EECS 343: Homework 1

Introduction to Operating Systems and Processes

Fall 2014

Important Dates

Out: October 6, 2014.

Due: October 14, 2014, 11:59PM CDT.

Submitting your assignment: Please use the course submission site. There is a link to it from the class site. **Submit only ASCII text files.**

Problems

1. List three hardware features that enable the implementation of operating system functionality and explain the significance of each. For instance, a fixed rate clock allows the creation of a variable timer for timesharing.

2. For the computer that you are using, how should OS designers prioritize among reliability, security, portability and performance? Explain why.

3. To a programmer, a system call looks like any other call to a library procedure. Is it important that a programmer know which library procedures result in system calls? Under what circumstances and why?

4. How do user programs and system services interact in a microkernel architecture? What are the advantages/disadvantages of the microkernel approach to system design?

5. When a process creates a new process using the `fork()` operation, which of the following states is shared between the parent and child processes?

   (a) Stack
   (b) Heap
   (c) Shared memory segments

6. Consider the following set of processes, their arrival times and expected running times. For each of the following scheduling algorithms, determine the mean process turnaround time and mean waiting time. Ignore process switching overhead.

   (a) Round Robin $(q = 10)$

   (b) First-Come, First-Served (run in alphabetical order)

   (c) Shortest Job First

Process	ERT	Arrival
A	85	0
B	30	10
C	35	15
D	20	80
E	50	85