

DUE DATE: Monday February 22<sup>nd</sup> 2010 @ 11:59 pm

## Homework 3

5.11 from [SCG]

### [Problem 1] 2 points

Consider the exponential average formula used to predict the length of the next CPU burst. What are the implications of assigning the following values to the parameters used by the algorithm?

- $\alpha = 0$  and  $\tau_0 = 100$  milliseconds
- $\alpha = 0.99$  and  $\tau_0 = 10$  milliseconds

### Grading

Points distribution: 1 point each for (a) and (b)  
Total: 2 points

5.12 from [SCG]

### [Problem 1] 6 points

Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst	Time Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

- Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a nonpreemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.
- What is the turnaround time of each process for each of the scheduling algorithms in part a?
- What is the waiting time of each process for each of the scheduling algorithms in part a?
- Which of the schedules in part a results in the minimal average waiting time (over all processes)?

### Grading

Points distribution: 2 points each for (a) and (b); 1 point for (c) and (d)  
Total: 6 points

5.15 from [SCG]

**[Problem 3] 2 points**

Consider a system running ten I/O-bound tasks and one CPU-bound task. Assume that the I/O-bound tasks issue an I/O operation once for every millisecond of CPU computing and that each I/O operation takes 10 milliseconds to complete. Also assume that the context switching overhead is 0.1millisecond and that all processes are long-running tasks. What is the CPU utilization for a round-robin scheduler when:

- a. The time quantum is 1 millisecond
- b. The time quantum is 10 milliseconds

**Grading**

Points distribution: 1 point each for (a) and (b)  
Total: 2 points

---

**Grading**

This assignment will contribute a maximum of 5 points towards your final grade. The grading for this assignment will be done on a 10-point scale, and the breakdown of points for each of these problems has been listed.

**You are required to work alone on this assignment.**

---

**Late Policy**

See <http://www.cs.colostate.edu/~cs451/assignments.html>