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***Homework #3***

3)
  01010011
+ 01100110
  10111001
+ 01110100
  10101101
(Convert to 1's Complement)
  01010010

The one's complement can detect bit errors.
By checking the least significant bit (this one does not)
It is impossible that a one bit error will go undetected, however a two bit error may go undetected.

14) NAK-only protocol would look for packet x+1 instead of packet x to acknowledge a missing packet, so it would make sense that the more frequent the packets are sent the easier would be the NAK-only as opposed to the ACK-only since the ACK-only since loss will happen more often the faster the packets are sent. Thus, when the packets are sent infrequently the opposite would apply.

27a
Seq: 207 Source: 302 Destination: 80

27b
Ack: 207 Source: 80 Destination: 302

27c
Ack:127 (i.e., waiting for bytes 127 and on)

27d
Host A→Host B (Segment 1: Seq=127, 40 bytes (timeout) & Segment 2: Seq=207, 40 bytes)
Host B→Host A (Ack=207 & Ack=247)

Host A→Host B (Segment 1: Seq=127, 80 bytes (timeout) & Segment 2: Seq=207, 80 bytes)
Host B→Host A (Ack=247)

28) Flow control will minimize how fast Host A can transmit to Host B and assuming that we wait for the entire packet, Host A needs to slow to 50 Mbps.

36) If they wait for two duplicates instead of one it lowers the risk of needing to "reorder" packets.

40a) transmission rounds 1-6 & transmission rounds 23-26 since the congestion window increases exponentially

40b) transmission rounds 6-22 since the congestion window increases linearly

40c) loss by triple duplicate ACK since it cuts the congestion window size in half

40d) loss by timeout since it cuts down the window size back to 1

40e) The threshold is initially 32 since the slow start ends and congestion avoidance begins

40f) The threshold at segment 18 is 24

40g) The threshold at segment 22 is 29

40h) The $70^{th}$ segment is sent during the $5^{th}$ transmission round

40i) The congestion window size and the threshold would be 4

40j) The congestion window size and the threshold would be 1

40k) 158 packets