CSC4200 – Homework 3 (Total 70 points)

Due – Feb 12th 2023, 11:59 PM CST

1. How “wide” is a bit on a 5-Gbps link? How long is a bit in copper wire, where the speed of propagation is 2.3× 108 m/s? 10 + 10 = 20 pts

1Gb = 10^9 bits

10^-9 = 1 ns wide

1 ns \* 2.3x10^8

=2.3x10^-1

=0.23m

2. How can a wireless node interfere with the communications of another node when the two nodes are separated by a distance greater than the transmission range of either node? – 10 points

If we have node 1 and node 3 while node 2 is between and has communications with both other nodes.

So, node 1 and node 3 don’t know of each other’s existence, so since they are so closely related if node 3 transmits a signal, it will interfere with node 1’s signal.

3. What kind of problems can arise when two hosts on the same Ethernet share the same hardware address? Describe what happens and why that behavior is a problem. – 10 points  
  
If two hosts share the same hardware address will be seen as the same host to all other hosts. This means that all of their activities must coordinate, or else this can lead to a communication failure or breakdown.

4. In the absence of any packet losses or duplications, explain why it is not necessary to include any “sequence number” data in the packet headers. 10 pts

5. Compute no of bits required for sequence numbering when delay\*bandwidth product is 1 MB and each packet is 512 Bytes (Assume to use the bandwidth in full capacity). – 10 pts

6. Draw a timeline diagram for the sliding window algorithm with SWS = RWS = 3 frames, for the following situation when Frame 4 is lost. Use a timeout interval of about 2 × RTT. – 10 pts

Ans: