

OS Theory Assignment - 2

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Course MCA 1C

Q-1)

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

(A)

(b) FCFS

Process	Burst Time	TAT	WT
P ₁	10	10	0
P ₂	1	11	10
P ₃	2	13	11
P ₄	1	14	13
P ₅	5	19	14
		<u>67</u>	<u>48</u>

$$\text{Avg TAT} = \frac{67}{5}$$

$$\text{Avg WT} = \frac{48}{5}$$

Gantt chart

P_1	P_2	P_3	P_4	P_5	
0	10	11	13	14	19

(b) SJF Non Preemptive Scheduling

Process	BT	TAT	WT
P ₁	10	19	9
P ₂	1	1	0
P ₃	2	4	2
P ₄	1	2	1
P ₅	5	9	4
		<u>35</u>	<u>16</u>

$$\text{Avg TAT} = \frac{35}{5} = 7$$

$$\text{Avg WT} = \frac{16}{5} = 3.2$$

P_2	P_4	P_3	P_5	P_1	
0	1	2	4	9	19

c) Priority Scheduling

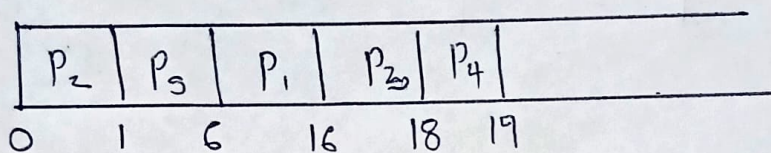
Here we would be considering Priority 1 as highest

Process	Priority	BT	TAT	WT
P ₁	3	10	16	6
P ₂	1	1	1	0
P ₃	3	2	18	16
P ₄	4	1	19	18
P ₅	2	5	6	1
			<u>60</u>	<u>41</u>

$$\text{Avg TAT} = \frac{60}{5} = 12$$

$$\text{Avg WT} = \frac{41}{5} = 8.2$$

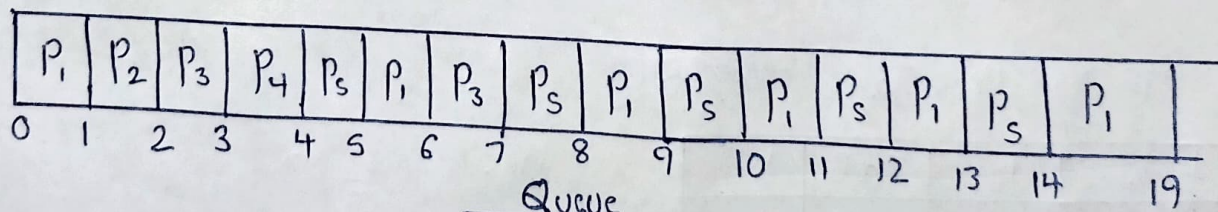
Gantt Chart



d) Round Robin (Preemptive) quantum = 1

Process	BT	TAT	WT
P ₁	10 ^{9 8 7}	19	9
P ₂	1 ⁰	2	1
P ₃	2 ¹⁰	7	5
P ₄	1 ⁰	4	3
P ₅	5 ^{4 3 2 1}	<u>14</u>	<u>9</u>
		46	27

Gantt Chart



Queue

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

(B) Turn Around Time (TAT)

a) FCFS

$$\begin{aligned} &= (10+11+13+14+19)/5 \\ &= 67/5 \\ &= 13.4 \text{ ms} \end{aligned}$$

b) SJF

$$\begin{aligned} &= (19+1+4+2+9)/5 \\ &= 35/5 = 7 \text{ ms} \end{aligned}$$

c) Priority

$$\begin{aligned} &= (16+1+18+19+6)/5 \\ &= 60/5 \\ &= 12 \text{ ms} \end{aligned}$$

d) Round Robin

$$\begin{aligned} &= (19+2+7+4+14)/5 \\ &= 46/5 \\ &= 9.2 \text{ ms} \end{aligned}$$

(C) Waiting Time (WT)

a) FCFS

$$\begin{aligned} &= (0+10+11+13+14) \\ &= 48/5 \\ &= 9.6 \text{ ms} \end{aligned}$$

b) SJF

$$\begin{aligned} &= (9+0+2+1+4)/5 \\ &= 16/5 = 3.2 \text{ ms} \end{aligned}$$

c) Priority

$$\begin{aligned} &= (6+0+16+18+1)/5 \\ &= 41/5 \\ &= 8.2 \text{ ms} \end{aligned}$$

d) Round Robin

$$\begin{aligned} &= (9+1+5+3+9)/5 \\ &= 27/5 \\ &= 5.4 \text{ ms} \end{aligned}$$

(D)

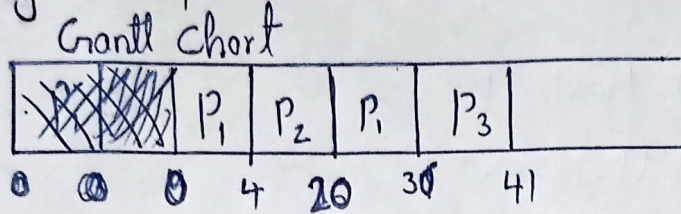
SJF has the minimum average waiting time (either non preemptive or preemptive since they give the same result in this case).

Q-2)

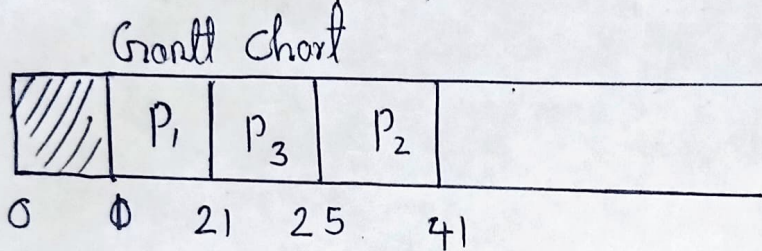
Process	AT	BT	Priority
P ₁	1	20 ^{16 12 8}	2
P ₂	4	16 ^{16 8}	1
P ₃	5	4 ⁰	5

(A)

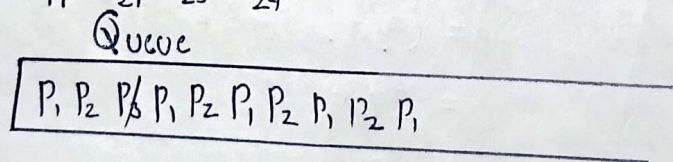
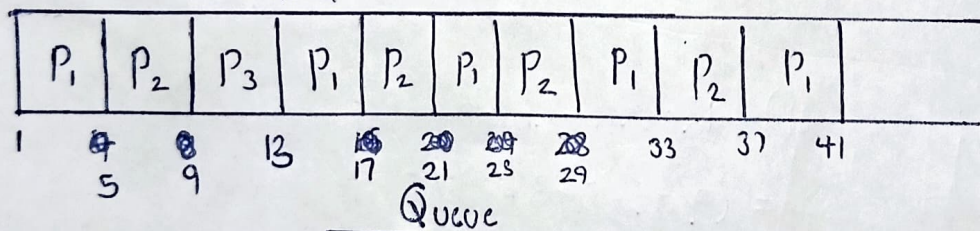
a) Priority (Preemptive)



b) SJF (Non-Preemptive)



c) Round Robin Time Quantum = 4



(B) Avg Waiting Time

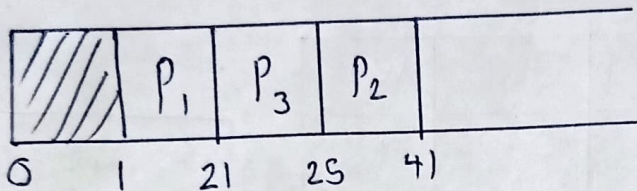
i) Priority

Process	AT	BT	Priority	CT	TAT	WT
P ₁	1	20	2	36	35	15
P ₂	4	16	1	20	16	0
P ₃	5	4	5	41	35	32
					<u>87</u>	<u>47</u>

$$\text{Avg WT} = \frac{47}{3} = 15.66$$

(ii) SJF (Non Preemptive)

Process	AT	BT	Priority	CT	TAT	WT
P ₁	1	20	2	21	20	0
P ₂	4	16	1	41	37	21
P ₃	5	4	3	25	20	16
					<u>77</u>	<u>37</u>



$$\text{Avg WT} = 37/3 = 12.34$$

iii) Round Robin (Time Quantum = 4)

Process	AT	BT	Priority	CT	TAT	WT
P ₁	1	20	2	41	40	20
P ₂	4	16	1	37	33	17
P ₃	5	4	3	13	8	4
					<u>81</u>	<u>41</u>

$$\text{Avg waiting Time} = \frac{41}{3} = 13.67$$

(c) Average Turn Around Time

i) Priority = $88/3 = 29$

ii) SJF = $77/3 = 25.66$

iii) Round Robin = $81/3 = 27$

Q-3

Process	BT	AT
P ₁	8	0
P ₂	5	1
P ₃	2	2
P ₄	4	2

ii) Preemptive SJF

Process	AT	BT	CT	TAT	WT
P ₁	0	8 ⁷	23	23	15
P ₂	1	5 ^{4.5}	15	14	9
P ₃	2	2 ⁰	4	2	0
P ₄	2	4	9	7	3

$$\text{Avg WT} = \frac{27}{4} = 6.75$$

Gantt chart

P ₁	P₂	P ₃	P₄	P ₄	8	P ₂	8	P ₁	
0	1	2	4	5	9	10	15	16	23

iii) Round Robin (TQ=2)(Context switching 1)

Process	AT	BT	CT	TAT	WT
P ₁	0	8 ^{6.25}	28	28	20
P ₂	1	5 ^{3.1}	25	24	19
P ₃	2	2 ⁰	8	6	4
P ₄	2	4 ^{2.0}	20	18	14

$$\text{Avg WT} = 57/4 = 14.25$$

Gantt chart

P ₁	8	P ₂	8	P ₃	8	P ₄	8	P ₁	8	P ₂	8	P ₄	8	P ₁	8	P ₂	
0	2	3	5	6	8	9	11	12	14	15	17	18	20	23	25	26	28

Queue

P ₁	P ₂	P ₃	P ₄	P ₁	P ₂	P ₃	P ₁	P ₂	P ₁
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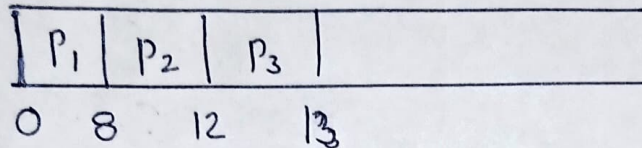
8	P ₁
23	26

Q-4)

Process	AT	BT	CT	TAT	WT
P ₁	0.0	8	8	8	0
P ₂	0.4	4	12	11.6	7.6
P ₃	0.8	1	13	12.2	11.2
				<u>31.8</u>	

i) FCFS

Gantt Chart



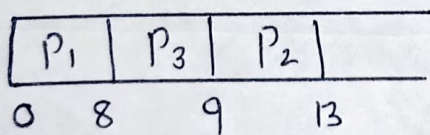
$$\text{Avg TAT} = 31.8/3$$

$$= 10.6 \text{ sec}$$

ii) SJF

Process	AT	BT	CT	TAT	WT
P ₁	0.0	8	8	8	0
P ₂	0.4	4	13	12.6	8.6
P ₃	0.8	1	9	8.2	7.2
				<u>28.8</u>	

Gantt Chart



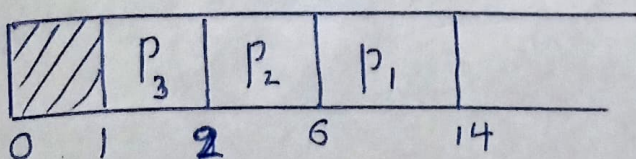
$$\text{Avg TAT} = 28.8/3$$

$$= 9.6 \text{ sec}$$

iii)

Process	AT	BT	CT	TAT	WT
P ₁	0.0	8	14	14	6
P ₂	0.4	4	6	5.6	1.6
P ₃	0.8	1	2	1.2	0.2
				<u>20.8</u>	

Gantt Chart



$$\text{Avg TAT} = 20.8/3$$

$$= 6.933 \text{ sec}$$