Operating Systems Lab (CS-UH 3010)
Spring 2024

Assignment 4: Multi-Level Feedback Queue Implementation

Deadline: April 04, 2024, 11:59 PM

Requirements:

1. Implement three queues with following configurations:

Queue	Schedular	Time Quantum
High priority (Q1)	Round Robin	8 ms
Medium priority (Q2)	Round Robin	15 ms
Low priority (Q3)	FCFS	
Boosting = 110 ms		

2. Processes in the high priority queue should be executed first.

3. If there are no processes in the high priority queue, processes from the medium priority queue should be executed.

4. If there are no processes in both the high and medium priority queues, processes from the low priority queue should be executed.

5. Each process should be assigned a priority level initially based on its arrival time.

6. After each time quantum, the priority of the process should be decreased by one level, and it should be moved to the next lower priority queue.

7. If a process completes its execution before the time quantum expires, it should be removed from the queue.

8. Make use of Boosting (110ms) factor in your implementation.

Test Cases: Use the following sample processes with arrival times and burst times provided as test cases for your implementation. Make sure to handle context switching, calculate completion time (CT) and turnaround time (TAT) correctly.

Output table should look similar to the one below with calculated CT and TAT.

```
PID             Arrival time    Burst time      Completion Time    Turnaround Time

P1              0 ms            06 ms

P2              0 ms            14 ms

P3              0 ms            30 ms

P4              0 ms            65 ms

P5              103 ms          02 ms
```

Simulation Output:

Besides the output table above, simulate the state of your schedular after each time quantum like below:

```
t = 0
Q1      P1(06)   P2(14)   P3(30)   P4(65)
Q2
Q3

t = 6
Q1      P2(14)   P3(30)   P4(65)
Q2
Q3

t = 14
Q1      P3(30)   P4(65)
Q2      P2(06)
Q3

t = 22
Q1      P4(65)
Q2      P2(06)   P3(22)
Q3
```

and so on …

Note: With each process, its remaining burst time is specified.