Name: SHADAB IQBAL

ID: 19101072
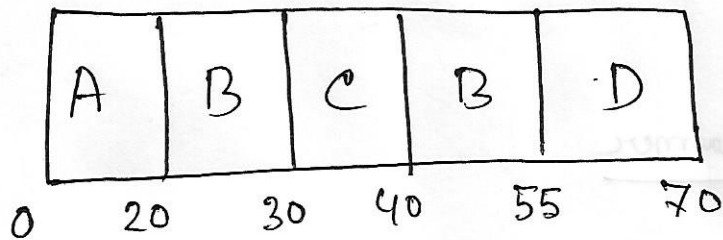
Section: 07

<u>Disclaimer</u>

I have not shared any answers with anyone, did not help anyone and did not take help from anyone for this exam. The answers I have given here are done by myself only.

Shadab

Signature

Ans. to Q No - 4

a

A	B	C	B	D

0   20   30   40   55   70

$A \rightarrow P_1$
$B \rightarrow P_2$
$C \rightarrow P_3$
$D \rightarrow P_4$

b

Waiting time

$P_2 \rightarrow (20 - \overset{15}{\cancel{20}}) + (40 - 30)$

$\rightarrow 5 + 10 = 15$

Ans. 15

Turnaround time

$P_2 \rightarrow End - Arrival$
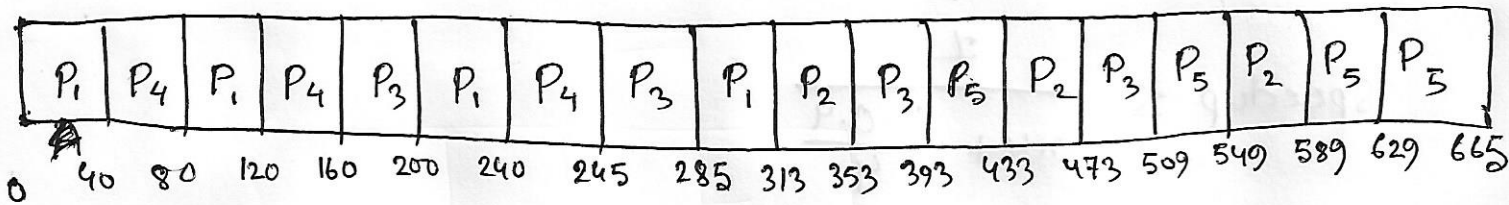
$\rightarrow 55 - 15$

$\rightarrow 40$

Ans. 40

c

4 content switches are needed here.

Ans. to Q No - 5

a

P_1	P_4	P_1	P_4	P_3	P_1	P_4	P_3	P_1	P_2	P_3	P_5	P_2	P_3	P_5	P_2	P_5	P_5

0   40   80   120   160   200   240   245   285   313   353   393   433   473   509   549   589   629   665

b

Waiting time:

$P_1 \rightarrow (0-0) + (80-40) + 80 + 45 = 165$

$P_2 \rightarrow 63 + 80 + 76 = 219$

$P_3 \rightarrow 60 + 45 + 68 + 80 = 253$

$P_4 \rightarrow$ ~~57~~ 135 $\qquad P_5 \rightarrow 209$

$\therefore$ Average waiting time $= \dfrac{981}{5} = 196.2$

(Ans.)

Response time:

$P_1 \rightarrow 0 - 0 = 0$

$P_2 \rightarrow 313 - 250 = 63$

$P_3 \rightarrow 160 - 100 = 60$

$P_4 \rightarrow 40 - 25 = 15 \qquad P_5 \rightarrow 393 - 300 = 93$

$\therefore$ Average response time $= \dfrac{231}{5} = 46.2$

(Ans)

Ans to Q No - 3

Given, core = 4, S = 40% = 0.4

$$Speedup \leq \frac{1}{0.4 + \frac{1-0.4}{4}}$$

$$\leq 1.82 \text{ times}$$

Again, if core = 8 and S = 0.4

$$Speedup \leq \frac{1}{0.4 + \frac{0.6}{8}}$$

$$\leq 2.11 \text{ times}$$

∴ Performance increase = $\frac{0.29}{2.11} \times 100\%$

$$= 13.74\%$$

∵ 13.74% < 30%, J will decide NOT

to buy 8 core processor.

Ans. to Q No - 1

a

The operating system is loaded through the Bootstrap program. The computer already knows where the Bootstrap program is and that Bootstrap program loads the OS into the main ~~was~~ memory for startup.

b

We need OS for communicating and using the resources from our hardware. We need to install it. Only copying the file is not enough. Because then our computer will not be able to recognize the OS and load it correctly during startup.

Example - 1: When a process will need I/0, it will go from ready to waiting state and when I/0 request is complete, it will go back to the ready state.

Example - 2:

~~A process can be interrupted to~~

A process can create a child process and wait for it's completion. In this state, the parent process will go into the waiting state and when the child process finishes execution, the parent process will go back to the ready state.

d

Data parallelism divides the data among different threads and each of those threads perform the same operation on the data.

Task parallelism divides the task itself among several threads and each thread, perform different operation on the data.

· Data parallelism example: If we want to do sum from 1-1000, we can divide this data among 2 different threads. One thread will sum from 1-500 and another thread will sum from 501-1000.

Task parallelisme example:

If we want to do addition and subtraction

on the same number, we can do it using 2 different thread. One will return sum and another will return difference.

Yes, it's possible to do both at same time.

<u>e.</u>

Yes, it can prevent starvation. Because in multilevel feedback queue, the processes can switch between different queues. So, if a process is waiting for a long time in a queue, it will simply move to another queue, where it will have higher priority for execution.