**Comp 2322 Computer Networking**

**Homework Three Solutions**

**Total marks: 10 points**

**Questions:**

1. Consider transferring an enormous file of *L* bytes from Host A to Host B. Answer the following questions: (4 points, two points each)
   1. Assume an MSS of 680 bytes and the TCP sequence number field has 4 bytes. What is the maximum value of *L* such that TCP sequence numbers are not exhausted?

Ans:

The maximum possible sequence numbers are .

For TCP, the sequence number does not increment by one with each segment. Rather, it increments by the number of bytes of data which have been sent. So the maximum size of the file is irrelevant to the value of an MSS, i.e., the maximum size file that can be sent from A to B is the number of bytes representable by maximum possible sequence number .

* 1. Assume that a total of 56 bytes of transport, network, and data-link header are added to each segment before the resulting packet is sent out over a 150 Mbps link. Ignore flow control and congestion control, so A can pump out the segments back to back and continuously. For the *L* you obtain in (a), find how long it takes to transmit the file.

Ans:

The total numbers of segments required to send the file are .

For each segment, 56 bytes of header need to be added, resulting a total of bytes of header.

The total number of bytes transmitted is .

Thus, the time to transmit the file over a 150 Mbps link is seconds.

1. (6 points) Consider the TCP timer management that TCP estimates the round-trip time and retransmission timeout interval. The formulas used to compute the round-trip time and retransmission time interval are given:

Suppose that the two measured *SampleRTT* values are 105 ms and 115 ms. Compute the *EstimatedRTT* after each of these *SampleRTT* values is obtained, using a value of α = 0.125 and assuming that the value of *EstimatedRTT* was 100 ms just before the first of these samples were obtained. Compute also the *DevRTT* after each sample is obtained, assuming a value of β = 0.25 and assuming the value of *DevRTT* was 4 ms just before the first of these samples was obtained. Last, compute the TCP *TimeoutInterval* after each of these samples is obtained.

Ans:

After 1st sampleRTT is measured,

After 2nd sampleRTT is measured,