CET-225
Operating Systems
Experiment # 09

Experiment Title

CPU Scheduling Algorithm Priority-Based scheduling ,Round Robin Scheduling Algorithm

Assessment of CLO(s): 04

Performed on _____

Student Name:			
Roll No.		**Group**	
Semester		**Session**	

Total (Max)	**Performance (03)**	**Viva (03)**	**File (04)**	**Total (10)**
Marks Obtained				
Remarks (if any)				

Experiment evaluated by

Instructor's Name	**Engr. Bushra Aziz**		
Date		**Signature**	

PRIORITY SCHEDULING ALGORITHM

In priority scheduling algorithm each process has a priority associated with it and as each process hits the queue, it is stored in based on its priority so that process with higher priority is dealt first. It should be noted that equal priority processes are scheduled in FCFS order.

Implementation –

1. First input the processes with their arrival time, burst time and priority.
2. Sort the processes, according to arrival time if two process arrival time is same then sort according process priority if two process priority are same then sort according to process number.
3. Now simply apply FCFS algorithm.

   Each process will be executed according to its priority. Calculate the waiting time and turnaround time of each of the processes accordingly.

Priority Bases scheduling (non-Preemptive) Example

Process	Arrival time	Burst time	Priority
P1	0 ms	5 ms	1
P2	1 ms	3 ms	2
P3	2 ms	8 ms	1
P4	3 ms	6 ms	3

NOTE: In this example, we are taking higer priority number as higher priority.

Gantt Chart

P1		P4		P2		P3	
0ms	5ms	5ms	11ms	11ms	14ms	14ms	22ms

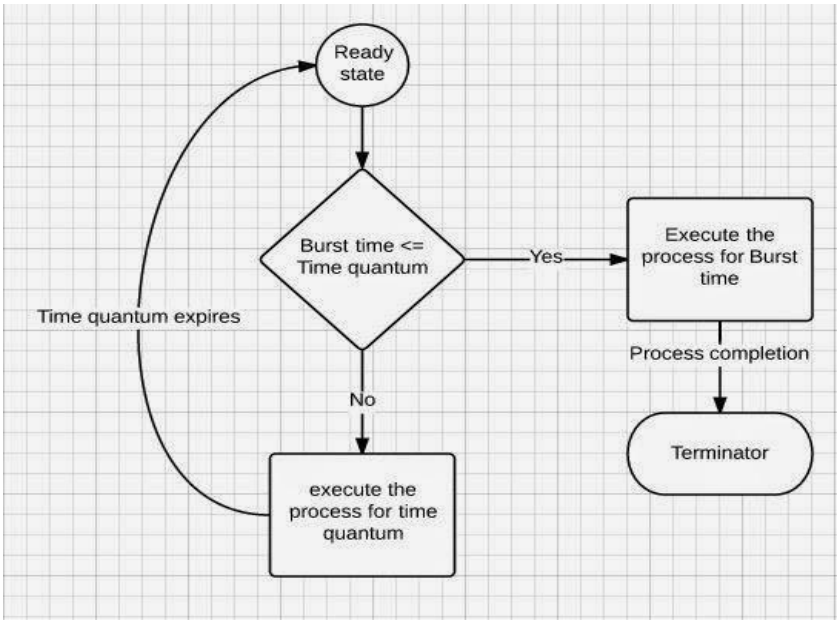
Calculate the waiting time and turnaround time of each of the processes accordingly.

```
-----------------------------------------------
| Process | Waiting Time | Turnaround Time   |
-----------------------------------------------
|    P1   |      0ms     |        5ms        |
|    P2   |      10ms    |        13ms       |
|    P3   |      12ms    |        20ms       |
|    P4   |      2ms     |        8ms        |
-----------------------------------------------
```

Total waiting time: (0 + 10 + 12 + 2) = 24ms
Average waiting time: (24/4) = 6ms
Total turnaround time: (5 + 13 + 20 + 8) = 46ms
Average turnaround time: (46/4) = 11.5ms

Round Robin Scheduling Algorithm

Round Robin scheduling algorithm is one of the most popular scheduling algorithms which can actually be implemented in most of the operating systems. The Algorithm focuses on Time Sharing. In this algorithm, every process gets executed in a **cyclic way**. A certain time slice is defined in the system which is called time **quantum**. Each process present in the ready queue is assigned the CPU for that time quantum, if the execution of the process is completed during that time, then the process will **terminate** else the process will go back to the **ready queue** and waits for the next turn to complete the execution.



Implementation

For round robin scheduling algorithm, read the number of processes/jobs in the system, their CPU burst times, and the size of the time slice. Time slices are assigned to each process in equal portions and in circular order, handling all processes execution. This allows every process to get an equal chance. Calculate the waiting time and turnaround time of each of the processes accordingly.

Steps to find Completion times of all processes:

```
1-   Create an array rem_bt[] to keep track of
burst time of processes. This array is initially a
   copy of bt[] (burst times array)
2-   Create another array ct[] to store completion
times of processes. Initialize this array as 0.
3-   Initialize time : t = 0
4-   Keep traversing the all processes while all
processes are not done. Do following for i'th process
if it is
not done yet.     a- If rem_bt[i] > quantum
       (i)  t = t + quantum
(ii) bt_rem[i] -= quantum;
    c- Else // Last cycle for this process


(ii)  ct[i]=t;

(iii) bt_rem[i] = 0; // This process is
```

Round Robin Scheduling Example

Process	Arrival time	Burst time
P1	0 ms	10 ms
P2	0 ms	5 ms
P3	0 ms	8 ms

Gantt Chart

P1		P2		P3		P1		P2		P3	
1	2	2	4	4	6	6	8	8	10	10	12

P1		P2		P3		P1		P3		P1	
12	14	14	15	15	17	17	19	19	21	21	23

Calculate the waiting time and turnaround time of each of the processes accordingly.

Process	Waiting Time	Turnaround Time
P1	13ms	23ms
P2	10ms	15ms
P3	13ms	21ms

Total waiting time: (13 + 10 + 13) = 36ms
Average waiting time: (36*/3) = 12ms*

Total turnaround time: (23 + 15 + 21) = 59ms
Average turnaround time: (59*/3) = 19.66ms*

Exercises:

1. Write a Python program to implement Round Robin Algorithm.
2. Write a Python program to implement Priority Algorithm.
3. Modify both algorithms for the different arrival time.