

CS 372 **Introduction to Computer Networks**
Self-Check Exercises: Lecture 19

- 1) What is the purpose of the TCP countdown timer?
- 2) What is the key point of a cumulative acknowledgement scheme?
- 3) If a TCP sender sends packets with sequence numbers 100, 200, and 300, and has several more packets (all of 100 bytes) waiting in the sending buffer, and two ACKs are received back, with ACK numbers 200 and 300, what is the next step for the sender?
- 4) If a TCP sender sends packets with sequence numbers 100, 200, and 300, and has several more packets (all of 100 bytes) waiting in the sending buffer, and only one ACK is received, with ACK number 400, what is the next step for the sender?
- 5) If a TCP sender sends packets with sequence numbers 100, 200, and 300, and has several more packets (all of 100 bytes) waiting in the sending buffer, and no ACKs are received back, what is the next step for a TCP sender?
- 6) What are the key points of a Selective Repeat retransmission scheme.
- 7) What is the purpose of fast retransmit? How is it implemented?

- 8) HostA has established a TCP connection with HostB in a remote network. HostA is sending packets to HostB, and HostB immediately acknowledges every packet. Assume that the timeout is the same for all packets. HostB's "window size" is 2000 bytes. HostB has already received and acknowledged everything sent by HostA's application up to and including byte #140. HostA now sends packets of the same application data stream in order: P (50 Bytes), Q (60 Bytes), and R (100 Bytes).
- a. What are the sequence numbers on packets P, Q, and R?
 - b. Suppose that packets P, Q, and R arrive in order at HostB. What are the acknowledgement numbers in the ACK's for packets P, Q, and R?
 - c. Suppose that packet Q arrives at HostB before packet P. What is the acknowledgement number in the ACK for packet Q? If packet P arrives after packet Q (but before packet R), what is the acknowledgement number in the ACK for packet P?
 - d. Suppose that packet P is lost, but packets Q and R are received. What is the acknowledgement number in the ACK for packet R?