CHAPTER ONE

INTRODUCTION TO SYSTEMS ANALYSIS AND DESIGN

ANSWERS TO CASE-SIM: SCR ASSOCIATES

Introductory note: The SCR case study provides a valuable real-world experience for students. The case involves an imaginary IT consulting firm that maintains a realistic Web site, complete with a company intranet that students can access. The student becomes an entry-level systems analyst reporting to a supervisor named Jesse Baker.

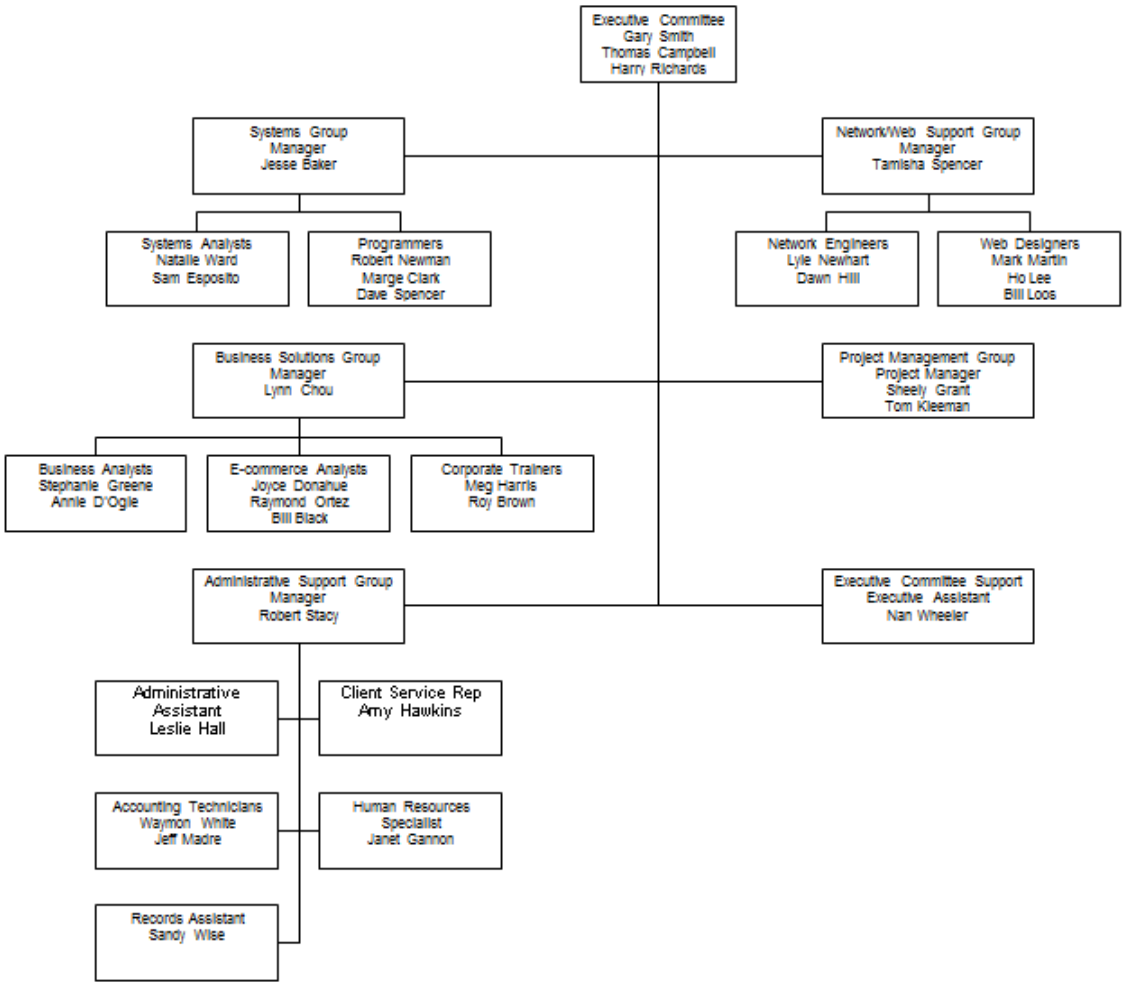
In each session, the student receives e-mail messages, voice mail messages, and a list of tasks to perform. The voice mail all comes from Jesse Baker, and the e-mail messages come from Jesse Baker and other members of the firm. Each message contains guidance and direction that would be typical of a real-life situation. After reading the e-mail, listening to the voice messages, and consulting the task list, the rest is up to the student. He or she must go back to the chapter, review the terms, concepts, and skills, and then apply them in the context of the case study. Four main tasks occur in each session. A typical task might require the student to prepare an e-mail message, a memo, Internet research, or a graphic element such as a chart or diagram. The task list for Session 1 follows.

1. Investigate SCR's Internet site and learn about the company's history, purpose, and values. Send Jesse a brief memo with suggestions to expand or improve these sections.
   The SCR Web site includes realistic features, content, and links that allow students to learn about the company and its background. Encourage students to find examples of other IT consulting firms and compare them to the SCR site. This task could tie into Assignment 4, which requires Web research to find other firms. It would be helpful to get students interested in the SCR site's design and navigation features before they start working on the case itself. Students with a background in Web design probably will have suggestions and comments to share with the class.

2. On the SCR intranet, visit the data, forms, and resource libraries and review a sample of the information in each library.
   This task provides an overview of the site and will give students a valuable introduction to the case study. If you have not done so already, this would be a good time to explain the

main features of the case study, which include the SCR intranet, personalized e-mail messages, the reference libraries, and the task list for each session.

3. Using the SCR functions and organization listed in the data library, create an organization chart using Microsoft Word, Visio, or a drawing program.
   Students can use the list of SCR functions and organization (Document 1-2 from the data library) to create an organization chart. A sample chart follows:



4. Jesse says that SCR has plenty of competition in the IT consulting field. Get on the Internet and find three other IT consulting firms. She wants a brief description of each firm and the services it offers.
   Students should have little difficulty locating IT consulting firms. This would be a good topic for student reports, and for actual visits to the online sites if computer resources are

available in the classroom. You might ask students to critique each site on the basis of useful information content, organization, and aesthetics.

ANSWERS TO CHAPTER EXERCISES

Review Questions

1. What is information technology, and why is it important to a business?
   Information technology (IT) is a combination of hardware and software products and services that companies use to manage, access, communicate, and share information. More than ever, business success depends on information technology. According to a Department of Commerce report, the IT industry has created a new economy, where advances in hardware, software, and connectivity provide unprecedented benefits to businesses and individuals around the world. ***(Page 4)***

2. Define business profiles, processes, and modeling..
   A business profile is an overview that defines a company's overall functions, processes, organization, products, services, customers, suppliers, competitors, constraints, and future direction. A business process describes specific events, tasks, and desired results. To understand a company's operations, systems analysts first develop a business profile and then create a series of business models. A business model graphically represents business functions that consist of business processes such as sales, accounting, and purchasing that perform specific tasks. ***(Pages 10 -11)***

3. Identify the main components of an information system, and describe the system's stakeholders.
   An information system has five key components: hardware, software, data, processes, and people. People who have an interest in an information system are called stakeholders.
   Stakeholder groups include the management group responsible for the system; the users, sometimes called end users, inside and outside the company who will interact with the system; and IT staff members, such as systems analysts, programmers, and network administrators who develop and support the system ***(Pages 8-10)***

4. Explain the difference between vertical and horizontal systems packages.
   A horizontal system is a basic system, such as an inventory or payroll program, that can be adapted for use in many companies. A vertical system is designed to meet the unique requirements of a specific business or industry, such as a Web-based retailer or a video rental chain. ***(Page 8)***

5. How do companies use EDI? What are some advantages of using XML?
   Online trading marketplaces initially were developed as company-to-company data-sharing arrangements called electronic data interchange (EDI). EDI enabled computer-to-computer transfer of data between companies, usually over private telecommunications networks. Firms used EDI to plan production, adjust inventory levels, or stock up on raw materials using data from another company's information system.
   As B2B volume soared, the development of extensible markup language (XML) enabled company-to-company traffic to migrate to the Internet, which offered standard protocols,

universal availability, and low communication costs. XML is a data description language that allows Web-based communication between different hardware and software environments. XML is extremely flexible because it is concerned with the data itself rather than the output format. For example, a user could view XML customer data as a Web page on a notebook computer or as a contact list on a PDA.

The unique advantage of XML is that data description is not linked to output formatting. This is just the opposite of HTML (hypertext markup language), where the language controls the way the information is displayed on a Web browser. ***(Page 14)***

6. Describe five types of information systems, and give an example of each.
Information systems include enterprise computing systems, transaction processing systems, business support systems, knowledge management systems, and user productivity systems. Enterprise computing systems support company-wide data management requirements. Airline reservation and credit card billing systems are examples of enterprise computing systems.

Transaction processing (TP) systems process data generated by day-to-day business operations. Examples of TP systems include customer billing, accounts receivable, and warranty claim processing.

Business support systems provide job-related information support to users at all levels. These systems can analyze transactional data, generate information needed to manage and control business processes, and provide information that leads to better decision making. A tracking system that analyzes sales trends and forecasts future volume is an example of a business support system.

Knowledge management systems simulate human reasoning by combining a knowledge base and inference rules that determine how the knowledge is applied. Online tech support systems are examples of knowledge management systems.

User productivity systems provide employees at all organizational levels with a wide array of tools that can improve quality, job performance, and productivity.

User productivity systems include networking, e-mail, voice mail, fax, video conferencing, word processing, automated calendars, database management, spreadsheets, desktop publishing, presentation graphics, company intranets, and Internet access. **(*Pages 15 - 17)***

7. Describe four organizational levels of a typical business and their information requirements.
Four organizational levels are operational personnel, lower management, middle management, and top management.

Operational personnel need very detailed information directly related to the job functions they perform.

Members of lower management, such as supervisors and team leaders, need detailed operational information and some exception and summary information specific to their narrow areas of responsibility.

Middle managers need less detailed information, more exception and summary information, and broader information than lower management.

Top managers need summary-level information; one-time, what-if information; and external information to support the strategic planning process. ***(Pages 18 - 19)***

8. Describe the phases of the systems development life cycle, and compare the SDLC waterfall model to the spiral model.
   The systems development life cycle consists of five phases: systems planning, systems analysis, systems design, systems implementation, and systems operation and support.
   During the systems planning phase, you identify the nature and scope of the problems discovered in the systems request and conduct a preliminary investigation.
   The purpose of the systems analysis phase is to learn exactly what takes place in the current system, determine and fully document in detail what should take place, and make recommendations to management on the alternative solutions and their costs.
   The purpose of the systems design phase is to determine how to construct the information system to best satisfy the documented requirements.
   Systems implementation is the phase during which the information system actually is constructed.
   During systems support and security, the end users take ownership of the constructed information system, the system is evaluated, and the IT department provides ongoing support through maintenance changes and enhancements. ***(Pages 22 - 24)***

9. Explain the use of models, prototypes, and CASE tools in the systems development process. Also explain the pros and cons of agile development methods.
   Modeling produces a graphical representation of a concept or process that systems developers can analyze, test, and modify. A systems analyst can describe and simplify an information system by using a set of business, data, object, network, and process models.
   Prototyping involves the creation of an early working version of an information system or its components. A prototype can serve as an initial model that is used as a benchmark to evaluate the completed system, or it can develop into the final version of the system. CASE tools help systems analysts develop and maintain information systems. CASE tools provide an overall framework for systems development, support a wide variety of design methodologies, boost IT productivity, and improve the quality of the finished product.
   Agile development methods have attracted a wide following and an entire community of users. Agile methods typically use a spiral model, which represents a series of iterations, or revisions, which are based on user feedback. Proponents of the spiral model believe that this approach reduces risks and speeds up software development.
   Analysts should recognize that agile methods have advantages and disadvantages. By their nature, agile methods allow developers to be much more flexible and responsive, but can be riskier than more traditional methods. For example, without a detailed set of system requirements, certain features requested by some users might not be consistent with the company's larger game plan. Other potential disadvantages of adaptive methods can include weak documentation, blurred lines of accountability, and too little emphasis on the larger business picture. Also, unless properly implemented, a long series of iterations might actually add to project cost and development time.
   (Pages 19 - 21& 25 - 26)

10. What is objected-oriented analysis, and how does it differ from structured analysis?
Whereas structured analysis regards processes and data as separate components, object-oriented (O-O) analysis combines data and the processes that act on the data into things called objects. O-O analysis uses object models to represent data, behavior, and the means objects affect other objects.
By describing the objects (data) and methods (processes) needed to support a business operation, a system developer can design reusable components for faster system implementation and decreased development cost. Many analysts believe that, compared with structured analysis, O-O methods are more flexible, efficient, and realistic in today's dynamic business environment. ***(Pages 19 - 24 & 24 - 25)***

Discussion Topics

1. Some experts believe that the growth in e-commerce will cause states and local governments to lose a significant amount of sales tax revenue, unless Internet transactions are subject to sales tax. Do you agree? Why or why not?
This issue has sparked strong differences of opinion among national and state leaders, consumer advocacy groups, and trade associations whose members offer online sales and services. In some respects, the same question could apply to mail order firms who conduct no physical operations within a state or locality. Examples would include firms such as L. L. Bean and Lands End. Should the Internet be treated differently? You might want your students to do some preliminary research and then debate this issue. Also, you might follow this topic as news items occur during the course.

2. Present an argument for and against the following proposition: Because IT managers must understand all phases of the business, a company should fill top management vacancies by promoting IT managers.

Some possible arguments for the proposition follow:

a. *Information technology (IT) management has a broad understanding of the information processing of the company instead of the narrower view held by managers from other areas of the company.*
b. *IT management deals with all functional company areas so members of IT management know and interrelate with the people who lead and who work in these areas. Because they provide needed services to these areas, IT management personnel have the support of the key personnel from these areas.*
c. *Information systems development and maintenance is complex and requires extraordinary management skills to operate successfully. These same skills are necessary in top-level management positions.*
d. *Computer technology dominates many companies today. Today's technology leaders should be tomorrow's business leaders.*

Some possible arguments against the proposition follow:

a. *IT management is more comfortable dealing with computers and with procedures, and less comfortable dealing with people. Top-level management positions require a strong interest in people and strong skills in dealing with people.*

b. *Whether a firm is product-oriented or service-oriented, it must make a profit to survive. Future company leaders should, therefore, come from the production, service, or financial areas, because these areas are the most important to a company. Possibly, in Internet-dependent firms, the best choice would be an IT manager — but only if he or she had extraordinary business skills apart from technical ability.*
c. *It is unwise to restrict prospects for top-level management positions to one specific area of the company. Competent leaders are apt to rise from many different departments.*
d. *People who have worked in several different functional areas are better rounded than those restricted to just one area. So, unless the IT manager has worked outside the IT department, he or she essentially is a specialist and is at a disadvantage compared to someone with more general knowledge and skills.*

3. The head of the IT group in a company is often called the chief information officer (CIO) or chief technology officer (CTO). Should the CIO or CTO report to the company president, to the finance department, where many of the information systems are used, or to someone or somewhere else? Why would it matter?

Several possible advantages of having the IT director report to the chief financial officer of the company follow:
a. *The operation of the IT department represents a large expense for most companies. The chief financial officer is in the best position to monitor and control this expense.*
b. *Financial information systems are among the first in a company to be computerized, and it is natural, therefore, to place the IT department under the chief financial officer.*
c. *It would be difficult for a company to make a profit if it did not have excellent control over its data and information. The chief financial officer has responsibility for all centralized monetary functions. Therefore, this same person should have responsibility for all centralized data and information processing functions.*
d. *Too many technical details are involved with the operation of the information technology department, and having the department report to the president would be unwise. Logically the finance area is the only lower-level area of the company that has the breadth of responsibility necessary to manage the IT department.*

Several possible disadvantages of having the IT director report to the chief financial officer of the company follow:
a. *There is a danger that too much attention would be paid to the financial information systems and not enough to other information systems.*
b. *The IT department should report to the president of the company because information technology is as important to the company as the company's financial functions. They, therefore, deserve equal attention from the president.*
c. *Information technology is too complicated to assign to someone whose expertise is finance and not computer technology.*

4. Computers perform many jobs that previously were performed by people. Will computer-based transactions and expanded e-commerce eventually replace person-to-person contact? From a customer's point of view, is this better? Why or why not?
IT professionals agree that computer technology is changing the way companies do business. Many brick-and-mortar firms are launching large-scale B2B and B2C ventures that profoundly will affect traditional business practices and operations. Few observers think that IT will replace person-to-person contact totally, although many clerical and administrative functions will become automated. The real question is how these changes will affect people in an information-oriented society. Many observers feel that the implications of huge quantities of information and 24/7 access can cut in both directions.
Reasonable people differ on these issues, and you might want to propose a debate among your students. For additional background and viewpoints about the impact of computer technology on traditional person-to-person interaction, students can perform research on the Internet and compare the views of technology-based publications such as InfoWorld*, to mainstream business publications such as* Fortune*,* Forbes*, and the* Harvard Business Review*, among others.*

Projects

1. Contact at least three people at your school or a nearby company who use information systems. List the systems, the position titles of the users, and the business functions that the systems support.
Answers will vary. Students could perform this task as individuals or work in teams. It might be interesting to compare and discuss the various ways in which businesses manage information.

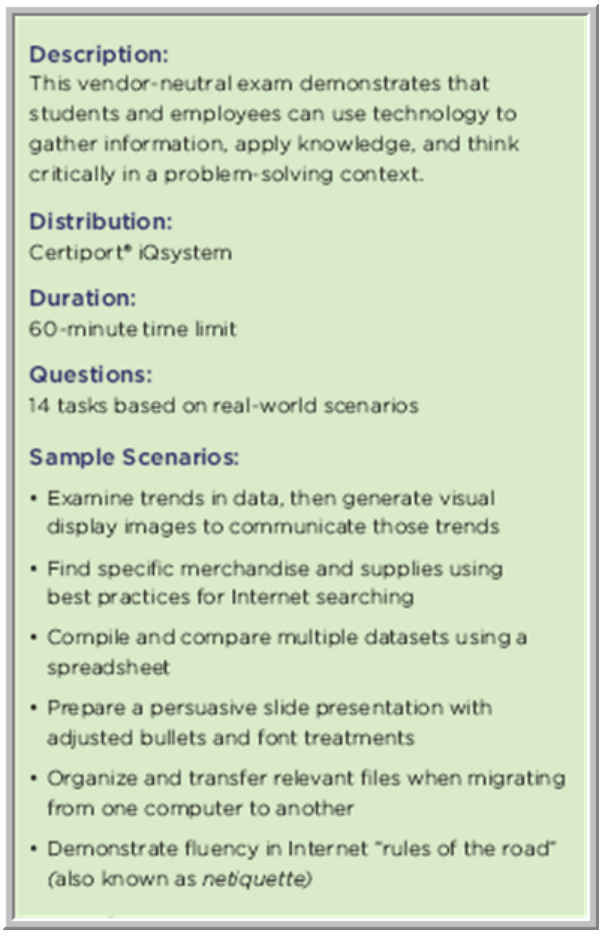
2. Research newspaper, business magazine articles, or the Web to find computer companies whose stock is traded publicly. Choose a company and pretend to buy $1,000 of its stock. What is the current price per share? Why did you choose that company? Report each week to your class on how your stock is doing.
This project assumes that students have some basic understanding of the stock market. If they do, sites such as Yahoo! offer financial information and analysis links and resources. If students need fundamental information about investing in stocks, you might direct them to the material at www.free-financial-advice.net/stock-market.html. An industry leader like Vanguard also offers free online information about investing at its Web site www.vanguard.com. Also, many school and community libraries can assist students in learning about financial terms and concepts, including stock market investments.

3. Do a search on the Web to learn more about agile system development approaches and spiral models. Prepare a summary of the results and a list of the sites you visited.
Answers will vary. Many sites describe and discuss agile methods. Students should have no trouble finding material on agile methods and spiral models and preparing a summary of the results. Several sites are shown in the text, and a simple search will produce a list of many more.

4. Is it really possible to measure thinking skills? Before you decide, visit Certiport's Web site shown in Figure 1-36 and investigate the critical thinking certification. Also visit the Critical Thinking Community site shown in Figure 1-35. Prepare a brief memo with your conclusion and reasons.
   To succeed in the classroom or the workplace, students must be able to define, access, evaluate, manage, integrate, create, and communicate information. These skills are described in the following table, which is from the Certiport.com Web site.
   Critical thinking is necessary to assess facts, organize data, make a judgment, or solve a problem. As instructors, we should encourage students to learn and practice these skills.

TASK	SKILL SET
Define	Articulate the problem in order to facilitate electronic search for information.
Access	Collect information in digital environments including web pages and databases.
Evaluate	Judge whether a set of information is sufficient to solve a problem by determining authority, bias, timeliness, relevance, and other aspects of materials and data.
Manage	Organize information to make it more accessible and useful.
Integrate	Interpret and represent information using digital tools to synthesize, summarize and compare information from multiple sources.
Create	Adapt, apply, design or construct information using visual technology tools.
Communicate	Disseminate information tailored to a particular audience in an effective digital format.

Most educators believe that it is possible to measure critical thinking skills, and data from the Educational Testing Service (ETS) supports this conclusion. The new critical thinking exam offered by Certiport and ETS uses a series of simulations and scenarios, which include tasks similar to the ones shown in the following figure:



Description:
This vendor-neutral exam demonstrates that students and employees can use technology to gather information, apply knowledge, and think critically in a problem-solving context.

Distribution:
Certiport® iQsystem

Duration:
60-minute time limit

Questions:
14 tasks based on real-world scenarios

Sample Scenarios:

- Examine trends in data, then generate visual display images to communicate those trends
- Find specific merchandise and supplies using best practices for Internet searching
- Compile and compare multiple datasets using a spreadsheet
- Prepare a persuasive slide presentation with adjusted bullets and font treatments
- Organize and transfer relevant files when migrating from one computer to another
- Demonstrate fluency in Internet "rules of the road" (also known as *netiquette*)

ANSWERS TO APPLY YOUR KNOWLEDGE

1 Low-Voltage Components

Situation: You are the IT manager at Low-Voltage Components, a medium-sized firm that makes specialized circuit boards. Low-Voltage's largest customer, TX Industries, recently installed a computerized purchasing system. If Low-Voltage connects to the TX system, TX will be able to submit purchase orders electronically. Although Low-Voltage has a computerized accounting system, that system is not capable of handling EDI.

1. Should Low-Voltage develop a system to connect with TX Industries' purchasing system? Why or why not?
   By developing a new order entry system, Low-Voltage will improve efficiency and strengthen its bond with TX Industries. The computer-to-computer link also will enable Low-Voltage to provide better IT support for production planning, and IT industries should be able to reduce manufacturing costs.

2. What terms or concepts describe the proposed computer-to-computer relationship between Low-Voltage and TX Industries?
   The computer-to-computer relation between Low-Voltage and TX Industries is called electronic data interchange (EDI).

3. Is Low-Voltage's proposed new system a transaction processing system? Why or why not?
   The proposed order entry system will perform online transaction processing. Transaction processing (TP) systems process data generated by day-to-day business operations.

4. Before Low-Voltage makes a final decision, should the company consider an ERP system? Why or why not?
   Answers will vary. An ERP strategy depends on the size of the firm and how it integrates its operations and financial data, among other factors.

2 Systems Analyst Salaries

Situation: As part of your job search, you decide to find out more about salaries and qualifications for systems analysts in the area where you would like to work. To increase your knowledge, search the Internet to perform the following research:

1. Find information about a career as a systems analyst.
   Many sources for IT career information exist on the Web. Online publications such as InfoWorld *provide various articles, resources, and links. If students have trouble getting started, you can suggest* http://www.infoworld.com/t/careers *as a place to begin.*

2. Using the Internet, determine whether the Federal Bureau of Labor Statistics lists salary information for systems analysts. If so, summarize the information you find.
   The Bureau of Labor Statistics maintains salary surveys for a wide range of jobs. For example, systems analysts are included in job code 151051, and computer support staff are included in job code 151041. To review the results of BLS salary surveys, you can visit http://data.bls.gov/oes/search.jsp.

3. Find at least two online ads for systems analysts and list the employers, the qualifications, and the salaries, if mentioned.
   The Internet offers numerous sites for job seekers, and students should have no problem locating examples. A good starting point to suggest is http://www.itcareers.com/.

4. Find at least one ad for an IT position that specifically mentions e-commerce.
   The e-commerce boom has sharply increased demand for IT professionals with e-commerce experience and skills. Students should have no trouble finding examples on the Web.

3 MultiTech Interview

Situation: You have an interview for an IT position with MultiTech, a large telecommunications company, and you want to learn more about the firm and its organizational structure. To prepare for the interview, you decide to review your knowledge about corporations, including the following questions:

1. What are the four organizational levels in a typical company?
   In the typical organizational model, operational personnel report to lower-level and middle-level managers, who in turn report to top managers. The top managers report to the board of directors that is elected by the company's shareholders.

2. How can you classify companies based on their mix of products and services?
   Traditionally, companies were identified as production-oriented or service-oriented. A new category, Internet-dependent companies, includes companies that depend on the Internet as a primary business channel. Production-oriented companies primarily manufacture and sell goods. Service-oriented companies primarily offer information or services, or sell goods produced by others. Some companies offer a mix of products, services, information, and technical resources to customers. Internet-dependent companies, also called dot-com firms, base their primary business on a commercial (.com) Web site, rather than using traditional business channels.

3. What is empowerment?
   In many companies, operational employees need information to handle tasks and make decisions that previously were assigned to supervisors. This trend, called empowerment, gives employees more responsibility and accountability. Many companies find that empowerment leads to better employee motivation and increased customer satisfaction.

4. What types of information systems might a large company use?
   Large companies require many different types of information systems. For example, all employees, including top managers, use office systems. Similarly, operational personnel often require information support from what formerly were called management information systems. Now, it is more useful to identify a system by its functions and features, rather than by its users. Today's systems include enterprise computing systems, transaction processing systems, business support systems, knowledge management systems, and user productivity systems.

4 Rainbow's End Interview

Situation: Your MultiTech interview seemed to go well, but you did not get the job. During the meeting, the interviewer mentioned that MultiTech uses structured analysis and relies heavily on modeling, prototyping, and CASE tools. Thinking back, you realize that you did not fully understand those terms. As you prepare for an interview with Rainbow's End, a large retail chain, you decide to review some IT terms and concepts. You want to be ready for the following questions:

1. What are the main differences between structured analysis, O-O, and agile development methods?
   While structured analysis regards processes and data as separate components, object-oriented (O-O) analysis combines data and the processes that act on the data into things called objects. O-O analysis uses object models to represent data, behavior, and by what means objects affect other objects. By describing the objects (data) and methods (processes) needed to support a business operation, a system developer can design reusable components for faster system implementation and decreased development cost. Many analysts believe that, compared with structured analysis, O-O methods are more flexible, efficient, and realistic in today's dynamic business environment.

   As noted in the suggested answer to Review Question 9, Agile development methods have attracted a wide following and an entire community of users. Agile methods typically use a spiral model, which represents a series of iterations, or revisions, which are based on user feedback. Proponents of the spiral model believe that this approach reduces risks and speeds up software development. Analysts should recognize that agile methods have advantages and disadvantages.

   By their nature, agile methods allow developers to be much more flexible and responsive, but can be riskier than more traditional methods. For example, without a detailed set of system requirements, certain features requested by some users might not be consistent with the company's larger game plan. Other potential disadvantages of adaptive methods can include weak documentation, blurred lines of accountability, and too little emphasis on the larger business picture. Also, unless properly implemented, a long series of iterations might actually add to project cost and development time.

2. What is a CASE tool and what does it do?
   Computer-aided systems engineering (CASE) is a technique that uses powerful programs, called CASE tools, to help systems analysts develop and maintain information systems. CASE tools provide an overall framework for systems development and support a wide

variety of design methodologies, including structured analysis and object-oriented analysis. CASE tools can boost IT productivity and improve the quality of the finished product. For example, developers use CASE tools to maintain design integrity, manage a complex project, and generate a wide variety of business, process, and data models. Many CASE tools can be used to build prototypes and generate code modules that speed up implementation.

3. What is business process modeling and how is it done?
   Business process modeling (BPM) graphically represents a concept or function that systems developers can analyze, test, and modify. A systems analyst can describe and simplify an information system by using a set of business, data, object, network, and process models. In addition to BPM, analysts use other techniques, such as data flow diagrams, entity-relationship diagrams, use cases, and unified modeling language.

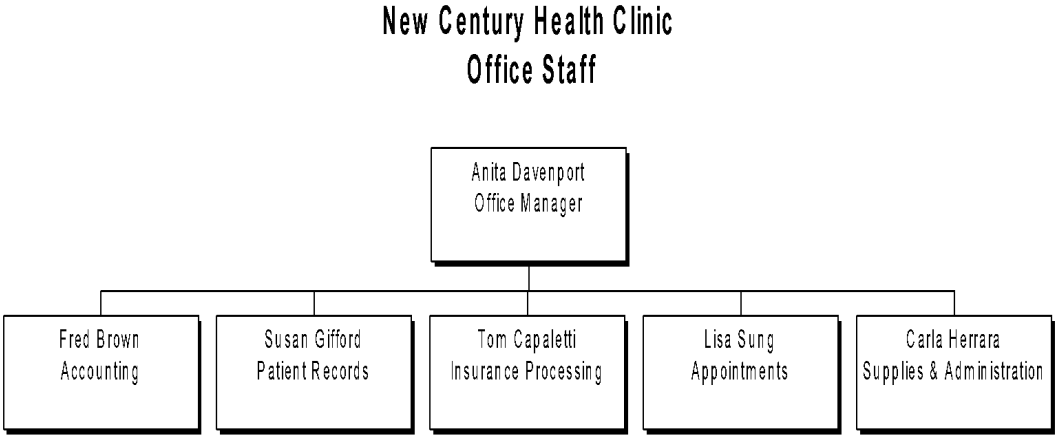
4. What is prototyping and why is it important?
   Prototyping involves the creation of an early working version of the information system or its components. Just as an aircraft manufacturer tests a new design in a wind tunnel, systems analysts construct and review prototypes for larger systems. Prototyping tests system concepts and provides an opportunity to examine input, output, and user interfaces before final decisions are made.

   A prototype can serve as an initial model that is used as a benchmark to evaluate the completed system, or the prototype itself can develop into the final version of the system. Either way, prototyping speeds up the development process significantly.

ANSWERS TO CASE STUDIES

New Century Health Clinic

1. Create an organization chart of the office staff using Microsoft Word or a similar program, or you can draw it by hand. In Word 2010 and Word 2007, click the Insert tab on the Ribbon, then Smart Art, then Hierarchy.
   A sample organization chart is shown in the following figure. The job titles are not important, but it is necessary to identify the functions. Your students will want to refer to this chart in later chapters. Systems analysts must draw critical facts from a written summary, and creating an organization chart requires students to practice their analytical skills.



2. Identify at least three business processes that New Century performs, and explain who is responsible for the specific tasks.

   Business processes and the person responsible are:

Business Process	Person Responsible
Prepare office payroll	**Fred Brown**
Handle tax reporting	**Fred Brown**
Handle profit distribution	**Fred Brown**
Maintain patient records	**Susan Gifford**
Handle insurance reporting	**Tom Capaletti**
Handle accounting	**Tom Capaletti**
Manage appointment book	**Lisa Sung**
Make patient reminder calls	**Lisa Sung**
Prepare daily appointment list	**Lisa Sung**
Order office and clinic supplies	**Carla Herrera**
Organize office and clinic supplies	**Carla Herrera**

3. Explain how New Century might use a transaction processing system, a business support system, and a user productivity system. For each type of system, provide a specific example, and explain how the system would benefit the clinic.
   The clinic could utilize a transaction processing system to track each charge, payment, and insurance claim. This system would reduce administrative costs, speed up insurance reimbursement, and provide controls and reports. A business support system could be used to analyze provider workloads, turnaround time for claims and payments, and forecast future staffing needs. A user productivity system would increase office efficiency and improve patient satisfaction.

4. During the systems development process, should New Century consider any of the following: B2B, vertical and horizontal system packages, or Internet-based solutions? Explain your answers.
New Century must develop computerized information systems for all critical operations as soon as possible. The first step is to identify New Century's current procedures, which are typical of many small- and medium-size companies. These include managing customer (patient) records, accounts receivable (patient and insurance billing), accounts payable; scheduling production or services; and handling inventory, payroll, and human resources.
Because New Century deals with many insurance companies, there probably are opportunities to exchange claim information and payment status using EDI. Also, New Century can consider vertical and horizontal packages that would support the clinic's information management needs. The following table shows some possible systems that might be considered, along with potential benefits.

System	***Type of System***	***Use***	***Benefit***
Accounts receivable	*Vertical or horizontal*	*Track money owed the clinic for goods sold/services rendered; send monthly bills/statements to patients and insurance companies; automatically generate reminder statements*	*Identify overdue accounts and credit risks; provide faster, more accurate billing; improve customer service; increase cash flow by reducing the time between goods sold/services rendered and payment*
Accounts payable	*Vertical or horizontal*	*Send checks to suppliers; generate a purchases journal*	*Increase clinic's control over purchasing; minimize manual data entry; improve cash flow; increase profitability; provide more effective management of current liabilities*
Inventory	*Vertical or horizontal*	*Track inventories of office and clinic supplies*	*Obtain real-time inventory data; better inventory management*
Payroll	*Horizontal*	*Generate employee checks and federal and state tax forms; manage profit distribution to partners*	*Monitor and control pay to individual employees; determine cost of completing jobs; allow for electronic funds transfer (direct deposit) into employee bank accounts*

Voice mail	*Horizontal*	*Internal and external messaging*	*Allow customers to contact office after hours; faster, more effective internal messaging*
Fax	*Horizontal*	*Transmit forms to insurance companies; order office and clinic supplies*	*Faster transmission and ordering speeds insurance claim processing/order fulfillment*
Word processing	*Horizontal*	*Create letters, memos, faxes, agendas, newsletters; do business mailings*	*More professional-looking documents via formatting features and templates; easier editing*
Scheduling; automated calendars	*Vertical or horizontal*	*Managing and tracking schedules; printing daily appointment lists*	*Minimize scheduling conflicts; provide efficient service, while maximizing appointment times*
Database management	*Horizontal*	*Managing and providing access to customer records (patients, employers, and insurance firms)*	*Increase access to records; provide better organization in a single repository; allow for querying and filtering of records; reduce paper flow*
Spreadsheets	*Horizontal*	*Plan and/or track costs, budgets, profits*	*Increase clinic's control over costs, budgets, profits; improve cash flow; increase profitability; provide more effective management of assets and liabilities*
Intranet	*Horizontal*	*Share data across the entire clinic (e.g., forms, policies, procedures; patient data; announcements)*	*Increase access to corporate and customer (patient) information; reduce paper flow*
Web-based	*Internet*	*Order office and clinic supplies online; place prescription orders for patients; send/check status of deliveries; create Web page to market the clinic, inform prospective patients, and answer frequently asked questions*	*Better customer service; reduce paper; less expensive ordering; real-time tracking data for orders*

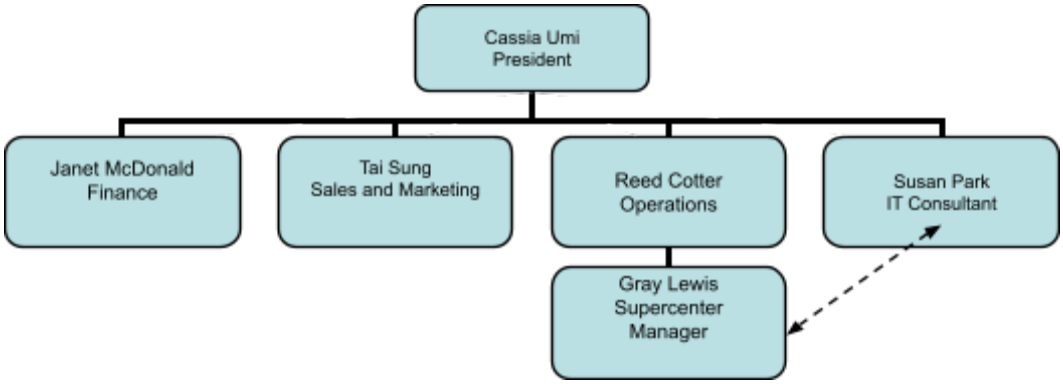
E-mail	*Internet*	*Send reminder e-mails to patients; communicate with employers, insurance firms*	*More efficient, less expensive than long-distance calls*
EDI	*Internet*	*Track claim data and reimbursement status*	*Reduce administrative costs, speed up insurance reimbursement, and provide controls and reports*

Personal Trainer, Inc.

1. Develop a business profile for Personal Trainer, based on the facts provided. List at least three of Personal Trainer's business processes.
   According to Gray Lewis, who will manage the new facility at the new "supercenter," Personal Trainer will offer exercise equipment, a health food store, a pool, a snack bar, sporting goods, child care, child-fitness programs, a teen center, and a computer cafe. Each of these activities represents a major business function, which in turn includes various business processes.
   A few examples of business processes might include the following:
   - *Add new member*
   - *Create fitness class*
   - *Schedule fitness instructor*
   - *Register member in class*
   - *Sell health food products*
   - *Sell sporting goods*
   - *Design training program for member*
   - *Enter member charges*
   - *Prepare monthly bills*
   - *Apply member payments*

2. Create an organization chart for Personal Trainer, Inc., using Microsoft Word or a similar program, or you can draw it by hand. In Word 2010 and Word 2007, click the Insert tab on the Ribbon, then Smart Art, then Hierarchy.

   A sample chart follows:



3. Review the conversation between Susan and Gray. In your opinion, is Gray totally supportive of the new system? Why or why not? Do you agree with the way that Susan responds to Gray's comments? Why or why not?
   Based on his comments, Gray seems a bit skeptical. Although he knows that Cassia wants more information support for the new operation, he states that he is not so sure. Sometimes managers like Gray are reluctant to embrace major changes in IT management. A further clue is his statement about not wanting to "reinvent the wheel."
   In response to his comments, Susan offers a specific approach, which Gray seems to accept. Students should recognize that an IT professional must work effectively with various levels within the organization in order to gain trust, confidence and management support. Also, Susan must be courteous and discreet — she is an outside consultant, not Gray's boss. But Gray knows that she was brought in by Cassia, who is Gray's boss. The relationship between managers and the IT team is critical to a project's success, and it would appear that Susan is trying hard to get off on the right foot in her meeting with Gray.

4. Should Personal Trainer consider any of the following systems: enterprise computing, transaction processing, business support, knowledge management, or user productivity? Why or why not? What opportunities might Personal Trainer have for Web-based B2C transactions in the future? What about B2B?
   With a dozen or more fitness centers, Personal Trainer might be ready for a company-wide approach to managing its IT resources. Enterprise computing and ERP systems allow a company to integrate its primary functions (such as production, sales, services, inventory control, and accounting) to improve efficiency, reduce costs, and help managers make key decisions. Enterprise computing also improves data security and reliability by imposing a company-wide framework for data access and storage.

Personal Trainer will certainly use transaction processing in its day-to-day operations, and the firm could benefit significantly from using a business support system to help mangers make key decisions. For example, based on data generated by the TP system, a business support system might help Gray to identify fast-moving services and products, and use that information to plan future staffing and marketing decisions.

Personal Trainer might not be large enough to benefit from a knowledge management system, but the company certainly can use user productivity systems to empower its employees, reduce expenses, and serve its customers better.

From the meeting discussion, it is clear that Cassia wants members to have online access to their fitness programs. Internet access would be an example of B2C commerce, which would give Personal Trainer the ability to sign up new members, provide online class registration, and explore new markets for its services. Personal Trainer also could examine opportunities for B2B commerce in its dealings with the suppliers of products or services that it purchases. By opening up B2B links with its suppliers, Personal Trainer might achieve better inventory management and reduce its internal purchasing and communications costs.

Original Kayak Adventures

1. Develop a business profile for Original Kayak Adventures. The profile should include information about OKA's business activities, organization, resources, customers, and potential opportunity to engage in e-commerce.
In the textbook, students learn that a business profile defines a company's overall functions, processes, organization, products, services, customers, suppliers, competitors, constraints, and future direction. The first step is to create an outline using the facts presented in the background statement. A sample answer follows:

Functions

OKA has three main business functions: kayak rentals, instruction, and guided tours.

Processes

To support its business functions, OKA performs various business processes. Based on the background statement, a partial list might include entering reservations, displaying kayak availability, creating schedules, billing, updating the OKA Web site, updating kayak fleet data, and maintaining an inventory of accessory and safety equipment.

Organization

The organization chart includes Edie Caputo, John Caputo, and Janet Jacobs, a local college student. Edie handles most of the computer work at this time.

Products

At this time, OKA does not sell products. Edie Caputo would like to offer a selection of books and videos about kayaking and eco-tourism.

Services

OKA offers kayak rentals, instruction, and guided tours. If the business expands, OKA

might consider other services, such as kayak repair and maintenance, kayak sales and brokerage, expansion of the OKA Web site to share more information about kayaking, and Elderhostel tours.

Customers

OKA's business is split evenly between customers with reservations and walk-in customers. These two groups may have different profiles and might respond differently to marketing and pricing policies. Also, OKA offers three different services (rentals, instruction, and guided tours) that appeal to different customers. With better information, OKA will better understand the needs of its customers and gauge the potential of promotions, special discounts, and so on.

Suppliers

The background information does not mention OKA's suppliers. Students can assume that OKA deals with wholesale sources for kayaks and marine equipment.

Competitors

No other Kayak rental firms operate within 20 miles of OKA's location.

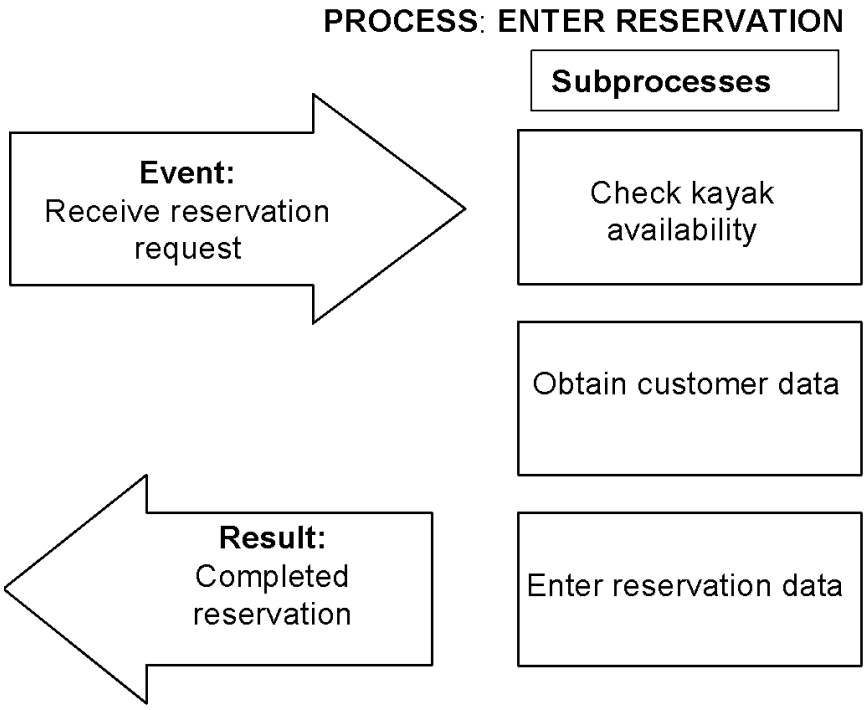
Constraints

John and Edie have been too busy to update the system, and it seems clear that outside assistance will be required. Nothing is known about budget or time constraints, and these would have to be discussed in an initial meeting.

Future Direction

OKA appears to be doing well after two years in business. The Caputos would like to see the business grow, and they realize that they need more information in order to plan for the future. A business support system with decision support features would enable the Caputos to examine potential business opportunities by creating business models and using what-if analysis.

2. List OKA's main functions and business processes. Draw a model of an OKA business process, including possible events, processes, and results.
A business model graphically represents business functions that consist of business processes. Students can use Figure 1-11 on page 10 as a sample, but there are many ways to develop a graphical model, including CASE tools, drawing programs, and freehand. The main objective is to show the events, subprocesses, and results. Answers to this assignment will vary depending on the process selected. An example follows:



3. What types of information systems does OKA use? Do these systems support its current and future business objectives? Why or why not?
The notebook entries represent a manual type of transaction processing system, and the transaction data is managed by the Access database. Together with the visible display of kayak availability, these systems provide some business support, but they lack decision support and what-if capability.
Edie Caputo also uses an inexpensive accounting system, which is a user productivity tool. The Caputos would like more information about scheduling, rental patterns, customer profiles, advertising effectiveness, and future business opportunities. Additionally, Edie is considering new business functions, such as adding books and videos. Clearly, the OKA's information systems do not support the firm's current business activities and will be unable to support future objectives.

4. From an object-oriented viewpoint, OKA treats reservations as a class. Based on the background information provided, what are some properties of reservation objects?
Students should understand that an object is a member of a class, which is a collection of similar objects, and that objects have characteristics called properties. Because an object can represent a person, thing, or event, a reservation can be represented as an object. The properties of a reservation object might include a reservation number (to identify the reservation uniquely), a reservation date, a customer number or name that will be associated with this reservation, a type of activity (rental, instruction, or guided tour), and a kayak number (to assure that a specific kayak is "booked").

ANSWERS TO CHAPTER CAPSTONE CASE: SoftWear, Limited (SWL)

1. Write an employment advertisement for a new systems analyst position at SWL. Perform Internet research to locate examples of advertisements for systems analysts, and consider SWL's business profile when you write the advertisement.
   Answers will vary depending on what job posting examples the student located on the Internet. Based on the facts in the case study, SWL is a medium-sized company that uses a combination of centralized mainframe processing and networked PCs. SWL is growing rapidly and will expand its IT operations to support business needs. In considering entry-level systems analysts, SWL will be looking for people with strong communication, interpersonal, and analytical skills.
   It is probably too early to identify specific technical skills, which will depend on the systems solutions that are selected. Programming experience certainly is desirable, but might not be essential if the new systems analyst has some experience in working with information systems. The ability to understand business information needs and work effectively with users will be important and should be mentioned. Other specific educational or experience requirements will vary.

2. Should SWL consider any of the following systems: ERP, business support, or knowledge management? Why or why not?
   ERP systems: *SWL probably would be a good candidate for an ERP strategy. The main objective of enterprise computing is to integrate a company's primary functions (such as production, sales, services, inventory control, and accounting) to improve efficiency, reduce costs, and help managers make key decisions. Enterprise computing also improves data security and reliability by imposing a company-wide framework for data access and storage. If SWL expands in the future, an ERP environment could provide a ready-made framework for IT systems. ERP does have some risk, however. Some companies have been disappointed in the time, money, and commitment necessary to implement ERP successfully.*

   Business support systems: *SWL certainly could take advantage of business support systems that provide job-related information support to users at all levels of a company. These systems can analyze transactional data, generate information needed to manage and control business processes, and provide information that leads to better decision making. This would be very important in SWL's sales, marketing, and manufacturing operations. For example, when SWL sells merchandise to a customer, a transaction processing system records the sale, updates the customer's balance, and makes a deduction from inventory. A business support system linked to the TP system could highlight slow- or fast-moving items, customers with past due balances, and inventory levels that need adjustment. This information would be extremely valuable to SWL users and managers.*

   Knowledge management systems: *Compared to ERP and business support systems, it is not as clear whether SWL could use a knowledge management system. These systems simulate human reasoning by combining a knowledge base and inference rules that determine how the knowledge is applied. Many firms use knowledge management systems*

to support consumers and find answers to frequently asked questions. If SWL expands into a Web-based business, a knowledge management system and related knowledge base might be a helpful tool, but the company should carefully examine the costs and benefits to determine whether such a system would be feasible.

3. What opportunities might SWL have for Web-based B2B transactions in the future?
   SWL certainly should use B2B strategies as a key to its relationship with its suppliers and wholesale customer. B2B enables a company to access the global marketplace, obtain instant information about market prices and availability, increase procurement efficiencies, reduce costs, and mitigate risks.
   SWL could use EDI to establish links with long-term partners, and also access B2B sites where buyers, sellers, distributors, and manufacturers transact business, exchange information, and collaborate. As part of its automated B2B strategy, SWL should consider using RFID technology, which uses high-frequency radio waves to track physical objects and facilitate inventory management and control.

4. Should SWL consider ways to increase a sense of empowerment among its employees? Why or why not? Could user productivity software play a role in that effort? How?
   SWL certainly should increase the sense of empowerment among its employees. Empowerment gives employees more responsibility and accountability. Human resources studies show that when employees feel empowered, they are more productive, more effective, and more motivated.
   Empowerment is directly linked to user productivity. If a user is more productive, he or she feels empowered, and tries to be even more productive. Many companies provide employees at all levels with technology that improves productivity, such as groupware, e-mail, voice mail, fax, video conferencing, word processing, automated calendars, database management, spreadsheets, desktop publishing, presentation graphics, company intranets, and high-speed Internet access. SWL also can empower operational employees who use TP systems by giving them better technology and tools that help reduce repetitive non-essential functions and boost productivity.

Manage the SWL Project
You have been asked to manage SWL's new information system project. One of your most important activities will be to identify project tasks and determine when they will be performed. Before you begin, you should review the SWL case in this chapter. Then list and analyze the tasks, as follows:

LIST THE TASKS Start by listing and numbering at least ten tasks that the SWL team needs to perform to fulfill the objectives of this chapter. Your list can include SWL Team Tasks and any other tasks that are described in this chapter. For example, Task 3 might be to Draw an SWL organization chart, and Task 6 might be to Identify the various levels of SWL management.
An answer might include tasks listed in the Chapter Introduction Case, and other examples of tasks found in the SWL case or elsewhere in the chapter. A sample answer follows:

Task List
- *Learn about business information systems and business models*
- *Describe various types of business information systems and their characteristics*
- *Find out more about different types of companies and the information systems that users need*
- *List the SDLC phases, and describe alternative systems development methods*
- *Explain the role of the systems analyst, and describe the tools and techniques that analysts use*
- *Review SWL's overall business operation*
- *Review the SWL organization chart*
- *Review the IT department organization chart*
- *Review the information systems currently in use at SWL*
- *Analyze SWL's opportunity to use B2B systems*

ANALYZE THE TASKS Now study the tasks to determine the order in which they should be performed. First identify all concurrent tasks, which are not dependent on other tasks. In the example shown in Figure 1-40, Tasks 1, 2, 3, 4, and 5 are concurrent tasks, and could begin at the same time if resources were available.

Other tasks are called dependent tasks, because they cannot be performed until one or more earlier tasks have been completed. For each dependent task, you must identify specific tasks that need to be completed before this task can begin. For example, you would want an organization chart to help you identify the management levels, so Task 6 cannot begin until Task 3 is completed, as Figure 1-40 shows.

Answers will vary. A sample list of concurrent and dependent tasks follows:

Concurrent Tasks	***Dependent Tasks***
1. Learn about business information systems and business models	*6. Review SWL's overall business operation*
2. Describe various types of business information systems and their characteristics	*7. Review the SWL organization chart*

3. Find out more about different types of companies and the information systems that users need	*8. Review the IT department organization chart*
4. List the SDLC phases, and describe alternative systems development methods	*9. Review the information systems currently in use at SWL*
5. Explain the role of the systems analyst, and describe the tools and techniques that analysts use	*10. Analyze SWL's opportunity to use B2B systems*

For each dependent task, a sample list of predecessor tasks follows:

Dependent Tasks	***Predecessor Tasks***
6. Review SWL's overall business operation	1,2,3,4,5
7. Review the SWL organization chart	6
8. Review the IT department organization chart	7
9. Review the information systems currently in use at SWL	6,7
10. Analyze SWL's opportunity to use B2B systems	8,9

Chapter 3 describes project management tools, techniques, and software. To learn more, you can visit the Features section on your Student Study Tool CD-ROM, or visit the Management Information Systems CourseMate Web site at **www.cengagebrain.com** and locate the project management resources library for this book. On the Web, Microsoft offers demo versions, training, and tips for using Project 2010. You also can visit the **OpenWorkbench.org** site to learn more about this free, open-source software.
The Features section on the Student Study Tool CD-ROM includes Web links for Microsoft Project and Open Workbench, and a user guide for Open Workbench. Instructors can demonstrate Microsoft Project if it is available, and show students how to download and install Open Workbench. Instructors also can create additional assignments that use project management software skills in a systems development environment.

ANSWERS TO READY FOR A CHALLENGE

Instructor Note: *Remind students that to view sample answers to Practice Tasks, they can visit the Management Information Systems CourseMate Web site at www.cengagebrain.com, navigate to the resources for this chapter, and locate Ready for a Challenge.*

Ready for a Challenge?

You are a summer intern in the IT department at Game Technology. You report to the IT director, Mike McGee. Mike assigned you to work with two systems analysts: Lauren Jacksina and Cathy Ross. Lauren and Cathy both report to Felesia Stukes, manager — IT development, who reports to Mike. Joe Turner, manager — IT operations also reports to Mike. Dawn Rountree, database administrator, and Greg Wade, network administrator, report to Joe.

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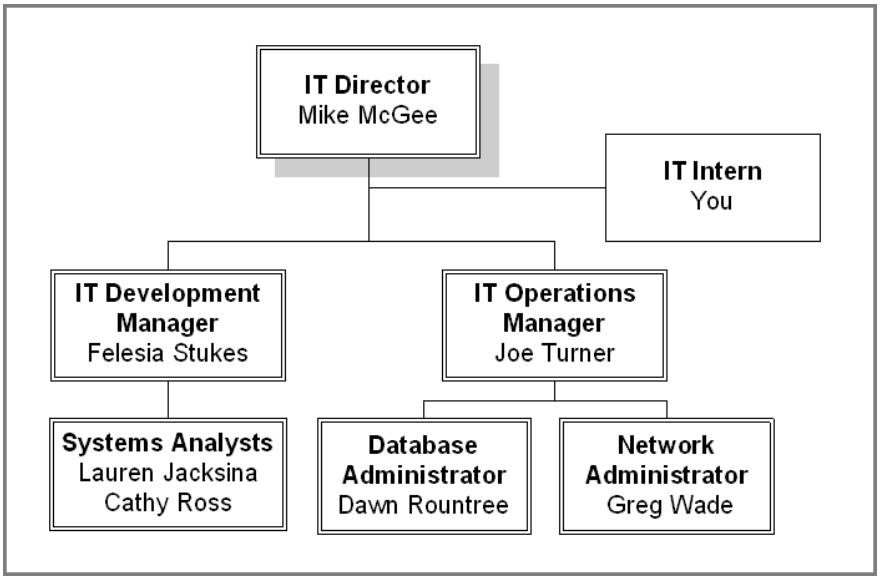
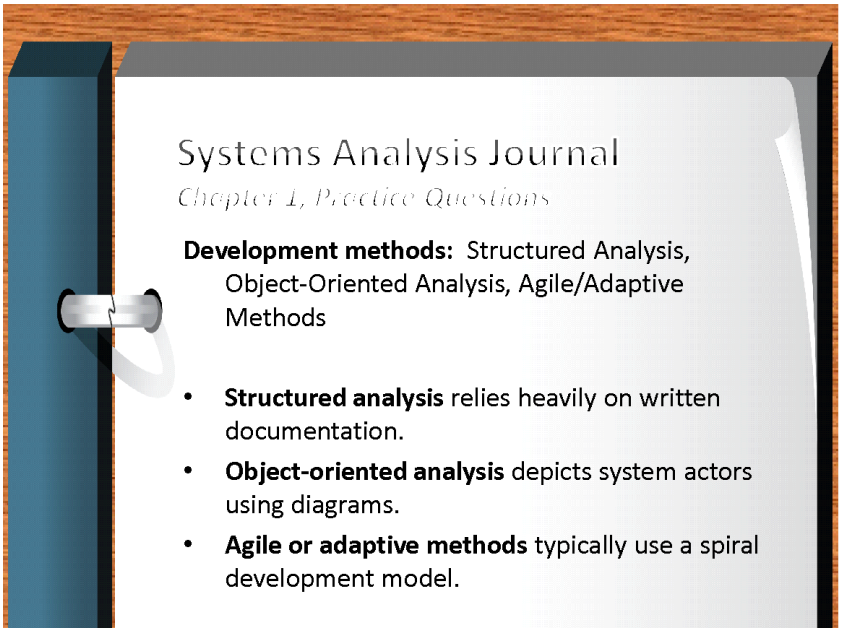


B. Write a journal entry that answers the questions about development methods.

After you complete the Practice Tasks, to check your work and view sample answers, visit the Management Information Systems CourseMate Web site at www.cengagebrain.com, navigate to the resources for this chapter, and locate Ready for a Challenge?.



The Challenge

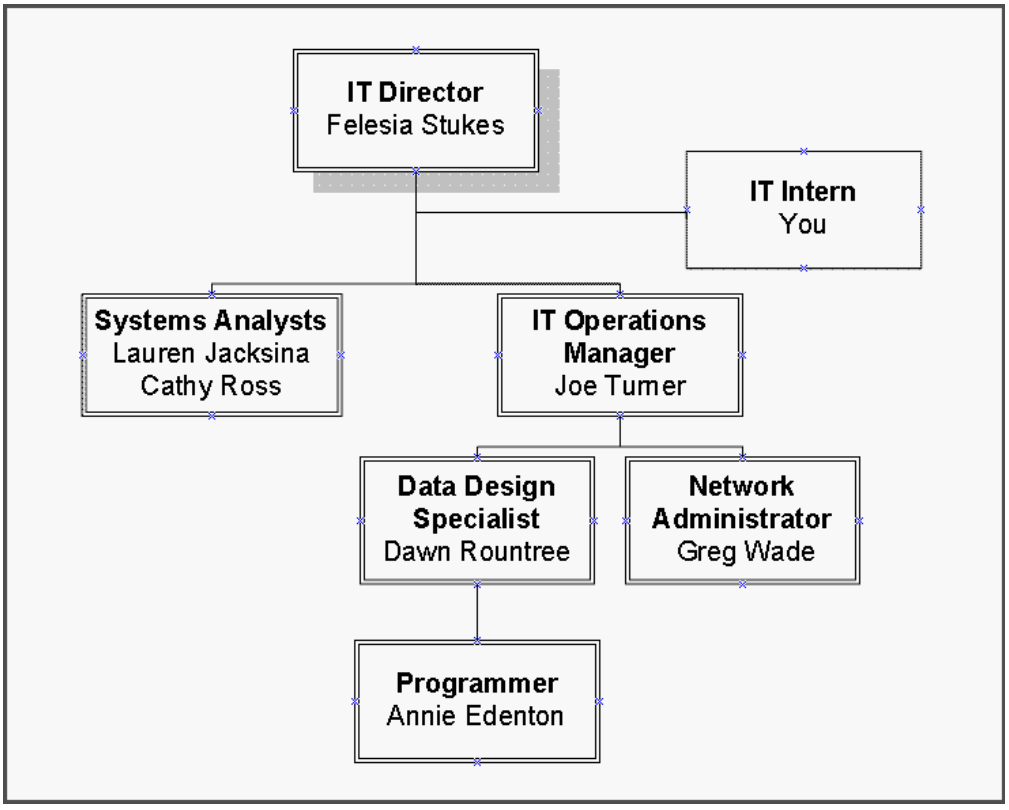
Three weeks ago, Mike McGee left to join a larger company, and management decided to reorganize the IT department. Felesia Stukes was promoted to IT director, and to save money, her old job was eliminated. You, Lauren, Cathy, and Joe will report to her. The rest of the team is unchanged, except that a new programmer, Annie Edenton, has been hired, reporting to Dawn Rountree. Dawn's title has been changed to data design specialist.

To update your journal, you need to add three more pieces of information:

- Which development method uses a five-phase model?
- Which development method stresses intense team-based efforts?
- Which development method uses a waterfall model?

Challenge Tasks

A. Draw a new organization chart showing the changes, with full names and titles.



B. Write a journal entry that answers the new questions about development methods.