Sheet4

1) In One-Bit Sliding Window, if node A sends packet 1A to node B, node B receives packet 1A and it sends packet 1B to node A together with ACK 2A. Suppose node A sends packet 2A to node B, node B receives packet 2A but it does not have a packet to send to node A. Will the protocol fail? Why or why not?

2) In a Go-Back-N protocol, the window size is 6. Frames with sequence number 1, 2, 3, 4 and 5 have been sent. The sender just received an ACK for frame 1. Frames 6, 7, 8, 9 and 10 are waiting to be sent.
   a. Which frame(s) can the sender send before it must wait for the next ACK from the receiver? Explain.
   b. Some time later, the sender transmitted frames 20, 21, 22, 23, 24, and 25; however, frame 22 got lost. If Go-Back-N is used, what frame(s) would the sender have to retransmit? Explain.
   c. Suppose the same situation as in b) but sender and receiver use Selective Repeat with window size=6. What frame(s) would the sender need to retransmit? Explain.

3) Does Selective-Repeat use cumulative ACKs? Why?.

4) What are the trade-offs between Go-Back-N and Selective-Repeat?

5) In Go-Back-N, if there is no reverse traffic, will the protocol fail? Why or why not?

6) In Selective-Repeat, if there is no reverse traffic, will the protocol fail? Why or why not?

7) In Go-Back-N, sender window size (maximum outstanding frames) must be MAX_SEQ and not MAX_SEQ+1. Why?

8) In Selective-Repeat, why the NR_BUFS (window sizes) are defined (MAX_SEQ+1)/2 and not MAX_SEQ?

9) If a transmission channel drops packets at a high rate, which protocol will yield better performance: Go-Back-N or Selective-Repeat?

10) In Selective-Repeat, is it a good design to have ACK timer<<retransmit timer or the reverse (ACK timer>>retransmit timer)?

11) for a sliding window protocol, A 1000km long cable (both ways) operates a 1MBPS. If the round trip delay is 10 microsec/km. and the frame size is 1kB, then how many bits are required for sequence number? 4 bits.

12) Frames of 1000 bits are sent over a 10^6 bps in a half duplex link between two hosts. The round trip delay is 25ms. What is the minimum number of bits that will be required to represent the sequence numbers distinctly? Assume that no time gap needs to be given between transmission of two frames. 5 bits.