

# Systems Analysis and Design Tenth Edition

## Phase 1: Systems Planning

### A Guide to the Instructor's Manual:

We designed the Instructor's Manual to supplement and enhance your teaching experience with classroom activities and a cohesive chapter summary.

This document is organized chronologically, using the same main heading in **red** that you see in the textbook. Under each heading you will find (in order): Lecture Notes that summarize the section, Figures and Boxes found in the section, if any, Teaching Tips, and Classroom Activities. Pay special attention to teaching tips, and activities geared towards quizzing your students, and enhancing their critical thinking skills.

In addition to the Instructor's Manual, the Instructor's Resources also contain PowerPoint Presentations, Solutions to Exercises, Figures, Test Banks, and other materials to aid you as an instructor.

### For Your Students:

The Tenth Edition includes Video Learning Sessions, an end-of-chapter exercise called Critical Thinking Challenge, and online CourseCasts that can keep your students posted on technology developments and trends.

- **Video Learning Sessions.** Eighteen multimedia Video Learning Sessions describe key systems analysis skills and concepts and provide students with a self-paced, interactive learning tool that reinforces the text. The sessions provide step-by-step explanations that are easy to follow and understand. Each session includes practice tasks, sample answers, and challenge tasks to keep students interested and engaged as they learn. A Your Turn feature in every Video Learning Session challenges students to apply their skills and check their work against sample answers. This hands-on practice can help students better handle actual assignments and tasks. Instructors may use the Video Learning Sessions as classroom presentations, distance-education support, student review tools, and exam preparation.
- **Critical Thinking Challenge.** This feature stresses critical thinking skills, including perception, organization, analysis, problem-solving, and decision-making. Students complete Practice Tasks, view sample answers, and then apply their skills to the Challenge Tasks.
- **CourseCasts.** Our online feature, CourseCasts, is a library of weekly podcasts designed to keep your students up-to-date with the latest in technology news. Direct your students to <http://coursecasts.course.com>, where they can download the most recent CourseCast to their mp3 player. Ken Baldauf, host of CourseCasts, is a faculty member of the Florida State University Computer Science Department where he is responsible for teaching technology classes to thousands of FSU students each year. Ken is an expert in emerging technology, and he highlights the most pertinent news and information. CourseCasts enable your students to spend their time enjoying technology, rather than trying to figure it out. We suggest that you open or close your lecture with a discussion based on the latest CourseCast.

## **1: Phase 1: Systems Planning**

### LECTURE NOTES

- Use the Gantt chart as a starting point for a discussion about systems development. Mention that each phase has one or more main topics, and the chart will be updated as we move through the textbook.
- Explain that Systems planning is the first of five phases in the systems development life cycle. In this phase, you learn about the relationship between systems projects and corporate strategies.
- This phase explains how systems projects get started, how to evaluate a project proposal to determine its feasibility, and how to use project management skills.
- Mention that the deliverable for this phase is the preliminary investigation report.
- Point out the Dilbert cartoon, and mention that it is always a good idea to know whether a project fits the company's overall strategy.

FIGURES: Gantt chart on Page 1.

### CLASSROOM ACTIVITIES

1. Class Discussion: Ask if they ever had an experience like the one in the Dilbert cartoon.
2. Group Activity: Ask students if they have ever used Gantt charts, and to explain how they were used. Also ask for examples of other task sets that might lend themselves to Gantt charts (planning a vacation, buying and installing a new kitchen faucet, etc.)

### VIDEO LEARNING SESSIONS:

This phase includes Video Learning Sessions to help your students understand and apply key concepts and skills. The sessions are highlighted as they appear in the textbook.

# Systems Analysis and Design Tenth Edition

## Chapter 1: Introduction to Systems Analysis and Design

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### **2: Objectives**

Students will have mastered the material in Chapter One when they can:

- Describe the impact of information technology
- Define systems analysis and design and the role of a systems analyst
- Define an information system and describe its components
- Explain how to use business profiles and models
- Explain Internet business strategies and relationships, including B2C and B2B
- Identify various types of information systems and explain who uses them
- Distinguish among structured analysis, object-oriented analysis, and agile methods
- Explain the waterfall model, and how it has evolved
- Discuss the role of the information technology department and the systems analysts who work there

## **2: Introduction**

### LECTURE NOTES

- Use Figure 1-1 as a starting point for a discussion about how information technology affects business
- List the ways in which companies use information
- Note the importance of information technology in a global economy
- Present the Chapter Introduction Case: Mountain View College Bookstore on page 3, which sets up the material developed in the chapter
- Review the background, participants, project status, and discussion topics for the case
- Show Figure 1-2

FIGURES: 1-1, 1-2

### BOXES

1. Video Learning Sessions: Introduce the Video Learning Session and encourage students to visit the Web site mentioned for a welcome and introduction.

### CLASSROOM ACTIVITIES

1. Class Discussion: Ask students for specific examples of how computers can be used for each way in which companies use information (e.g., computers can increase productivity by monitoring factors such as production costs, labor requirements, and so on).
2. Group Activity: Consider assigning students to each role in the Chapter Introduction Case and having them read the case dialogue.

## **4: What Is Information Technology**

### LECTURE NOTES

- Define information technology (IT)
- Explain how business depends on information technology
- Use Figure 1-3 as a starting point for a conversation about the evolution of information technology
- Use Figure 1-4 to illustrate job opportunities available in IT
- Provide an overview of systems analysis and design
- Define an information system
- Discuss what systems analysts do

FIGURES: 1-3, 1-4

### TEACHING TIPS

Explain how information systems are used. In business, clerks, sales representatives, accountants, supervisors, managers, executives, and customers all use information systems, either directly or indirectly. Information systems support daily, short-term, and long-term activities.

Discuss the history of information technology and how IT has evolved. From Herman Hollerith and IBM to tablets and smartphones, generate excitement about the endless possibilities of IT in the 21<sup>st</sup> century.

## CLASSROOM ACTIVITIES

## 1. Quick Quiz:

- 1) Assign Review Question 1 on page 37.

## 2. Critical Thinking: What characteristics would make an individual a strong systems analyst?

**6: Case In Point 1.1: Cloud Nine Financial Advisors**

Cloud Nine provides its clients with a monthly newsletter that offers recommendations about stocks to buy or sell. Doug Layton, Cloud Nine's president, has asked your opinion on whether dot-com stocks might be good investments for the future. He specifically mentioned Google, eBay, Amazon.com, and Yahoo!, but he said you could suggest other companies. Doug wants you to do some Internet research to learn more about these Web-based companies and their future prospects. You can use a search engine, or start by visiting the Web sites of publications such as *Forbes*, *Fortune Magazine*, *Business Week*, or *The Wall Street Journal*, among others.

***Comments:** Encourage students to share the results of their research. Some students understand the stock market, but many others do not. This would be a good opportunity to explain the basics of investing. In recent years, compared to other sectors, IT industry stocks have been significantly more volatile, and the hope of higher rewards is balanced by the prospect of higher risks. Google and Yahoo! are excellent examples of new stock offerings that exceeded all expectations. No one can know which companies will be the winners. The main point of this case is to encourage students to understand more about the business aspects of the IT industry, and to decide whether they want to invest in this area.*

**6: Information System Components**

## LECTURE NOTES

- Define system and mission-critical system using Figure 1-5, and point out that an information system requires data
- Explain how data is different from information, and emphasize that data is processed into information
- Use Figure 1-6 to identify the key components of an information system
- Define hardware, list types of hardware, and define server farm
- Describe Moore's Law, and discuss Figure 1-7
- Define software, and explain how system software is different from application software
- Examples of application software include word processing programs, spreadsheet programs, database programs, video and audio editing programs, and Web browsers
- Describe enterprise applications, and provide examples such as order processing systems, payroll systems, and company communication networks
- Differentiate between a horizontal system and a vertical system
- Define legacy systems
- Redefine data using a typical payroll system as an example
- Use Figure 1-8 to show how an information system such as payroll can store data in related tables
- Describe processes
- Emphasize that an analyst must understand and document processes to build a successful information system
- Define stakeholders and users (end users), and list internal and external users

- Emphasize that the success of a system usually depends on user satisfaction

FIGURES: 1-5, 1-6, 1-7, 1-8

#### TEACHING TIPS

Although they may not know it, students probably are familiar with a number of systems: the digestive system consists of related organs that process food; the highway system consists of related roads used to drive to various locations; the decimal number system consists of symbols and rules used to perform calculations.

Gordon Moore, co-founder of Intel, unveiled what is now known as Moore's Law in an article for *Electronics* magazine. At that time, Moore predicted that the number of transistors and resistors placed on computer chips would double every year, with a proportional increase in computing power and decrease in cost. The forecast proved amazingly accurate for 10 years, when Moore revised the estimate to doubling every one and a half to two years.

Explain that system software is necessary to run any type of application software. It serves as an interface between the user, the application software, and the computer's hardware. Offer examples of system software, which include: Windows, UNIX, Mac OS X, and Linux (operating systems); personal firewalls (security software); and file viewers, file compression utilities, disk scanners, and screen savers (utility programs).

Explain that software packages are prewritten applications available for various functions. In-house applications often are developed when a software package that meets a company's needs is not available. Because they are not prewritten, the advantage of in-house applications is that they can be developed to match a company's requirements exactly. The disadvantage of custom software is that it is more expensive, and usually takes longer to design and implement, than software packages. With in-house applications, debugging and testing costs, and the attendant frustrations, must be borne alone. One guideline for evaluating an organization's need for in-house applications versus software packages is to look for a software package that has an 80 percent or better fit with requirements. If the fit is less than 80 percent, an organization either should consider an in-house application or reevaluate its requirements.

#### CLASSROOM ACTIVITIES

1. Class Discussion: Ask students for examples of mission-critical systems.
2. Class Discussion: Challenge students to give examples of data and information. Encourage them to explain why they classified each example as they did.
3. Class Discussion: Ask students to suggest processes that might be used to perform a simple result, such as selling an item in a grocery store.
4. Critical Thinking: Which is more widely available and less expensive: horizontal or vertical systems? Why?

5. Critical Thinking: Clifford Stoll — lecturer, computer security expert, and author of *Silicon Snake Oil: Second Thoughts on the Information Superhighway* — notes a wide gap between data and information. “The Internet has great gobs of data,” Stoll maintains, “and little, little information.” Why or why not?

## **9: Business in the 21st Century**

### LECTURE NOTES

- Define e-commerce (electronic commerce), or I-commerce (Internet-commerce)
- Differentiate between B2C (business-to-consumer) e-commerce and B2B (business-to-business) e-commerce
- Describe B2C e-commerce, and point out types of companies that participate in B2C e-commerce
- Explain how B2C e-commerce is changing traditional business models
- Note the growth in B2C marketing and the resulting call for systems analysts and programmers
- Describe B2B e-commerce, and point out the advantages of B2B e-commerce
- Point out how businesses use the advantages of the Internet using Figures 1-11 and 1-13
- Describe electronic data interchange (EDI)
- Use Figure 1-9 to illustrate supply chain management (SCM) and define supply chain
- Differentiate between product-oriented companies and service-oriented companies, noting the trend toward companies combining products, services, information, and technical resources
- Use Figure 1-10 as part of a discussion about the diminishing distinctions between product-oriented and service-oriented companies
- Discuss the growth of the digital content market using Figure 1-12

FIGURES: 1-9, 1-10, 1-11, 1-12, 1-13

### TEACHING TIPS

Note that some authorities identify another form of e-commerce called C2C (consumer-to-consumer) in which transactions take place between individuals. Online auctions are a type of C2C.

Mention that B2C e-commerce involves the sale of products or services to the general public. In addition to allowing customers to compare and buy products, some B2C Web sites offer access to product reviews, chat rooms, and other product-related information.

Explain that B2B e-commerce consists of the sale and exchange of products and services between businesses. *Newsweek* magazine has described B2B e-commerce as “the nuts and bolts of American industry.” One of the reasons for the phenomenal growth of B2B (especially when compared to the growth of B2C) is that companies often are more willing than individuals to transact business online; in fact, the online marketplace is more efficient than the traditional ways in which companies do business.

### CLASSROOM ACTIVITIES

1. Class Discussion: Ask students for examples of product-oriented companies and service-oriented companies.
2. Class Discussion: Ask students to describe their B2C experiences. What types of services or products (such as travel, hobbies, electronic products, and so on) did they purchase? How satisfied were they with the transaction? Why?

3. Critical Thinking: Assign Discussion Topic 1 on page 37.

4. Projects to Assign: Assign Project 2 on page 37.

5. Quick Quiz:

- 1) Assign Question 4 on page 37.

### **13: Modeling Business Operations**

#### LECTURE NOTES

- Point out that IT professionals must understand a company's business operations in order to design a successful system
- Note that different businesses have different requirements
- Define business profile, and explain how systems analysts develop a business profile
- Describe business process modeling
- Define business process model (BPM) and business process, and discuss Figure 1-14
- Point out that complex business operations can require linked models
- Describe business process modeling notation (BPMN), and discuss Figure 1-15

FIGURES: 1-14, 1-15

#### BOXES

1. Toolkit Time: Refer students to Part B of the four-part Toolkit that follows Chapter 12 for more information about business process modeling tools.

#### TEACHING TIPS

Explain that a system produces specific results. To design any successful system, it is important to recognize the results desired and the processes needed to produce those results.

Discuss how business process models (BPM) provide visual representations of business processes helping IT professionals understand a company's business operations.

Use Figures 1-14 and 1-15 to illustrate business process models (BPM) and business process modeling notation (BPMN).

#### CLASSROOM ACTIVITIES

1. Class Discussion: Ask students for examples of business processes for registration for classes at their University.

2. Quick Quiz:

- 1) Assign Question 3 on page 37.

### **14: Business Information Systems**

#### LECTURE NOTES

- Compare how systems were categorized in the past with the way they are classified today, and list the new set of system definitions



- Define enterprise computing
- Identify the main objective of enterprise computing
- Define enterprise resource planning (ERP), and note the benefits, and potential disadvantage, of ERP
- Discuss Figure 1-16 and Herman Miller's use of ERP
- Describe transaction processing (TP) systems, and use Figure 1-17 to identify tasks performed by TP systems
- Describe business support systems and management information systems (MIS)
- Describe radio frequency identification (RFID) technology, including a discussion of Figure 1-18
- Point out the decision support capability of business support systems
- Describe what-if scenarios as an alternative
- Describe knowledge management systems
- Characterize the knowledge base and inference rules that make up knowledge management systems
- Discuss Figure 1-19
- List examples of user productivity systems, which systems increase employee efficiency and assist with communications
- Define groupware, and tell how user productivity systems have impacted the office
- Explain why most large companies integrate information systems

FIGURES: 1-16, 1-17, 1-18, 1-19

#### TEACHING TIPS

Enterprise Resource Planning (ERP) systems are used by most organizations today to increase efficiencies and maximize effectiveness of operations. Explain why ERP systems are considered essential to integrate business processes, improve data security, and help managers make key decisions. Mention several of the key vendors of ERP systems and discuss how an understanding of these systems is required in most organizations.

Transaction processing systems were among the first computerized systems that processed business data. Explain why TP systems are mission-critical systems. Note the efficiency of TP systems. Transactions can be processed immediately online (called online transaction processing) or collected and processed later together (called batch processing). Most systems use online transaction processing, but batch processing sometimes is used for certain tasks, like calculating paychecks and printing invoices. Some businesses use a combination of batch and online processing. Department stores might handle checkout transactions with an online point-of-sale system, but batch process data at the end of the day to restock inventory levels, calculate sales reports, and identify trends.

Explain that management information systems evolved from transaction processing systems as a way to organize information for managers. Management information systems can produce detailed reports that list transactions, summary reports that consolidate data, or exception reports that identify data outside of normal conditions.

For students familiar with spreadsheets, explain that what-if analysis is an important component of that kind of software, in which certain values are changed in order to reveal the effects of the changes.

Explain that in addition to inference rules, a knowledge management system can employ heuristics (rules of thumb made up of accepted guidelines that usually find a good solution) and attempt to emulate human thought processes. Knowledge management systems often contain an explanation facility that helps users understand how certain conclusions were reached and a knowledge acquisition facility that allows the knowledge base to be updated.

With regard to fuzzy logic, mention that fuzzy logic deals in probable, rather than definite, outcomes based on the data. These are the systems meteorologists use to frame their predictions. Knowledge management systems are an aspect of artificial intelligence (AI), which applies human intelligence to computers.

Mention that a single database can support a transaction processing system, business support system, knowledge management system, and user productivity system; the data and information simply are used in different ways for different purposes.

### CLASSROOM ACTIVITIES

1. Group Activity: Assembling the knowledge of multiple experts can be a challenge; human experts frequently disagree. To show this, have students select a topic on which they all are “experts” (such as choosing a class) and challenge them to develop a consensus knowledge base and inference rules.
2. Critical Thinking: Assign Discussion Topic 4 on page 37.
3. Quick Quiz:
  - 1) Assign Question 6 on page 37.

## **18: What Information Do Users Need?**

### LECTURE NOTES

- Note how corporate organizational structure has changed in recent years
- Use Figure 1-20 to describe a typical organizational model
- Point out why a systems analyst must understand a company's organizational model
- Describe top managers and strategic plans
- Point out how strategic plans affect a company's future
- Note the information needed to develop a strategic plan
- Describe middle managers
- Characterize knowledge workers, noting that knowledge workers support an organization's basic functions
- Describe supervisors, or team leaders
- Define operational employees, and describe the empowerment trend

FIGURE: 1-20

### TEACHING TIPS

Organizational levels affect not only the type of information needed; it also colors the presentation of information. A night shift supervisor can be given raw columns of data. A report for a top manager, however, often requires an artistic title page, a summary page, and several pages of graphical presentations complete with footnotes.

Many claim that top managers deal primarily with unstructured problems that require intuition and judgment, while lower management levels confront structured problems that can be solved using established routines and specific facts. Some authorities feel top management should not issue specific directives, but instead provide guidelines, direction, and a budget framework.

Point out how the information required by middle managers is different from the information required by top managers. While top managers make strategic decisions, some say that middle managers make tactical decisions, determining specific programs and plans to meet stated objectives. As businesses expand and new companies grow, middle managers are in increasing demand. To take advantage of the opportunities available, employment counselors recommend that middle managers:

- 1) Stay current in their field
- 2) Remain abreast of technology
- 3) Develop professional contacts
- 4) Keep their resume up to date
- 5) Have a backup plan

Explain that supervisors make operational decisions that involve a company's day-to-day activities. These decisions should be consistent with and support the decisions made by middle management. Top managers often have far less computer experience than middle managers and supervisors.

#### CLASSROOM ACTIVITIES

1. Projects to Assign: Assign Project 1 on page 37.
2. Quick Quiz:
  - 1) Assign Question 7 on page 37.
3. Critical Thinking: Assign Discussion Topic 2 on page 37.
4. Critical Thinking: Is it possible to rely too heavily on computers and not enough on judgment and intuition? Is it possible to count too much on intuition and not enough on information from computers?

### **19: Systems Development Tools**

#### LECTURE NOTES

- List various systems development tools, and point out that systems analysts should be familiar with each of these
- Define modeling
- Differentiate among a business model (or requirements model), a data model, an object model, a network model, and a process model
- Mention that models work together to describe an environment, and list techniques used in modeling
- Define prototyping and prototype
- Point out the disadvantage of prototyping, and mention that a second problem is that prototypes often have insufficient documentation, or even no documentation at all
- Define computer-aided systems engineering (CASE) (also called computer-aided software engineering) and CASE tools

- Discuss Figures 1-21 and 1-22

FIGURES: 1-21, 1-22

#### BOXES

1. Toolkit Time: Refer students to Part B of the four-part Toolkit that follows Chapter 12 for more information about CASE tools.

#### TEACHING TIPS

Explain that a prototype allows users to work with a system before it is completed to make sure it meets their needs. Prototypes and test data commonly are used to see how a complex system will work before committing large amounts of time and money. Prototyping rarely is used in small businesses.

Explain that CASE tools increase the efficiency of systems development. CASE tools can exist independently or be integrated together. Mention that Part B of the Systems Analyst's Toolkit explains how analysts use CASE tools. CASE technology allows programmers to retrieve commonly used algorithms from a central repository and piece them together to form modules. CASE tools can be used to design a program in a condensed form of English and then automatically generate code in a programming language. One disadvantage of CASE tools is that it can take a long time to learn them.

#### CLASSROOM ACTIVITIES

1. Class Discussion: Ask students if a kind of prototyping could be used before deciding on a personal course of action (such as asking for a date or deciding whether or not to take a part-time job). If so, how?
2. Critical Thinking: Is prototyping a method being used by system developers to avoid documenting requirements? Why or why not?

### **21: Systems Development Methods**

#### LECTURE NOTES

- Identify methods used in systems development
- Using Figure 1-23, introduce structured analysis, object-oriented (O-O) analysis, and agile (or adaptive) methods; note the importance of understanding different methods
- Define project management, and refer students to the chapter about project management tools and techniques for more information
- Define structured analysis and systems development life cycle (SDLC)
- Explain why structured analysis is called a predictive approach and a process-centered technique
- Explain what business rules are and use Figure 1-24 to illustrate a process model
- Define data flow diagram (DFD)
- Point out that the SDLC describes activities and functions employed in all systems development, regardless of the approach used
- Introduce the waterfall model, and define deliverable, or end product
- List the steps in the SDLC; explain that depending on the system being developed, the length and complexity of each phase in the SDLC can vary
- Use the circular symbols in Figure 1-25 to illustrate an alternative model of the SDLC
- Describe the systems planning phase

- List sources of a systems request, with requests from top managers or other governing bodies generally receiving the highest priority
- Define preliminary investigation, and point out how systems analysts can react when they receive a request for system changes
- Define feasibility study and explain its importance
- Describe the systems analysis phase, defining requirements modeling and system requirements document
- Describe the systems design phase; during the systems design, analysts acquire any necessary hardware and software and develop the details of the new or modified system
- Define system design specification
- Describe the systems implementation phase, and discuss systems evaluation
- Describe the systems support and security phase, and define scalable design
- Describe objects
- Define class and properties
- Use Figure 1-26 to show how an object inherits properties from its class
- Define methods, and mention that the data elements in an object are called attributes or variables
- Define message as something that indicates the name of a method to be used
- Explain why O-O methodology is popular; a major benefit of the O-O approach is the ability to reuse and modify existing objects
- Discuss the importance of creating a model for the many tasks required in system development
- Use Figure 1-27 to show an interactive model, more representative of object-oriented methods
- Use Figure 1-28 as a reference in a definition of agile methods (iterative development), and define spiral model
- Briefly introduce Scrum and Extreme Programming (XP)
- Describe joint application development (JAD) and rapid application development (RAD)
- Point out the existence of other systems development techniques; discuss IBM's Rational® software and the Microsoft Solutions Framework®
- Mention that companies can choose their own approach, often using CASE tools

FIGURES: 1-23, 1-24, 1-25, 1-26, 1-27, 1-28

#### BOXES

1. Toolkit Time: Refer students to Part B of the four-part Toolkit that follows Chapter 12 for more information about CASE tools.

#### TEACHING TIPS

Instructors who teach online will be especially interested in the three Video Learning Sessions in this section, on project management, on DFD symbols and diagrams and on object modeling, as resources to which they can send their distance-learning students.

Point out that the SDLC is formalized in many organizations, with detailed instructions outlining reporting requirements, specific tasks that must occur in each phase, and individual responsibilities. The goal of structured analysis and the SDLC is to create a system with the desired capabilities, within budget, and on time.

Point out how perceived problems can be different from actual problems. Benefits of a new system can be intangible, such as greater customer satisfaction, or tangible, such as reduced expenses. A compelling benefit can be the cost of *not* acting; a bank's installation of an ATM may not yield positive cash benefit, but consider the impact that not installing an ATM would have on business.

Explain that during systems analysis, developers study the current system, determine the user's requirements (requirements modeling), and recommend a solution (systems requirement document). The time spent on this phase of the SDLC usually is quite short when compared with the rest of the project.

Mention that some experts feel an impartial third party who has not been actively involved in the design of the system should do the systems evaluation. Users and systems analysts may have a tendency to test only what has been designed; a third party is more likely to discover a procedure or type of data that has been overlooked.

During the systems support and security phase, explain that a systems analyst reviews the system, identifies errors, identifies enhancements, monitors system performance, and protects the system. When systems implementation is complete, the key issue is whether the system performs as advertised: does it work as intended and meet users' needs? Experienced systems analysts find that the worst situation occurs when management or users have changed their expectations, and these changes are not reflected in the new system. The best insurance against this problem is frequent communication between and feedback from all participants throughout the SDLC. Point out that information systems development is a continuing process.

Mention that Alan Kay pioneered the concept of object-oriented analysis in the late 1960s with his programming language, Smalltalk. As an example of packaging data and processes together in an object, consider an employee object. This object might contain data about the employee (name, address, Social Security number, and so on) together with processes that can print an employee record or compute the employee's pay. When an object changes, any program that accesses the object automatically accesses the change.

Students may need help differentiating between JAD and RAD. A JAD session is a lengthy, structured, group work meeting in which users and IT professionals discuss an aspect of a systems development project. The goal is to obtain group agreement on an issue. RAD is the concept of developing software during the system development process. Prototyping is a common RAD technique.

### CLASSROOM ACTIVITIES

1. Projects to Assign: Assign Project 3 on page 37.

2. Quick Quiz:

1) Assign Questions 8 and 9 on page 37.

3. Critical Thinking: Agile methods are quickly becoming a preferred development approach. Ask students to compare and contrast the Agile approach with the Structured and Object-oriented analysis methods.

## **27: The Information Technology Department**

### LECTURE NOTES

- Describe an information technology (IT) department
- Define technical support
- Use Figure 1-29 to identify the seven main functions of an IT department
- Describe the application development group, listing members of a development team and characterizing a popular model for information systems development
- Define systems support and security; point out the responsibilities of the systems support and security group
- Describe user support; define help desk (IC) or service desk, and explain the role of user support specialists
- Define database administration, and note the importance of continuous attention and technical support for mission-critical database applications
- Define network administration; point out the responsibilities of network administration, and refer students to Chapter 10 for more detail about network administration
- Define Web support, and note the tasks involved in Web support
- Define quality assurance (QA), and note the responsibilities of the QA team

FIGURE: 1-29

### TEACHING TIPS

A help desk specialist is an entryway into the information technology (IT) field. Almost all organizations provide their employees with some type of help desk assistance. Within most companies, this job is one of the least technical. Some of the job requirements may include the following:

- 1) Solve procedural and software questions both in person and over the telephone
- 2) Develop and maintain help desk operations manuals
- 3) Assist in training new help desk personnel

The type of questions one might encounter as a help desk specialist depends on the setting. In most instances a help desk specialist must be informed about major software packages in use. Entry-level positions primarily answer calls from people with questions. Other positions, however, provide additional assistance and assume further responsibilities, often demanding greater knowledge and problem-solving skills that can serve as a springboard to more advanced positions in the IT field.

### CLASSROOM ACTIVITIES

1. Critical Thinking: Assign Discussion Topic 3 on page 37.

## **28: Case In Point 1.2: Global Health and Momma's Motels**

Suppose you work in the IT department of Global Hotels, a multinational hotel chain. Global Hotels runs several specialized business support systems, including a guest reservations system that was developed in-house to meet the requirements of a large company with worldwide operations. Guests can make one-stop online reservations by visiting Global's Web site, which has links to all major travel industry sites.

Global Hotels just acquired Momma's, a regional chain of 20 motels in western Canada. Momma's uses a vertical reservations package suitable for small- to medium-sized businesses, and a

generic accounting and finance package. Should Momma's use Global Hotels' information systems or continue with its own? In your answer, consider issues such as business profiles, business processes, system interactivity, EDI, e-commerce, and the characteristics of both information systems. What additional information would be helpful to you in making a recommendation?

**Comments:** *The answer depends on the corporate culture and IT policies at both companies, and the organizational relationship between them. Clearly, there is quite a difference between Global Hotels and Momma's. Students can discuss how that difference would affect information needs of smaller versus larger firms.*

*To make a decision about the SDLC process, Global must determine whether Momma's can handle local IT needs with its current systems development approach. If so, it might be best to leave this process alone. On the other hand, Momma's might have to develop and install certain corporate-wide systems to interface with the Global Hotels financial and accounting systems. In this case, Global probably would send IT people to guide Momma's in applying Global's standard SDLC process. In a diversified corporation, the main objective is to select a development strategy that supports the business needs of both the parent and the subsidiary business unit.*

*With regard to Momma's future approach, students should be able to see how issues such as business profiles, business processes, system interactivity, EDI, e-commerce, and the characteristics of both information systems might affect the decision. If the objective is tighter integration between the two business units, then Momma's might benefit from EDI and strategies. On the other hand, there might be a downside to adopting Global's systems development approach just because it is a larger, more sophisticated business. Going back to the question about what additional information would be helpful in making a recommendation, students should suggest more data on corporate culture, IT policies at both companies, the organizational relationship between them, and strategic plans.*

### **29: Case In Point 1.3: What Should Lisa Do?**

Lisa Jameson has two job offers. One is from Pembroke Boats, a boat manufacturer that employs 200 people in a small Ohio town. Pembroke does not have an IT department and wants her to create one. The job position is called information coordinator, but she would be the only IT person.

The other offer, which pays about \$7,500 more annually, is from Albemarle Express, a nationwide trucking firm located in Detroit. At Albemarle Express, Lisa would be a programmer-analyst, with the promise that if she does well in her position, she eventually will move into a systems analyst position and work on new systems development. Lisa has heard a rumor that another company might acquire Albemarle Express, but that rumor has occurred before and nothing has ever happened. What should Lisa do, and why?

**Comments:** *Encourage students to identify the key issues that Lisa should consider. These include working for a small firm rather than a large corporation, living in a small town instead of a big city, being on her own versus being a member of a large IT department, getting involved in a startup situation versus working with established systems. Also to be considered are salary issues, job security questions, and the possible impact of future mergers or downsizing. In the end, Lisa must decide what is important to her as an individual.*

### **29:The Systems Analyst**

#### LECTURE NOTES

- Describe a systems analyst



- Explain the role and responsibilities of a systems analyst
- Point out the required skills (including critical thinking skills) and educational background of a systems analyst
- Point out that the Systems Analyst's Toolkit that follows Chapter 12 includes many tools to help with those skills
- Discuss Figures 1-30 and 1-31
- Define certification and discuss Figure 1-32
- Point out the strong demand for systems analysts, noting the advancement opportunities available for systems analysts
- Explain how the responsibilities of a systems analyst vary depending on an employer's size, with many analysts working as consultants
- List job titles that may involve responsibilities of a systems analyst
- Point out the importance of company organization when evaluating prospective employers
- Mention how company size affects the role of a systems analyst
- Note the importance of considering salary, location, and future growth
- Define corporate culture, and explain why a systems analyst must understand a company's corporate culture in order to be successful using Figure 1-33

FIGURES: 1-30, 1-31, 1-32, 1-33

#### BOXES

1. Toolkit Time: Refer students to the communications tools in Part A of the four-part Toolkit that follows Chapter 12.
2. Toolkit Time: Refer students to the information technology resource tools in Part D of the four-part Toolkit that follows Chapter 12.

#### TEACHING TIPS

Systems analysts are the liaison between users and IT professionals. They convert user requests into technical specifications. To be effective, a systems analyst must:

- 1) Have some technical skills
- 2) Be familiar with business operations
- 3) Have excellent communications and interpersonal skills

The primary focus of this work is to design and develop new hardware and software systems and to incorporate new technologies. A successful systems analyst must be willing to embrace new technologies and be prepared for continual learning. Typically, systems analysts are more involved in design issues than in day-to-day coding. Systems analyst is a somewhat arbitrary title, however, as companies have varying definitions for the role.

Explain the duties of the systems analyst can vary. In small- and medium-sized businesses, the systems analyst also may be a programmer. The role of the systems analyst is critical. The systems analyst must understand the business' and the users' needs, as well as the technical aspects of system and program development.

Emphasize the importance of interpersonal skills in the work of the systems analyst. Despite the importance of the relationship between IT professionals, such as the systems analyst, and users, such as business managers, the bond can be contentious. A popular joke lampoons the opinions they sometimes hold:

A hot-air balloonist was lost, so he called down to a man on the ground for help. "Excuse me, do you know where I am?" he asked.

"You're in a balloon," the man on the ground replied.

"You must work in an IT department," the balloonist said.

"You're right! How did you know?" asked the man on the ground.

"What you've told me is technically correct," said the balloonist, "but it's of no practical use."

"You must be a business manager," the man on the ground said.

"How did you know?" asked the balloonist.

"Well," said the man on the ground, "you don't know where you are and you don't know where you're going. We just met, but somehow already everything is my fault!"

Minimum educational requirements for systems analysts are a bachelor's degree, but many people opt for a master's degree. Point out the opportunities available on the Internet to update technical knowledge and skills.

Benefits of certification include:

- 1) Proof of professional achievement
- 2) Enhancement of job opportunities
- 3) Opportunity for advancement

Explain that certifications are developed by a sponsoring organization, which include computer equipment and software vendors, independent training companies, and professional organizations.

#### CLASSROOM ACTIVITIES

1. Class Discussion: Ask students to consider other ways in which systems analysts can maintain their skills.
2. Projects to Assign: Ask students to research the certifications offered by companies listed on page 31.
3. Projects to Assign: Assign Project 4 on page 37.
4. Quick Quiz:
  - 1) Assign Questions 5 and 10 on page 37.

#### **32: Case In Point 1.4: Just-in-Time Airfreight, Inc.**

Suppose you are the IT director at Just-in-Time Airfreight, and you have received authorization to hire another systems analyst. This will be an entry-level position, and the person will assist senior systems analysts on various projects involving the reservations and the human resources systems. Using the information in this chapter, draft an ad that would appear in *The Wall Street Journal*, local newspapers, and online. You can get some ideas by visiting monster.com, or a similar site. In your ad, be sure to list desired skills, experience, and educational requirements.

**Comments:** *Answers will vary. The main objective is to get students to think about real-world IT opportunities. While four-year degrees are required, many companies will accept equivalent training, experience, or certification credentials. Encourage students to do a job search first, and then try to write a suitable ad. The following is an example of an actual ad for a systems analyst that appeared on dice.com:*

### **Job Summary**

This person will be responsible for formulating and defining systems scope and objectives through research and fact-finding combined with an understanding of applicable business systems and industry requirements. Includes analysis of business and user needs, documentation of requirements, and translation into proper system, functional, or operational requirement specifications.

### **Required Skills**

- Performs project scoping, planning, complex business and data analysis, requirement gathering and documentation, specifications, use cases, and workflow diagrams.
- May be responsible for application security administration and production migrations.
- May be responsible for ensuring that application system security remains SOX and HIPAA compliant.
- May serve as a liaison among business units, technology teams, and support teams.
- May define, develop, and implement quality assurance practices and procedures, test plans, test cases, and other QA assessments.
- May lead teams or taskforces, or may serve as project manager.

### **Required Experience:**

- Bachelor's degree in Information Technology, Business, or similar degree or equivalent work experience.
- Excellent written and verbal communication skills, organizational and time management skills, and project management skills.
- Proficient at Microsoft Office Suite, Visio, and Project
- Healthcare or managed care experience is a plus
- Prior Sarbanes Oxley (SOX) compliance experience is a plus

### **33: A Question of Ethics**

You are enjoying your job as a summer intern in the IT department of a local company. At lunch yesterday, several people were discussing ethical issues. You learned that some of them belong to IT organizations that have ethical codes to guide members and set professional standards. For example, Ann, your supervisor, belongs to the Association for Computing Machinery (ACM), which has over 100,000 members from more than 100 countries and a Web site at [acm.org](http://acm.org). Ann said that the ACM code of ethics is important to her, and would definitely influence her views. On the other hand, Jack, a senior programmer, believes that his own personal standards would be sufficient to guide him if ethical questions were to arise.

Because you are excited about your career as an IT professional, you decide to visit ACM's site at [acm.org](http://acm.org) to examine the code of ethics and make up your own mind. After you do so, would you tend to agree more with Ann or with Jack?

**Comments:** *Ann's position makes more sense. She is not saying that she would follow the ACM guidance in all cases — only that the ACM code would influence her. She can still rely on her personal standards if she wishes to do so. Jack, on the other hand, won't have the benefit of broad-based community standards that have been accepted by many thousands of members. His own moral compass might be fine, but it certainly would not hurt to have valuable input from others.*

### Key Terms

- adaptive methods (21)
- agile methods (21)
- application software (7)
- B2B (business-to-business) (9)
- B2C (business-to-consumer) (9)
- business model (19)
- business process (13)
- business process model (BPM) (13)
- business process modeling notation (BPMN) (14)
- business profile (13)
- business rules (22)
- business support systems (16)
- CASE tools (20)
- certification (31)
- class (24)
- computer-aided software engineering (20)
- computer-aided systems engineering (CASE) (20)
- corporate culture (32)
- critical thinking skills (30)
- data (6)
- data flow diagram (DFD) (23)
- deliverable (23)
- e-commerce (electronic commerce) (9)
- electronic data interchange (EDI) (10)
- empowerment (19)
- enterprise applications (7)
- enterprise computing (15)
- enterprise resource planning (ERP) (15)
- feasibility study (23)
- groupware (17)
- hardware (7)
- help desk (IC) (28)
- horizontal system (7)
- I-commerce (Internet commerce) (9)
- inference rules (16)
- information (6)
- information system (5)
- information technology (IT) (4)
- iterative (26)
- joint application development (JAD) (26)
- knowledge base (16)
- legacy systems (7)
- management information systems (MIS) (16)
- mission-critical system (6)

- modeling (19)
- Moore's Law (7)
- object-oriented (O-O) analysis (21)
- objects (24)
- preliminary investigation (23)
- processes (8)
- product-oriented (10)
- project management (22)
- properties (24)
- prototype (20)
- radio frequency identification (RFID) (16)
- rapid application development (RAD) (26)
- requirements modeling (23)
- scalable design (24)
- server farm (7)
- service desk (28)
- service-oriented (10)
- software (7)
- spiral model (26)
- stakeholders (8)
- strategic plans (18)
- structured analysis (21)
- supply chain (10)
- supply chain management (SCM) (10)
- system (6)
- system design specification (24)
- system requirements document (24)
- system software (7)
- systems analysis and design (5)
- systems analysis phase (23)
- systems analyst (6)
- systems design phase (24)
- systems development life cycle (SDLC) (22)
- systems request (23)
- systems support and security phase (24)
- technical support (27)
- transaction processing (TP) systems (15)
- user productivity systems (17)
- users (8)
- vertical system (7)
- waterfall model (23)

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### End of Chapter Material

- **Chapter Exercises** The Chapter Exercises include short exercises and review questions that reinforce concepts and provide opportunities to practice skills.
- **Apply Your Knowledge** The Apply Your Knowledge exercises let students apply their knowledge of systems analysis and design in four mini-cases.
- **Case Studies** In each assignment, realistic business scenarios are presented, requiring students to answer questions of varying difficulty.
- **CASE Tool Workshop** These tasks can be completed using the Visible Analyst CASE tool to help students practice planning, building, and maintaining information systems.
- **MIS CourseMate Features** This section directs students to Web-based exercises, which include Online Case Simulations, Critical Thinking Challenges, Video Learning Sessions, and a set of Learn It Online activities.