

# Operating Systems Notes

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## Week 1 (Whole lecture made no sense)

### What is an Operating System?

- A software that converts hardware into a usefull form for applications
- A resource allocator and control program making efficient use of hardware and managing the execution of user programs.

### What does an OS provide?

- Abstraction - provides a standard library for resources
- (Resources are anything valuable, i.e. CPU, memory, disk)

### Advantages of Abstraction

- Allows applications to reuse common facilites
- Make different devices look the same
- Provides higher-level or more useful functionality

### What is a process?

- An execution stream in the context of a process state
- What is an execution stream?
- Stream of executing instructions
- Running piece of code
- Thread of control

## Week 2

### Status Bit

Determines if we are in user mode or kernel mode.

## Scheduler

Determines the order that tasks are completed. Some common performance metrics for the scheduler are:

- Turnaround time: completion-time - arrival-time
- Response time: initial-schedule-time - arrival-time
- Waiting time: How long tasks spend in the ready queue
- Throughput: Jobs completed per unit of time
- Resource utilization: Keep expensive devices busy
- Overhead: The number of context switches
- Fairness: All jobs get the same amount of CPU over some time interval

Schedulers can be First Come First Served (FCFS), Shortest Job First (SJF), Shorted Time to First Completion (STCF), RR, Multi Level Feedback Queue (MLFQ), Completely Fair Scheduler (CFS).

The Dispatcher performs context-switches, i.e. switching from user mode to kernel mode.

In FCFS scheduling, convoys of small tasks tend to build up when a large one is running.

## Preemptive Scheduling

Potentially schedule different jobs at any point by taking CPU away from running job. So we can run half a task and then if a shorter task comes along we can switch and run that task.