Which process goes to CPU? (Ready → Running)

Scheduling Algorithms

Non-preemptive
1. FCFS (First Come First Serve)
2. SJF (Shortest Job First)
3. LJF (Longest Job First)
4. HRRN (Highest Response Ratio Next)
5. Multilevel queue

Preemptive
(for greater responsiveness and priority reasons)

1. SRTF : Shortest Remaining Time First
2. LRTF : Longest Remaining Time First
3. Round Robin
4. Priority Based

CPU Scheduling

1. Arrival Time : Time at which process enters the ready queue
2. Burst Time : Time required by a process to get executed on CPU.
3. Completion Time : Time at which process completes its execution
4. Turn Around Time : Completion Time − Arrival Time
5. Waiting Time : TAT − Burst Time
6. Response Time : [The time at which a process gets CPU first time] − Arrival time

FCFS (First Come First Serve)

Criteria : Arrival Time
Mode : Preemptive

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

GANT CHART

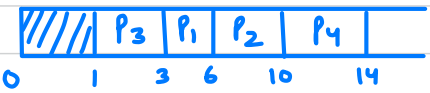
SJF (Shortest Job First)

Criteria : Burst Time
Mode : Non-preemptive

TAT = CT − AT
WT = TAT − BT

Process NO	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P_1	1	3	6	5	2	2
P_2	2	4	10	8	4	4
P_3	1	2	3	2	0	0
P_4	4	4	14	10	6	6

GANT CHART



WT and RT are same in case of non-preemptive because the process gets executed completely when it gets the CPU

$$\text{Avg TAT} = \frac{25}{4} = 6.25$$

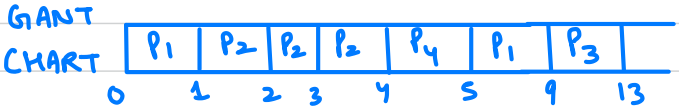
$$\text{Avg WT} = \frac{12}{4} = 3$$

SRTF (Shortest Remaining Time First)

Criteria : Burst Time
Mode : Preemptive

Process NO	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P_1	0	5	9	9	4	0
P_2	1	3	4	3	0	0
P_3	2	4	13	11	7	7
P_4	4	1	5	1	0	0

GANT CHART



$$\text{Avg TAT} = \frac{24}{4} = 6$$

$$\text{Avg WT} = \frac{11}{4} = 2.75$$

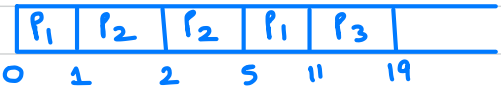
$$\text{Avg RT} = \frac{7}{4} = 1.75$$

Q

Process NO	Arrival Time	Burst Time
P_1	0	7
P_2	1	4
P_3	2	8

The Gantt chart for preemptive SJF scheduling algorithm is ?

Sol



Round Robin

Process NO	Arrival Time	Burst Time	Completion Time	TAT	WT	RT
P_1	0	5	12	12	7	0
P_2	1	4	11	10	6	1
P_3	2	2	6	4	2	2
P_4	4	1	9	5	4	4

Criteria : Time Quantum → Unit of time the CPU will execute a process before switching to another process

Mode : Preemptive

Time Quantum = 2

Context Switching

Save running process → bring new process through

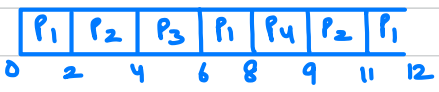
PCB (Process Control Block)

(Has all the information of process)

Every process has its own pcb

Ready Queue : P_1 P_2 P_3 P_1 P_4 P_2 P_1

Running Queue :



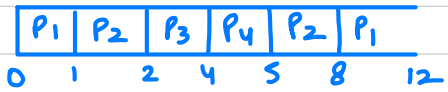
Q How many context switches?

Sol 6

Preemptive Priority

Priority	Process NO	Arrival Time	Burst Time	Completion Time	TAT	WT
10	P_1	0	5	12	12	7
20	P_2	1	4	8	7	3
30	P_3	2	2	4	2	0
40	P_4	4	1	5	1	0

Higher no, higher priority



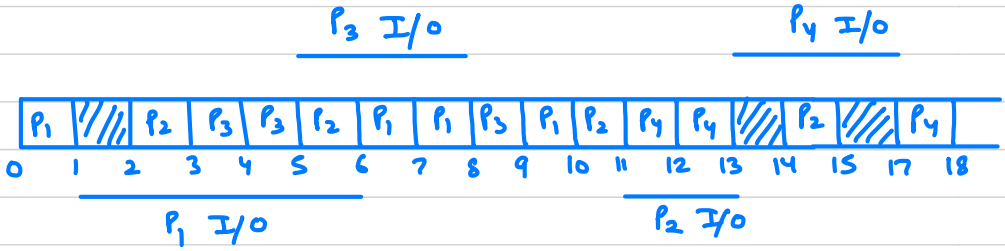
Criteria : Priority
Mode : Preemptive

Mix Burst Time (CPU & I/O)

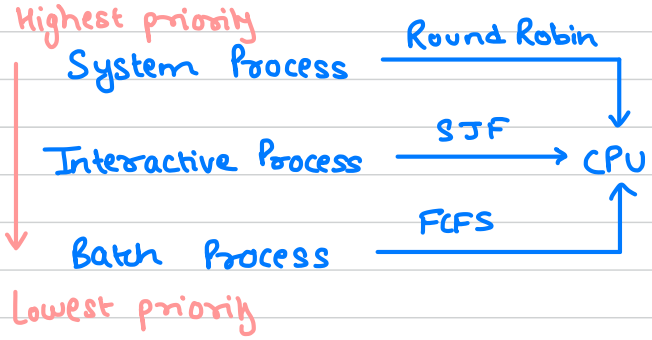
Process	AT	Priority	CPU	I/O	CPU	Find CT CT
P_1	0	2	1	5	3	10
P_2	2	3	3	3	1	15
P_3	3	1	2	3	1	9
P_4	3	4	2	4	1	18

Lower no, higher priority

Mode : preemptive
Criteria : priority based



Multi-level queue Scheduling



Instead of having one ready queue, we have multiple queue

We are categorizing the processes according to their different real-life scenario

But if there are too many system processes, batch process will not get its turn due to low priority

Multilevel Feedback Queue Scheduling (Solution for multi-level queue scheduling)