**How to run the program:**

- Have the dpkt module installed
- Run this command in the terminal:
    - python analysis_pcap_tcp.py “filename”
    - Where “filename” is a valid pcap file

**High Level Summary**

For calculating the throughput, I iterated through every packet that was sent from the sender to the receiver (indicated by the source and destination port), up until the FIN packet, summing up the bytes that were sent for each packet. This size was obtained from the length field in the IP object minus the ip header. The resulting length is the payload size plus the TCP header.

For calculating the congestion window sizes, I added all the packets sent from the source to the destination to a buffer. Once an ack is received for one of the first two packets in the buffer, I printed the length of the buffer (which I approximated to be the sliding window size) and emptied the buffer. I repeated this process two more times to get three window sizes, which were present in all three flows in the PCAP file given.

Finally for the number of retransmissions due to triple duplicate acks or timeouts, I saved an array of all the sequence numbers that were sent from the sender to the receiver. In a separate array, I kept the number of acknowledgements received for the sequence number in the corresponding index in the first array. Whenever a sequence number was sent twice, I looked at the acknowledgements array and if the number of acknowledgements were greater than or equal to 3, I incremented a counter for the number retransmissions due to triple duplicate acks. Otherwise, I incremented the counter for retransmissions due to timeouts, and set the acknowledgment numbers back to 0 in both cases.