

CS & IT ENGINEERING



Operating System

CPU Scheduling

Lecture - 02

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Recap of Previous Lecture



Topic

Process Scheduling

Topic

Process Scheduling Algorithms

Topic

✓ FCFS Scheduling

Topic

✓ SJF Scheduling

Topics to be Covered



Topic

SRTF Scheduling

Topic

LJF & LRTF Scheduling

Topic

HRRN Algorithm

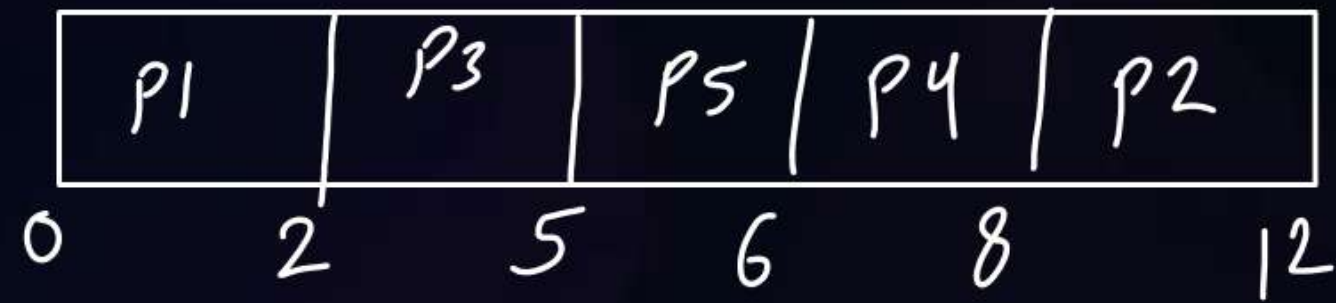
Topic

Priority based algorithm



Topic : SJF (Shortest Job First)

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



time	Ready Queue
0	P1
2	P2, P3
5	P2, P4, P5



Topic : FCFS (First Come First Serve)

Advantages:

- Easy to implement
- No complex logic
- No starvation

Disadvantages:

- No option of Preemption
- Convoy effect makes the system slow

starvation:-

indefinite blocking or waiting
or
process waiting for CPU for
indefinite time.



Topic : SJF (Shortest Job First)

Advantages:

avg TAT

1. Minimum average waiting time among non-preemptive scheduling
2. Better throughput in continuous execution

Disadvantages:

1. No practical implementation because Burst time is not known in advance
2. No option of Preemption
3. Longer Processes may suffer from starvation



Topic : SRTF (Shortest Remaining Time First)

Scheduling Criteria: *smallest BT first \Rightarrow Tie breaker = FCFS*

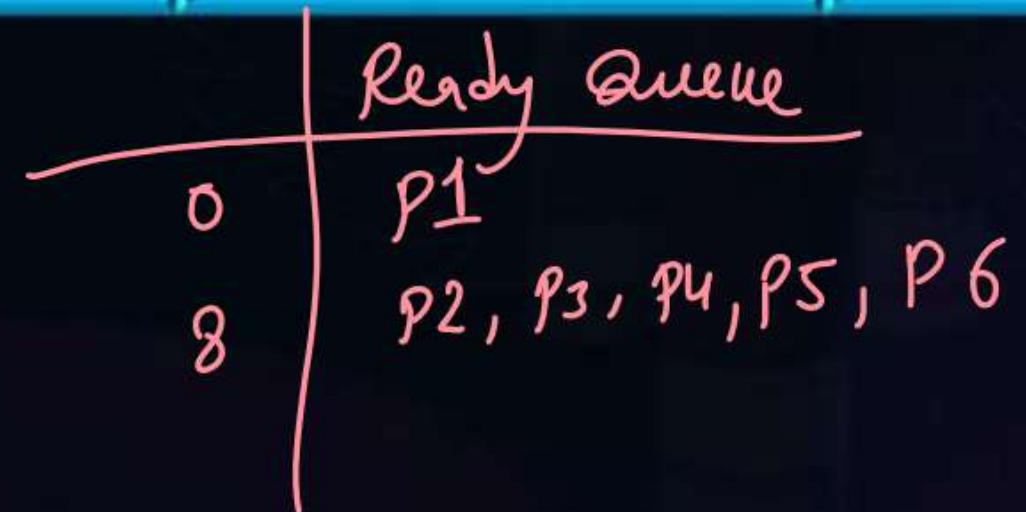
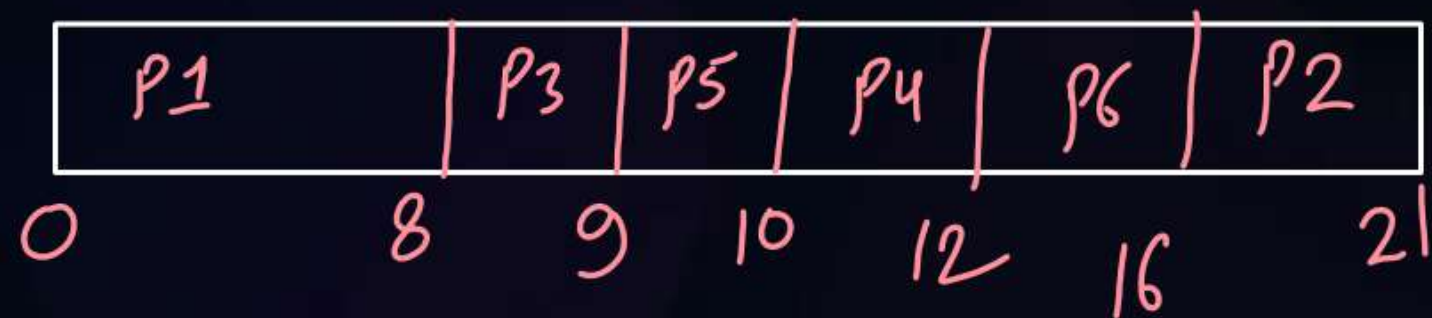
Type of Algorithm: *Preemptive*



Topic : ~~SRTF~~ (Shortest Job First)

SJF

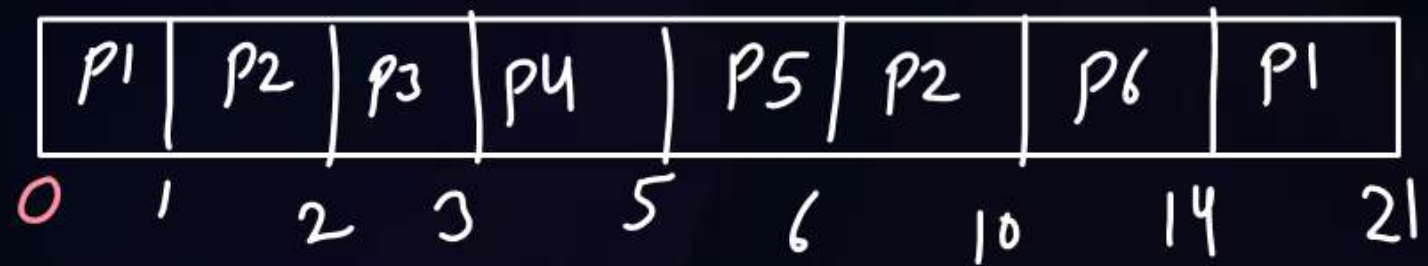
Process	Arrival Time	Burst Time	Completion Time	Turnaround Time	Waiting Time
P1	0	8			
P2	1	5			
P3	2	1			
P4	3	2			
P5	4	1			
P6	5	4			





Topic : SRTF (Shortest Remaining Time First)

Process	Arrival Time	Burst Time	Completion Time	Turnaround Time	Waiting Time
P1	0	8	21	21	13
P2	1	5	10	9	4
P3	2	1	3	1	0
P4	3	2	5	2	0
P5	4	1	6	2	1
P6	5	4	14	9	5



	AT	BT
P1	0	8 7
P2	1	5 4
P3	2	X
P4	3	2 X
P5	4	X
P6	5	X

time	Ready Queue
0	P1 (8)
1	P1 (7), P2 (5)
2	P1 (7), P2 (4), P3 (1)
3	P1 (7), P2 (4), P4 (2)
4	P1 (7), P2 (4), P4 (1), P5 (1)
5	P1 (7), P2 (4), P5 (1) , P6 (4)

P1	P2	P3	P4	P5	P2	P6	P1	
0	1	2	3	4	6	10	14	21
				5				



Topic : SRTF (Shortest Remaining Time First)

Process	Arrival Time	Burst Time	Completion Time	Turnaround Time	Waiting Time
P1	4	7	20	16	9
P2	5	5	13	8	3
P3	3	1	5	2	1
P4	1	2	3	2	0
P5	2	1	4	2	1
P6	0	4	8	8	4

	AT	BT
P1	4	7
P2	5	5
P3	3	1
P4	1	2
P5	2	1
P6	0	4 3

P6	P4	P5	P3	P6	P2	P1	
0	1	2 3	4	5	8	13	20

Time	Ready Queue
0	P6(4)
1	P6(3), P4(2)
2	P6(3), P4(1), P5(1)
3	P6(3), P5(1), P3(1)
4	P6(3), P3(1), P1(7)
5	P6(3), P1(7), P2(5)



Topic : SRTF (Shortest Remaining Time First)

6 / $P_1(8), P_2(5), P_3(2), P_5(1)$

Process	Arrival Time	Burst Time	Completion Time	Turnaround Time	Waiting Time
P1	0	9	22	22	13
P2	1	6	14	13	7
P3	2	4	9	7	3
P4	3	2	5	2	0
P5	6	1	7	1	0

P1	P2	P3	P4	P3	P5	P3	P2	P1	
0	1	2	3	5	6	7	9	14	22

Time	Ready Queue
0	$P_1(9)$
1	$P_1(8), P_2(6)$
2	$P_1(8), P_2(5), P_3(4)$
3	$P_1(8), P_2(5), P_3(3), P_4(2)$
5	$P_1(8), P_2(5), P_3(3)$



Topic : SRTF (Shortest Remaining Time First)

Advantages:

avg. TAT

1. Minimum average waiting time among all scheduling algorithm
2. Better throughput in continue run

Disadvantages:

1. No practical implementation because Burst time is not known in advance
2. Longer Processes may suffer from starvation

H.W.

	AT	BT
P1	0	6
P2	0	7
P3	1	1
P4	2	3
P5	9	1

SJF,
SRTF

H.W.

	AT	BT
P1	0	9
P2	1	2
P3	4	1
P4	6	2
P5	9	1



2 mins Summary

Topic

SJF Scheduling

Topic

SRTF Scheduling

Topic

HRRN Algorithm

Topic

Priority based algorithm

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THANK - YOU