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TTM4100
Communication – Services and Networks

Assignment for Chapter 3: "Transport Layer"

Deadline of submission: 12.02.2017

The assignment questions are mostly based on the Problems of Chapter 3 in the textbook: J. F. Kurose and K. W. Ross. *Computer Networking: A Top-Down Approach (International Edition, 6/e)*. Please note that there are 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. True or False?

1.a) Transport-layer protocols can only provide reliable data transfer over reliable networks.

1.a.1 True
1.a.2 False

1.b) Applications can only have reliable data transfer if the transport-layer protocol used provide it.

1.b.1 True
1.b.2 False

1.c) UDP does not establish a connection between endpoints.

1.c.1 True
1.c.2 False

1.d) In TCP, properties of ACKs received are used in congestion control.

1.d.1 True
1.d.2 False

1.e) It is impossible to have Congestion Control when using UDP.

1.e.1 True
1.e.2 False

2. More True or false

2.a) Suppose Host A has a UDP socket with port number 25565, and Hosts B and C both send a UDP segment with destination port number 25565 to Host A. Host A cannot know that these segments came from two different hosts.

2.a.1 True
2.a.2 False

2.b) TCP uses only the source and destination port header fields to determine what socket a segment should be sent to.

2.b.1 True
2.b.2 False

2.c) A TCP sender window can contain acknowledged data as well as unacknowledged data.

2.c.1 True
2.c.2 False

2.d) Host A is sending a large file to Host B over TCP. Host A cannot send more unacknowledged data than what fits in the receive window of Host B.

2.d.1 True
2.d.2 False

2.e) With the Go-Back-N protocol, it is not possible to receive an ACK for a packet that is outside one's current sending window.

2.e.1 True
2.e.2 False

3. TCP - Segments and Sequence Numbers.

Host A and Host B have established a connection using TCP. Host A sends two segments of data to Host B. The first has sequence number 81 and the second has sequence number 121.

3.a) How much data was in the first segment?

3.a.1 Cannot be decided from the given information.
3.a.2 40 bytes.
3.a.3 81 bytes.
3.a.4 121 bytes.

3.b) How much data was in the second segment?

3.b.1 Cannot be decided from the given information.
3.b.2 40 bytes.
3.b.3 81 bytes.
3.b.4 121 bytes.

4. TCP – Acknowledgments.

Consider the connection in task 3. And suppose the hosts decided not to use selective repeat, but they are using go-back-n.
Now, Host B has received and acknowledged all the bytes up to 150.
The last acknowledgment it sent had the acknowledgment number 151.

4.a) Host B receives a new segment with length 30 bytes, and sequence number 181. What acknowledgment number should Host B put in its ACK for that segment?

4.a.1 151
4.a.2 181
4.a.3 211

4.b) After sending the ACK for task a) Host B receives a segment with sequence number 151, this one is also 30 bytes long. What acknowledgment number should Host B put in its ACK for that segment?

4.b.1 151
4.b.2 181
4.b.3 211

4.c) After sending the ACK for task b) Host B receives a segment with length 30 bytes, and sequence number 151. What acknowledgment number should Host B put in its ACK for that segment?

4.c.1 151
4.c.2 181
4.c.3 211
4.c.4 No need to send ACK, because it is a duplicate of a segment that has already been ACK-ed.

4.d) If they had used selective repeat instead of go-back-n, what would the answer to task 4.a) be?

4.d.1 151
4.d.2 181
4.d.3 211

4.e) How about 4.b) with selective repeat?

4.e.1 151
4.e.2 181
4.e.3 211

5. The TCP Header

The packets received by Host B in task 4 have a few header fields, here are some of them:
-source IP address=192.168.0.10
-destination IP address=192.168.0.23
-source port=400
-destination port=600

5.a) Which of these header fields belong in the TCP header?

5.a.1 The IP addresses
5.a.2 The Ports
5.a.3 All of them
5.a.4 None of them

5.b) In the ACKs host B sends back to host A, what are the discussed header fields?

5.b.1 srcIPAddr=192.168.0.10, dstIPAddr=192.168.0.23, srcPort=400, dstPort=600
5.b.2 srcIPAddr=192.168.0.23, dstIPAddr=192.168.0.10, srcPort=400, dstPort=600
5.b.3 srcIPAddr=192.168.0.23, dstIPAddr=192.168.0.10, srcPort=600, dstPort=400
5.b.4 srcIPAddr=192.168.0.10, dstIPAddr=192.168.0.23, srcPort=600, dstPort=400