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## Information Technology

### The Four Areas of Information Technology Employment

Compare and contrast job descriptions, working conditions, education, training requirements, salary ranges, industry certifications, and employment outlook for the four areas.

Describe job requirements for careers and professions in IT.

Evaluate careers in four information technology areas: Information Services and Support, Network Systems, Programming and Software Development, and Interactive Media.

### Compare and Contrast Careers in IT

Compare and contrast careers in computing.

Describe the variety of occupations and professions within the world of IT and investigate how computing is used in other disciplines.

Identify college majors that require at least one course in computing.

Investigate methods for finding websites with career exploration resources, identifying a desired IT career area, and justifying that choice.

List and describe professional organizations and professional codes in the field of computing.

### Entrepreneurship

Analyze how computing is often used in contemporary entrepreneurship.

Compare and contrast entrepreneurship with working for an employer.

Demonstrate concepts, processes, and behaviors associated with successful entrepreneurship.

### Assessment

Analyze personal skills and aptitudes that relate to IT careers.

Categorize personal skills and aptitudes.

Differentiate between the use of specific personal assessment tools in identifying personal strengths and weaknesses.

### Lifelong Learning Skills

Create, refine, and implement a plan for personal growth and skill development related to IT careers.

Define a work-based learning experience in an IT environment, and describe the purpose and benefits of a work-based learning environment.

Demonstrate an understanding of education and career development as lifelong learning process and techniques for acquiring new (IT) industry-related knowledge and improving professional skills.

Demonstrate techniques for promoting personal advancement and seeking education and other experiences that enhance personal growth.

Identify steps for seeking a promotion.

### Create a Professional Portfolio

Create a cover letter, resume, and job application.

Create and maintain a career portfolio.

Demonstrate preparing for a job search and interview.

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## General Workplace Skills

### Communication Skills

Define customer-service skills: in-person.

Define customer-service skills: telephone.

Demonstrate communicating effectively to customers, coworkers, and supervisors with appropriate speaking and listening skills and nonverbal communication skills.

Demonstrate techniques for determining and addressing customer needs using in-person, telephone, and email customer service skills.

Identify how to employ effective verbal and nonverbal communication skills.

### Positive Personal Qualities in the Workplace

Demonstrate recognizing a professional appearance for the workplace.

Examine critical thinking and problem-solving skills, and demonstrate creativity and resourcefulness.

Identify and demonstrate positive personal qualities, such as flexibility, open-mindedness, showing initiative, and being willing to learn new concepts and skills.

Organize ideas and then create IT-related oral and written messages to communicate those ideas.

### Diversity in the Workplace

Analyze diversity awareness.

Demonstrate an ability to accept constructive criticism.

Explain the importance of conflict resolution skills and being able to accept constructive criticism.

Identify gender and diversity issues in computing and IT.

### Positive Work Ethic

Demonstrate a positive work ethic, having a positive attitude toward taking direction, and motivation toward accomplishing tasks.

Demonstrate an understanding of the work ethics, behavior, and legal responsibilities employees commit to in the workplace.

Demonstrate awareness of business ethics, workplace rules, regulations, policies, procedures, and processes.

### Teamwork and Collaboration

Apply leadership and teamwork skills to accomplish goals.

Demonstrate initiative, courtesy, loyalty, honesty, cooperation, and punctuality as a team member.

Demonstrate leadership skills in a team.

Demonstrate teamwork.

Formulate a plan for collaborating to solve an IT problem.

### Assessment in the Workplace

#### Project Management Skills

Demonstrate an awareness of project management concepts and tools.

Demonstrate how to work efficiently by using time, task, and resource-management skills.

Demonstrate planning, time-management, storyboarding, and project management skills.

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#### Parts of an Email Message

- Breakdown email purposes, capabilities and functions.
- Demonstrate an awareness of how to use an email program's address book.
- Identify components of an email message, such as address, to, from, subject, and body.
- Identify when to use different email options, such as cc, bcc, email attachments, and forwarding.

#### Appropriate Email Use

- Demonstrate e-mail etiquette.
- Describe principles of e-mail and Internet etiquette.
- Identify the appropriate use of e-mail and common problems associated with e-mail.
- Identify when to include (quote) from an original e-mail message in a response.
- Respond to and utilize information derived from e-mail to solve business problems and complete business tasks.

#### Organizations

- Examine how an organization's strategic and operational plans are formulated, including how it uses planning tools.
- Examine processes for accomplishing an organization's goals using available resources.
- Examine the impact of an organization's management structure and culture on operations.
- Explore and analyze the structures and work cultures of different organizations.

#### Organizational Responsibilities

- Analyze organizational responsibilities as they relate to labor issues, worker rights and responsibilities, wages, benefits, and working conditions, including workers' health and safety.
- Demonstrate an understanding of how safety, health, and environmental management systems are employed in a corporation.
- Demonstrate an understanding of the importance of following safety guidelines.
- Examine an industry/organization's responsibilities for its workers' health and safety.
- Examine laws, regulations, and practices affecting workers' health and safety in an industry.

### IT and Computer Hardware

#### Information Technology

- Compare and contrast methods for evaluating emerging technologies.
- Discuss the use of technology in an IT environment.
- Explain how IT affects business and society.
- Identify and describe some current and emerging computer technology and software used for personal and business tasks.

#### Job-Specific Math Skills

- Define and use common statistical procedures to present and communicate data.
- Select and use correct mathematical processes and tools to solve complex problems.
- Solve work-related problems using measurements.

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#### **IT Legal and Ethical Issues**

- Define legal and ethical responsibilities for IT professionals.
- Demonstrate and apply an understanding of IT-related legal and ethical issues.

#### **Wireless IT**

- Compare and contrast the ways in which emerging wireless tech impacts business globally.
- Explore current global business trends and an IT employee's role in maintaining productive business.

#### **Computing Basics**

- Analyze the ways major applications have changed the way we work and live.
- Explain the idea of a "paperless society" and how computers support that.
- Explore the basic operating principles of digital computers.
- List different ways computers are used.
- List the basic operating principles of digital computers.

#### **The Evolution of the Computer**

- Demonstrate an understanding of Moore's Law as it relates to miniaturization.
- Describe analog and digital technology, convert between binary and decimal numbers, and define the terms bit and byte.
- Describe the evolution of the computer and microprocessors.
- Identify persons with major contributions to the field of computing.

#### **Hardware Input and Output**

- Define input and output.
- Describe how the hardware components of a computer interact with one another.
- Explain and identify the pieces that make up the architecture of a computer system.
- Understand terms and units used to describe major hardware components.
- Use information about the function, type, capabilities, size and speed of CPUs, motherboards, RAM, and hard drives to compare two computers.

#### **Sound, Graphics, and Network Cards**

- Demonstrate proficiency in the use of a mouse and keyboard.
- Demonstrate proficiency with peripherals.
- Explain the functions and characteristics of sound cards, graphics cards, and network cards.
- Explain the need for peripherals.

#### **System Maintenance**

- Define system maintenance and preventive measures.
- Describe consequences of not taking preventive measures.
- Install and configure hardware in a computer system.
- Troubleshoot problems with computer peripherals and office equipment.

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### Upgrade Computer Hardware

- Choose computers for specific purposes based on their commercial descriptions.
- Define the process of planning upgrades and changeovers, and demonstrate knowledge of the process of planning upgrades and changeovers.
- Given a scenario, make recommendations to improve a computer system.
- Investigate different (hardware) upgrade considerations.
- List the steps in setting up a new computer.

## Networks and the Internet

### Network Basics

- Demonstrate knowledge of how data is passed in packets, and ways to deal with network failure.
- Describe what a network is.
- Explain hierarchical addressing schemes.
- Explain the benefits of a network.
- Identify the role of servers and clients on a network.

### Evolution of Networks

- Analyze current trends and developments in networking.
- Identify different types of networks and how they work.
- Investigate important events in the evolution of networks.
- Investigate networking terminology.
- Investigate the most common types of networks and differentiate between them.

### Wireless Networks

- Compare and contrast wired and wireless networks.
- Describe how computers connect to wired and wireless networks.
- Investigate and analyze trends related to networking and wireless technology.

### Network Administration

- Demonstrate basic understanding of network administration by identifying the relationship between computer networks and other communications networks.
- Describe communications hardware and software used in networking.
- Explain and apply troubleshooting techniques and strategies for fixing network connectivity issues.
- Identify and describe communications and networking systems used in workplace environments.
- Identify and describe the functions of network operating systems.

### History of the Internet

- Explain the Internet's effect on computing and society.
- Identify and examine persons with major contributions to the Internet.
- Trace and outline the history and development of the Internet.
- Trace the future of the Internet.

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### Ethical Issues on the Internet

- Analyze ethical issues and problems associated with computers and information systems.
- Compare and contrast the pros and cons of hacking and cracking.
- Demonstrate an understanding of how to use the Internet efficiently for work.
- Describe and analyze copyright laws related to file sharing and Internet regulatory control.
- Explain and predict the consequences of software piracy on developers and the role of relevant enforcement organizations in software piracy.

### Copyright and IP

- Examine the emergence of e-commerce and e-government and how it relates to intellectual property and describe the function of a non-disclosure agreement.
- Explain intellectual property and examine the consequences of plagiarism.
- Explain the potential impact of e-commerce and e-government on business and society.
- Identify adherence to copyright rules and regulations and differentiate between copyright and trademarks.
- Identify and explain the effects of technology crimes.

### Search on the Internet

- Define ethical use of Internet/online resources using citations (both formal and informal).
- Demonstrate citing a source.
- Examine the ethical and unethical use of Internet and online sources.
- Identify criteria for conducting searches on the Internet, including analyzing whether an online source is reputable or not.

### Risks on the Internet

- Analyze the benefits and risks of networked computing.
- Examine issues concerning Internet security (including computer viruses and spam) and online predators.
- Explain and identify the risks/dangers of working on an insecure network/ or in an unsecured environment.
- Identify the risks of posting personal and work information on the Internet as it relates to identity theft (and other potential dangers).

### Improving Network Security

- Compare and contrast anti-virus software.
- Explain how and by whom encryption is used on a daily basis.
- Explain the purpose of a firewall.
- Explain the purpose of spyware/adware and describe methods for protecting against it.
- Identify network security issues and describe methods that help protect against security attacks.

## Operating Systems and Application Software

### Software Overview

- Compare and contrast the use of various software applications and their appropriate use.
- Identify classes of system and application software and differentiate between them.
- Identify new and emerging classes of software, and demonstrate knowledge of the process of upgrading and changing software applications.
- Identify open source, free, and proprietary licenses, as well as their benefits and drawbacks.

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**Software Development**

- Describe the development of software applications and the software development process.
- Identify and define features common to most software applications.
- Identify basic problems with application software.

**Computer Operating Systems**

- Compare and contrast the differences among current Windows, Unix, and Macintosh operating systems.
- Examine major operating system fundamentals and components.
- Examine the history and purpose of various OSes (such as DOS, Windows, OS X, iOS/Android).
- Identify persons with major contributions to operating systems.

**File Management**

- Demonstrate a working knowledge of standard file formats and identify file naming conventions in different operating systems.
- Demonstrate an understanding of file extensions and the purpose of file types across software products.
- Demonstrate proficiency with proper file management techniques and structure.
- Identify the hierarchy of files and folders and find files and folders using specific file paths.
- Match file extensions with their associated programs by differentiating among file types.

**File Management Tools**

- Demonstrate proper use of system management tools.
- Demonstrate using file protection and security.
- Practice viewing files in different ways (by icon, name, type, size, and date).
- Use file management tools to create folders and select, move, copy, cut, delete, rename, and sort files.
- Use the trash or recycling features to safely manage file deletions and restore files.

**Web Browsers**

- Dissect and identify the various components of a URL (in other words, explain how to read and understand a URL).
- Examine how URLs and associated URL protocols work.
- Examine what a web browser is, what it does (render web pages), and how it does this.
- List and examine the major/most popular web browsers and their features.

**HTML and the Web****Web Pages**

- Identify and describe design principles related to web page design.
- Identify and describe types and styles of typeface used for web publications, including serif and sans serif, and analyze reasons for using one typeface instead of another.
- Identify and describe web terminology and the elements of a web page.
- Identify and explain the terminology and need for interactive media and web-based applications, including things like Adobe Flash and Ajax.
- Identify individual web page layouts and content.

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### Investigate Web Design

- Analyze and develop an awareness of acceptable and excellent web page design.
- Analyze design elements of professional web sites by evaluating the use of theme and navigational links.
- Identify and critique the layout, navigation, and accessibility of a web site based on its purpose.

### HTML Basics

- Analyze basic HTML.
- Identify and describe the purpose of basic HTML.

### Create a Web Page

- Create a Web page with links, graphics, text with basic HTML tags, bulleted lists, and an email address.
- Identify the terminology associated with web page editing software and its functions.
- Write HTML code using an HTML editor and then render it using a Web browser.

### Use CSS to Design a Web Page

- Compare and contrast creating a web page manually versus using a WYSIWYG editor.
- Demonstrate the ability to use various web development software programs.
- Learn about CSS and why it's used, and then apply basic CSS to style HTML.
- Use CSS to express the design of a website.

### Add Images to a Web Page

- Apply color theory to choose strong color choices for a web page's background and text color.
- Create a web page with images.
- Examine color theory as it relates to web page design and legibility.
- Use CSS to change the text and background color and appearance of a web page.

### Publish to the Web

- Demonstrate knowledge about publishing to the Internet.
- Identify a website host for publishing a website.
- Investigate how to determine the preferred procedures for posting/publishing a website using the selected website host.
- Investigate how to make decisions about how often the site should be updated, who will change the content, and who will maintain the site.
- List steps necessary to take in order to publish a website to the Internet.

## Getting Started

### Install the Software

## Spreadsheets and Presentations

### Spreadsheet Basics

- Describe the ways in which spreadsheets are used to solve real-world business problems
- Identify key features and functions of spreadsheet software
- Identify terminology associated with spreadsheet software



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**Create and Use a Spreadsheet**

- Create and format a spreadsheet that incorporates textual and numeric content
- Explore formulas and the order of operations principle
- Use functions to perform basic calculations, such as addition, subtraction, multiplication, and division

**Use Spreadsheet Functions and Formulas**

- Create formulas to produce a business document
- Use a spreadsheet program's built-in functions to produce a business document

**Advanced Spreadsheet Features**

- Analyze advanced spreadsheets
- Describe lookup tables and nested IF statements
- Describe subtotals, cell protection, and conditional formatting
- Identify common types of charts and graphs

**Create Advanced Spreadsheets**

- Generate charts and graphs
- Use lookup tables and nested IF statements
- Use subtotals, cell protection, and conditional formatting

**Spreadsheets and Data Management**

- Describe the use of multiple search parameters to locate, sort, and filter data
- Describe the use of simple search parameters to locate, sort, and filter data
- Identify data management procedures

**Presentation Software**

- Describe terminology associated with presentation software
- Identify advanced features of presentation software
- Identify common uses of presentations in business
- Identify the basic features of presentation software

**Create a Presentation**

- Create, save, edit, and print a presentation with handouts and speaker notes
- Identify the parts of a presentation
- Identify ways to enhance communication in a presentation

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**Create Multimedia****Digital Images**

- Compare and contrast image file formats
- Distinguish between raster and vector graphics
- Identify resources used to access and digitize graphics
- Understand how images are digitized and displayed

**Create and Edit Images**

- Identify and compare the different kinds of graphic art software
- Use image editing software to create and edit a digital image

**Digital Audio**

- Describe how sound is digitized and reproduced
- Identify and compare audio file formats

**Audio Editing Techniques**

- Analyze techniques for editing a digital audio file
- Describe audio editing software

**Digital Video**

- Describe how video is digitized and reproduced
- Identify and compare video file formats and encoding methods

**Create a Multimedia Presentation**

- Differentiate between linear and non-linear presentations
- Incorporate digital images and audio in a presentation
- Incorporate hyperlinks in a presentation

**Word Processing Software Basics**

- Identify key features and functions of word processing software
- Identify terminology associated with word processing software
- Understand how word processing software is used in the real world

**Create and Format a Letter**

- Identify the characteristics of a professional letter
- Identify word processing features that are useful for letter writing and formatting
- Use word processing features to create and format a letter

**Format a Research Paper**

- Format a multi-page research paper according to a set of approved style guidelines
- Identify commonly used style guidelines for academic papers (APA, MLA, CSE, ACS) and the disciplines in which they are used.
- Understand the use of style guidelines for formatting academic papers

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**Create a Business Card and a Flyer**

- Create a business card
- Create an advertising flyer
- Define desktop publishing
- Identify desktop publishing features in a word processing program

**Databases**

**Databases**

- Define database
- Distinguish databases from spreadsheets
- Identify basic components of databases
- Identify common uses of databases in business

**Database Software Basics**

- Explore forms
- Explore queries and reports
- Identify key features of database software

**Relating Fields and Records**

- Analyze the table relationships of a database
- Describe how fields and records in different tables are related
- Describe primary keys
- Discuss the difference between flat files and relational databases

**Creating a Database**

- Describe how to choose a primary key
- Describe how to organize information in fields of data
- Discuss the steps necessary to prepare for creating a database
- Discuss when to create a database

**Locate and Sort Data**

- Use tools to locate data in a database
- Use tools to sort data in a database

**Query Data**

- Create and run complex queries
- Create and run simple queries
- Identify the uses of queries in a database

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#### Export Data

- Identify options for exporting query data
- Use database tools to export query data to a document
- Use database tools to export query data to a spreadsheet

#### Using Reports to Communicate Data

- Describe how to use reports to communicate data effectively
- Describe how to use tools to include calculated figures in reports
- Identify different kinds of data reports

### Introduction to Programming

#### Programming Overview

- Define computer program, programming, and programming language
- Discuss the history and development of programming languages
- Identify persons who contributed significantly to the field of computer programming

#### Algorithms

- Define and describe the purpose of algorithms
- Identify examples of algorithmic problem solving in everyday life

#### Programming Design

- Define and discuss object-oriented programming design
- Define and discuss structured programming design
- Define and discuss the significance of programming design
- Define and discuss top-down programming design
- Identify three types of programming design

#### Logic Problems

- Define logic and logic problems in relation to computer programming
- Give examples of logic problems in relation to computer programming
- Identify and discuss strategies for solving logic problems

#### Writing a Problem Statement

- Analyze writing a problem statement
- Define problem statement
- Describe the importance of writing problem statements when designing software
- Identify characteristics of effective problem statements

#### Exploring a Problem and Communicating a Solution

- Describe strategies used to explore a problem
- Explain how to communicate the design of an algorithm and the flow of data

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		<p><b>Using Flowcharts and Pseudocode</b></p> <ul style="list-style-type: none"> <li>Analyze the use of flowcharts and pseudocode in designing a computer program</li> <li>Communicate the design of a program in a flowchart</li> <li>Communicate the design of a program in pseudocode</li> </ul>
		<p><b>Write and Test Code</b></p> <p><b>Variables and Data Types</b></p> <ul style="list-style-type: none"> <li>Define and discuss the use of data types</li> <li>Define and discuss the use of variables</li> <li>Identify common data types used in programming</li> </ul> <p><b>Functions, Procedures, Arguments and Parameters</b></p> <ul style="list-style-type: none"> <li>Analyze the similarities and differences between procedures and functions</li> <li>Define and discuss the use of parameters and arguments</li> <li>Define and discuss the use of procedures and functions</li> </ul> <p><b>Conditional Statements</b></p> <ul style="list-style-type: none"> <li>Analyze the use of else and elif statements</li> <li>Analyze the use of if statements</li> <li>Define and discuss the use of conditional statements in computer programming</li> </ul> <p><b>Iteration</b></p> <ul style="list-style-type: none"> <li>Define and describe the use of iteration in computer programming</li> <li>Identify the use of iteration to repeat a set of programming instructions</li> </ul> <p><b>Internal Data Representation</b></p> <ul style="list-style-type: none"> <li>Describe computer numbering systems and internal data representation</li> <li>Describe how to convert between binary and decimal number systems</li> <li>Identify binary, octal, decimal, and hexadecimal number systems</li> </ul> <p><b>Integrated Development Environments</b></p> <ul style="list-style-type: none"> <li>Define integrated development environment (IDE)</li> <li>Describe and differentiate between compilers and interpreters</li> <li>Identify popular IDEs</li> <li>Identify the components of an IDE and the purpose of each</li> </ul> <p><b>Resources for Programmers</b></p> <ul style="list-style-type: none"> <li>Identify other resources for computer programming</li> <li>Identify reference materials for computer programming</li> </ul>

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		<b>Program with Variables</b> <ul style="list-style-type: none"><li>Create variables of different data types and use them in code</li><li>Describe naming conventions for variables</li><li>Describe the importance of using correct syntax</li></ul>
		<b>Program with Functions and Arguments</b> <ul style="list-style-type: none"><li>Analyze the use of syntax when using functions and arguments</li><li>Write a function, with and without an argument</li></ul>
		<b>Testing and Fixing Code</b> <ul style="list-style-type: none"><li>Describe the process of fixing and verifying code</li><li>Describe the process of testing code</li></ul>
		<b>Program with Lists and Loops</b>
		<b>Use Conditional Statements</b> <ul style="list-style-type: none"><li>Use else-if statements in a program</li><li>Use if-then statements in a program</li></ul>
		<b>Use Data Structures</b> <ul style="list-style-type: none"><li>Describe an array and how it differs from a list</li><li>Define and give examples of ordered data structures</li><li>Use a list and list methods in a program</li></ul>
		<b>Use Iteration</b> <ul style="list-style-type: none"><li>Use iteration to change an ordered data structure</li><li>Use iteration to repeat a set of programming instructions</li></ul>
		<b>Readable Code</b> <ul style="list-style-type: none"><li>Analyze how code formatting improves readability</li><li>Define readable code</li><li>Discuss the importance of writing code that is readable</li><li>Identify the characteristics of readable code</li></ul>
		<b>Encode and Decode Text</b> <ul style="list-style-type: none"><li>Define and differentiate between ASCII and Unicode character encoding</li><li>Define and discuss the use of character encoding</li><li>Write a program to decode a Unicode character encoding into text</li><li>Write a program to encode a text string in Unicode</li></ul>

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**Types of Errors**

- Define and discuss logic errors
- Define and discuss run-time errors
- Define and discuss syntax errors
- Define errors in the context of computer programming
- Identify three types of errors

**Debugging a Program**

- Debug a program
- Define and differentiate between diagnosing and troubleshooting
- Define bugs and debugging