

1. **(KR, Chapter 3, Problem 22)** Why do you think TCP avoids measuring the `SampleRTT` for retransmitted segments?
2. **(KR, Chapter 3, Problem 25)** Why do you think the TCP designers chose not to perform a fast retransmit after the first duplicate ACK for a segment is received?
3. Microsoft Windows 95 sets the default maximum TCP receiver window to 8192 bytes. Is this a good idea? Why or why not?
4. **(KR, Chapter 4, Problem 13)** Consider a subnet with prefix 101.101.101.64/26. Give an example of one IP address (of form xxx.xxx.xxx.xxx) that can be assigned to this network. Suppose an ISP owns the block of addresses of the form 101.101.128/17. Suppose it wants to create four subnets from this block, with each block having the same number of IP addresses. What are the prefixes (of form a.b.c.d/x) for the four subnets?
5. **(KR, Chapter 4, Problem 18)** In this problem we will explore the impact of NATs on P2P applications¹. Suppose a peer with user name Arnold discovers through querying that a peer with user name Bernard has a file it wants to download. Also suppose that Bernard is behind a NAT whereas Arnold isn't. Let 138.76.29.7 be the WAN-side address of the NAT and let 10.0.0.1 be the internal IP address for Bernard. Assume that the NAT is not specifically configured for the P2P application.
 - (a) Discuss why Arnold's peer cannot initiate a TCP connection to Bernard's peer, even if Arnold knows the WAN's side address of the NAT, 138.76.29.7.
 - (b) Now suppose that Bernard has established an ongoing TCP connection to another peer, Cindy, which is not behind a NAT. Also suppose that Arnold learned from Cindy that Bernard has the desired file and that Arnold can establish (or already has established) a TCP connection with Cindy. Describe how Arnold can use these two TCP connections (one from Bernard to Cindy, and the other from Arnold to Cindy) to instruct Bernard to initiate a direct TCP connection (that is, not passing through Cindy) back to Arnold. This technique is sometimes called *connection reversal*. Note that even though Bernard is behind a NAT, Arnold can use this direct TCP connection to request the file, and Bernard can use the connection to deliver the file.

¹Knowledge of Section 2.6 not required to solve this problem