# **Operating System CPU Scheduling Part - 3**

**DPP-03** 

1. Consider 4 processes P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub> and P<sub>4</sub> with respective times in below table.

| Process        | AT | CPU/Burst | I/O  | CUP  |
|----------------|----|-----------|------|------|
|                |    | time      | time | time |
| P <sub>1</sub> | 0  | 6         | 5    | 3    |
| $P_2$          | 4  | 3         | 22   | 3    |
| P <sub>3</sub> | 7  | 7         | 0    | 0    |
| P <sub>4</sub> | 20 | 8         | 3    | 2    |

Using SRTF algorithm find the completion time of  $P_1$ ,  $P_2$ ,  $P_3$  &  $P_4$  and also note that processes performs CPU operation followed by I/O operation and followed by CPU operation again. Multiple process can perform I/O operation at a same time.

- (a) 15, 37, 20, 29
- (b) 14, 36, 19, 28
- (c) 16, 37, 20, 29
- (d) none
- 2. Choose the correct statements about MFQS.
  - (i) MFQS tries to run a process having shorter Burst time which in turn leads to optimize the turn around time.
  - (ii) A process which is waiting for longer period of time in lower priority queue may be moved to a higher priority queue which prevents starvation.
  - (iii) This algorithm is less flexible than multilevel queue scheduling.
  - (iv) none
  - (a) (i) (ii)
- (b) (ii) (iii)
- (c) (i) (iii)
- (d) (iv)
- **3.** Consider four processes  $P_1$ ,  $P_2$ ,  $P_3$  and  $P_4$  with execution times and arrival times below.

| Process               | Execution time/   | Arrival time |
|-----------------------|-------------------|--------------|
|                       | <b>Burst time</b> |              |
| $p_1$                 | 29                | 0            |
| $p_2$                 | 25                | 10           |
| <b>p</b> <sub>3</sub> | 15                | 25           |
| <b>p</b> <sub>4</sub> | 20                | 40           |

What is the completion time for process  $P_3$ ?

- (a) 44
- (b) 45
- (c) 46
- (d) 47
- **4.** Consider 4 Jobs P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub> and P<sub>4</sub> with the arrival, Burst times below in the table.

| Process        | Burst Time |
|----------------|------------|
| $P_1$          | 5          |
| $P_2$          | 2          |
| P <sub>3</sub> | 9          |
| P <sub>4</sub> | 3          |

What is the completion time of P<sub>4</sub> under round robin scheduling policy with time quantum of two units?

- (a) 12
- (b) 13
- (c) 14
- (d) 15
- **5.** Consider 4 processes P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub> and P<sub>4</sub> with arrival and Burst times given below in the table.

| PID            | AT | BT |
|----------------|----|----|
| $P_1$          | 0  | 7  |
| $P_2$          | 1  | 4  |
| P <sub>3</sub> | 2  | 2  |
| $P_4$          | 3  | 3  |

Using round robin scheduling policy with time quantum 1, find completion order and number of context switches, note that ignore context switches at time zero and at the end.

- (a) Total context switches = 14 and completion order is  $P_3$ ,  $P_2$   $P_4$   $P_1$
- (b) Total context switches = 15 and completion order is  $P_3$ ,  $P_2$   $P_4$   $P_1$
- (c) Total context switches = 15 and completion order is  $P_3$ ,  $P_4$   $P_2$   $P_1$
- (d) Total context switches = 15 and completion order is  $P_3$ ,  $P_1$   $P_2$   $P_4$

## **Answer Key**

1. **(b)** 

2.

4. (b) 5. (b)

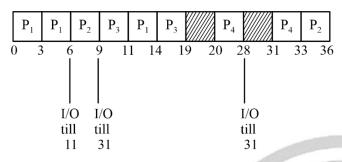
(a) 3. (a)



### Hints and solutions

1. (b)

#### **GANTT Chart**

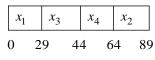


2. (a)

This algorithm is more flexible than multilevel queue scheduling.

3. (a)

#### **GANTT Chart**



Completion time of P<sub>3</sub>

$$P_3 = 44$$

**4. (b)** 

### **GANTT Chart**]

Ready Queue

CPU

5. (b)

Ready Queue

$$oxed{P_1} oxed{P_2} oxed{P_1} oxed{P_2} oxed{P_1} oxed{P_2} oxed{P_1} oxed{P_4} oxed{P_2} oxed{P_1} oxed{P_2} oxed{P_1} oxed{P_4} oxed{P_2} oxed{P_1} oxed{P_4} oxed{P_1}$$

**CPU** 

$$P_1 | P_2 | P_1 | P_3 | P_2 | P_1 | P_4 | P_3 | P_2 | P_1 | P_4 | P_2 | P_1 | P_4 | P_1 | P_1$$

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Total context switches = 15.

Completion order =  $P_3$ ,  $P_2$ ,  $P_4$ ,  $P_{1.}$ 



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