CS341 18Fall HW4

20140040 KeonilKim

[Problem 1]

Although UDP is more appropriate for voice or video applications which are loss-tolerable but delay-sensitive, TCP is often used in today’s internet since the firewalls mostly block UDP traffic.

[Problem 2]

Both segments will be directed to the same socket. OS determines the origins of the segments by handling IP addresses.

[Problem 3]

GBN: Problem in Figure 3.27 will not happen if there is no overlapping between the receiver’s trailing edge and the sender’s leading part. The largest window size will be k-1

SR: Problem in Figure 3.27 will not happen if the sequence number space could fit the entire receiver window and the entire sender window without overlapping.

Let w be window size and the lowest sequence number that the receiver is waiting for is m. The window is then [m, m + w - 1]

In this case, the sender window could be [m - w, m - 1] in extreme case.

(The case that all w ACKs(with value from m - w to m - 1)sent from receiver is not received by the sender)

Thus, to avoid overlapping between sender and receiver’s window, k should be larger than m + w - 1 - (m - w) = 2w - 1, which means k ≥ 2w

Thus, the largest window size will be k/2

[Problem 4]

[Problem 5]

a.

GBN

Host A: 9 Segments with sequence number 1, 2, 3, 4, 5, 2, 3, 4, 5

Host B: 8 ACKs with sequence number 1, 1, 1, 1, 2, 3, 4, 5

SR

Host A: 6 segments with sequence number 1, 2, 3, 4, 5, 2

Host B: 5 ACKs with sequence number 1, 3, 4, 5, 2

TCP

Host A: 6 segments with sequence number 1, 2, 3, 4, 5, 2

Host B: 5 ACKs with sequence number 2, 2, 2, 2, 6

b.

TCP

Host A receives three dup ACKs with the same sequence number. It first does fast retransmit rather just waits for timeout.

[Problem 6]

[Problem 7]

a. [1, 6], [23, 26]

b. [6, 16], [17, 22]

c. Triple duplicate ACK. The congestion window size is not 1.

d. Timeout. The congestion window size is 1.

e. 32. At 32, slow start ends and congestion avoidance begins.

f. 21. At round 16, packet loss detected. The threshold is then half of the congestion window, which was 42.

g. 14. Same as problem (f), the loss detected at round 22 and the size of the congestion window was 29.

h. 7 round. Packet 1 is sent in 1 round. Packet 2^(n-1) – (2^n – 1) are sent in n round from n = 2, 3, 4, 5, 6. Packet 64 – 96 are sent in 7 round.

i. threshold is 4, window size is 7. Threshold is half of the current size, 8/2 = 4, and the congestion window will be threshold + 3, which is 7.

j. threshold is 21, window size is 1.

k. In the form of (round: the number of packet), (17: 1), (18: 2), (19: 4), (20: 8), (21: 16), (22: 21), total 52.

[Problem 8]

[Essay]

Although they are not enough to be called as ‘toughest’, I’ve been faced many tough challenge when I study. However, the toughest challenge that I know face with is from rather unexpected part of my life. I start swimming this summer. Although I learn swimming when I was very young, like 10 years old, the basic techniques are still in my body. It is not quite difficult to do well in average amateur competition. However, as I set my goal to be the first-class swimmer in Korean amateur swimmer, I should practice and train harder. Expected, but still it is so challenging that I think of quitting the swimming. Here, my challenge is this: Not giving up even though I know that I cannot reach the record that I set. Sometimes I feel everything unmeaningful, but I know that I will regret desperately and blame myself if I give up now. Pursuing obviously impossible goal despite of the mental and physical limitation is my toughest challenge now.