

OS Assignment 2

Date: 30-08-2016

1A. Provide two programming examples of multithreading giving improved performance over a single-threaded solution.

1B. Provide two programming examples of multithreading that would *not* improve performance over a single-threaded solution.

2A. What resources are used when a thread is created? How do they differ from those used when a process is created?

2B. Consider a multiprocessor system and a multithreaded program written using the many-to-many threading model. Let the number of user-level threads in the program be more than the number of processors in the system. Discuss the performance implications of the following scenarios.

a) The number of kernel threads allocated to the program is less than the number of processors.

b) The number of kernel threads allocated to the program is greater than the number of processors but less than the number of user-level threads.

3A. Five jobs are waiting to be run. Their expected run times are 9, 6, 3, 5, and X. In what order should they be run to minimize average response time (of course your answer will depend on X)

3B. The exponential average formula with $\alpha = 1/2$ is being used to predict run times. The previous four runs, from oldest to most recent, are 40, 20, 40, and 15 msec. What is the prediction of the next time? (assume the initial guess is 40 msec.)

4. Consider the following set of processes, with length of CPU burst given in msec:

<u>Process</u>	<u>Burst time</u>	<u>Priority</u>
P ₁	10	3
P ₂	1	1
P ₃	2	3
P ₄	1	4
P ₅	5	2

The processes are assumed to have arrived in order P₁, P₂, P₃, P₄, P₅ all at time 0. Which of the following algorithms: FCFS, SJF, nonpreemptive priority, and RR (quantum = 1) results in minimum average waiting time

5. Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the questions, use nonpreemptive scheduling and base all decisions on the information you have at the time the decision must be made.

<u>Process</u>	<u>Arrival Time</u>	<u>Burst Time</u>
P ₁	0.0	8
P ₂	0.4	4
P ₃	1.0	1

a) What is the average turnaround time for these processes with the FCFS scheduling algorithm?

b) What is the average turnaround time for these processes with the SJF scheduling algorithm?