CS 4316/5313: Computer Networks

Homework 2

(24 pts)

1. How is a UDP socket fully identified? What about a TCP socket? What is the difference between the full identification of both sockets?

2. Describe why an application developer might choose to run an application over UDP rather than TCP. Is it possible for an application to enjoy reliable data transfer even when the application runs over UDP? If so, how?

3. Suppose a process in Host C has a UDP socket with port number 6789. Suppose both Host A and Host B each send a UDP segment to Host C with destination port number 6789. Will both of these segments be directed to the same socket at Host C? If so, how will the process at Host C know that these two segments originated from two different hosts?

4. Why UDP Internet Checksum is called a weak protection? Describe with an example (different than lecture) how Internet checksum is calculated when sender wants to send 4 16-bit integers using UDP. Show how receiver will make sure no error was introduced during the transmission.

5. Consider a planet where everyone belongs to a family of six, every family lives in its own house, each house has a unique address, and each person in a given house has a unique name. Suppose this planet has a mail service that delivers letters from source house to destination house. The mail service requires that (1) the letter be in an envelope, and that (2) the address of the destination house (and nothing more) be clearly written on the envelope. Suppose each family has a delegate family member who collects and distributes letters for the other family members. The letters do not necessarily provide any indication of the recipients of the letters.

a. Using the solution to Problem R1 above as inspiration, describe a protocol that the delegates can use to deliver letters from a sending family member to a receiving family member.

b. In your protocol, does the mail service ever have to open the envelope and examine the letter in order to provide its service?

6. Explain the differences between Go-Back-N and Selective Repeat. Show a scenario where selective repeat fails due to larger window size.

7. How does TCP ensure flow control? Show two scenarios where a 2-way TCP handshake does not work in network.

8. What is the difference between flow control and congestion control? Explain the various causes of congestion.