Worksheet 7

1. In the rdt protocols, why did we need to introduce sequence numbers?

2. In the rdt protocols, why did we need to introduce timers?

3. Suppose that the roundtrip delay between sender and receiver is constant and known to the sender. Would a timer still be necessary in protocol rdt 3.0, assuming that packets can be lost? Explain.

4. Answer true or false to the following questions and briefly justify your answer:
   a. With the SR protocol, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.
   b. With GBN, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.

5. Illustrate the segments sent using the Go-back-N reliable transport protocol (use the simplest version of this protocol we discussed). Assume that each segment receives one sequence number (i.e. do not count bytes like TCP) that begins with 1. The sender will have one segment ready at each time step (so segment 7 will be ready at timestep 7). It takes one timestep for a segment to travel between the two ends. The sender will timeout a segment on the third timestep, so that segment 1 would timeout at timestep 4. Window size N=4. Illustrate the window size, data segments with sequence numbers, and ACKs with numbers. Data segment 3 and the ACK for segment 6 will be lost the first time they are transmitted.