

Operating Systems Laboratory
Spring Semester 2017-18

Assignment 3a

Simulation of CPU Scheduling Algorithms

Assignment given on: January 29, 2018
Assignment deadline: February 05, 2018

The objective of this assignment is to generate random arrival times and CPU bursts for a set of processes following some probability distribution, and study the performances of various CPU scheduling algorithms through simulation. The specifications for the problem are as follows.

- a) Read the number of processes N , and generate the arrival times and CPU bursts of the processes using some probability distribution. The first process is assumed to arrive at time 0; for all subsequent processes the *inter-arrival time* is generated as a random variable (between 0 and 10) following exponential distribution with some given mean. Also the CPU bursts of the processes are generated as uniform random variables (between 1 and 20). Save the generated table in a file.

***Hint:** If R is a uniform random number in the range $(0, 1)$, a random variable from an exponential distribution with mean λ can be generated as:*

$$(-1.0 / \lambda) * \log_e R.$$

- b) Simulate the following CPU scheduling algorithms on the process arrival trace as generated in (a) above, and compute the average turnaround times (ATN) for the processes:
- (i) First Come First Serve (FCFS)
 - (ii) Pre-emptive Shortest Job First
 - (iii) Round Robin with time quantum $\delta = 1, 2$ and 5 time units.
- c) Run the simulation for $N = 10, 50$ and 100, ten times for each value of N , and generate the plot comparing the average values of ATN obtained for various scheduling techniques for different values of N .

Submission Guideline:

- Create the program as a single file as **Ass3a_<groupno>.c** or **.cpp**. Create the plot file as **Ass3a_plot_<groupno>.pdf**. Upload the two files.
- You must show the running version of the program to your assigned TA during lab hours.