

CPU Scheduling

①

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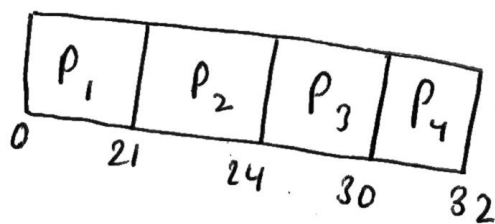
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Section: O2-TP304

1. In first come first serve "scheduling algorithm" the process which arrives first gets executed.

Process	Burst time
P_1	21
P_2	3
P_3	6
P_4	2

Gantt chart



The average waiting time will be

$$\frac{(0 + 21 + 24 + 30 + 32)}{4} = 18.75 \text{ ms}$$

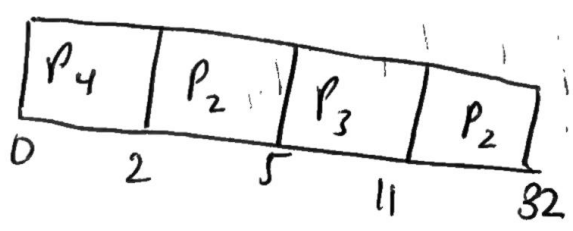
P_1 comes first so its waiting time will be 0.
 P_1 requires 21 units for completion. P_2 takes

21 ms waiting time. Waiting time for P_3 is
exec time of P_1 + exec. time of $P_2 = (21+3) = 24\text{ms}$
Waiting time for P_4 is exec time of $(P_1+P_2+P_3)\text{ms}$.

2. "Shortest Job first" scheduling works on the
process with the shortest burst time or duration
first.

Process	Burst Time
P_1	21
P_2	3
P_3	6
P_4	2

The shortest problem is executed first
Gantt chart



P_4 is executed first since it is a shorter
process. Then P_2 followed by P_3 and at last P_1 .

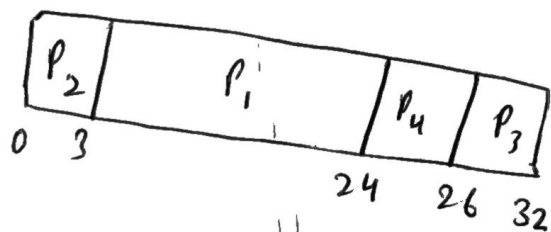
$$\frac{(0+2+5+11)}{4} = 4.5\text{ms}$$

③ Compared to FCFS algorithm, SJF algorithm has a user average waiting time.

3.

Process	Burst Time	Priority
P_1	21	2
P_2	3	1
P_3	6	4
P_4	2	3

The Gantt chart based on the priority scheduling will be



The average waiting time would be

$$\frac{(0 + 3 + 24 + 26)}{4} = 13.25 \text{ ms.}$$

- P_2 - 1st priority = 0 (waiting time)
 P_1 - 2nd priority = 3 (exec time of P_2)
 P_4 - 3rd priority = 3 (exec time of P_2) + 21 (exec time of P_1) = 24

$$P_3 - 4^{\text{th}} \text{ priority} = 3(\text{exec. time of } P_2) + 21$$

$$(\text{exec time of } P_1) + 2$$

$$(\text{exec time of } P_4) = 26.$$

4.

Round Robin Scheduling

Process	Arrival Time	Burst Time
P_1	0	5
P_2	1	6
P_3	2	3
P_4	3	1
P_5	4	5
P_6	6	4

Ready Queue :-
 $P_1, P_2, P_3, P_4, P_5, P_1, P_6, P_2, P_5$
Granted Queue :-

p_1	p_2	p_3	p_4	p_5	p_1	p_6	p_2	p_5	
0	4	8	11	12	16	17	21	23	24

(5)

Now	Completion Time	Turn Around Time Comp Time - Arrival Time	Waiting Time Arr time - Burst Time
P ₁	17	17	12
P ₂	23	22	16
P ₃	11	9	6
P ₄	12	9	8
P ₅	24	20	15
P ₆	21	15	11

Average Waiting Time!.

$$= \frac{(12 + 16 + 6 + 8 + 15 + 11)}{6}$$

$$= \frac{68}{6} = 11.33.$$