

L 2-1

Scheduling Algorithm

- P Way of selecting process from ready queue and put it on the CPU.
- According to degree of multi programming we try to keep multiple processes in ready queue. Where is ready queue?
→ Inside RAM

Scheduling Algorithms

Pre emptive

- Shortest Remaining Time First (SRTF)
- LRTF (Longest ...)
- Round Robin
- Priority based

Non pre-emptive

- FCFS (First Come First Serve)
- SJF (Shortest Job First)
- LJF (Longest Job First)
- HRRN (Highest Response Ratio First)
- Multi level Queue

- From **Suspend** → **Backing Store** **Suspend Ready**
 might happen if even suspend is full.
- PS command to get process information.

L2.2 CPU Scheduling

Arrival → Time at which process enters ready queue

Burst time → Time required by process to get executed on CPU

Completion time → Time at which process completed its execution

Turnaround time → Completion time - arrival time

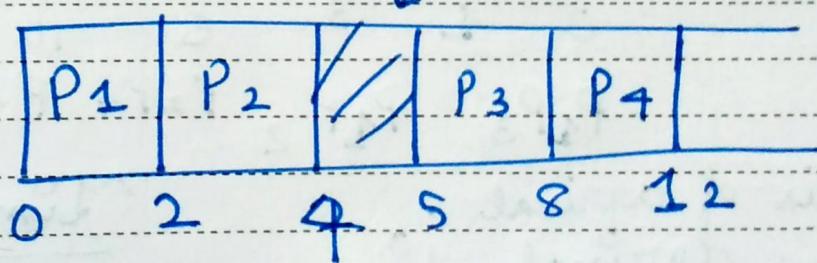
Waiting time → Turnaround time - Burst time

Response time → Time at which process gets CPU first time - Arrival time

Criteria : "Arrival Time", Mode: "Non - Preemptive"

L2.3	FCFS	First Come First Serve				
Process No.	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P ₁	0	2	2	2	0	0
P ₂	1	2	4	3	1	1
P ₃	5	3	8	3	0	0
P ₄	6	4	12	6	2	2
<u>P₅</u>						

Gantt Chart



Time →

$$TAT = CT - AT$$

$$WT = TAT - BT$$

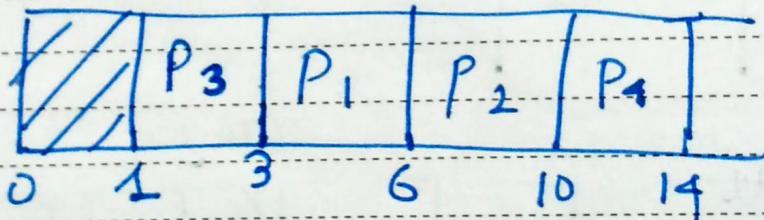
RT = WT in non pre-emption

To Criteria Burst Time
Mode :- Non Preemptive

L2.4 Shortest Job First (SJF)

Process No.	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P ₁	1	3	6	5	2	3
P ₂	2	4	10	8	4	7
P ₃	1	2	3	2	0	0
P ₄	4	4	14	10	6	6

Gantt Chart



P₁ P₃ P₁ P₂ P₂ P₄ P₄

choose on basis of arrival time
 In arrival time is same choose the process with lesser process id.

$$TAT = CT - AT$$

$$WT = TAT - BT$$

Criteria: "Burst Time"; Mode: "Pre-emption"

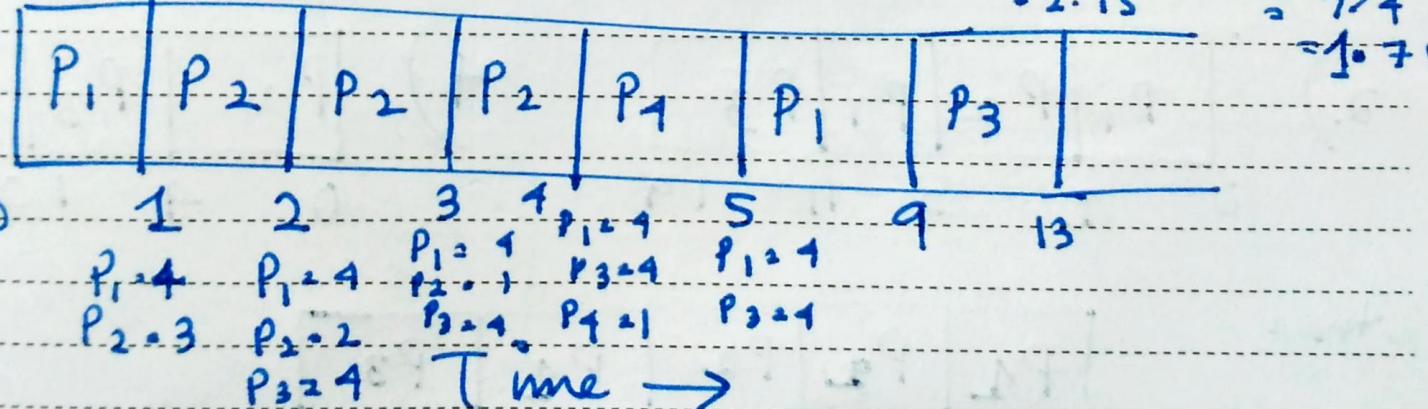
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Shortest Remaining Time First
(SJF with Pre-emption)

Process No.	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P ₁	0	5	9	9	9	80
P ₂	1	3	4	3	0	80
P ₃	2	1	13	11 12	7	97
P ₄	4	1	5	1	0	0

$$\text{Avg TAT} = \frac{2+4+4+1}{4} = 3, \text{Avg WT} = \frac{1+1+0+0}{4} = 0.75, \text{Avg RT} = \frac{80+80+97+0}{4} = 54.25$$

Gantt chart



$$TAT = CT - AT$$

$$WT = TAT - BT$$

$$WRT = \{ CPU \text{ first time} - AT \}$$

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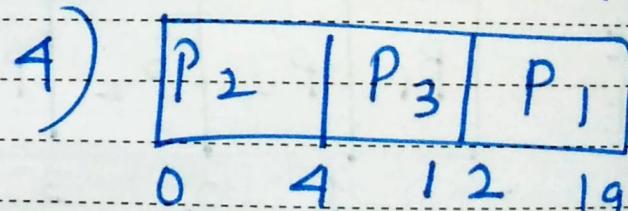
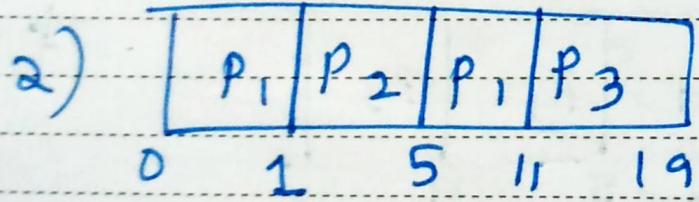
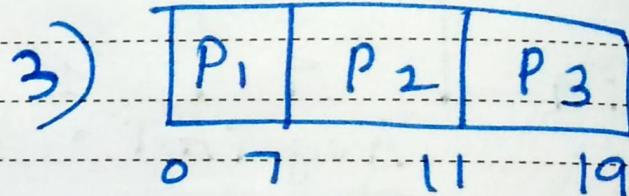
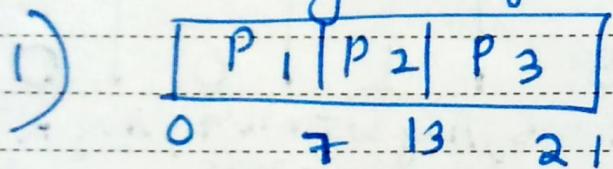
SJF

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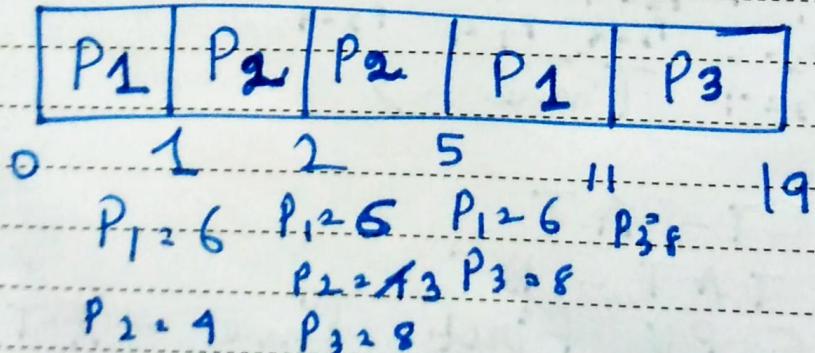
Process	Arrival Time	Burst Time
P ₁	0	7
P ₂	1	4
P ₃	2	8

→ SRTF

Gantt Chart for Pre-emptive, SJF
Scheduling algorithm is .



Ans 2



Round Robin

Criteria :-

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"Time Quantum"

Mode :-

"Preemptive"

Process No.	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P ₁	0	3	12	12	7	0
P ₂	1	2	11	10	6	1
P ₃	2	4	6	4	2	2
P ₄	4	1	9	5	4	4

$$TQ = 2$$

Ready Queue

P ₁	P ₂	P ₃	P ₄	P ₁	P ₂	P ₁
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Running Queue

P ₁	P ₂	P ₃	P ₁	P ₁	P ₂	P ₁
0	2	4	6	8	9	11

Ready \rightarrow Running
 Content switching
 (Save content of running)

How many times
 context switching
 occurs

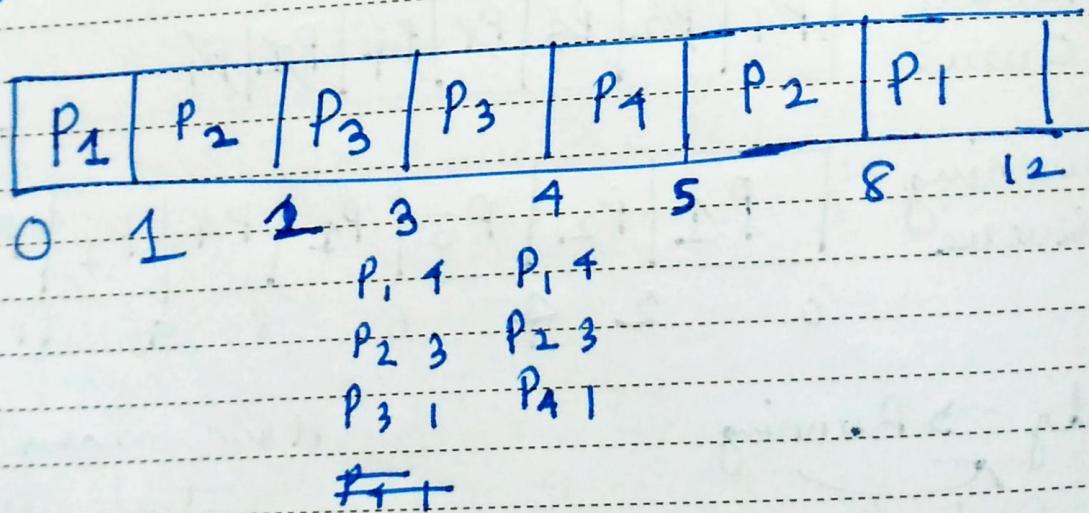
$$\cancel{2+1=3} \\ = 6$$

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Criteris Priority
Mode: Preemptive

Priority	Process No.	Arrival Time	Burst Time	Completion Time	TAT	WT
10	P ₁	0	5A ₀	12	12	7
20	P ₂	1	4B ₀	8	7	3
30	P ₃	2	2X ₀	4	2	0
40	P ₄	4	10	5	1	0

Higher number, higher priority



If same priority, choose on basis of arrival time.