I have read and understood the course academic integrity policy

Name: Pratibha Arjun Barsale

UB Number: 50247005

1. Timeout scheme:

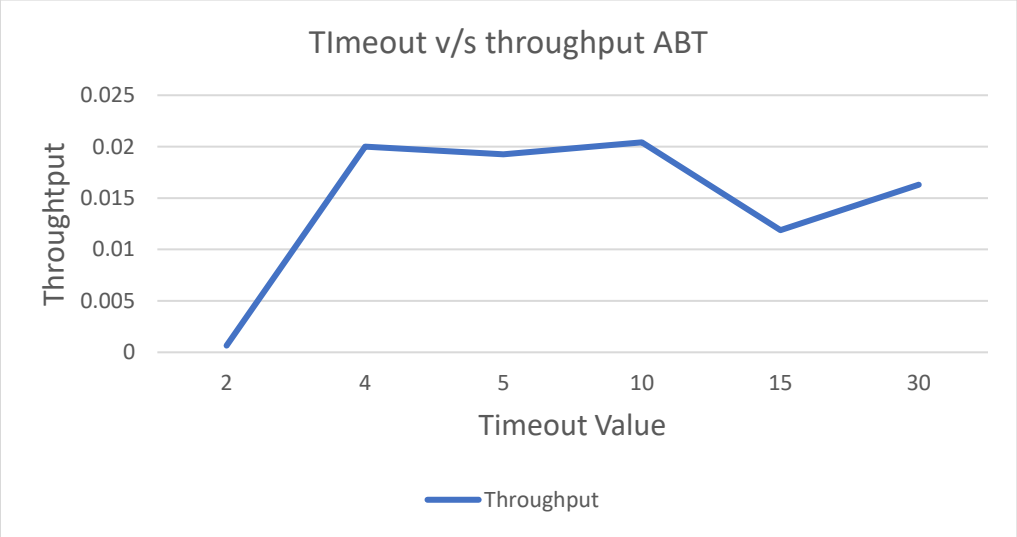
For determining the timeout for each protocol, I tested each protocol keeping a constant value for messages, arrival time, corruption and window size.

Then, different loss values were tested. Following is the graphical representation of each protocol.

A) ABT protocol

Observation: As the timeout value increases, the throughput also increases. But after timeout 10, the throughput started decreasing.

So, Timeout value of 10 is used for ABT protocol

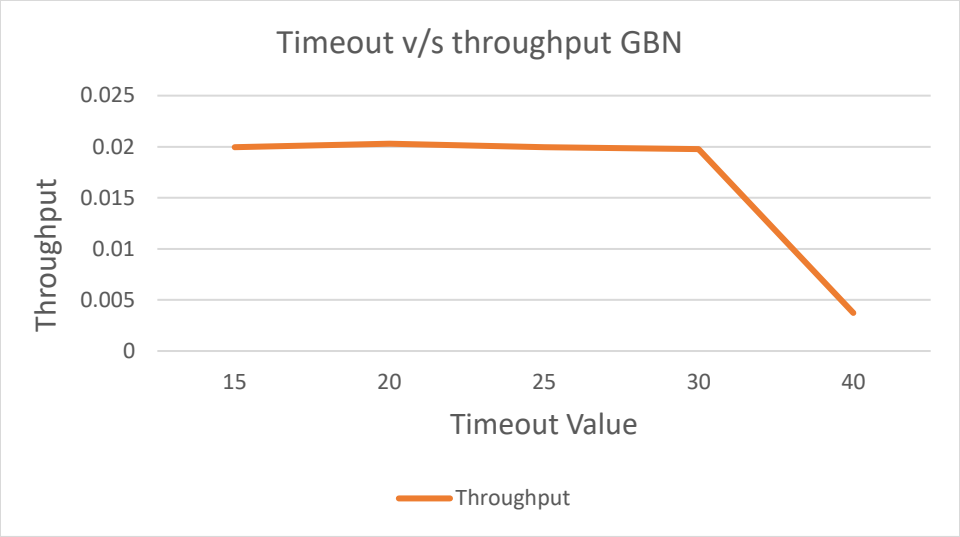


B) GBN protocol

Observation: It has been observed from the below graph that the throughput value for GBN is almost very same when the timeout value is between 15 to 30. After 30, the throughput starts decreasing and becomes less than 0.005 at 40 timeout value.

Timeout value of 20 is selected for this protocol as the throughput is maximum for that value.

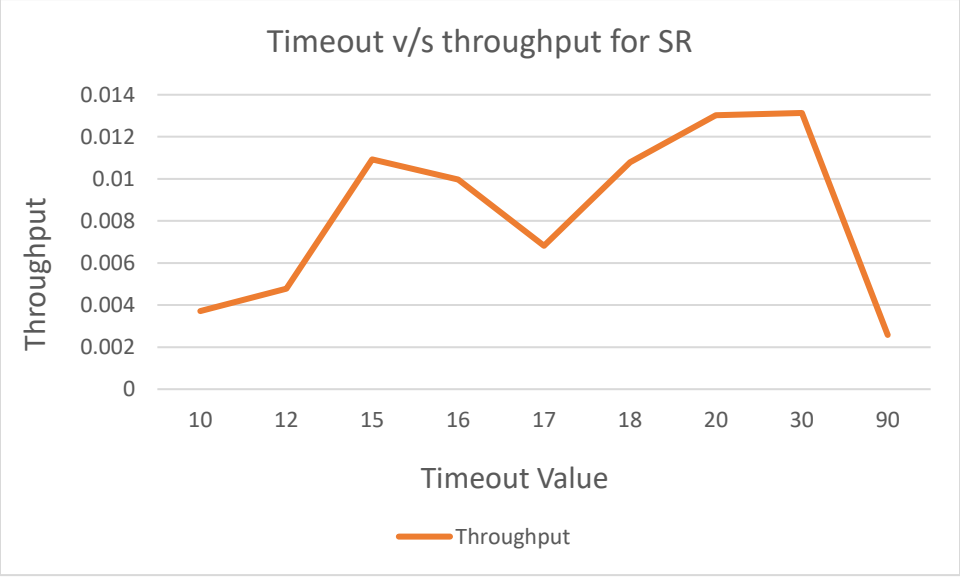
So, Timeout value of 20 is used for GBN protocol



C) SR protocol

Observation: It has been observed from the below graph that the throughput value for SR is having variations for different timeout value. For timeout 20-30, the throughput is maximum. Timeout value of 30 is selected for this protocol as it gives better throughput than timeout value 20.

So, Timeout value of 30 is used for SR protocol



2. Timer Implementation for SR protocol

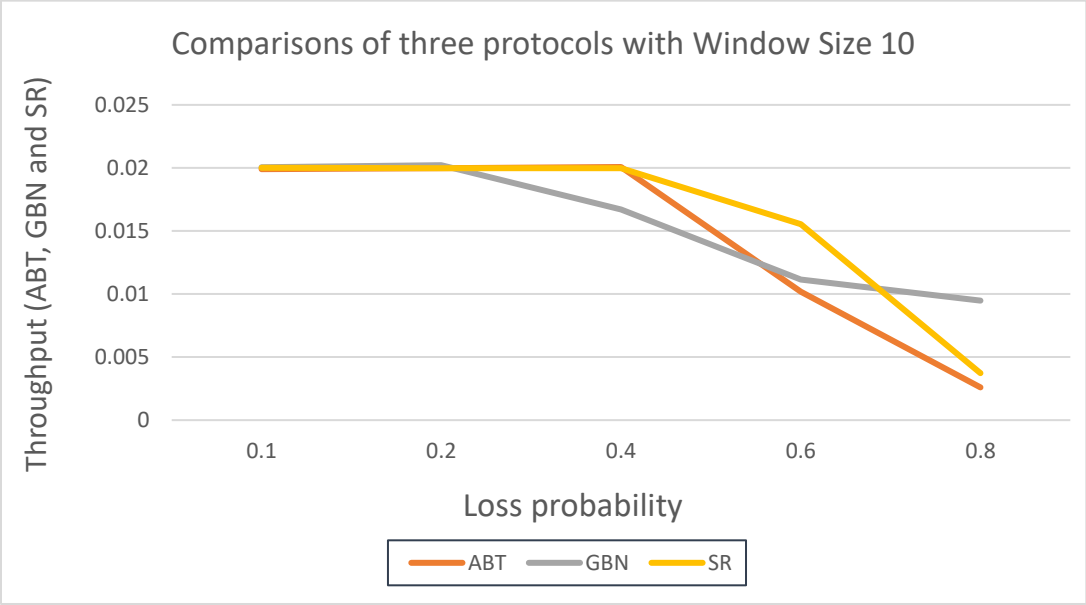
In SR protocol, each packet should have its own logical timer. However, there exist a single hardware timer. To mimic this single hardware timer to multiple logical timers, following scheme was used:

- Whenever sender sends a packet to the network layer, it keeps track of the timer expiry value for this packet. Initially, for the first packet, the timer is started.
- When the timer interrupt occurs, all the packets from base to (nextseqnum-1) are scanned. Whenever a packet for which ack has not been received is scanned, the timer expiry value is checked. If it matches the current simulator timer value, the packet is resent, the new timer expiry value for this packet is set and the scanning stops.
- Now the main task is to again decide the timeout value. For this all the unacknowledged packets from base to (nextseqnum-1) are scanned and the minimum expiry value is selected.
- The timer interrupt is set for the value got from subtracting current simulator time from the value selected from the above scheme.
- In this way, the timer will only interrupt when it is required and will resend the appropriate packet.

3. Performance Comparisons

I. Experiment 1

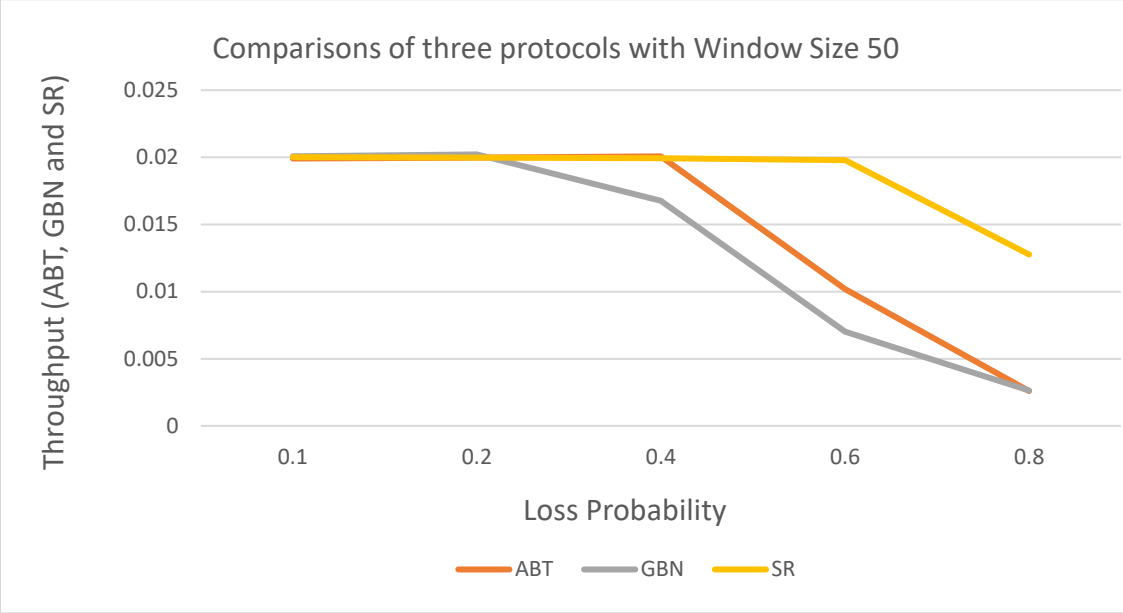
A) Window size: 10; X-axis: Loss probability; Y-axis: Throughput (ABT, GBN and SR)



Observations:

- When the loss probability is between 0.1 and 0.4, SR and ABT have almost same throughput value. After this point, throughput of both starts decreasing and SR's throughput is better than ABT.
- For GBN, the throughput is less than SR and ABT till 0.7 and 0.6 loss probability respectively. After that, the throughput of GBT is more than the other protocols.
- This behavior seems different. For loss 0.8, SR should have been giving more throughput than GBN. This may be because the window size is less that is 10.

B) Window size: 50; X-axis: Loss probability; Y-axis: Throughput (ABT, GBN and SR)

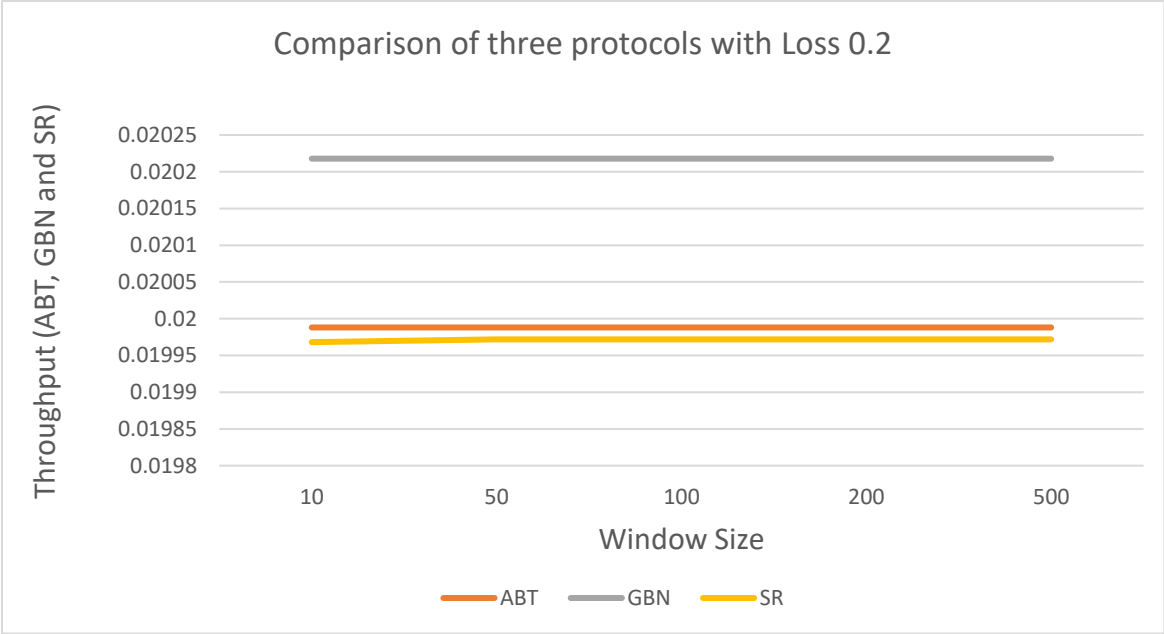


Observations:

- After changing the window size to 50, during the loss probability between 0.1 and 0.4, SR and ABT have same throughput value as for window 10.
- After this point, SR stills exhibits same behavior and is better than other two protocols in terms of throughput.
- GBN and ABT are giving same throughput for loss probability of 0.8

II. Experiment 2

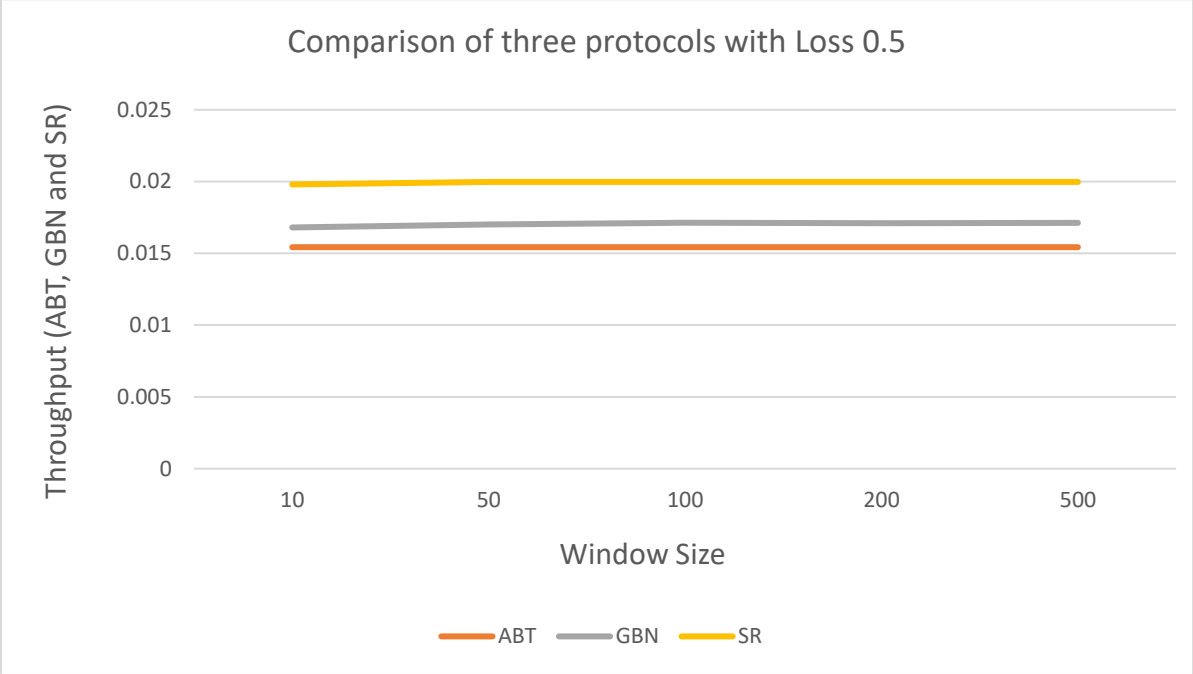
A) Loss probability: 0.2; X-axis: Window size; Y-axis: Throughput (ABT, GBN and SR)



Observations:

- The above experiment states that for loss probability 0.2, the three protocols give same throughput for any of the window size between 10 to 500. This means window size doesn't matter here.
- GBN is performing best here. SR is the one giving least throughput. It seems that SR must be the one to perform better here and not GBN. This is because of the loss probability selected for this experiment.

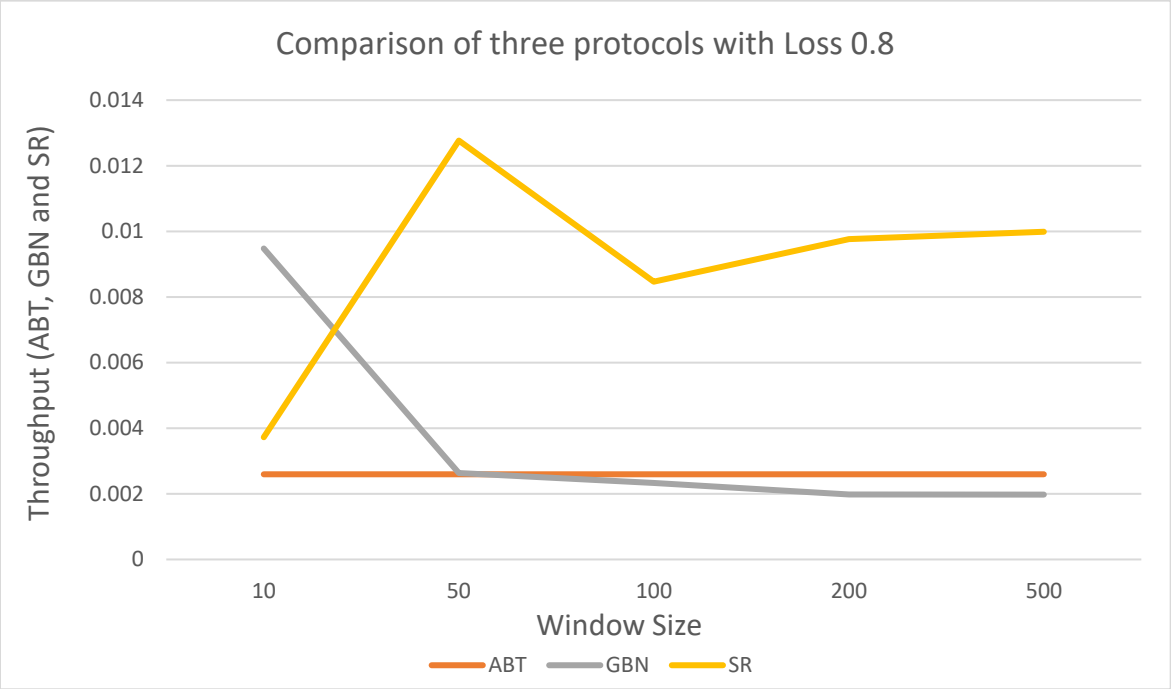
B) Loss probability: 0.5; X-axis: Window size; Y-axis: Throughput (ABT, GBN and SR)



Observations:

- After changing the loss probability from 0.2 to 0.5 the above experiment shows that SR is performing best, followed by GBN and then ABT.
- In the previous experiment, the reverse behavior for SR was observed for loss probability 0.2

C) Loss probability: 0.8; X-axis: Window size; Y-axis: Throughput (ABT, GBN and SR)



Observations:

- This experiment was to check the throughput of all the protocols with loss probability of 0.8. ABT does not depend on window size and exhibits same behavior with a throughput of around 0.003
- For low window size of 10, GBN gives more throughput than SR. As the window size reaches 50, the behavior reverses for both and the throughput of SR is highest for 50 window size.
- GBN is almost similar to ABT after window size 50
- SR throughput varies for different window sizes and is best at 50.