2011-0123
masab bin fakhar

Date 16/5/2022

QUESTION #01

DATA:-

effective memory access time = 150 ns
main memory access time = 100ns = page table access time
TLB access time = ?
∴ TLB hit ratio 70%.
∴ There is no page fault.

SOLUTION:-

formula:-

effective memory access time = hit (TLB + main memory access time) + miss (TLB + page table access time + main memory).

∴ hit = 90% = 0.90
miss = 100 - 90 = 10% = 0.10.

150 = 0.9 (TLB + 100) + 0.1 (TLB + 100 + 100)

150 = 0.9 TLB + 90 + 0.1 TLB + 20
150 - 90 - 20 = 1 TLB

TLB = 20 ns Ans

QUESTION #02.

DATA:-

∴ There is two level pagging scheme,
∴ There is no page fault.
TLB = 25 ns
physical memory / main memory = 100 ns.
hit = 75%, miss = 25%
EAT = ?
no of levels of page table = 2

Date 16/5/2022

SOLUTIONS:-

EAT = hits (TLB + main memory access time) + miss [TLB + (no of levels of page table + 1) × main memory access time]

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

EMAT =

EAT = 93.75 + 0.25 [325].

EAT = 93.75 + 81.25.

EAT = 175 ns.

EMAT = 175 ns Ans.

QUESTION #03

DATA:

1. There is three level pagging.
2. no page fault.

TLB = 30 ns.

physical memory / main memory access time = 100 ns.

hit ratio = 70%.

no of level of page table = 3

SOLUTION:-

EAT = 0.70 (30 + 100) + 0.30 [30 + (3+1) × 100].

= 0.70 (130) + 0.30 [430]

= 91 + 129.

EAT = 220 ns

EMAT = 220 ns. Ans.

Date: 16/5/2022

QUESTION #04

main memory access time

DATA:-

average access time/page faults time = 25 ms = 25000 μs
page table access time = 2 μs
main memory access time = 1 μs
EMAT = ?

SOLUTION:

formula,

EMAT = % reference of main memory + % of page table access time + % of page faults.

EMAT = 80%.(1) + 18%.(2) + 2%(25000 + 2)

= 0.8(1) + 0.18(2) + 0.02(25002).
= 0.8 + 0.36 + 500.04.
= 501.2 μs Ans

QUESTION #05

DATA:

number of memory size of memory = ?
address consist of = 22 bits.
no of location form = 2^{22} locations
Size of one location = 2 byte.

Date 16/05/2022

SOLUTION:-

size of memory = no of locations × size of one location

$= 2^{22} \times 2^{1}$

$= 2^{23}$

$= 2^{3} \times 2^{20}$ — $2^{20} = 1MB$

size of memory = 8MB Ans

QUESTION #06

DATA:-

no of bits required in memory = ?

size of memory = 16 GB

$= 2^{4} \times 2^{30}$

1 GB = 2^{30}

$= 2^{34}$ bytes

Size of one location = 4 byte = 2^{2}

SOLUTION:-

size of memory = no of locations × size of one location

2^{34} = no of locations × 2^{2}

$\frac{2^{34}}{2^{2}}$ = no of location

2^{32} = no of location ans.

no of bits = 32 bits Ans

Date: 16/05/2022.

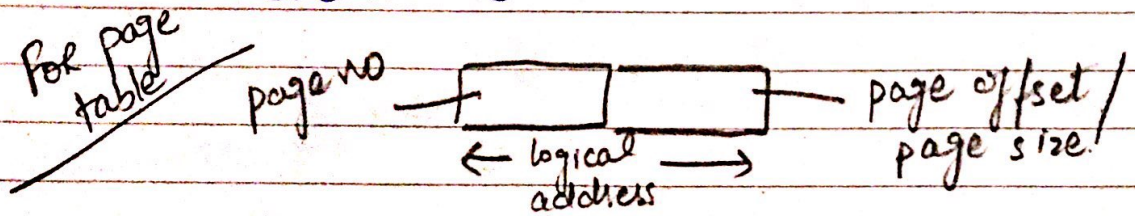
QUESTION #07

DATA:

logical address = 32 bit
page size = 4KB
page table entries = 4bytes
page table size = ?

SOLUTIONS-

For page table



page size = 4KB. ∴ 1KB = 2^{10}

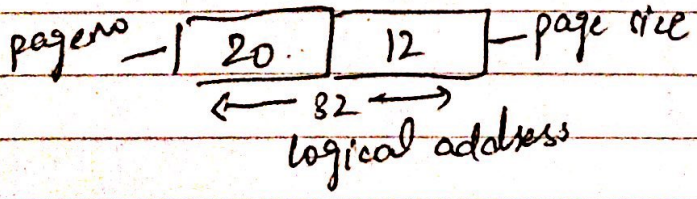
$= 2^2 \times 2^{10}$

$= 2^{12}$ byte.

page no = logical address - page size

= 32 - 12

= 20 bits.



Now we calculate page table size,

page table size = page no × page table entries.

$= 2^{20} \times 2^2$

$= 2^{22}$

$= 4MB$