Computer Communications and Networks (COMN)
2016/17, Semester 2

Assignment Part 2 Results Sheet

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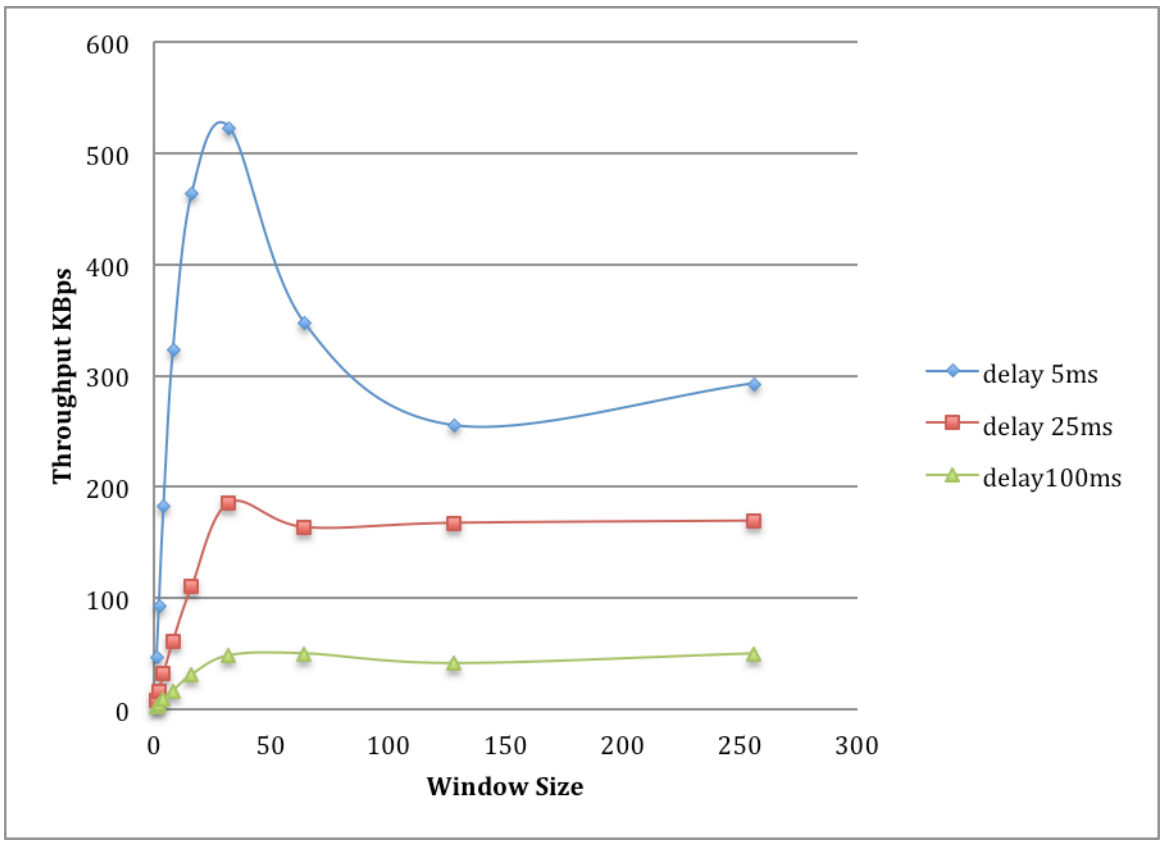
Question 1 – Experimentation with Go-Back-N:

	Throughput (Kilobytes per second)		
Window Size	**Delay = 5ms retryTimeout = 20ms**	**Delay = 25ms** retryTimeout = 100ms	**Delay = 100ms retryTimeout = 400ms**
1	47.11033333	8.2007	2.4555
2	93.019	16.19	4.87
4	183.7703333	31.96566667	9.7385
8	323.2296667	61.08	16.665
16	463.736	110.295	31.26
32	522.9853333	185.3733333	48.48666667
64	347.6386667	163.59	50.21
128	255.2633333	167.3333333	41.4445
256	293.041	169.3333333	50.175

Create a graph as shown below using the results from the above table:



Question 2 – Discuss your results from Question 1.

For smaller delays, there is an optimal value for window size in order to maximize the throughput value. The plot shows that smaller delays result in greater throughput, which makes sense because it takes shorter time for a packet to get from the sender to the receiver. There is a correlation between throughput and window size. For smaller delays, which means sender transmits faster, there is an optimal value for window size. As the window size increases, throughput increases as well since more packets are allowed to be sent without being ack'd. If the window size is too big, when timeout occurs the sender will have to resend a lot of packets and therefore resulting in a slower performance. As the delay is larger, which means it takes longer for a packet to arrive, the throughput simply becomes constant as window size increases. This is because the rate of packets being sent and packets arrival would stay constant when window size is not a major factor.

Question 3 – Experimentation with Selective Repeat

Window Size	Throughput (Kilobytes per second) Delay = 25ms retryTimeout = 100ms
1	7.34
2	14.287
4	28.37845
8	54.6455
16	101.965
32	187.8

Question 4 - Compare the throughput obtained when using "Selective Repeat" with the corresponding results you got from the "Go Back N" experiment and explain the reasons behind any differences.

Selective repeat should have, generally, a higher throughput than Go Back N since it is a more efficient protocol. The results show the opposite. This is probably due to the way I implemented the timers, instead of manipulating the setSoTimeOut() method or using a lot of threads, I created a thread that constantly check of out-of-date timers and resend those packets. Packet transmissions are still performing accurately but with a lower throughput. Selective repeat should have a higher efficiency because it acks packet when it can and thus saving retransmission time.

This is reasonable as, when the window size is large GBN has to resend so many packets when timeout
so only when the window size is large enough we can recognise the difference

Question 5 – Experimentation with *iperf*

Window Size (KB)	Throughput (Kilobytes per second) Delay = 25ms
1	14.125
2	16.75
4	39.376
8	67.125
16	92.25
32	69.375

Question 6 - Compare the throughput obtained when using "Selective Repeat" and "Go Back N" with the corresponding results you got from the *iperf* experiment and explain the reasons behind any differences.

The speed of transfer for TCP is slower than UDP (SR and GBN). It has an optimal window size of 16 KB. TCP is slower because it is reliable, a connection orientated protocol and ordered, and thus there is additional overhead and processing time. It is reliable means it provides error detection, congestion control and retransmission of lost packets. It is a connection orientated protocol means that a connection or socket must first be established before data can flow and data travels both ways. It is ordered means that it uses sequence numbers to ensure that packets are reconstructed in the correct order.