Ritesh Deshmukh

Computer Networks CSE 5344
Project 2: Transmission Control Protocol Analysis Using Wireshark
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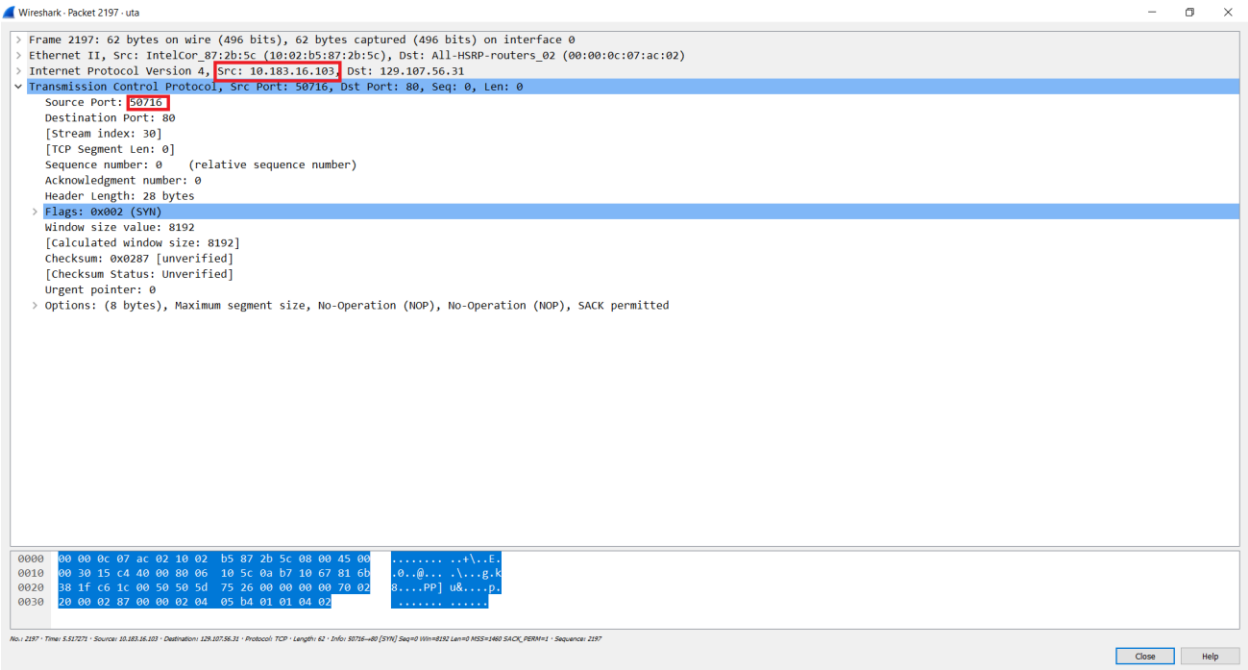
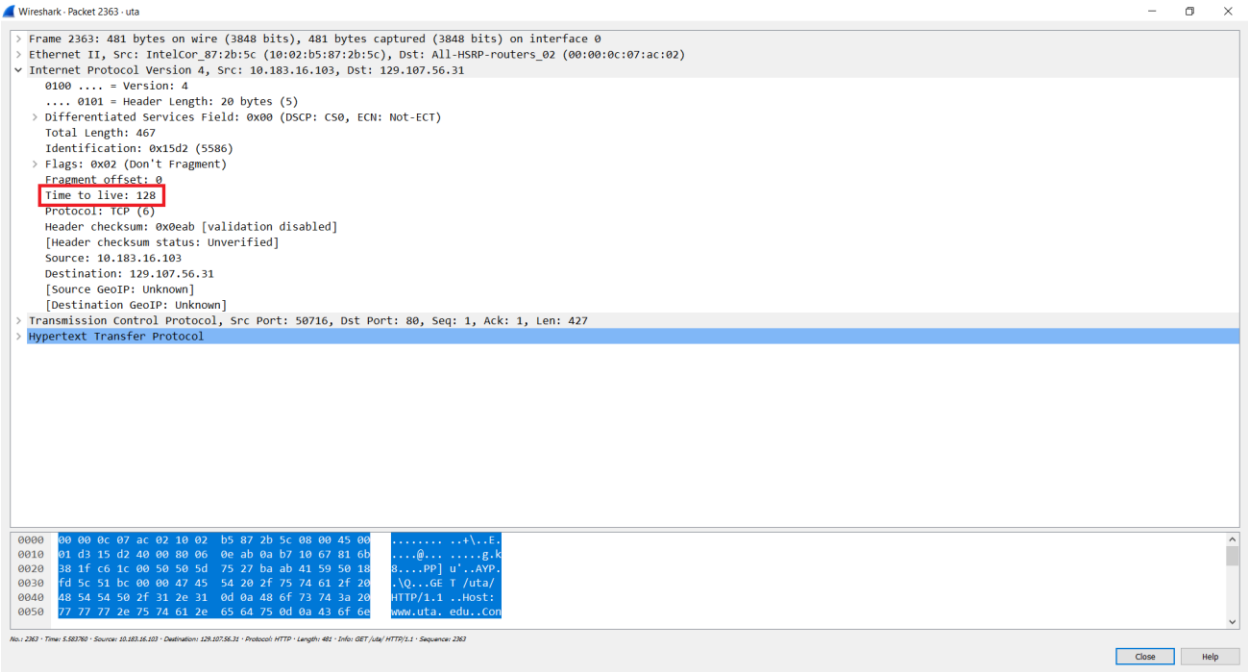
Problem Set 1

1.What is the IP address and TCP port number used by your client computer (source) to browse the page uta.edu.
-> IP Address = 10.183.16.103 Port number = 50716



Use the 'GET' message to answer the following questions.
2. What is the TTL value that is used in this communication?
-> 128



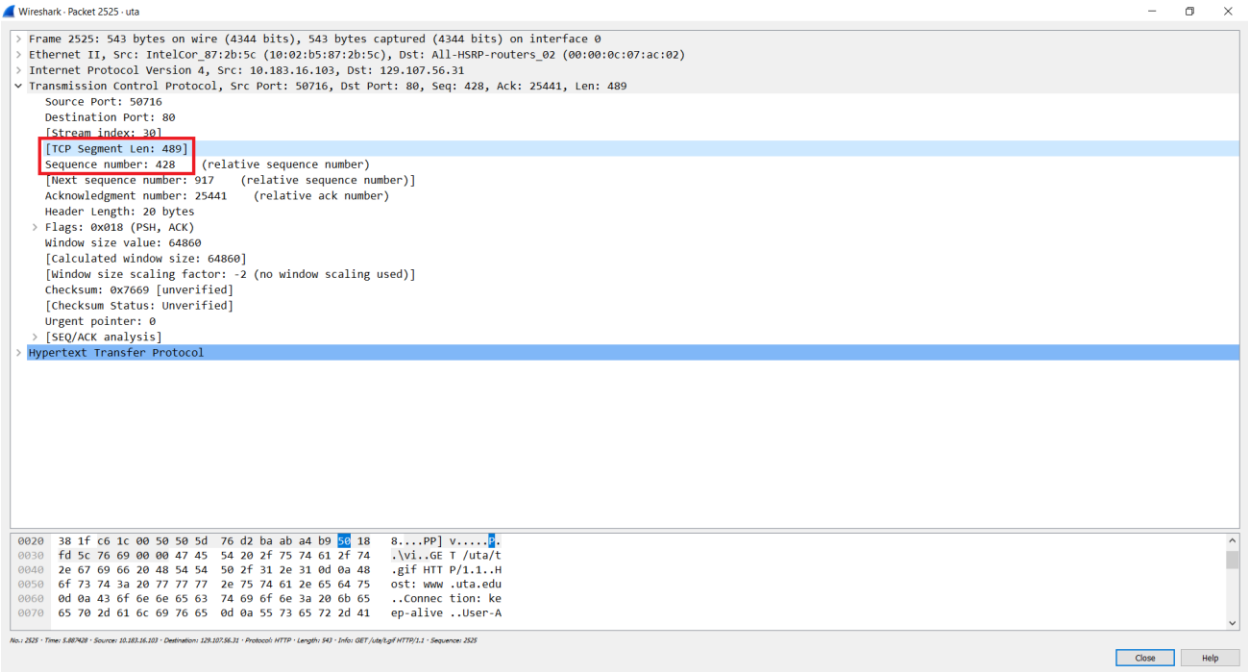
3. Did you Use IPV4 or IPV6 for communication?
-> IPV4

4. Does your optional field has some particular information or not.
-> There is not information present in the field specified.

5. Is the Packet Fragmented
-> Since the Fragment Offset is 0, the packet is not fragmented.

6. What is the TCP segment length?
-> 489

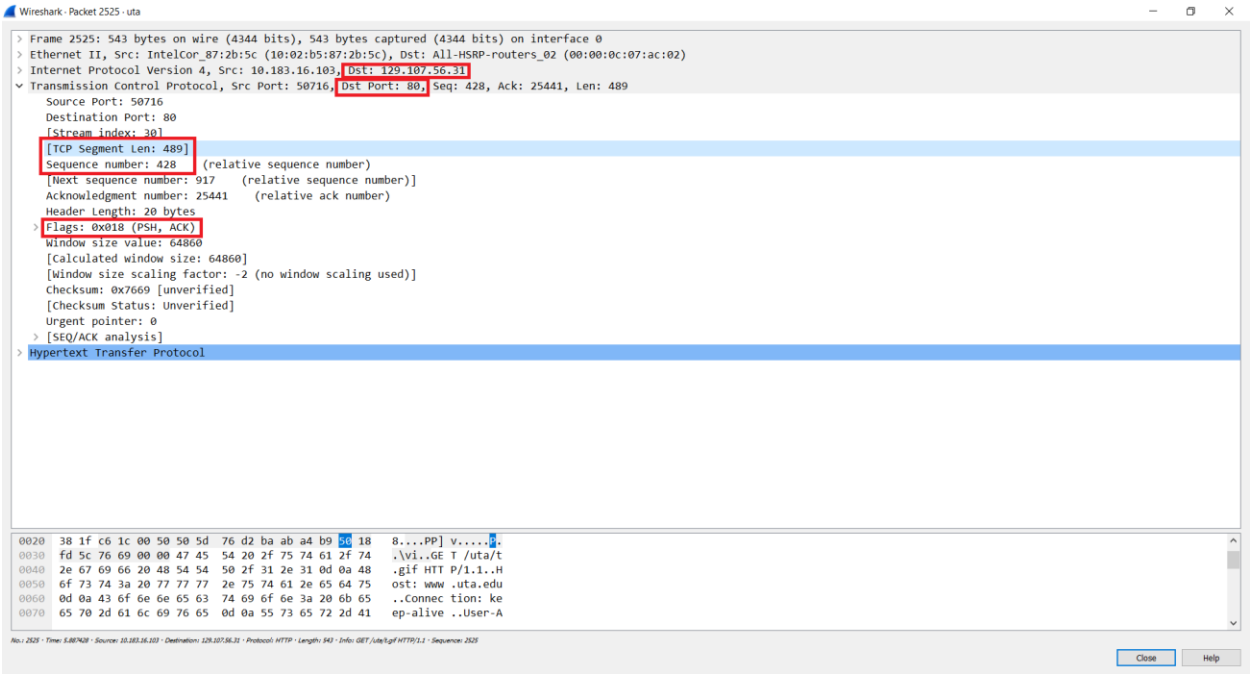
7. What is the Sequence Number of TCP segment (you can use the relative sequence number).
-> 428



8. Calculate the acknowledgement number based on the two questions above. Verify your solution with the Wireshark values.
-> 917

9. What are the fields in the TCP Flags. No need to give any values but give the field names given in Wireshark
- > (PSH, ACK)

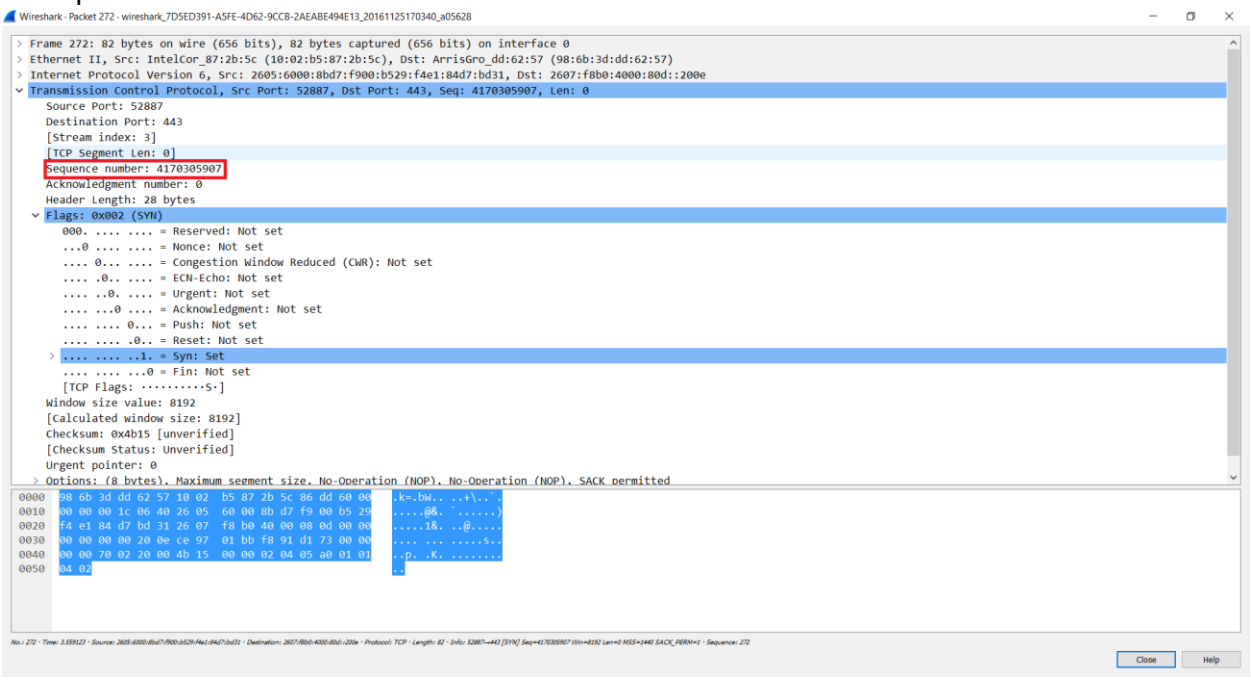
10. What is the IP address of uta.edu? On what port number is it sending and receiving TCP segments for this connection?
-> IP Address = 129.107.56.31 Port Number = 80



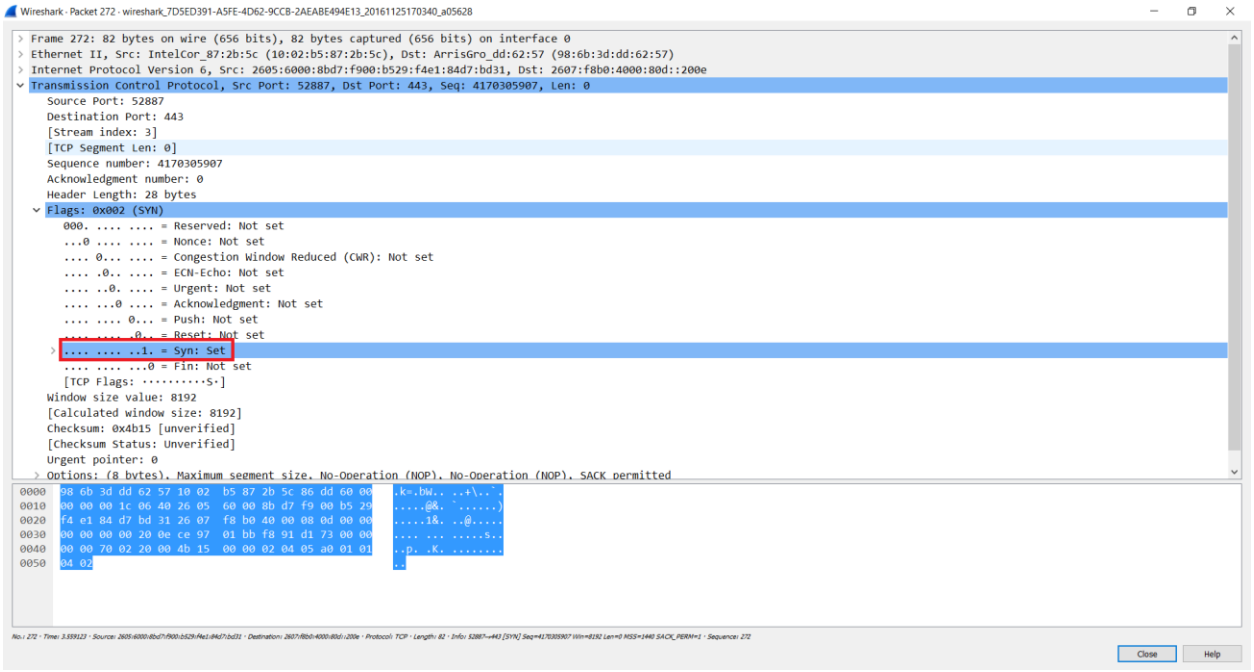
Problem Set 2

1. What is the sequence number (absolute) of the TCP SYN segment that is used to initiate the TCP connection between the client computer and youtube.com?

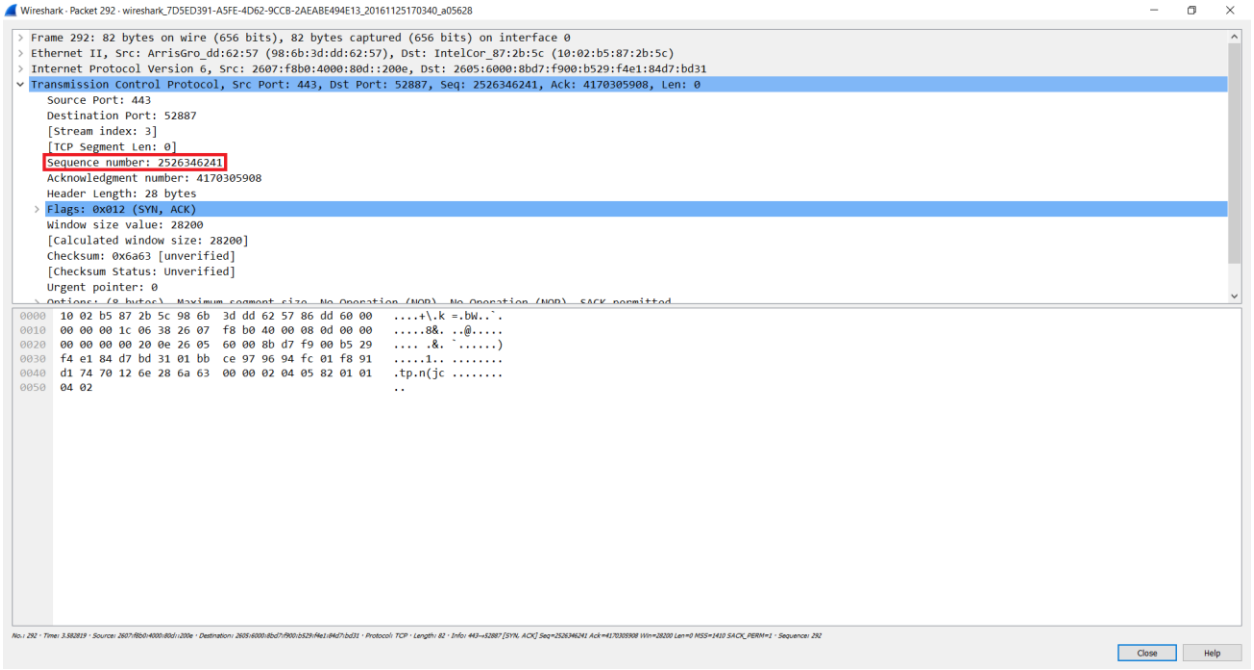
-> Sequence number: 4170305907



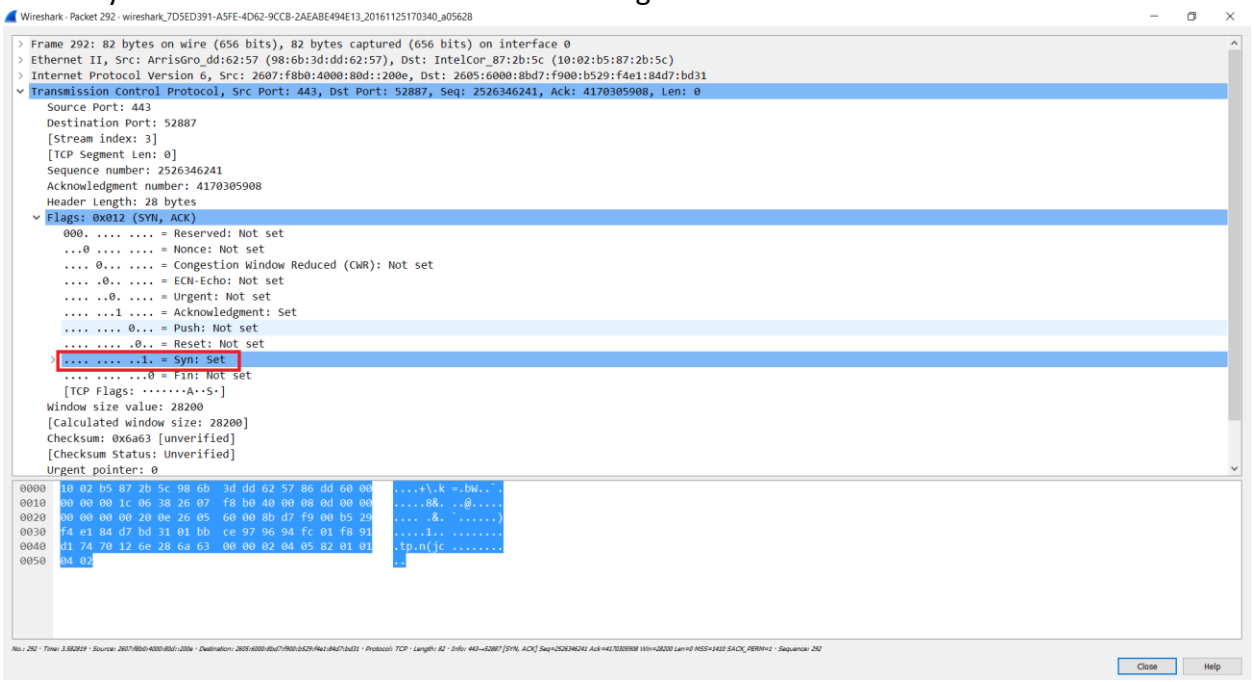
2. What is it in the segment that identifies the segment as a SYN segment?
-> The SYN bit is Set in the flags that identifies the segment as a SYN Segment.



3. What is the sequence number of the SYNACK segment sent by youtube.com to the client computer in reply to the SYN? What is the value of the Acknowledgement field in the SYNACK segment?
-> Sequence number: 2526346241

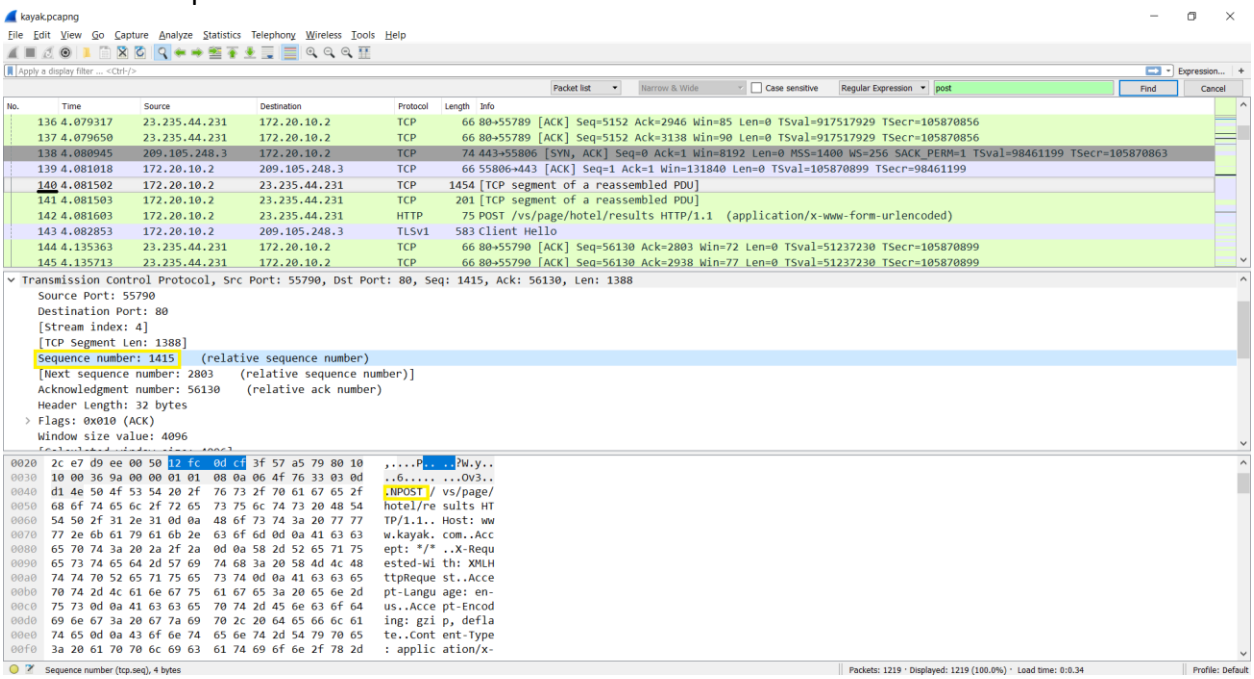


4. How did youtube.com determine that value? What is it in the segment that identifies the segment as a SYNACK segment?
-> The Syn and the ack bits are both set in the flags.



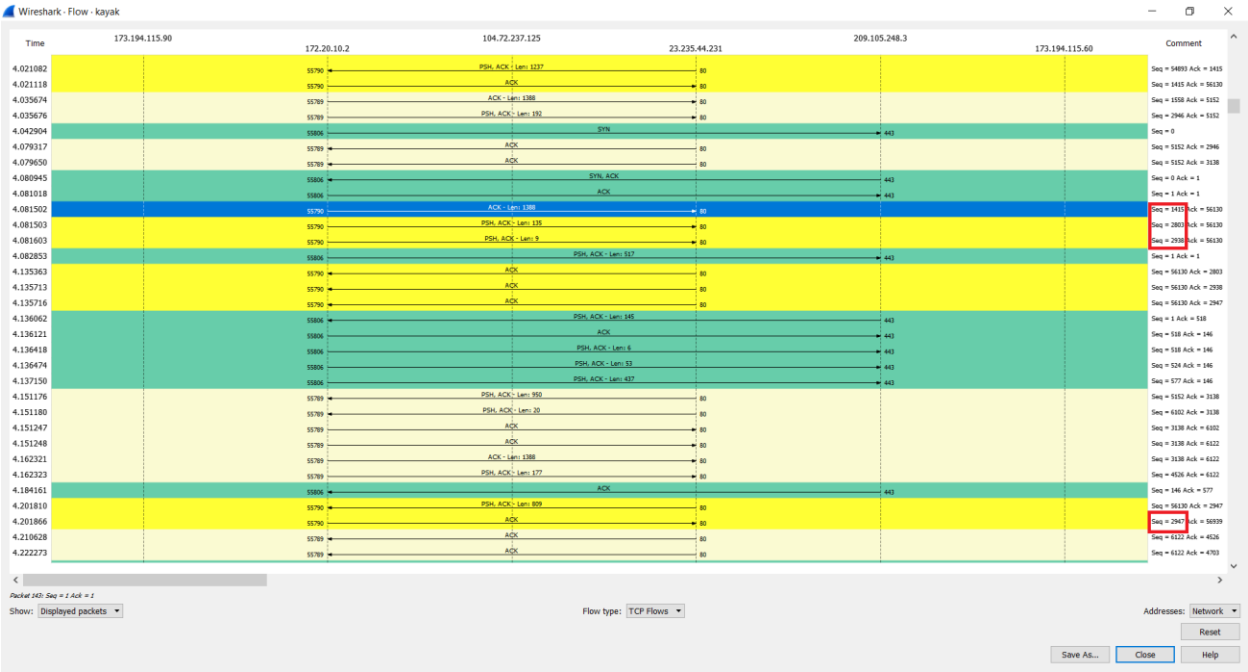
Problem Set 3

1. What is the sequence number of the TCP segment containing the first HTTP POST command?
-> The sequence number of the TCP segment containing the first HTTP POST command is on No. 140 and its sequence number is 1415



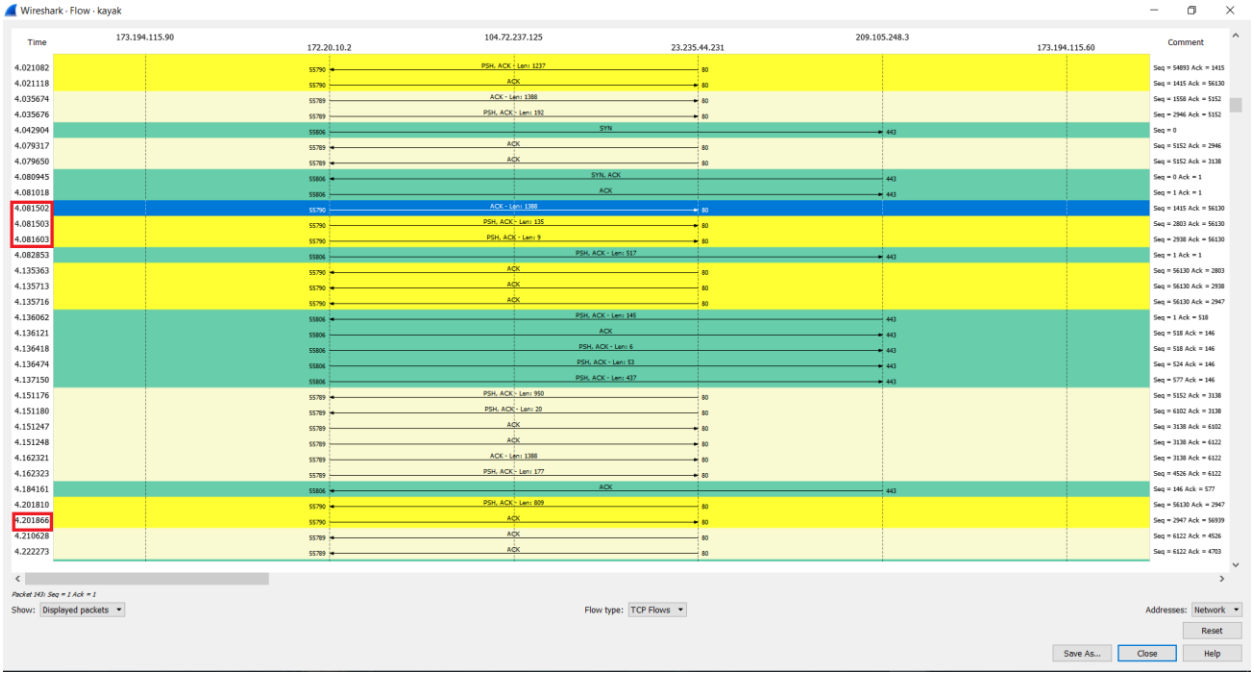
2. Consider the TCP segment containing the HTTP POST as the first segment in the TCP connection.

I) What are the sequence numbers of the first four segments in the TCP connection (including the segment containing the HTTP POST)? Sequence numbers: 1415, 2803, 2938, 2947

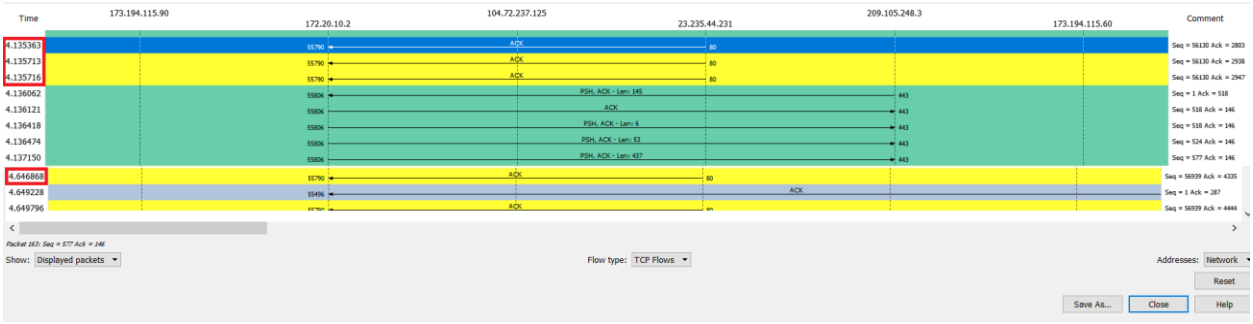


ii) At what time was each segment sent?

Time at which each segment was sent: 4.081502, 4.081503, 4.081603, 4.201866



iii) When was the ACK for each segment received?
Time at which ACK for each segment was received: 4.135363, 4.135713, 4.135716, 4.646468



iv) Given the difference between when each TCP segment was sent, and when its acknowledgement was received,
Difference: 0.053861, 0.05421, 0.054113, 0.445002

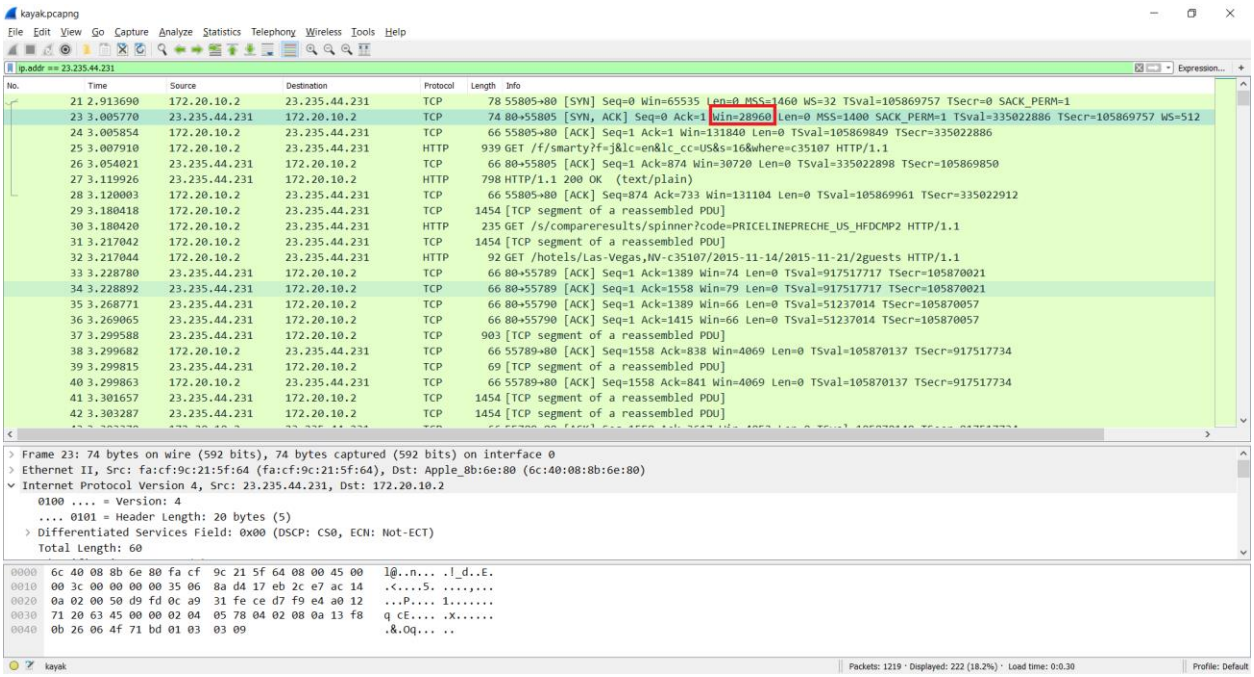
v) what is the RTT value for each of the four segments?
RTT value: 0.053861000, 0.054210000, 0.054113000, 0.076515000

vi) What is the EstimatedRTT value (see Section 3.5.3, page 239 in text) after the receipt of each ACK?
Estimated RTT: 0.053861, 0.05421, 0.054113, 0.398941

vii) Assume that the value of the EstimatedRTT is equal to the measured RTT for the first segment, and then is computed using the EstimatedRTT equation on page 239 for all subsequent segments.

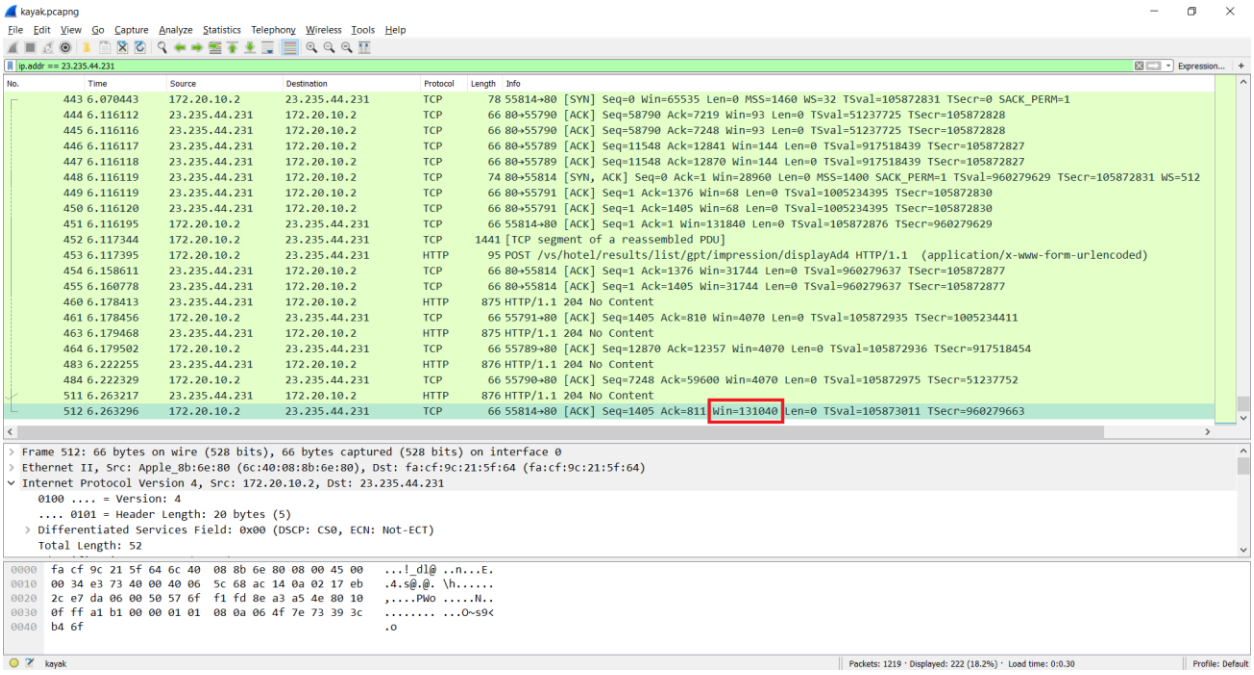
3. What is the length of each of the first four TCP segments?
Length: 140: - 1454, 141: - 201, 142: - 75, 160: - 66

4. What is the minimum amount of available buffer space advertised at the receiver for the entire trace?
Minimum available buffer space at the receiver: 28960 bytes

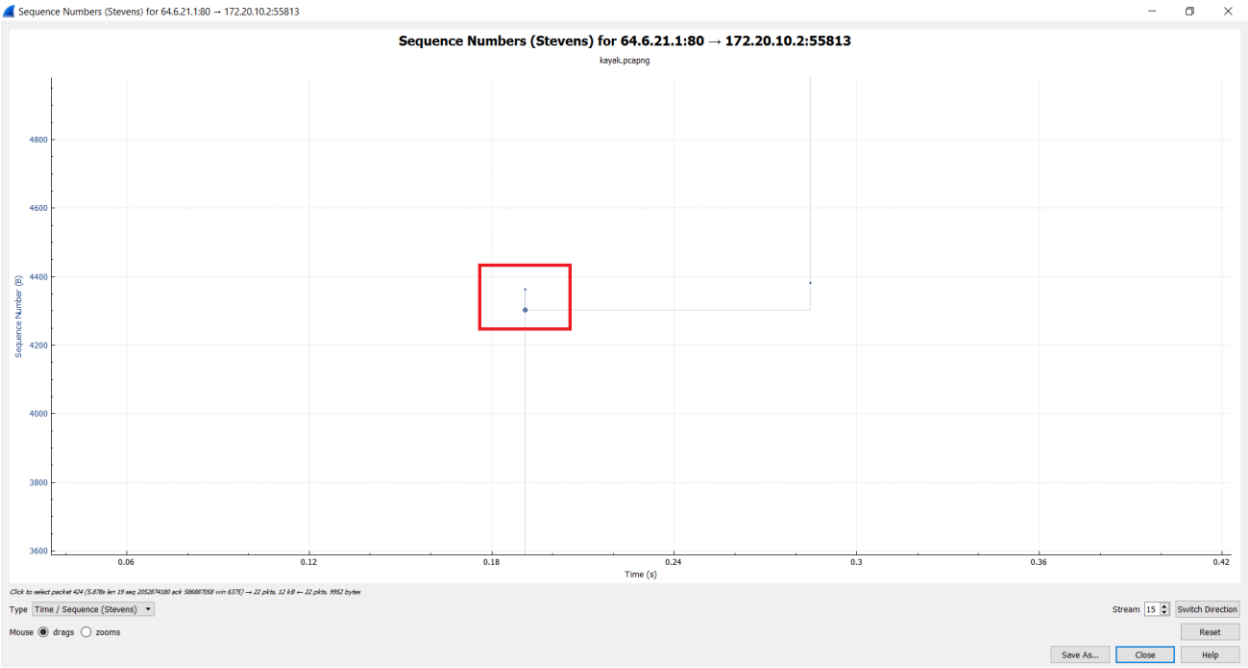


5. Does the lack of receiver buffer space ever throttle the sender?

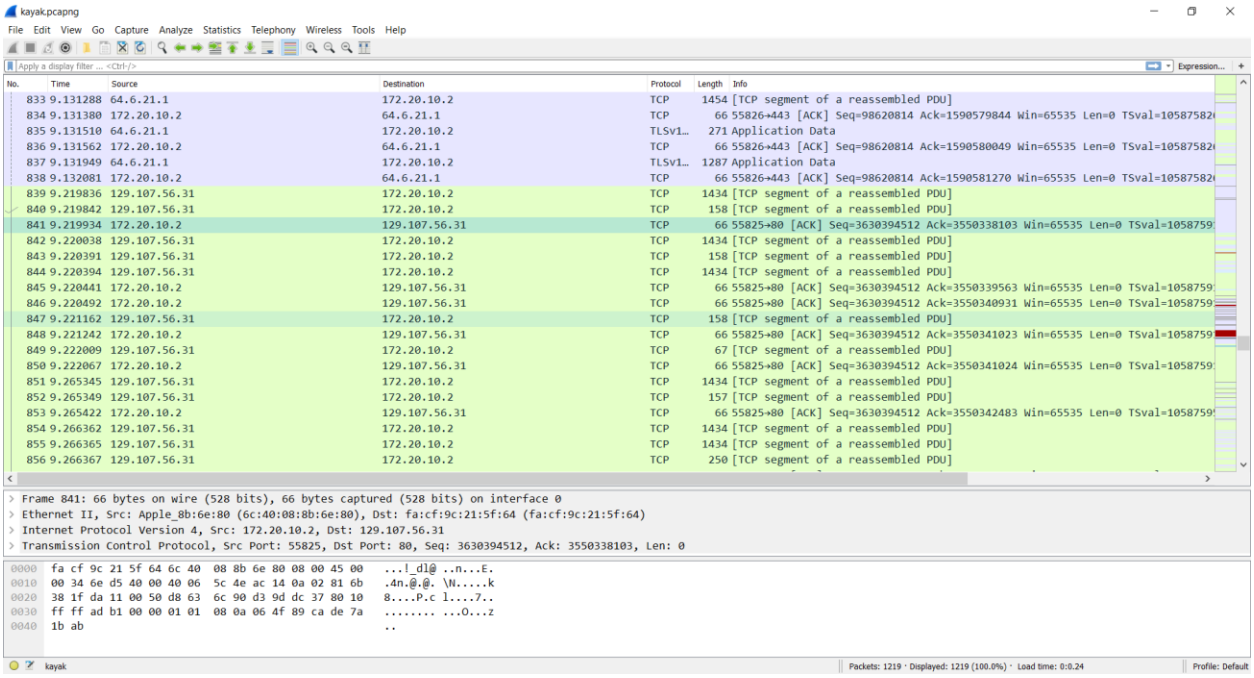
Since the maximum buffer space goes to 131040, the lack of receiver buffer space does not throttle the sender.



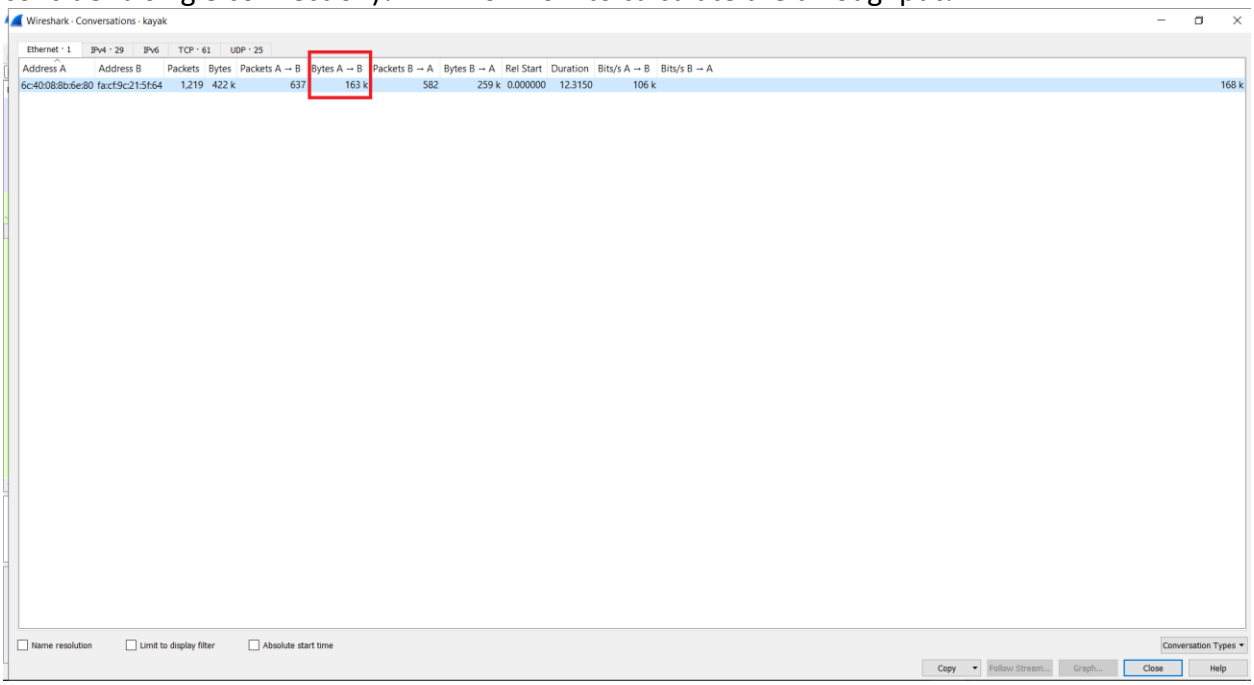
6. Are there any retransmitted segments in the trace file? What did you check for (in the trace) in order to answer this question?
The retransmitted segments in the trace file are. I checked for the Time Sequence(Stevens) graph in TCP Stream Graphs.

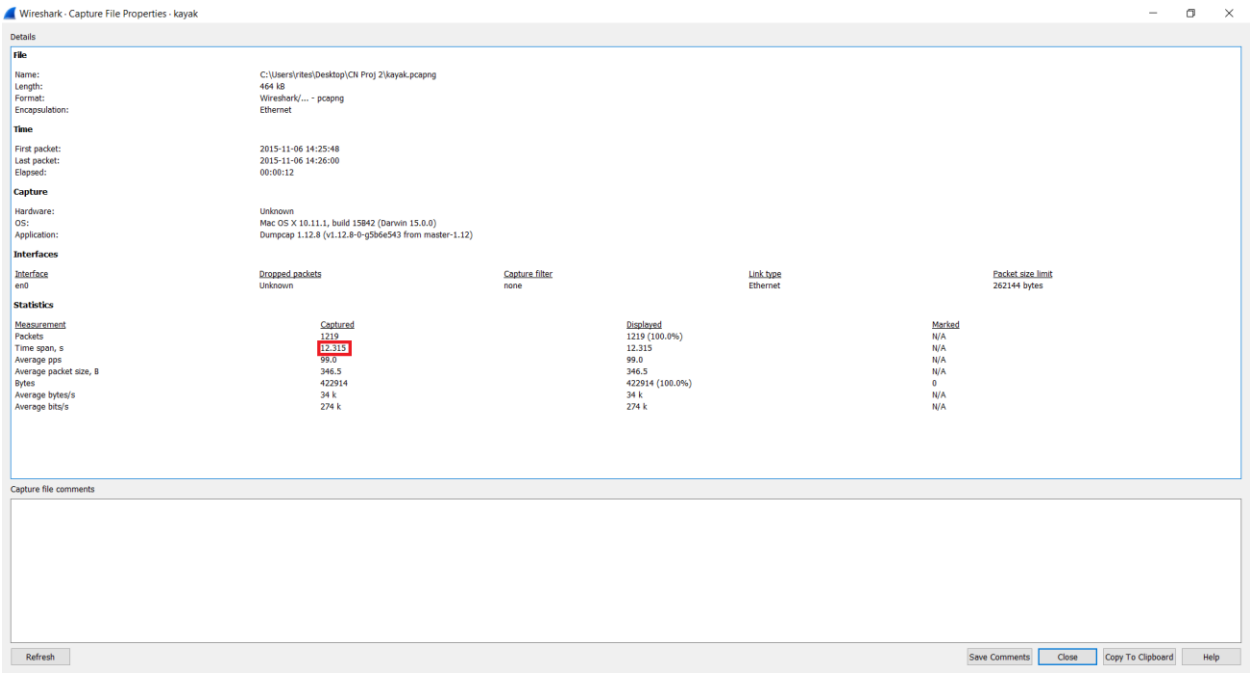


7. How much data does the receiver typically acknowledge in an ACK? Can you identify cases where the receiver is ACK-ing every other received segment (see Table 3.2 on page 247 in the text)?
-> The receiver typically acknowledges 65535 bytes.
Following are the numbers, where the case asked took place = 841, 845, 846, 848



8. What is the throughput (bytes transferred per unit time) for the TCP connection (Just consider a single connection)? Think on how to calculate the throughput!



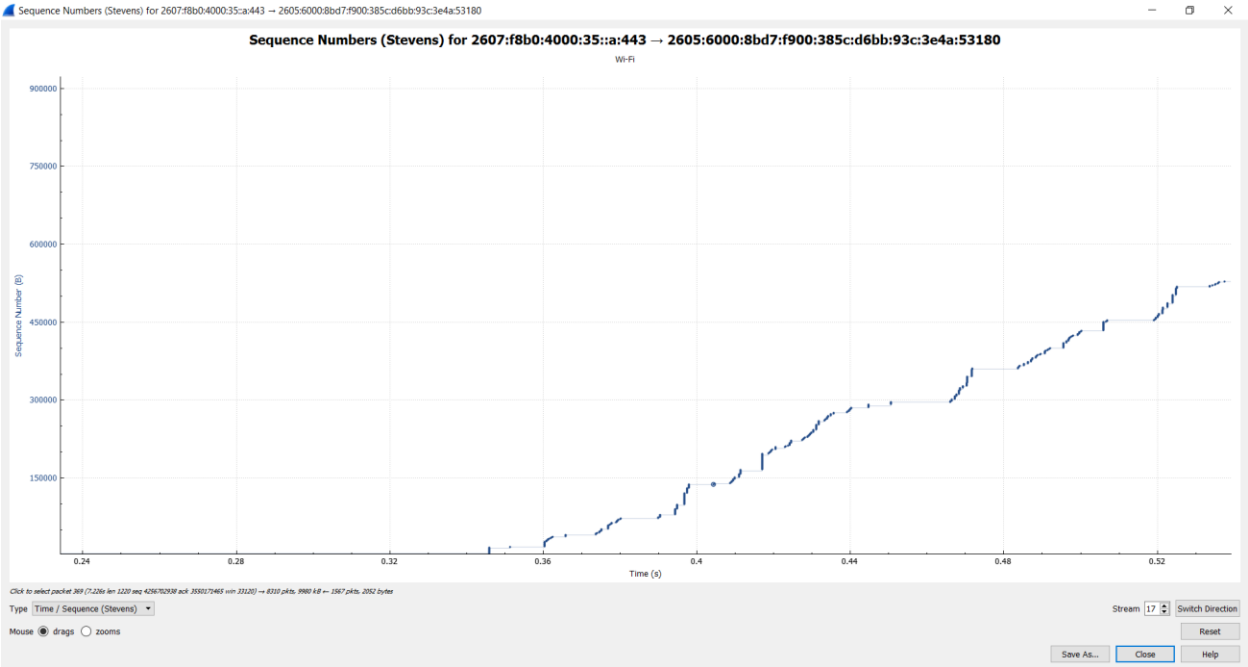


Throughput = 163/12.315 = 13.2358 Kbytes/sec

9. Explain how you calculated this value.
-> The throughput was calculated using the amount of data sent from sender to receiver and the time span provided. Dividing the two will give you the value.

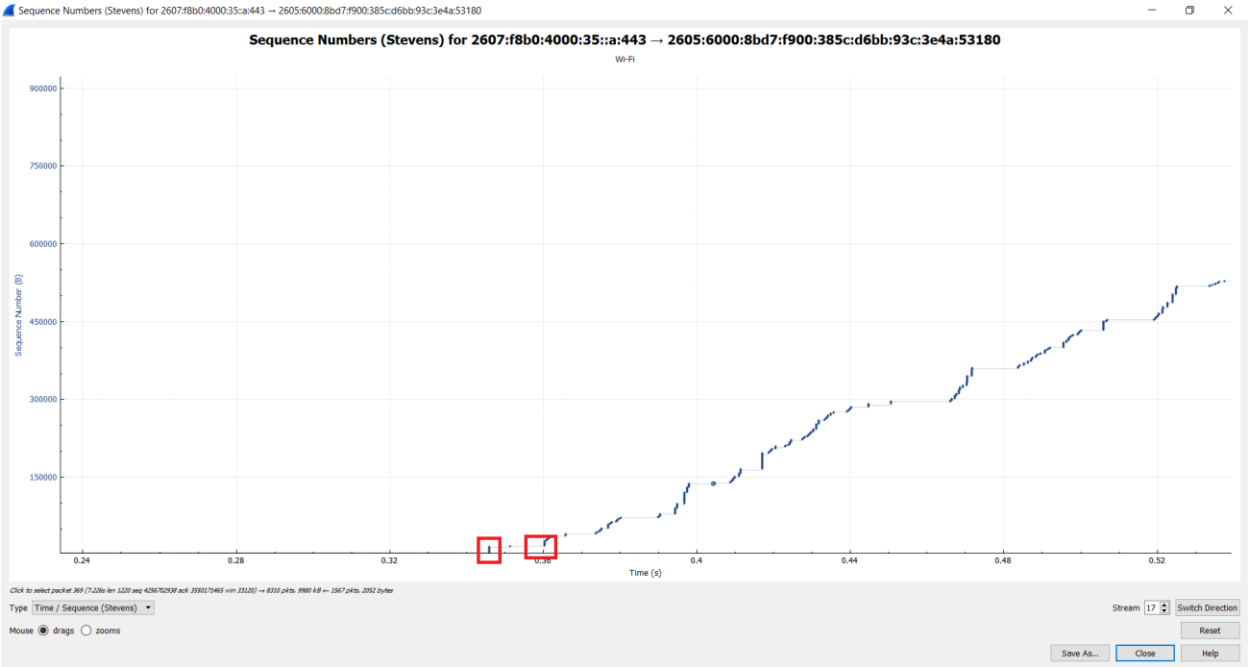
Problem Set 4:

Use the Time-Sequence-Graph(Stevens) plotting tool to view the sequence number versus time plot of segments being sent from youtube.com to your computer.
Answer each of three questions below for the trace that you have gathered when you transferred a file to your computer from youtube.com.

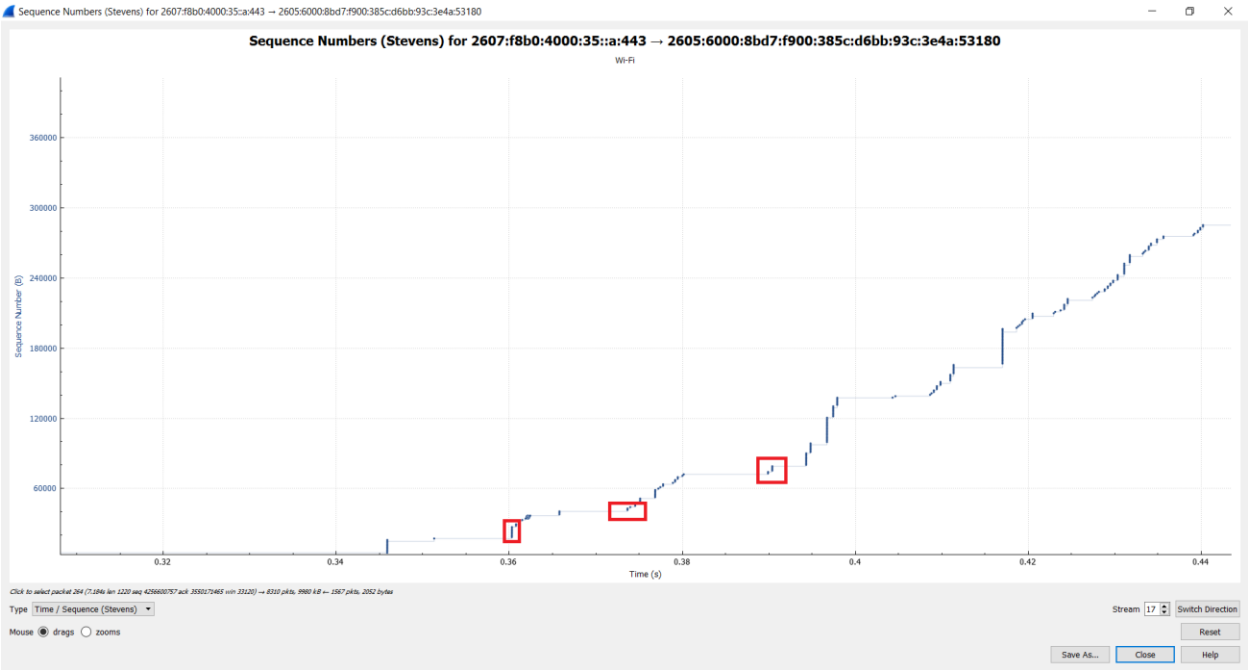


1. Can you identify where TCP's slow-start phase begins and ends.

-> The TCP’s slow start begins at 0.345 and ends at 0.36 according to the graph.



2. Where congestion avoidance takes over? Highlight these areas.
-> Congestion avoidance takes place at places around 0.36,0.375, 0.0.39 and after each time packets are sent. Not all places are marked on the graph where the congestion avoidance takes place.



3. Comment on ways in which the measured data differs from the idealized behavior of TCP that we've studied in the text.
-> After viewing the measured data, we can say that the scenarios in the real world are very different than what is studied. In the real world, there is packet loss every now and then due to the window size difference, so it is clearly established that the level of efficiency always differs.