Systems Analysis and Design 12th edition Tilley Solutions Manual

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Systems Analysis and Design (12th Ed)

End of Chapter Solutions

Notes:

- This document contains **all** the solutions to the end-of-chapter questions for the 12th edition. This includes any altered or added questions for the 11th edition of the book.
- Page number references have been removed from the answers.
- The 12th edition of the book contains only end of chapter exercises of three types: questions, discussion topics, and projects. All other exercises that appeared at the end of each chapter in previous editions, such as "Apply Your Knowledge" from the 10th edition, have been removed from the body of the textbook.

September 8, 2019

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Chapter 1: Introduction to Systems Analysis and Design

Chapter 1 – Introduction to Systems Analysis and Design: Chapter 1 provides an introduction to systems analysis and design by describing the role of information technology in today's dynamic business environment.

Questions

1. What is information technology and why is it important to society?

   Information technology (IT) *refers to the combination of hardware, software, and services that people use to manage, communicate, and share information. More than ever, business success depends on information technology. The headlines in* ***Error! Reference source not found.*** *offer dramatic examples of how information technology issues such as data privacy, mobile devices, and social media affects our society. We live in a world where we can be traced, analyzed, and surveilled without our knowledge. This raises many important questions, such as how to secure personal data while still providing useful functionality and business value.*

2. What are the five main components of an information system?

   An information system has five key components, as shown in ***Error! Reference source not found.****: hardware, software, data, processes, and people.*

3. Explain how ridesharing services such as Uber and Lyft are disrupting traditional taxicab business models.

   Business today is being shaped by three major trends: rapidly increasing globalization, technology integration for seamless information access across a wide variety of devices such as laptops and smartphones, and the rapid growth of cloud-based computing and software services. These trends are being driven by the immense power of the Internet.

   Ridesharing services such as Uber and Lyft are disrupting traditional taxicab business models through disintermediation: connecting drivers directly to customers, bypassing the traditional dispatch service. They are also disrupting the traditional limitation on who can drive a taxicab (medallion owners) to allow anyone with a car and who wants to earn some extra money to do so, all via mobile apps and cloud-based technology.

4. Describe the business profile of a home improvement store like Home Depot or Lowe's and how it is used.

   A business profile is an overview of a company's mission, functions, organization, products, services, customers, suppliers, competitors, constraints, and future direction. Although much of this information is readily available, a systems analyst usually needs to do additional research and fact-finding to fill out missing or incomplete information. A business profile is the starting point for the modeling process, and a systems analyst can describe and simplify an information system by using a set of business models and business process models. Students should be able to understand the business of home improvement stores, supply the basic information, and fill in the details.

5. What are the seven types of information systems used in business?

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The seven types of information systems used in business are: enterprise computing systems, transaction processing systems, business support systems, knowledge management systems, user productivity systems, digital assistants, and systems integration.

6. What types of information do the four organizational levels common to many businesses need?

A typical organizational model identifies business functions and organizational levels, as shown in ***Error! Reference source not found.****. A systems analyst must understand the company's organizational model to recognize who is responsible for specific processes and decisions and to be aware of what information is required by whom.*

Top managers *develop long-range plans, called strategic plans, which define the company's overall mission and goals. To plot a future course, top managers ask questions such as "How much should the company invest in information technology?", "How much will Internet sales grow in the next five years?", or "Should the company build new factories or contract out production functions?" Top managers focus on the overall business enterprise and use IT to set the company's course and direction. To develop a strategic plan, top managers also need information from outside the company, such as economic forecasts, technology trends, competitive threats, and governmental issues.*

Just below the top management level, most companies have a layer of ***middle managers*** *and* ***knowledge workers****. Middle managers provide direction, necessary resources, and performance feedback to supervisors and team leaders. Because they focus on a somewhat shorter time frame, middle managers need more detailed information than top managers but somewhat less than supervisors who oversee day-to-day operations.*

Knowledge workers include systems analysts, programmers, accountants, researchers, trainers, human resource specialists, and other professionals. Knowledge workers also use business support systems, knowledge management systems, and user productivity systems. Knowledge workers provide support for the organization's basic functions. Just as a military unit requires logistical support, a successful company needs knowledge workers to carry out its mission.

Supervisors*, often called* ***team leaders****, oversee operational employees and carry out day-to-day functions. They coordinate operational tasks and people, make necessary decisions, and ensure that the right tools, materials, and training are available. Like other managers, supervisors and team leaders need decision support information, knowledge management systems, and user productivity systems to carry out their responsibilities.*

Operational employees *include users who rely on transaction processing systems to enter and receive data they need to perform their jobs. In many companies, operational users also need information to handle tasks and make decisions that were assigned previously to supervisors.*

7. Compare three system development methods.

Many options exist for developing information systems, but the most popular alternatives are structured analysis, which is a traditional method that still is widely used, object-oriented (o-o) analysis, which is a more recent approach that many analysts prefer, and agile methods, which include the latest trends in software development. Figure 1-17 provides an overview of the three methods.

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8. Name the tools that enable the systems analyst to develop, manage, and maintain large-scale information systems.

All systems development methods must be supported by tools to enable the systems analyst to develop, manage, and maintain large-scale information systems. These tools go by various names, including application lifecycle management (ALM), also called product lifecycle management (PLM); integrated development environments (IDE); and computer-aided systems engineering (CASE), also called computer-aided software engineering. CASE tools provide an overall framework for systems development and support a wide variety of design methodologies, including structured analysis and object-oriented analysis.

9. Summarize the seven main functions of the IT department.

The IT department develops and maintains information systems. The IT group provides technical support, which includes seven main functions: application development, systems support and security, user support, database administration, network administration, web support, and quality assurance. These functions overlap considerably and often have different names in different companies.

10. What are the roles and responsibilities of a systems analyst in a modern business?

A systems analyst investigates, analyzes, designs, develops, installs, evaluates, and maintains a company's information systems. To perform those tasks, a systems analyst constantly interacts with users and managers within and outside the company. A systems analyst helps develop IT systems that support business requirements. To succeed, analysts often must act as translators. For example, when they describe business processes to programmers, they must speak a language that programmers will understand clearly. Typically, the analyst builds a series of models, diagrams, and decision tables and uses other descriptive tools and techniques. Similarly, when communicating with managers, the analyst often must translate complex technical issues into words and images that nontechnical people can grasp. To do this, the analyst uses various presentation skills, models, and communication methods.

Analysts are often the company's best line of defense against an IT disaster—a system that is technically sound but fails because it does not meet the needs of users and managers. When this occurs, poor communication is usually to blame. For an analyst, the most valuable skill is the ability to listen. An effective analyst will involve users in every step of the development process and listen carefully to what they have to say. As the process continues, the analyst will seek feedback and comments from the users. This input can provide a valuable early warning system for projects that might other- wise go off the track.

Discussion Topics

1. Some experts believe that the growth in e-commerce will cause states and local governments to lose tax revenue, unless Internet transactions are subject to sales tax. What is one argument that supports this view, and one that opposes it?

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. Those who believe that Internet transactions should not be taxed often point to other sales channels, such as mail order firms that conduct no physical

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*operations within a state or locality, and therefore do not collect sales tax. Should the Internet be treated differently? Opponents of a tax-free Internet often cite the impact on local and state government, and suggest that **all** channels should operate on a level playing field. You might ask your students to research and debate this issue. Also, you might follow this topic as news occurs during the course.*

2. When team members are geographically dispersed, communication becomes more challenging. Explain how groupware can increase user productivity in this context.

*Companies provide employees at all levels with technology that improves productivity. User productivity systems include groupware, which enables users to share data, collaborate on projects, and work in teams – irrespective of where they are physically located. One popular groupware product is Slack, shown in **Error! Reference source not found.**. Slack provides common app integration and unified communication channels for distributed teams.*

3. Under what circumstances should a systems analyst recommend an agile methodology over structured development or object-oriented analysis?

Although most projects utilize one approach, it is not unusual for system developers to mix and match methods to gain a better perspective. In addition to these three main development methods, some organizations choose to develop their own in-house approaches or use techniques offered by software suppliers, tool vendors, or consultants. Many alternatives exist, and IT experts agree that no single development method is best in all cases. An approach that works well for one project might have disadvantages or risks in another situation. The important thing is to understand the various methods and the strengths and weaknesses of each approach.

Although agile methods are becoming popular, analysts should recognize that these approaches have advantages and disadvantages. By their nature, agile methods can 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 agile 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. The bottom line is that systems analysts should understand the pros and cons of any approach before selecting a development method for a specific project.

4. Should the IT director report to the company president, or somewhere else? Does it matter?

No clear organizational pattern exists. Perhaps the strongest case for having the IT department report to the president is that information technology is a vital corporate asset, and should not be "owned" by a particular department or function. IT can have a huge impact on profitability, and deserves equal attention from the top executive.

However, not everyone agrees with this view, and many would argue that IT should report to the chief financial officer, because financial functions require the most IT support. Also, the operation of the IT department represents a large expense for most companies, and the chief financial officer probably is in the best position to monitor and control this expense.

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5. Rapid advancements in areas such as machine learning and predictive analytics in data science are affecting the daily operations of many IT departments. What should a systems analyst do to stay current?

The demand for systems analysts is expected to remain strong. Systems analysts need to track trends in information technology because technological changes affect business operations, career opportunities, and enterprise strategies. As depicted in Figure 1-31, many of the developments related to big data are driving trends in information technology – trends the system analyst must follow to stay current.

Projects

1. Contact three people at your school who use information systems. List their positions, the information they need, the systems they use, and the business functions they perform.

Students can perform this task as individuals or work in teams. It might be interesting to compare and discuss the various ways in which the departments manage information.

2. Visit three websites to learn more about agile system development. Prepare a list of the sites you visited and a summary of the results.

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.

3. Model-based systems engineering (MBSE) is one of the leading methods used by systems analysts to develop information systems. Cameo Systems Modeler is one of the leading tools supporting MBSE. Research magazine articles and the web to learn more about this tool's capabilities. Identify three of its strengths in terms of improving the quality of the finished product.

Cameo Systems Modeler is a well-known product with many sources of information about the tool available to the students. To limit the scope of the investigation, have the students focus on using the tool specifically to improve product quality.

4. Explore the *Critical Thinking Community* website at *criticalthinking.org*. Identify three important topics currently being discussed, and describe your findings.

You might encourage students to explore beyond the suggested link and challenge them to identify additional resources and issues. Also consider asking them to examine their own approach to learning, and whether they would consider themselves to be critical thinkers.

5. Compare the corporate culture of three leading IT companies and show how their statement of values could attract (or repel) systems analysts from joining their organization.

It would be insightful for examine a traditional company, such as IBM, which has an established but dynamic corporate culture that has withstood the test of time. Newer companies such as Facebook are also quite large, but their culture originates in a different space than that of IBM. The culture of a Silicon Valley startup is different yet again, and the type of employee they seek may have different professional goals – particularly if they are at the start of their career.

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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 toward quizzing your students and enhancing their critical thinking skills.

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

1: Phase 1: Systems Planning

LECTURE NOTES

- Use the Gantt chart as a starting point for a discussion about systems development
- Inform that systems planning is the first of five phases in the systems development life cycle
- Indicate that the systems planning phase explains how systems projects get started, how to evaluate a project proposal to determine its feasibility, and how to use project management tools and techniques
- Discuss the deliverable for the systems planning phase

FIGURES: Gantt chart screenshot on Page 1

CLASSROOM ACTIVITIES

1. Group Activity: Ask students if they have ever used Gantt charts, and ask them to explain when they have used them. 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.)

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Chapter 1: Introduction to Systems Analysis and Design

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Key Terms
End of Chapter Material

Learning Objectives

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

- Describe the impact of information technology on society
- Describe the five main components of an information system
- Explain Internet business strategies and relationships, including B2C and B2B
- Explain how to use business profiles and models
- Understand the seven types of information systems used in business
- Describe the types of information the four classes of users need
- Distinguish among structured analysis, object- oriented analysis, and agile systems development methods
- List the tools that enable the systems analyst to develop, manage, and maintain large-scale information systems
- Explain the seven main functions of the information technology department
- Describe the roles and responsibilities of a systems analyst within the enterprise

1.1: Information Technology

LECTURE NOTES

- Use Figure 1-1 as a starting point for a discussion about how information technology affects the society
- Discuss the benefits of using information by an organization
- Discuss the importance of information technology in a global economy
- Define information technology (IT)
- Discuss the role of information technology in an organization's success
- Use Figure 1-2 to discuss job opportunities available in IT
- Define an information system
- Provide an overview of systems analysis and design
- Discuss the role of systems analysts

FIGURES: 1-1. 1-2

TEACHING TIPS

Explain the way in which 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.

Talk over 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 21st century.

CLASSROOM ACTIVITIES

1. Quick Quiz: Assign Question 1 on page 42.
2. Quick Quiz: Assign Question 2 on page 42.
3. Critical Thinking: What characteristics would make an individual a strong systems analyst?

1.2: Information Systems

LECTURE NOTES

- Define system and mission-critical system
- Explain in what way data is different from information
- Use Figure 1-4 to identify the key components of an information system
- Define hardware
- Discuss Moore's Law
- Define software, and show that system software is different from application software
- Describe enterprise applications by providing 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
- Describe processes
- Define stakeholders and users (end users)
- FIGURES: 1-3, 1-4, 1-5, 1-6

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TEACHING TIPS
Using Figure 1-6, illustrate a payroll system that stores data in related tables.

Elucidate the prediction of Gordon Moore, a cofounder of Intel, and update that this prediction was valid for 50 years.

Explain that system software manages the hardware components of a system. It also controls the flow of data, provides data security, and manages network operations. Offer examples of system software, which include: Windows, UNIX, Mac OS, and Linux (operating systems); personal firewalls (security software); and file viewers, file compression utilities, disk scanners, and screen savers (utility programs).

CASE IN POINT 1.1: Data Breaches
A data breach occurs when a hacker gains illegal access to a system and steals personal data, such as credit card numbers or home addresses. With more of our information stored in the cloud, data breaches are becoming increasingly common. Research recent news articles about large-scale data breaches, summarize why they occurred, and suggest how they might be prevented in the future.

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 operation, 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. Quick Quiz: Assign Question 5 on page 42

1.3: Internet Business Strategies

LECTURE NOTES
- Define ecommerce (electronic commerce)
- Discuss the use of an app
- Describe B2C ecommerce, and point out the types of companies that participate in B2C ecommerce
- Discuss how B2C ecommerce is changing traditional business models
- Describe B2B ecommerce, and point out the advantages of B2B ecommerce
- Describe electronic data interchange (EDI)
- Differentiate between B2C (business-to-consumer) ecommerce and B2B (business-to-business) ecommerce
- Define supply chain

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

Explain that B2B ecommerce consists of the sale and exchange of products and services between businesses.

CLASSROOM ACTIVITIES
1. 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?
2. Critical Thinking: Assign Discussion Topic 1 on page 42.
3. Quick Quiz: Assign Question 4 on page 42.
4 Projects to Assign: Assign Project 2 on page 42.

1.4: Modeling Business Operations

LECTURE NOTES
- Define business profile
- Define business process
- Define business process model (BPM)
- Describe business process modeling notation (BPMN)

FIGURES: 1-7, 1-8, 1-9

TEACHING TIPS
Discuss the use of business process models (BPM) in providing visual representations of business processes using Figure 1-7.

Use Figure 1-8 to illustrate a business process modeling notation (BPMN).

CLASSROOM ACTIVITIES
1. Class Discussion: Ask students for examples of business processes for registration of classes at their university.
2. Quick Quiz: Assign Question 3 on page 42.

1.5: Business Information Systems

LECTURE NOTES
- Specify the types of systems
- Define enterprise computing
- Discuss the main objective of enterprise computing
- Define enterprise resource planning (ERP), and discuss its advantages and disadvantages
- Use Figure 1-10 to show an example of an ERP solution that can boost productivity
- Describe transaction processing (TP) systems, and use Figure 1-11 to show the tasks processed by a TP system
- Discuss business support systems and management information systems (MIS)

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- Discuss radio frequency identification (RFID) technology with the help of Figure 1-12
- Discuss the important feature of business support systems
- Characterize the knowledge base and inference rules that make up knowledge management systems
- Use Figure 1-13 to explain a knowledge management system
- Give examples of user productivity systems
- Define groupware
- Discuss the use of personal digital assistants
- Discuss the need for systems integration

FIGURES: 1-10, 1-11, 1-12, 1-13, 1-14, 1-15

CASE IN POINT 1.2: Autonomous Vehicles
Imagine you work for a large automotive company. Your manager asks you to look into integrating a digital assistant into a new vehicle for the next production year. How would understanding your company's business profile help you complete this task?

TEACHING TIPS
Enterprise Resource Planning (ERP) systems are used by most organizations today to increase efficiencies and maximize effectiveness of operations.

Explain the reason for ERP systems to be considered essential for integrating business processes, improving data security, and helping managers make key decisions. For example, a truck manufacturer can use ERP to forecast customer demand for his trucks at several locations. Mention several of the key vendors of ERP systems and discuss how an understanding of these systems is required in most organizations.

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.

CLASSROOM ACTIVITIES
1. Group Activity: Ask students if they have ever used a website that uses a knowledge base and to list their experiences with such websites.
2. Quick Quiz: Assign Question 5 on page 42.

1.6: Organizational Information Models

LECTURE NOTES
- Use Figure 1-16 to describe a typical organizational model
- Point out why a systems analyst must understand a company's organizational model
- Describe strategic plans
- Discuss the top and middle levels of management as well as knowledge workers
- Describe the roles of supervisors and team leaders
- Define operational employees
- Describe the empowerment trend

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FIGURE: 1-16

TEACHING TIPS
Organizational levels affect not only the type of information needed; it also defines 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.

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.

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 42.
2. Quick Quiz: Assign Question 6 on page 42.
3. Critical Thinking: Assign Discussion Topic 2 on page 42.

1.7: Systems Development

LECTURE NOTES
- List the different systems development methods
- Using Figure 1-17, introduce and differentiate structured analysis, object-oriented (O-O) analysis, and agile (or adaptive) methods
- Define structured analysis and systems development life cycle (SDLC)
- Clarify the reason for structured analysis being called a predictive approach and a process-centered technique
- Describe the concept of business rules, and use Figure 1-18 to illustrate a process model
- Discuss data flow diagrams (DFD)
- Point out that the SDLC describes activities and functions employed in all systems development, regardless of the approach used
- Introduce waterfall model, and define deliverable
- List the steps in the SDLC model
- Describe the systems planning phase
- Explain the concept of systems request
- Discuss preliminary investigation
- Outline feasibility study and explain its importance
- Describe the purpose of systems analysis phase along with the first step of the phase and its deliverable
- Describe the purpose of systems design phase
- Define system design specification
- Describe the systems implementation phase, and discuss systems evaluation

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- Describe the systems support and security phase, and define scalable design
- Describe objects
- Define class and properties
- Use Figure 1-20 to show how an object inherits properties from its class
- Define methods with respect to O-O analysis
- Discuss the role of a message in O-O analysis
- Use Figure 1-21 to depict how planning, analysis, and design tasks interact continuously to generate prototypes that can be tested in a typical O-O development model
- Discuss agile methods and iterative development
- Define spiral model
- Discuss the advantages and disadvantages of agile methods
- Describe joint application development (JAD) and rapid application development (RAD)
- Define prototyping and prototype
- Point out the disadvantage of prototyping
- Define computer-aided systems engineering (CASE) (also called computer-aided software engineering) and CASE tools

FIGURES: 1-17, 1-18, 1-19, 1-20, 1-21, 1-22, 1-23, 1-24, 1-25

TEACHING TIPS

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, the current system is studied by developers, user's requirements (requirements modeling) are determined, and a solution (systems requirement document) is recommended. 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. 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.

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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.

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 is rarely used in small businesses.

Explain that CASE tools increase the efficiency of systems development. CASE tools can exist independently or be integrated together. CASE technology allows programmers to retrieve commonly used algorithms from a central repository and combines 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 they can take a long time to learn them.

CLASSROOM ACTIVITIES
1. Projects to Assign: Assign Project 3 on page 42.
2. Quick Quiz: Assign Questions 8 and 9 on page 42.
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.
4. Class Discussion: Ask students if a kind of prototyping could be used before deciding on a personal course of action (such as whether or not to take a part-time job).

1.8: The Information Technology Department

LECTURE NOTES
- Discuss information technology (IT) department
- Use Figure 1-26 to discuss a typical IT organization in a company that has networked PCs, enterprise-wide databases, centralized processing, and web-based operations
- Describe technical support
- Describe the application development group, listing the members of a development team and characterizing a popular model for information systems development
- Discuss systems support and security; point out the responsibilities of the systems support and security group
- Define help desk, and clarify the role of user support specialists
- Outline database administration, and discuss the importance of continuous attention and technical support for mission-critical database applications
- Define network administration and point out the responsibilities of network administration
- Define web support, and point out the tasks performed by web support specialists
- Discuss the responsibilities of a quality assurance (QA) team

FIGURE: 1-26

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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.

CASE IN POINT 1.3: Global Hotels 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 website, which has links to all major travel industry sites. Global Hotels just acquired Momma's, a regional chain of 20 motels. 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, and e-commerce. What additional information would be helpful to you in making a recommendation?

CLASSROOM ACTIVITIES
1. Critical Thinking: Assign Discussion Topic 4 on page 42.

1.9: The Systems Analyst

LECTURE NOTES
- Discuss the roles and responsibilities of a systems analyst
- Point out the skills (including critical thinking skills) and educational background a systems analyst must posses
- Use Figure 1-27 to show that the INCOSE is one of the leading organizations offering systems analysts a wealth of information, news, training, communities, and more
- Discuss the importance of strong oral and written communication skills to be possessed by systems analysts
- Discuss the importance of critical thinking skills and use Figure 1-28 to show the website for The Critical Thinking Community that provides encouragement and resource for critical thinkers
- Point out the need for certification and use Figure 1-29 to show that employers like to hire people who can think logically and effectively
- Point out the strong demand for systems analysts, noting the horizon of opportunities available for systems analysts
- List job titles that may involve responsibilities of a systems analyst
- Point out the importance of company organization when evaluating prospective
- Describe the role of a systems analyst based on company size

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- Discuss the importance of considering salary, location, and future growth
- Define corporate culture and use Figure 1-30 to show the attractive corporate culture of Salesforce
- List the key trends that disrupt information technology
- Discuss bring your own device movement (BYOD)
- Discuss product-oriented and service-oriented firms

FIGURES: 1-27, 1-28, 1-29, 1-30

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 state-of-the-art technical knowledge
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 that 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.

Minimum educational requirement for systems analysts is 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.

TEACHING TIPS
Explain that bring your own device movement (BYOD) allows employees to bring their own devices to access an organization's data and perform operations. If any problem occurs in these devices, the IT department will not be in charge.

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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, your supervisor belongs to the Association for Computing Machinery (ACM), which has over 100,000 members from more than 100 countries and a website at acm.org. Your supervisor said that the ACM code of ethics is important to her and would definitely influence her views. On the other hand, one of the senior programmers 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 website to examine the code of ethics and make up your own mind. After you do so, would you tend to agree more with your supervisor or with the senior programmer?

CLASSROOM ACTIVITIES
1. Class Discussion: Ask students to think through other ways in which systems analysts can maintain their skills.
2. Projects to Assign: Assign Project 4 on page 42.
3. Projects to Assign: Assign Project 5 on page 42.
4. Quick Quiz: Assign Question 10 on page 42.
5. Critical Thinking: Assign Discussion Topic 5 on page 42.

1.10: Summary

- Point out that information technology (IT) refers to the combination of hardware, software, and services that people use to manage, communicate, and share information
- Describe the essential components of an information system
- Discuss the importance offering a mix of products, technical and financial services, consulting, and customer support
- Explain the responsibilities of a systems analyst
- Describe a typical organization structure
- Discuss the popular system development approaches
- Describe the functions of the IT department
- Explain the important characteristics of a systems analyst
- Discuss some key trends in information technology

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Key Terms

agile methods
app
application lifecycle management (ALM)
application software
artificial intelligence
B2B (business-to-business)
B2C (business-to-consumer)
bring your own device (BYOD)
business model
business process
business process model (BPM)
business process modeling notation (BPMN)
business profile
business rules
business support systems
CASE tools
certification
class
computer-aided software engineering (CASE)
computer-aided systems engineering (CASE)
corporate culture
critical thinking skills
data
data center
data flow diagram (DFD)
deliverable
ecommerce (electronic commerce)
electronic data interchange (EDI)
empowerment
enterprise application
enterprise computing
enterprise resource planning (ERP)
feasibility study
groupware
hardware
help desk
horizontal system
inference rule
information
information system
information technology (IT)
integrated development environments (IDE)
users
iterative
knowledge base
legacy systems
machine learning
management information systems (MIS)
mission-critical system
modeling
Moore's Law
NoSQL databases
objects
object-oriented (O-O) analysis
personal digital assistant
preliminary investigation
processes
product lifecycle management (PLM)
product-oriented
properties
prototype
radio frequency identification (RFID)
requirements engineering
scalable
service-oriented
software
spiral model
stakeholders
strategic plans
structured analysis
supply chain
supply chain management (SCM)
system
system design specification
system requirements document
system software
systems analysis and design
systems analysis phase
systems analyst
systems design phase
systems development life cycle (SDLC)
systems implementation phase
systems planning phase
systems request
systems support and security phase
technical support
transaction processing (TP) systems
user productivity system
vertical system
waterfall model

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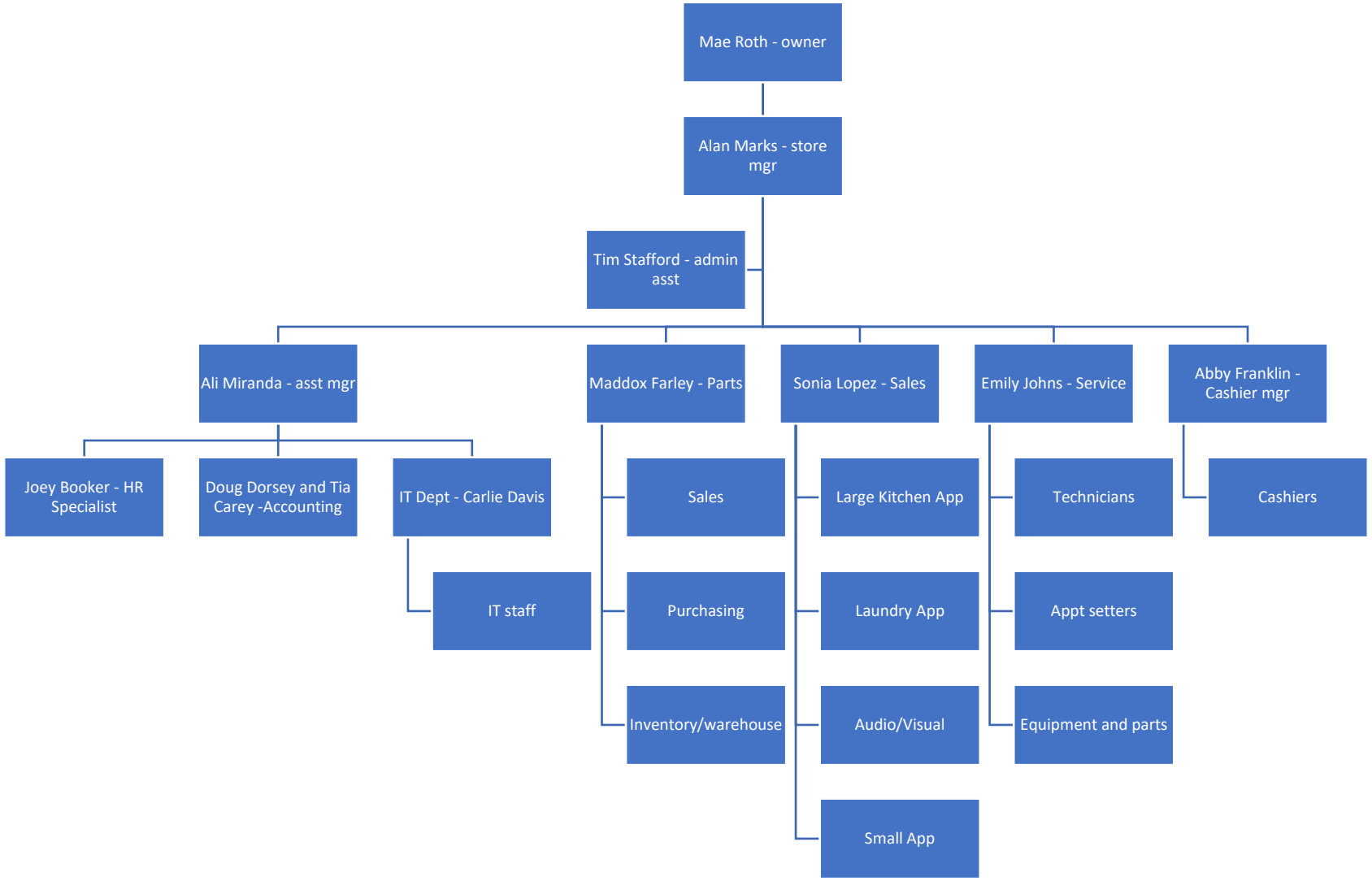
End of Chapter Material

Chapter Exercises: The Chapter Exercises include questions, discussion topics, and projects that reinforce concepts and provide opportunities to practice skills.

Top of Document

Students will need to use the Resource Library, specifically the Organizational Staffing document, and the Appliance Warehouse website to complete the tasks.

Ch 2 – Org chart



SWOT analysis

Below is an example of a possible SWOT analysis. Students answers will vary.

Strengths: (All internal organizational strengths) • Busy store • Know the appliance industry well • Already have an existing parts department	**Weaknesses:** (All internal organizational weaknesses) • Currently have no service technicians • Current customers are buying new, assuming no problems with new appliances • New sub-industry to AW
Opportunities: (all external/industry opportunities) • Comprehensive multi-year service plans are popular • Unemployment is high, should be able to staff the service department easily	**Threats:** (all external/industry threats) • Price of gas is going up so service calls will be more expensive • Other big chain appliance stores have very competitive prices for service plans and service calls

Mission statement

Mission statement should be re-written to reflect the entry into the appliance service market. Student answers will vary.

Original mission statement: We are your one stop shop for all of your home appliances and parts!

Sample revision: We can solve all your appliance problems! We stock all home appliances, parts, and can service all your appliances.

Problem/Opportunity statement

Student answers will vary. Below is an example of the statement.

Revenues will increase by offering service plans and service calls to customers. We can achieve efficiencies using our already established parts department.

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