Assignment No : 3

Q.1) Differentiate between preemtive and non-premtive scheduling.

Preemptive	Non-preemptive
1) Process can be interrupted in between	Interrupt until it terminate itself or it's time is up
2) It has overhead of scheduling the process	It does not have overhead.
3) It is flexible	It is rigid.
4) Cost associated	No cost associated
5) CPU utilization high	CPU utilization low.
6) Eg. Round-Robin, shortest remaining time first	E.g. FCFS, SJF

Q.2) Which of the following scheduling algorithm result in starvation.

a) FCFS   b) SJF   c) Round-Robin   d) Priority - scheduling

a) FCFS
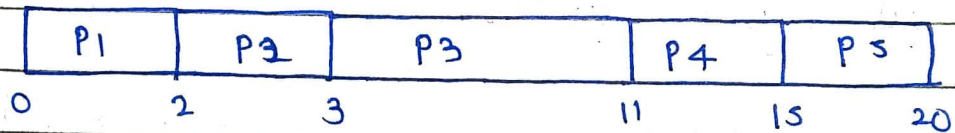
d) Priority scheduling

Q.3) Consider the following set of process with length of CPU burst given in millisecond.

The process are assumed to have arrived in order P1, P2, P3, P4, P5 all at time 0.
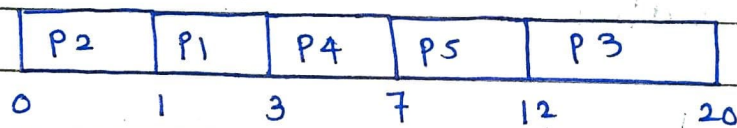
Process	Burst Time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	2
P5	5	3

a) Draw Gantt chart for Following algorithm :

1) FCFS

P1	P2	P3	P4	P5

0   2   3   11   15   20

2) SJF

P2	P1	P4	P5	P3

0   1   3   7   12   20

3) Non Preemtive priority scheduling

P2	P1	P4	P5	P3

0   1   3   7   12   20

4) Round Robin (T.q = 2 mls)

P1	P2	P3	P4	P5	P3	P4	P5	P3	P5	P3

0   2   3   5   7   9   11   13   15   17   18   20
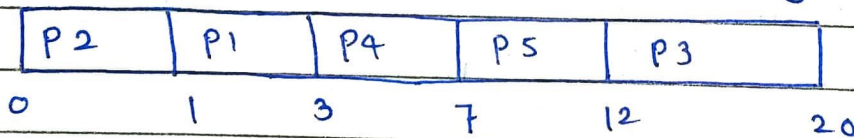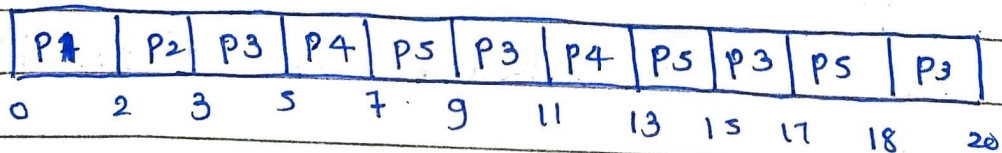
b) What is the turnarround time for each process for each of scheduling algorithm in Part a?

Process	FCFS	SJF	Priority	RR
P1	2	3	3	2
P2	3	1	1	3
P3	11	20	20	20
P4	15	7	7	15
P5	20	12	12	18

c) What is the waiting time for each process?

Process	FCFS	SJF	Priority	RR
P1	0	1	1	0
P2	2	0	0	2
P3	3	12	12	12
P4	11	3	3	9
P5	15	7	7	13

d) Which of the algorithm results in minimum average waiting time cover all processors?

i) Average waiting time for FCFS
$$= \frac{0 + 2 + 3 + 11 + 15}{5} = 6.2$$

ii) Average waiting time for SJF
$$= \frac{1 + 0 + 12 + 3 + 7}{5} = 4.6$$

iii) Average waiting time for priority scheduling algorithm:
$$= \frac{1 + 0 + 12 + 3 + 7}{5} = 4.6$$

iv) Average waiting time for round robin algorithm

$$= \frac{0 + 2 + 12 + 9 + 13}{5} = 7.2$$

∴ SJF & priority scheduling algorithm have same average waiting time.

∴ SJF & priority sheduling algorithm has minimum average waiting time i.e. 4.6 over all processes.

Q.4) Suppose that following process arrive for execution at time indicated, each process will run for amount of time listed. In answering the question use non preemptive scheduling and base all decision have information you have at time decision must be made.
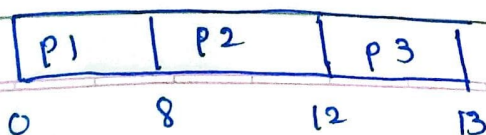
Process	Arrival Time	Burst time
P1	0.0	8
P2	0.4	4
P3	1.0	1

a) What is the average turnarround time for this process with FCFS scheduling algorithm?

Turnarround Time =
   completion time - Arrival time - waiting time
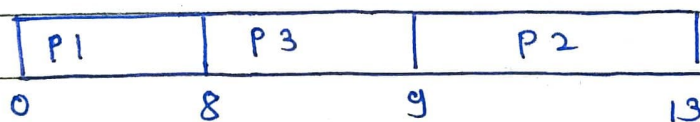   - turnarround time - burst time

FCFS Gantt chart:

P1	P2	P3

0   8   12   13

Process	Completion time	Turnarround time	waiting time
P1	8	8-0 = 8	8-8 = 0
P2	12	12-0.4 = 11.6	11.6-4 = 7.6
P3	13	13-1.0 = 12	12-1 = 11

Average Turn arround time =

$$\frac{8+11.6+12}{3} = \frac{31.6}{3} = 10.53$$

b) What is average turnarround time for this process with SJF?

Gantt chart :

P1	P3	P2	
0	8	9	13

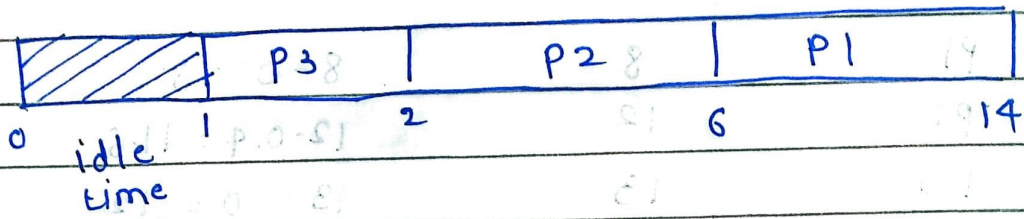| Process	Completion time	Turn arround time	waiting time
P1	8	8 - 0 = 8	0
P2	13	13-0.4 = 12.6	8.6
P3	9	9-1.0 = 8	7

Average Turnarround time =

$$\frac{8+12.6+8}{3}$$

$$= \frac{28.6}{3} = 9.53$$

c) SJF with 1 unit cpu idel time :
Gantt chart :-

	P3	P2	P1	
0   1   2   6   14

idle
time

Process	Arrival time	Burst time	CT	Turnarround time	waiting time
P1	0.0	8	14	14	6
P2	0.4	4	6	5.6	1.6
P3	1.0	1	2	1	0

Average Turnarround time =

$$\frac{14 + 5.6 + 1}{3}$$

$$= \frac{20.6}{3}$$

$$= \underline{6.87}$$