Lab Scheduling

10th of November, 2021

You will implement an CPU scheduling simulator. You may work with one other person on this lab. You may share examples and results but you may not share code or program design.

Processes

Your scheduling simulator will need to handle processes. Each process should have a name, a start time, and a duration (how long to run). You may want to store how long the process as spent waiting and when the process stopped.

Processes can be read in from a file. Each line will include the process name, start time, and duration. You will need to support a command line argument for loading a file.

Your program should support a command line argument (`-r`) for producing random (valid) processes. Start times and durations can range between 0 and 100.

Algorithms

You will implement five scheduling algorithms: First Come First Serve (`-fcfs`), Round Robin (`-rr`), HRRN (`-hrrn`), Shortest Job First (`-sjf`), and Shortest Job Remaining (`-sjr`). Your Round Robin algorithm should preemptively change processes after five time slices. You simulator MUST use these command line flags.

Statistics

You will need to calculate several statistics. The statistics should be printed at the conclusion of the program.

1. makespan – the time to run all processes
2. average – the average waiting time
3. throughput – the number of processes completing per time slice
4. total – sum of completion times
5. utilization – percentage of time slices with the processor in use

Output

You will format your results in an easy to understand diagram. For each time slice you will print what each process is doing. The format was discussed in class and an example output is linked on the course website.

Test Cases and Running

You are welcome to share test cases and compare output. You will need to hand in several test cases.

Examples:

- `./scheduler -r 5 -rr`
- `./scheduler -fcfs input.file`
- `./scheduler -sjf test.case`

Handing in

Create a README.txt file which describes what each group member has done.

This lab will be due on 11/19/2021 at 11:59pm.

You will need to handin your project using the handin script for lab4.