3. Explain why IT is both a business pressure and an enabler of response activities that counter business pressures.

4. What does a flat world mean to you in your choice of a major? In your choice of a career? Will you have to be a "lifelong learner"? Why or why not?

5. What might the impact of a flat world be on your standard of living?

6. Is IT a strategic weapon or a survival tool? Discuss.

7. Why might it be difficult to justify a strategic information system?

8. Describe the five forces in Porter's competitive forces model, and explain how increased access to high-speed Internet has affected each one.

9. Describe Porter's value chain model. What is the relationship between the competitive forces model and the value chain model?

10. Describe how IT can be used to support different value chains for different companies.

11. Discuss the idea that an information system by itself can rarely provide a sustainable competitive advantage.

[Problem-Solving Activities]

1. Surf the Internet for information about the Department of Homeland Security. Examine the available information, and comment on the role of information technologies in the department.

2. Experience mass customization by designing your own shoes at *www.nike.com*, your car at *www.jaguar.com*, your CD at *www.easternrecording.com*, your business card at *www.iprint.com*, and your diamond ring at *www.bluenile.com*. Summarize your experiences.

3. Access *www.go4customer.com*. What does this company do and where is it located? Who are its customers? Which of Friedman's flatteners does this company fit? Provide examples of how a U.S. company would use its services.

4. Enter Walmart China (*www.wal-martchina.com/english/index.htm*). How does Walmart China differ from your local Walmart (consider products, prices, services, etc.)? Describe these differences.

5. Apply Porter's value chain model to Costco (*www.costco.com*). What is Costco's competitive strategy? Who are Costco's major competitors? Describe Costco's business model. Describe the tasks that Costco must accomplish for each primary value chain activity. How would Costco's

information systems contribute to Costco's competitive strategy, given the nature of its business?

6. Apply Porter's value chain model to Dell (*www.dell.com*). What is Dell's competitive strategy? Who are Dell's major competitors? Describe Dell's business model. Describe the tasks that Dell must accomplish for each primary value chain activity. How would Dell's information systems contribute to Dell's competitive strategy, given the nature of its business?

7. The market for optical copiers is shrinking rapidly. It is estimated that 90 percent of all duplicated documents are generated by computer printers. Can a company such as Xerox Corporation survive?

   a. Read about the problems and solutions of Xerox from 2000 to 2010 at *www.fortune.com*, *www.findarticles.com*, and *www.google.com*.

   b. Identify all the business pressures on Xerox.

   c. Find some of Xerox's response strategies (see *www.xerox.com*, *www.yahoo.com*, and *www.google.com*).

   d. Identify the role of IT as a contributor to the business technology pressures (e.g., obsolescence).

   e. Identify the role of IT as a facilitator of Xerox's critical response activities.

[Closing Case IBM's Watson]   MIS   MKT   FIN

The Problem

Computer scientists have long sought to design computer-based information systems (CBISs) that interact in natural human terms across a range of applications and processes, comprehending the questions that humans ask and providing answers that humans can understand. A major step toward achieving this goal is the development of the IBM Watson system.

An Interesting IT Solution

IBM (*www.ibm.com*) has developed an artificial intelligence CBIS capable of answering questions posed in natural language.

(We discuss artificial intelligence in Technology Guide 4.) IBM named the system "Watson," after the company's founder, Thomas J. Watson, Sr. IBM asserts that Watson processes information more like a computer than a human. In fact, Watson is an application of advanced natural language processing, information retrieval, knowledge representation and reasoning, and machine learning technologies to the field of open-domain (general) question answering. IBM has labeled the type of processing demonstrated by Watson as *cognitive computing*.

IBM developed Watson specifically to answer questions on the quiz show *Jeopardy!*. In February 2011, Watson competed on *Jeopardy!* against former winners Brad Rutter and Ken

Jennings. Watson won the game series and received the first prize of $1 million. (In *Jeopardy!*, the host reads the answer, and the contestants must then provide the correct question.)

The Results

Following the television performance, IBM executives immediately turned their attention to commercializing Watson. Today, Watson is being employed by a wide variety of organizations, to address a diverse set of problems.

One of Watson's earliest applications was in the field of medicine. IBM executives chose medicine because Watson could have a distinctive social impact while also proving its ability to master a complex body of knowledge.

- *Medicine* was a logical choice. Although some health data are structured—for example, blood pressure readings and cholesterol counts—the vast majority are unstructured. These data include textbooks, medical journals, patient records, and nurse and physician notes. In fact, modern medicine entails so much unstructured data that its rapid growth has surpassed the ability of healthcare practitioners to keep up. It is important to note here that IBM has made it clear that Watson is *not* intended to replace doctors. Rather, its purpose is to assist them in avoiding medical errors and sharpening their medical diagnoses.

  Enter Watson. Watson can read all of the world's medical journals in seconds. The system can read, and remember, patient histories, monitor the latest drug trials, examine the potency of new therapies, and closely follow state-of-the-art guidelines that help doctors choose the best treatments. Watson can also analyze images such as MRIs and EKGs.

  In early 2015, the three top-ranked *U.S. News & World Report for Health* 2014–2015 hospitals in cancer care were working with Watson: Memorial Sloan Kettering (*www.mskcc.org*), MD Anderson Cancer Center (*www.mdanderson.org*), and the Mayo Clinic (*www.mayoclinic.org*). In addition, the Cleveland Clinic and the New York Genome Center are using Watson in the new field of genomic-based medicine. Similarly, Pathway Genomics (*www.pathway.com*) employs Watson to provide personalized options to help patients and their physicians make informed decisions about living a healthier life.

- *Customer service*. The Watson Engagement Advisor is designed to help customer-facing personnel assist consumers with deeper insights more quickly than was previously possible. Engagement Advisor's "Ask Watson" feature can quickly address customers' questions, offer feedback to guide their purchase decisions, and troubleshoot their problems. Companies employing the Advisor include USAA (*www.usaa.com*), Genesys (*www.genesys.com*), DBS Bank of Singapore (*www.dbs.com.sg*), and many others.
  - USAA is also using Watson to assist military personnel in transitioning from the military to civilian life.

- RedAnt (*www.redant.com*) uses Watson to transform how consumers shop. It also used Watson to develop a retail sales trainer that lets employees easily identify individual customers' buying preferences by analyzing demographics, purchase history, and wish lists, as well as product information, local pricing, customer reviews, and tech specs.
- MD Buyline (*www.mdbuyline.com*) uses Watson to help hospitals procure medical devices.
- Welltok (*www.welltok.com*) uses Watson to enable health plans to more effectively engage their members.

- *Financial services*. Many financial organizations have integrated Watson into their business processes. As one example, Citigroup (*www.citigroup.com*) employs Watson to analyze financial, regulatory, economic, and social data across financial exchanges, currencies, and funds to help simplify and improve the bank's digital interactions with its customers.

- *Travel services*. Terry Jones, founder of Travelocity (*www.travelocity.com*) and Kayak (*www.kayak.com*), has launched WayBlazer (*www.wayblazer.com*), a new travel company powered by Watson. Watson engages, learns, and advises users through a natural language interface to help create the best travel experience.

- *Other interesting applications*:
  - Macy's (*www.macys.com*) uses Watson to better target Millennials by interpreting their social signals on social media.
  - BNSF Railway (*www.bnsf.com*) is using Watson to help detect faulty sections in the company's 32,500 miles of track before they break.
  - Repsol (*www.repsol.com*) is using Watson to improve its strategic decision making in the optimization of oil reservoir production and in the discovery of new oilfields.

In February 2014, IBM announced that it was deploying Watson to Africa to encourage business opportunities across the world's fastest-growing continent. Watson eventually will be available for use in key areas such as education, water and sanitation, and agriculture.

One year later, IBM announced an alliance with Japanese telecommunications giant SoftBank (*www.softbank.jp/en*). As part of the deal, Watson is learning to speak and think in Japanese, one of the most challenging languages for a computer system because it relies on a pictorial alphabet known as kanji.

By early 2015, hundreds of IBM clients and partners across 6 continents, 25 countries, and 12 industries had projects underway with Watson. IBM executives asserted that Watson was 24 times faster, 2400 percent more powerful, and less than 10 percent the size of the system that won *Jeopardy!*. In fact, Watson has shrunk from the size of a master bedroom to that of three stacked pizza boxes.

Sources: Compiled from "IBM Watson Group Invests in Pathway Genomics to Help Personalize Consumer Health," *IBM News Release*, November 2014; "IBM's $100M 'Project Lucy' Brings Watson to Africa," *KurzweilAI.net*, February 7, 2014;

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Questions

1. What applications can you think of for Watson in a university setting?

2. What are potential disadvantages of using Watson in healthcare settings?

3. Would you consider being diagnosed only by Watson? Why or why not?

4. Would you consider being diagnosed by your personal physician, if he or she consulted Watson? Why or why not?