CHAPTER 13

PRACTICE SET

Questions

Q13-1. In a full-duplex Ethernet, each station is connected to the switch and the media is divided into two channels for sending and receiving. No two stations compete to access the channels; each channel is dedicated.

Q13-3. The common traditional Ethernet implementations are *10Base5*, *10Base2*, *10-Base-T*, and *10Base-F.*

Q13-5. The common Gigabit Ethernet implementations are *1000Base-SX*, *1000Base-LX*, *1000Base-CX*, and *1000Base-T4*.

Q13-7. The *preamble* is a 56-bit field that provides an alert and timing pulse. It is added to the frame at the physical layer and is not formally part of the frame. SFD is a one-byte field that serves as a flag.

Q13-9. A *bridge* can raise the bandwidth and separate collision domains.

Problems

P13-1. We interpret each four-bit pattern as a hexadecimal digit. We then group the hexadecimal digits with a colon between the pairs:

5A:11:55:18:AA:0F

P13-3. The first byte in binary is 00000111. The least significant bit is 1. This means that the pattern defines a multicast address.

P13-5. The smallest Ethernet frame is 64 bytes and carries 46 bytes of data (and possible padding). The ratio is (data size) / (frame size) in percent. The Ratio is 71.9 percent.

P13-7. We can calculate the load for each activity (as shown below) and add them together. The total load is 2,888,890 bps or almost 3 Mbps. However, we have not specified how fast we want the files we want to be downloaded. We have assumed that the employee is so patient to allow the files to be downloaded at the portion of the rate assigned for part a. In real case, the total rate is much higher.

a. If the LAN should handle only this case, we have

load = (all employees) × (file size) × (number of times per second)

load = (100) × (10,000,000 × 8) (10 / (8 × 3600)) ≈ 277,778 bps

b. If the LAN should handle only this case, we have

load = (10 employees) × (rate) = (10) × (250 Kbps) = 2,500,000 bps

c. If the LAN should handle only this case, we have

load = (half) × (all employees) × (e-mails/hour) × (size × 8bits) / (an hour)

load = (1/2) × (100) × (10) × (100,000 × 8) / (3600) ≈ 111,112 bps

P13-9. In a Fast Ethernet network, the data rate is 100 Mbps.

a. There are 100,000,000 bits on the channel in each second, which means that (2/1000) × 100,000,000 = 200,000 bits are affected by the noise.

b. If each packet is 1000 bytes or 8,000 bits (assuming ASCII characters), this means 200,000/8,000 = 25 packets. However, since the noise can start from the beginning or near the end of the first packet, 25 or 26 packets are possibly destroyed.

P13-11. In a 10-Gigabit Ethernet network, the data rate is 10 Gbps.

a. There are 10,000,000,000 bits on the channel in each second, which means that (2/1000) × 10,000,000,000 = 20,000,000 bits are affected by the noise.

b. If each packet is 1000 bytes or 8,000 bits (assuming ASCII characters), this means 20,000,000/8,000 = 2500 packets. However, since the noise can start from the beginning or near the end of the first packet, 2500 or 2501 packets are possibly destroyed.