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	202	206.94
10	153	190.84
15	121	180.92
20	118	159.80
25	130	140.68
30	116	137.36
40	123	116.05
50	120	104.53
75	124	79.77
100	119	67.54

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).

Impact on number of retransmissions :
Average number of re-transmissions decrease considerably when timeout increases up to 20ms. beyond 20ms there the avg no of re-transmissions remains approximately the same (120-130).
This implies that at 20ms is enough time for most of the acknowledgements to arrive without unnecessary retransmissions.

impact on average throughput :
avg throughput continues to decrease as the timeout increases, due to prolonged idle waiting times after each packet.

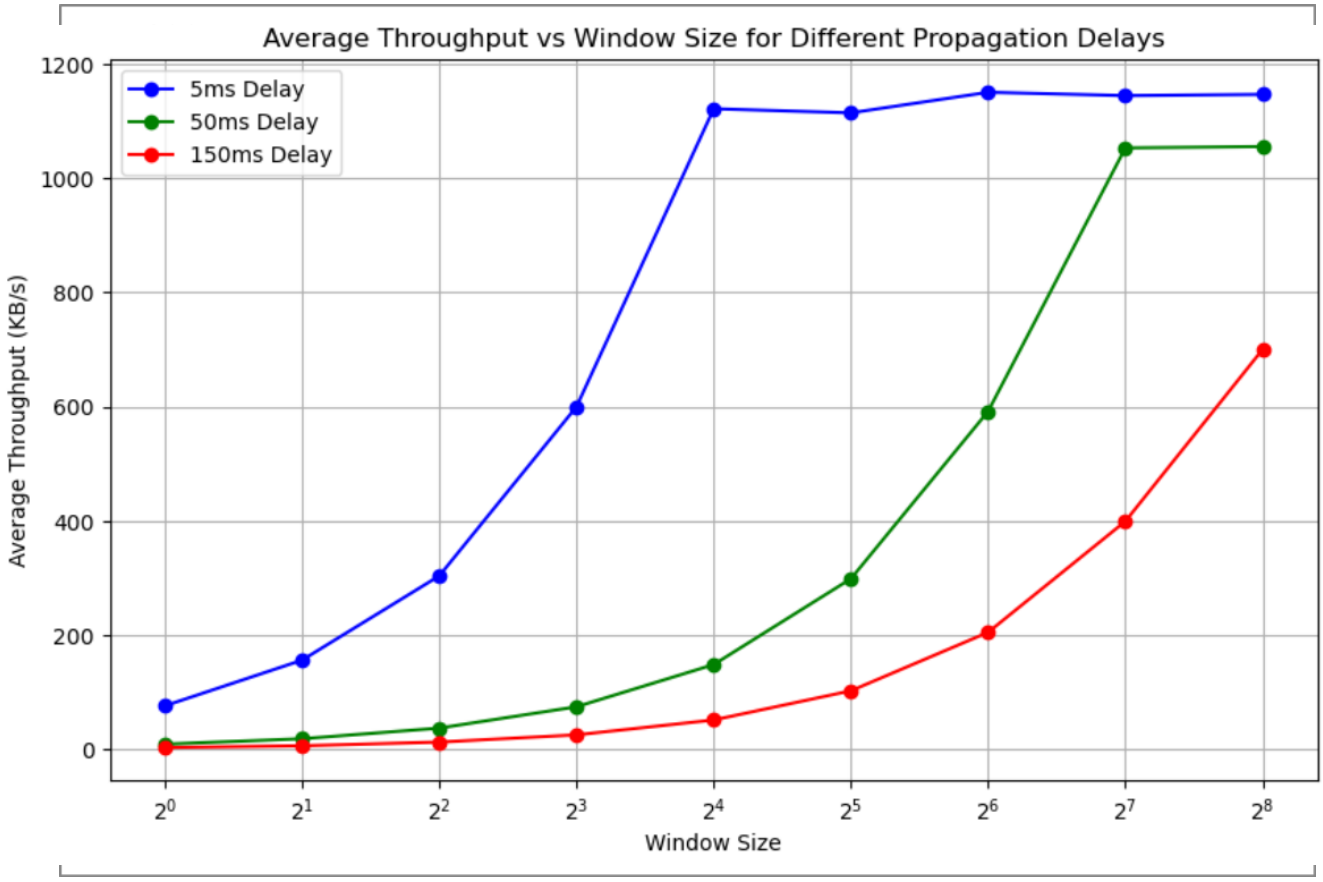
Therefore from communication efficiency viewpoint, an optimal timeout of around 20ms minimizes retransmissions while maintaining relatively high throughput.

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	76.35	9.26	3.23
2	156.37	18.37	6.47
4	303.99	37.35	12.87
8	600.22	74.72	25.54
16	1121.91	148.64	51.57
32	1114.725	298.99	102.72
64	1150.74	592.2	205.15
128	1144.96	1053.37	399.60
256	1147.04	1055.67	700.51

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 as the window size increases, the avg throughput also generally increases across all propagation delays.
for 5ms delay: the avg throughput rises quickly and reaches a peak with larger window sizes due to lower latency, allowing the sender to send data at a high rate.
for for 50ms and 150ms delays, the throughput starts much lower and increases gradually.
The highest avg throughput is achieved with 5ms delay and window size of 256 implying that lower delays and higher window sizes optimizes the average throughput

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