CSCI 4171/CSCI 6704
NETWORKS

ASSIGNMENT NO.3
Date Given: Tuesday, November 1, 2016
Date Due: Wednesday, November 16, 2016

In this assignment, you will write two programs for simulation - one for bridge processing and one for routing. You may use Java, C, C++ or Python as the language for building your programs.

1. Write a simple program to simulate the bridge processing flowchart discussed in the lectures. The program should read a text file that contains the forwarding database (FDB). The first line in the text file contains the number of ports on the bridge. The program should then read another text file containing randomly generate frames – just the source and destination numbers and port numbers of arrival. For each frame, the program should use the flowchart to make an update of the forwarding database and/or to forward/discard the frame. Ignore the CRC error detection part (that is, assume that the frames are error free). Include the source code and sample runs of the program.

As a simple example, the text file containing the FDB and port numbers could look like this:

```
4
A       1
B       1
C       2
D       2
E       3
F       3
X       3
```

In the above example, the bridge has four ports (1, 2, 3 and 4) and the current FDB has 7 entries. (Port no.4 has not yet received any frame and hence there is no entry for port no. 4).

The second text file could be like this:

```
A       B       1
X       B       3
A       M       1
M       X       4
Etc.
```

The first line means that the frame has source address A and destination address B and arrives at port 1 of the bridge. In this case, the frame should be discarded by the bridge.
The output would look something like this:

```
A       B       1       Frame discarded
X       B       3       Frame sent on port 1
A       M       1       Frame broadcast on all out ports
M       X       4       FDB updated; Frame sent on port 3
Etc.
```

You should keep track of the updated FDB and also submit that as part of your output.

2. Write a program that illustrates packet routing at a router. The program should accept as input the following:
    a. A text file containing a routing table (the five column generic routing table with mask, destination address, next hop, flag and interface).

b. A text file containing a list of packets (with just destination addresses)

It should produce an output showing a list of how each packet will be handled by the router. For instance, it should output

"Packet with destination address 192.168.1.1 will be forwarded to 192.168.5.2 out on interface S1".

Your program should be written in a ***general*** manner, in the sense, it should work for any routing table and any packet. It should work for both network specific and host specific entries. However, you need not consider subnetting, that is, the masks can be the default ones for Class A (255.0.0.0), Class B (255.255.0,0) and Class C (255.255.255.0). Test your program for different types of packets and different types of entries in the routing table. Submit the source code and sample runs of the program.