TSN2101 Operating System: Assignment (10%) (Trimester 1, 23/24, 2310)

Instructions:

a) Form a group with a maximum of **FOUR (4) members** that must in same tutorial group (you are allowed to form a group with lesser member, but we encourage you join in a group of **FOUR**.
b) You are allowed to use any programming language to simulate these concepts, not limited to C++, Java, Python, etc. Only the group leader will submit the program to MMLS (under Assignment Report->Tutorial Session->student Name) or Google Classroom (depending on your lecturer's preference) by 4 Feb 2024, 11.59 pm.
c) All the team members are required to present the prototype to their respective lecturers during the given slots from 5 Feb to 11 Feb 2024.
d) The presentation will be conducted online or physical, depending on your lecturer's preference. The lecturers will provide the case study to test the prototype.
e) Prototype with GUI on input and output will be granted higher marks (maximum 10%) than without GUI.

Any form of plagiarism will not be tolerated. No marks will be given for this assignment if plagiarism is detected.

Topic 1:

Simulation of CPU scheduling algorithms

Process Scheduling

Process Scheduling algorithms: Do 1 scheduling algorithm from Part A and 3 scheduling algorithms from Part B

Part A

a) Round Robin with Quantum 3

Part B

b) Preemptive SJF

c) Non Preemptive SJF

d) Preemptive Priority

e) Non Preemptive Priority

1. User should be able to enter the details about the processes such as Arrival Time, Burst Time,

Priority, Time Quantum for Round Robin assigned at the beginning of simulation and the

number of processes can range from 3 to 10.

2. Executing the program should show the Gantt chart (visual form) of each algorithm.

3. Calculation of

a) Turnaround time for each process

b) Total and Average Turnaround time for the entire processes

c) Waiting time for each process

d) Total and Average Waiting time for the entire processes

Pre-assigned case

A sample of case study listed below for students to test the program, but lecturers will choose other case study during the presentation of prototype.

Process	Burst time	Arrival time	Priority
P0	6	0	3
P1	4	1	3
P2	6	5	1
P3	6	6	1
P4	6	7	5
P5	6	8	6

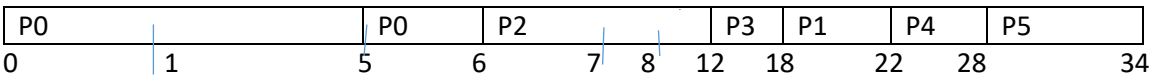
Assumption

I. For Preemptive Priority, if current process (in CPU) having SAME PRIORITY with new arrival process, NO PREEMPTION will be executed , TO REDUCE CONTEXT SWITCH
II. For Preemptive Priority , if current process (in CPU) having SAME Burst time with new arrival process, NO PREEMPTION will be executed , TO REDUCE CONTEXT SWITCH
III. For Round Robin, if there are two or more processes with SAME PRIORITY and same arrival time in the ready poll, privileage go to the process that not being executed before (to give chance to "hungry" process to be feed into CPU).
IV. For all algorthms, if SAME PRIORITY for those processes in the ready poll, CHOOSE FCFS
V. For all algorthms, if BURST TIME SAME for those processes in the ready poll, CHOOSE FCFS
VI. For all algorthms, the lower the priority count, the higher the priority for a process

Expected output:

Sample inputs and outputs:

e) NON Preemptive Priority



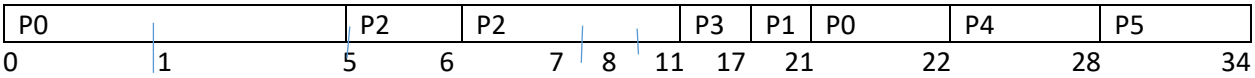
$P0(6)^3$ $P1(4)^3$ $P2(6)^1$ $P3(6)^1$ $P4(6)^5$ $P5(6)^6$

SAME PRIORITY, NO PREEMPTION, TO REDUCE CONTEXT SWITCH

SAME PRIORITY, CHOOSE FCFS

d) Preemptive Priority

$PO(1)^3$



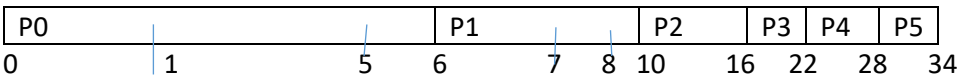
$P0(6)^3$ $P1(4)^3$ $P2(6)^1$ $P3(6)^1$ $P4(6)^5$ $P5(6)^6$

SAME PRIORITY, NO PREEMPTION, TO REDUCE CONTEXT SWITCH

SAME PRIORITY, CHOOSE FCFS

	ARRIVAL TIME	BURST TIME	FINISHING TIME	TURNAROUND TIME	WAITING TIME
P0	0	6	22	22	16
P1	1	4	21	20	16
P2	5	6	11	6	0
P3	6	6	17	11	5
P4	7	6	28	21	15
P5	8	6	34	26	20

C) NoN Preemptive SJF

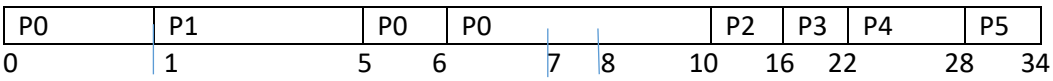


P0(6) P1(4) P2(6) P3(6) P4(6) P5(6)

- IF BURST TIME SAME, CHOOSE FCFS

b) Preemptive SJF

P0(5) P1(0) P0(4) P0(3) P0(2)



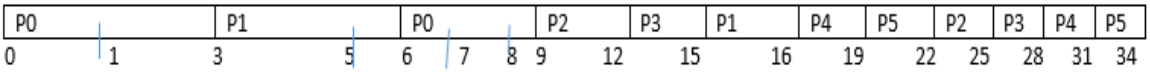
P0(6) P1(4) P2(6) P3(6) P4(6) P5(6)

- If same burst time , look for FCFS

a) Round Robin with Quantum 3

g) Round Robin with Quantum 3

P0(3) P1(1) P0(0) P2(3) P3(3) P1(0) P4(3) P5(3) P2(0)



P0(6) P1(4) P2(6) P3(6) P4(6) P5(6)

	ARRIVAL TIME	BURST TIME	FINISHING TIME	TURNAROUND TIME	WAITING TIME
P0	0	6	9	9	3
P1	1	4	16	15	11
P2	5	6	25	20	14
P3	6	6	28	22	16
P4	7	6	31	24	18
P5	8	6	34	26	20