COMP3520 Operating System Internals

Homework 1

1. List and briefly define the four main elements of a computer.

2. What is the purpose of interrupts?

3. What characteristics distinguish the various elements of a memory hierarchy?

4. What is the distinction between spatial locality and temporal locality?

5. Suppose a workstation has a clock rate of 25 MHz, which means that the machine is capable of performing 25 million basic operations per second. For example, a register test instruction might take just 1 clock cycle, but an arithmetic instruction might require 10 clock cycles, while an I/O instruction might require hundreds.
   a. What is the time duration of one basic operation?
   b. Assuming the average instruction takes 2.5 clock cycles, how many instructions can be executed in 100 microseconds?

6. What are the main differences between multiprogramming and time sharing?

7. How are system calls implemented?