

Computer Networks Homework

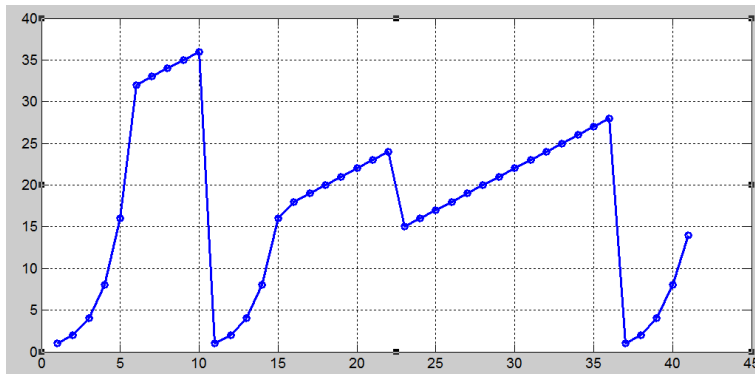
Transport Layer

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1. Compute 8-bit checksum for 01100010 and 10111001, and use an example to show that if the two numbers each has a 1-bit error, the checksum can not detect the errors.

答: checksum=11100011. 经过分析发现, 只要两个字段对应的位置同时发生了错误, 其检验和结果就不变(例如 0110001~~1~~、1011100~~0~~), 故无法检测错误。

2. Consider the following cwnd evolution at a TCP sender:



- (a) Is this TCP Tahoe or TCP Reno?

答: 由于 time 22~23 时 cwnd 没有直接降为 1MSS, 说明 sender 收到了三个冗余的 ACK 而且符合 TCP Reno.

- (b) What is the sender's initial ssthresh?

答: 由 time 6 时增长变为线性知, ssthresh 为 32MSS.

- (c) What happens at time 10? What is ssthresh and cwnd at time 11?

答: 由于 cwnd 变为 1MSS, 说明出现了 Timeout. 由慢启动规则知, 此时 ssthresh 变为 time 10 时 cwnd 的一半, 也就是 18MSS; cwnd=1MSS.

- (d) What happens at time 22? What is ssthresh and cwnd at time 23?

答: 出现了三个冗余的 ACK, 此时 ssthresh 变为 time 22 时 cwnd 的一半, 也就是 12MSS; 此时 cwnd 为 ssthresh+3MSS=15MSS.

- (e) What happens at time 36? What is ssthresh and cwnd at time 37?

答: 发生了 Timeout. 此时 ssthresh 为 14MSS; cwnd 为 time 36 时的两倍, 即 2MSS.

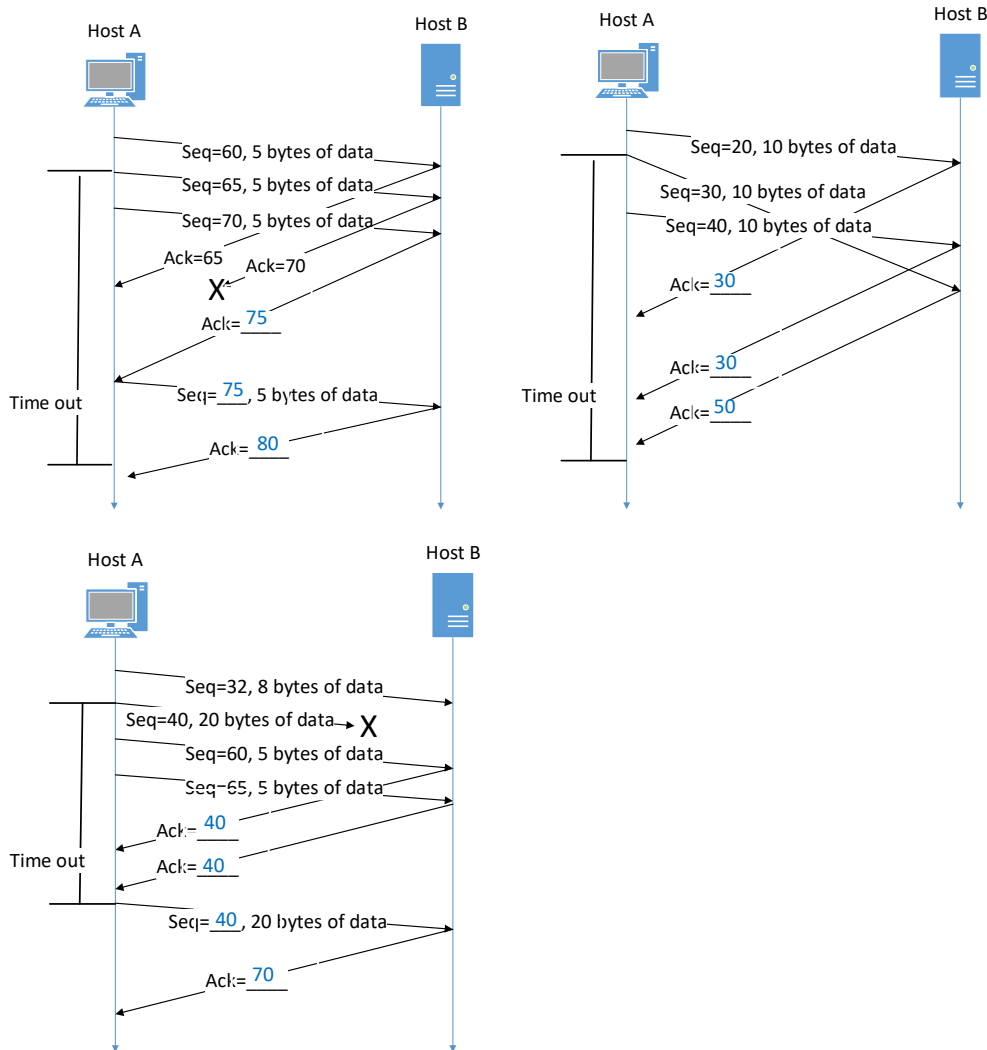
- (f) When is the 50th segment is sent?

答: 在 time 1~5 期间一共发送了 1+2+4+8+16=31 个 segments, 因此在 time 5~6 期间发送了 50th segment.

- (g) Which intervals the TCP connection is under slow start?

答: ①time 1~6 ②time 11~15 ③time 37~41

3. Host A sets up a TCP connection with Host B, fill in the blanks the appropriate sequence and acknowledgement numbers.



4. Two TCP connections A and B strictly follow AIMD and they share a same bottleneck of 100 Mbps. Initially connection A has a throughput of 64 Mbps, connection B has a throughput of 32 Mbps, the two connections increase their throughputs at a same rate. 1) Fill in following table. 2) After how many loss events, the difference between the two connections' throughputs is within 5 Mbps?

Round	A	B
1 st loss event	64→66→33	32→34→17
2 nd loss event	33→58→29	17→42→21
3 rd loss event	29→54→27	21→46→23
4 th loss event	27→52→26	23→48→24

因此在 3rd loss event 时差距小于 5Mbps.