**REPORT FOR GO-BACK-N PROTOCOL TASKS**

**Task 1: Effect of Window Size:**

**Values Considered:**

|  |  |  |  |
| --- | --- | --- | --- |
| **MSS** | **Probability** | **Window Size (N)** | **Average Delay  (in seconds)** |
| 500 | 0.05 | 1 | 1987.2 |
| 500 | 0.05 | 2 | 1901.7 |
| 500 | 0.05 | 4 | 1041.8 |
| 500 | 0.05 | 8 | 1046.2 |
| 500 | 0.05 | 16 | 583.2 |
| 500 | 0.05 | 32 | 242.7 |
| 500 | 0.05 | 64 | 381.2 |
| 500 | 0.05 | 128 | 416.4 |
| 500 | 0.05 | 256 | 385.3 |
| 500 | 0.05 | 512 | 318.9 |
| 500 | 0.05 | 1024 | 417.7 |

**Graph: X-axis: Window Size Y-axis: Average Delay (in seconds)**

The above graphs plots transmission delays for window sizes varying from 1 to 1024 in powers of 2. With window size 1, we can transmit only one packet at a time i.e. it implements stop-and -wait protocol which has highest delays. As the window size increases, the number of packets sent increases thus decreasing the transmission delay. But, after window size of 16 the transmission delay starts to increase again as the Go-Back-N protocol retransmits the entire window when there is packet loss. As the window size increases and when there is a packet loss, the number of packets to retransmit also increases thus increasing the transmission delay.

**Task 2: Effect of MSS:**

**Values Considered:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Window Size (N)** | **Probability** | **MSS** | **Average Delay  (in seconds)** |
| 64 | 0.05 | 100 | 879.6 |
| 64 | 0.05 | 200 | 826.4 |
| 64 | 0.05 | 300 | 465.0 |
| 64 | 0.05 | 400 | 390.9 |
| 64 | 0.05 | 500 | 381.2 |
| 64 | 0.05 | 600 | 360.8 |
| 64 | 0.05 | 700 | 324.8 |
| 64 | 0.05 | 800 | 261.7 |
| 64 | 0.05 | 900 | 108.9 |
| 64 | 0.05 | 1000 | 229.0 |

**Graph: X-axis: MSS Y-axis: Average Delay (in seconds)**

In the above graph, we record the readings starting from 100 bytes per packet i.e. MSS=100. This means that more packets are transferred in total. When transferring more packets, it is possible that more number of packets are lost which in turn leads to more retransmissions. When the number of retransmissions increase, it leads to more delay in transmission of data. When MSS increases gradually to 1000 bytes, the number of packets to transit decreases which decreases the transmission delay as there will be less number of retransmissions. Thus, with increasing MSS, the transmission delay decreases.

**Task 3: Effect of Probability:**

**Values Considered:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Window Size (N)** | **MSS** | **Probability** | **Average Delay  (in seconds)** |
| 64 | 500 | 0.01 | 189.6 |
| 64 | 500 | 0.02 | 222.6 |
| 64 | 500 | 0.03 | 140.2 |
| 64 | 500 | 0.04 | 261.5 |
| 64 | 500 | 0.05 | 381.2 |
| 64 | 500 | 0.06 | 398.8 |
| 64 | 500 | 0.07 | 407.9 |
| 64 | 500 | 0.08 | 418.7 |
| 64 | 500 | 0.09 | 495.1 |
| 64 | 500 | 0.10 | 587.6 |

**Graph: X-axis: Probability Y-axis: Average Delay (in seconds)**

The above curve indicates that as the probability increases, the time for transmission increases. As the probability increases, more number of packets are dropped. This increases the number of packets to be retransmitted thus increasing the transmission delay. The increase of delay with the increase in probability is linear.

**References :**

1. Checksum calculation code from

http://stackoverflow.com/questions/4113890/how-to-calculate-the-internet-checksum-from-a-byte-in-java