Roll no. 66

Operating System Tutorial - 8

Q1

→ TLB hit ratio = $p = 0.6$

TLB access time = 10 milliseconds

Memory access time = m = 80 milliseconds

EMAT (Effective Memory Access Time) = ?

Here, $EMAT = p * (t+m) + (1-p) * (t+m+m)$

$$= 0.6 * (10+80) + (1-0.6) * (10+80+80)$$
$$= 54 + 68$$
$$\underline{EMAT = 122} \quad \text{milliseconds}$$

Q2

→ Logical Address Space (LAS) = 16

Process Size = 16

Main memory size = 64B

Frame Size = 4B

The logical Address 6 indicates Page 1 and offset = 2. This page is placed in frame 4. we have frame size 4 Bytes. So, the physical address of data in RAM will be 14 or 1110

Q3 Consider a computer system with 40-bit virtual addressing and page size of sixteen kilobytes. If the computer system has a one-level page table per process and each page table entry requires 48 bits, then the size of the per-process page table is _____ megabytes.

→ size of Memory = 40 bit = 2^{40}

page size = 16 kB = 2^{14}

No. of page = size of memory / page size

$$= \frac{2^{40}}{2^{14}} = 2^{16}$$

∴ No. of pages = 2^{26}

Size of Page Table = No. of pages * Page Table entry size

$$= 2^{26} * 48 \text{ bits}$$

$$= \frac{2^{26} * 48}{8} \text{ MegaBytes}$$

Size of Page Table = 384 Megabytes