Name - Gourav Suram
DIV - CS-SEDA
Roll - 39

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TUTORIAL - Paging

Q. Consider a simple paging system with the following parameters 232 bytes of physical memory, page size of 210 bytes. 216 pages of logical address space.

(a) How many bits are in logical ~~order~~ address?
→ The number of bits in logical address space is (216 pages) * (210 bytes/page) = 226 bytes. Thus, 26 bits are required for the logical address.

(b) How many bytes in a frame?
→ A ~~byte~~ frame is same size as a page, 210 bytes.

(c) How many bits in the physical address specify the frame.
→ The number of frame in main memory in (232 bytes of main memory) / (210 bytes / frame) = 222 frames. So 22 bits is needed to specify the frame.

(d) How many entries in a page table?
→ There is one entry for each page in logical address space. Therefore there are 216 entries.

(e) How many bits in each page table entry? Assume each page table entry includes a valid / invalid bit
→ In addition to the valid / invalid bit, 22 bits are needed to specify the frame location in main memory for a total of 23 bits.