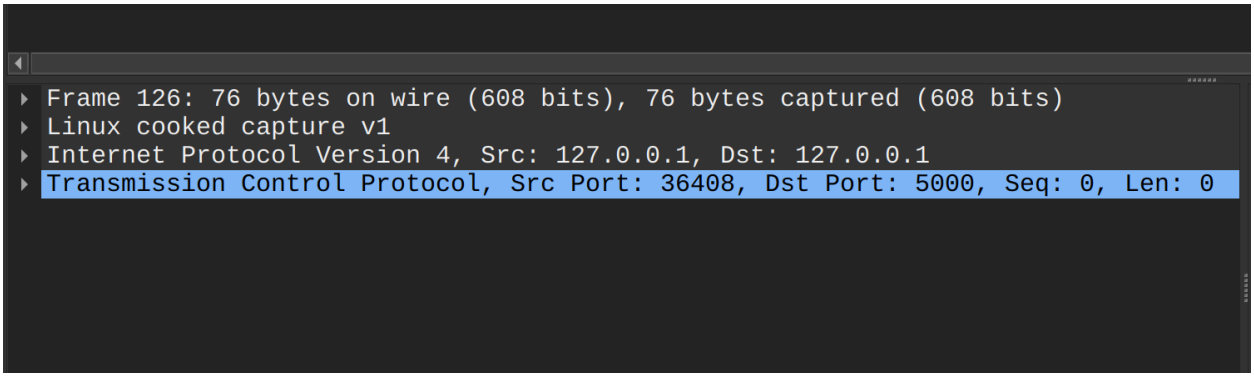
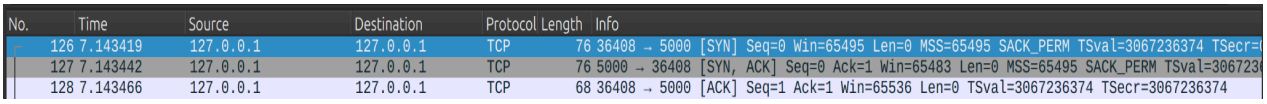
NETWORKS ASSIGNMENT 3
TCP SOCKETS

Q1. The source port : 36408 (keeps varying)
The destination port : 5000 (fixed)
The source and destination IP address : 127.0.0.1

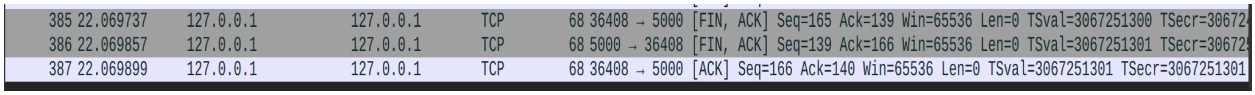


Q2 For the Three-way handshake we will track the very first 3 packets exchanges which will essentially tell us that the secure connection has been established and further the exchange of packets take place.



SYN : sent by the client to start the connection
SYN-ACK : sent by the server acknowledging the SYN of the client and sending its own SYN
ACK : sent by the client accepting the SYN of the server

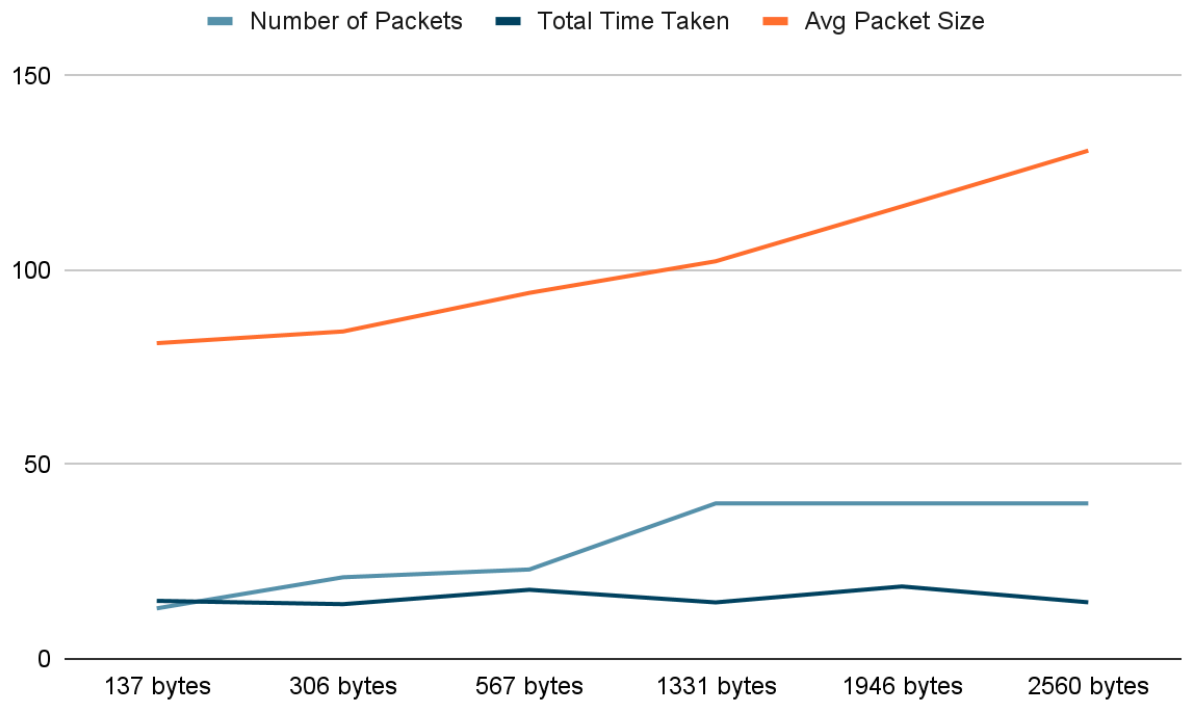
Q3 For the closure procedure we need to track the last 3 packets exchanges which concludes the secure connection.



FIN-ACK : the client sends the FIN to the server as a proposal to close the prodecure
FIN-ACK : the server acknowledges the FIN sent by the client, and sends it own FIN
ACK : sent by the client accepting the FIN of the server

Q4/5/6

File Size	Number of Packets (One way)	Total Time Taken (s)	Avg Packet Size (One way) (bytes)
137 bytes	13	14.9265	81.23
567 bytes	23	17.7821	94.17
2560 bytes	40	14.5579	130.77
306 bytes	21	14.0786	84.24
1331 bytes	40	14.5340	102.3
1946 bytes	40	18.6310	116.43



As we can see from the graph that as the file size increases the number of packets required to transfer the file from the client to the server increases, also at the same time for the same number of packets the averaged packet size increases. The large average packet size for relatively smaller input file size s due to the overhead of the TCP headers onto the packets. The variation in time can be due to many reasons including the RTTs, network congestion and TCPs methods to handle it. Also one thing that gets observant is that with larger files the TCP becomes more efficient because of the reduced overhead size as compared to the file size itself.

Topic / Item	Count	Average	Min Val	Max Val	Rate (ms)	Percent	Burst Rate	Burst Start
▸ Packet Lengths	13	81.23	68	118	0.0009	100%	0.0900	18.841

443	6	485 bytes	3	2	136 bytes	4	349 bytes	4.286160	14.2168	76 bits/s	196 bits/s
443	3	295 bytes	0	2	187 bytes	1	108 bytes	0.000000	0.1930	7,753 bits/s	4,477 bits/s
443	5	2 kB	4	3	1 kB	2	514 bytes	4.286254	1.7439	4,706 bits/s	2,357 bits/s
443	6	481 bytes	6	3	204 bytes	3	277 bytes	4.288997	5.7586	283 bits/s	384 bits/s
'960	7	539 bytes	8	4	335 bytes	3	204 bytes	4.985812	0.3137	8,542 bits/s	5,201 bits/s
443	22	11 kB	11	12	10 kB	10	1 kB	7.825115	17.0037	4,647 bits/s	478 bits/s
000	24	2 kB	10	13	1 kB	11	894 bytes	7.143419	14.9265	565 bits/s	479 bits/s