Homework #2, Due Tuesday October 2 by 10AM; will cover solutions in class
CS A342, 28 points total

Wireshark Lab

1) (10 pts) Below is a short Java program that connects to an actual server, sends it some junk, receives OK, and then exits.

```
import java.io.*;
import java.net.*;

public class SendTCPJunk
{
      public static void main(String argv[]) throws Exception
      {
            String s;
            BufferedReader inFromUser = new BufferedReader(
               new InputStreamReader(System.in));
            Socket clientSocket = new Socket("137.229.156.166",7654);
            DataOutputStream outToServer = new DataOutputStream(
               clientSocket.getOutputStream());
            BufferedReader inFromServer = new BufferedReader(
               new InputStreamReader(clientSocket.getInputStream()));

            // A not very efficient way to make a string of 3200 X's
            StringBuffer sb = new StringBuffer();
            for (int i = 0 ; i <3200; i++)
            {
                  sb.append("X");
            }
            s = sb.toString();

            outToServer.writeBytes(s + "\n");
            outToServer.writeBytes("DONE\n"); // Server waits for this
            s = inFromServer.readLine();
            System.out.println("Ack from Server: " + s);  // Receive OK

            clientSocket.close();
      }
}
```


Install the wireshark software from http://www.wireshark.org/ and start a capture session. Run this Java program while the session is being captured.

a) Save your log and turn it in with your submission.
b) What port number was assigned to the Java program on your computer?
c) How many sequences/segments were used to transmit the XXXX string data? Explain how you could tell.
d) How many sequences/segments were used to transmit the OK reply?
e) The program sends the XXXXX data, a newline, and then DONE on the next line. Was the DONE sent in its own packet or part of the XXXXX packet?

Theory Problems

2) (3 pts) Could TCP be used directly over a network (e.g. an Ethernet) without using IP? Why or why not?

3) (3 pts) Suppose that the UDP receiver computes the checksum for the received UDP segment and finds that it matches the value carried in the checksum field. Can the receiver be absolutely certain that no bit errors have occurred? Explain.

4) (3 pts) In the rdt protocols, why did we need to introduce sequence numbers?

5) (4 pts) If experiencing packet loss would you expect Go-Back-N or Selective Repeat to be more efficient? Justify your answer.

6) (5 pts) Consider out motivation for correcting protocol rdt2.1. Show that the receiver, shown in Figure 3.57, when operating with the sender show in Figure 3.11, can lead the sender and receiver to enter into a deadlock state, where each is waiting for an event that will never occur.