CS3500 - Operating System, August 2022

Lab 4: CPU Scheduling

Due Date: Friday, 15th September 9AM in Moodle.

Multilevel Queue Scheduling

A multilevel queue scheduling algorithm partitions the ready queue into several separate queues. The processes are permanently assigned to one of the queues, generally based on some property of the process, such as memory size, process priority, or process type. Each queue has its own scheduling algorithm.
You have to implement a multilevel queue scheduling algorithm with five queues, listed below:
1. System processes (sys)
2. Interactive processes (ip)
3. Interactive editing processes (iep)
4. Batch processes (bp)
5. Student processes (std)

Each type of process is given a time slice of CPU to run its processes. That is each queue runs in a round robin fashion. System process runs in a priority scheduling manner. Interactive and interactive editing process will work on FCFS basis. Batch and student process on SJF scheduling. Assume that all processes are preemptive
You are supposed to find the sequence the CPU schedules the process for execution. And calculate Completion Time, Waiting Time, Turnaround Time for each process
Completion Time: Time at which process completes its execution.
Turn Around Time: Time Difference between completion time and arrival time.
Turn Around Time = Completion Time – Arrival Time
Waiting Time (W.T): Time Difference between turnaround time and burst time.
        Waiting Time = Turn Around Time – Burst Time

Inputs:

Round Robin Quantum Time

No. of Process: N integer

process_id, arrival_time, burst_time and type_of_process, priority.

In case of processes without priority, priority=0

Expected output:

Process Execution Sequence

Process_id, Completion_time, TAT, WT

Sample Test Case:

Input

Quantum = 3

p1 0 3 sys 1
p2 0 2 ip 0
p3 0 2 iep 0
p4 0 3 bp 0
p5 0 1 sp 0
p6 1 2 iep 0
p7 2 4 sys 2
p8 2 3 ip 0
p9 3 2 bp 0
p10 3 3 sp 0
p11 3 2 iep 0
p12 4 3 sys 4
p13 4 2 sys 3
p14 5 3 ip 0
p15 6 5 ip 0
p16 6 3 bp 0
p17 6 2 bp 0
p18 7 5 sp 0
p19 9 2 ip 0
p20 10 2 sp 0

Note: you may save this as file for ease of running the program

Output Sequence:

P1	P2	P8	P3	P6	P9	P17	P5	P20
0	3	5	6	8	9	11	12	13 15

P7	P8	P14	P6	P11	P17	P4	P10	P7
18	20	21	22	24	25	27	30	31

P13	P14	P15	P4	P16	P18	P12	P15	P16
33	35	36	37	39	42	45	48	49

P18	P15	P19
51	52	54

Note: Calculate Completion Time, Waiting Time, Turnaround Time for each process using standard method