CS431: Operating Systems
Homework #1
Due Apr 23 (for M/W class), Apr 24 (for T/Th class)

You will be coding up the scheduling algorithms we discussed in Lecture 4. *You will definitely want to see the lecture notes for Lecture 4!*

On Blackboard, under homework assignments, download the zip file for Homework 1.

Create a new Java project in your favorite IDE. I named the project "ScheduleSim", but you can use whatever name you wish. This will be a console app, and it does *not* have a package designation.

Step 1:
In Main.java, look for the studentName variable. Change this string to be your name.

Step 2:
Look in the FirstComeFirstServedScheduler.java file. This is the scheduler that I've implemented. Notice the tick() routine. This has the logic for moving jobs from queue to queue during the simulation run.

Step 3:
Look in the other ...Scheduler.java files. These too have a tick routine, but the tick routine is empty (some have a few helpful hints in them!). You need to provide the body for these routines! Look at the hints, and look at the lecture notes, and refer back to FCFS scheduler.

Some notes:
For Round Robin, use one tick as the quanta, so each time we are in tick, you can preempt the running process (if it is still running).
For Priority, we will NOT add the decrementing of priority each clock tick, nor will there be timeouts. Just use the basic Priority schedule.
Multiple-Queue Scheduling: be sure to look at the notes in the file. This explains how to implement the quanta for this algorithm.

Step 4:
Run the program! This has a simple interface: it will prompt you with a list of choices. Type in the number of your choice to move through the menus. For now, you will pick choice '1' (test). It will then ask you which algorithm you wish to test, enter a number from 0 to 5. (Note: you don't have to have all the schedulers written to start using the program. Write one scheduler, then you can test that one. Once you are satisfied with the results, move on to the next scheduler.) It will then ask you for a test case number, either 1 or 2. 1 has a list of 4 jobs, 2 has a list of 10 jobs.

The program will run your simulation, then print a little report. The report lists all of the jobs (in the order they completed), and prints stats for the job. At the end of the line, it will compare your results with mine. The comparison just looks at your end time vs. my end time. Ideally, we will have the same times for all the jobs. Worst case scenario (for me) is if you find a bug in my scheduler, so my results are wrong. Worst case scenario (for you) is that you find the numbers are wrong, so you work on your algorithm to see what you did wrong.

NOTE: If you are really convinced that your algorithm is correct, yet our numbers differ, let me know!

Step 5:
When you have written and are satisfied with your algorithms, enter '2' to the program. This will then run all 6 algorithms on the THIRD test case, which has 30 jobs. This just prints the average turnaround time for the list.

Copy the console text into an email and send it to me. This is the first part of your homework.

Step 6:
Looking at your results for all of the schedulers and all of the test cases, tell me which scheduler you would prefer, and why. Remember, some of these schedulers are batch schedulers, so might not be the best for an interactive system. Send me an email with your analysis (it doesn't have to be long, just a couple of sentences). If you wish, you can send both answers (for steps 5 and 6) in the same email.

If you have any questions, please let me know, either by email, after class, or during office hours.