CSE 321

Scheduling Exercises

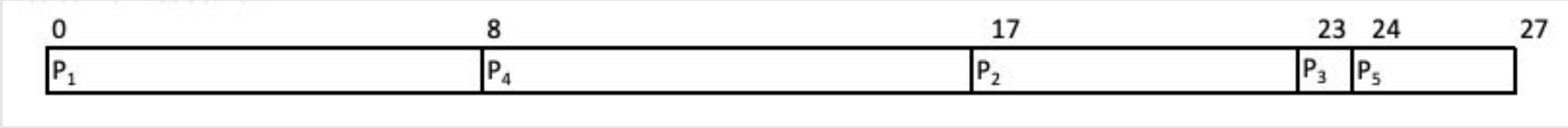
Problem – 1

Process	Burst Time	Arrival
P_1	8	0
P_2	6	2
P_3	1	2
P_4	9	1
P_5	3	3

- Draw its Gantt Chart considering FCFS.
- Calculate the average waiting time.
- Calculate the average turnaround time.

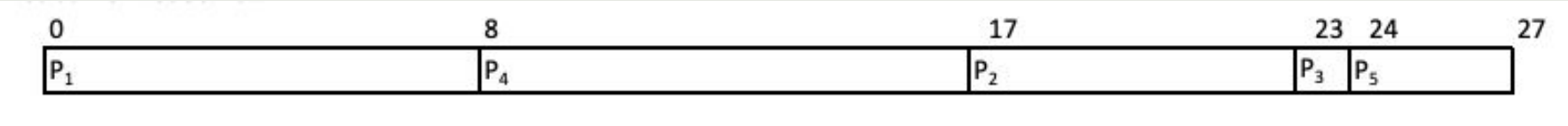
Problem – 1

Process	Burst Time	Arrival
P_1	8	0
P_2	6	2
P_3	1	2
P_4	9	1
P_5	3	3



Problem – 1: Gantt Chart

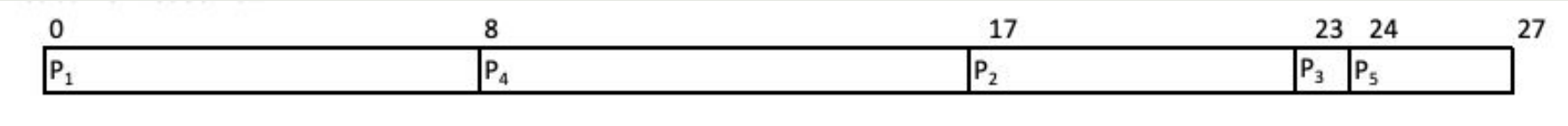
Process	Burst Time	Arrival
P_1	8	0
P_2	6	2
P_3	1	2
P_4	9	1
P_5	3	3



- Waiting time: $P_1 = 0$, $P_2 = 17 - 2$, $P_3 = 23 - 2$, $P_4 = 8 - 1$, $P_5 = 24 - 3$
- Average waiting time: $(0 + 15 + 21 + 7 + 21)/5 = 64/5 = 12.8$ms

Problem – 1: Gantt Chart

Process	Burst Time	Arrival
P_1	8	0
P_2	6	2
P_3	1	2
P_4	9	1
P_5	3	3



- Turnaround time: P_1 = 8, P_2 =21, P_3 = 22, P_4 = 16, P_5 = 24
- Average turnaround time: (8 + 21 + 22 + 16 + 24)/5 = 81/5 = 18.2ms

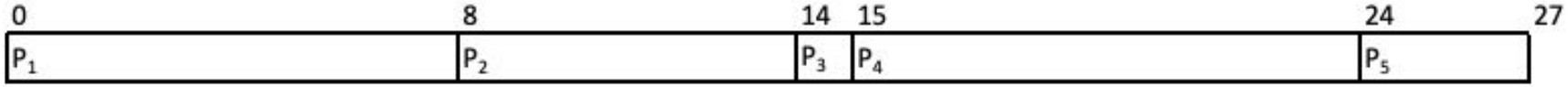
Problem – 2

Process	Priority	Burst Time	Arrival
P_1	4	8	0
P_2	1	6	2
P_3	2	1	2
P_4	2	9	1
P_5	3	3	3

- Draw its Gantt Chart considering Priority scheduling (Non-preemptive & preemptive).
- Calculate the average waiting time for each case
- Calculate the average turnaround time for each case
- Calculate the number of context switches (when applicable)

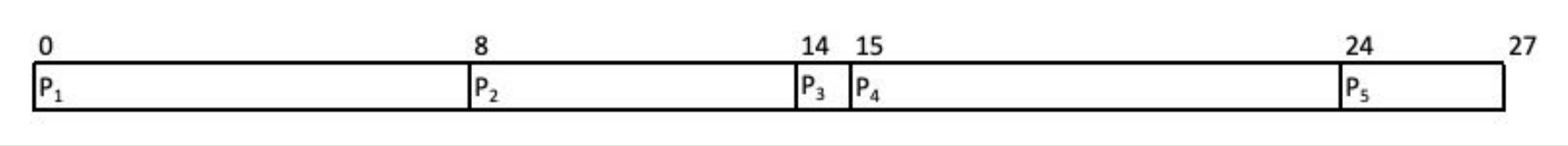
Problem – 2 (Non-preemptive)

Process	Priority	Burst Time	Arrival
P_1	4	8	0
P_2	1	6	2
P_3	2	1	2
P_4	2	9	1
P_5	3	3	3



Problem – 2 (Non-preemptive)

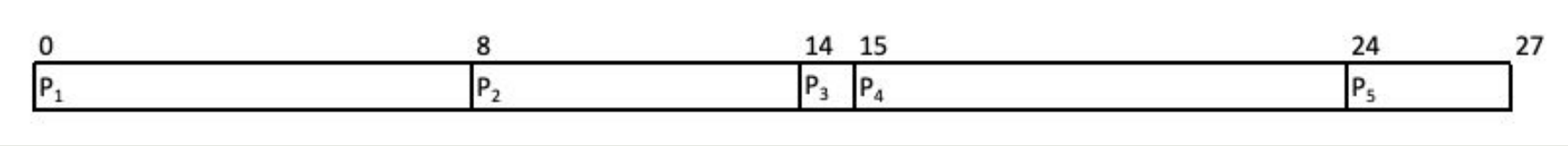
Process	Priority	Burst Time	Arrival
P_1	4	8	0
P_2	1	6	2
P_3	2	1	2
P_4	2	9	1
P_5	3	3	3



- Waiting time: $P_1 = 0$, $P_2 = 8 - 2$, $P_3 = 14 - 2$, $P_4 = 15 - 1$, $P_5 = 24 - 3$
- Average waiting time: $(0 + 6 + 12 + 14 + 21)/5 = 53/5 = 10.6$ms

Problem – 2 (Non-preemptive)

Process	Priority	Burst Time	Arrival
P_1	4	8	0
P_2	1	6	2
P_3	2	1	2
P_4	2	9	1
P_5	3	3	3



- Turnaround time: $P_1 = 8$, $P_2 = 14 - 2$, $P_3 = 15 - 2$, $P_4 = 24 - 1$, $P_5 = 27 - 3$
- Average Turnaround time: $(8 + 12 + 13 + 23 + 24)/5 = 80/5 = 16$ms

Problem – 2 (Preemptive)

Process	Priority	Burst Time	Arrival
P_1	4	8	0
P_2	1	6	2
P_3	2	1	2
P_4	2	9	1
P_5	3	3	3

Problem – 2 (Preemptive)

Process	Priority	Burst Time	Arrival
P_1	4	8	0
P_2	1	6	2
P_3	2	1	2
P_4	2	9	1
P_5	3	3	3

Problem – 2 (Preemptive)

Process	Priority	Burst Time	Arrival
P_1	4	8	0
P_2	1	6	2
P_3	2	1	2
P_4	2	9	1
P_5	3	3	3

- Waiting time: $P_1 = 0 + (20 - 1)$, $P_2 = 2 - 2$, $P_3 = 8 - 2$, $P_4 = (1 - 1) + 9 - 2$, $P_5 = 17 - 3$
- Average waiting time: $(19 + 0 + 6 + 7 + 14)/5 = 46/5 = 9.2$ms

Problem – 2 (Preemptive)

Process	Priority	Burst Time	Arrival
P_1	4	8	0
P_2	1	6	2
P_3	2	1	2
P_4	2	9	1
P_5	3	3	3

- Turnaround time: P_1 = 27, P_2 = 8 – 2 , P_3 = 9 – 2, P_4 = 17 – 1, P_5 = 20 – 3
- Average turnaround time: (27 + 6 + 7 + 16 + 17)/5 = 73/5 = 14.6ms

Problem – 2 (Preemptive)

Process	Priority	Burst Time	Arrival
P_1	4	8	0
P_2	1	6	2
P_3	2	1	2
P_4	2	9	1
P_5	3	3	3

- Number of context switches: 6

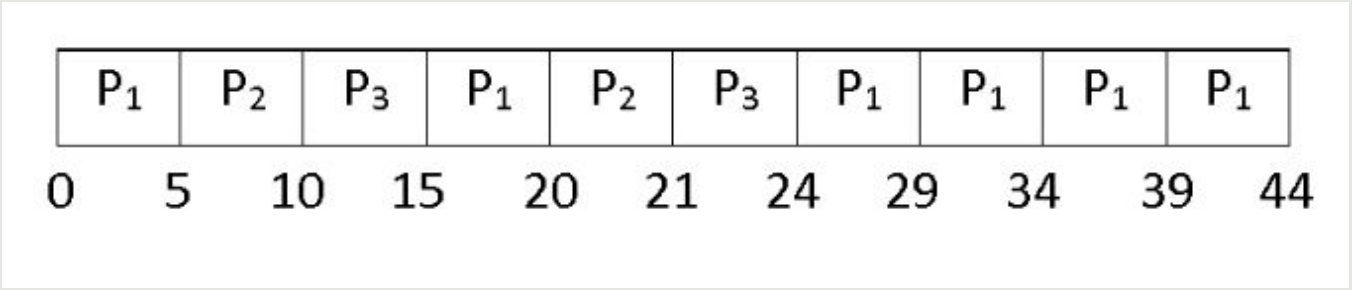
Problem – 3

Process	Burst Time
P_1	30
P_2	6
P_3	8

- Draw its Gantt Chart for RR (assume q = 5ms).
- Calculate the average waiting time
- Calculate the average turnaround time
- Calculate the number of context switches

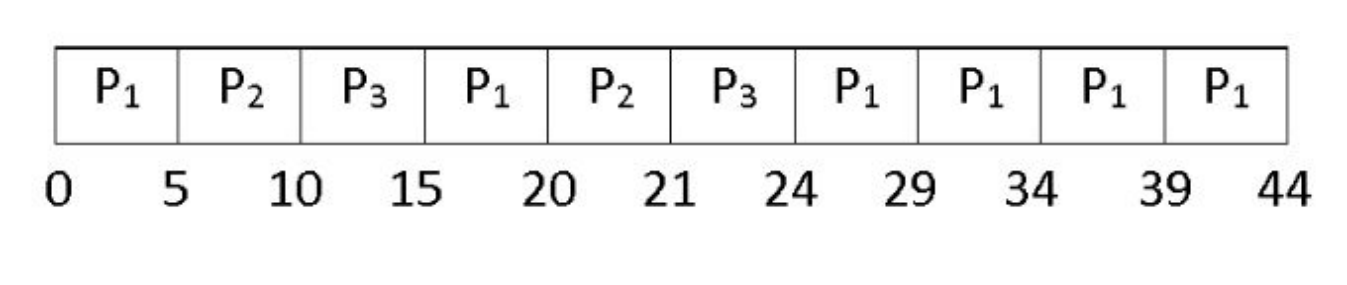
Problem – 3

Process	Burst Time
P_1	30
P_2	6
P_3	8



Problem – 3

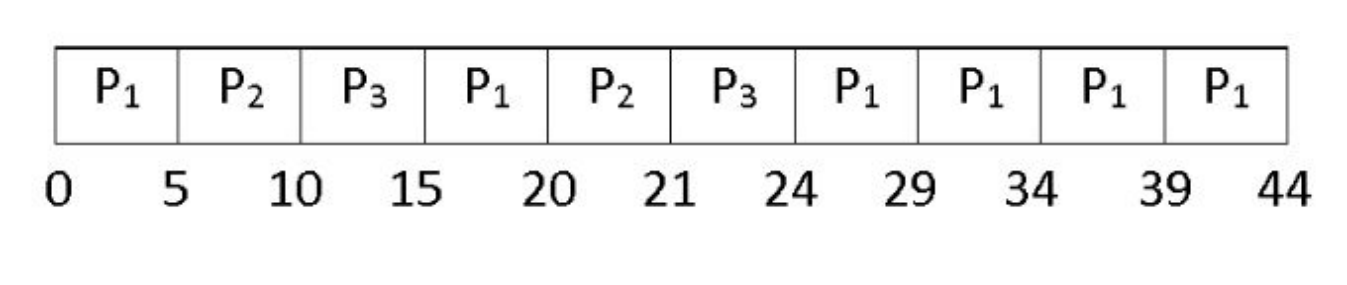
Process	Burst Time
P_1	30
P_2	6
P_3	8



- Waiting time: P_1 = 0 + (15 – 5) + (24–20), P_2 = (10 – 5) + (20 – 10), P_3 = 10 + (21 – 15)
- Average waiting time: (14 + 15 + 16)/3 = 45/9 = 15ms

Problem – 3

Process	Burst Time
P_1	30
P_2	6
P_3	8



- Turnaround time: $P_1 = 44$, $P_2 = 21$, $P_3 = 24$
- Average turnaround time: $(44 + 21 + 24)/3 = 89/3 = 29.66$ms

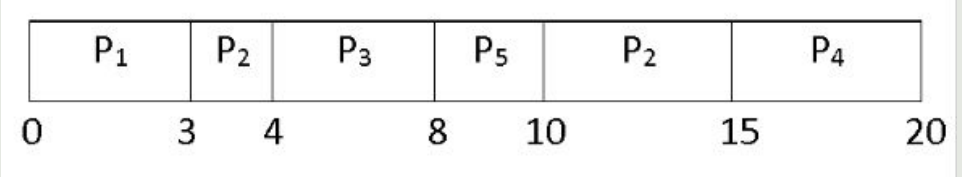
Problem – 4

Process	Burst Time	Arrival
P_1	3	0
P_2	6	2
P_3	4	4
P_4	5	6
P_5	2	8

- Draw its Gantt Chart for SRTF (Preemptive SJF)
- Calculate the average waiting time
- Calculate the average turnaround time

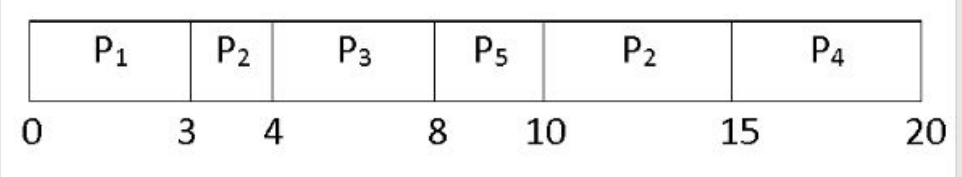
Problem – 4

Process	Burst Time	Arrival
P_1	3	0
P_2	6	2
P_3	4	4
P_4	5	6
P_5	2	8



Problem – 4

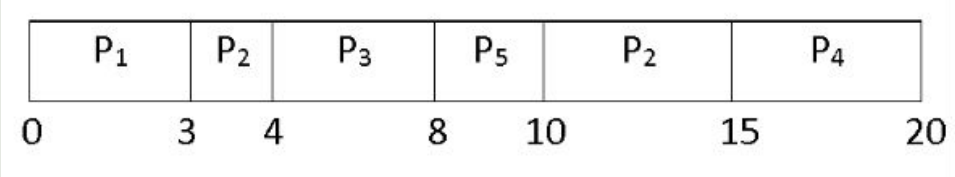
Process	Burst Time	Arrival
P_1	3	0
P_2	6	2
P_3	4	4
P_4	5	6
P_5	2	8



- Waiting time: $P_1 = 0$, $P_2 = (3 - 2) + (10 - 4)$, $P_3 = 0$, $P_4 = 15 - 6$, $P_5 = 8 - 8$
- Average waiting time: $(0 + 7 + 0 + 9 + 0)/5 = 16/5 = 5.33$ms

Problem – 4

Process	Burst Time	Arrival
P_1	3	0
P_2	6	2
P_3	4	4
P_4	5	6
P_5	2	8



- Turnaround time: $P_1 = 3$, $P_2 = (4 - 2) + (15 - 4)$, $P_3 = 4$, $P_4 = 20 - 6$, $P_5 = 10 - 8$
- Average turnaround time: $(3 + 13 + 4 + 14 + 2)/5 = 36/5 = 7.2$ms