TKM College of Engineering
Department of Computer Science & Engineering
22CST404: OPERATING SYSTEMS

TUTORIAL 1

1. How many times does the following C program print 'yes'? Explain the fork() system call.

    ```
    int main()
    {
    fork(); fork(); printf("yes"); fork(); return 0;
    }
    ```

2. Given below are the arrival and burst times of four processes P1, P2, P3 and P4. Draw the Gantt Chart using FCFS, SJF pre-emptive, SJF non-preemptive and RR scheduling (Quantum = 4ms, no priority based preemption). Calculate the average waiting time, average turn around time and average response time.

Process	Arrival Time (ms)	Burst Time (ms)
P1	0	8
P2	1	4
P3	2	9
P4	3	5

3. Given below are the burst times ad priorities of four five processes P1, P2, P3, P4 and P5. The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

Process	Priority	Burst Time (ms)
P1	3	10
P2	1	1
P3	3	2
P4	4	1
P5	2	5

    a. Draw four Gantt charts illustrating the execution of these processes using FCFS,SJF, non preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.

b. What is the turnaround time of each process for each of the scheduling algorithms?
c. What is the waiting time of each process for each of the scheduling algorithms?
d. Which of the schedules in part results in the minimal average waiting time?

4. All 5 processes arrive at time 0, in the order given, with the length of the CPU-burst time given in milliseconds. Consider FCFS, SJF and RR scheduling (quantum = 10 ms) scheduling algorithms for this set of processes. Calculate the waiting time and find out which algorithm would give the minimum average waiting time.

Process	Burst Time (ms)
P1	10
P2	29
P3	3
P4	7
P5	12

5. Consider the following processes. Draw Gantt chart illustrating the execution of the given processes using Shortest Remaining Time Next scheduling algorithm. Calculate the Average waiting Time and Average Turn around Time.

Process	Arrival Time (ms)	Burst Time (ms)
P1	0	3
P2	2	6
P3	4	4
P4	6	5
P5	8	2

6. Consider the following set of processes P1, P2, P3, P4 and their CPU burst times. Using SJF algorithm, calculate average waiting time and average turn around time.

Process	Burst Time (ms)
P1	6
P2	8
P3	12
P4	7
P5	3

7. Assume you have the following jobs to execute with one processor, with the jobs arriving in the order listed here:

Process	Priority	Burst Time (ms)
P1	3	80
P2	1	20
P3	4	10
P4	5	20
P5	2	50

Suppose a system uses FCFS scheduling.
   a. Draw a timing chart illustrating the execution of these processes.
   b. What is the turnaround time for process p4?
   c. What is the average wait time for the processes?

Now assume the system uses priority scheduling where a small integer means a high priority

   a. Draw a timing chart illustrating the execution of these processes.
   b. What is the turnaround time for process p2?
   c. What is the average wait time for the processes?

8. Consider the following set of processes and CPU burst times. Calculate the average WT, avg RT and avg TAT for the algorithms FCFS, SJF, RR (quantum = 3 ms) and priority scheduling. Which one is the best algorithm?

Process	Priority	Burst Time (ms)
P1	4	5
P2	1	12
P3	3	18
P4	5	16
P5	2	2