

Operating Systems, Summer Term 2017
Assignment 1: Process Scheduling

Due: July 29, at 23:59

1. Project Description

In this project you are going to implement simulations of six process scheduling algorithms: First Come First Served, Shortest Remaining Time Next, Round Robin, priority scheduling, lottery scheduling, and fair-share scheduling. Your program need not be multi-threaded. That is, your implementation of processes does not have to involve runnable objects. To you, a process is a quadruple consisting of the following:

- a) Name (mainly for tracing purposes).
- b) Arrival time.
- c) Run time.
- d) Priority.

Note that, the priority which will be used in priority, lottery and fair-share scheduling is given such that the lower the value, the higher the priority.

Here are some details about the six scheduling algorithms.

First Come First Served. Scheduler considers which process to run upon the completion of a process.

Shortest Remaining Time Next. Scheduler considers which process to run upon the arrival of a new process.

Round Robin. Quantum length is taken as input from the user.

Priority Scheduling. Processes having the same priority level should be scheduled among themselves using First Come First Served.

Lottery Scheduling. Quantum length is taken as input from the user. The number of tickets given to a process is proportional to its priority. For example, if priorities are represented by integers, and some process has priority p , then the process is given p tickets.

Fair-Share scheduling. Assume a round-robin strategy and a quantum length as taken from the user. A user's share of CPU time should be proportional to their priority.

- 2. Groups:** This is **not** a group project and as such, you should work on the project individually.

3. Deliverables

a) Source Code

- You should implement simulations of the six scheduling algorithms described above.
- You do not have to implement processes as runnable objects.
- Your program should accept a set of quadruples representing processes as a csv file. It should output a csv file for each algorithm detailing which process runs at which time unit. Also, calculate the turnaround time, average turnaround time, waiting time, and average waiting time for each process and include them in the output file for each algorithm (Refer to the sample input and output csv files uploaded.)
- Try to use explanatory comments whenever possible.

b) Project Report, including the following.

- A brief description of lottery scheduling, and fair-share scheduling.
- A description of the main classes and/or data structures you implemented/used.
- A sample output of running the algorithms on the gives input sample.
- A description of how to run and exit the program.
- Proper citation of any sources you might have consulted in the course of completing the project.
- You should not use any code available in library or internet references unless otherwise approved by your TA's.
- If your program does not run, discuss what you think the problem is and any suggestions you might have for solving it.

4. Important Dates

Source code. On-line submission by July 29 at 23:59 on os.summer17@gmail.com.

Project Report. A hard-copy should be submitted to your TA by July 30 by max 16:00.