CS/EE 145A Networking

Homework Set # 1
Due: Wednesday, 10/17/07

1. Hosts A and B are each connected to a switch S via 10-Mbps links as shown in the figure below. The propagation delay on each link is 20 μs. Switch S, a store and forward device, begins retransmitting a received packet 35 μs after it has finished receiving it. Calculate the total time required for host B to receive from A

   (a) a 10,000 bit packet
   (b) two 5000 bit packets transmitted back to back by A.

2. Suppose that one byte of a packet covered by the Internet checksum algorithm needs to be decremented (e.g., a header hop count field). Give a method to compute the revised checksum without rescanning the entire packet contents, for the case where the byte is low order, and the case where the byte is high order.

3. Suppose we want to transmit the message 11001001 and protect it from errors using the CRC polynomial $x^3 + 1$.

   (a) Use polynomial long division to determine the message to transmit.
   (b) Suppose the leftmost bit of the message is inverted during transmission. What is the result of the receiver's CRC calculation? How does the receiver know an error has occurred?