CSE 310
Programming assignment 2
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Part A

i)
I made a separate list for all sequence numbers, ack numbers, source ports, source ip address, destination ip address, and destination address. Throughput values, timestamps were also stored in advance. As I repeat through those packets I store them in a list, dictionaries that will help me calculate.

To calculate throughput, using packet size to calculate the total packet size across the source and destination. The timestamp field is used to find the total time it took to send all packets to the source and destination in the first and last packets.

Part B

ii)
I am calculating congestion window per RTT, As congestion window is RTT clocked. I am checking how many packets are sent from sender to receiver in an RTT in all 3 connections. Although it may not be possible to predict the exact result by only showing up to three results, there will be two cases. First, it will continue to increase or increase and then turn to decrease. Perhaps the above two situations are most appropriate, judging from the decreasing width of the increase.

flow 1
The initial congestion window size is 18980. Seems that the first three sizes grow multiplicatively but not exactly by a factor 2. The first 3 growth rate = [1.53, 2.05, 1.17]

flow 2
The initial congestion window size is 16060. Seems that the first three sizes grow multiplicatively but not exactly by a factor 2. The first 3 growth rates = [2.63, 1.51, 1.11].

flow 3
The initial congestion window size is 18980. Seems that the first three sizes grow multiplicatively but not exactly by a factor 2. The first 3 growth rate = [1.53, 2.05, 1.17]

Packet loss may occur during subsequent packet congestion periods, in which case the size of the congestion window will decrease.

using two dictionaries to calculate all retransmissions caused by triple redundant approvals. One is used to calculate the number of packets with the same sequence number and the other is used to calculate the number of the same packet.

iii)

Simply if you run this .py program the result will appear in the console section. Remember to place this Python file and the pcap file you want to open in the same directory.

Flow 1
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source port : 43498   source ip : 130.245.145.12
destination port : 80   destination ip : 128.208.2.198
sequence number : 705669103
acknowledgement number : 1921750144
window size : 49152

source port : 43498   source ip : 130.245.145.12
destination port : 80   destination ip : 128.208.2.198
sequence number : 705669127
acknowledgement number : 1921750144
window size : 49152

Throughput = 5.251354304335755 Mbps

Congestion Window = 18980
Congestion Window = 29200
Congestion Window = 59860

Triple Acknowledgement Loss = 2
Timeout Loss = 2

Flow 2
----

source port : 43500   source ip : 130.245.145.12
destination port : 80   destination ip : 128.208.2.198
sequence number : 3636173852
acknowledgement number : 2335809728

window size : 49152

source port : 43500   source ip : 130.245.145.12
destination port : 80   destination ip : 128.208.2.198
sequence number : 3636173876
acknowledgement number : 2335809728
window size : 49152

Throughput = 1.285411832990512 Mbps

Congestion Window = 16060
Congestion Window = 42340
Congestion Window = 64240

Triple Acknowledgement Loss = 36
Timeout Loss = 59

Flow 3
----

source port : 43502   source ip : 130.245.145.12
destination port : 80   destination ip : 128.208.2.198
sequence number : 2558634630
acknowledgement number : 3429921723
window size : 49152

source port : 43502   source ip : 130.245.145.12
destination port : 80   destination ip : 128.208.2.198
sequence number : 2558634654
acknowledgement number : 3429921723
window size : 49152

Throughput = 1.4814064219614047 Mbps

Congestion Window = 18980
Congestion Window = 37960
Congestion Window = 54020

Triple Acknowledgement Loss = 0
Timeout Loss = 1

Process finished with exit code 0