Class Assignment – (Spring 2021)

Q1. Assuming a 2 KB page size, what are the page numbers and offsets for the following address references (provided as decimal numbers):

a. 2975

b. 29366

c. 30000

d. 256

e. 16385

Answer 1:

Divide 2975 by 2kb=2048 for page number and take mod for offset

1. Pg 1 offset 927
2. Pg 14 offset 694
3. Pg 14 offset 1328
4. Pg 0 offset 256
5. Pg 8 offset 1.

Q2. Consider a paging system with the page table stored in memory.

1. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?  
     
   Answer2a:   
   400 nanoseconds: 200 nanoseconds to access the page table and 200 nanoseconds to access the word in memory.
2. If we add associative registers, and 75 percent of all page-table references are found in the associative registers, what is the effective memory reference time? (Assume that finding a page-table entry in the associative registers takes 20ns if the entry is there.)

Answer2b:   
Effective Access Time = 0.75 x {20 ns + 200 ns} + 0.25 x {20 ns + (2) x 200 ns}

EAT=165+ 105 = 270 ns

Q3. Consider a machine with 64 MB physical memory and 34-bit virtual address space. If the page size is 4 KB, Find.

1. No. of pages in page table
2. No. of frames
3. Number of bits in physical address

Answer 3:

a) No. of pages= 234/ 212 = 222

b) 64 MB= 26 \*210 \* 210= 226

c) hence 26 bits for frame number + 12 bits for page number = 38 bits