1. Suppose you manage a group of seven employees in a small business. Each of your employees wants to be connected to the Internet. Consider two alternatives:

   * Alternative A: Each employee has his or her own modem and connects individually to the Internet
   * Alternative B: The employees' computers are connected using a LAN, and the network uses a single modem to connect.

   b. Explain the actions you need to take to create each alternative.
   c. Compare the alternatives using the criteria in Figure 6-16.
   d. Which of these two alternatives do you recommend?

2. Consider the situation of a company that has two offices at physically separated sites. Suppose each office has a group of 15 computers.

   a. If the two offices are retail art galleries, what is likely to be the most common type of interoffice communication? Given your answer, what type of WAN do you think is most appropriate?
   b. Suppose the two offices are manufacturing sites that communicate via email and that regularly exchange large drawings and plans. What are the advantages and disadvantages of each of the four WAN types for these offices? Under what circumstances would you recommend a leased-line WAN?
   c. Suppose the two offices are the same as described in part b, but that in addition each has salespeople on the road who need to connect to the office computers. How would your answer to part b change?
   d. Would you change your answer to part c if both offices are located in the same building? Why or why not?
   e. What additional factors would you need to consider if one of the offices in part c was in Los Angeles and the other was located in Singapore?

3. Reread the Larry Jones (Student) Network Services case in the *Innovation in Practice* box on page 197.

   a. Consider the first fraternity house that Larry equipped. Explain how a LAN could be used to connect all of the computers in the house. Would you recommend an Ethernet LAN, an 802.11 LAN, or a combination? Justify your answer.
   b. This chapter did not provide enough information for you to determine how many switches the fraternity house might need. However, in general terms, describe how the fraternity could use a multiple-switch system.
   c. Considering the connection to the Internet, would you recommend that the fraternity house use a dial-up, a DSL, or a cable modem? Although you can rule out at least one of these alternatives with the knowledge you already have, what additional information do you need in order to make a specific recommendation?
   d. Should Larry develop a standard package solution for each of his customers? What advantages accrue from a standard solution? What are the disadvantages?

1. Assume you teach your MIS class and that a student comes to your office one day and asks, "Why do I have to learn how the Internet works? Give me three practical applications of this knowledge." How would you respond? Before you answer this question, read and think about the questions that follow.

2. How important do you think the existence of the TCP/IP—OSI protocols and architecture are to the success of the Internet? How did they contribute to the growth of the Internet? In what ways do protocols decrease competition? In what ways do they increase competition? In what ways do protocols stifle innovation? In what ways do they facilitate innovation? Explain how protocol architectures enable many different vendors to create interoperable products. In 2007 and beyond, what other industries might benefit from a similar standard?

3. Search the Internet for four companies that make products for one or more of the five layers of the TCP/IP—OSI architecture. Search for terms introduced in Chapter 6 and in this appendix, such as *802.3, 802.11, optical cable, VPN, firewall, switch, FTP,* and others. For each company, name one of their products, explain its function, and describe how that product relates to the TCP/IP—OSI architecture.

4. At one time, it was believed that the world would soon run out of IP addresses. Accordingly, a new protocol called IPv6 was proposed with longer IP addresses that provide many more unique IP addresses. During that same time, however, DHCP and NAT began to see widespread use, and their use dramatically reduced the growth in need for unique IP addresses. Explain why this is so. Suppose you are the director of product planning for a high-tech company, and 5 years ago you had been the initiator and principal proponent for the development of a new line of products based on IPv6. Your product sales have been substantially below your estimates. What do you do now? What product development principle(s) can you extract from this situation? How can you protect your organization from such situations in the future?

5. The biggest bottleneck in the Internet is the last mile from the ISP to the home. Numerous cities are developing plans and proposals to provide optical fiber cable to the doors of small businesses and homes. When this occurs, applications that require high bandwidth, such as home movies, will become feasible. Explain how companies such as Netflix are positioning themselves to pounce on that high bandwidth when it becomes available. Name three other products or services that become feasible when most homes have optical fiber cable at the door. What companies or industries stand to lose from the development of high-bandwidth capability? If you worked in one of those companies, how would you respond to this threat? How can you use the knowledge you gained from this question to guide your search for your first job?