Fall 2022
CSE 321 Operating Systems
Lab Assignment 4
Total Marks: 30

Given the list of processes, their CPU burst times, arrival times and priorities, implement **SJF, Priority and Round Robin** scheduling algorithms with **preemption**. For each of the scheduling policies, compute and print the Completion Time(CT), Turnaround Time (TAT), and Waiting Time (WT) for each process using **C Programming.**

Waiting time: Processes need to wait in the process queue before execution starts and in execution while they get preempted.

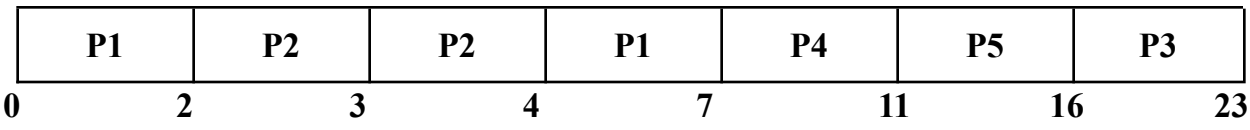
Turnaround time: Time elapsed by each process to get completely served. (Difference between submission time and completion time).

Task 1: SJF Scheduling with preemption

You can use the following input as sample:

Process	Arrival Time	Burst Time
P1	0	5
P2	2	2
P3	3	7
P4	4	4
P5	5	5

Solution in a Gantt chart:



Sample Output Structure:

```
Grant Chart: P1  P5  P2  P1  P5  P2  P1  P5  P2  P1  P3  P4  P3  P4

Proc    AT    BT    CT    WT    TAT
P1       3     8    22    11    19
P5       4     5    18     9    14
P2       5     6    20     9    15
P3      18     3    27     6     9
P4      20     3    28     5     8

Average waiting time: 8.0
Average turnaround time: 13.0
```

**Output values are random and do not match the given input.

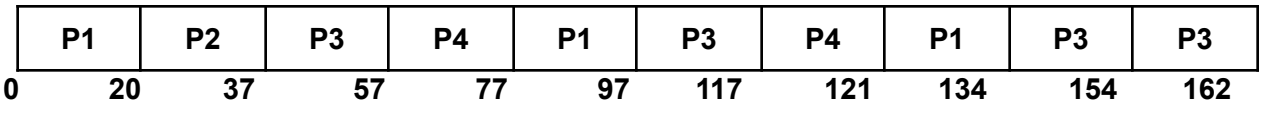
Task 2: Round Robin

You can use the following input as sample:

Time Quantum = 20 ms

Process	Burst Time
P1	53
P2	17
P3	68
P4	24

Solution in a Gantt chart:



Sample Output Structure:

```
Grant Chart: P1  P5  P2  P1  P5  P2  P1  P5  P2  P1  P3  P4  P3  P4

Proc    AT    BT    CT    WT    TAT
P1       3     8    22    11    19
P5       4     5    18     9    14
P2       5     6    20     9    15
P3      18     3    27     6     9
P4      20     3    28     5     8

Average waiting time: 8.0
Average turnaround time: 13.0
```

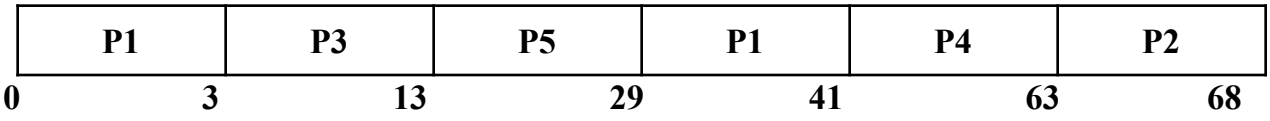
**Output values are random and do not match the given input.

Task 3: Priority Scheduling

You can use the following input as sample (smallest integer = highest priority):

Process	Arrival Time	Burst Time	Priority
P1	0	15	2
P2	14	5	4
P3	3	10	0
P4	9	22	3
P5	7	16	1

Solution in a Gantt chart:



Sample Output Structure:

```
Grant Chart: P1  P5  P2  P1  P5  P2  P1  P5  P2  P1  P3  P4  P3  P4

Proc    AT    BT    CT    WT    TAT
P1       3     8    22    11    19
P5       4     5    18     9    14
P2       5     6    20     9    15
P3      18     3    27     6     9
P4      20     3    28     5     8

Average waiting time: 8.0
Average turnaround time: 13.0
```

**Output values are random and do not match the given input.