CS224 (m): Computer Networks (minor)
Tutorial 04, 17/19 Aug 2016

Concepts tested: UDP, reliable data transfer

1. Suppose a process in host A is listening on a UDP socket corresponding to port 5000. If it were to receive two segments, is it possible for the segments to have originated from different hosts? If so, how does the application process distinguish that the two segments originated from different hosts?

2. Can a given destination port be associated with more than one TCP connection? Explain.

3. Can a given socket be associated with more than one TCP connection? Explain.

4. Smarty Pants wants to enhance single bit party scheme and decided to use two redundant bits. One bit represents the parity of all odd-numbered bits and second bit the parity of all even-numbered bits. Example: 0111 is encoded as 011110 (assuming 'even-parity'). In what way is this scheme better than single-bit parity? In what way is not better?

5. Tracing revealed the following sequence of packets sent by a sender employing stop and wait protocol. '0' and '1' refer to the sequence number in the packet.
   0 0 0 1 1 0 0 0 0 1 0 1 1 1 0
   Which of the following is most likely to produce the pattern.
   Bad forward channel
   Bad reverse channel
   Bad timeout setting
   Deterministic bug in error detection algorithm

6. In stop and wait protocol, suppose both sender and receiver retransmit the previous packet on receipt of a duplicate ACK or data frame. Draw a timeline to show the sequence of events which will happen if somehow the first data frame is duplicated.

7. Suppose the stop and wait protocol is employed over a link A to B, where the A to B link bandwidth is 1Mbps with a propagation delay of 20ms and B to A link bandwidth is 10Mbps with a propagation delay of 10ms (reverse link different from forward link). Suppose that the data packet size is 1000 bytes and ACK size is 100 bytes, what is the throughput achieved by the protocol? Ignore other delays.

8. In the above problem's context, if you are designing a new RDT protocol, what should your target throughput be i.e what is the maximum throughput that can (potentially) be achieved over this link?

9. What is the maximum number of bytes that can be accommodated as UDP payload?