EEL 4781 – Midterm Examination - 1

Date: November 4, 2010

**Name: ………………………………………………………………………………………………………….**

Instructions:

* This exam is open book and open notes. Allotted time is 75 minutes.
* Explicitly state all your assumptions.
* Don’t just give answers, always try to write down the way you were thinking. Even if you can not find a solution, write down the paths you have tried.
* Note that the points add up to 100 + 20 bonus points.

**Problem 1 (20 pts):**

Show the string 00001111 in Manchester encoding.

**Problem 2 (30pts):**

In the virtual circuit network in the figure below, the following connections are established (in order):

* H1 connected to H2
* H1 connected to H3
* H1 connected to H4
* Second connection from H1 to H3



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

**Problem 3 (30pts): Link state routing**



The network above uses Link State Routing.

a) Trace Dijkstra’s shortest path algorithm to find the shortest path from C to all the other nodes. **(Explicitly show what happens in each step: just showing the shortest paths earns 0 points!)**

b) Show C-s routing table.

**Problem 4 (20pts):**

1. Classless inter-domain routing (CIDR) has eased the problem of running out of IPv4 addresses. Why? (1-2 sentences)
2. Network address translation (NAT) has eased the problem of running out of IPv4 addresses. Why? (1-2 sentences)

**Problem 5 (20pts):**

1. Explain what Carrier Sense means for a medium access system.
2. Explain what Collision Detect means for a medium access system.
3. Explain what Collision Avoidance means for a medium access system.

All the answers should be one sentence of the following form

“<technology> means <what difference it makes> such that <advantage> but <disadvantage or cost>”.

You need to write very little.

But be very careful that you get it exactly right. For this question, if you give a wrong answer, it will be counted against you.