CS & IT ENGINEERING

Operating System

Memory Management

DPP 08 Discussion Notes

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01 Question

02 Discussion

Q.1

Consider the following statements: [NAT]

(i) Paging never suffers from internal fragmentation. False.

(ii) Segmentation never suffers from external fragmentation. False

(iii) Segmentation may suffer from internal fragmentation. False

How many of the above statements are correct?

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Q.2

[MSQ]

Consider the following segment table:

Segment No.	Base	Length
0	5519	400
1	2500	15
2	100	500
3	1257	600
4	1859	500

Which of the following logical address will generate trap addressing error?

A. 000 0110011010 — 0 to 410 — ← 3 bits → — 410 > 400 Trap generated.

B. 001 0000001111 — 1 to 15 — 15 = 15 Trap generated.

C. 010 0100101100 — 2 to 300 — 300 < 500 ✓

D. 100 0111110011 — 4 to 499 — 499 < 500 ✓

$\lceil \log_2 600 \rceil \Rightarrow 10$ bits

Q.3

Virtual memory can be implemented using _____.

[MCQ]

A. Thrashing

B. Segmentation

C. Demand paging

D. None of these

Q.4

If x is TLB or cache access time, y is main memory access time, and z is page fault service time or disk access time. Then, which of the fallowing relation are correct regarding access time. [MCQ]

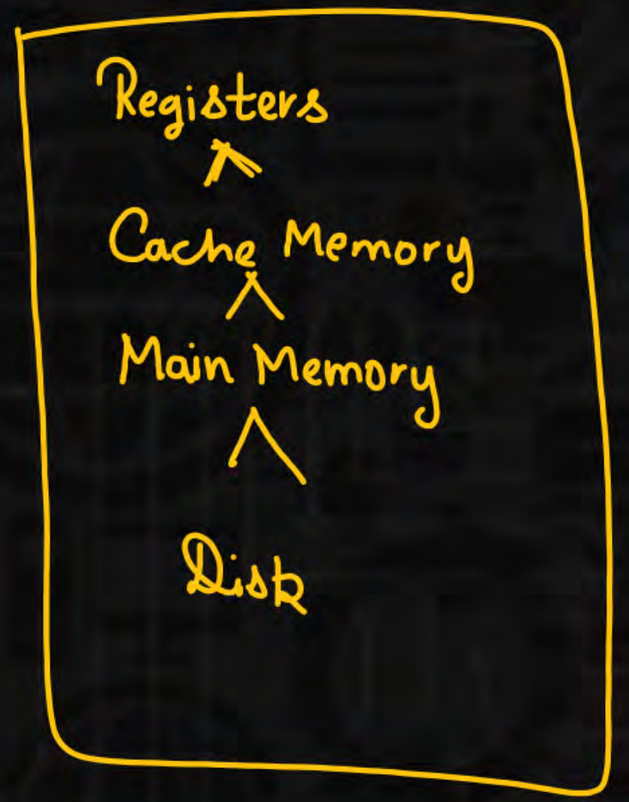
A. $x > y = z$ ✗

B. $x < y = z$ ✗

C. $x < y < z$

D. $x > y > z$

$x < y < z$



Q.5

The size of virtual memory is limited by _____.

[MCQ]

A. Main memory size.

B. Capacity of page table registers.

C. Logical address space.

D. Disk size.

Q.6 How many levels of paging is required if it is desired to limit page table to 1 page by assuming page size = 4KB, e = 4B, LA = 64 bits.

[MCQ]

A. 1

B. 2

C. 4

D. 6

Given: LA = 64 bits

P.S = 4KB (2^{12} B) | $\log_2 2^{12}$ = 12 bits.

P.T.E(e) = 4B

No. of pages = L.A / P.S

P.T.S ⇒ No. of page * e.

I: $\frac{2^{64}}{2^{12}} \Rightarrow 2^{52}$		P.T.$S_1 \Rightarrow 2^{52} * 2^2$ B $\Rightarrow 2^{54}$ B
II: $\frac{2^{54}}{2^{12}} \Rightarrow 2^{42}$		P.T.$S_2 \Rightarrow 2^{42} * 2^2$ B $\Rightarrow 2^{44}$ B
III: $\frac{2^{44}}{2^{12}} = 2^{32}$		P.T.$S_3 \Rightarrow 2^{32} * 2^2$ B $= 2^{34}$ B.

IV : $\frac{2^{34}}{2^{12}} \Rightarrow 2^{22}$

P.T.$S_4 \Rightarrow 2^{22} * 2^2 B = 2^{24} B$

V : $\frac{2^{24}}{2^{12}} \Rightarrow 2^{12}$

P.T.$S_5 \Rightarrow 2^{12} * 2^2 B \Rightarrow 2^{14} B$

VI : $\frac{2^{14}}{2^{12}} \Rightarrow 2^2$

P.T.$S_6 \Rightarrow 2^2 * 2^2 B \Rightarrow 2^4 B = \underline{16B}$

Q.7

Consider a system using segmented paging architecture, where segment is divided into 16K pages each of size 4KB and segment table is divided into 8k pages of each size of 2KB (Byte addressable memory) PAS is 64MB, then calculate page table size of segment (in MB). [NAT]

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Segment table : 8K pages , 2KB

$2^4 * 2^{20}$ B

⇒ 16 MB.

: 8K pages * 2KB

$2^{3*10} * 2^{1*10}$

⇒ $2^{13} * 2^{11}$ B ⇒ 2^{24} B


THANK YOU GW
SOLDIERS !