

158.235 Tutorial

Transport Layer - TCP & UDP

1) True or False

- a) Suppose Host A is sending a large file to Host B over a TCP connection. If the sequence number for a segment of this connection is m , then the sequence number for the subsequent segment will necessarily be $m+1$. _____
 - b) Host A is sending Host B a large file over a TCP connection. Assume Host B has no data to send Host A. Host B will not send acknowledgements to Host A because Host B cannot piggyback the acknowledgements on data. _____
 - c) The size of the TCP RcvWindow never changes throughout the duration of the connection

 - d) Suppose Host A sends one segment with sequence number 75 and 5 bytes of data over a TCP connection to Host B. In this same segment the acknowledgment number has to be 81. _____
- 2) Describe why an application developer might choose to run an application over UDP rather than TCP.
- 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) UDP and TCP use 1s complement for their checksums. Suppose you have the following three 8-bit bytes: 01010011, 01100110, 01110100. What is the 1s complement of the sum of these 8-bit bytes? (Note that although UDP and TCP use 16-bit words in computing the checksum, for this problem you are being asked to consider 8-bit sums.) Show all work. Why is it that UDP takes the 1s complement of the sum; that is, why not just use the sum? With the 1s complement scheme, how does the receiver detect errors? Is it possible that a 1-bit error will go undetected? How about a 2-bit error?
- 5) Differentiate between TCP flow control and congestion control.
- 6) What is the value of the receiver window (rwnd) for a host A, if the receiver, host B, has a buffer of size 4000 bytes and 1500 bytes of received and unprocessed data

- 7) What is the size of the window for host A if the value of the rwnd is 2000 bytes and the value of the cwnd is 4500 bytes.

8) TCP provides reliable data transport to the application layer data. For the following scenarios, sketch and complete the interactions between the TCP sender and TCP receiver, showing how they handle segment loss. For scenario 2 fill in the blank as well.

