
BTech-III-FSAI-B1(H): Operating System Lab

Assignment # 02 (1 Questions, 30 Points)

Held on: 24-Aug-2023 (Thu)

Lab Timings: 13:00 to 14:30 Pages: 2

Submission time: 14:30 Hours, 24-Aug-2023

School of Computer Science, UPES

Question 1: (30 points)

Write a C program to implement two of the following scheduling algorithms. There are 6 algorithms- 3 non-preemptive and 3 preemptive.

0. First-Come-First-Served (FCFS)
1. Non-Preemptive Priority Scheduling (NPS)
2. Shortest Job First (SJF)
3. Shortest Remaining Time First (SRTF)
4. Round Robin (RR) Time quantum - 2
5. Preemptive Priority Scheduling (PPS)

The algorithms that you have to implement depend on your SAP ID. To find your algorithm-1, find mod 6 of your SAP ID. To find your second algorithm, add 3 to your first algorithm and then find its mod 6. (If X is a number, 'X mod 6' denotes the remainder after dividing X by 6).

Example: If your SAP ID is 500105115, your algorithm-1 is $500105115 \bmod 6 = 3$ (i.e. SRTF) and algorithm-2 is $(3 + 3) \bmod 6 = 0$ (i.e. FCFS).

If your SAP ID is 500105399, your algorithm-1 is $500105399 \bmod 6 = 5$ (i.e. PPS) and your algorithm-2 is $(5 + 3) \bmod 6 = 2$ (i.e. SJF).

Input : The input should be in following format. You may choose to give input through file or via the terminal-

Line 1 : Number of processes

Line 2 onwards : A table containing four columns- PID, Arrival Time, Burst Time and Priority. The priority values will only be used by priority scheduling algorithms.

Example Input :

```
4
0 1 7 3
1 2 6 2
2 3 2 3
4 5 3 1
```

Output : A table containing Completion Time, Turnaround Time, Response Time and Waiting Time of every process for each algorithm. Bonus points for displaying the Gantt Chart.

Example Output : after applying FCFS on the example input.

```
7 7 0 0
13 12 6 6
15 13 11 11
18 14 11 11
```

Terminology :

- Arrival Time - The timestamp at which the process was admitted to the ready queue
- Burst Time - The time required by the process to complete its execution
- Priority - The number denotes the priority of the process. Smaller the number, greater the priority
- Time Quantum - A fixed period of time for which a process is allowed to use CPU before getting preempted to allow next process to run. Used in Round Robin algorithm
- Completion Time - The timestamp at which the process completed its execution
- Turnaround Time - Total time spent by the process since it got admitted to the ready queue till it got terminated after execution, i.e. Completion Time - Arrival Time
- Response Time - The time spent by the process since it got admitted to the ready queue till it first got the access to CPU
- Waiting Time - The time spent by the process in waiting state, i.e. Turnaround time - Burst Time

Marking Criteria

For each algorithm,

3 Marks For correctly reading the input.

2 Marks For calculating completion time.

4 Marks For calculating turnaround time.

2 Marks For calculating response time.

4 Marks For calculating waiting time.

5 Marks Bonus for displaying Gantt charts for both algorithms.

-15 Marks For all the parties involved in copy cases (whether copied from peers or the internet or AI).

No Marks will be awarded if the submitted file is not a c file (.c).