ASSIGNMENT 03

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ROLL NO: 20K-0183 Section: B

Q1. effective memory access = 150ns
Main memory access = 100ns
α = 70% = 0.7
TLB = ?

~~= 0.7(150) + 0.3(200)~~

= 0.7 (TLB + 100) + 0.3 (TLB + 200)

150 = 0.7 TLB + 70 + 0.3 TLB + 60

20ns = TLB

TLB = 20ns

Q2 TLB = 25ns
Memory access time = 100ns
α = 0.75

EAT = 0.75 (25+100) + 0.25 [(2+1) (100) + 25]

= 0.75 (125) + 0.25 (325)

EAT = 175ns

Q3

TLB = 30ns
Physical Memory = 100ns
$\therefore \alpha = 70\%$

EAT = $0.7(30+100) + 0.3(4(100)+30)$
$= 0.7(130) + 0.3(430)$

EAT = 220ns

Q4

Avg. access Time = 25ms = 25000 lls
main memory access time = 1 lls
page table access time = 2 lls

EMAT = $0.8(1) + 0.18(2) + 0.02(25000+2)$
$= 0.8 + 0.36 + 500.04$

EMAT = 501.2 lls = 0.5012 ms

Q5

Size of memory = ?
address consists = 22 bits
no. of locations = 2^{22}
Size of one location = 2 byte

Size of memory = no. of location × size of location

$= 2^{22} \times 2^1$
$= 2^{23} = 2^3 \times 2^{20}$
$= 8 \times 2^{20}$ Bytes $\because 2^{20} = 1$MB

Size of memory = 8 MB

Q6

no of bits required = ?
Size of memory = 16 GiB = $2^4 \times 2^{30}$
$= 2^{34}$ bytes
Size of 1 location = 4 byte = 2^2

Size of memory = no. of locations × size of locations
$2^{34} = 2^2 \times$ no. of location
no. of locations = 2^{32}

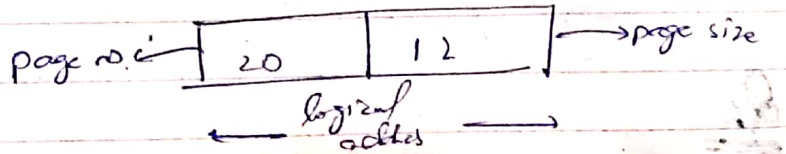
no. of bits = 32

Q7.

logical address: 32 bit
page size: 4 KB
page table entries: 4 Bytes
page table size: ?

page size: 4 KB = 2^{12} byte

page no. = logical address − page size
= 32 − 12
page no. = 20 bits



Page table size = page no. × page table entries
= $2^{20} \times 2^{2}$
= 2^{22}

Page table = 4 MB

Q8

	3	0	1	2	7	0	3	0	4	2	3	0	3	0	3	2	1	2	0	1	7	0	1
f_1	3	3	3	3	7	7	7	7	7	2	2	2	2	2	2	2	2	2	2	2	7	7	7
f_2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
f_3			1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
f_4				2	2	2	2	2	4	4	4	4	4	4	4	1	1	1	1	1	1	1	1
	0	1	2	3	4	5	6		7	8					9					10			

10 faults in total.