Operating Systems Lab 07

Hafsa Salman - 22K-5161

Question no. 01 (FCFS)

Process	AT	BT	Completion time	TAT	WT	RT
P1	0	2	2	2	0	0
P2	1	3	5	4	1	1
P3	2	5	10	8	3	3
P4	3	4	14	11	7	7
P5	4	6	20	16	10	10

Gantt Chart:

P1	P2	P3	P4	P5

0   2   5   10   14   20
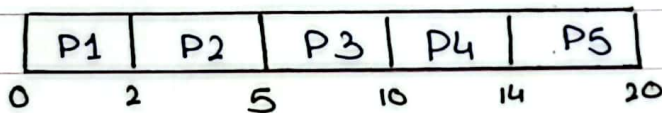
- Turn Around Time = Completion - Arrival
- Waiting time = Time TAT - Buest
- Response time = CPU 1st - Arrival

- Average waiting time

$$= \frac{0 + 1 + 3 + 7 + 10}{5} = 4.2$$

- Average turn around time

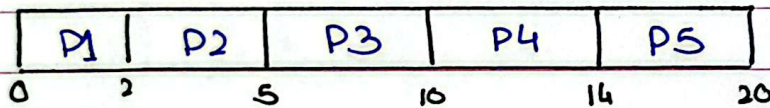$$= \frac{2 + 4 + 8 + 11 + 16}{5} = 8.2$$

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Question no. 02 (SJF)

Process	Arrival	Burst	Completion	TAT	WT	RT
P1	0	2	2	2	0	0
P2	1	3	5	4	1	1
P3	2	5	10	8	3	3
P4	3	4	14	11	7	7
P5	4	6	20	16	10	10

Gantt Chart

P1	P2	P3	P4	P5
0   2   5   10   14   20

- Average turn around time

$$= \frac{2 + 4 + 8 + 11 + 16}{5} = 8.2$$

- Average waiting time

$$= \frac{0 + 1 + 3 + 7 + 10}{5} = 4.2$$

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Question no. 03   (RR)
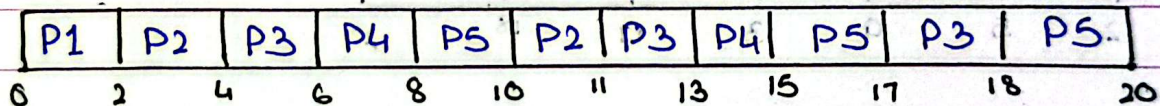
a) Time Quantum = 2

Process	AT	BT	CT	TAT	WT	RT
P1	0	2	2	2	0	0
P2	1	3	11	10	7	1
P3	2	5	18	16	11	2
P4	3	4	15	12	8	3
P5	4	6	20	16	10	4

Ready queue

P1	P2	P3	P4	P5	P2	P3	P4	P5	P3	P5

Grantt Chart

P1	P2	P3	P4	P5	P2	P3	P4	P5	P3	P5

0   2   4   6   8   10   11   13   15   17   18   20

- Average turn around time

$$\frac{2 + 10 + 16 + 12 + 16}{5} = 11.2$$

- Average waiting time

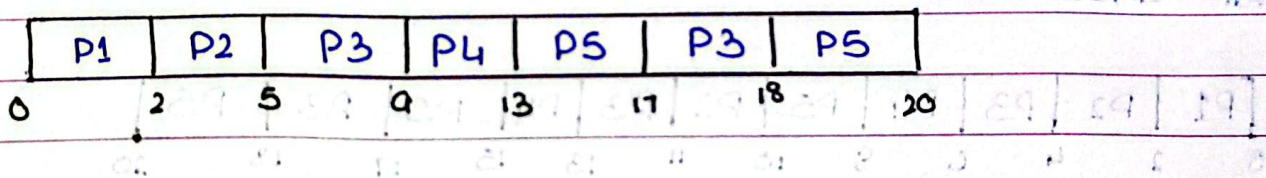$$= \frac{0 + 7 + 11 + 8 + 10}{5} = 7.2$$

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b) Time Quantum = 4

Process	AT	BT	CT	TAT	WT	RT
P1	0	7	27	2	0	
P2	1	3	5	4	1	
P3	2	5	18	16	11	
P4	3	4	13	10	6	
P5	4	6	20	16	10	

Ready Queue

P1	P2	P3	P4	P5	P3	P5

Gantt Chart

P1	P2	P3	P4	P5	P3	P5

0   2   5   9   13   17   18   20

Average turn around time

$$= \frac{2 + 4 + 16 + 10 + 16}{5} = 9.6$$

Average waiting time

$$= \frac{0 + 1 + 11 + 6 + 10}{5} = 5.6$$

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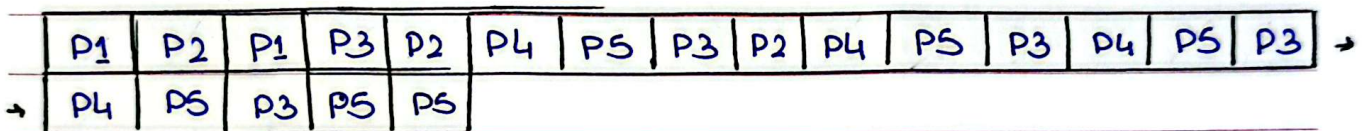
c) Time Quantum = 1

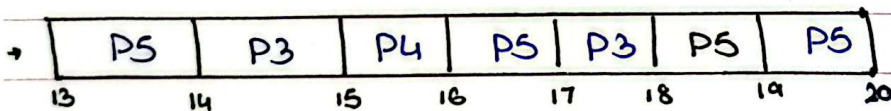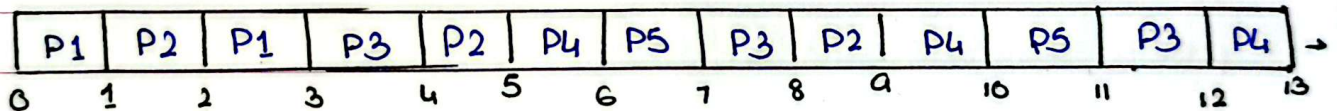| Process	AT	BT	CT	TAT	WT	RT
P1	0	2	3	3	1	0
P2	1	3	9	8	5	0
P3	2	5	18	16	11	1
P4	3	4	16	13	9	2
P5	4	6	20	16	10	2

Ready Queue

P1	P2	P1	P3	P2	P4	P5	P3	P2	P4	P5	P3	P4	P5	P3	→

→	P4	P5	P3	P5	P5

Gantt Chart

P1	P2	P1	P3	P2	P4	P5	P3	P2	P4	P5	P3	P4	→
0	1	2	3	4	5	6	7	8	9	10	11	12	13

→	P5	P3	P4	P5	P3	P5	P5
13	14	15	16	17	18	19	20

- Average turn around time:

$$= \frac{3 + 8 + 16 + 13 + 16}{5} = 11.2$$

- Average waiting time

$$= \frac{1 + 5 + 11 + 9 + 10}{5} = 7.2$$

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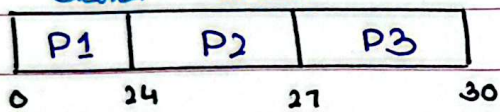
Question no. 04 (FCFS)

Process	Arrival	Burst	CT	TAT	WT	RT
P1	0	24	24	24	0	0
P2	0	3	27	27	24	24
P3	0	3	30	30	27	27

Gantt Chart

P1	P2	P3

0   24   27   30

Question no. 04 (SJF)

Process	AT	BT	CT	TAT	WT	RT
P1	0	24	30	30	6	6
P2	0	3	3	3	0	0
P3	0	3	6	6	3	3

Gantt Chart

P2	P3	P1

0   3   6   30
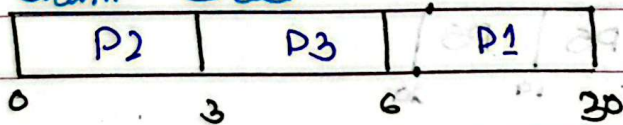
Question no. 04 (RR)

a) Time Quantum = 1

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Process	AT	BT	CT	TAT	WT	RT
P1	0	24	30	30	6	0
P2	0	3	8	8	5	1
P3	0	3	9	9	6	2

Ready Queue

P1	P2	P3	P1	P2	P3	P1	P2	P3	P1

Gantt Chart

P1	P2	P3	P1	P2	P3	P1	P2	P3	P1

0 1 2 3 4 5 6 7 8 9 30

b) Time Quantum = 2

Process	AT	BT	CT	TAT	WT	RT
P1	0	24	30	30	6	0
P2	0	3	9	9	6	2
P3	0	3	10	10	7	4

Ready Queue

P1	P2	P3	P1	P2	P3	P1

Gantt Chart

P1	P2	P3	P1	P2	P3	P1

0 2 4 6 8 9 10 30

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Question no. 05 (RR)
Time quantum = 2

Process	AT	BT	CT	TAT	WT	RT
P1	0	4	8	8	4	0
P2	1	5	18	17	12	1
P3	2	2	6	4	2	2
P4	3	1	9	6	5	5
P5	4	6	21	17	11	5
P6	5	3	19	14	11	8

Ready Queue

P1	P2	P3	P1	P4	P5	P6	P6	P5	P2	P6	P5

Gantt Chart

P1	P2	P3	P6 1	P4	P5	P2	P6	P5	P2	P6	P5
0	2	4	6	8	9	11	13	15	17	18	19	21

- Average turn around time

$$= \frac{8 + 17 + 4 + 6 + 17 + 14}{6} = 11$$

- Average waiting time

$$= \frac{4 + 12 + 2 + 5 + 11 + 11}{6} = 7.5$$