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## CHAPTER 6

# Computer Networks

(Solutions to Practical Set)

### Review Questions

1. A point-to-point connection provides a dedicated link between two devices. The entire capacity of the link is reserved for transmission between those two devices. A multipoint connection (also called multidrop connection) is one in which more than two specific devices share a single link. In a multipoint environment, the capacity of the channel is shared, either spatially or temporally.
2. There are four basic topologies: mesh, star, bus, and ring.
3. We discussed three types of networks: LAN, MAN, and WAN. A local area network (LAN) is usually privately owned and links the devices in a single office, building, or campus. A wide area network (WAN) provides long-distance transmission of information over large geographic areas that may comprise a country, a continent, or even the whole world. A metropolitan area network (MAN) is a network with a size between a LAN and a WAN. It normally covers the area inside a town or a city.
4. When two or more networks are connected, they become an internetwork, or an *internet* (lowercase i). The most notable internet is called the *Internet* (uppercase letter I), a collaboration of more than hundreds of thousands of interconnected networks.
5. The layers in TCP/IP protocol suite are application (layer 5), transport (layer 4), network (layer 3), data link (layer 2), and physical (layer 1).
6. The application layer is responsible for providing services to the user. The address used at this layer is the client-server address such as an e-mail address or a URL.
7. The transport layer is responsible for process-to-process delivery of the entire message. The transport layer address is the process identification, called a port number.
8. The network layer is responsible for the source-to-destination (computer-to-computer or host-to-host) delivery of a packet, possibly across multiple networks (links). The address used at this level is the logical or IP address.

9. The data link layer delivers a frame from a node to another. Data link layer addresses are often called physical addresses or medium access control (MAC) addresses.
10. The physical layer is responsible for the movements of individual bits from one hop (node) to the next. There is no need for addressing in the physical layer because the transmission is broadcast.
11. Node-to-node delivery is the delivery of a frame from one node to the next; it is the responsibility of the data link layer.
12. Source-to-destination delivery is the delivery of individual packets from the source host to the destination host which is the responsibility of the network layer.
13. Process-to-process delivery is the delivery of the entire message; it is the responsibility of the transport layer.
14. Simple Mail Transfer Protocol (SMTP) is the application program used in the e-mail system.
15. File Transfer Protocol (FTP) is the standard application program used for file transfer.
16. TELNET is a general-purpose client-server program that lets a user access any application program on a remote computer; in other words, it allows the user to log onto a remote computer.
17. When a user logs onto a local time-sharing system, it is called local login. When a user wants to access an application program or utility located on a remote machine, he or she uses remote login.
18. Static documents have fixed contents and are used to present information that does not change. Dynamic documents are programs that run on the server. Active documents are programs that run on the client.

### Multiple-Choice Questions

- |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|
| 19. a | 20. c | 21. a | 22. c | 23. b | 24. c |
| 25. c | 26. c | 27. d | 28. a | 29. b | 30. d |
| 31. a |       |       |       |       |       |

### Exercises

32.
  - a. data link layer
  - b. network layer
  - c. transport layer
  - d. application layer
33. All 200 stations are affected.
34. Only the stations on the damaged portion of the network are affected.
35. All 200 stations are affected if special provisions are not used.

36. In a square room with each side of length  $x$  meters: a ring LAN would require  $4x$  meters of cable, a bus would require  $3x$  meters of cable, and a star (with hub at the center) would require  $4 \times (1/2)^{1/2} x = 2.83x$  meters of cable. Therefore, a star LAN with a hub at the center of the room needs less cabling.
37. A star LAN is more reliable. If any station in a ring LAN stops forwarding messages, the entire LAN stops working. If any part of the cable in a bus LAN is damaged, the entire LAN stops working. In a star LAN, if any station or any segment of cable is damaged, the other computers can still communicate.
38. The problem is probably a bus that is too long. The bus can be divided into two segments connected by a *repeater*, a device that regenerates bits.
39. An application can use whichever protocol is appropriate for that application. If an application needs to establish a reliable connection between machines, it can use TCP. If it only needs to send small amounts of noncritical information, it can use UDP to accomplish the transfer faster. SCTP combines the advantages of both UDP and TCP for real-time applications.

40.

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|----|----------|----------|----------|----------|
| a. | 01110000 | 00100000 | 00000111 | 00011100 |
| b. | 10000001 | 00000100 | 00000110 | 00001000 |
| c. | 11010000 | 00000011 | 00110110 | 00001100 |
| d. | 00100110 | 00100010 | 00000010 | 00000001 |
| e. | 11111111 | 11111111 | 11111111 | 11111111 |

41.

- 126.241.103.127
- 191.220.224.5
- 31.240.63.221
- 143.245.195.29
- 247.147.231.93

42. In the client-server architecture, each application is made of two separate but related programs: a client program and a server program. The server program must be running all the time; the client program can be running only when needed. This model is implemented at the application layer.

43.

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|----|-----------------|---------------------|
| a. | Local: madeline | Domain: belle.gov   |
| b. | Local: lindsey  | Domain: jasmine.com |
| c. | Local: wuteh    | Domain: hunan.int   |
| d. | Local: honoris  | Domain: queen.org   |

44. An e-mail address must uniquely identify a mail box on the internet while an IP address must uniquely identify a machine on the Internet. There is not a one-to-one relationship. Many e-mail address are normally correspond to a single IP address.

- 45. FTP is used to transfer files over a network. TELNET is used to establish a login session on a remote machine. After establishing a session, we can also use TELNET commands to copy files.
- 46. What is downloaded is an active document because the game is needed to be run on the client site.
- 47. What is downloaded is a static document because the document is not changed.
- 48. The URL is <http://www.hadb/user/general>.