Review Questions with Answers

1. For n devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology?
Ans: n(n-1)/2 cable link are required for mesh, n for ring, n-1 cable link for bus, and n cable link for star topology.

2. What is the difference between half-duplex and full-duplex transmission modes?
Ans: In half-duplex mode, each station can both transmit and receive, but not at the same time. When one device is sending, the other can only receive, and vice versa. Like walkie-talkies.

In full-duplex mode, both stations can transmit and receive simultaneously. Like telephone network.

3. What are some of the factors that determine whether a communication system is a LAN or WAN?
Ans: Size and Coverage of area determine whether a communication system is LAN or WAN. A LAN normally covers an area less than 2 mile, a WAN can be worldwide.

4. Identify the five components of a data communications system?
Ans: A data communications system has five components-(i) Message, (ii) Sender, (iii) Receiver, (iv)Transmission medium, (v) Protocol.

5. What are the advantages of a multipoint connection over point-to-point connection?
Ans: In a multipoint environment, the capacity of the channel is shared, either spatially or temporally. If several devices can use the link simultaneously, it is a spatially shared connection. If users must take turns, it is a timeshared connection.

6. Why are standard needed?
Ans: Standard are essential in creating and maintaining an open and competitive market for equipment manufacturers and in guaranteeing national and international interoperability of data and telecommunications technology and processes. Standards provide guidelines to manufacturers, vendors, government agencies, and other service providers to ensure the kind of interconnectivity necessary in today's marketplace and in international communications.

7. What are the advantages of distributed processing?
Ans: Most networks use distributed processing, in which a task is divided among multiple computers. Instead of one single large machine being responsible for all aspects of a process, separate computers (usually a personal computer or workstation) handle a subset.

8. Name the four basic network topologies, and cite advantage of each type.
Ans:
Bus Topology: Easy installation, less cabling, easy expansion etc.
Ring Topology: Less effort in adding or removing devices, simple fault isolation.
Star Topology: Less expensive than mesh, robustness etc.
Mesh Topology: Robustness, present of privacy and security.

9. What is an internet? What is the Internet?
Ans: When two or more networks are connected, they become an internetwork, or internet.

The most notable internet is called the Internet, a collaboration of more than hundreds of thousands of interconnected networks. Private individuals as well as various organizations such as government agencies, schools, research facilities, corporation, and libraries in more than 100 countries use the internet.

10. What are the two types of line configuration?
Ans: Point to point and Multipoint.

11. What are the three criteria necessary for an effective and efficient network?
Ans: Performance, Reliability, Security.

12. Why are protocols needed?
Ans: In computer networks, communication occurs between entities in different systems. An entity is anything capable of sending or receiving information. However, two entities can not simply send bit streams to each other and expect to be understood. For communication to occur, the entities must agree on a protocol.

13. Categorize the four basic topologies in terms of line configuration.
Ans:
Point to point- mesh and star.

Multi point- bus and ring.

Exercises

14. What is the maximum number of characters or symbols that can be represented by Unicode?
Ans: The code can define up to 2^(32) (4,294,967,296) characters or symbols.

15. A color image uses 16 bits to represent a pixel. What is the maximum number of different colors that can be represented?
Ans: The number of different colors you can represent with 16 bits is 2^{16}, or about 65k colors.

16. Assume six devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device?
Ans: Cables needed (6*5)/2 = 15 and,
Each device needs to be connected to 5 other devices. So, each device needs to have 5 ports. Six devices times five ports equals 30 total ports.

17. For each of the following four networks, discuss the consequences if a connection fails.

a. Five devices arranged in a mesh topology,

Ans: Mesh is high redundancy. Only one device would be disconnected if all the connections were to fail for that device. You can have many connections to other devices that's why its less likely to fail. The only cause for failure at this point is really the power and if you just don't have any. Even if one of the connections between two devices fail there is no effect on network and they can still communicate through other channels.

b. Five devices arranged in a star topology (not counting the hub),

Ans: Star runs to a central device like a switch, so if the switch itself fails then the whole network will be disconnected.

c. Five devices arranged in a bus topology,

Ans: Bus runs in a straight line from one network device to another. So if one gets disconnect then the all the devices connected down the line get disconnect.

d. Five devices arranged in a ring topology.

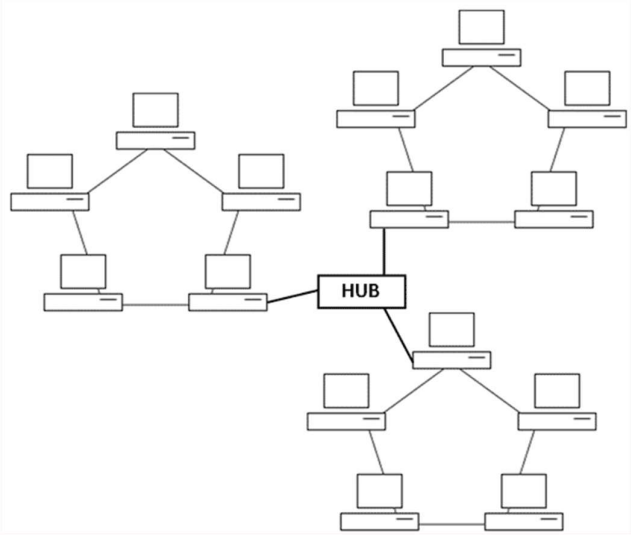
Ans. Ring is like a bus except it connects back onto itself. So if one device fails they all fail. The exception is if there is a redundant inside ring like that used in FDDI (fiber ring) then if both get disconnect from one device then they all do.

18. You have two computers connected by an Ethernet hub at home. Is this a LAN, a MAN, or a WAN? Explain your reason.
Ans: This is a LAN (Local Area Network). A WAN is a Wide Area Network that typically connects machines that are geographically remote. A Man is a Metropolitan Area Network - that connects together all machines in an enterprise, campus or town.

19. In the ring topology in Figure 1.8, what happens if one of the stations is unplugged?
Ans: The network would stop functioning because the token has to pass through each station in the ring.

20. In the bus topology in Figure 1.7, what happens if one of the stations is unplugged?
Ans: From that station rest all will stop functioning.

21. Draw a hybrid topology with a star backbone and three ring networks.
Ans:



22. Draw a hybrid topology with a ring backbone and two bus networks.
Ans: Do as Homework

23. Performance is inversely related to delay. When you use the Internet, which of the following applications are more sensitive to delay?

a. Sending an e-mail
b. Copying a file
c. Surfing the Internet

Ans: It is true that performance is inversely proportional to delay. Sending an email is more sensitive to delay than copying a file and surfing the internet.
Because E-mailing may be interrupted due to high latency, but can always assume as soon as the server is performing again, without user interaction.

Copying a file is less sensitive to delay than surfing the web and sending an e-mail.

Surfing the web is not so much affected by delay because due to effect of latency on surfing the net.

24. When a party makes a local telephone call to another party, is this a point-to-point or multipoint connection? Explain your answer.
Ans: It is Point-to-Point connection because multipoint connection needs more than two end points.

25. Compare the telephone network and the Internet. What are the similarities? What are the differences?
Ans: Both are the ways of Communications, Both can be make by wires/wireless. Both are capable to two-way traffic of signals. Internet allows us to share our files with our Friends while telephone don't. Video chat is being used by people who has the access to internet, but it isn't possible through telephone.

*****