

Process Scheduling

Laboratory 3

Duration: 3 weeks

This assignment will help us learn different process scheduling algorithms and their relative pros and cons.

To do this task, you will need to develop a simulator of a scheduler. You may use any language (C / C++ is recommended). The simulator must take in the following command line arguments: `<scheduling-algorithm> <path-to-workload-description-file>`. Experiment with different values of the time quantum. The simulator must produce as output the following metrics: Throughput, Turnaround Time (average and maximum), and Waiting Time (average and maximum), Run Time of your simulator (not counting I/O). Also, report the schedule itself (choose a nice format which will also help you debug).

For all the studies, we will use the workload description files given [here](#). Each row in the file refers to one process. The row format is as follows:

`<process-arrival-time> <cpu-burst-1-duration> <io-burst-1-duration> <cpu-burst-2-duration> <io-burst-2-duration> ... -1`

For example:

0 100 2 200 3 25 -1 indicates arrival time = 0; CPU burst 1 duration = 100; I/O burst 1 duration = 2; CPU burst 2 duration = 200; I/O burst 2 duration = 3; CPU burst 3 duration = 25; end of process.

Assume that every line ends with -1. A process may have any number of CPU / I/O burst cycles terminated with a -1. There will be any number of processes, terminated by an end of file. The arrival times are in nondecreasing order.

Part I

Implement the following algorithms:

- A. First In First Out
- B. Non pre-emptive Shortest Job First
- C. Pre-emptive Shortest Job First

Part II

Now, suppose you have two processors. Re-evaluate all three algorithms.

Part III

Implement and evaluate the Linux Completely Fair Scheduler [\[1\]](#) [\[2\]](#) . Your report must include your understanding of this scheduling algorithm. Assume a single processor. Indicate in your report a workload where this scheduler is better than the others (create a workload if you have to).

Submission:

- Source code with suitable makefiles
- Report containing observations in the form of graphs and their analyses. Report must also contain a description of the Linux Completely Fair Scheduler.