

WORKING IN THE ENTERPRISE: Systems, Certifications, and Careers

12



Various careers are available in the technology field.

“I have enjoyed discovering many facets of the technology field through this course. I would like to continue learning about technology, but I am uncertain of my specific career path. What more do I need to know about the technology field and its careers?”

While you may be familiar with some of the content in this chapter, do you know how to . . .

- Manage information using the five components of information literacy?
- Effectively research and compose a project?
- Set up your home office for telecommuting?
- Explain why those who use unlicensed software may be committing a crime?
- Explain issues surrounding outsourcing of jobs?
- Describe issues that may arise when someone jailbreaks a smartphone or mobile device?
- Start your job search online?
- Create a professional online presence?
- Explain how social media can help your job search?
- Use LinkedIn?
- Create a video resume?
- Create an online survey?

In this chapter, you will discover how to perform these tasks along with much more information essential to this course. For additional content available that accompanies this chapter, visit the free resources and premium content. Refer to the Preface and the Intro chapter for information about how to access these and other additional instructor-assigned support materials.

© hacobob / Shutterstock.com; © Monkey Business Images / Shutterstock.com; © iStockPhoto / anyaiwanova; © StockLite / Shutterstock.com; © Jenner / Fotolia; Source: Illinois State University





© hacohob / Shutterstock.com

Objectives

After completing this chapter, you will be able to:

- 1 Identify the qualities of valuable information
- 2 Describe various information systems used in an enterprise
- 3 Identify the components of and steps in information literacy
- 4 Describe career opportunities available in these segments of the computer industry: general business and government organizations and their IT departments; technology equipment field; software and apps field; technology service and repair field; technology sales; technology education, training, and support field; and IT consulting
- 5 Identify job titles and responsibilities for various technology jobs
- 6 Identify mobile app development strategies
- 7 Identify ways to prepare for certification
- 8 Describe the general areas of IT certification
- 9 Identify ways to begin a job search
- 10 Explain how to create a professional online presence

The Technology Industry

Nearly every job requires you to interact with technology to complete projects, exchange information with coworkers, and meet customers' needs. The technology field provides many opportunities for people of all skill levels and interests, and a demand for computer professionals continues to grow. Figure 12-1 identifies some technology-related careers available to today's college graduates. You can use both social media and job search websites to learn about technology careers and to promote yourself to potential employers. By creating a professional online presence, hiring managers can learn more about you beyond what you can convey in a traditional one-page paper resume.

As new technologies emerge, organizations look for potential employees who possess skills and a desire to learn and who are comfortable using all types of technology. This chapter discusses the various types of information systems you may encounter in an organization, as well as technology professionals with whom you might interact. It also explores current technology careers and how you can prepare for them.



Figure 12-1 The technology industry offers many rewarding careers.

© iStockPhoto / jayfish

Information Systems in the Enterprise



Technology Trend

Discover More: Visit this chapter's free resources to learn about crowd sourcing.

Businesses, and their employees, use many types of systems. A system is a set of components that interact to achieve a common goal. A billing system, for example, allows a company to send invoices and receive payments from customers. Through a payroll system, employees receive paychecks — often deposited directly into their bank accounts. A manufacturing system produces the goods that customers order. Very often, these systems also are information systems. Recall from Chapter 11 that an **information system** is a set of hardware, software, data, people, and procedures that work together to produce information. Information systems support daily, short-term, and long-range information requirements of users in a company.

To assist with sound decision making, information must have value. For it to be valuable, information should be accurate, verifiable, timely, organized, accessible, useful, and cost effective.

- Accurate information is error free. Inaccurate information can lead to incorrect decisions. For example, consumers assume their credit reports are accurate. If your credit report incorrectly shows past-due payments, a bank may not lend you money for a vehicle or a house.
- Verifiable information can be proven as correct or incorrect. For example, security personnel at an airport usually request some type of photo identification to verify that you are the person named on the ticket.
- Timely information is useful only within a specific time period. A decision to build additional schools in a particular district should be based on the most recent census report — not on one that is 10 years old. Most information loses value with time. Some information, however, such as information about trends, gains value as time passes and more information is obtained. For example, your transcript gains value as you take more classes.
- Organized information is arranged to suit the needs and requirements of the decision maker. Two different people may need the same information presented in a different manner. For example, an inventory manager may want an inventory report to list out-of-stock items first. The purchasing agent, instead, wants the report alphabetized by vendor.
- Accessible information is available when the decision maker needs it. Having to wait for information may delay an important decision. For example, a sales manager cannot decide which sales representative deserves the award for highest annual sales if the December sales have not been entered in the database yet.
- Useful information has meaning to the person who receives it. Most information is important only to certain people or groups of people. Always consider the audience when collecting and reporting information. Avoid distributing useless information. For example, an announcement of an alumni association meeting is not useful to students who have not graduated yet.
- Cost-effective information should provide more value than it costs to produce. An organization occasionally should review the information it produces to determine if it still is cost effective to produce. Some organizations create information only on demand, that is, as people request it, instead of on a regular basis. Many make information available online so that users can access it as they need it.

Discover More: Visit this chapter's free resources to learn more about daily, short-term, and long-range information requirements of users.

Functional Units

A large organization, commonly referred to as an enterprise, requires special computing solutions because of its size and geographic distribution. A typical enterprise consists of a wide variety of departments, centers, and divisions — collectively known as functional units. Examples of functional units include human resources, manufacturing, and customer service.



Technology Innovator

Discover More: Visit this chapter's free resources to learn about Wikimedia Foundation and its founder, Jimmy Wales.

Some information systems are used exclusively by only one type of functional unit within the enterprise. Table 12-1 lists some of the more common information systems that are used by functional units in a typical enterprise. Other information systems that support activities of several functional units include enterprise resource planning, document management systems, and content management systems.

Table 12-1 Information Systems Used Exclusively by Functional Units in an Enterprise

Functional Unit	Information System
Human Resources (HR)	<ul style="list-style-type: none"> • A <i>human resources information system (HRIS)</i> manages one or more administrative human resources functions, such as maintaining and managing employee benefits, schedules, and payroll.
Engineering or Product Development	<ul style="list-style-type: none"> • <i>Computer-aided engineering (CAE)</i> aids in the development and testing of product designs, and often includes CAD (computer-aided design).
Manufacturing	<ul style="list-style-type: none"> • <i>Computer-aided manufacturing (CAM)</i> controls production equipment, such as drills, lathes, and milling machines. • <i>Material Requirements Planning (MRP)</i> monitors and controls inventory, material purchases, and other processes related to manufacturing operations. • <i>Manufacturing Resource Planning II (MRP II)</i> is an extension of MRP that also includes product packaging and shipping, machine scheduling, financial planning, demand forecasting, tracking labor productivity, and monitoring product quality.
Marketing	<ul style="list-style-type: none"> • Market research systems analyze data gathered from demographics and surveys.
Sales	<ul style="list-style-type: none"> • <i>Salesforce automation (SFA)</i> helps salespeople manage customer contacts, schedule customer meetings, log customer interactions, manage product information, and place customer orders.
Customer Service	<ul style="list-style-type: none"> • <i>Customer relationship management (CRM)</i> manages information about customers, past purchases, interests, and the day-to-day interactions, such as phone calls, email messages, web communications, and Internet messaging sessions.

© Cengage Learning



Technology Trend

Discover More: Visit this chapter's free resources to learn about how employees and others can monitor their health status.

Enterprise Resource Planning

Enterprise Resource Planning (ERP) integrates MRP II with the information flow across an organization to manage and coordinate the ongoing activities of the enterprise, including product planning, manufacturing and distribution, accounting and finance, sales, human resources, and customer support.

Advantages of ERP include complete integration of information systems across departments, better project management, and improved customer service. Complete integration means information is shared rapidly, and management receives a more complete and timely view of the organization through the information. Project management software often is standardized across an enterprise so that different parts of the enterprise easily can integrate and collaborate on their planning and logistics. Figure 12-2 illustrates how ERP encompasses all major activities of an enterprise.



Figure 12-2 ERP encompasses all of the major activities throughout an enterprise.

© Hurst Photo / Shutterstock.com; © Monkey Business Images / Shutterstock.com; © PKIV1 / iStockphoto.com; © Bartłomiej Magierowski / Shutterstock.com; © Inti St Clair / Getty Images; © iStockphoto / choicegraphx; © John Penezic / Shutterstock.com; © lucadp / Shutterstock.com; © Andresr / Shutterstock.com; © baki / Shutterstock.com; © StockLite / Shutterstock.com; © wavebreakmedia / Shutterstock.com; © Tumar / Shutterstock.com; © Cengage Learning

Document Management Systems

Some organizations use document management systems to make collaboration possible among employees. A **document management system (DMS)** allows for storage and management of a company's documents, such as word processing documents, presentations, and spreadsheets. A central library stores all documents within a company or department. The system supports access control, security, version tracking of documents, and search capabilities; it also gives users the ability to check out documents to review or edit them and then check them back in when finished. This information can be used for searches within the document repository. Web-based application document management systems allow individuals and any organization to enjoy the benefits of document management systems as applications running in a browser. Users are granted access to certain parts of the repository, depending on their needs.

Discover More: Visit this chapter's free resources to learn more about web-based application document management systems.

Content Management Systems

A **content management system (CMS)** enables and manages the publishing, modification, organization, and access of various forms of documents and other files, including media and webpages, on a network or the web. CMSs include information about the files and data (metadata). For example, the metadata for a company's employee manual may include the author's name, revision number, a brief summary, and last revision date. A CMS also provides security controls for the content, such as who is allowed to add, view, and modify content and on which content the user is allowed to perform those operations.

Users add content to a CMS through a graphical user interface or webpage. Based on the user's actions, the CMS processes content, categorizes the content, indexes the content so that it later can be searched, and stores the content. Users then access the content stored in the system through a website, company portal, or other application. Read Secure IT 12-1 for security issues related to CMSs.



BTW

DMS and CMS

A CMS (content management system) typically includes a DMS (document management system).



Internet Research

What are popular content management systems?

Search for: popular content management systems



SECURE IT 12-1



How Secure Are Content Management Systems?

Content management systems (CMSs) control many websites and online applications. Much of their popularity is due to their ease of use, especially because CMS operators need minimal technical skills to organize and update documents and files. This simplicity, however, is one reason cyberthieves can accomplish malicious attacks. The operators' lack of networking and security knowledge exposes the CMSs to security risks, especially distributed denial of service attacks (discussed in Chapter 5).

The United States Computer Emergency Readiness Team (US-CERT) and other organizations assess CMS vulnerabilities and offer specific actions for operators to follow. These practices include limiting the amount of website content that is displayed automatically, installing updates regularly, changing passwords, removing unused files, and using antivirus programs.

Because of the CMS's vulnerabilities, some security experts recommend the alternative of using HTML and uploading webpages to a web server. HTML allows the programmer to specify precisely how the custom page will

be displayed instead of relying on the CMS's templates. It also alleviates the need to install software upgrades and security updates. A person skilled in HTML programming may be able to develop and maintain a small, static website more quickly than having to conquer the steep learning curve that is associated with some CMSs.

Consider This: Under which circumstances would a company consider coding HTML directly, rather than maintaining a CMS to develop its website? How would a company evaluate and select a particular CMS?



CONSIDER THIS

What are uses of a CMS?

Publishing entities, such as news services, use CMSs to keep websites and web feeds up to date. As news or information is published, it is categorized and updated on the appropriate sections of the website. For example, a sportswriter may submit a story to the CMS and add metadata that indicates the story is a headline story. The CMS categorizes the story so that it is displayed as the first item with a large headline on the sports section of the website and included in the sports section's web feed. The CMS indexes the information in the story so that users who search the website based on keywords in the story will find a link to the story. Bloggers use CMSs to post to their blogs without having to format each entry manually in HTML. Blog posts can be categorized so that readers can search by category for posts on the same topic. Blogs also are searchable. Readers can use the CMS to comment on blog posts, and the blog owner may need to approve the comments before they are published.

Other Enterprise-Wide Information Systems

Some enterprise-wide information systems focus on the collection, organization, and sharing of information so that users can make decisions based on an up-to-date and accurate view of the information. The following sections discuss these information systems.

Transaction Processing Systems A *transaction processing system (TPS)* is an information system that captures and processes data from day-to-day business activities. Examples of transactions are deposits, payments, orders, and reservations. When you use a credit card to purchase an item, you are interacting with a transaction processing system.



BTW

TPS

Transaction processing systems were among the first computerized systems that processed business data. Many people initially used the term, data processing, to refer to the functions of these systems.

Information systems use batch or online transaction processing systems (Figure 12-3). With *batch processing*, the computer collects data over time and processes all transactions later, as a group. With *online transaction processing (OLTP)*, the computer processes each transaction as it is entered. For example, when you book a flight on the web, the airline probably uses OLTP to schedule the flight, book the flight, and send you a confirmation message.

Most transaction processing systems today use OLTP because users need information immediately. For some routine processing tasks, such as printing monthly invoices or weekly paychecks, they use batch processing.

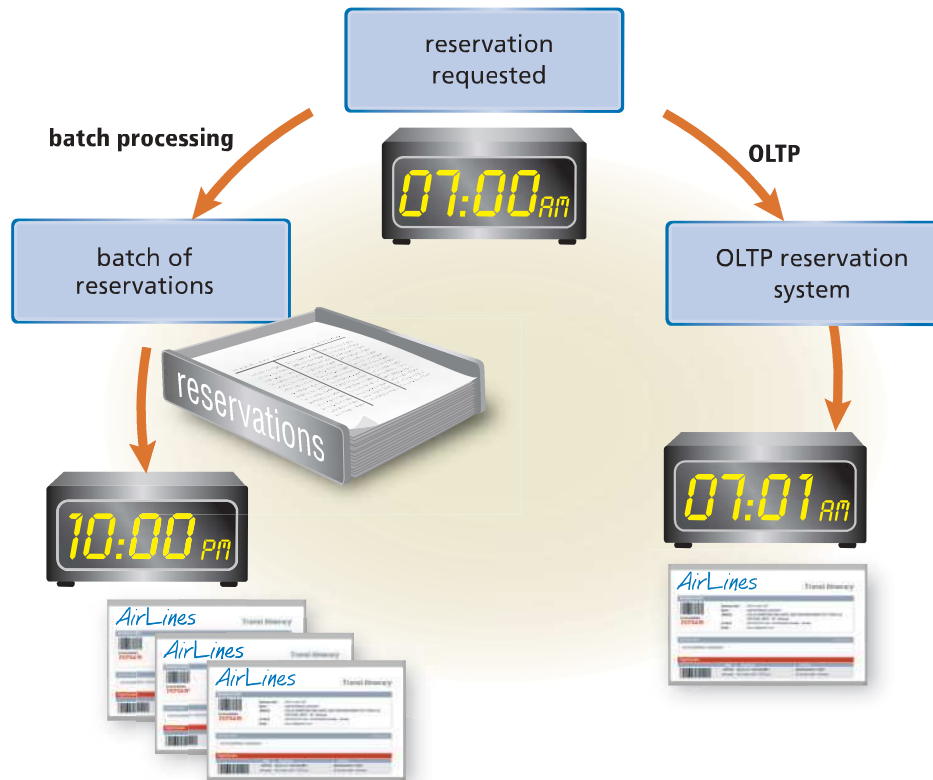


Figure 12-3 With batch processing, all reservations would be processed together at the end of the day. With OLTP, by contrast, reservations are processed immediately.

© Cengage Learning

Management Information Systems A **management information system (MIS)** is an information system that generates accurate, timely, and organized information, so that managers and other users can make decisions, solve problems, supervise activities, and track progress. Management information systems often are integrated with transaction processing systems and focus on creating information that managers and other users need to perform their jobs.

A management information system creates three basic types of reports: detailed, summary, and exception (Figure 12-4). A *detailed report* usually lists just transactions. For example, a Detailed Flight Report lists the number of passengers booked for a given flight. A *summary report* consolidates data usually with totals, tables, or graphs, so that managers can review it quickly and easily. An *exception report* identifies data outside of a normal condition. These out-of-the-ordinary conditions, called the *exception criteria*, define the normal activity or status range. For example, a Premier Club Booking Exception Report notifies the airline's marketing department that some flights have not met minimum goals for booking Premier Club members.

Discover More: Visit this chapter's free resources to learn more about how managers coordinate resources to make decisions.

Detailed Flight Report for Flight #328				
Passenger Name	Gender	Birthdate	Seat	Premier Club
Adams, Latisha	F	4/25/92	3C	Y
Brewer, Milton	M	10/14/45	22F	N
Cam, Lin	F	12/16/91	2A	Y
Canaan, Lana	F	4/12/90	21A	N
Cole, Kristina	F	5/10/79	16C	N
Drake, Louella	F	3/4/81	4A	Y
Galens, Lynette	F	11/2/75	2C	N
Gilbert, Laura	F	2/20/78	4F	N
Henreich, Max	M	3/10/85	17C	Y
Hidalgo, Ronald	M	10/15/44	3F	Y
Marsh, Constance	F	11/5/82	2C	N
McGill, Teresa	F	2/27/73	16F	Y
Moretti, Leo	M	9/22/90	17A	Y
Nitz, Dawn	F	7/12/65	3F	N
Ruiz, Albert	M	2/13/93	10D	Y
Stein, Michelle	F	8/16/50	3A	N
Tu, Benjamin	M	1/16/77	22C	N
Van Wijk, Fred	M	6/9/89	10A	Y
Warner, Betty	F	7/1/58	16A	N

Summary Flight Report for March 30

Flight #	Origin/ Destination	Passengers	Premier Club Members
1048	ORD – RSW	108	33
543	ORD – BMI	24	12
715	ORD – LAX	160	62
701	ORD – JFK	26	10

Exception Flight Report for March 30

Flight #	Class	Origin/ Destination	Premier Club Members	Premier Club Member Goal
1048	A	ORD – RSW	1	4
701	C	ORD – JFK	3	5

Figure 12-4 Three basic types of reports generated in an MIS are detailed, summary, and exception.

© Cengage Learning

Decision Support Systems A decision support system (DSS) helps users analyze information and make decisions (Figure 12-5). Some decision support systems are company specific and designed solely for managers. Others are available to everyone on the web. Programs that analyze data, such as those in a decision support system, sometimes are called *online analytical processing (OLAP)* programs.

A decision support system uses data from internal and external sources. Internal sources of data might include databases, sales orders, MRP and MRP II results, inventory records, or financial data from accounting and financial analyses. Data from external sources could include interest rates, population trends, or raw material pricing.

Some decision support systems include their own query languages, statistical analyses, spreadsheets, and graphics that help users retrieve data and analyze the results. Some also allow managers to create a model of the factors affecting a decision.



Figure 12-5 This decision support system helps managers analyze sales by product and by sales rep.

Courtesy of Dundas Data Visualization, Inc.



Technology Innovator

Discover More: Visit this chapter's free resources to learn about Ray Kurzweil (technology inventor and futurist).



Internet Research

What are recent developments in artificial intelligence?

Search for: artificial intelligence applications

Expert Systems An **expert system** is an information system that captures and stores the knowledge of human experts and then imitates human reasoning and decision making (Figure 12-6). Expert systems consist of two main components: a knowledge base and inference rules. A *knowledge base* is the combined subject knowledge and experiences of the human experts. The *inference rules* are a set of logical judgments that are applied to the knowledge base each time a user describes a situation to the expert system.

Expert systems help all levels of users make decisions. Enterprises employ expert systems in a variety of roles, such as answering customer questions, training new employees, and analyzing data. Expert systems also successfully have resolved such diverse problems as diagnosing illnesses, searching for oil, and making soup.



Figure 12-6 This company's restaurant advisor expert system recommends a restaurant based on a user's answers to specific questions.

Courtesy of Exsys



CONSIDER THIS

How do expert systems relate to artificial intelligence?

Expert systems are a component of artificial intelligence. **Artificial intelligence (AI)** is the application of human intelligence to computers. Artificial intelligence technology senses a person's actions and, based on logical assumptions and prior experience, takes the appropriate action to complete the task. Artificial intelligence has a variety of capabilities, including speech recognition, logical reasoning, and creative responses.

Mini Feature 12-1: Information Literacy

To adequately manage information, you should know how to use the five components of information literacy and also know the steps in effective research and composition. Read Mini Feature 12-1 to learn about information literacy.


MINI FEATURE 12-1

Information Literacy

Managing the vast amount of information inundating us daily can be an overwhelming task, not only for those involved in technology careers, but also for any digital citizen. This twenty-first century skill set, called *information literacy*, prepares students, employees, and citizens to manage information so that they can be knowledgeable decision makers.

Defining Information Literacy

More than 25 years ago, the American Library Association was the first organization to recognize the importance of information literate citizens. As the web and the Internet became a mainstay in education, business, and home environments, experts realized that the traditional basic literacy skills of reading, writing, and arithmetic were insufficient for living a productive life. According to the Association of College & Research Libraries, also needed are lifelong skills “to locate, evaluate, and use effectively the needed information.”

Information Literacy Components

An individual’s quality of existence depends upon obtaining quality information. Information literate people know how to locate meaningful sources that can be used to solve problems, make decisions, and set goals. The following five categories are recognized as integral literacy components:

- **Digital literacy:** Using computers, mobile devices, the Internet, and related technologies effectively is a necessity in business and society. Also important is an understanding of the general concerns of having computers in the world, including their integration in employment and education and their effects on national and personal security.
- **Library instruction:** Undergraduates rarely seek the help of librarians when performing academic research. This lack of help may be due, in part, to the fact that the students misunderstand the role of the reference librarian. Information literate individuals use the librarians’ expertise in locating relevant sources. They also understand the necessity of using citations, how information is cataloged and organized, search strategies, and the process of locating and evaluating resources.
- **Media literacy:** Skills needed to understand how mass communication and popular culture affect learning and entertainment include the ability to evaluate and analyze how music, film, video, television, and other nonprint media are used effectively to persuade and inform.
- **Numerical literacy:** The ability to use basic math skills and interpret data is essential to solving problems and communicating information. Also important are

understanding how data is gathered and presented in graphs, charts, and other visuals and how to interpret and verify information presented in media.

- **Traditional literacy:** Individuals who can read and understand a variety of documents are likely to complete their educations, obtain employment, and participate in community groups. They also need to think critically about the material they have read and to express their thoughts by writing and speaking coherently.

Steps in Effective Research and Composition

Locating appropriate material, organizing these sources, and producing the final document require effort and careful thought. The following paragraphs discuss steps you should take when crafting research, thinking critically, and drafting strategies:

- **Establish an appropriate topic.** Identify the purpose and audience. Determine an effective method of communicating the information, such as a written paper, oral presentation, or blog. Explore and narrow the topic so that it is manageable within time and logistical constraints. Determine the audience’s familiarity with the topic and the need to find reference materials.
- **Identify sources.** Determine where to locate electronic and print resources, including websites, media, databases, and printed materials. Differentiate between primary and secondary sources, popular and scholarly articles, and current and historical materials.
- **Evaluate materials.** Analyze the sources to determine reliability, accuracy, timeliness, and bias. Compare the materials to determine if the authors agree or disagree with topics.
- **Create the final work.** Organize and integrate the source material using direct quotations, paraphrases, and summaries. Document the work to credit sources and avoid plagiarism. Integrate photos, charts, and graphs when necessary to clarify the message. Use the writing process to create, review, revise, and proofread.

Discover More: Visit this chapter’s free resources to learn more about information literacy components and the steps in effective research and composition.

- **Consider This:** Test your skills at effective research by examining a website for a vehicle you would consider purchasing. Describe the photos, colors, placement of objects, and description. Who is the intended audience? Is any information missing from the website? What message is the company attempting to send? Do you think the message achieves its purpose?



© Dragana Gerasimoski / Shutterstock.com



© Pertusinas / Shutterstock.com



© Iemych / Shutterstock.com

NOW YOU SHOULD KNOW

Be sure you understand the material presented in the section titled Information Systems in the Enterprise as it relates to the chapter objectives.

Now you should know...

- Whether information is valuable (Objective 1)
- Which enterprise information systems you have used (Objective 2)
- How you can be information literate (Objective 3)

Discover More: Visit this chapter's premium content for practice quiz opportunities.

**New Technologies**

As new technologies and trends emerge, you should stay informed about them to ensure your relevance in the technology market.

Technology Careers

With billions of dollars in annual revenue, the technology industry is a major source of career opportunities worldwide. This industry has created thousands of high-tech career opportunities, even in organizations whose primary business is not technology-related. As technology changes, so do the available careers and requirements. New careers are available in social media and mobile technologies that did not exist a few years ago. For this reason, you should stay up to date with technology developments.

General Business and Government Organizations and Their IT Departments

Business and government organizations of all sizes use a variety of computers, mobile devices, and other technology. Most use networks to ensure seamless communications among employees,

vendors, and customers. They also use webpages, email, mobile apps, online social networks, and more to communicate with the public.

Larger organizations use computers and other technology to answer and route phone calls, process orders, update inventory, and manage accounts receivable, accounts payable, billing, and payroll activities. Many use mobile devices, web conferencing, and VPNs (virtual private networks) to stay connected with employees who work in other locations or who telecommute (Figure 12-7). Read How To 12-1 for tips related to setting up a home office for telecommuting. Read Ethics & Issues 12-1 to consider whether telecommuting is good or bad for business.



Figure 12-7 Some organizations allow employees to telecommute.


© Goodluz / Shutterstock.com

HOW TO 12-1

Set Up Your Home Office for Telecommuting

Telecommuting mutually benefits employers and employees. Employers do not have to pay for the physical infrastructure (including office space and parking) for the employee, and telecommuters often work more hours than those who physically commute to an office. Employees benefit from not having to commute and from having a comfortable work environment. The following guidelines describe how to set up your home office for telecommuting:

- Choose a location in your home that is free from noise and distractions. If your home is occupied by others during the hours you plan to telecommute, your office should be located away from potentially noisy areas. For example, an office next to a room where someone else is watching television may not be an ideal choice.
- Make sure your office has a comfortable desk and chair. Although it may be tempting to sit on your couch with your laptop while you work, having a professional workspace will increase productivity.
- Consider acquiring additional furniture, such as a file cabinet and bookshelf, especially if you plan to store files and books for reference.
- If required, verify your office has a sufficient Internet connection. If you are using a wired connection, one should be available near your desk. If you are using a wireless network, make sure the signal strength is sufficient in your office.
- Make sure the office has a phone to place and receive calls. If you will be relying on a mobile phone, verify your phone can receive a strong signal and has a conveniently located charger and power outlet.
- Use a headset with your phone to minimize background noise.
- Obtain supplies that typically are found in an office setting, such as writing utensils, paper, tape, a stapler, paper clips, and sticky notes.
- If your employer does not provide a computer for your use, make sure your computer is sufficiently equipped to complete your job tasks. Make sure you also have accessories, such as USB flash drives and other external storage media, if necessary.
- Consider obtaining an all-in-one printer that can print scan, copy, and fax (if necessary), as well as extra printer cartridges.

 **Consider This:** What other equipment, supplies, and furniture would you prefer to have in an office from where you telecommute?

ETHICS & ISSUES 12-1

Is Telecommuting Good or Bad for Business?

Studies show that nearly 80 percent of workers dream of leaving the confines of an office to work from the comfort of home, at least part of the time. Although employees may view working from home as an ideal situation, some bosses do not agree. An Internet CEO, for example, made news when she reviewed data such as employees' sign-ins to the company's VPN (virtual private network) and discovered that many employees were not working during company hours. As a result, the CEO made the decision to end telecommuting at her company.

Supporters cite reduced pollution and commuting time. Other benefits include increased productivity due to lack of

office gossip and politics. Many feel that they could not be as dedicated to their jobs without telecommuting because of the flexible hours and closeness to home. Others feel that trusted employees should have the privilege if they earn it. Companies benefit by saving on resources, such as office space.

Opponents claim that some lack the self-discipline to work remotely. Employees may be distracted more easily without direct management supervision. Some workers have difficulty setting appropriate boundaries regarding childcare or other family obligations. Additionally, productivity actually may decrease if employees stagger work hours to fit their schedule, limiting times when employees can schedule meetings.

Many experienced workers agree that telecommuting cannot replace valuable face-to-face time with coworkers, vendors, and customers. Some workers fear telecommuting because they feel that the lack of a personal relationship with managers puts them at the top of the list for downsizing.

Consider This: Is telecommuting good or bad for business? Why? Are some businesses or positions better suited for telecommuting? If so, which ones? Do some people lack the self-discipline to be productive while telecommuting? If so, how should managers determine whether to allow this practice and who may participate?

Most medium and large businesses and government organizations have an IT (information technology) department. IT staff are responsible for ensuring that all the computer operations, mobile devices, and networks run smoothly. They also determine when and if the organization requires new hardware, mobile devices, or software. Usually, these jobs are divided into the following areas:

- Management — directs the planning, research, development, evaluation, and integration of technology.
- Research and software development — analyzes, designs, develops, and implements new information technology and maintains and improves existing systems.
- Technical support services — evaluates and integrates new technologies, administers the organization's data resources, and supports the centralized computer operating system and servers.
- Operations — operates the centralized computer equipment and administers the network, including both data and voice communications.
- Training/Support — teaches employees how to use components of the information system or answers specific user questions.
- Information security services — develops and enforces policies that are designed to safeguard an organization's data and information from unauthorized users.
- Marketing/Strategy — directs and implements Internet and social media marketing, and manages customer relationships.



Technology Innovator

Discover More: Visit this chapter's free resources to learn about Meg Whitman (technology business executive).

Technology Equipment

The *technology equipment field* consists of manufacturers and distributors of computers, mobile devices, and other hardware, such as magnetic and optical drives, monitors, printers, and communications and networking devices. In addition to the companies that make end-user equipment, thousands of companies manufacture components used inside a computer or mobile device, such as chips, motherboards, cables and connectors, and power supplies.

Available careers in this field include positions with companies that design, manufacture, and produce computers and input, output, communications, mobile, and networking devices. Careers include designing and fabricating chips, testing internal components (Figure 12-8), assembling computers and devices, and packing finished products.

Discover More: Visit this chapter's free resources to learn about technology equipment manufacturers.

Software and Apps

The *software and apps field* consists of companies that develop, manufacture, and support a wide range of software and apps for computers, the web, and mobile devices. Some companies specialize in a particular type, such as productivity software or tools, or focus on a device type. Other companies — especially larger firms, such as Microsoft — produce and sell many types of software that work with both computers and mobile devices and may use Internet services to sync data among devices or provide collaborative features.


Some employees develop desktop, web, and mobile apps, such as productivity software, games, simulations, and more; others develop operating systems and related tools. Read Secure IT 12-2 to consider how unlicensed software affects software publishers.

Discover More: Visit this chapter's free resources to learn about leading software companies.



Figure 12-8 This lab technician tests internal computer components.

© iStockPhoto / anyaivanova

 SECURE IT 12-2 **Using Unlicensed Software Is a Crime**


Software publishers own the copyright to their products. These companies are on the lookout for copies of their software that have been duplicated, distributed, or used without their permission. The pirated software denies these publishers revenue they would have earned from sales, which they could have used to produce new products and improve current products. A recent Business Software Alliance (BSA) Global Software Survey revealed that 43 percent of all software has been installed without proper licensing, including one in five pieces in the United States. This software is valued at more than \$62 billion.

Software may be considered unlicensed in a number of circumstances: it could have been downloaded illegally from file-sharing websites, it could have an expired license, or it could be installed on multiple computers when the license specifies use on only one computer. Using unlicensed software violates copyright laws and is subject to serious

criminal and civil penalties up to \$150,000 for each illegal copy. It is important, therefore, to understand when software can be copied legally. In most circumstances, the software owner can make one copy of the software for backup purposes. Many people make multiple copies, however, either to share or to sell. Often the sharing is done online. In one survey, more than 50 percent of students and 25 percent of instructors admitted that they have copied or would copy software illegally.

People and companies copy software illegally for a variety of reasons, insisting that software prices are too high, that software often is copied for educational or other altruistic purposes, that copied software makes people more productive, that no restrictions should be placed on the use of software after it is purchased, and that software copying is a widespread practice. They also may not be aware that their actions are illegal, but ignorance is not an excuse for illegal actions.

Along with the risk of facing litigation, people and businesses using unlicensed software risk data theft and unauthorized access to their information because they are not receiving program updates and patches that could prevent hacking attempts. If people discover unlicensed software being used on a computer at work or at school, the best practice is to report this situation to managers or IT authorities. The Business Software Alliance encourages people to call its hotline and promises to keep the information confidential.

 **Consider This:** What penalties should be imposed for using unlicensed software? Why? Can you counter the reasons people give for copying software illegally? How? Would you copy software illegally, even if your boss told you to copy it? Why or why not? Should software vendors be allowed to probe your computer secretly for illegally installed software? Why or why not?

Technology Service and Repair

The *technology service and repair field* provides preventive maintenance, component installation, and repair services to customers (Figure 12-9). Some technology service technicians possess general knowledge that enables them to work with a variety of devices from different manufacturers. Other technicians receive training and certifications directly from manufacturers to specialize in devices from that manufacturer. This work is best suited for those individuals who like to troubleshoot and solve problems and who have a strong background in electronics.

Many technology equipment manufacturers include diagnostic software with their computers and devices that assists technicians in identifying problems. Today's technology also allows technicians to diagnose and repair software problems from a remote location; that is, the technician accesses the user's hard drive or smartphone from a different location. Read Ethics & Issues 12-2 to consider the trustworthiness of computer repair services.

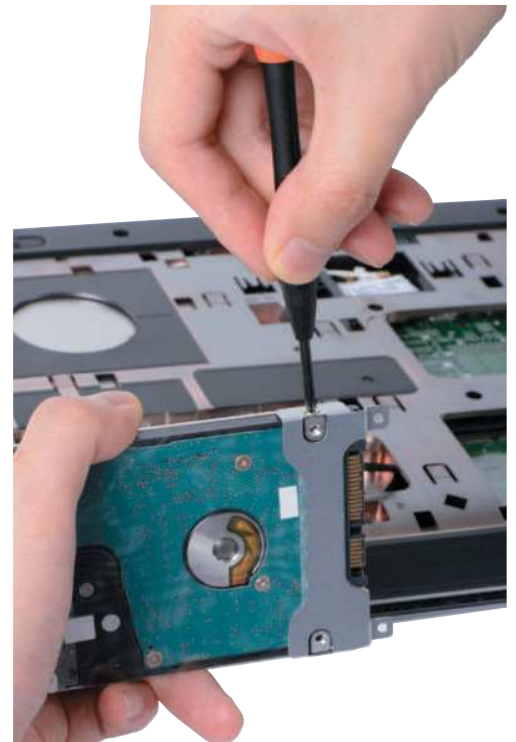


Figure 12-9 This repair technician is replacing a laptop hard drive.

© iStockPhoto / theJIPEN

ETHICS & ISSUES 12-2

Can You Trust Data Recovery or Computer Repair Services?

While doing legitimate data recovery and device support tasks, IT workers and computer repair technicians often have access to confidential information. Most often you need to provide your password and access to your network, computer, or device during service. In doing so, you also give access to financial information, confidential records, email and other communications, and passwords. The result could be leaked information or identity theft.

IT workers often sign agreements with organizations stating that they will not access any information that is not critical

to their jobs. Information systems at many government agencies and some organizations log all access to sensitive information. In some high-profile cases, organizations fired or suspended workers after log information proved they violated policies.

In one state, the law requires computer repair technicians who review or analyze data to have a private investigator license. The law implies that the technician is performing an investigation, in a sense, when business managers and parents hire them to analyze the computer usage habits of employees or children.

Privacy experts recommend backing up and wiping all data before turning over your

computer or device to an IT or computer repair technician. You may assume that these professionals likely will follow ethical guidelines. It can be difficult, however, to repair the effects of unauthorized access, use, or distribution of your data.

Consider This: What should the consequences be for IT or computer repair technicians who access unauthorized data? Why? Would licensing and requiring training lessen the impact of unauthorized access? Why or why not? How can you protect your data when repairing or servicing your computer or device?

Technology Sales

Technology salespeople must possess a general understanding of technology and a specific knowledge of the product they are selling. Strong people skills are important, including a keen listening ability and superior verbal communications. Technology salespeople generally determine buyers' needs and direct buyers toward devices, computers, and apps that meet their needs.



Figure 12-10 A salesperson in an electronics store shows a digital camera to customers.
© dotshock / Shutterstock.com

Some salespeople work directly for technology equipment manufacturers, mobile device manufacturers, or software manufacturers. Others work for resellers, including retailers that sell personal computer products. The technology salesperson in a retail store often is a suitable entry-level job for students working toward a certificate or degree in computer-related fields (Figure 12-10). Before consulting the opinion of a salesperson, be sure to independently research the product so that you can better determine whether answers to your questions are unbiased. Read How To 12-2 to learn how to evaluate extended warranty options.

HOW TO 12-2

Evaluate Extended Warranty Options

When you purchase electronic devices, such as computers and mobile devices, retailers and third-party vendors typically offer an extended warranty on the computer or device. These warranties, which are available for a fee, offer services that extend beyond what the device's manufacturer's warranty covers. For example, extended warranties may include replacing parts that break after the manufacturer's warranty expires, accidental damage, or replacing parts that become worn as a result of normal wear and tear. The following guidelines describe how to evaluate extended warranty options:

- Extended warranties can be offered by the manufacturer, retailer, or a third party. Extended warranties offered by a third party sometimes can be less expensive, but it may be more difficult to obtain service for your device. With an extended warranty that is offered by the manufacturer or retailer, it may be easier and faster to obtain service.
- Evaluate the manufacturer's warranty and what it covers. You may find that the additional coverage an extended warranty

provides may not be worth the cost, so do your research first on the manufacturer's warranty. Do not rely on a salesperson to inform you of what a manufacturer's warranty does and does not cover.

- Determine an appropriate length for the extended warranty. For example, if you believe the device will be used for only three years before you will consider replacing it, do not purchase a warranty that extends longer than three years.
- Compare the cost of the warranty with costs associated with repairing or replacing the device. It may be less expensive to pay for one or two repairs instead of purchasing an extended warranty.
- Carefully research devices before you purchase them. Read reviews from people who have purchased the same device, and stay away from devices that are prone to problems. By purchasing a reliable device, you reduce the need for an extended warranty.
- Consider purchasing accidental damage protection. This protection offers either

a repair or replacement of devices that are damaged accidentally. For example, if you drop your phone and the screen cracks, accidental damage protection may cover the repair. The number of repairs or replacements offered through an accidental damage protection plan may be limited, so do your research before purchasing it.

- Do not fall for sales tactics. Salespeople often earn commission or receive incentives for selling extended warranties. For this reason, they will make every effort to convince you of the possibility that something could go wrong. Educating yourself and determining the risk you want to take before purchasing your device will help you make a more informed decision about purchasing an extended warranty.

Consider This: Have you ever purchased an extended warranty? What other factors do you consider when determining whether to purchase an extended warranty?

Technology Education, Training, and Support

Schools, colleges, universities, and private companies all need qualified educators to provide technology-related education and training. The high demand in this field has led to a shortage of qualified instructors at the college level as instructors increasingly move to careers in private industry, which offers the promise of higher pay.

Corporate trainers teach employees how to use software and apps, design and develop systems, write programs, integrate and sync data from apps used on multiple devices, and perform other technology-related activities (Figure 12-11). Many large companies use their own training departments.

Corporations usually require less educational background for trainers than educational institutions require for instructors.

In a more informal setting, a help desk specialist answers hardware, software, and networking questions in person, over the phone, or electronically via email or a chat room. Educational requirements for help desk specialists are less stringent than they are for other careers in the technology field. The help desk specialist position is an ideal entryway into the IT field.



Figure 12-11 A corporate trainer shows employees how to use new software.

© Jenner / Fotolia



BTW

Instructors

Your instructors may be helpful resources when you are looking for a job. Because of their professional experience, they may be able to connect you with potential employers, recommend classes you should take, or suggest internship opportunities.

IT Consulting

Technology professionals sometimes become IT consultants after gaining experience in one or more technology-related areas, such as software development, systems analysis and design, network configuration, developing mobile devices, using social media, or web development. An **IT consultant**, typically hired based on expertise, provides technology services to his or her clients. Large enterprises often hire teams of consultants to offer advice about technology-related concerns. IT consultants must possess strong technical skills in their specialized area and must be able to communicate effectively to clients. Read Ethics & Issues 12-3 to consider the effects of outsourcing IT jobs.

ETHICS & ISSUES 12-3



Is Outsourcing Jobs Wrong?

Companies have a long history of outsourcing, or relying on outside companies to perform certain tasks. Outsourcing enables companies to find workers with specialized experience and to control costs. When a company sends jobs overseas, outsourcing becomes offshoring. A skilled computer professional in the United States typically commands a higher salary than an IT worker in other countries. To remain competitive, many companies have chosen to send computer jobs abroad.

Proponents say that the United States has a long history of outsourcing all types of work when the economics of the situation demands it. Companies feel that they have a right to choose to send business tasks abroad if it saves costs. Foreign economies benefit when companies hire and pay

workers a fair wage and provide benefits. American consumers benefit from the reduced cost of goods.

Opponents say that offshoring results in unemployment and harms the economy. Others are concerned that sensitive work, such as health record maintenance or weapons manufacturing, could place U.S. citizens at risk. Some experts state that the work done abroad should be easy to manage and quantifiable in order to ensure it meets company standards. Some companies have received negative press due to inefficiencies in call centers and customer support located abroad.

Government officials and lawmakers struggle with policies regarding offshoring, especially with regard to taxing workers. Politicians debate whether or not companies who keep business in the United States

should receive tax breaks. Many argue that the United States should require companies who hire foreign workers to pay a fair salary and provide benefits comparable to those for American workers.

Consider This: Should the government limit a company's ability to outsource computer jobs to other countries? Why or why not? Should companies receive criticism for outsourcing jobs? Why or why not? What are some possible alternatives to outsourcing that would help to keep a company competitive? What steps can people take in their careers to avoid becoming a victim of outsourcing? Would you pay more money for goods manufactured in the United States? Why or why not?

Putting It All Together — Job Titles and Descriptions

The following sections briefly describe some of the more popular technology-related job titles for several categories of IT careers.

System Development Careers in system development require you to analyze or create software, apps, databases, websites and web-based development platforms, and networks. Some careers are listed in Table 12-2.



Table 12-2 System Development Jobs

Job Title	Job Description
Cloud Architect	Identifies business requirements, strategies, and solutions for cloud storage and services that meet a company's goals or needs
Database Designer	Specifies the structure, interface, and requirements of a large-scale database; determines security and permissions for users
Program and App Developer	Specifies, designs, implements, tests, and documents programs and apps in a variety of fields, including robotics, operating systems, animation, and applications
Systems Analyst	Works closely with users to analyze their requirements, designs and develops new information systems, and incorporates new technologies
Systems Programmer	Installs and maintains operating system software and provides technical support to the programming staff
Web Designer	Designs the layout, navigation, and overall appearance of a website with a focus on user experience; specifies a website's appearance using HTML5, JavaScript, CSS, media, and other web design technologies
Web Developer	Analyzes, develops, and supports the functionality of a website, including applications that often interact with databases or other online resources

Technology Operations Careers in technology operations require you to have knowledge about how hardware, software, and networks function. Some careers are listed in Table 12-3.

 **Table 12-3 Technology Operations Jobs**

Job Title	Job Description
Computer Technician	Installs, maintains, and repairs hardware and servers; installs, upgrades, and configures software; troubleshoots hardware problems
Help Desk Specialist/ Help Desk Technician	Answers technology-related questions in person, on the phone, or via email or an online chat room
Network Administrator/ Engineer	Installs, configures, and maintains LANs, WANs, wireless networks, intranets, Internet systems, and network software; identifies and resolves connectivity issues
Technical Project Manager	Guides design, development, and maintenance tasks; serves as interface between programmers/developers and management

Web Marketing and Social Media Careers in web marketing and social media require you to be knowledgeable about web-based development platforms, social media apps, and marketing strategies. Some careers are listed in Table 12-4.

 **Table 12-4 Web Marketing and Social Media Jobs**

Job Title	Job Description
Customer Relationship Management (CRM) Specialist	Integrates apps and data related to customer inquiries, purchases, support requests, and behaviors in order to provide a complete application that manages a company's relationships with its customers
Internet/Social Media Marketing Specialist	Directs and implements an organization's use of Internet and social media marketing, including Facebook pages, Twitter feeds, blogs, and online advertisements
Search Engine Optimization (SEO) Expert	Writes and develops web content and website layouts so that they will appear at the beginning of search results when users search for content
User Experience (UX) Designer	Plans and designs software and apps that consider a user's reaction to a program and its interface, including its efficiency, its effectiveness, and its ease of use

Data Storage, Retrieval, and Analysis Careers in data storage and analysis require you to be knowledgeable about collecting, analyzing, and reporting data from databases or the web. Some careers are listed in Table 12-5.

 **Table 12-5 Data Storage, Retrieval, and Analysis Jobs**

Job Title	Job Description
Data Scientist	Uses analytics and other Big Data tools to compile statistics on data that an organization can use to plan product development or create strategies for marketing
Database Analyst	Uses data modeling techniques and tools to analyze and specify data usage
Database Administrator	Creates and maintains the data dictionary; monitors database performance
Digital Forensics Examiner	Collects and analyzes evidence found on computers, networks, mobile devices, and databases
Web Analytics Expert	Collects and measures Internet data, such as website traffic patterns and advertising, and develops reports that recommend strategies to maximize an organization's web presence



Technology Innovator

Discover More: Visit this chapter's free resources to learn about Salesforce (cloud computing company known for its CRM software).

Information and Systems Security Careers in information and systems security require you to be knowledgeable about potential threats to a device or network, including viruses and hacking. Security specialists need to know the tools and techniques to protect against threats. Some careers are listed in Table 12-6.

 **Table 12-6 Information and Systems Security Jobs**

Job Title	Job Description
Computer Security Specialist/ Mobile Security Specialist	Responsible for the security of data and information stored on computers and mobile devices within an organization
Network Security Administrator	Configures routers and firewalls; specifies web protocols and enterprise technologies
Security Analyst	Implements security procedures and methods, looks for flaws in security of a company's devices and networks, works with and trains employees at all levels, and assigns permissions and network settings
Security System Project Manager	Develops and maintains programs and tools designed to provide security to a network
Digital Forensics Analyst	Inspects electronic data to recover documents and files from data storage devices that may have been damaged or deleted, in order to use them as evidence in a crime investigation

App Development and Mobile Technologies Careers in app development and mobile technologies require you to have knowledge about trends in the desktop and mobile app market, as well as the ability to develop secure apps for a variety of computers and mobile devices. Some careers are listed in Table 12-7.

 **Table 12-7 App Development and Mobile Technologies Jobs**

Job Title	Job Description
Desktop or Mobile Application Programmer/ Developer	Converts the system design into the appropriate application development language, such as Visual Basic, Java, C#, and Objective C, and toolkits for various platforms
Games Designer/Programmer	Designs games and translates designs into a program or app using an appropriate application development language
Mobile Strategist	Integrates and expands the company's initiatives for mobile users
Mobile Technology Expert	Develops and directs an organization's mobile strategy, including marketing and app development

Mini Feature 12-2: Mobile App Development

When creating mobile apps, selecting a strategy to develop an app is as important as describing its capabilities. Read Mini Feature 12-2 to learn about three approaches to developing mobile apps.

MINI FEATURE 12-2

Mobile App Development

Developers and technology managers should evaluate several possible approaches for creating mobile apps, and make a decision based on both technical and business considerations. Should they invest the time and money it takes to develop high-performing native apps for many different mobile operating systems? Would they be better off creating mobile web apps, written using standard web technologies, to run in a mobile browser? Or should they use a hybrid, or mixed, approach that can simplify the development process and lower development costs at the expense of a possible inconsistent user experience across platforms?

Native Apps

A *native app* is written for mobile devices running a particular mobile phone operating system, such as Google's Android, Apple's iOS, or Microsoft's Windows Phone. They offer fast performance and can store data for offline use. Native apps can access all of a device's content, including its contacts, calendar, and photos, and can interact with its hardware, including the microphone, camera, or accelerometer to measure movement and motion. For example, the native Instagram app shown in the figure below can access the device's camera to take photos.

Apps developed for a specific mobile platform or device generally will not work on another without significant modification. Creating native apps requires programming languages, presentation technologies, and development tools particular to each platform.

After testing to be sure it works properly, developers deploy, or submit, a native app to an app store for approval and distribution. When deploying native apps to Google Play, Apple's App Store, or the Windows Store, developers must ensure that their apps follow rules and conditions that their publishers issue. For example, apps must run properly, may not contain offensive content, and should notify the user when requesting the current location or access to information stored on the device. Developers pay an annual fee to publish apps in an app store. The store retains a percentage of the sales price of any apps sold as a commission.



Source: © Instagram Courtesy of Neil Litt

Mobile Web Apps

Mobile web apps are actually websites that provide a user experience similar to native apps. Developers write them using standard web technologies including HTML5, CSS, and JavaScript. Mobile web apps are not deployed to an app store; rather, they are deployed to a web server and users access them in a mobile browser. Users, therefore, always have access to the most recent version of an app. Creating a shortcut to the app's website and saving it as an icon or tile on a device's home screen provides easy access to the mobile web app. Many mobile web apps have a responsive web design, so that they will be displayed properly on devices with screens of different sizes.

Some companies choose to develop mobile web apps so that they can write one app that works on all devices that is not subject to the rules of an app store. Mobile web apps can access a limited set of device features, such as basic gestures, working offline, tap-to-call, and GPS, but do not have access to native features, such as the camera, microphone, accelerometer, and device notifications. For example, the Instagram mobile web app shown in the figure to the right runs in a browser and only displays photos, but does not allow you to take photos using your device's camera.



Source: Instagram Courtesy of Neil Litt

Hybrid Apps

A *hybrid app* combines features of native and mobile web apps. Like native apps, hybrid apps are developed for specific platforms and deployed to an app store. They can access many of a device's hardware features, such as its camera. Like mobile web apps, they are built with HTML5, CSS, and JavaScript. Developers use development tools to package this code with a browser and prepare it as a native app to deploy to popular app stores. In this way, hybrid apps are cross-platform, meaning the same code can run on many mobile platforms. This approach often saves development time and costs, but may not provide a consistent user experience or fast performance on all devices.

Discover More: Visit this chapter's free resources to learn more about development technologies for creating mobile apps.

Consider This: If an app is available as both a mobile web app and in an app store for you to download, which would you be more likely to use? Why? Suppose you have a great idea for an app, and you raise enough money to hire an experienced developer to build it for you. Would you ask the developer to code it as a web, hybrid, or native app? Why? Does your choice depend on the capabilities and requirements of the app?

NOW YOU SHOULD KNOW

Be sure you understand the material presented in the section titled Technology Careers as it relates to the chapter objectives. *Now you should know...*

- Which technology fields you find interesting (Objective 4)
- Which technology jobs you might like to pursue (Objective 5)
- How mobile apps are developed (Objective 6)

Discover More: Visit this chapter's premium content for practice quiz opportunities.

Technology Certifications

A certification demonstrates your knowledge in a specific area to employers or potential employers. Organizations often require technology certification to ensure quality standards and to confirm their workforce remains up to date with respect to technology.

Most certification programs do not require academic coursework. Test results alone determine certification. Few professionals, however, have the experience and skill set to take a certification exam without preparation.

To assist in preparing for a certification exam, several training options are available: self-study, online training, instructor-led training, and web resources. Authorized testing centers provide most certification exams for a fee. The exam sponsor's website typically lists testing centers near you. On the website, you can schedule and pay for your exam (Figure 12-12). At a testing center, you may use a computer to take the examination, or you may mark your answers on a form that will be read by a scanner for grading. You likely will know before you leave the testing center whether you passed the examination. Some tests are in a multiple-choice format. Others are skill based. If you do not pass an exam, you may have to pay the fee again to retake it.



Figure 12-12 Certification exam sponsors, such as (ISC)² shown here, provide ways for you to prepare for exams, register and pay for exams, and more.

Source: (ISC)²



Exam Day

Before taking a certification exam, read the instructions provided by the testing center to ensure you bring all necessary supplies, equipment, or technology. Print a copy of the directions in case your GPS device or app fails. Arrive early and silence or turn off your mobile devices. Know approximately how long the exam will take so that you can use your time wisely.

Obtaining a certification requires time and money. Certifications demonstrate your commitment to your chosen area. When deciding whether to obtain a certification, consider your long-term career goals, as well as your current experience. Read evaluations of the certification to determine its value in the industry you have chosen. Examine employment projections and available job opportunities to determine if it is worth obtaining the certification.

Technology certifications are available in many areas, some of which are discussed next.

Application Software Certifications

Although numerous types of application software exist, several programs have achieved national recognition for use as business and graphics tools. Most sponsors of application software certifications have a partner training program and encourage computer-training centers to be authorized training representatives. A popular application software certification includes *Microsoft Office Specialist*, which tests a user's skills of Microsoft Office programs.

As with most other certifications, vendor-authorized testing facilities take registrations and administer the certification test. People with the following jobs may be interested in application software certification:

- Corporate trainers
- Office managers/workers
- Technology teachers
- Help desk specialists
- Technology sales representatives

Discover More: Visit this chapter's free resources to learn more about available application software certifications.

Data Analysis and Database Certifications

Data analysis certifications focus on the discovery, collection, and analysis of evidence on computers and networks. These certifications often contain the word, *forensics*, in their title. Database certifications cover the tasks required to support a database management system. If you are interested in working with data analysis or database certifications, you also may benefit from certifications in hardware, networking, programming, and security.

People with the following jobs may be interested in data analysis and database certification:

- Data scientist
- Database administrators
- Database analysts
- Digital forensics examiners

Discover More: Visit this chapter's free resources to learn more about available data analysis and database certifications.

Hardware Certifications

Hardware certifications vary in scope from a narrow focus with an emphasis on the repair of a specific device to an integrated hardware solution that addresses a company's current and future computing needs. Obtaining an advanced certification in hardware implies that you have achieved a standard of competence in assessing a company's hardware needs, and you can implement solutions to help the company achieve its computing goals. A popular hardware certification includes *A+*, which tests knowledge of computer setup, configuration, maintenance, troubleshooting, basic networking skills, and system software.

People interested in hardware certifications also may benefit from networking and operating system software certifications, which are closely tied to advanced hardware knowledge. People with the following jobs may be interested in hardware certification:

- Cable installation technicians
- Computer repair technicians
- Corporate trainers
- Help desk specialists
- IT consultants
- System engineers and administrators

Discover More: Visit this chapter's free resources to learn more about available hardware certifications.

Networking Certifications

Network expertise is acquired through years of experience and training because so many variables exist for a total network solution. Obtaining an advanced certification in networking implies that you have achieved a standard of competence, enabling you to address the complex issues that arise when planning, installing, managing, and troubleshooting a network. Cisco, Novell, Sun, and others offer certifications that test knowledge of installing, configuring, operating, and administering networks.

People in the following careers may be interested in network certification:

- Hardware service technicians
- IT consultants
- Network managers
- Network engineers
- System administrators

Discover More: Visit this chapter's free resources to learn more about available networking certifications.



BTW

High-Tech Talk

Discover More: Visit this chapter's free resources to learn about bioinformatics (where biologists use technology to analyze, store, and retrieve biological information).

Operating System Certifications

Several options for various knowledge levels are available to those seeking operating system certifications. These certifications focus on particular skills of the user, the operator, the system administrator, and the software engineer. IBM, Microsoft, Novell, RedHat, Sun, and others offer certifications that test knowledge of their operating systems.

If you are interested in an occupation as an operating system administrator or software engineer, you also may benefit from certifications in networking, hardware, and the Internet. These additional certifications are closely linked to the operating system and serve to broaden expertise in that area. (Read Secure IT 12-3 to learn about risks associated with users who make unauthorized modifications to operating systems.) People with the following jobs may be interested in a certification in operating systems:

- Hardware technicians
- Help desk specialists
- Network administrators
- IT consultants
- System administrators

Discover More: Visit this chapter's free resources to learn more about available operating system certifications.

SECURE IT 12-3

Risks of Jailbreaking and Rooting

Copyrights protect creators of original works, and digital rights management (DRM) strategies were developed to prevent people from pirating the owners' digital content. (Refer to Chapter 5 for details about copyrights and piracy.) Hardware manufacturers include DRM software on their products to control the apps and other programs that can be installed. When users want to run unapproved apps and customize their smartphones or mobile devices, they can make unauthorized modifications to the operating system and bypass the DRM

restrictions. This process, called *jailbreaking*, generally refers to hacking into Apple's iPhones and iPads, whereas a similar term, *rooting*, refers to products running Android and other operating systems.

When software developers create apps for Apple's iOS, Apple scrutinizes the software to ensure it adheres to strict guidelines. This review process helps maintain integrity and security. When the phone or mobile device is jailbroken, however, this reliability no longer exists. Apple states that jailbreaking causes these issues: security vulnerabilities,

instability, shortened battery life, unreliable voice and data, disruptions of services, and the inability to apply future software updates. The unauthorized modification violates the end-user license agreement (EULA), so the device may no longer be covered by the manufacturer's warranty.

Consider This: Do you know anyone with a jailbroken smartphone or mobile device? Should Apple ease the limitations that are placed on changing iOS default settings or installing apps and other software from websites other than the App Store?

BTW

High-Tech Talk

Discover More: Visit this chapter's free resources to learn how game developers create 3-D graphics, which appear to have height, width, and depth, giving realistic qualities to objects.

Programmer/Developer Certifications

Various certifications are available in the programmer/developer area. These certifications usually are supported with training programs that prepare applicants for the certification test. A popular specific programmer/developer certification includes *Google Apps Certified Specialist*, which tests a user's skills of administering, selling, and deploying Google Apps. A more broad development certification includes *Project Management Professional (PMP)*, which tests knowledge of tasks required during system development.

If you are interested in developing applications, you also may benefit from certifications in networking and web design. These certifications are closely tied to programming and may broaden employment opportunities. People with the following jobs may be interested in a programmer/developer certification:

- Game developers
- IT consultants
- Mobile application developers
- Project leaders/managers
- Systems analyst
- Web developers

Discover More: Visit this chapter's free resources to learn more about available programmer/developer certifications.

Security Certifications

Security certifications measure a candidate's ability to identify and control security risks associated with any event or action that could cause a loss of or damage to computer hardware, software, data, information, or processing capability. (Read Secure IT 12-4 to consider the effects of inadequately protected customer data.) While some security certifications focus solely on network and Internet security, others include measures to secure operating systems, application programs, and information systems, as well as the physical facility and its people. A popular specific security certification includes *Certified Information Systems Security Professional (CISSP)*, which tests in-depth knowledge of access control methods, information systems development, cryptography, operations security, physical security, and network and Internet security. Some security certifications relate specifically to the area of digital forensics.

People in the following careers may be interested in security certification:

- Information security officers and managers
- Law enforcement officials
- Military intelligence officers
- Network administrators
- Wireless network administrators
- Network security specialists
- Security administrators

Discover More: Visit this chapter's free resources to learn more about available security certifications.



SECURE IT 12-4

Protecting Customer Data


Many for-profit and nonprofit companies and organizations have been affected by malware intrusions into their point-of-sale systems. Hackers have broken into retail servers and accessed data for millions of credit and debit card accounts. In one situation, they broke into a large entertainment company's server, disrupting service to its customers and publishing personal data for millions of customers, including passwords and possibly credit card information. The breached company allegedly waited one week to inform customers about the attack. The hackers who exposed this company's data were part of a well-known activist group that routinely targets large corporations and government agencies to expose data vulnerabilities and to protest policies. The group claimed that the company had not encrypted the exposed data

properly. The group's members are unknown, so officials are unable to hold them responsible for their actions.

Customers, however, sued the company for the breach. One lawsuit stated that the company's lack of encryption and adequate firewalls makes it responsible for the hackers' actions. Officials agreed, with one stating, "If you are responsible for so many payment card details and log-in details, then keeping that personal data secure has to be your priority." Customers held the company responsible for the delay in notification. The attack ultimately cost the company an estimated \$170 million. Since the breach, the company changed its user agreement policies. The new policy states that by agreeing to use its products, users give up the right to sue for security breaches.

Thousands of other corporate security breaches have ranged from email phishing

schemes to stolen equipment. Cybersecurity risks affect all businesses because criminals know how to manipulate technology to compromise the networks and install malware. The U.S. Department of Homeland Security, U.S. Secret Service, and the National Cybersecurity and Communications Integration Center work to locate organized criminal groups, warn organizations about potential unauthorized access, and detect intrusions. They provide information about performing risk assessments, installing backup systems, and establishing security policies.

 **Consider This:** Should hackers be punished for exposing customer data? Why or why not? What expectations of security should customers have when they enter personal data on a website or form? Should companies be able to prevent customers from suing them? Why or why not?



Counselors and Alumni

If your school has a career center or alumni network, take advantage of these valuable resources. Career counselors and experienced alumni can help you prepare for and secure an interview in your chosen field. They also might provide references to potential employers.

Job Searching and Career Planning

Many job opportunities may exist in your industry, so it is important to narrow down the available jobs to ones for which you are qualified and in which you are interested. Tools at your disposal include the career service department at your school (Figure 12-13), career planning websites, and online social networks. Read How To 12-3 to learn how to start your job search online.

Whether you are seeking a new job or currently are employed, you may find a career planning website useful. Career planning websites often allow you to post your resume online or enter your resume information in a form at the website for potential employers to review. Many also offer mobile apps. Examples of popular career planning websites include CareerBuilder, Dice, and Monster. Use a search engine to locate these career planning websites and their mobile apps.

Discover More: Visit this chapter's free resources to learn more about career planning websites.



Figure 12-13 A college or university career services website, such as the Illinois State University one shown here, provides helpful career planning information.

Source: Illinois State University

HOW TO 12-3



Start Your Job Search Online

Starting your job search online will help you locate available jobs and determine whether you are qualified to apply. Performing your research online will save time applying and interviewing for jobs for which you are not qualified. The following steps describe how to start your job search online.

1. Begin your job search by reviewing the information on online social networks, job search websites, and organizations' websites. On these websites, you can learn about career opportunities and prepare for an interview.
2. Follow an organization's activity on Facebook, Twitter, LinkedIn, and other social media channels.
3. Research a company's online activity to become familiar with some of the products, services, and opportunities that they provide.
4. Visit career services websites hosted by your college or university. These websites often contain information about career fairs, resume planning workshops, and campus recruitment activities.
5. Consider visiting a career planning website. These websites offer information about available jobs and local salaries. You
6. Upload your resume to career planning websites and job search websites. Create the resume in a word processing program and then save it in the PDF format so that it has a consistent appearance when viewed on a variety of computers or mobile devices.



Consider This: Have you ever searched for a job online? Why or why not? If so, were you successful in finding a job for which you were qualified?

Mini Feature 12-3: Creating a Professional Online Presence

In addition to the information provided in a job application and resume, many employers will search the web to learn more about job candidates. For this reason, both beginning and established technology professionals promote themselves online. Read Mini Feature 12-3 to learn about creating a professional online presence.

MINI FEATURE 12-3

Creating a Professional Online Presence

An understanding of the web, digital media, and online social networks, such as LinkedIn, is beneficial in creating your online presence.

Recommended Online Strategies

A professional online presence that positively conveys your accomplishments, skills, interests, and personality offers potential employers a more complete picture of you beyond what can be conveyed in a resume.

- Register a form of your name as a domain name and host a blog or website at that web address. If your name is not available or you do not have access to a web server, include your name as part of the web address for your website on a free service, such as Blogger or WordPress.
- Avoid informal or humorous names for your account profiles, blog title, or domain name.
- Include a photo of yourself that presents your best self.
- Use a webcam to create a 30-second video in which you introduce yourself. In the video, summarize your skills and professional interests. Post the video on YouTube or another video sharing site and include a link to it on your blog or website.
- Upload a PDF file of your resume, and include a link to it on your blog or website.
- Include links to your LinkedIn and Twitter profiles on your blog or website.
- Include links to any other publications, articles, videos, or digital content you have created.
- Create consistent accounts on online social networks. Read Ethics & Issues 12-4 to consider ways that social media can help in your job search.
- Post appropriate content to your blog, website, or online social networks regularly.
- Before uploading your resume or publishing your blog or website, ask at least two people to proofread content for any spelling and grammar mistakes. Keep the language professional.


Using LinkedIn

LinkedIn is an online social network where professionals, such as Reid Hoffman, founder of LinkedIn, can create profiles and connect with coworkers and industry colleagues. LinkedIn uses the term, contacts, to describe the individuals in your professional network and also stores your relationship with each contact in your network. Read How To 12-4 for steps to create a LinkedIn profile.

Use LinkedIn to:

- Connect with or stay in touch with current and former coworkers and classmates.
- Follow companies on LinkedIn to stay informed of job openings.
- Use LinkedIn's employment database to learn about career opportunities. View the job listing to find the name of the person who posted the job and to determine the connections between you and those members you might want to contact in order to learn about a company or open jobs.
- Join groups of people with similar interests or experiences. For example, your school's alumni group, people who work at the same company, people looking to share experiences they had when starting their own businesses, and people who use specific apps might be willing to share their expertise.
- Consider expanding your network by connecting with your contacts' connections. If you invite an extended contact to connect, be sure to include a note that introduces yourself and indicates your professional reason for connecting.

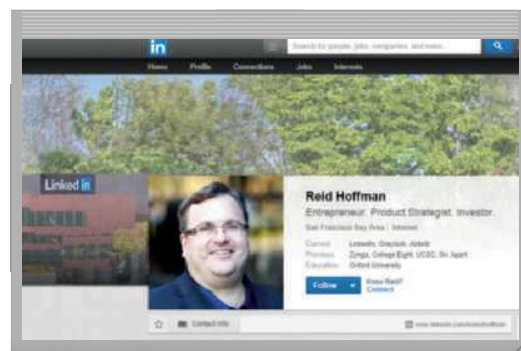
Discover More: Visit this chapter's free resources to learn more about maintaining a professional online presence and using LinkedIn.

 **Consider This:** What online resources should you use to create a professional online presence? Why? What groups or companies should you join or follow on LinkedIn? What steps will you take to enhance your professional online presence?



Online Social Networks

Online social networks revise their privacy settings often. Periodically revisit your privacy settings on all personal social media accounts to ensure you have chosen the most current options that will secure your privacy.



Source: LinkedIn

ETHICS & ISSUES 12-4



How Can Social Media Help Your Job Search?

It is no secret that what you do or say on social media can affect you in the job search. As previously mentioned, many employers check potential employees' social media profiles, including Facebook, Twitter, Google+, and LinkedIn, as part of the screening process. You likely are aware that you should use privacy settings and to be careful what you post, but how can you use social media tools to aid you in your job search?

Employers not only look for red flags (inappropriate or inflammatory posts, typographical errors, poor grammar, or photos that show unsavory or unethical

activities), but also for reasons to offer the candidate a position. A social media profile that presents you as professional and lists your qualifications can lead an employer to put you ahead of others. Employers also use social media to determine if a candidate's personality would fit into the corporate culture.

Instead of hiding all information behind privacy settings, employment experts recommend several social media strategies for job seekers. Create a profile that shows an interest in topics relevant to your profession. Use LinkedIn and other resources to follow companies and industry professionals to be aware of events, news, or job openings. Network with students,

colleagues, and industry contacts. Present consistent information, especially regarding education and experience, across all social media platforms. Consider using Twitter to share industry news, to demonstrate not only your interest, but your enthusiasm for the field.

Consider This: Does your social media presence reflect your interest in your desired field? What changes can you make so that your profile stands out among other job candidates? How does your profile compare to others in your industry? What can you gain by using social media to network or find industry information?

HOW TO 12-4

Create a Professional Presence on LinkedIn

Building a professional profile and network on LinkedIn can help you locate professionals who can introduce you to employees at companies where you might like to work. In addition, LinkedIn also helps prospective employers locate you. Upon joining LinkedIn, you specify a profile that allows contacts, prospective contacts, and others to learn about you. The following steps describe how to create a professional presence on LinkedIn.

1. Include your full name, and avoid using nicknames.
2. Select and upload a professional photo. Consider using a high-quality photo that

clearly shows your face, and make certain you are dressed professionally in the photo.

3. Include comprehensive information about your work experience, education, and skills.
4. If you have any professional publications, websites, or blogs, be sure to list them and provide web addresses.
5. Build your network on LinkedIn by finding other LinkedIn members to add to your network. To see if any of your current acquaintances are on LinkedIn, you can import email addresses from your email address book or import profiles of friends from other online social networks. LinkedIn also may suggest

people you may know from a school you attended or company for which you work(ed).

6. Ask other members to provide recommendations about your skills.
7. Review your extended contacts (the network of your contacts' contacts) and determine whether you should connect directly with any of them.
8. As your work experience, education, or skills change, be sure to promptly update your LinkedIn profile.

Consider This: What professional information is, or will you put, in your LinkedIn profile?

NOW YOU SHOULD KNOW

Be sure you understand the material presented in the sections titled Technology Certifications, and Job Searching and Career Planning, as it relates to the chapter objectives.

Now you should know . . .


- How you can prepare for a certification (Objective 7)
- Which types of certifications you find interesting (Objective 8)
- How you can begin a job search (Objective 9)
- How you can create a professional online presence (Objective 10)

Discover More: Visit this chapter's premium content for practice quiz opportunities.

Chapter Summary

This chapter discussed information systems used in an enterprise. It also presented various technology career fields and specific technology jobs. It then discussed technology certifications. Finally, it described how to begin a job search and create a professional online presence.

Discover More: Visit this chapter's free resources for additional content that accompanies this chapter and also includes these features: Technology Innovators: Wikimedia Foundation/Jimmy Wales, Ray Kurzweil, Meg Whitman, and Salesforce; Technology Trends: Crowd Sourcing and Monitoring Health Status; and High-Tech Talks: 3-D Graphics and Bioinformatics.

-  Test your knowledge of chapter material by accessing the Study Guide, Flash Cards, and Practice Test resources from your smartphone, tablet, laptop, or desktop.

TECHNOLOGY @ WORK

Architecture and Design

While walking down the city street, you stop to admire a new skyscraper with the most striking architectural features you ever have seen. You think to yourself that those responsible for designing the building are nothing less than brilliant. While a great deal of time is spent by people designing the building, computers and technology also play an important role in making the process more efficient. Today's tools allow architects and designers to see exactly what a finished building will look like before construction even begins.

During the preliminary design process, architects and design firms use CAD software to design the appearance and layout of a new building and can provide clients with a 3-D walk-through of a building so that they can determine whether the proposed design will meet their needs. Later, the program can be used to include the placement of support beams, walls, roof shape, and so on, and also conform to building codes.

CAD software also allows engineers in various fields, such as mechanical and electrical, to design separate layers in a structure. The software then can superimpose the designs to check for interactions and conflicts, such as if a structural beam in one layer interferes with a drain in another layer. The CAD software makes it easy to modify and correct the

structure before it is built, which can save time and money during the construction process. This software also eliminates most, if not all, of the manual drafting required.

Engineers use computers to determine the type of foundation required to support the building and its occupants; the heating, ventilating, and air conditioning (HVAC); the electrical requirements; and how the building may withstand external threats, such as hurricanes and tornadoes.

At the conclusion of the architecture and design process, contractors can use the information from computers to estimate the

total cost to build the structure. If, while construction is ongoing, a need arises to modify the building's design in some way, computers can incorporate a change and quickly provide plans for the new design.

The next time you notice a building under construction, stop to think about how computers and technology have increased the efficiency of the architecture and design process.

 **Consider This:** How else might computers and technology be used in architecture and design?



© LDprod / Shutterstock.com

Study Guide

The Study Guide exercise reinforces material you should know for the chapter exam.

Discover More: Visit this chapter's premium content to **test your knowledge of digital content** associated with this chapter and **access the Study Guide resource** from your smartphone, tablet, laptop, or desktop.

Instructions: Answer the questions below using the format that helps you remember best or that is required by your instructor. Possible formats may include one or more of these options: write the answers; create a document that contains the answers; record answers as audio or video using a webcam, smartphone, or portable media player; post answers on a blog, wiki, or website; or highlight answers in the book/e-book.

1. A(n) _____ system is a set of hardware, software, data, people, and procedures that work together to produce information.
2. List and describe seven criteria that make information valuable.
3. Describe how functional units in an enterprise use information systems.
4. Define the term, enterprise resource planning (ERP). What are the advantages of ERP?
5. Explain the uses of and relationship between a document management system (DMS) and a content management system (CMS).
6. Describe security issues surrounding use of a CMS. List uses of a CMS.
7. List transactions that may occur when using a transaction processing system (TPS). Differentiate between batch and online transaction processing.
8. Define the term, management information system (MIS). Differentiate among the three types of reports an MIS generates.
9. Describe how a decision support system (DSS) is used. OLAP stands for _____.
10. List types of internal and external sources used in a DSS.
11. A(n) _____ system is an information system that captures and stores the knowledge of human experts and then imitates human reasoning and decision making. Define the terms, knowledge base, inference rules, and artificial intelligence (AI).
12. Define the components of information literacy. List steps in effective research and composition.
13. List guidelines for setting up your home office for telecommuting. Explain issues surrounding telecommuting.
14. List and describe the areas typically found in an IT department.
15. Describe the technology equipment field, and list possible jobs in this area.
16. Explain different types of companies in the software and apps field.
17. Explain security issues that arise when using unlicensed software.
18. Describe the technology service and repair field. Explain how technicians use diagnostic software.
19. Explain the issues surrounding data recovery and computer repair services.
20. List criteria needed to be a technology salesperson. Describe various careers in this field.
21. Explain how to evaluate extended warranty options for electronic devices.
22. Describe the role of a corporate trainer.
23. Explain the responsibilities and educational requirements of a help desk specialist.
24. Define the roles an IT consultant might fulfill.
25. Explain issues surrounding outsourcing and offshoring of jobs.
26. List requirements and available careers for the following areas: system development; technology operations; web marketing and social media; data storage, retrieval, and analysis; information and systems security; and app development and mobile technologies.
27. Describe three approaches to developing mobile apps.
28. Explain how and why an employee or employer might value or require technology certifications. What options are available to prepare for a certification exam?
29. Describe the benefits of obtaining an application software certification. List jobs that may require, or jobholders who may benefit from, obtaining this certification.
30. Explain the focus of a data analysis certification. List jobs that may require, or jobholders who may benefit from, obtaining this certification.
31. Explain why an employee might obtain an advanced hardware certification. _____ is a popular hardware certification.
32. List jobs that may require, or jobholders who may benefit from, obtaining a hardware certification.
33. Explain the expertise necessary to achieve a networking certification. List jobs that may require, or jobholders who may benefit from, obtaining this certification.
34. List options that are available for operating system certification. Name companies that offer operating system certifications.
35. List jobs that require, or jobholders who may benefit from, obtaining an operating system certification.
36. Explain security issues surrounding jailbreaking and rooting.
37. List examples of programmer/developer certifications. List jobs that may require, or jobholders who may benefit from, obtaining this certification.
38. Explain what is measured by obtaining a security certification. Name one popular specific security certification.
39. Describe how security breaches of customer data might occur. Explain the responsibility of a company to protect its customer data.
40. List jobs that may require, or jobholders who may benefit from, obtaining a security certification.
41. List steps to start your job search online.
42. Explain how a job seeker might use a career planning website. List examples of popular career planning websites.
43. List strategies to create a professional online presence. Explain how professionals use LinkedIn.
44. Explain how social media can help your job search.
45. List steps to create a professional presence on LinkedIn.

You should be able to define the Primary Terms and be familiar with the Secondary Terms listed below.

Discover More: Visit this chapter's premium content to view definitions for each term and to access the Flash Cards resource from your smartphone, tablet, laptop, or desktop.

Key Terms

Primary Terms (shown in bold-black characters in the chapter)

artificial intelligence (AI) (560)	decision support system (559)	help desk specialist/help desk technician (569)	search engine optimization (SEO) expert (569)
cloud architect (568)	desktop or mobile application programmer/developer (570)	information system (554)	security analyst (570)
computer security specialist/mobile security specialist (570)	digital forensics analyst (570)	Internet/social media marketing specialist (569)	security system project manager (570)
computer technician (569)	digital forensics examiner (569)	IT consultant (568)	systems analyst (568)
content management system (CMS) (577)	document management system (DMS) (556)	management information system (MIS) (558)	systems programmer (568)
customer relationship management (CRM) specialist (569)	Enterprise Resource Planning (ERP) (555)	mobile strategist (570)	technical project manager (596)
data scientist (569)	expert system (560)	mobile technology expert (570)	user experience (UX) designer (569)
database administrator (569)	games designer/programmer (570)	network administrator/engineer (569)	web analytics expert (569)
database analyst (569)		network security administrator (570)	web designer (568)
database designer (568)		program and app developer (568)	web developer (568)

Secondary Terms (shown in *italic* characters in the chapter)

<i>A+</i> (573)	<i>hybrid app</i> (571)	<i>salesforce automation (SEA)</i> (555)	<i>technology service and repair field</i> (565)
<i>batch processing</i> (558)	<i>inference rules</i> (560)	<i>software and apps field</i> (564)	<i>transaction processing system (TPS)</i> (557)
<i>Certified Information Systems Security Professional (CISSP)</i> (575)	<i>information literacy</i> (561)	<i>summary report</i> (558)	
<i>computer-aided engineering (CAE)</i> (555)	<i>jailbreaking</i> (574)	<i>technology equipment field</i> (564)	
<i>computer-aided manufacturing (CAM)</i> (555)	<i>knowledge base</i> (560)		
<i>customer relationship management (CRM)</i> (555)	<i>Manufacturing Resource Planning II (MRP II)</i> (555)		
<i>detailed report</i> (558)	<i>Material Requirements Planning (MRP)</i> (555)		
<i>exception criteria</i> (558)	<i>Microsoft Office Specialist</i> (572)		
<i>exception report</i> (558)	<i>native app</i> (571)		
<i>Google Apps Certified Specialist</i> (574)	<i>online analytical processing (OLAP)</i> (559)		
<i>human resources information system (HRIS)</i> (555)	<i>online transaction processing (OLTP)</i> (558)		
	<i>Project Management Professional</i> (574)		
	<i>rooting</i> (574)		



decision support system (559)

Checkpoint

The Checkpoint exercises test your knowledge of the chapter concepts. The page number containing the answer appears in parentheses after each exercise. The Consider This exercises challenge your understanding of chapter concepts.

Discover More: Visit this chapter's premium content to **complete the Checkpoint exercises** interactively; complete the **self-assessment in the Test Prep resource** from your smartphone, tablet, laptop, or desktop; and then **take the Practice Test**.

True/False

Mark T for True and F for False.

- _____ 1. Accessible information has meaning to the person who receives it. (554)
- _____ 2. A typical enterprise consists of a wide variety of departments, centers, and divisions — collectively known as functional units. (554)
- _____ 3. CMSs are popular in large part because of their ease of use; CMS operators need minimal technical skills. (557)
- _____ 4. In most circumstances, the licensed software owner can make multiple copies of software, for back up or to share with other users. (565)
- _____ 5. It is good practice to back up and wipe all data before turning over your computer or device to an IT or computer repair technician. (566)
- _____ 6. With third-party extended warranties, it is easier to obtain quick service for your device than returning it to the retailer. (567)
- _____ 7. Educational requirements for help desk specialists are far more stringent than they are for other careers in the technology field. (567)
- _____ 8. Apps developed for a specific mobile platform or device generally work on any other device without any modification. (571)
- _____ 9. Like native apps, hybrid apps are developed for specific platforms and deployed to an app store. (571)
- _____ 10. Most professionals have the experience and skill set to take a certification exam without preparation. (572)
- _____ 11. Data analysis certifications focus on the discovery, collection, and analysis of evidence on computers and networks. (573)
- _____ 12. Employers often use social media to determine if a candidate's personality would fit into the corporate culture. (578)

Multiple Choice


Select the best answer.

1. _____ information is arranged to suit the needs of the decision maker. (554)
 - a. Verifiable
 - b. Organized
 - c. Timely
 - d. Cost-effective
2. A(n) _____ allows for storage and management of a company's documents. (556)
 - a. CMS
 - b. DMS
 - c. MRP II
 - d. ERP
3. With _____, the computer processes each transaction as it is entered. (558)
 - a. batch processing
 - b. inference rules
 - c. rooting
 - d. online transaction processing
4. A(n) _____ report consolidates data usually with totals, tables, or graphs. (558)
 - a. detailed
 - b. summary
 - c. exception
 - d. criteria
5. In an expert system, the _____ is the combined subject knowledge and experiences of the human experts. (560)
 - a. inference rules
 - b. artificial intelligence (AI)
 - c. decision support system
 - d. knowledge base
6. Which of the following skills is *not* necessary for technology salespeople? (566)
 - a. a general understanding of technology
 - b. specific knowledge of the product they are selling
 - c. testing internal components
 - d. strong people skills
7. A(n) _____ is written for mobile devices running a particular mobile phone operating system. (571)
 - a. native app
 - b. hybrid app
 - c. DSS
 - d. expert system
8. If you are interested in developing applications, you also may benefit from certifications in _____. (574)
 - a. hardware
 - b. operating system
 - c. networking and web design
 - d. CISSP

Checkpoint

Matching Match the terms with their definitions.

- | | |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| _____ 1. MRP (555) | a. processing system in which the computer processes each transaction as it is entered |
| _____ 2. CRM (555) | b. application of human intelligence to computers |
| _____ 3. ERP (555) | c. information system that manages information about customers, past purchases, interests, and the day-to-day interactions |
| _____ 4. OLTP (558) | d. program that combines features of native and mobile web apps |
| _____ 5. artificial intelligence (560) | e. process of hacking into iPhones and iPads in order to make unauthorized modifications to the operating system and bypass DRM restrictions |
| _____ 6. inference rules (560) | f. broad development certification that tests knowledge of tasks required during system development |
| _____ 7. hybrid app (571) | g. information systems that monitors and controls inventory, material purchases, and other processes related to manufacturing operations |
| _____ 8. A+ (573) | h. hardware certification that tests knowledge of computer setup, configuration, maintenance, troubleshooting, basic networking skills, and system software |
| _____ 9. jailbreaking (574) | i. set of logical judgments that are applied to the knowledge base each time a user describes a situation to the expert system |
| _____ 10. Project Management Professional (574) | j. integration of MRP II with the information flow across an organization to manage and coordinate the ongoing activities of the enterprise |

 **Consider This** Answer the following questions in the format specified by your instructor.

- Answer the critical thinking questions posed at the end of these elements in this chapter: Ethics & Issues (563, 566, 568, 578), How To (563, 567, 576, 578), Mini Features (561, 571, 577), Secure IT (557, 565, 574, 575), and Technology @ Work (579).
- What elements are contained in an information system? (554)
- What are the qualities of valuable information? (554)
- What are some common information systems used by functional units in a typical enterprise? (555)
- What are some advantages of ERP? (555)
- In addition to documents, what other items can be included in a CMS? (557)
- What factors make CMSs so popular? (557)
- Who assesses CMS vulnerabilities? (557)
- How does batch processing differ from online transaction processing (OLTP)? (558)
- How do detailed reports, summary reports, and exception reports differ? (558)
- What are some examples of internal and external sources that a decision support system might use? (559)
- How do enterprises use expert systems? (560)
- What are some capabilities of artificial intelligence? (560)
- What are the five categories recognized as integral literacy components? (561)
- What are the benefits of telecommuting? (563)
- What are some responsibilities of IT staff? (564)
- What careers are available in the technology equipment field? (564)
- Under what circumstances is software considered unlicensed? (565)
- What individuals might be best suited for a career in the technology service and repair field? (565)
- How might your information be compromised if a computer repair technician works on your computer or mobile device? (566)
- What skills must an IT consultant have? (568)
- What are some disadvantages of offshoring? (568)
- What knowledge is required to work in a technology operations job? (569)
- What are some typical rules and conditions developers must follow in order to deploy an app to an app store? (571)
- What are the drawbacks of hybrid apps? (571)
- What options are available to help you prepare for a certification exam? (572)
- What is meant by the term, rooting? (574)
- What issues does jailbreaking cause? (574)
- What tools can help you search for a job? (576)

Problem Solving

The **Problem Solving** exercises extend your knowledge of chapter concepts by seeking solutions to practical problems with technology that you may encounter at home, school, or work. The **Collaboration** exercise should be completed with a team.

Instructions: You often can solve problems with technology in multiple ways. Determine a solution to the problems in these exercises by using one or more resources available to you (such as a computer or mobile device, articles on the web or in print, blogs, podcasts, videos, television, user guides, other individuals, electronics or computer stores, etc.). Describe your solution, along with the resource(s) used, in the format requested by your instructor (brief report, presentation, discussion, blog post, video, or other means).

Personal

- 1. Keywords for Job Search** After taking your third computer class, you realize that you would like to train people how to use computers and software. You look for a job online and are asked to enter some keywords for your job search. What keywords will you enter to find a job that allows you to train others how to use computers and software?
- 2. Online Job Search** Having decided to work in the computer equipment field, you begin your job search online. In addition to looking on job search websites for available positions, where else might you find job postings?
- 3. Documenting Education and Experience** You are preparing your resume to submit to a computer service and repair company. You have studied computer service and repair in various classes and want to convince your prospective employer that you are the best candidate for the job. What might convince the employer to offer you a job?
- 4. Contemplating a Job Offer** After graduating from college with a degree in computer science, you send your resume to several companies. Almost immediately, you receive a job offer as a technical support representative in a mid-sized organization. Will you accept this job offer or wait for additional offers? Why?
- 5. Appropriate Certification** Because you hope to pursue a career as a system administrator, you would like to obtain a certification. Many certifications are available, but you want to choose the one(s) that will best prepare you for your future career. Which certification(s) will you consider?



Source: (ISC)²

Professional

- 6. Staying Current with Technology** Having accepted a job as a computer salesperson, you now realize the importance of staying up to date with the latest technologies and products. What are three ways that you can stay current in the technology field while working full time?
- 7. Outsourcing IT Positions** As the chief information officer for a large organization, you consider outsourcing various positions within your department to save money. What are some types of positions that can be outsourced easily? What positions might be difficult to outsource? Why?
- 8. Conducting an Interview** You are preparing to conduct several interviews for candidates applying for a job as a senior systems administrator. What types of questions will you ask during the interview to determine whether they have the experience required to fulfill the job responsibilities?
- 9. Tough Decision** Two top candidates who applied for a job within your organization have interviewed well, and you are having difficulty selecting which candidate should be offered the job. One candidate has several certifications and only two years of job-related experience, while the other candidate has six years of experience, but no certifications. What decision will you make, and why?
- 10. Training Decision** Your boss has allocated money to allow everyone in the IT department to attend training related to their job responsibilities. While researching the training available for your job as a system administrator, you learn that you either can take a semester-long course at a local university or attend an accelerated one-week, forty-hour training course. At the end of each training session, you will be ready to become certified. Which type of training will you choose? Why?

Collaboration

- 11. Technology in Architecture and Design** As a student in a drafting class, your instructor has challenged you to design your dream home by using programs and apps wherever possible. Form a team of three people that will determine how to accomplish this objective. One team member should compare and contrast two programs or apps that can be used to create a two-dimensional floor plan, another team member should compare and contrast two computer-aided design programs or apps that can create a more detailed design of the house, and the third team member should compare and contrast two programs or apps that can assist with other aspects of the design process, such as landscaping and interior design.

The How To: Your Turn exercises present general guidelines for fundamental skills when using a computer or mobile device and then require that you determine how to apply these general guidelines to a specific program or situation.

Discover More: Visit this chapter's premium content to **challenge yourself with additional How To: Your Turn exercises**, which include App Adventure.

Instructions: You often can complete tasks using technology in multiple ways. Figure out how to perform the tasks described in these exercises by using one or more resources available to you (such as a computer or mobile device, articles on the web or in print, online or program help, user guides, blogs, podcasts, videos, other individuals, trial and error, etc.). Summarize your 'how to' steps, along with the resource(s) used, in the format requested by your instructor (brief report, presentation, discussion, blog post, video, or other means).

1 Conduct an Effective Interview

Gathering information is an important task, whether you are trying to assess whether a job candidate would be a good fit for an open position, or if you need to gather feedback about a new system you are developing. An important means of gathering information is the personal interview. Interviews must be thorough and comprehensive. Prior to conducting an interview, you must determine that an interview is the best means for obtaining the information you seek. You have learned a variety of ways to obtain information, and you should use each of them appropriately. Because an interview may interrupt a person's schedule and takes time, you must be sure the information gained in the interview justifies this interruption. Once you have determined you should conduct an interview to gather information, plan to ask questions that will generate useful answers. The following steps guide you through the process of conducting an interview that ultimately will generate useful answers.

- a. Your questions should directly address the goals of the interview. Do not expect the person being interviewed to provide a tutorial. Your questions must generate answers that supply you with the information you need to make a decision.
- b. Your questions should be thought-provoking. In general, do not ask questions requiring a yes or no answer. Your questions should not lead the interviewee to an answer — rather, the questions should be open-ended and allow the person to develop the answer. As an interviewer, never argue with the person being interviewed, do not suggest answers or give opinions, ask straightforward questions rather than compound questions, never assign blame for any circumstance that might come up in the interview, and never interrupt while the person is talking. Finally, you, as the interviewer, should not talk much. Remember, you are conducting the interview to gain information, and it is the person you are interviewing who has that information. Let him or her talk.

- c. Pay attention carefully, with your ears and your eyes. What you hear normally is most important, but body language and other movements often convey information as well. Concentrate on the interviewee — expect that you will make much more eye contact with the person than he or she will with you. Allow silences to linger — the normal impulse in a conversation is to fill the silence quickly; in an interview, however, if you are quiet, the person being interviewed might think of additional information.
- d. As you listen, concentrate on the interviewee. When points are being made, do not take notes because that will distract from what the person is saying; stay focused. Once the information has been conveyed, jot down a note so that you will remember.
- e. Throughout the interview, offer reinforcing comments, such as, “The way I understand what you just said is ...” Make sure when you leave the interview that no misunderstandings exist between you and the person you interviewed.
- f. Before you conclude the interview, be sure all your goals have been met. You may not have another opportunity to interview the person, so ensure you have asked sufficient questions to gain the information you need to make a decision.
- g. After the interview, it is recommended you send a follow-up email message or letter to the person you interviewed to review the information you learned. This message or letter should invite the interviewee to correct any errors you made in summing up your findings. In addition, for all the people you interview, keep a record of the time and place of the interview. In this way, if any questions arise regarding the interview, you will have a record.

Interviewing Online

If you are not in the same physical location as the people you want to interview, it may be better to conduct the interview online. If you plan to conduct the interview online, consider the following advice:

How To: Your Turn

How To: Your Turn

- Plug in the computer or device so that you do not have to rely on battery power. If you must rely on battery power, be sure that the battery is fully charged.
 - Use a wired Internet connection, rather than connecting to a wireless network, to minimize the risk of losing Internet connectivity during the interview.
 - Select a location for the video call that has a neutral background and is free from distractions.
 - Know how to initiate or receive a video call.
 - Exit your email, chat, and other unnecessary applications during the interview so that you are not distracted or interrupted by alerts and notification messages.
 - Test the videoconferencing software in advance to ensure the configuration works.
 - Adjust the microphone, webcam, and speakers before the actual interview to ensure optimum call quality.
 - Practice switching between the videoconferencing app's chat window and your desktop or a browser window, in case you want to share a link, send a file, or type a message during the interview.
 - Keep your eyes focused on the webcam so that you will appear attentive.
- b. Prepare your script. Before you start recording, write and memorize the words you will say in the video. The video should be no longer than one minute, so write your script accordingly. Remember — you are trying to impress your potential employer.
 - c. Set the stage. The lighting and image in the video are critical to making a professional-appearing video. You should use adequate light so that the video is clear. Generally, you should arrange the camera for a head-and-shoulders shot.
 - d. Practice. You must practice your presentation in front of the camera. You can record and play back your practice recordings until you feel confident about your presentation.
 - e. Dress for the part. When on camera, the impression you make will be influenced by your attire and your personal grooming. You should dress as if you were doing a live interview.
 - f. Record the video. Your video should be no longer than one minute, but you might want to divide it into segments. For example, you could separate your statement about why you want to work for a company from your statement about your educational background.

Exercises

1. Think about the last time you were involved in an interview (either as an interviewer or an interviewee). What types of questions were you asked? Do you feel the questions solicited useful answers?
2. If you were to interview a candidate for a technology-related position, what types of questions would you ask?
3. What advantages do open-ended questions have? When might a question requiring a brief answer be appropriate?

Create a Video Resume

Resumes are used to inform potential employers about your experience, education, qualifications, and other important information. When using job search services on the web, such as Monster, CareerBuilder, and Dice, you often will submit your resume electronically.

A video resume contains a video of you speaking to your potential employer, explaining your interest in the job and why you think you are the best qualified candidate. The following steps guide you through the process of creating a video resume.

Record the Video

When you record the video resume, you must be aware of several important elements:

- a. Make sure you have access to a computer with a webcam. Alternatively, you can record the video with a more sophisticated camera.

Capture the Video

After you have recorded the video on a video camera, attach the video camera to the computer or insert the memory card from the camera into the computer and then complete the following steps:

- a. Run a program or app to capture the video.
- b. Select the option to import a video from the location on which it was stored.
- c. If necessary, navigate to the location of and select the video to import.
- d. Specify a name to identify the imported video.
- e. Start the import process. This process may take several minutes to complete.
- f. When the import process is complete, display the contents from the camera and verify the video has imported correctly.

Edit the Video

After recording the video, you normally should edit it and save it in a format that can be placed in your resume. To edit the video, complete the following steps:

- a. Import the video clip(s) that will comprise your video resume into a new project in the program or app you are using to create your video.
- b. If you are working with multiple video clips, arrange them in the correct order.

- c. View the video clips in the order you desire to make sure the transition from one video clip to the next is not obvious. If it is obvious, you either can use editing features in the program or app to make the transition less obvious, or you may need to record one or more video clips again.
- d. Review the audio quality to make sure it is clear and that the volume is adequate. If necessary, use editing features in the program or app to reduce or eliminate background noise.
- e. Avoid using special effects, such as sound effects, transitions, or other visual effects. The purpose of the video resume is to advertise you as a potential employee, so do not include anything that may distract from that.
- f. After you have edited the video, play the video from beginning to end to make sure you are pleased with it.
- g. Save, but do not close, the project.
- h. Export the video to an appropriate format. Because you will be distributing this resume and possibly publishing it on the web, use a format that is of acceptable quality but does not generate an excessively large file.

Share Your Resume

Now that you have edited your resume and exported it, you are ready to share your video resume with potential employers.

Saving in a Document

- a. Open the document on your computer.
- b. Use the commands in the word processing program to insert the video resume at the desired location.
- c. Verify the video plays properly.
- d. Save the document.
- e. Open the document on another computer and make sure the video plays properly.

Saving on the Web

- a. Connect to your web hosting company.
- b. Upload the video to the folder that contains your website's files.
- c. Modify the webpage that you want to include the video resume. You either can update the webpage so that the video plays on the page itself, or so that the webpage visitor has to tap or click a link to open and play the video in a new window.
- d. Save the changes to the webpage.
- e. Run a browser, navigate to the webpage containing the video resume, and make sure the video resume plays as intended. You should test your video resume from multiple computers and devices using multiple browsers.

How To: Your Turn

Exercises

1. What type of information would you include in your video resume?
2. Compare and contrast three programs or apps that can edit a video. Which one do you like the most? Why? Which one do you like the least? Why?

3 Create an Online Survey

If you want to collect information from a group of people, one way is to use an online survey. Online surveys can be sent to many individuals across the globe, allowing you to collect responses in a timely manner. Multiple web apps exist that allow you to create and distribute online surveys either for free or for a fee. Each web app has slightly different features, so evaluate various options before deciding which one to use. The following steps guide you through the process of creating an online survey.

- a. Navigate to the website you want to use to create the online survey.
- b. If necessary, create an account on the website hosting the web app.
- c. Select the option to create a new survey.
- d. Enter a descriptive title for the survey.
- e. Add the appropriate instructions to the survey.
- f. Add the questions to your survey. This includes:
 - Choosing the correct question type
 - Entering a descriptive question
 - If necessary, specifying the answer choices
 - Selecting whether the question is required
 - Specifying whether certain answers should prompt additional questions to appear
- g. Save the survey.
- h. Test the survey to make sure it functions as intended.
- i. Distribute the survey to intended recipients.
- j. When the due date for the survey passes, collect the survey results.

Exercises

1. What are at least three reasons you might need to distribute an online survey in your desired field?
2. Compare and contrast at least three online tools that can create and distribute surveys. Which one was your favorite? Why? Which one was your least favorite? Why? What are the differences between their free and fee-based accounts?

Internet Research

The Internet Research exercises broaden your understanding of chapter concepts by requiring that you search for information on the web.

Discover More: Visit this chapter's premium content to **challenge yourself with additional Internet Research exercises**, which include Search Sleuth, Green Computing, Ethics in Action, You Review It, and Exploring Technology Careers.

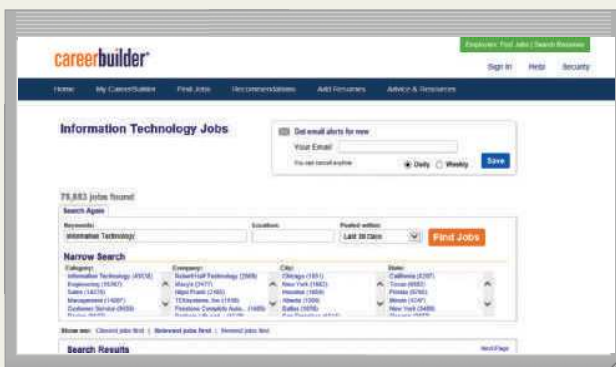
Instructions: Use a search engine or another search tool to locate the information requested or answers to questions presented in the exercises. Describe your findings, along with the search term(s) you used and your web source(s), in the format requested by your instructor (brief report, presentation, discussion, blog post, video, or other means).

1 Making Use of the Web Careers and Employment

It is a good idea to acquire information before graduation about the industry in which you would like to work. While your teachers provide valuable training and knowledge to prepare you for a career, they rarely teach you how to begin a job search. You can broaden your horizon by searching online for career information and job openings.

Career websites provide details about training and education requirements, employment outlook, industry trends, and salary data. They also offer advice on writing a cover letter and resume, applying for jobs online, networking, and preparing for an interview. When you are offered a job, turn to these websites to obtain industry salary comparisons and negotiation techniques.

Job seekers can search employment websites, such as CareerBuilder, Dice, and Monster, for specific position openings worldwide. The jobs can be sorted by category, industry, location, date posted, job title, and keywords. Some websites list job fairs and separate the listings by categories, such as entry level, part time, summer, and temporary.



Source: CareerBuilder

Research This: (a) Visit at least two career websites and review the resources. What type of career advice is given? Are aptitude tests available? What tools are provided to manage a job search, such as tips for writing a cover letter and resume, job search mistakes to avoid, search strategies, and online social network tips?

(b) Use at least two employment websites to search for three job openings in your field. Which positions are available? What are their salaries, locations, required education and experience, and job descriptions? Can job seekers post a resume? Are company profiles and salary comparison available? Do these websites have mobile apps?

2 Social Media

Companies have created policies that employees must follow when participating in social media and online social networks. Intel, for example, considers participation in social media to be an opportunity, not a right, and requires its employees to disclose their identity, protect the company's confidential and classified information, and use common sense when writing and airing opinions. Apple employees are urged to use good judgment when using online social networks and are barred from discussing the company on their own websites and from commenting on or posting messages regarding the company and its products on any related websites.

Research This: Locate at least two corporate policies for social media participation and summarize the requirements. Do you agree with the companies' guidelines? Are the policies too lenient or too strict? What actions are taken if an employee fails to abide by the policies? In what ways may policies differ among various fields, such as in health care and education?

3 Search Skills Using the Web for Research

A search engine may provide targeted results from news websites, blogs, corporate websites, and other sources. In addition, research websites, digital libraries, and specialized search engines can provide valuable information when using the web for research.

Your college or university library's website may list links to online journals, magazines, films, and books that will be helpful resources. It may make available links to online research databases, such as Gartner, Factiva, LexisNexis, and ProQuest, that offer IT

Internet Research

professionals' press releases, analysis, and case studies about companies, technologies, and industries. These sources often present valuable background information, and they offer IT professionals relevant business information to guide their decision-making.

Academic search engines, such as Google Scholar, and digital libraries, such as JSTOR (Journal Storage), provide access to academic journals and conference publications that can be useful when doing academic research. Navigating to these websites from campus may give you additional access to online research databases to which your library has a paid subscription.



Source: Gartner

Research This: Complete these tasks and report your findings. (1) Use your school library's website to find articles in online newspapers about information literacy. (2) Use a research database available from your school library's website to find an article about the fastest-growing IT careers. (3) Use a research database available from your school library's website to find an article about a company or technology discussed in this chapter. (4) Use Google Scholar or JSTOR to find a recent scholarly publication about rapid application development.

4 Security

Microsoft, Apple, Facebook, and Twitter are among the technology companies that have experienced a series of attacks exploiting security flaws in the Java plug-in for browsers. These security intrusions appear to have originated from hackers in China, Russia, or Eastern Europe who were attempting to obtain the companies' intellectual property, sensitive data, and users' personal information. The cyberthieves bypassed Java's built-in protections and installed malware on the compromised computers.

Kaspersky Security estimates that more than one-half of the security threats can originate from Java flaws. Oracle, the company that develops Java, issues patches to address known security vulnerabilities, but the Department of Homeland Security and other experts recommend not using Java until it is needed in browsers because new attacks may occur in the popular programming language.

Research This: Locate at least two articles discussing Java security flaws. How do Oracle and other companies inform users about the need to obtain updates to fix security holes? How many devices worldwide have Java installed? How can users discover if Java is installed on their computer or mobile device and, if it is, learn how to uninstall it?

5 Cloud Services

Enterprise Software Apps

Many companies make use of enterprise software apps to manage customer relationship management (CRM) and Enterprise Resource Planning (ERP). The rise of cloud computing in the enterprise has resulted in these and other enterprise software apps being hosted and managed on the cloud, rather than being purchased and installed in house. Software as a service (SaaS), a service of cloud computing, provides the delivery of software applications that are stored and deployed from servers on the Internet.

Enterprise software applications are popular SaaS offerings because IT departments do not need to install the software or manage the servers on which they run; instead, they can concentrate on configuring and specifying the services that these apps provide. Their "pay as you go" model, where customers are charged only for the capabilities they use, make SaaS apps attractive from a financial perspective. Users always interact with the most up-to-date version, and because the apps are accessed in a browser, it is easy to maintain the app across large organizations.

Research This: (1) Read about Salesforce, a pioneer in cloud-based CRM applications. What services does Salesforce provide? Find a case study about Salesforce, and describe how Salesforce's cloud solutions met one of its customer's needs. (2) Read about enterprise SaaS offerings to manage business operations and customer relations. Select or compare cloud services from companies such as SAP, Microsoft, and Oracle, and prepare a summary of their offerings. What are advantages and disadvantages to companies running these apps on the cloud?

Critical Thinking

The Critical Thinking exercises challenge your assessment and decision-making skills by presenting real-world situations associated with chapter concepts. The Collaboration exercise should be completed with a team.

Instructions: Evaluate the situations below, using personal experiences and one or more resources available to you (such as articles on the web or in print, blogs, podcasts, videos, television, user guides, other individuals, electronics or computer stores, etc.). Perform the tasks requested in each exercise and share your deliverables in the format requested by your instructor (brief report, presentation, discussion, blog post, video, or other means).

1. Offshoring and Outsourcing

The consulting company where you work as a systems analyst has refused to use offshoring, claiming management prefers to employ homeland citizens. The company's competitors have been using offshoring for some time. Your company's management team wants to discuss outsourcing the company's accounting system to an overseas firm.

Do This: Research laws, guidelines, and opinions regarding outsourcing. Address the following questions: Do you think systems should be developed entirely overseas? Why or why not? What are the major advantages and disadvantages of developing systems offshore? What security issues exist when using offshore developments? Does the United States have an obligation to help with employment overseas or in developing nations? Why or why not? What factors should a company consider when determining whether to use offshore developers?

2. Mobile App Development

Your company creates digital quizzes and study guides for nursing students. Currently you deliver these quizzes and other materials through a subscription-based website. Customers have been asking for an app that is optimized for smartphones and tablets. You have been asked to gather necessary information to start the project.

Do This: Determine which type of mobile app might be best suited to this type of product and explain why. Research other quiz and study guide apps. Read user

reviews to determine what features customers might find valuable. List common features of the most highly-rated apps. What skills, hardware, and software are necessary to develop this type of app? What resources might your company have to purchase or use to develop the app? Research mobile app development jobs on an employment website to find examples of requirements for this type of job. What certifications might you look for when hiring a mobile app developer?

3. Case Study

Amateur Sports League You are the new manager for a nonprofit amateur soccer league. Several employees of the league have expressed interest in telecommuting a few days per week. You need to present a telecommuting proposal for the next meeting of the board of directors.

Do This: Research benefits and disadvantages of allowing telecommuting. List requirements for employees to be able to work from home, including types of Internet access and hardware. Discuss security issues with allowing employees to telecommute. How can you address security concerns? List guidelines employees should follow when working from home. Should you implement a method for evaluating employee efficiency or productivity when telecommuting? Why or why not? How would you assess individual employee performance? What jobs are better suited to telecommuting? Why? Would you recommend that the league allow telecommuting? Why or why not?

Collaboration

4. Job Search You work in the human resources department of a network security company. You currently have several openings for positions, including a network administrator, a security expert, and a help desk technician.

Do This: Form a three-member team and have each team member choose a different position. As a team, discuss any common requirements or background necessary for all of the positions based on the type of company. Each team member should list the educational background, available certifications, and other requirements for the position. Find listings for available jobs in your area. What responsibilities are listed for the position? What salary information can you locate? Create a list of information potential employees should have as part of their online profile. As a team, meet to discuss and compile your findings.



© iStockPhoto / theJIPEN