EEL 4781 - Homework 2
Due November 9, 2010

Problem 1 (20pts):
Let us assume that in a MAC protocol are participating three nodes A, B, and C. We shall assume that the time is measured in units which are necessary to transmit one byte (eg 100 bytes are transmitted in 100 time units). The delay from A to B, B to C, and C to A is 20 time units each.

Now, assume that at time 0
- A wants to send a frame 50 bytes long
- B wants to send a frame 100 bytes long
- C wants to send a frame 150 bytes long

Trace what is happening on the network if the MAC protocol used is:
   (a) Simple ALOHA (the nodes discover that there was a collision only at the end of the transmission)
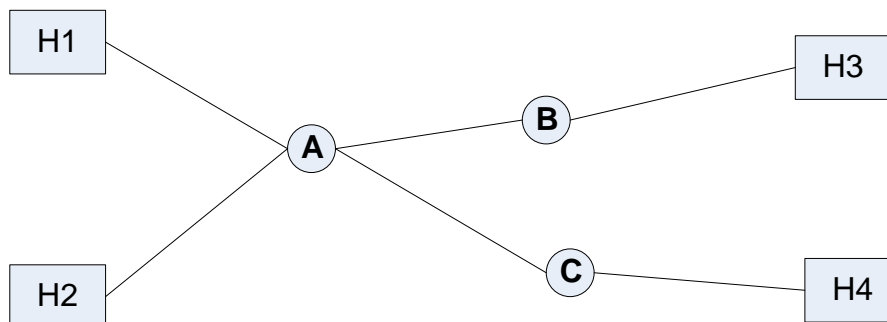   (b) CSMA/CD (Ethernet)
   (c) CSMA/CA (RTS/CTS, 802.11 with DCF)

Problem 2 (20 pts):
Show the string 11011101 in Manchester encoding.
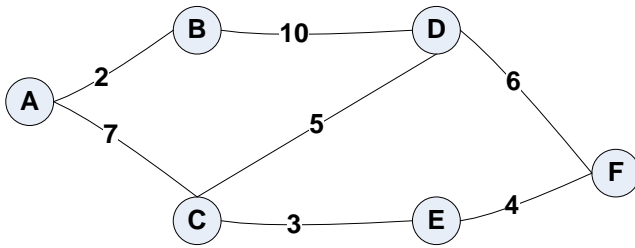
Problem 3 (20pts)
In the virtual circuit network in the figure below, the following connections are established (in order):
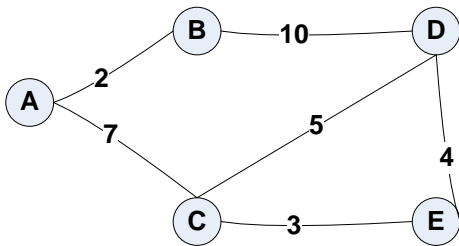- H3 connected to H2
- H3 connected to H1
- H3 connected to H4

Show the content of the label switching tables in A,B and C after the three connections have been established.

Problem 4: (20 pts)

The network above uses Link State Routing. Use Dijkstra's shortest path algorithm to find the shortest path from E to all the other nodes. Show E-s routing table.

Problem 5: (20 pts)

The network above uses Distance Vector Routing.
   (a) Write down the initial routing tables of all the nodes (t=0)
   (b) Write down the routing tables at t=1 of all the nodes after each of them had sent its routing table at time t=0 to its neighbors
   (c) Write down the routing tables of all the nodes after they sent the routing tables at t=1 to their neighbors.

Problem 6: (20 pts)

A router has the following CIDR entries in its routing table:

Address/Mask	Next hop
10.10.8.0/21	Interface 0
10.10.10.0/22	Interface 1
192.53.40.0/23	Interface 3
Default	Interface 4

For each of the following IP addresses, what does the router do if a packet with that address arrives

   (a) 10.10.10.10
   (b) 10.10.8.14
   (c) 10.10.12.45
   (d) 192.53.40.7
   (e) 192.53.56.7