CN-3530/CS 301 Assignment 2

1. Stop and Wait Protocol

Question 1 – Number of retransmissions and throughput with different retransmission timeout values with stop-and-wait protocol. For each value of retransmission timeout, run the experiments for **5 times** and write down the average **number of retransmissions** and **average throughput**.

Retransmission timeout (ms)	Average number of re-transmissions	Average throughput (Kilobytes per second)
5	134.4	273.81
10	141	188.84
15	124.2	210.08
20	127	174.52
25	125	151.14
30	115.2	142.41
40	122.4	117.32
50	128.6	96.48
75	132	82.79
100	121	61.06

Question 2 – Discuss the impact of retransmission timeout value on number of retransmissions and throughput. Indicate the optimal timeout value from communication efficiency viewpoint (i.e., the timeout that minimizes the number of retransmissions and keeps the throughput as high as possible).

As the retransmission timeout increases, we observe that the average number of retransmissions generally decreases. However, this comes with a trade-off as the throughput also tends to decrease with increasing timeout values.

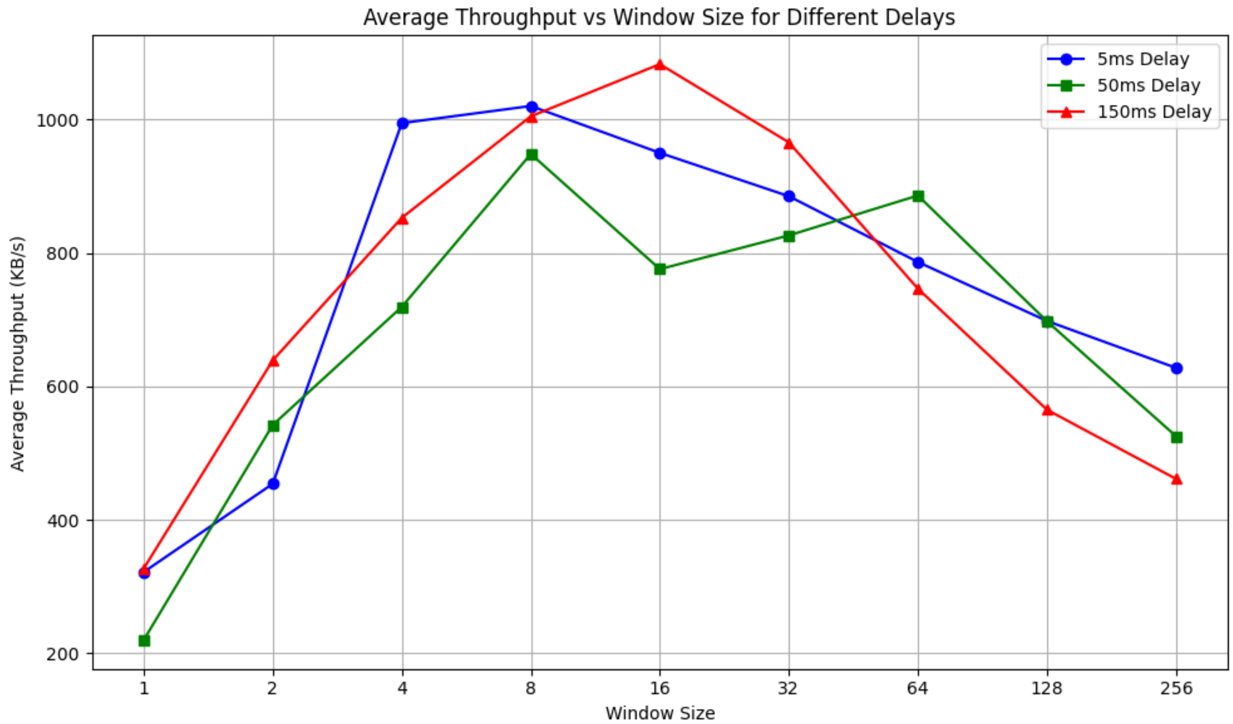
Based on my observations, best value of timeout is **15ms** as the re-transmissions are minimized and throughput is maximized.

2. Go back N Protocol

Question 1 – Experimentation with Go-Back-N. For each value of window size, run the experiments **5 times** and write down the **average throughput**.

	Average throughput (Kilobytes per second)		
Window Size	**Delay = 5ms**	**Delay = 50ms**	**Delay = 150ms**
1	321.56	219.64	326.86
2	453.86	542.09	638.98
4	994.71	719.13	852.69
8	1020.4	948.42	1004.93
16	950.07	775.74	1083.08
32	885.05	826.34	965.76
64	786.42	886.16	746.37
128	698.02	697.48	564.91
256	627.69	525.18	461.23

Create a graph similar to the one shown below using the results from the above table: (Edit: change delays to 5ms, 50ms and 150 ms as mentioned in the assignment statement)



Question 2 – Discuss your results from Question 1.

The results show that using the Go-Back-N protocol, increasing the window size initially improves throughput because it allows more packets to be sent at the same time, making better use of the available bandwidth. However, after reaching a window size of 8, the throughput levels off or even drops, especially with higher delays of 50ms and 150ms. This suggests that larger window sizes can lead to network congestion or more packet loss, which hurts performance.

For the best results, a window size between 8 and 16 is ideal, as it maximizes throughput while keeping efficiency in check for different delay scenarios. I used a retransmission timeout of 15ms for both the 5ms and 50ms delays and found 20ms to be the best for the 150ms delay.

<u>PLAGIARISM STATEMENT <Include it in your report></u>

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