**Lesson 0**

Operating Systems

An operating system is a program that manages the computer hardware

provides a basis for application programs

acts as an intermediary between computer-user and hardware

provides an environment within which other programs can do work

**Computer system**

|  |  |  |
| --- | --- | --- |
| Hardware | provides basic computing resources | CPU, memory, I/O devices |
| Operating system | Controls and coordinates use of hardware among various applications and users |  |
| Application programs | define the ways in which the system resources are used to solve the  computing problems of the users | Word processors, compilers, web browsers, database systems, video games |
| Users | People, machines, other computers |  |

**OS: Definition for COS3721**

The operating system is the one program running at all times on the computer - usually called the kernel.

Along with the kernel there are two other types of programs:

System programs: associated with the operating system but not part of the kernel.

Application programs: include all programs not associated with the operation of the system

**Lesson 0**

Computer System Operation

For a computer to start running it needs an initial program to run at boot time.

This initial program or bootstrap program tends to be simple.

It is stored in ROM or EEPROM and is known as firmware within the computer hardware.

It initializes all aspects of the system.

The bootstrap must know how to load the operating system. To accomplish this the bootstrap

program must locate and load the operating system kernel into memory.

Types of Events

|  |  |  |
| --- | --- | --- |
| **Interrupt**  (Asynchronous) | signaled by an interrupt from either hardware (keyboard, timer, etc) or software | Hardware triggers an interrupt by sending a signal to the CPU. Software may trigger an interrupt by executing a special operation called a system call or monitor call. |
| **Trap**  (Synchronous) | raised by a user program (exception in a user process) | It's caused by division by zero or invalid memory access. It's also the usual way to invoke a kernel routine (a system call) because those run with a higher priority than user code. |