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# **TTM4100**

## **Communication – Services and Networks**

**Assignment for Chapter 3: “Transport Layer”**

**Deadline of submission:           09.02.2012**

The assignment questions are chosen from the Problems of Chapter 3 in the textbook: J. F. Kurose and K. W. Ross. *Computer Networking: A Top-Down Approach (International Edition, 5/e)*. Pearson 2010. Please note that there are some modifications to the questions in the textbook, the questions in this document are to be used if there are differences.

For each question or sub-question, several choices are provided and only one of them is correct. Submit your answers to the Its Learning system.

## **1. Review Questions R8, R7 and R11, Chapter 3, page 323-324.**

**1.a) Is it possible for an application to enjoy reliable data transfer even when the application runs over UDP? (Page: 323. Review Questions R8 (first part of the question))**

*1.a.1 Yes*

*1.a.2 No*

**1.b) 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? (Page: 323. Review Questions R7 (first part of the question))**

*1.b.1 Yes*

*1.b.2 No*

**1.c) In our rdt protocols, why did we need to introduce sequence numbers? (Page: 324. Review Questions R11)**

*1.c.1 Sequence numbers are required for a receiver to find out whether an arriving packet contains new data or is a retransmission*

*1.c.2 Sequence numbers are required for a receiver to find out whether the sender sends data in an agreed rate.*

## **2. True or false ? (Page : 324. Review Questions R14, Chapter 3)**

**2.a) The size of the TCP *RcvWindow* never changes throughout the duration of the connection. (R14.e)**

*2.a.1 true*

*2.a.2 false*

**2.b) Suppose Host A is sending Host B a large file over a TCP connection. The number of unacknowledgement bytes that A sends cannot exceed the size of the receive buffer. (R14.d)**

*2.b.1 true*

*2.b.2 false*

**2.c) Host A is sending Host B a large file over a TCP connection. Assume Host B has not data to send Host A. Host B will not send acknowledgements to Host A because Host B cannot piggyback the acknowledgements on data. (R14.b)**

- 2.c.1 true
- 2.c.2 false

**2.d) The TCP segment has a field in its header for *RcvWindow*. (R14.f)**

- 2.d.1 true
- 2.d.2 false

**2.e) 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  $m+1$ . (R14.a)**

- 2.e.1 true
- 2.e.2 false

**2.f) Suppose that the last *SampleRTT* in a TCP connection is equal to 1 sec. The current value of *TimeoutInterval* for the connection will necessarily be  $\geq 1$  sec. (R14.c)**

- 2.f.1 true
- 2.f.2 false

**2.g) Suppose Host A sends one segment with sequence number 38 and 4 bytes of data over a TCP connection to Host B. In this same segment the acknowledgment number is necessarily 42. (R14.g)**

- 2.g.1 true
- 2.g.2 false

### **3. Review Questions R16, R15, R17, Chapter 3, page 325.**

**3.a) Suppose Host A sends two TCP segments back to back to Host B over a TCP connection. The first segment has sequence number 90; the second has sequence number 110. How much data is in the first segment? (R16.b)**

- 3.a.1 *Cannot be decided from the given information.*
- 3.a.2 *20 bytes.*
- 3.a.3 *90 bytes.*
- 3.a.4 *110 bytes.*

**3.b) Suppose Host A sends two TCP segments back to back to Host B over a TCP connection. The first segment has sequence number 90; the second has sequence number 110. Suppose that the first segment is lost but the second segment arrives at B. In the acknowledgement that Host B sends to Host A, what will be the acknowledgement number? (R16.a)**

- 3.b.1 *Cannot be decided from the given information.*
- 3.b.2 *20.*
- 3.b.3 *90.*
- 3.b.4 *110.*

**3.c) Consider the Telnet example discussed in Section 3.5. A few seconds after the user types the letter ‘C’, the user types the letter ‘R’. After typing the letter ‘R’, how many segments are sent, and what is put in the sequence number and acknowledgment fields of the segments? (R15)**

*3.c.1 1.*

*3.c.2 2*

*3.c.3 3*

*3.c.4 4*

**3.d) True or false? Consider congestion control in TCP. When the timer expires at the sender, the threshold is set to one half of its previous value. (R17)**

*3.d.1 true.*

*3.d.2 false*

**4. Suppose that the UDP receiver computes the Internet 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? (Page 326. Problem P8 (first part of the question), Chapter 3)**

*4.1 Yes, the receiver can be absolutely certain that no bit errors have occurred.*

*4.2 No, the receiver cannot be absolutely certain that no bit errors have occurred.*

**5. Host A and B are communicating over a TCP connection, and Host B has already received from A all bytes up through byte 358. Suppose Host A then sends two segments to Host B back-to-back. The first and second segments contain 50 and 80 bytes of data, respectively. In the first segment, the sequence number is 359, the source port number is 1028, and the destination port number is 80. Host B sends an acknowledgment whenever it receives a segment from Host A. (Page: 330. Problem P23, Chapter 3).**

**5.a) In the second segment sent from Host A to B, what are the sequence number, source port number, and destination port number? (P23.a)**

*5.a.1 Cannot be decided from the given information.*

*5.a.2 The sequence number is 409, the source port number is 1028 and the destination port number is 50.*

*5.a.3 The sequence number is 1028, the source port number is 359 and the destination port number is 80.*

*5.a.4 The sequence number is 409, the source port number is 1028 and the destination port number is 80.*

**5.b) If the first segment arrives before the second segment, in the acknowledgment of the first arriving segment, what is the acknowledgment number, the source port number, and the destination port number? (P23.c)**

*5.b.1 Cannot be decided from the given information.*

*5.b.2 The acknowledgement number is 409, the source port number is 80 and the destination port number is 1028.*

*5.b.3 The acknowledgement number is 409, the source port number is 1028 and the destination port number is 80.*

*5.b.4 The acknowledgement number is 439, the source port number is 80 and the destination port number is 1028.*

**5.c) If the second segment arrives before the first segment, in the acknowledgment of the first arriving segment, what is the acknowledgment number? (P23.b)**

*5.c.1 Cannot be decided from the given information.*

*5.c.2 The acknowledgement number is 409.*

*5.c.3 The acknowledgement number is 359.*

*5.c.4 The acknowledgement number is 439.*