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ECE 5484, Homework 5

1. a. Blocks of main memory = 264 / 64 = 264 / 26 = 258 blocks

b. Since cache has 2048 = 211 blocks, therefore size of the block = 11 bits

Since each block contains 64 = 26 bytes, therefore size of the offset = 6 bits

Therefore, size of the tag = 64 – (11 + 6) = 64 – 17 = 47 bits

c. 0x00000000000163FA

= 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0001 0110 0011 1111 1010

Tag = 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 000

Block = 10110001111

Offset = 111010

Therefore, 10110001111 = 0x58F = Cache block 1423

1. a. Blocks of main memory = 224 / 64 = 224 / 26 = 218 blocks

b. Since each block contains 64 = 26 bytes, therefore size of the offset = 6 bits

Therefore, size of the tag = 24 – 6 = 18 bits

c. Since it is associative cache, it can map anywhere.

1. a. Since number of sets = 64 / 2 = 32 = 25 sets, therefore size of set = 5 bits

Since each block contains 4 = 22 bytes, therefore size of the offset = 2 bits

Therefore, size of the tag = 21 – (5+2) = 14 bits

b. Since number of sets = 64 / 4 = 16 = 24 sets, therefore size of set = 4 bits

Since each block contains 4 = 22 bytes, therefore size of the offset = 2 bits

Therefore, size of the tag = 21 – (4+2) = 15 bit