Exercises for Lab1

Problem 1

Consider a machine with a byte addressable main memory of 2^8 bytes and block size of 4 bytes. Assume that a direct mapped cache consisting of 8 lines is used with this machine.

1) How is an 8-bit memory address divided into tag, line number, and byte number?
2) Into what line would bytes with each of the following addresses be stored?

   0001 1011
   0011 0100
   1101 0000
   1010 1010

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

Problem 2

Consider the following code:

```
cout << ”Hello World”;
cin >> a;
for(i = 0; i < 50; i++)
    cout<<i;
```

1) Give one example of the spatial locality in the code.
2) Give one example of the temporal locality in the code.