Computer Communications and Networks (COMN) 2019/20, Semester 2

Assignment Part 1 Results Sheet

Forename and Surname:	BRATIN GHOSH
Matriculation Number:	s2032224

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	2143.8	46.00498
10	1091.2	43.83560
15	737.2	40.24548
20	229.2	40.14362
25	208	38.50954
30	212.2	36.60884
40	210.8	33.70196
50	201.4	31.67946
75	209.6	25.69974
100	201.4	22.86828

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).

The average throughput is always inversely proportional to the value of timeout. This indicates that as we increase the value of timeout, the throughput continues to decrease. But in case of number of retransmissions, it decreases at first (seen when we increase timeout from 5ms to 20ms) and then the value plateaus. This trend is noticed because for small timeout values, there occurs several premature timeout or delayed ACK which increases the retransmission number value. Above a certain threshold, premature timeout or delayed ACK stops taking place and thus the retransmissions value plateaus. If there is packet or ACK loss, and we continue to increase the timeout value then we will continue to notice a drop in the

throughput value as the sender needs to wait for a long time before it gets a timeout in order to resend the packet.

From the data obtained, optimal timeout value can be considered to be **25 ms**. Below this value, premature timeout or delayed ACK is noticed which greatly increases the number of retransmissions. If we go above this value, and when we experience packet loss or ACK loss then our throughput decrease as we need to wait for a long time before the sender gets a timeout and resends the packet.