CPU SCHEDULING ALGORITHMS:

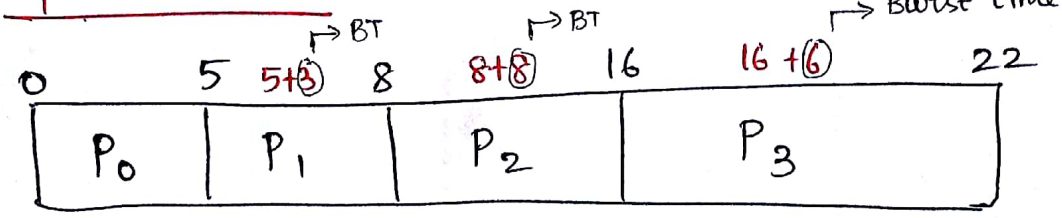
* FCFS → first come first serve
* SJF → shortest job first.
* SRT → Shortest Remaining Time.
* Priority based scheduling
* Round robin based scheduling.

FCFS:

CT - AT TAT - BT

Process	Arrival time (AT)	Burst time (BT)	completion time (CT)	Turnaround time (TAT)	waiting time (WT)
P_0	0	5	5	5	0
P_1	1	3	8	7	4
P_2	2	8	16	14	6
P_3	3	6	22	19	13

Gantt chart:



* completion time values are found by using Gantt chart.

$$\text{Avg (TAT)} = \frac{\text{tot (TAT)}}{\text{no. of process}} = \frac{5+7+14+19}{4}$$

$$= \frac{45}{4} = 11.25 \text{ msec}$$

$$\text{Avg (WT)} = \frac{0+4+6+13}{4} = \frac{23}{4} = 5.75 \text{ msec}$$

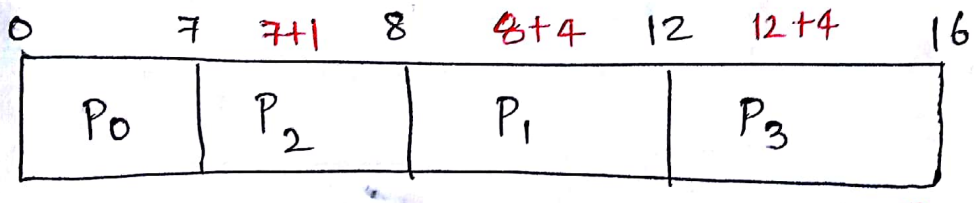
SJF: (check notes for Explanation)

* Shortest Job First
* Non - preemptive

→ AT → Arrival time
BT → Burst time
CT → Completion time
TAT → Turnaround time
WT → Waiting time

Process	AT	BT	CT	TAT	WT
P_0	0	7	7	7	0
P_1	2	4	12	10	6
P_2	4	1	8	4	3
P_3	5	4	16	11	7
				tot: 32	tot: 16

Gantt chart:



$$\text{Avg (TAT)} = \frac{32}{4} = \boxed{8 \text{ msec.}}$$

$$\text{Avg (WT)} = \frac{16}{4} = \boxed{4 \text{ msec.}}$$

∵ P_0 & P_1 are shortest processes.
∵ P_0 completed.
∵ P_1 P_2 P_3 are remaining in Queue
∵ P_1 P_2 P_3
4 1 4 ⇒ BT values
∵ In the above processes check BT values.
∵ P_2 is small.
∵ remaining P_1 P_3 with same BT values
∵ Take small process as P_1 → first
P_3 → Last.

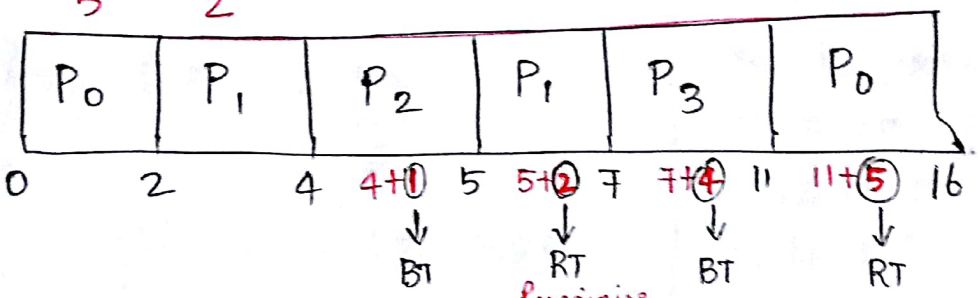
SRT:

* Shortest Remaining Time
* Preemptive. (A process is pause the process & switching over to another process depending upon some criteria)

Process	AT	BT	CT	TAT (CT − AT)	WT (TAT − BT)
P_0	0	7	16	16	9
P_1	2	4	7	5	1
P_2	4	1	5	1	0
P_3	5	4	11	6	2

→ Remaining Time for P_0 & P_1 (Shortest processes)

7−2 = 5 ; 4−2 = 2



$$\text{Avg (TAT)} = \frac{28}{4} = \boxed{7 \text{ msec.}}$$

$$\text{Avg (WT)} = \frac{12}{4} = \boxed{3 \text{ msec.}}$$

∵ P_0 & P_1 are the two shortest processes.

∵ As given in the name we need to find remaining time (RT) for P_0 & P_1

⇒ P_0 = BT → 7, AT → 2 } 7−2 = 5

P_1 = BT → 4, AT → 2 } 4−2 = 2

∵ other P_2 & P_3 are calculated with BT.

Priority Based Scheduling:

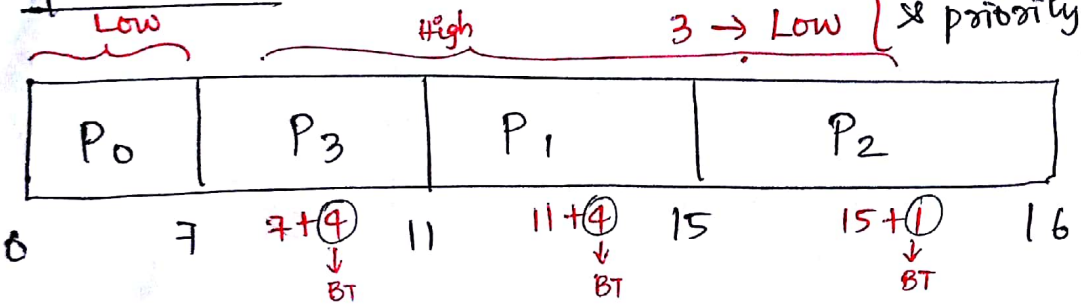
CT-AT TAT-BT

Process	Priority	AT	BT	CT	TAT	WT
P_0	3	0	7	7	7	0
P_1	2	2	4	15	13	9
P_2	4	4	1	16	12	11
P_3	1	5	4	11	6	2

P_0 & P_3 ⇒ Low & High process.

1 → High } check with process
3 → Low } & priority values.

Gnatt chart:



∵ first finish off the P_0 process. Since it is Low priority.

∵ Next High priority with P_1 P_2 P_3 processes.

∵ start with P_3 with BT value 4

↳ P_3 : 1 → High

∵ Next P_1 with BT value 4

↳ P_1 : 2 → High

∵ Next P_0 → we completed already.

∵ Next P_2 with BT value 4

↳ P_2 : 4 → High

$$\text{Avg (TAT)} = \frac{38}{4}$$

$$= \boxed{9.5 \text{ msec.}}$$

$$\text{Avg (WT)} = \frac{22}{4}$$

$$= \boxed{5.5 \text{ msec.}}$$

Round Robin based Scheduling:

Quantum value = 3 msec.

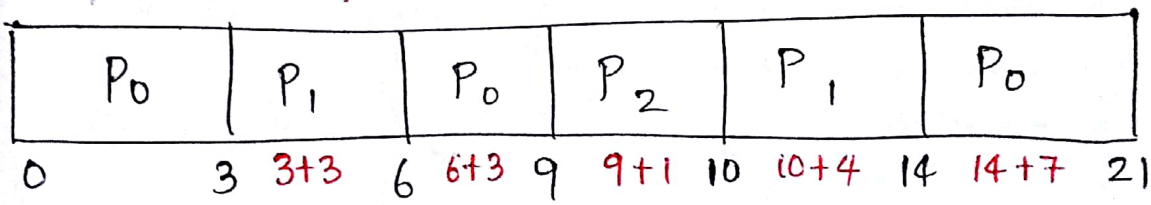
↓

Also called as time slice.

Process	AT	BT	CT	CT − AT (TAT)	TAT − BT (WT)
P_0	0	7	21	21	14
P_1	2	4	14	12	8
P_2	4	1	10	6	5

Quantum: Maximum time CPU given to the process at a single point of time.

Short process



$$\text{Avg (TAT)} = \frac{39}{4} = 9.75 \text{ msec}$$

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

∵ P_0 & P_1 are short process add with the Quantum values.
∵ and after that all the three processes are added with the Burst time (BT) values.