Home work sheet -3

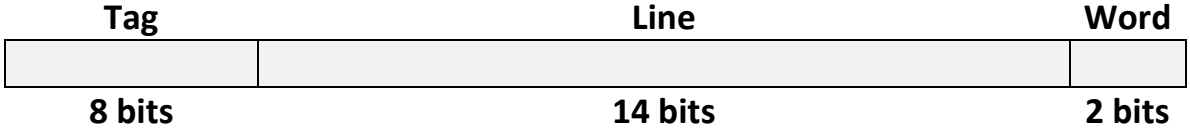
Cs 207 D

Q1: A two-way set-associative cache has lines of 16 bytes and a total size of 8 kbytes.The64-Mbyte main memory is byte addressable. Show the format of main memory Addresses

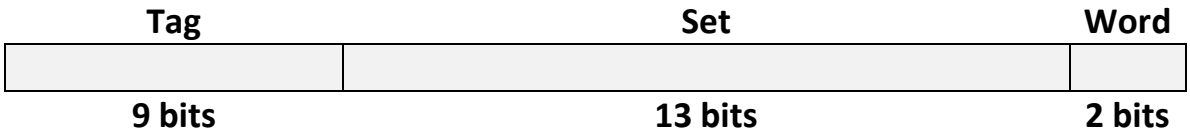
Q2: For the hexadecimal main memory addresses 111111, 666666,BBBBBB, show the following information, in hexadecimal format:

a. Tag, Line, and Word values for a direct-mapped cache, using the format of Figure 4.10

b. Tag and Word values for an associative cache, using the showing format



c. Tag, Set, and Word values for a two-way set-associative cache, using the showing format



Q3: **Consider a machine with a byte addressable main memory of 216 bytes and block size of 8 bytes. Assume that a direct mapped cache consisting of 32 lines is used with this machine.**

a. **How is a 16-bit memory address divided into tag, line number, and byte number?**

b. Into what line would bytes with each of the following addresses be stored?

0001 0001 0001 1011

1100 0011 0011 0100
1101 0000 0001 1101
1010 1010 1010 1010

c. Suppose the byte with address 0001 1010 0001 1010 is stored in the cache. What are the addresses of the other bytes stored along with it?
d. How many total bytes of memory can be stored in the cache?
e. Why is the tag also stored in the cache?.

Q4: Consider a memory system that uses a 32-bit address to address at the byte level, plus a cache that uses a 64-byte line size.

a. Assume a direct mapped cache with a tag field in the address of 20 bits. Show the address format and determine the following parameters: number of addressable units, number of blocks in main memory, number of lines in cache, size of tag.

b. Assume an associative cache. Show the address format and determine the following parameters: number of addressable units, number of blocks in main memory, number of lines in cache, size of tag.

c. Assume a four-way set-associative cache with a tag field in the address of 9 bits. Show the address format and determine the following parameters: number of addressable units, number of blocks in main memory, number of lines in set, number of sets in cache, number of lines in cache, size of tag.