

Computer Communications and Networks (COMN)

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Assignment Part 1 Results Sheet

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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 **average number of retransmissions** and **average throughput**.

Retransmission timeout (ms)	Average number of re-transmissions	Average throughput (Kilobytes per second)
5	5056.8	48.61
10	1123.8	43.75
15	1111.8	43.75
20	207.6	41.67
25	205.4	39.43
30	209.8	37.41
40	202	34.46
50	202	27.03
75	193	28.11
100	192.6	23.16

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).

Throughput is the rate at which messages are delivered successfully. When running the Stop-and-Wait protocol with a large retransmission timeout, the sender will wait more time until it retransmits a lost packet. This happens when an acknowledgement from the receiver for the sender's last sent message was not received within that timeout. All these delays are added up and at last being reflected in the total transmission time, which increases in size.

The experimental results in question 1 show that once the retransmission timeout value is set to 100ms, there are approximately around 193 retransmissions while the average throughput is calculated ~23.16

KB/s. When the retransmission timeout value drops to 5ms, there are around 5057 retransmissions and the average throughput is calculated ~48.61 KB/s. Loss packets are recovered by retransmissions, which take time and slow down an application. Although, this major disadvantage, retransmissions are considered essential when the retransmission timeout value is set to a value that can minimize the number of retransmissions while keeping the throughput high.

From the table in question 1 we can see that the ideal value lies in the range of 20 – 40ms. This is due to the fact the retransmissions are quite low while throughput is high. It can be concluded that the ideal value is 20ms because the experiments above were carried out with a 5ms one-way propagation delay meaning that the round-trip propagation delay is 20ms.