# CSc 4220/6220 – Fall 2018
# Assignment #3 – Transport Layer
## Deadline: Thursday, October 18th 11:59 pm
## Late Deadline: Monday, October 22nd 11:59 pm

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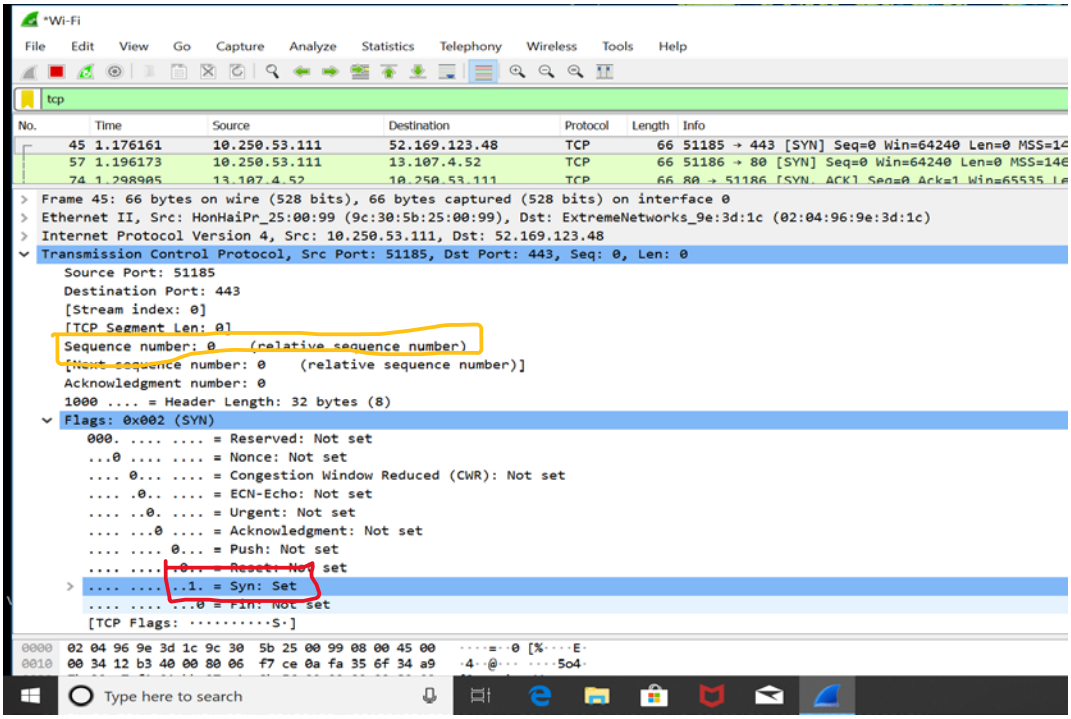
1. (20 points) Let the message from sender be 1001001100111010011101010001100l. Divide it into 8-bit segments (instead of 16-bit) and then calculate the 8-bit checksum. Explain how to use the checksum to determine the validity of the message on the receiver side using the same message.

2. (20 points) Briefly explain what each version of the reliable transfer protocol (RDT covered in class) proposes to implement reliable transfer of data over a network. Include their drawbacks and how are they solved in their next version. Explicitly explain what problem in Go-Back-N protocol was solved by selective repeat protocol.

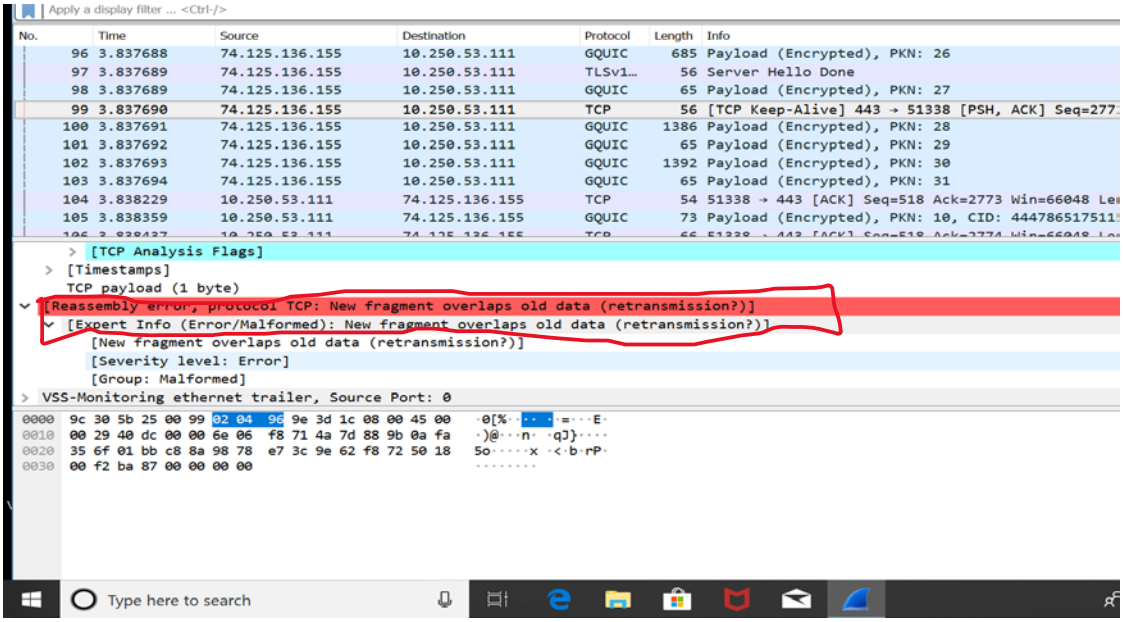



In the above example screenshot, the packet has SYN flag set to 1, which is an indication that this is connection establishment packet for TCP and is one of the handshaking packets.

3. (20 points) What are the sequence numbers assigned for SYN and FIN packets during the connection establishment and closing when requesting a web page? ~~of your client-server program done in your assignment 2. Use Wireshark for this.~~ [Hint: ~~Capture the packets for client server program when they are running, and the~~ The initial TCP packets has SYN bit as 1, and

final TCP packets would have FIN flag set to 1, See the sequence number for the packets with SYN as 1 and FIN as 1 for the client ~~and server~~. Switch off your Wi-Fi at the end in order to trigger the FIN flag to be set.]

4. (20 points) Observe any duplicate ACK which indicates the packet-loss. Duplicate ACK means packets from receiving side having acknowledgement number with different sequence number. Browse any website like you can upload your file and download it (Example: pdf to image converter) and record its flow of traffic till your download and stop the capture. [Hint: Both packets will have same source and destination values and same acknowledgement number]

5. 

(20 points) Observe any retransmission of packets due to its keep-alive time-out. Use the same procedure as problem 4 and screenshot by highlighting its details about retransmission in the screenshot like above.

For Graduate students:

1. Create a HTTP web server using TCP protocol which can be accessed by any number of clients from browser. Choose a port different from 80(standard HTTP port). Client should see 404 error page when they are requesting for a source not available on the server and also see 504 error-page when the server is down or stopped working.