system is created based on the type of computer. For single user computers, the OS concentrates on ease of use and good performance. For multi user computers, it concentrates on maximizing resource utilization. Handheld computers don’t require much resources so the OS focuses on optimizing usability and battery life. Embedded computers are very simple computers like calculators, so the OS is designed to run without user intervention.

The operating system manages resources, decides between conflicting requests for efficient and fair resource usage and controls execution of programs.

The operating system brings together the basic functions of controlling and allocating resources, that are required by almost all programs.

There are 3 types of programs: the kernel, which is the part of the operating system that is constantly running, system programs, that are associated with the operating system but are not part of the kernel, and application programs, which are unassociated with the operating system.

Mobile operating systems also consist of middleware, which is a set of software frameworks that provide additional services to application developers.

The CPU moves data from/to the main memory to/from the local buffers of each device controller. The device controllers are connected through a common bus to a shared memory.

When the computer starts, the bootstrap program is loaded. This is stored in the ROM, generally known as firmware. It initializes all parts of the system and loads the operating system kernel. Once the operating system and all startup processes have ended, the system waits for an event. The occurrence of an event is signaled by an interrupt.

There are two types of interrupts: Hardware, where a device may trigger an interrupt by sending a signal to the CPU, or Software, where an interrupt may be triggered by a system call.

A software interrupt is either caused by an error, or by user request.

The operating system is interrupt driven.

================== The rest of this topic is being skipped. ==================