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CLASS: B TECH COMPS. 6TH SEM

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Operating Systems
~~Practical Exam~~
Tutorial Test #5

Ans 1; Using the Shortest Job First algorithm,
if $0 \leq X \leq 3$, then, X, 3, 5, 6, 9
if $4 \leq X \leq 5$, then, 3, X, 5, 6, 9
if $5 \leq X \leq 6$, then, 3, 5, X, 6, 9
if $6 \leq X \leq 9$, then, 3, 5, 6, X, 9
if $9 \leq X$, then 3, 5, 6, 9, X

Ans 2; Process Switch is a technique by which the current process ~~is so~~ state is saved and another process is executed so that the current process may be resumed later.

Some of the events during which process switch may occur are as follows:-
- Multitasking :- When a process of higher priority needs to be executed first which arrived later.
- Interrupt handling :- When an interrupt occurs that requires urgent attention.
- User and Kernal mode switching.

The steps for Process Switching are:-
- The state of current process such as register values and PC value are stored in Process Control Block (PCB).
- The next Process is brought to main memory and executed.
- The previous process is restored from PCB and call stack.

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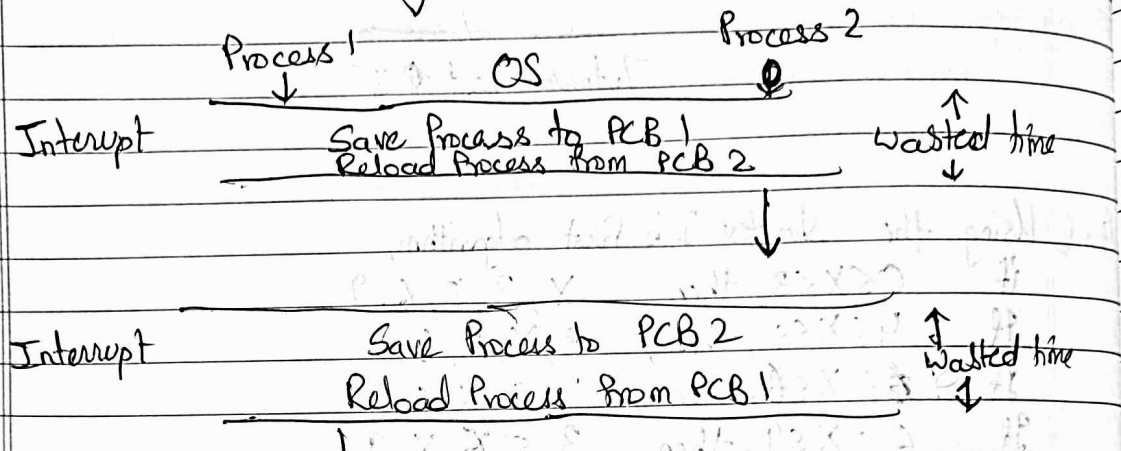
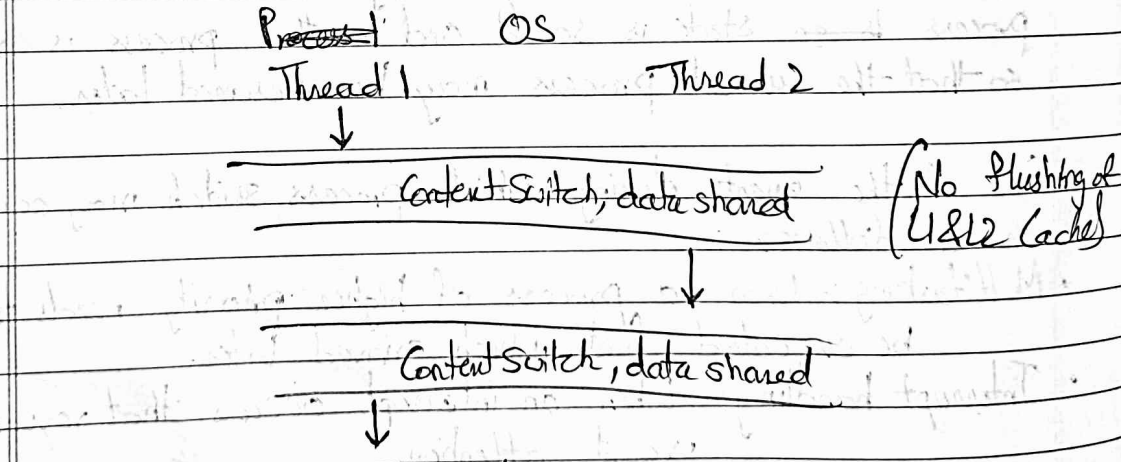
Ans 3: While content switching between Process switching,



However, thread doesn't require alternation of MMU for new address space during content switch and ~~cache~~ cache is not flushed.

While in threads,



Thread has the same virtual memory space.
Hence, in thread content switch, saving states may not be necessary and hence, saves time.

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Ans 4:- On taking all the run time durations,

$$\text{Prediction} = \left(\left(\left(\frac{(40+20)}{2} + 40\right)/2 + 15\right)/2\right.$$

$$= ((30+40)/2 + 15)/2$$

$$= (35+15)/2$$

$$= \underline{25 \text{ ms}}.$$

If only last 2 are considered, then, Prediction $= \frac{40+15}{2}$

$= \underline{27.5 \text{ ms}}$

Ans 5:-

- Busy waiting is not always less efficient than Blocking wait operation.
- In some cases busy waiting is better if the expected wait time is shorter than the time it takes to pre-empt and reschedule a thread.
- This behaviour is commonly seen in systems with more than one processor.

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Ans 6:- Segmentation method works almost like paging, the difference between the two is that segments are of variable length but page size is already fixed in case of paging.

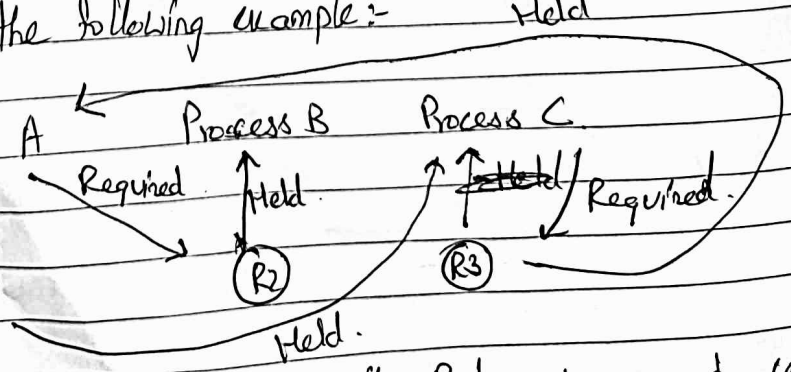
Hence, Segmentation does not play a significant role in memory management, the main reason being that it externally fragments the disk.

Instead, its purpose is to allow sharing of procedures and data among different processes

Segmentation is also a costly memory management algorithm due to repeated splitting and combining of existing segments.

Ans 7:- Yes: a system can be in a state which is neither deadlocked nor safe.
Being in an unsafe state means the system may not be guranteed to not encounter deadlock.

Consider the following example:-



Process B can be completed easily. But as we move to complete Process A and C, we encounter a deadlock condition in future. Hence, the system isn't currently under deadlock but will be in future.

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Ans 8: No. of tracks :- 0-199
Current track = 15
Previous track = 10
Queue = 8, 24, 16, 75, 195, 37, 55, 75, 153, 3
Sorted Queue = 3, 8, 16, 24, 37, 55, 75, 75, 153, 195

i) Shortest Seek time first:-

15 → 16	1
16 → 8	8
~~16 → 3~~ 8 → 3	5
3 → 24	21
24 → 37	13
37 → 55	18
55 → 75	20
75 → 75	0
75 → 153	78
153 → 195	42
Seek time =	206 tracks

ii) SCAN :-

15 → 16
16 → 24
24 → 37
37 → 55
55 → 75
75 → 75
75 → 153
153 → 195
195 → 199
199 → 8
8 → 3

Seek time = 199 - 15 + 199 - 3 = 380 tracks

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iii) LOOK:-

15 → 16
16 → 24
24 → 37
37 → 55
55 → 75
75 → 75
75 → 153
153 → 195
195 → 8
8 → 3

Seek time = 195 − 15 + 195 − 3
= 372 tracks

iv) CSCAN:-

15 → 16
16 → 24
24 → 37
37 → 55
55 → 75
75 → 75
75 → 153
153 → 195
195 → 199
199 → 0
0 → 3
3 → 8

398 − 7 = 391

Seek time = 199 − 15 + 199 + 8
= 391 tracks

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v) C-LOOK :-

15 → 16
16 → 24
24 → 37
37 → 55
55 → 75
75 → 75
75 → 153
153 → 195
195 → 3
3 → 8

Seek time = 195 - 15 + 195 - 3 + 5
= 390 - 13
= 377 tracks.