

Assignment

1) What is average turn around time for the following process

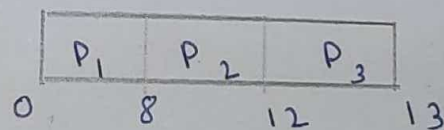
i) Using FCFS

ii) non-preemptive SJF

iii) preemptive SJF

Process	Arrival Time	Burst Time
P ₁	0	8
P ₂	0.4	4
P ₃	1	1

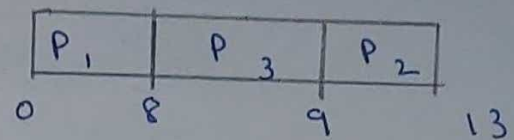
i) Using FCFS



Process	arrival Time	Burst Time	Waiting Time	Turnaround time
P ₁	0	8	0-0=0	8+0=8
P ₂	0.4	4	8-0.4=7.6	4+7.6=11.6
P ₃	1	1	12-1=11	1+12=13

$$\text{Average Turnaround Time} = \frac{8 + 11.6 + 13}{3} = \frac{32.6}{3} = 10.87 \text{ ms.}$$

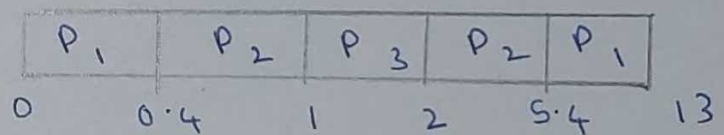
ii) non-preemptive SJF



Process	Arrival Time	Burst Time	Waiting Time	Turn around Time
P ₁	0	8	$0 - 0 = 0$	$8 + 0 = 8$
P ₂	0.4	4	$9 - 0.4 = 8.6$	$8.6 + 4 = 12.6$
P ₃	1	1	$8 - 1 = 7$	$7 + 1 = 8$

$$\text{Average turn around time} = \frac{8 + 12.6 + 8}{3} = \frac{28.6}{3} = 9.53 \text{ ms}$$

iii) Preemptive SJF



Process	Arrival Time	Burst Time	Waiting Time	Turn around Time
P ₁	0	8	$[0 + (5.4 - 0.4)] - 0 = 5$	$8 + 5 = 13$
P ₂	0.4	4	$[0.4 + (2 - 1)] - 0.4 = 1$	$4 + 1 = 5$
P ₃	1	1	$[1 - 1] = 0$	$1 + 0 = 1$

$$\text{Average Turn around Time} = \frac{13 + 5 + 1}{3} = 6.33 \text{ ms}$$

2. Consider the following process with CPU burst time given in ms

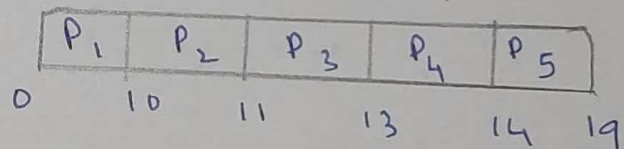
Process	Burst Time	Priority
P ₁	10	3
P ₂	1	1
P ₃	2	3
P ₄	1	4
P ₅	5	2

Processes are arrived in P₁, P₂, P₃, P₄, P₅ order at time 0.

- i) Draw Gantt chart to show execution between i) FCFS ii) SJF
 iii) non-preemptive priority iv) Round Robin (TQ = 1ms)
- ii) Calculate waiting time and turn around time for each scheduling algorithm

i)

i) FCFS

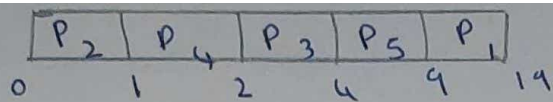


Process	Execution Time	Waiting Time	Turn around Time
P ₁	10	0	10
P ₂	1	10	11
P ₃	2	11	13
P ₄	1	13	14
P ₅	5	14	19

Waiting Time = 48 ms

Turn around Time = 67 ms

i) S3F

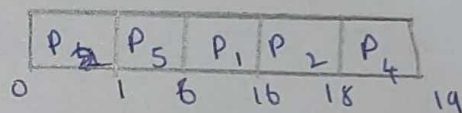


Process	Execution Time	Waiting Time	Turn around Time
P ₁	10	9	10 + 9 = 19
P ₂	1	0	1 + 0 = 1
P ₃	2	2	2 + 2 = 4
P ₄	1	1	1 + 1 = 2
P ₅	5	4	5 + 4 = 9

Total Waiting Time = 16ms

Total Turnaround Time = 35ms

iii) Non - preemptive priority



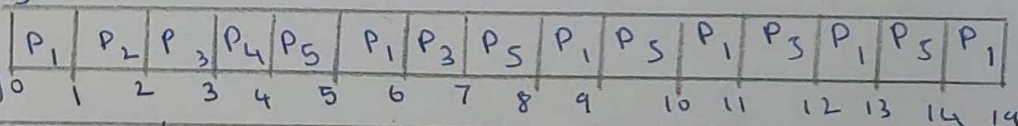
Process	Burst Time	Priority	Waiting Time	Turnaround Time
P ₁	10	3	6	10 + 6 = 16
P ₂	1	1	0	1 + 0 = 1
P ₃	2	3	16	2 + 16 = 18
P ₄	1	4	18	1 + 18 = 19
P ₅	5	2	1	5 + 1 = 6

Total waiting time = 41ms

Total Turnaround Time = 60ms

iv) Round Robin

(Time quantum = 1ms)



Process	Execution Time	Waiting Time	Turnaround Time
P ₁	10	0 + (5-1) + (8-6) + (10-9) + (12-11) + (14-13) = 9	10 + 9 = 19
P ₂	1	1	1 + 1 = 2
P ₃	2	2 + (6-3) = 5	2 + 5 = 7
P ₄	1	3	1 + 3 = 4
P ₅	5	4 + (7-5) + (9-8) + (11-10) + (13-12) = 9	5 + 9 = 14

Total Turnaround Time = 46ms

Total Waiting Time = 27ms