

Operating system I

Assignment # 3

CPU Schedulers Simulator

Write a java program to simulate the following schedulers:

1. **preemptive** Shortest- Job First (SJF) Scheduling
2. Round Robin (RR)
3. Priority Scheduling (**with the solving of starvation problem**)
4. AG Scheduling :
 - a. Each process is provided a static time to execute called quantum.
 - b. Once a process is executed for given time period, it's called **non-preemptive** **till** the finishing of (ceil(50%)) of its Quantum time, after that it's converted to **preemptive** Shortest- Job First (SJF).
 - c. We have 3 scenarios of the running process
 - i. The running process used all its quantum time and it still have job to do (add this process to the end of the **queue**, then increases its Quantum time by **one**).
 - ii. The running process didn't use all its quantum time based on another process converted from ready to running (add this process to the end of the **queue**, and then increase its Quantum time by **the remaining Quantum time**).
 - iii. The running process didn't use all its quantum time because it's no longer need that time and the job was completed (set it's quantum time to **zero**).

Example :

Processes	Burst time	Arrival time	Quantum
P1	17	0	7
P2	6	2	9
P3	11	5	4
P4	4	15	2

Answer:

- Quantum (7, 9, 4,2) -> ceil(50%) = (4,5,2,1)
- Quantum (7+3,9,4,2) -> ceil(50%) = (5,5,2,1)
- Quantum (10,0,4 ,2) -> ceil(50%) = (5,0,2,1)
- Quantum (10,0,4+1,2) -> ceil(50%) = (5,0,3,1)
- Quantum (10+5,0,5,2) -> ceil(50%) = (8,0,3,1)
- Quantum (15,0,5,2+1) -> ceil(50%) = (8,0,3,2)
- Quantum (15,0,5+2,3) -> ceil(50%) = (8,0,4,2)
- Quantum (15,0,7,0) -> ceil(50%) = (8,0,4,0)
- Quantum (0,0,7,0) -> ceil(50%) = (0,0,4,0)
- Quantum (0,0,0,0) -> ceil(50%) = (0,0,0,0)

P1	P2	P3	P1	P4	P3	P4	P1	P3	
0	4	10	14	19	21	24	26	34	38

Program Input

- Number of processes
- Round robin Time Quantum

For Each Process you need to receive the following parameters from the user:

- Process Name
- Process Arrival Time
- Process Burst Time

Program Output

For each scheduler output the following:

- Processes execution order
- Waiting Time for each process
- Turnaround Time for each process
- Average Waiting Time
- Average Turnaround Time
- Print all history update of quantum time for each process (**AG Scheduling**)

- Submission deadline date is Saturday 25 November.
- The assignment is submitted in group of max. 3 students and min. 2 students.
- Late submission is not allowed

Grading Criteria
BOUNS (15 grades)

	preemptive Shortest- Job First (SJF) Scheduling	Round Robin (RR) Scheduling	Priority Scheduling	AG Scheduling	Grade
Processes execution order	4	4	4	9	21
Waiting Time for each process	4	4	4	9	21
Turnaround Time for each process	1	1	1	3	6
Average Waiting Time	1	1	1	3	6
Average Turnaround Time	1	1	1	3	6
Print all history update of quantum time for each process (AG Scheduling)	0	0	0	5	5
Grade	11	11	11	32	65