

Comp 2322 Computer Networking

Homework Three

Due time: 11:59pm, March 4, 2023, Saturday

Total marks: 10 points

Submission Requirements:

You need to submit the homework to the blackboard via Learn@PolyU on or before the due time. Late submission will cause the marks to be deducted 25% per day.

Questions:

- 1) (4 points) Consider transferring an enormous file of L bytes from Host A to Host B. Answer the following questions:
 - a) 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? (2 points)
 - b) 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. (2 points)
- 2) (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:

$$EstimatedRTT_n = \alpha \cdot SampleRTT_n + (1 - \alpha) \cdot EstimatedRTT_{n-1}$$

$$DevRTT_n = \beta \cdot |SampleRTT_n - EstimatedRTT_{n-1}| + (1 - \beta) \cdot DevRTT_{n-1}$$

$$TimeoutInterval_n = EstimatedRTT_n + 4 \times DevRTT_n$$

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 $\alpha = 0.125$ 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 $\beta = 0.25$ 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.