Shortest Job First (SJF)

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TRUST

Shortest Job First Pre-emptive

- While a process is running if a process with lower burst time arrives then it will pre-empt the currently running process.

- Whenever a new process arrives check whether its burst time is less than the remaining burst of currently running process.

- It is also called as Shortest Remaining Time First (SRTF) / Shortest Remaining Time Next (SRTN)

Example 1 for Preemptive SJF (SRTF)

Process	Arrival Time	Burst Time
P_1	0.0	7
P_2	2.0	4
P_3	4.0	1
P_4	5.0	4

- Time 0 – P_1 gets the CPU   Ready = [(P_1,7)]
- Time 2 – P_2 arrives – CPU has P_1 with time=5, Ready = [(P_2,4)] – P_2 gets the CPU
- Time 4 – P_3 arrives – CPU has P_2 with time = 2, Ready = [(P_1,5),(P_3,1)] – P_3 gets the CPU
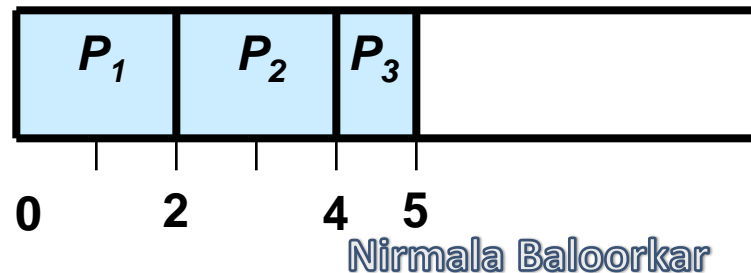
P_1	P_2	P_3	

0   2   4   5

Example 1 for Preemptive SJF (SRTF)

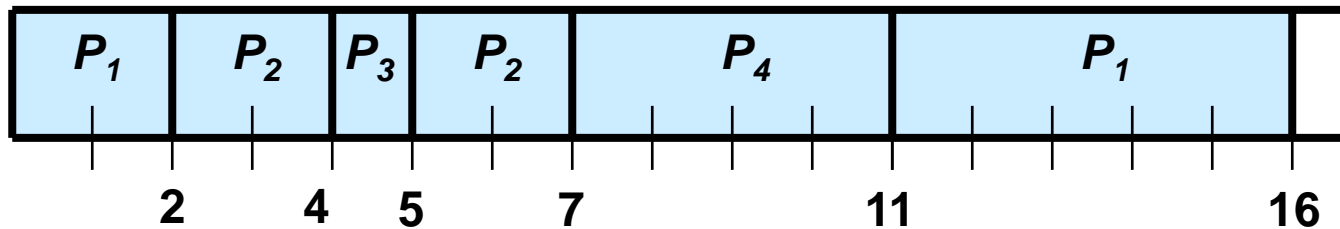| Process	Arrival Time	Burst Time
P_1	0.0	7
P_2	2.0	4
P_3	4.0	1
P_4	5.0	4

- Time 5 – P_3 completes and P_4 arrives - Ready = [(P_1,5),(P_2,2),(P_4,4)] – P_2 gets the CPU
- Time 7 – P_2 completes – Ready = [(P_1,5),(P_4,4)] – P_4 gets the CPU
- Time 11 – P_4 completes, P_1 gets the CPU
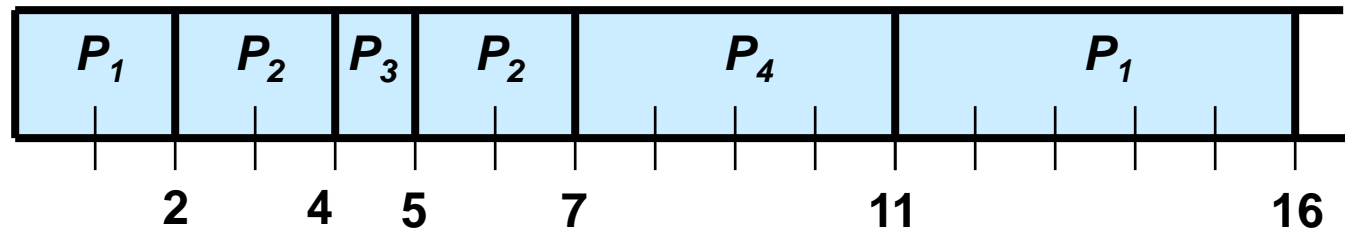
P_1	P_2	P_3	P_2	P_4	P_1

2   4   5   7   11   16

Example 1 for Preemptive SJF (SRTF)

Process	Arrival Time	Burst Time
P_1	0.0	7
P_2	2.0	4
P_3	4.0	1
P_4	5.0	4

Turnaround Time = Completion Time – Arrival Time

P_1	P_2	P_3	P_2	P_4	P_1

2   4 5   7   11   16
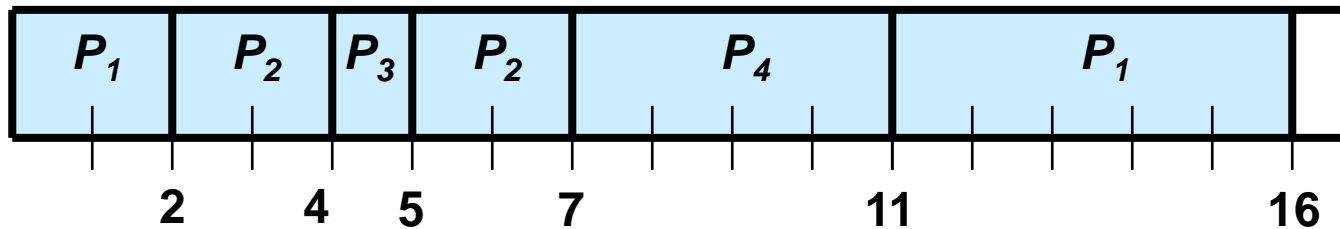
- Turnaround Time p1=16 ,p2=5,p3=1,p4=6
- Average Turnaround time = (16 + 5 + 1 +6)/4 = 7ms

Example 1 for Preemptive SJF (SRTF)

Process	Arrival Time	Burst Time
P_1	0.0	7
P_2	2.0	4
P_3	4.0	1
P_4	5.0	4

Waiting Time = Turnaround Time – Burst Time

P_1	P_2	P_3	P_2	P_4	P_1

2   4   5   7   11   16

- Turnaround Time p1=16 ,p2=5,p3=1,p4=6
- Waiting Time p1=9 ,p2=1,p3=0,p4=2
- Average waiting time time = (9 + 1 + 0 +2)/4 = 3ms

Example 2 of Shortest-remaining-time-first

Process	*Arrival* Time	Burst Time
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

- Time 0 – P_1 gets the CPU   Ready = [(P_1,8)]
- Time 1 – P_2 arrives – CPU has P_1 with rem. time=7, Ready = [(P_2,4)] – P_2 gets the CPU
- Time 2 – P_3 arrives – CPU has P_2 with rem. time = 3, Ready = [(P_1,7)(P_3,9)]   – P2 continues with the CPU
- Time 3- P4 arrives- CPU has P2 with rem. time=2, Ready =[(P_1,7)(P_3,9)(P4,5)] – P2 continues with the CPU
- After P2 finishes, then P4 executes , then P1 , finally P3
- *Preemptive* SJF Gantt Chart

P_1	P_2	P_4	P_1	P_3

0   1   5   10   17   26
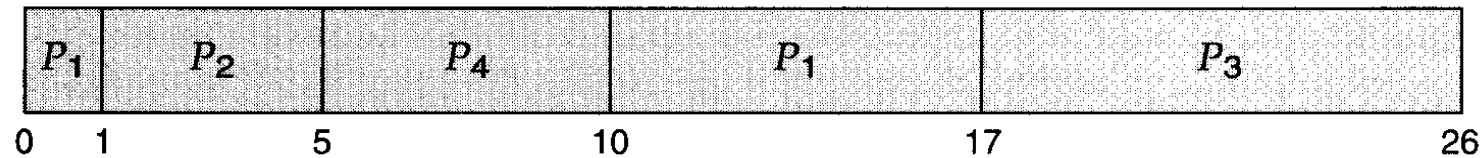
- Average waiting time = [(10-1)+(1-1)+(17-2)+(5-3)]/4 = 26/4 = 6.5 msec

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Example 3 SRTF

process	Burst time	Arrival time
P1	6	2
P2	2	5
P3	8	1
P4	3	0
P5	4	4

SJF(P) is also commonly referred as Shortest Remaining Time First Algorithm (SRTF)

It suffers from Starvation

Question ?