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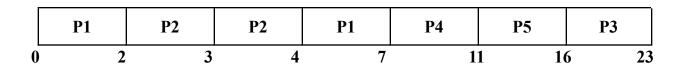
Waiting time: Processes need to wait in the process queue before execution starts and in execution while they get preempted.

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:

P1	P2	P2	P1	P4	P5	P3
0	2	3	4	7	11	16	23

Sample Output Structure:

**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:

P1	P2	P3	P4	P1	P3	P4	P1	P3	P3

```
0     20    37    57    77    97    117   121   134   154   162
```

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:

P1	P3	P5	P1	P4	P2
0 3	13	29	41	63	68

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.