COS 222 : Operating Systems

What Is an Operating System?

An operating system is a program/software that controls the execution of **application programs** and acts as an **interface** between applications and hardware. It has the following broad objectives:

- **Convenience**
- **Efficiency**
- **Flexibility**

Why are Operating Systems Useful?

Operating Systems provide the following:

- Program Development
- Program Execution
- Access to I/O devices
- Controlled Access To Files
- System Acces
- Error detection and rectification...and many more

Direct Memory Access

Direct Memory Access (DMA) is a technology that allows transfers between I/O modules and main memory to occur without the intervention of the CPU.

This would be handled by the **DMA module** on the CPU or on the IO module.

This dramatically increases performance because managing data transfers is **not an efficient use of the CPU's time**.

Interrupts

- This is a mechanism by which **hardware or software** my halt the typical CPU cycle to **demand attention**.

Interrupt Handlers

An interrupt handler, or an Interrupt Service Soutine (ISR), is a **callback function** in micro-controller firmware, operating system or device driver, where execution i triggered or **invoked by an interrupt**.

Processes

Process Control Block

The Process Control Block (PCB) is a data structure that contains all the relevant information pertaining to a single process present in the system.

Threads

A thread (or *lightweight process*)

Similarly to a process, a thread also has a **Thread Control Block** (TCB)