CSC358 Tutorial 4

Question 1: Concept Review

(a) What are the different roles of the transport layers and the network layer?

(b) What are the differences between TCP and UDP?

(c) Why do we mean by "UDP is connectionless"?

(d) In `rdt3.0`, what are purposes of ACKs, timeouts, and sequence numbers?

Question 2: Receiver FSM of `rdt3.0`

In the lecture slides, we showed and discussed the sender's FSM of `rdt3.0`, but we omitted the receiver FSM. In this question, you will complete the FSM for the receiver side of protocol `rdt3.0`. To get started, think about what modifications need to be made to the receiver's FSM in `rdt2.2`.

Question 3: Design a `rdt` protocol for 1-to-2 transmission

Consider a scenario in which Host A wants to simultaneously send packets to Hosts B and C. A is connected to B and C via a broadcast channel — a packet sent by A is carried by the channel to both B and C. Suppose that the broadcast channel connecting A, B and C can independently lose and corrupt packets (and so, for example, a packet sent from A might be correctly received by B, but not by C). Design a stop-and-wait-like error-control protocol for reliably transferring packets from A to B and C, such that A will not get new data from the upper layer until it knows that both B and C have correctly received the current packets. Give FSM descriptions of A, B and C (Hint: the FSMs for B and C should be essentially the same). In particular, think about the following questions:

(a) What are the states of the sender's FSM?

(b) What are the states of the receiver's FSM?

(c) Is it necessary to have sequence numbers?

(d) Is it necessary to have ACK or NAK, or both?

(e) Is it necessary to have timeout?

(f) Could this protocol be similar to one of the `rdt` protocols that we learned in class?