Branch : CSE & IT Batch : English

Operating System

CPU Scheduling

DPP 01

[MCQ]

1. Process can complete its execution from ____

(a) Ready state (b) Running state

(c) Block State (d) All of the above

[MCQ]

2. Consider a system with n number of processes, s is time when each process terminates, and t is the time each process arrives to the ready queue. What will be the average time for n processes to complete their execution?

(a) $\sum_{i=1}^{n} \frac{(t_i - s_i)}{n}$ (b) $\sum_{i=1}^{n} \frac{(n_i - t_i)}{s}$

(c) $\sum_{i=1}^{n} \frac{(s_i - n_i)}{t}$ (d) $\sum_{i=1}^{n} \frac{(s_i - t_i)}{n}$

[MSQ]

3. Which of the following statement is/ are INCORRECT regarding total number of schedules if the system has n number of processes?

(a) Total number of schedules possible in non-preemptive system are n.

(b) Total number of schedules possible in non-preemptive system are n^2.

(c) Total number of schedules possible in preemptive system are n^2.

(d) Total number of schedules possible in non-preemptive system are n!.

[NAT]

4. Consider a system with three non-preemptive processes, first process arrives at time unit 4 and executes for 12 ms, while first process was executing second process arrives at time 6 with burst time 8 ms and third process arrives at time 19 with burst time 8 ms. Assume X is the schedule length of the above system and Y is the amount of time CPU is idle and waiting for processes, calculate X + Y?

Note: CPU time started at 0.

[MSQ]

5. Which of the following statements are CORRECT regarding process state transition diagram?

(a) A process can move from ready to suspend blocked state.

(b) A blocked process can move to suspend ready state.

(c) A blocked process can move to running state.

(d) A running process can move to blocked state.

[NAT]

6. Consider the following processes, with their respective arrival time and burst times:

Processes	Arrival Time	Burst Time
P1	3	4
P2	5	6
P3	2	5
P4	0	3

Calculate the average turnaround time of all the processes scheduled using First come first serve algorithm. [Upto two decimal places]

Note: Scheduling overhead is negligible

[NAT]

7. Consider the following processes, with their respective arrival time and burst times:

Processes	Arrival Time	Burst Time
P1	2	5
P2	5	4
P3	4	6
P4	0	4

Calculate the sum of average waiting time and average turn around time of all the processes scheduled using First come first serve algorithm . [Upto two decimal places]

Note: Scheduling overhead is negligible.

[NAT]

8. Consider a pre-emptive system with 6 processes, each process executes for 2 ms and leaves the system, and again enters the system(in any order) after all other processes has executed its first 2 ms. Each process has a burst time of 5 ms. What will be the total schedule length. Assuming no process went in block state.

Answer Key

1. **(b)**
2. **(d)**
3. **(a, b, c)**
4. **(32)**
5. **(b, d)**
6. **(7.75)**
7. **(13.25)**
8. **(30)**

Hint & Solutions

1. (b)

Process can terminate or complete its execution from running state only. The termination may be normal or abnormal, but a process will always terminate from running state only.

2. (d)

Given,

n number of processes

s is time when each process terminates = Completion time

t is the time each process arrives to the ready queue = Arrival time

Average time for n processes to complete their execution= Average turnaround time

Average Turnaround time for n processes is given as

$\sum_{i=1}^{n} \frac{(s_i - t_i)}{n}$

Therefore, option D is the correct answer.

3. (a, b, c)

For n processes, the total number of schedules possible in non-pre-emptive system are n! And Total number of schedules possible in pre-emptive system are infinite.

Therefore, option A, B, C all are incorrect statements and correct options.

4. (32)

Gantt Chart:

IDLE	P1	P2	P3
0	4	16	24 32

Schedule length = completion time of last process - arrival time of first process.

X = 32- 4

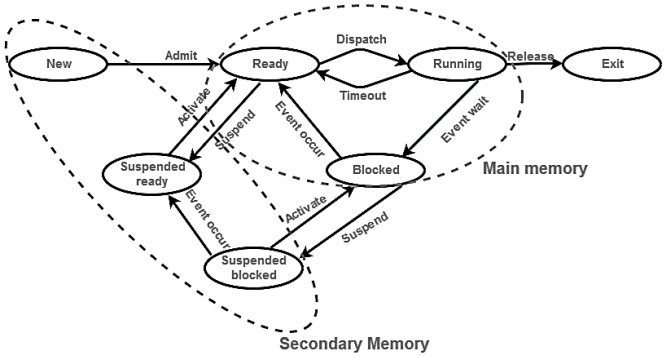
= 28

CPU is idle for 4 units from time 0 to 4. Y = 4

Therefore, X+ Y = 32.

5. (b, d)

According to process transition diagram



A blocked process can move to suspend ready state. And, A running process can move to blocked state.

Therefore, option B, D are correct.

6. (7.75)

P4	P3	P1	P2
0	3	8	12 18

Processes	Arrival Time	Burst Time	Completion Time	Turn Around Time
P1	3	4	12	9
P2	5	6	18	13
P3	2	5	8	6
P4	0	3	3	3

Average Turnaround time = (9 + 13+ 6 + 3)/ 4 = 7.75

7. (13.25)

P4	P1	P3	P2
0	4	9	15 19

Processes	Arrival Time	Burst Time	Completion Time	Turn Around Time	Waiting time
P1	2	5	9	7	2
P2	5	4	19	14	10
P3	4	6	15	11	5
P4	0	4	4	4	0

Average Waiting time = (2+ 10+ 5+ 0)/ 4 = 4.25

Average Turnaround time = (7+ 14+11+4)/ 4 = 9

Sum of average waiting time and average turnaround time of all the processes = 9 + 4.25 = 13.25

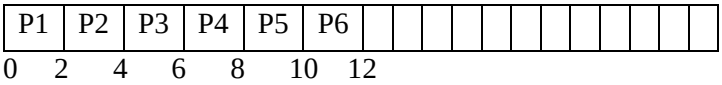
8. (30)

Schedule length is defined as the difference between completion time of last process and arrival time of first process.

There are total 6 processes in the system and it is given that each process will enter the system for 2 ms.

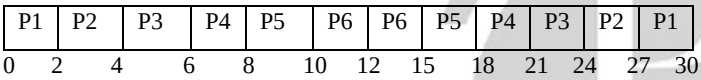
We can assume 6 processes as P1, P2, P3, P4, P5, P6

First all the processes completed their 2 ms.



Now, all the processes has remaining 3ms burst time because the condition is over, and now we can execute processes in any order.

Assuming now, we are executing processes as P6, P5, P4, P3, P2, P1



So, the total schedule length is 30.