CISC 341 - Spring 2017

Assignment #6

2. Suppose a computer using direct mapped cache has 232 byte of byte-addressable main memory, and a cache of 1024 blocks, where each cache block contains 32 bytes.

a) How many blocks of main memory are there? 8 blocks with 24 bytes left over.
b) What is the format of a memory address as seen by the cache, i.e., what are the sizes of the tag, block, and offset fields? 32 byte blocks have 23 bytes in the tag field, 3 in the block field, and 6 in the offset field.
c) To which cache block will the memory address 0x000063FA map?
[0|0|0|0|6|3|F|A]=[0000|0000|0000|0000|0110|0011|1111|1010] block 5

6. Suppose a computer using fully associative cache has 224 bytes of byte-addressable main memory and a cache of 128 blocks, where each block contains 64 bytes.

a) How many blocks of main memory are there? 4 blocks with 32 bytes left over.
b) What is the format of a memory address as seen by the cache, i.e., what are the sizes of the tag and offset fields? 8 bit addresses with 4 bits in the tag field and 4 in the offset field.
c) To which cache block will the memory address 0x01D872 map?

[0000|0001|1101|1000|0111|0010] block 4

21. Suppose we have 210 bytes of virtual memory and 28 bytes of physical main memory. Suppose the page size is 24 bytes.

a) How many pages are there in virtual memory? b) How many page frames are there in main memory?
c) How many entries are in the page table for a process that uses all of virtual memory?
9 pages are in virtual memory, 1 page is in physical memory,
at 4 bytes per page entry, this process would take 52 entries.