4proc-scheduling-lab

CST 334 (Operating Systems)
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Lab: Process scheduling

1. Suppose two jobs arrive at the same time and each takes 2 minutes to run. What is the average turnaround time under round-robin scheduling? Assume the jobs are run with very short time slices.

2. Redo problem 1, but this time suppose one job takes 2 minutes to run and the other takes 4 minutes to run.

3. Five batch jobs A through E arrive at a computer center at almost the same time. They have estimated running times of 10, 6, 2, 4, and 8 minutes. For each of the following scheduling algorithms, determine the average turnaround time:

- first-come, first-served (use order 10, 6, 2, 4, 8)
- shortest job first
- round robin

For the first two, assume that only one job runs at a time, and that it runs to completion. For the last one, assume time slices are the same for each job.

4. If you still have time, work out an expression for average response time given jobs with execution times A,B,C using shortest-job first. Assume the jobs arrive at the same time. (We did something similar in class, but with average turnaround time.)

5. If you still have time, work out an algebraic expression for average turnaround time with round-robin scheduling. You can assume you are given the process times in order of increasing time.

Hints:

1. Both jobs finish at about the same time. How long does it take both jobs to finish? Second hint: if the turnaround time for each job is 4 minutes, the average turnaround time is (4 + 4)/2 = 4 minutes.

2. Think about how long it takes the shorter of the two jobs to run. While it is running, so is the longer job, so it take a total of 4 minutes for the first job to finish. At that point, the longer job still has two minutes left to run, so it finishes in 6 minutes. The turnaround times are therefore 4 minutes and 6 minutes. What is the average turnaround time?

3. First-come, first-served: (10+16+18+22+30)/5 = 19.2; shortest-job first: (2 + 6 + 12 + 20 + 30)/5 = 14; round-robin: (10+18+24+28+30)/5 = 22

4. First try an example with three processes. Then try to figure out the general form for three processes when their times are A, B, C.. Then generalize this to the case where there are an arbitrary number of processes with times x_1, …, x_n. It's not too hard and I guarantee you will feel good when you figure it out!
