CHAPTER 11

UDP

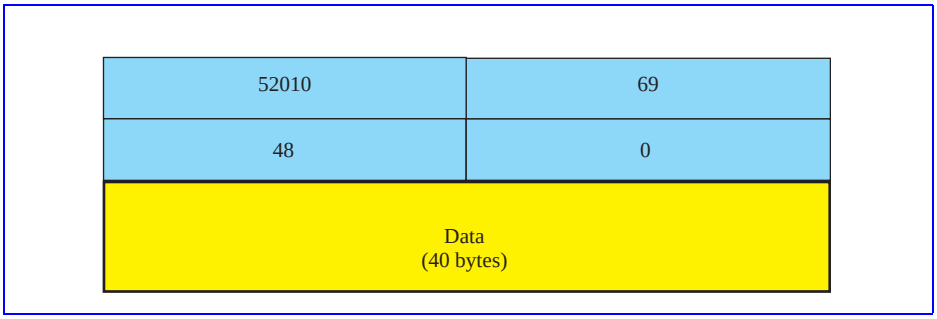
11.1 MULTIPLE-CHOICE QUESTIONS

1. c 2. a 3. c 4. d 5. a 6. b 7. a 8. d 9. d 10. c
11. d 12. b 13. c 14. a 15. a 16. c 17. d 18. a 19. a 20. c
21. c 22. d 23. c

11.2 EXERCISES

24. Reliability is not of primary importance in echo, daytime, bootp, TFTP and SNMP. In custom software, reliability can be built into the client/server applications to provide a more reliable, low overhead service.
25. IP and UDP are both connectionless and unreliable protocols. The main difference in their reliability is that IP only calculates a checksum for the IP header and not for the data while UDP calculates a checksum for the entire datagram.
26. Port addresses do not need to be universally unique as long as each IP address/port address pair uniquely identify a particular process running on a particular host. A good example would be a network consisting of 50 hosts, each running echo server software. Each server uses the well known port number 7, but the IP address, together with the port number of 7, uniquely identify a particular server program on a particular host.
27. Ephemeral is defined as short-lived or transitory. Ephemeral port numbers are only used for the duration of a single communication between client and server, so they are indeed short-lived.
28. See Figure 11.1
29. FTP uses the services of TCP, not UDP.
30. 11001011 00001000
31. 65152
32. 8DA9

Figure 11.1 *Exercise 28*



33. The client would use the IP address 122.45.12.7, combined with an ephemeral port number in the range of 49,152 – 65,535 generated by the SNMP software, for its source socket address and the IP address 200.112.45.90, combined with the well known port number 161, as the destination socket address.
34. The server would use the IP address 130.45.12.7, combined with an ephemeral port number in the range of 49,152 – 65,535 generated by the TFTP software, for its source socket address and the IP address 14.90.90.33, combined with the ephemeral port number supplied by the client with the request as the destination socket address.
35. The minimum size of a UDP datagram is 8 bytes at the transport layer and 28 bytes at the IP layer. This size datagram would contain no data–only an IP header with no options and a UDP header. The networking technology being used may require the using of padding.
36. Since the length of a datagram must be contained in a 2 byte field, the maximum size of a UDP datagram is 65,535 bytes (header plus data). However, given that the IP layer must also store the total length of the packet in a 2 byte field, the maximum length would be 20 bytes less than this, or 65,515 bytes, to leave room for the IP header. The networking technology being used may impose a smaller limit than this.
37. The smallest amount of process data that can be encapsulated in a UDP datagram is 0 bytes.
38. The largest amount of process data that can be encapsulated in a UDP datagram is 65,507 bytes. (65,535 minus 8 bytes for the UDP header minus 20 bytes for the IP header). The networking technology being used may impose a smaller limit than this.
39. This datagram could not be transferred using a single user datagram.
40. 16 bytes of data / 24 bytes of total length = 0.666
41. 16 bytes of data / 44 bytes of total length = 0.364
42. 16 bytes of data / 72 byte minimum frame size = 0.222
43.
    a. Port number 1586
    b. Port number 13
    c. 28 bytes

d. 20 bytes (28 – 8 byte header = 20 bytes)
e. From a client to a server
f. Daytime