

網路hw5 b06705033 資管三 莊海因

R16.

3 segments are sent.

First: seq=43 ack=80

Second: seq=80 ack=44

Third seq=44 ack=81

R17.

Host A: 1/10R

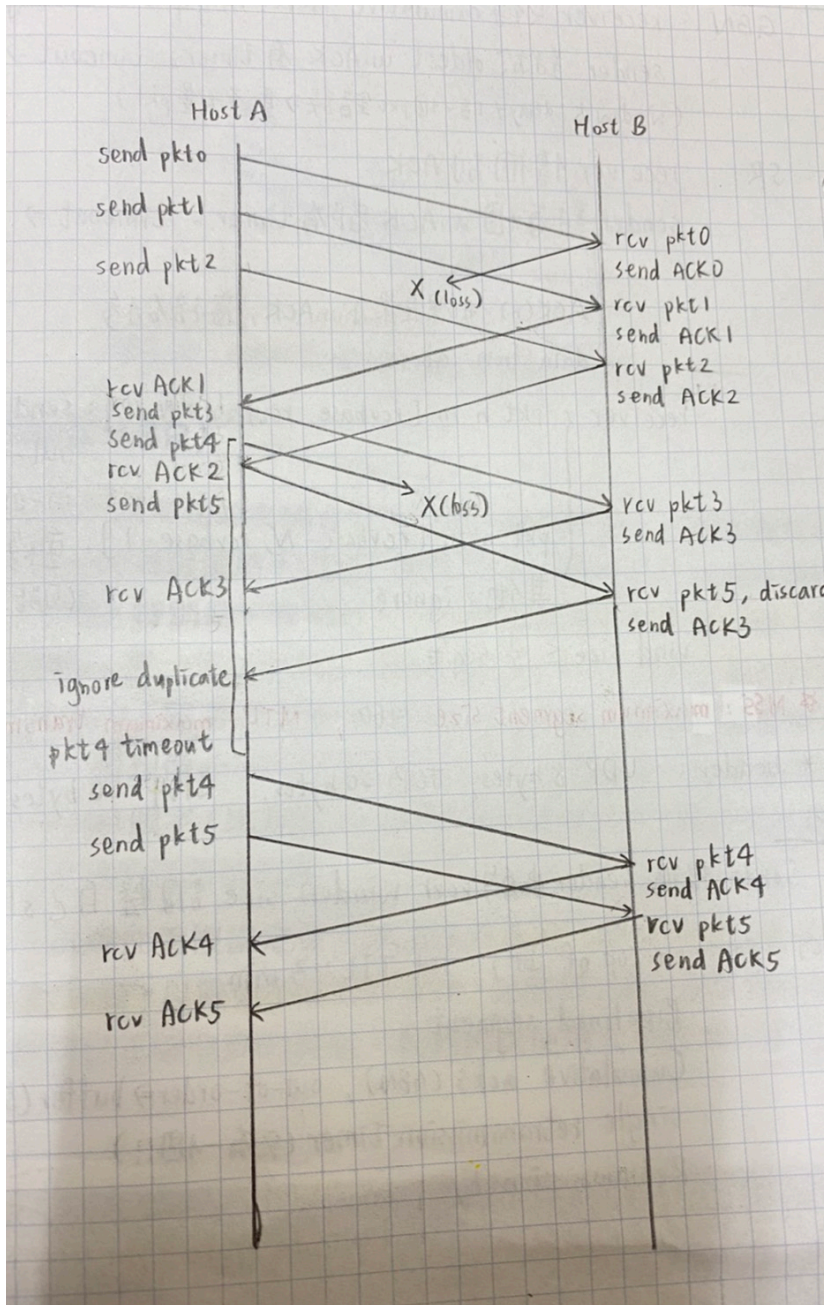
Host B: 9/10R

No, the situation is not fair.

R18.

False. The value of ssthresh is set to half of the value of the congestion window value when congestion was detected.

P19.



P32.

a.

$$EstimateRTT_1 = SampleRTT_1$$

$$EstimateRTT_2 = \alpha SampleRTT_1 + (1 - \alpha) SampleRTT_2$$

$$EstimateRTT_3 = \alpha SampleRTT_1 + (1 - \alpha)[\alpha SampleRTT_2 + (1 - \alpha) SampleRTT_3]$$

$$\begin{aligned} EstimateRTT_4 \\ = \alpha SampleRTT_1 + (1 - \alpha)\alpha SampleRTT_2 + (1 - \alpha)^2 \alpha SampleRTT_3 \\ + (1 - \alpha)^3 SampleRTT_4 \end{aligned}$$

b. By induction, we can learn that

$$EstimateRTT_n = \frac{\alpha}{1 - \alpha} \sum_{i=1}^{n-1} (1 - \alpha)^i SampleRTT_i + (1 - \alpha)^n SampleRTT_n$$

$$\alpha = 0.1,$$

$$EstimateRTT_n = \frac{1}{9} \sum_{i=1}^{n-1} (0.9)^i SampleRTT_i + (0.9)^n SampleRTT_n$$

c.

$$EstimateRTT_n = \frac{1}{9} \sum_{i=1}^{\infty} (0.9)^i SampleRTT_i$$

This procedure is called exponential moving average because the weight $(0.9)^i$ given to past samples decays exponentially.

P43.

In this problem, there is no danger in overflowing the receiver since the receiver's receive buffer can hold the entire file. Also, because there is no loss and acknowledgements are returned before timers expire, TCP congestion control does not throttle the sender. However, the process in host A will not continuously pass data to the socket because the send buffer will quickly fill up. Once the send buffer becomes full, the process will pass data at an average rate of $R \ll S$.

P54.

An advantage of using the earlier values of $cwnd$ and $ssthresh$ at t_2 is that TCP would not have to go through slow start and congestion avoidance to ramp up to the throughput value obtained at t_1 . A disadvantage of using these values is that they may be no longer accurate. In particular, if the path has become more congested between t_1 and t_2 , the sender will send a large window's worth of segments into an already (more) congested path.