Operating System
BSCS - 5A

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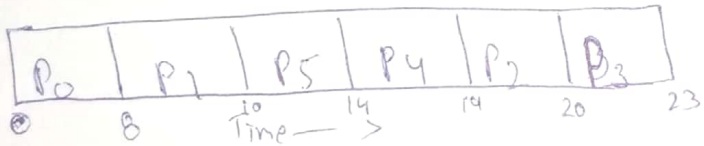
Assignment No. 1

QNo.1)

(i) FCFS (Non-preemptive)

Process	B.T	A.T	P	C.T	TAT	W.T
P_0	8	0	5	8	8	0
P_1	2	2	4	10	8	6
P_2	1	4	6	20	16	15
P_3	3	6	3	23	17	14
P_4	5	5	2	19	14	9
P_5	4	3	7	14	11	7

Grant chart :-



Average Turnaround Time = (8 + 8 + 16 + 17 + 14 + 11)/6 = 14

Average Waiting Time = (0 + 6 + 7 + 9 + 15 + 14)/6 = 9.17

Advantage

1) simple and easy to understand
2) No starvation
3) No priority Inversion

disadvantage

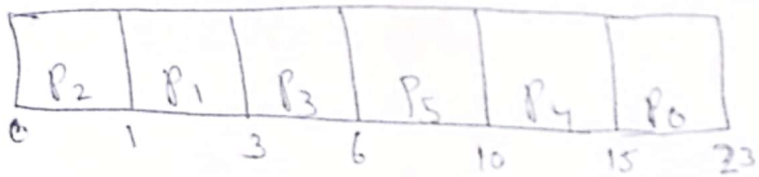
1) convoy effect
2) No consideration of priority
3) Inefficient use of CPU

(2)

(ii) SJF (Non preemptive)

Process No	C.T	TAT	W.T
P_0	23	23	15
P_1	3	4	2
P_2	1	1	0
P_3	6	9	6
P_4	15	15	10
P_5	10	12	8

Grant chart



Average TAT = $\frac{1+4+9+12+15+23}{6} = \frac{64}{6} = \boxed{10.6}$

Average W.T = $\frac{0+2+6+8+10+15}{6} = \boxed{6.8}$

Advantage

1) Minimization of waiting time
2) No starvation
3) Optimal Average TAT

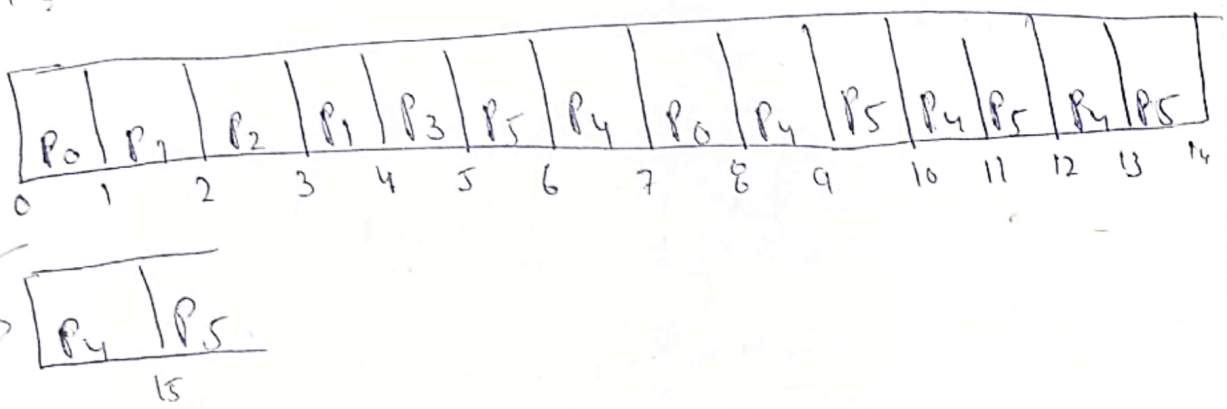
disadvantage

1) Predicting burst time
2) Convoy effect
3) Possibility of Indefinite waiting

SJF (preemptive)

Process No	TAT	WT
P0	23	15
P1	4	2
P2	3	2
P3	10	7
P4	15	10
P5	12	8

Grant chart :



Average TAT = $\frac{23+4+3+10+15+12}{6} = \boxed{11.1}$

Average WT = $\frac{15+2+2+7+10+8}{6} = \boxed{7.3}$

advantage

1) Responsiveness
2) Adaptability
3) Optimal TAT

disadvantage

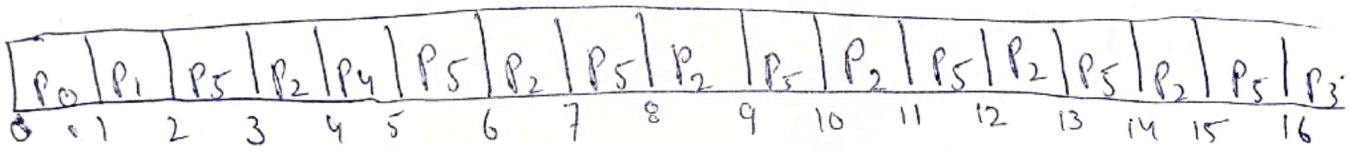
1) Priority Inversion
2) Starvation possibility
3) difficulty in implementation

(3)

(iii) preemptive priority

Process No	B.T	P	A.T	TAT	WT
P0	6	3	0	16	10
P1	3	5	2	4	1
P2	4	2	4	15	11
P3	2	4	6	10	8
P4	5	1	5	14	9
P5	7	7	3	16	9

Grant chart:-



Average TAT = $\frac{16+4+16+15+14+10}{6} = \boxed{12.5}$

Average WT = $\frac{10+1+9+11+9+8}{6} = \boxed{8}$

advantages

1) Responsiveness
2) Adaptability
3) Optimal priority Handling

disadvantages

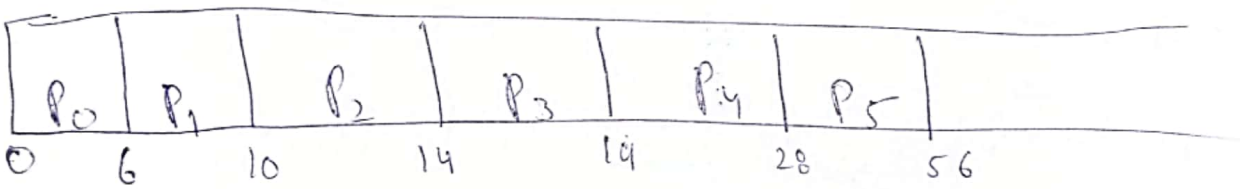
1) priority Inversion
2) starvation possibility
3) Complexity

Non - preemptive priority:

According to same data

Process No	TAT	WT
P_0	56	50
P_1	4	1
P_2	19	15
P_3	10	8
P_4	14	9
P_5	49	42

Grant chart :-



Average TAT = $\frac{56 + 4 + 19 + 10 + 14 + 19}{6}$ = 20.33

Average WT = $\frac{50 + 1 + 15 + 8 + 9 + 42}{6}$ = 20.83

advantages

- Predictability
- Reduced context switching Overhead
- priority Inversion Avoidance

disadvantages

- potential for Poor Response time
- Inefficient Resource Utilization
- Convoy effect

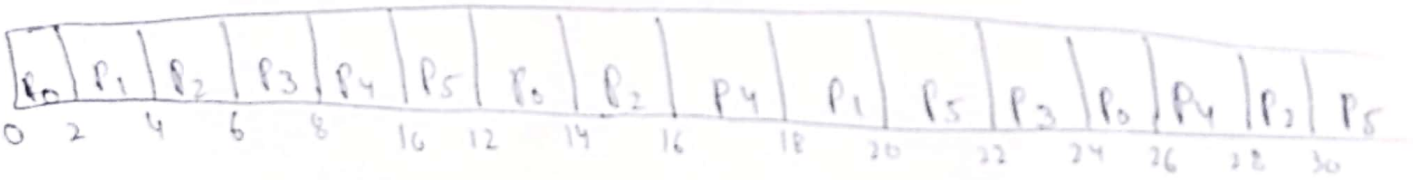
(4)

(iv) **Round Robin (RR)**- Non preemptive

According to some data that I use in (iii) task

Process No	TAT	WT
P_0	24	18
P_1	12	9
P_2	24	20
P_3	8	6
P_4	26	21
P_5	30	23

Grant Chart:-



Average TAT = $\frac{24+12+24+8+26+30}{6} = \boxed{20.66}$

Average WT = $\frac{18+9+20+6+21+23}{6} = \boxed{16.16}$

Advantage

- Fairness
- Response Time
- simple implementation

disadvantage

- Throughput
- long TAT
- limited for Real-time system