Problem Set 1

Due January 28th at 6pm (bonus if submitted before Fri Jan 26th at 6pm)

The problem sets ask questions about the important concepts of the reading and lecture materials. Each question should be answered in 1-4 paragraphs (no more 150 words). Please type your answers and submit as a PDF.

On your submission, please include your name, recitation, and indicate the number of hours it took you to complete this work.

Name:

Recitation:

Hours:

1. What are the three high level features that are provided by an Operating System? (describe each)
2. Why does an Operating System need protection from user code?
3. What are the four major components of an Operating System? (describe each)
4. How does a user application access system code within the Operating System? (list the steps, describe how CPU knows what code is running)
5. How are parameters passed to and results returned from a System Call? (describe possible mechanisms)
6. What are the steps taken to start up a computer?
7. What is a Virtual Machine and how does it differ from a physical machine?
8. Describe the differences between multi-programming and multi-tasking?
9. What is a context switch? (describe the mechanism, the reasons for a switch, and what is switched)
10. Provide a timing chart for the processes listed below using multi-programming and another when using multi-tasking. The values are all in number of ticks and you can assume no switching overhead. The multi-tasking timeline should assume a 40 tick time block. The IO column indicates when within the process an IO request is made and how long the wait for IO completion will take.

Process	Length	Arrival Time	IO (time, wait)
P1	40	0	(20, 30)
P2	20	10	none
P3	25	30	none