CHAPTER 12

TCP

12.1 MULTIPLE-CHOICE QUESTIONS

1. c	3. a	5. b	7. b	9. a
11. c	13. c	15. a	17. b	19. b
21. d	23. b	25. d	27. b	29. c
31. b	33. c	35. b		

12.2 EXERCISES

37. The RTT is not recalculated because, according to Karn's algorithm, it is only updated based on an acknowledged segment, not a retransmitted one..

39. The minimum size of the TCP header is 20 bytes.

41.

    a. None of the control bits are set. The segment is part of a normal communication.

    b. The FIN bit is set. This is a request to terminate the connection.

    c. The ACK and the FIN bits are set. This is an acknowledgment of data received and a simultaneous request to close the connection in the other direction.

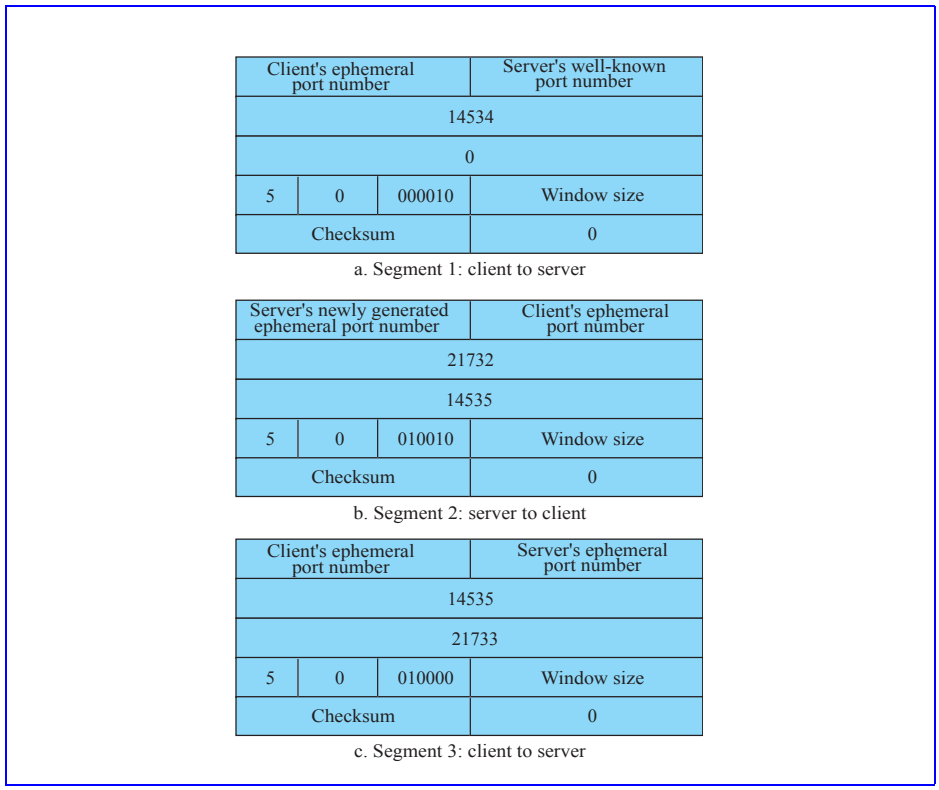
    d. The RST bit is set. The connection must be reset.

    e. The SYN bit is set. The client wishes to establish a connection with the server. The segment includes initialization information about the client end of the connection.

    f. The ACK and the SYN bits are set. This segment is sent in response to the segment in part e. It serves 2 purposes: it acknowledges the receipt of the connection request and includes initialization information about the server end of the connection.

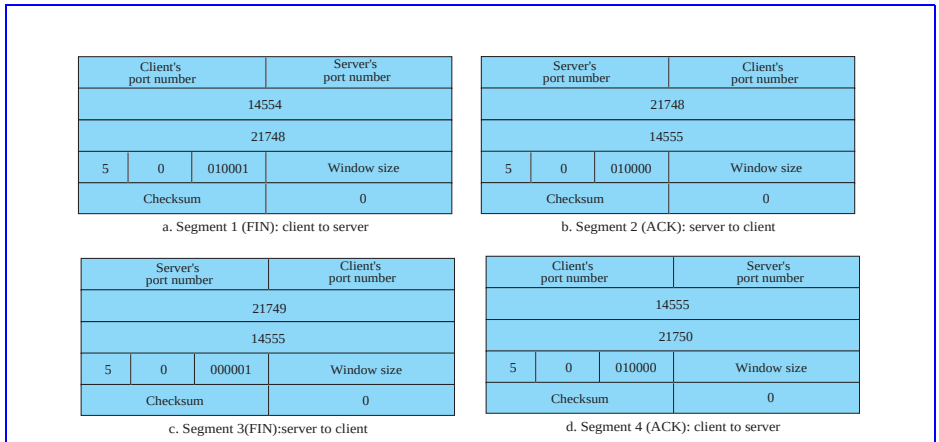
43. See Figure 12.1.

Figure 12.1 *Exercise 43*



45. See Figure 12.2.

Figure 12.2 *Exercise 45*



47. See Figure 12.3.
49. See Figure 12.4.

Figure 12.3 *Exercise 47*

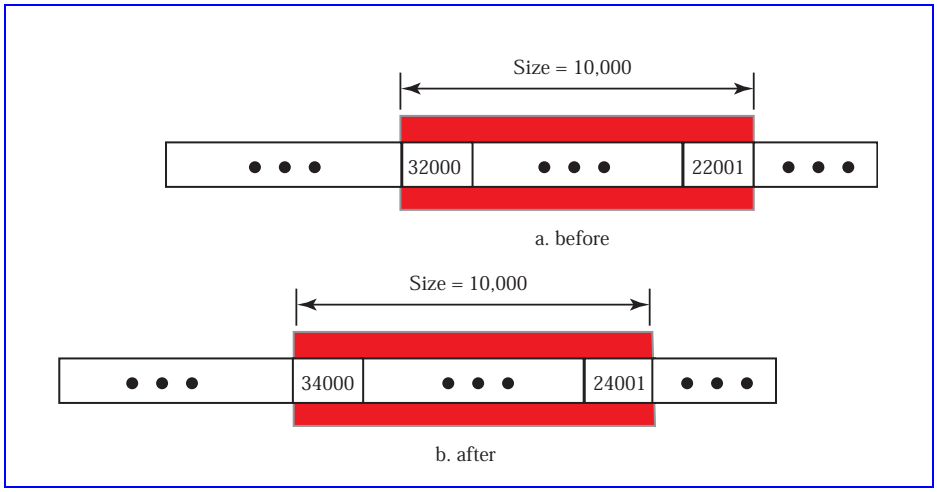
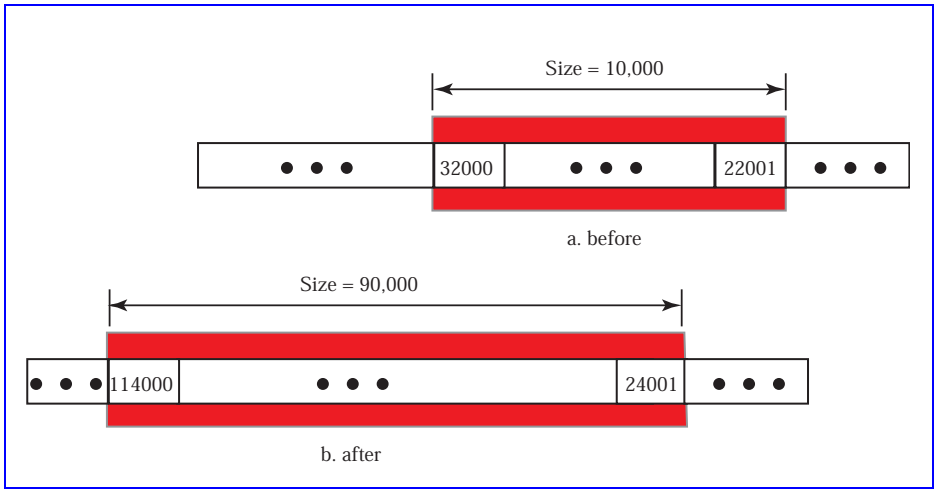


Figure 12.4 *Exercise 49*



51.

a. The only side of the connection that can receive a FIN segment while it is in the ESTABLISHED state is the server, so we are talking about the server. When the
FIN segment is received, the server sends an ACK segment to the client and moves to the CLOSE-WAIT state.

b. When the "close" message is received from the application, the server sends a FIN segment to the client, moves to the LAST-ACK state and waits for the last acknowledgment to arrive from the client.

53.

a. The only side of the connection that can receive a "close" message while in the SYN-RCVD state is the client, so we are talking about the client. When the client receives the "close" message from the application, it sends a FIN segment to the server and moves to the FIN-WAIT-1 state.

b. When the client receives the FIN segment from the server, it sends an ACK segment and moves to the CLOSING state.

55.

a. When the ACK segment is received, TCP sends nothing and moves from the FIN-WAIT-1 state to the FIN-WAIT-2 state.

b. When the FIN segment is received, TCP sends an ACK segment and moves to the TIME-WAIT state.

c. When the timeout occurs, TCP moves to the CLOSED state.

57. 16 bytes of data / 36 bytes of header and data = 0.444

59. 16 bytes of data / (56 bytes of TCP/IP header and data + 19 bytes of Ethernet overhead) = 0.213