Wireshark Lab 3: TCP

Group Details:

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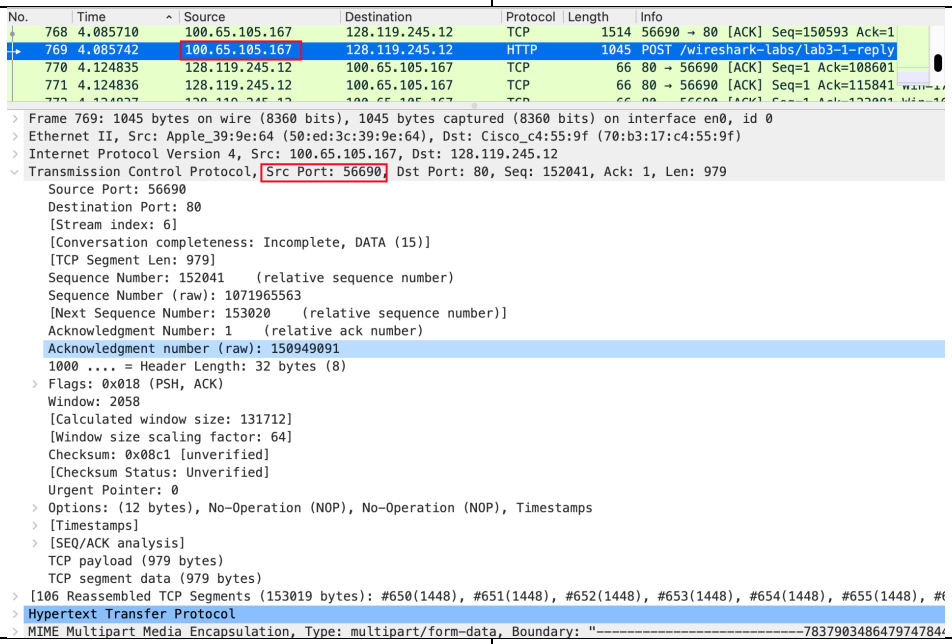
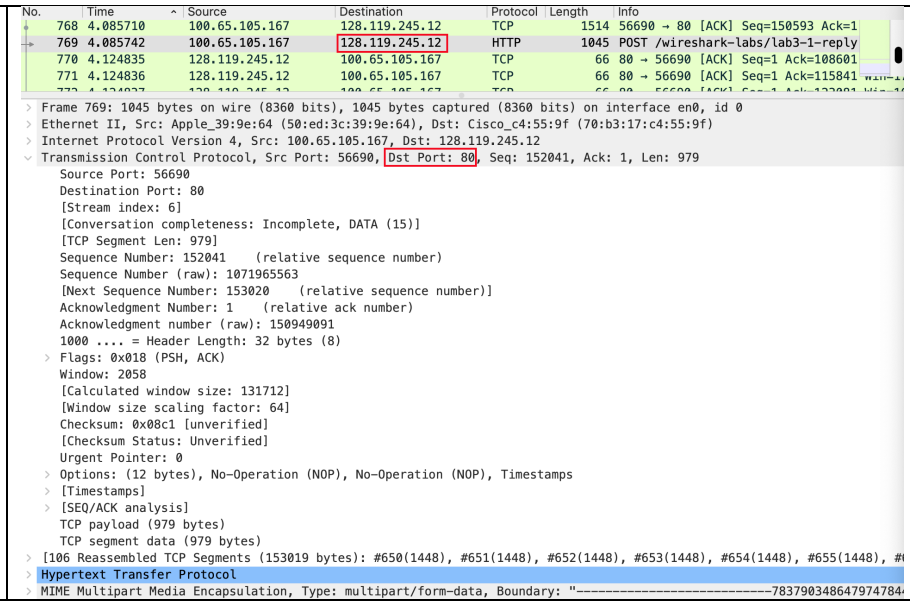
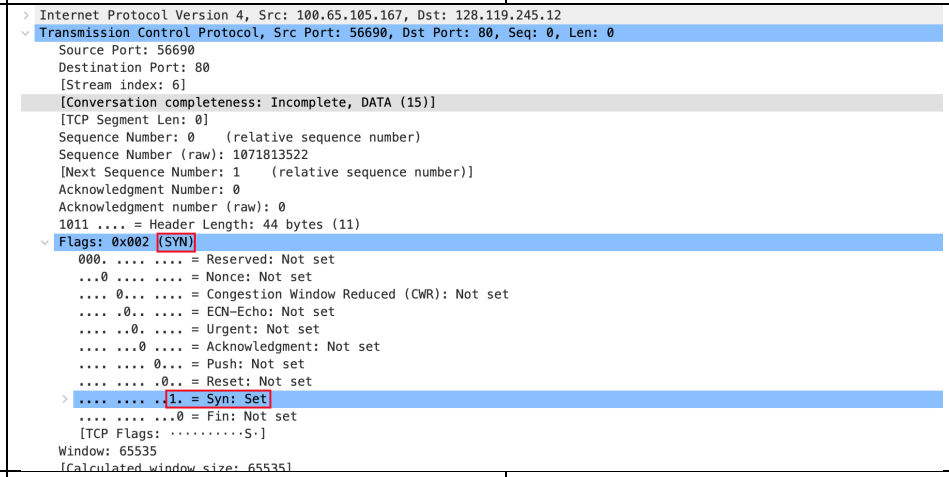
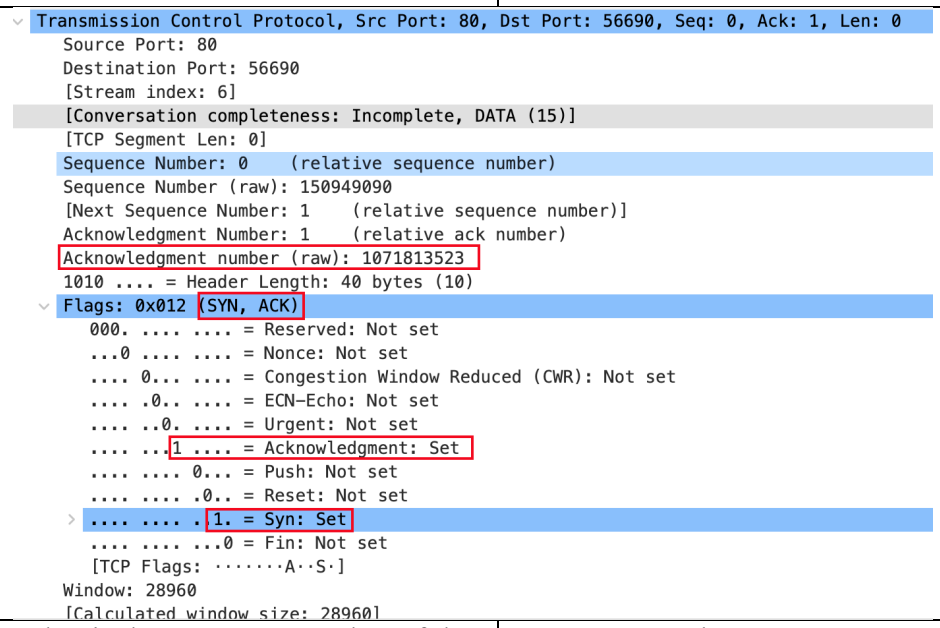
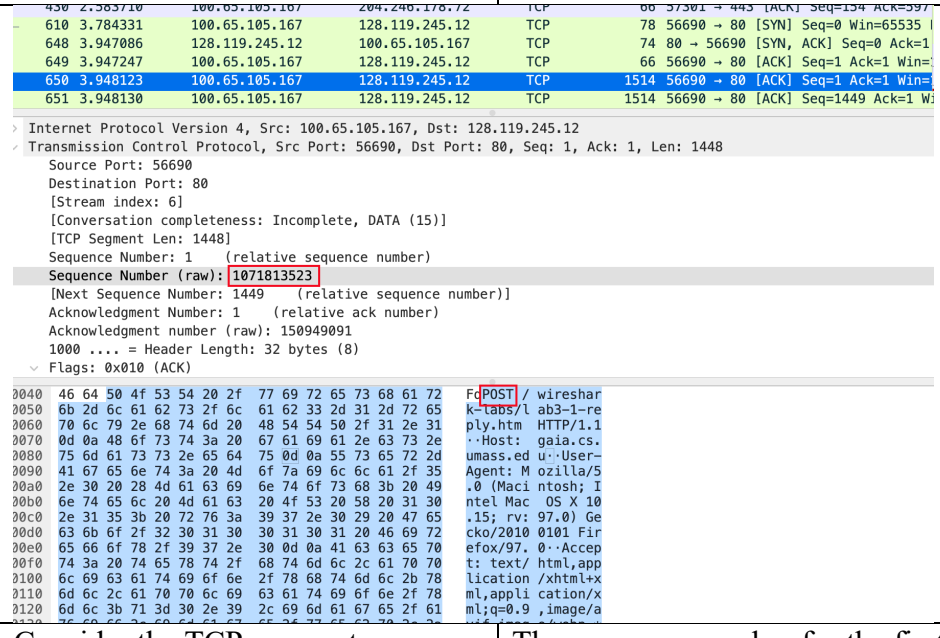
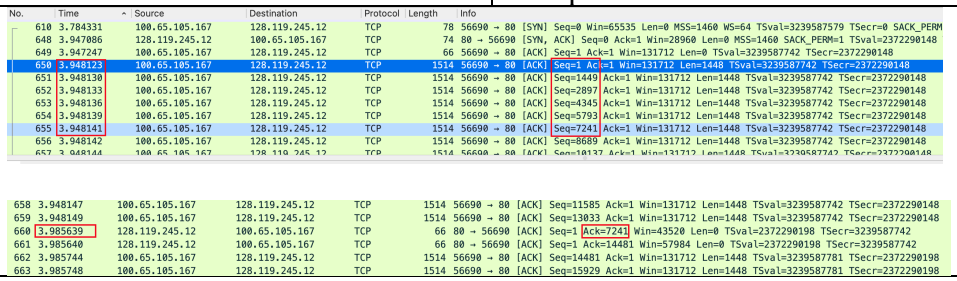
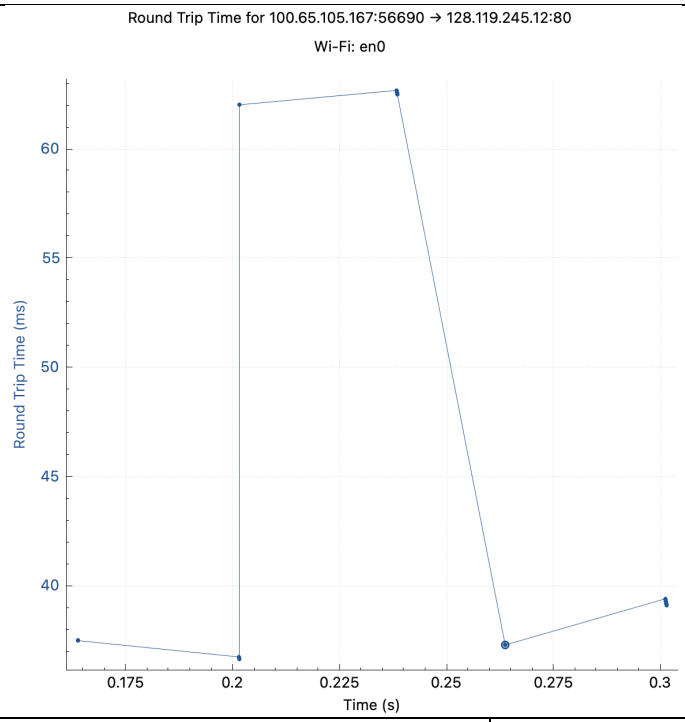
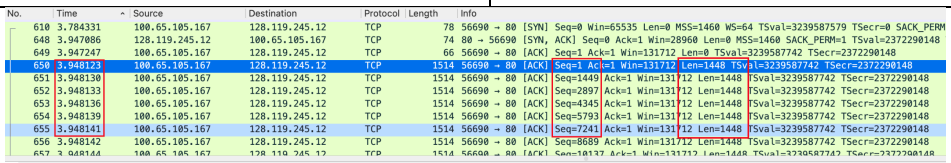
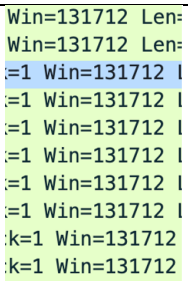
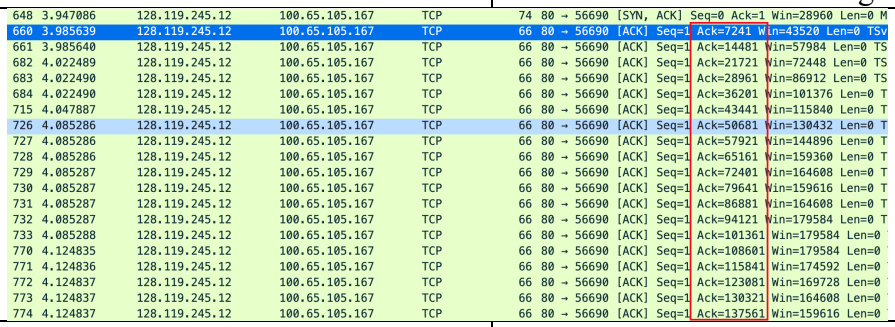
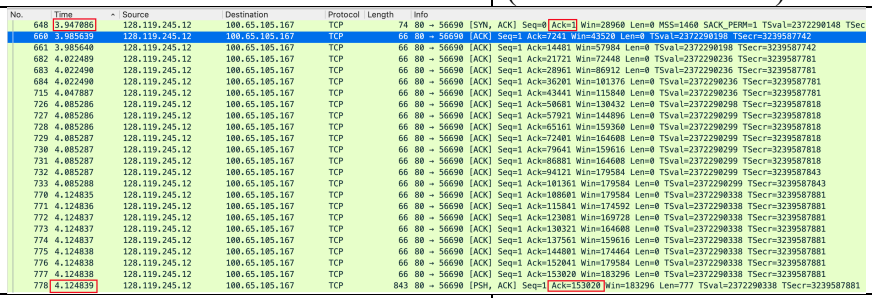
	Question	Answer
1	What is the IP address and TCP port number used by your client computer (source) that is transferring the file to gaia.cs.umass.edu?	IP address is: 100.05.105.167 Port Number is 56690
Annotated Screenshots (if needed)		
2	What is the IP address of gaia.cs.umass.edu? On what port number is it sending and receiving TCP segments for this connection?	IP address: 128.119.245.12 Port number: 80

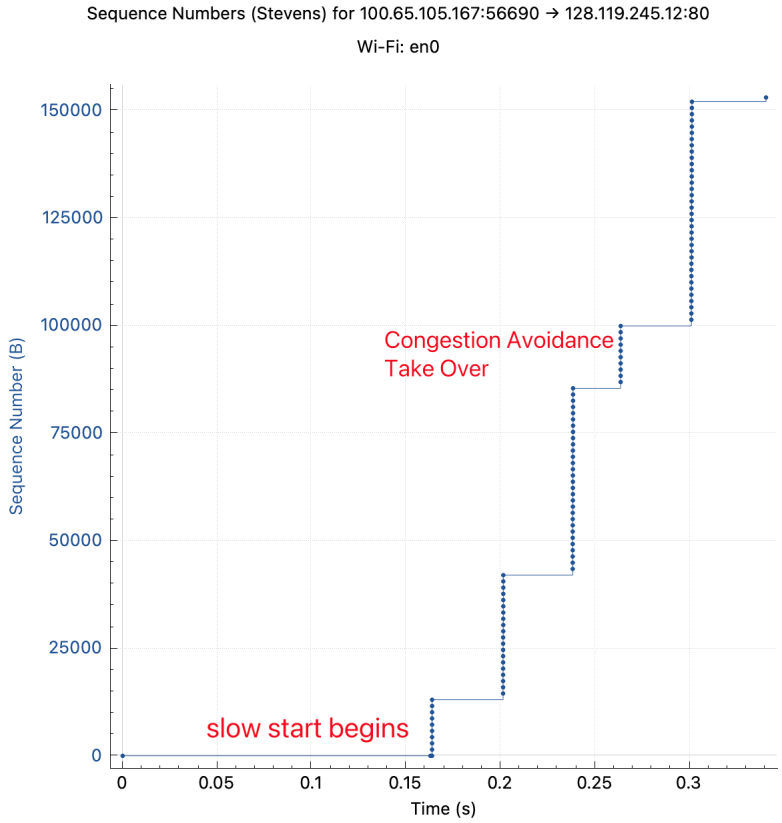
Annotated Screenshots (if needed)		
Question 3 omitted		
4	What is the sequence number of the TCP SYN segment that is used to initiate the TCP connection between the client computer and gaia.cs.umass.edu? What is it in the segment that identifies the segment as a SYN segment?	Sequence number: 1071813522 What identifies this as SYN segment: The Flags in this TCP segment is SYN. And it's set to 1 at last.
Annotated Screenshots (if needed)		
5	What is the sequence number of the SYNACK segment sent by gaia.cs.umass.edu to the client computer in reply to the SYN? What is the value of the ACKnowledgement field in the SYNACK segment? How did	Sequence number: 150949090 Acknowledgement number: 1071813523 How determine ACK value: ACK is always set to sequence number from the received packet + 1 What identifies as a SYNACK

	gaia.cs.umass.edu determine that value? What is it in the segment that identifies the segment as a SYNACK segment?	segment: the flag contains SYNACK, and the value of SYN and ACK are both set to 1.
Annotated Screenshots (if needed)		
6	What is the sequence number of the TCP segment containing the HTTP POST command?	Sequence number: 1071813523
Annotated Screenshots (if needed)		
7	Consider the TCP segment containing the HTTP POST as the first segment in the TCP connection.	The sequence number for the first 6 segments are: 1, 1449, 2897, 4345, 5793, 7241.

	What are the sequence numbers of the first six segments in the TCP connection (including the segment containing the HTTP POST)? At what time was each segment sent? When was the ACK for each segment received? Given the difference between when each TCP segment was sent, and when its acknowledgement was received, what is the RTT value for each of the six segments? What is the EstimatedRTT value after the receipt of each ACK?	The first 6 segments are sent at 3.948123 3.948130 3.948133 3.948136 3.948139 3.948141 seconds after the recording begins. The ACK for 7241, which is the last segment number of the first 6 segments sent, arrives at 3.985639 after the recording begins. No other ACKs for former segments are received. Since acummulative ACK is used, we know that former package has been received. Since we only have the last segment's ACK, we can't calculate the RTT value for each. However, each segment takes (3.985639 - 3.948123) / 6 = 6.252 ms The EstimatedRTT should be (1 - α) * EstimatedRTT + α * SampleRTT, where α = 0.125 for each segment. As we only know the ACK for the last of the first 6 segments, we can't calculate the EstimatedRTT after the receipt of each ACK.
Annotated Screenshots (if needed)		

		
8	What is the length of each of the first six TCP segments?	All 6 has length of 1448.
Annotated Screenshots (if needed)		
9	What is the minimum amount of available buffer space advertised at the received for the entire trace? Does the lack of receiver buffer space ever throttle the sender?	Minimum amount of the available buffer space: 1731712 The lack of receiver buffer did not throttle the sender.
Annotated Screenshots (if needed)		
10	Are there any retransmitted segments in the trace file? What did you check for (in the trace) in order to answer this question?	No. Should check for segment in the same direction with the same sequence number.

Annotated Screenshots (if needed)		
11	How much data does the receiver typically acknowledge in an ACK? Can you identify cases where the receiver is ACKing every other received segment	7240 bytes When in-order segment arrive with expected sequence number and all segment before this sequence number are already acknowledged, TCP sends ACK for every other packet. When there are some segments before this segment number waiting for ACK, TCP send single cumulative ACK for this segment.
Annotated Screenshots (if needed)	
12	What is the throughput (bytes transferred per unit time) for the TCP connection? Explain how you calculated this value.	Use the time interval between the first and last ACK, divided by the final ACK number, which is the total number of bytes transmitted. Throughput = 153020 * 8 / (4.124839- 3.947086) = 6.8 Mbit/s
Annotated Screenshots (if needed)		
13	Use the Time-Sequence-Graph (Stevens) plotting tool to view the sequence number versus time plot of segments being sent from the client to the gaia.cs.umass.edu server. Can you identify where TCP's slowstart phase begins and ends, and where congestion avoidance takes over? Comment on	The time is labeled in the graph. The segment size increases not linearly when enters congestion avoidance, which should be, as we mentioned in class.

	ways in which the measured data differs from the idealized behavior of TCP that we've studied in the text. **Tip: if your time sequence doesn't look like the one in the handout, try pressing the Switch Direction button.**	
Annotated Screenshots (if needed)		
Question 14 omitted		