



Winter 2010 CSE3213 Communication Networks

**Assignment # 1**

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Review chapters 1 and 2 of Garcia before attempting the assignment.

**Problem 1:** Suppose transmission channels become virtually error-free. Is the data link layer still needed?

**Problem 2:** Give two reasons for using layered protocols.

**Problem 3:** Match the following to one (or more) of the five Internet layers:

- a) Route determination
- b) Flow control
- c) Mechanical and electrical interface
- d) Reliable process-to-process data transportation
- e) Reassembly of data packets
- f) Error correction and retransmission

**Problem 4:** Explain how the notion of multiplexing can be applied at the data link, network, and transport layers. Draw a figure that shows the flow of PDUs in each multiplexing scheme.

**Problem 5:** Suppose an application layer entity wants to send an  $L$ -byte message to its peer process, using an existing TCP connection. The TCP segment consists of the message plus 20 bytes of header. The segment is encapsulated into an IP packet that has an additional 20 bytes of header. The IP packet in turn goes inside an Ethernet frame that has 18 bytes of header and trailer. What percentage of the transmitted bits in the physical layer corresponds to the message information if  $L = 100$ bytes? 500 bytes? 1000 bytes?

**Problem 6:** Suppose a user has two browser applications active at the same time, and suppose that the two applications are accessing the same server to retrieve HTTP documents at the same time. How does the server tell the difference between the two applications?

**Problem 7:** For each of the following services, discuss which of the following type of services:  
Reliable vs unreliable  
Connectionless vs connection-oriented would you prefer.

- (a) Internet Radio
- (b) File transfer
- (c) Ping
- (d) Telnet
- (e) Electronic Mail

**Problem 8:** Suppose client A initiates a Telnet session with server S. At about the same time, client B also initiates a Telnet session with server S. Provide possible but consistent source and destination port numbers for:

- (a) the segments sent from A to S.
- (b) the segments sent from B to S.
- (c) the segments sent from S to A.
- (d) the segments sent from S to B.
- (e) If A and B are different hosts, is it possible that the source port number in the segments from A to S is the same as that from B to S? Why or why not?
- (f) How does your answer to part (e) change if A and B are client programs on the same host?

In answering (a) to (f), you may assume that the range for assigned ports managed by the IANA is 0 – 1023, with Telnet-server application given a port number of 23.

**Problem 9:** Suppose we need a communication service to transmit real-time voice over the Internet. What features of TCP and what features of UDP are appropriate?