COMP 445 – Theoretical Assignment 2 (TA1)
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Instructions

- Please submit your assignment as a pdf file on Moodle. The name of the pdf file must contain your name and student id.
- All questions will receive equal points.
- Each question may have zero, one, or more than one correct choices.
- Wrong answers will be penalized with negative points.
- Partial answers will not receive any point.
- Blank answers (no answer) will not be penalized.

Student ID: .....

First Name / Last Name: .....

Signature: .....

Transport Layer

Q1: Among the following services, which ones are provided by UDP?

a) □ Congestion control

b) □ Flow control

c) □ Reliable data transfer

d) □ Bandwidth reservation

Q2: An application may choose to transmit data using UDP rather than just IP (the network-level protocol) when it needs:

a) □ High throughput

b) □ Multiplexing / de-multiplexing

c) □ Security

d) □ Connection management (establishment, teardown)

Q3: TCP acknowledgments arrive with RTT values of 29, 31 and 32ms. What is the new estimated RTT value after the third acknowledgement was received, taking an initial estimated RTT of 31ms and $\alpha = 0.125$?

a) □ 32ms

b) □ 30.9ms

c) □ 31.8ms

d) □ 31.1ms

Q4: Two non-duplicate ACKs are received while a TCP sender is in Slow Start mode with cwnd=1KB, ssthresh=64KB and MSS=1KB. What is the state of the TCP sender after the second ACK is received?

a) □ Slow Start

b) □ Congestion Avoidance

c) □ Fast Recovery

d) □ SYN sent

Q5: Assuming the same initial state and sequence of events as in the previous question, what will be the value of the cwnd variable (size of the congestion window) after the second ACK is received?

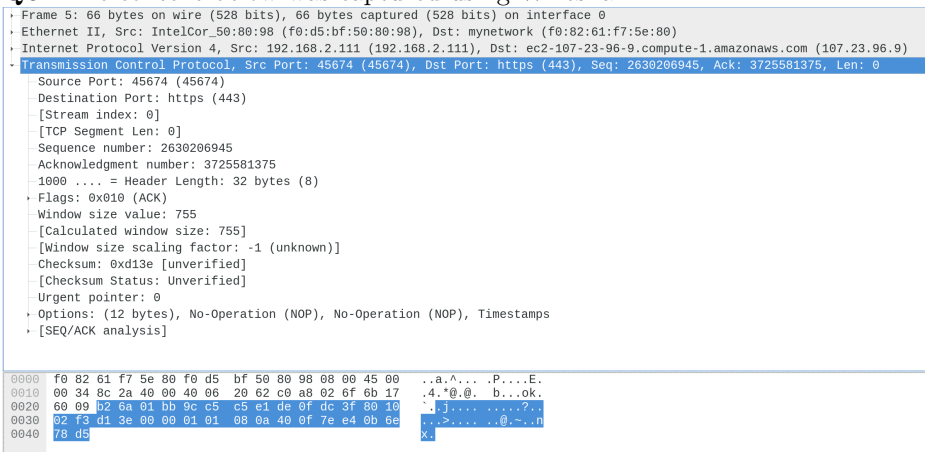
a) □ 1KB

b) □ 2KB

c) □ 3KB

d) □ 4KB

Q6: The content below was captured using Wireshark:



This trace contains:

a) □ A TCP segment that contains an acknowledgment

b) □ A UDP segment that contains an acknowledgment

c) □ A TCP segment that contains an HTTP message

d) □ An HTTP message that contains a TCP segment

Q7: Among the following mechanisms, which one(s) can be used to provide reliable data transfer?

a) □ Checksums

b) □ Timeouts

c) □ Sequence numbers

d) □ Acknowledgments

Q8: In connection-oriented multiplexing, two packets with the same source host, source port, destination host and destination port might be delivered to two different sockets:

a) □ Yes

b) □ No

Q9: What is the UDP checksum of D=10101010101010101010101010101010?

a) □ 1010101010101010

b) □ 0101010101010101

c) □ 1111111111111111

d) □ 0000000000000000

Q10: In a pipelined protocol, the sender allows N simultaneous non-acknowledged packets. This is meant to:

a) □ Increase network utilization, by a factor of $\frac{N}{2}$.

b) □ Increase network utilization, by a factor of N.

c) □ Reduce packet queuing time, by a factor of $\frac{N}{2}$.

d) □ Reduce packet queuing time, by a factor of N.