

L-2.1

Process Scheduling Algorithms (Preemption VS Non-preemption)

Scheduling Algorithms

Pre-emptive
(without ~~any~~ interrupts)

→ SJRTF (Shortest Remaining Time First)

→ LRFTF (Longest Remaining Time First)

→ Round Robin

→ Priority Based

Non-preemptive
(Without interrupts)

→ FCFS (First Come First Serve)

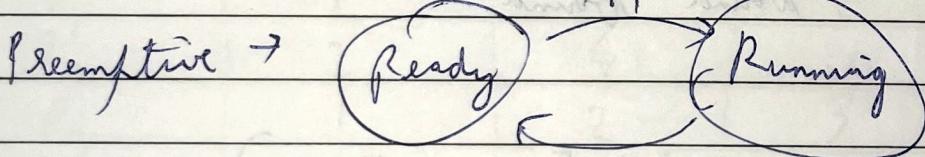
→ SJF (Shortest Job First)

→ LJP (Longest Job First)

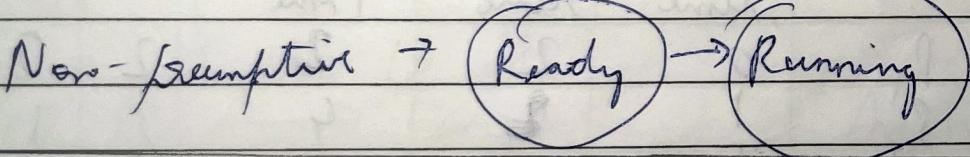
→ HRRN (Highest Response Ratio Next)

→ Multilevel Queue

Multilevel Multiprogramming → Keep maximum process in ready queue.



The reason due to transition is due to time quantum, and priority



L-2.2

What is Arrival, Burst, Completion, Turnaround, Waiting

Avg Response time in CPU Scheduling

Arrival time: The time at which process enters the ~~the~~ Ready Queue or State
Duration

Burst time} Time required by a process to get executed on CPU

Completion time: The time at which process completes its execution

Turnaround time: $(\text{Completion time}) - (\text{Arrival time})$

Waiting time: $(\text{Turnaround time}) - (\text{Burst time})$

Response time: $(\text{Time at which a process gets CPU first time}) - (\text{Arrival time})$

Process



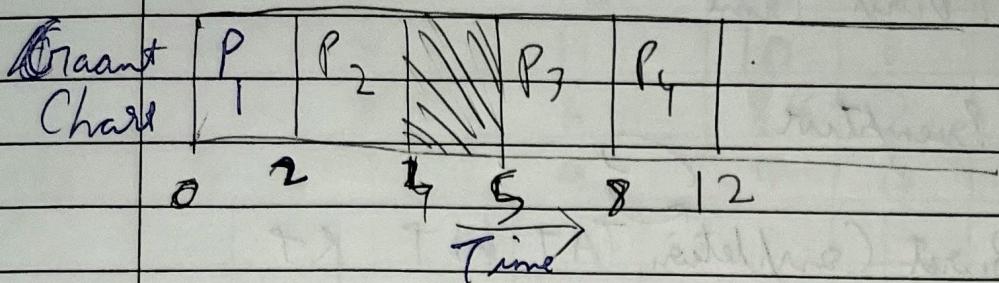
CPU I/O
Round Round

L-23 First Come First Serve (FCFS)

Process No	Arrival time	Burst time	Completion Time	TAT	WT	RT
P ₁	0	2	2	2	0	0
P ₂	1	3	4	3	1	1
P ₃	5	3	8	3	0	0
P ₄	6	4	12	6	2	8

Criteria : Arrival Time

Mode : Non-Preemptive



$$\text{Avg TAT} = \frac{15}{4} = 3.75$$

$$\text{Avg WFT} = \frac{3}{4} = 0.75$$

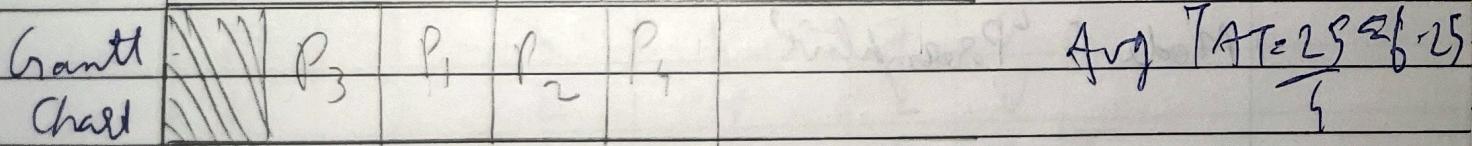
L2-4 Shortest Job First (SJF)

Criteria : Burst Time

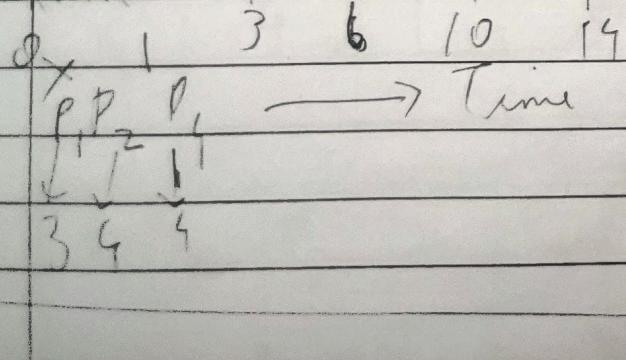
Mode : Non-Preemptive

Same ↗

Process No	Arrival Time	Burst Time	Completion Time	TAT	WTR
P ₁	1	3	6	5	2
P ₂	2	4	10	8	4
P ₃	4	2	6	2	0
P ₄	7	4	11	4	6



$$\text{Avg TAT} = \frac{29}{5} = 5.8$$



$$\text{Avg WFT} = \frac{12}{5} = 2.4$$

L-2.5

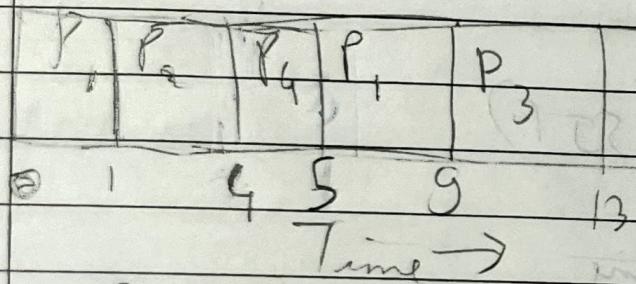
Shortest Remaining Time First (SJF with Preemption)

Criteria: Burst Time

Mode: Preemptive

Process No	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P ₁	0	5	9	9	9	0
P ₂	1	3	3	4	0	0
P ₃	2	4	9	13	97	97
P ₄	4	1	4	5	0	0

Gantt Chart

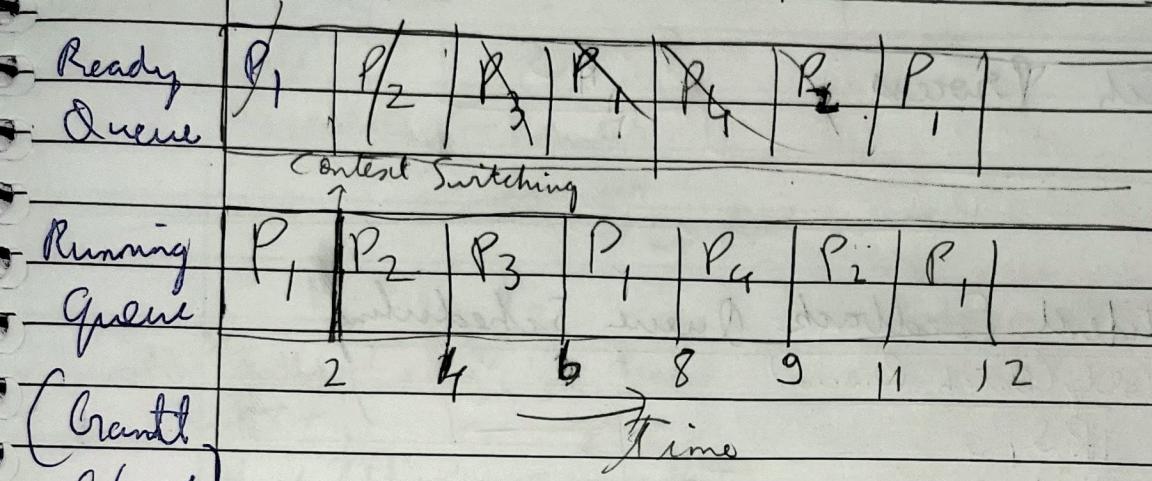


L-2.7 Round Robin (RR)

Criteria: 'Time Quantum'

Mode: 'Preemptive'

Process no.	Arrival Time	Burst Time	Completion Time	TAT	WT	RT	Grd., $TQ = 2$
P ₁	0	3	12	12	7	0	
P ₂	1	2	11	10	6	1	
P ₃	2	4	6	8	4	2	
P ₄	4	1	9	5	4	4	

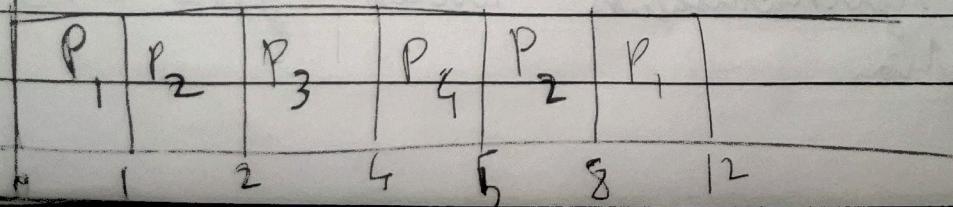


$$\text{No. of context switches} = 6$$

$L = 2 \cdot 8$ Preemptive Priority Scheduling Algorithm

Criteria: Priority, Mode: Preemptive
Higher the no, higher the priority

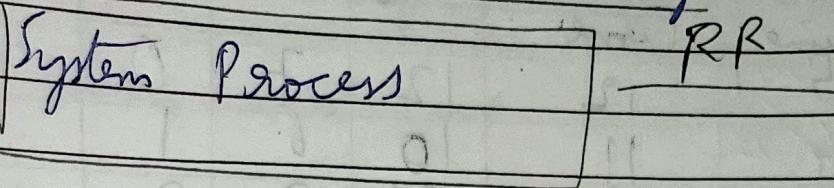
Priority	Process no.	Arrival Time	Burst Time	Completion Time	TAT	WT	P
10	P ₁	0	4	12	12	7	1
20	P ₂	1	3	8	7	3	2
30	P ₃	2	2	4	2	0	3
40	P ₄	4	1	5	1	0	4



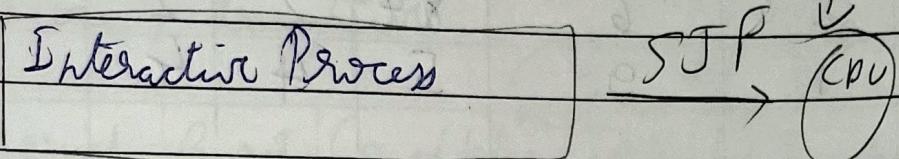
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Multilevel Queue Scheduling

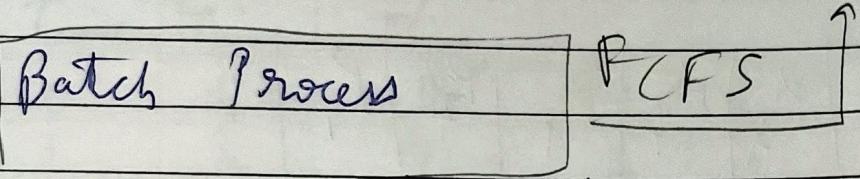
Highest Priority



Medium Priority



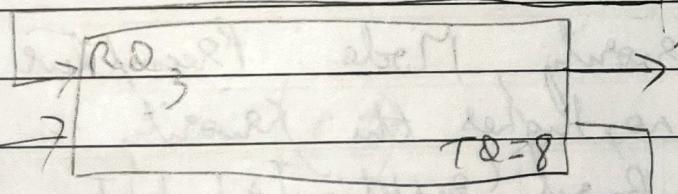
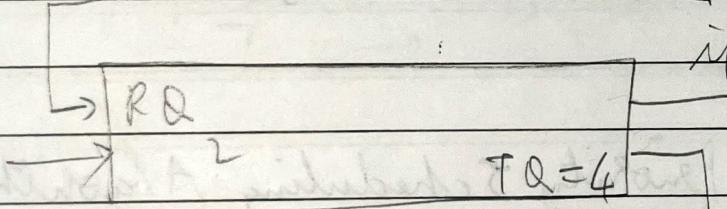
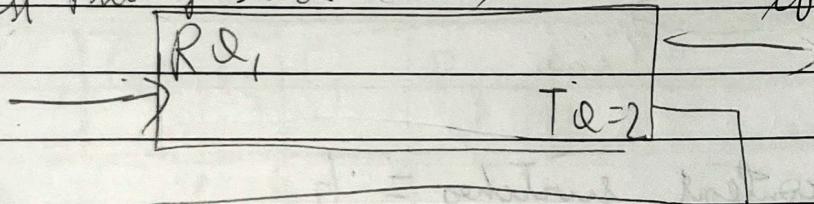
Lowest Priority



L-2-11

Multilevel Feedback Queue Scheduling

Lowest Priority (Batch Process)



High Priority
Priority

