

Operating System:

✓ CPU Scheduling: SJF & SRTF

By: Vishvadeep Gothi



VISHVADEEP GOTHI SIR

AIR 19

in GATE 2010



**ME from IISc Bangalore
MTech BITS Pilani (Data Sc.)**



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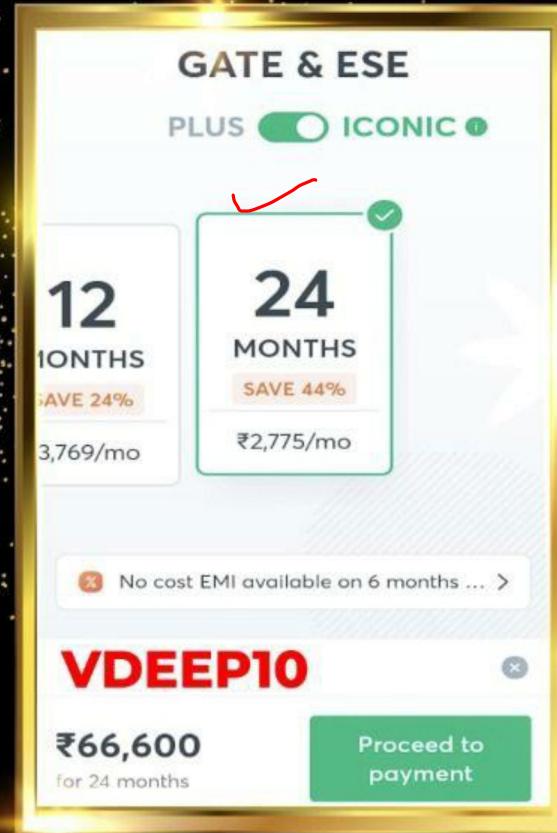
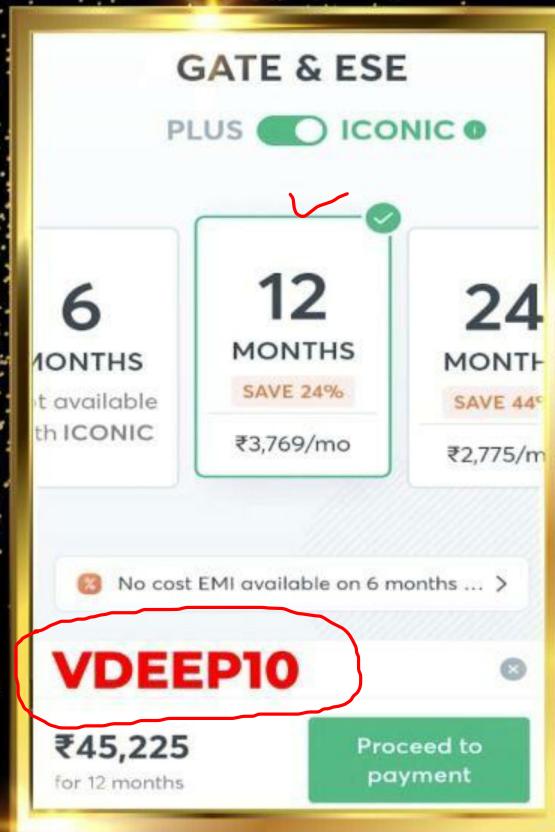
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SJF (Shortest Job First)

- ◎ Criteria: BT (smallest BT process first)
 - Tie-breaker: FCFS
- ◎ Type: non-preemptive



SJF (Shortest Job First)

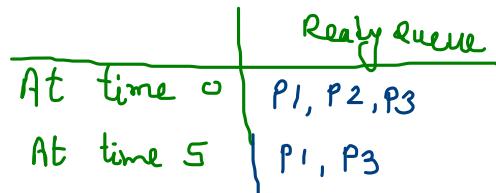
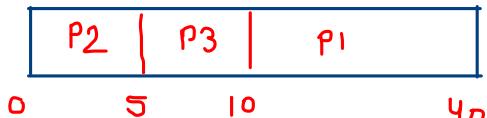
Process	AT	Burst Time
P1	0	30
P2	0	5
P3	0	5

SJF (Shortest Job First)



Process	Arrival Time	Burst Time	Completion Time	Turnaround Time	Waiting Time
P1	0	30	40	40	10
P2	0	5	5	5	0
P3	0	5	10	10	5

Gantt chart :-



$$\text{avg TAT} = \frac{55}{3} = 18.33$$

$$\text{avg WT} = \frac{15}{3} = 5$$



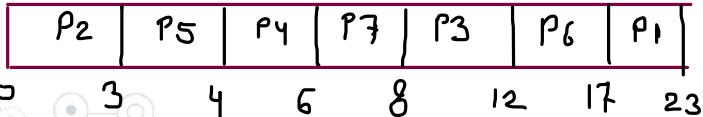
SJF (Shortest Job First)

Process	Arrival Time	Burst Time
P1	0	6
P2	0	3
P3	1	4
P4	2	2
P5	3	1
P6	4	5
P7	6	2



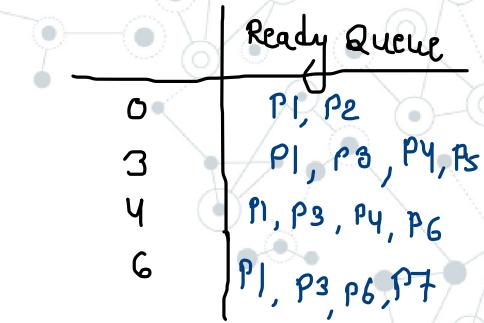
SJF (Shortest Job First)

Process	Arrival Time	Burst Time	Completion Time	Turnaround Time <small>CT - AT</small>	Waiting Time <small>TAT - BT</small>
P1	0	6	23	23	17
P2	0	3	3	3	0
P3	1	4	12	11	7
P4	2	2	6	4	2
P5	3	1	4	1	0
P6	4	5	17	13	8
P7	6	2	8	2	0



$$L = 23 - 0 = 23$$

$$\text{throughput} = \frac{7}{23}$$



$$\text{avg TAT} = \frac{54}{7}$$

$$\text{avg WT} = \frac{34}{7}$$

SJF (Shortest Job First)

Homework Question

Process	Arrival Time	Burst Time
P1	0	4
P2	4	3
P3	6	1
P4	3	5
P5	8	2

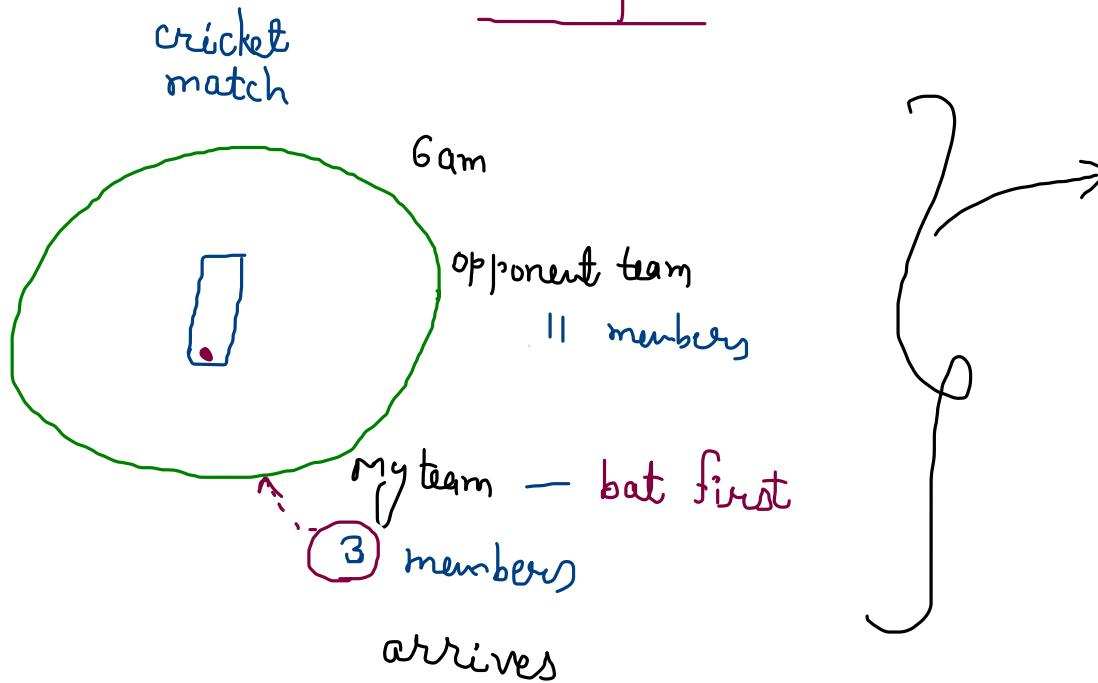


SJF (Shortest Job First)

Homework

Process	Arrival Time	Burst Time	Completion Time	Turnaround Time	Waiting Time
P1	0	4			
P2	4	3			
P3	6	1			
P4	3	5			
P5	8	2			

Example



SRTF (Shortest Remaining Time First)

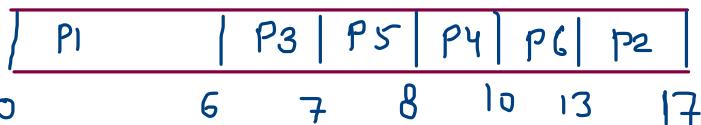
- ◎ Criteria: βT
 - Tie-breaker: FCFS
- ◎ Type: *Pre-emptive*



SRTF (Shortest Remaining Time First)

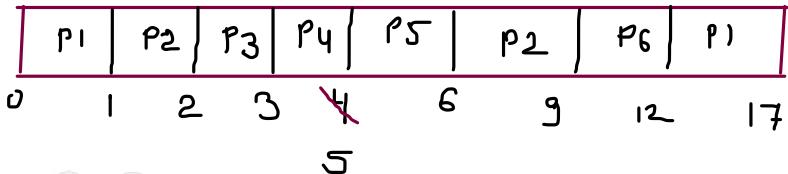
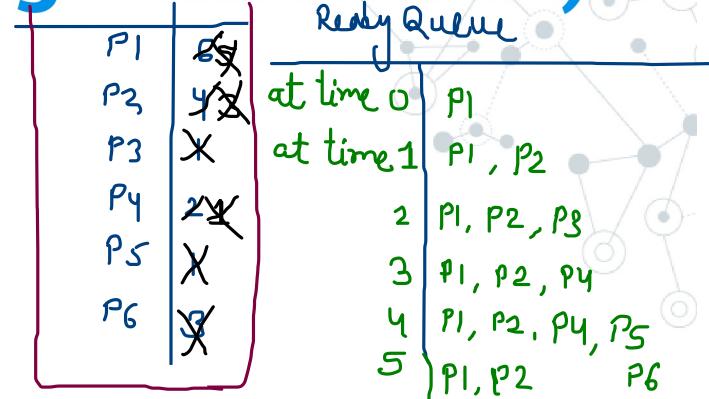
Process	Arrival Time	Burst Time
P1	0	6
P2	1	4
P3	2	1
P4	3	2
P5	4	1
P6	5	3

SJF :-



SRTF (Shortest Remaining Time First)

Process	Arrival Time	Burst Time
P1	0	6
P2	1	4
P3	2	1
P4	3	2
P5	4	1
P6	5	3



no. of context switches = 7

SRTF (Shortest Remaining Time First)

Process	Arrival Time	Burst Time	Completion Time	Turnaround Time	Waiting Time	Response Time
P1	0	6	17	17	11	0
P2	1	4	9	8	4	0
P3	2	1	3	1	0	0
P4	3	2	5	2	0	0
P5	4	1	6	2	1	1
P6	5	3	12	7	4	4

$$\text{avg TAT} = \frac{37}{6}$$

$$\text{avg WT} = \frac{20}{6}$$



Question GATE-2006

H. ω.

Consider three CPU intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6 respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm?

Do not count the context switches at time zero and at the end

- (A) 1
- (C) 3
- (B) 2
- (D) 4

Question GATE-2006

H. ω.

Consider three processes (process id 0, 1, 2 respectively) with compute time bursts 2, 4 and 8 time units. All processes arrive at time zero. Consider the longest remaining time first (LRTF) scheduling algorithm. In LRTF ties are broken by giving priority to the process with the lowest process id. The average turn around time is:

- (A) 13 units (B) 14 units
- (C) 15 units (D) 16 units



Question GATE-2014

H.w.

An operating system uses shortest remaining time first scheduling algorithm for pre-emptive scheduling of processes. Consider the following set of processes with their arrival times and CPU burst times (in milliseconds):

Process	Arrival Time	Burst Time
P1	0	12
P2	2	4
P3	3	6
P4	8	5

The average waiting time (in milliseconds) of the processes is _____.

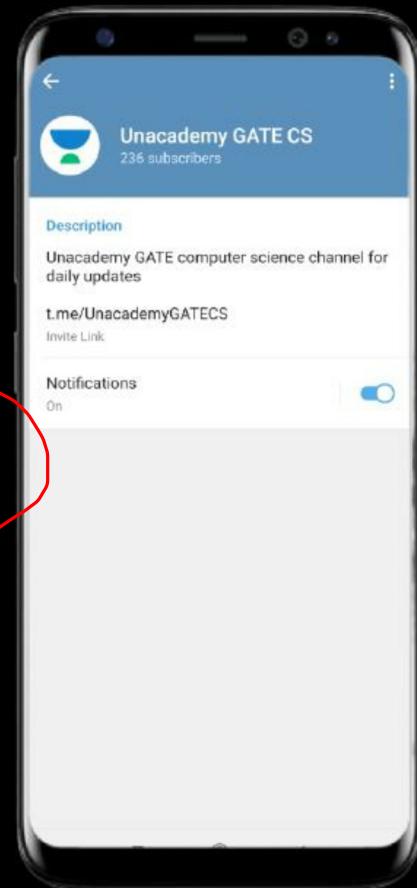
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