Lesson 1: Introduction to IT Business and Careers

Lesson 1 Objectives

• Define Information Technology (IT) job roles
• Review career opportunities in the IT industry
• Describe the importance of successfully explaining technical issues to non-technical audiences
• Identify technology adoption models
• Describe business ontological models and data models
• Review the importance of adhering to standards during software, hardware and Web development
Information Technology (IT)

- Information Technology (IT) – refers to all aspects of managing and processing information
- Computer departments in most businesses are referred to as IT departments
- IT departments deal with:
  - Computer technologies and services
  - Telecommunication technologies and services
  - Networking technologies and services

IT Job Roles

- Web site designer
- Web application developer
- Web architect
- Mobile application developer
- Web site analyst
- Web site manager
- Database administrator/specialist
- Server administrator
- Network engineer
- Security manager
- Security analyst/consultant
- SEO analyst
- Web marketing manager
- Blog manager
- PC and mobile-device repair technician
- Help desk technician

Conducting Job Searches

- Participating in on-campus interviews
- Searching wanted ads
- Visiting employment agencies/employment placement services
- Attending job/career fairs
- Volunteering
- Seeking part-time work
- Networking (socially)
- Using an executive search firm
- Mailing cover letters and résumés to companies
- Applying in person
- Entering résumés electronically or posting them to the Web
- Using Internet technology to conduct job searches
Using the Internet to Conduct Job Searches

- Use a variety of Internet search engines to search for information about career opportunities in the IT industry
- Enter keywords to narrow your search to specific job types, and retrieve available job listings that relate to your career goals

Building a Personal Network

- Network (socially) with business associates and other people who may be able to provide job leads
- Professional networking sites include:
  - LinkedIn (www.linkedin.com)
  - Spoke (www.spoke.com)
  - ZoomInfo (www.zoominfo.com)
  - Jigsaw (www.jigsaw.com)

Creating a Résumé

- Formatting a résumé:
  - Create using a word-processing program
  - Use formatting to increase visual appeal
  - Recipient needs same word-processing program to be able to read résumés
- Text format résumés:
  - Contain little formatting
  - Intended for keyword-searchable résumé databases and applicant tracking systems
- RTF résumés:
  - Incorporate basic formatting techniques
  - Can be read by many different programs on many different platforms
Creating a Résumé (cont’d)

• PDF résumés:
  – Compatible across all computer platforms
  – Not vulnerable to viruses
  – Need PDF software
• HTML résumés:
  – Posted as Web pages or sent as HTML-based e-mail messages
  – Retain the formatting characteristics of a word-processing file

Education and IT Careers

• University degrees are available in:
  – Computer science
  – Computer engineering
  – Management information systems
• Employers are also looking for:
  – Interpersonal skills
  – Business skills
  – Project management skills

Education and IT Careers (cont’d)

• Importance of continuing education
• Obtain certifications in:
  – CIW
  – A+
  – Network+
  – Security+
Technical Concepts and Training

- Communicating technical issues to end users
- Justifying IT-related expenses to management
- Understanding problems and concerns of end users
- Providing clear solutions
- Remembering the ROI affect of IT decisions
- Presenting technical data clearly so that managers understand the information and can make informed decisions

Technology Adoption Models

- Paradigm shift – a change from one way of thinking to another
- Moore’s Law – an analogy for advances in technological innovation
  - the number of transistors on integrated circuits doubles approximately every two years
- Technology adoption life cycle – the degree to which members of a population will adopt or accept a new product or innovation
- Diffusion of innovation – early adopters and the early majority have different expectations of a product

Business Modeling

- Ontology – the study of how a particular knowledge domain, or system, is organized
- Business ontology – describes the flow of information through a business hierarchy
- Ontology and IT
- Web Ontology Language (OWL)
  - knowledge representation languages
  
  ```xml
  <Ontology ontologyIRI="http://example.com/tea.owl"...>
  <Prefix name="owl" IRI="http://www.w3.org/2002/07/owl#"/>
  <Declaration>
  <Class IRI="Tea"/>
  </Declaration>
  </Ontology>
  ```
Data Modeling

• Data modeling – determines the requirements that a database must fulfill in order to function properly for an organization
• Data modeling steps:
  – Planning and analysis
  – Conceptual design
  – Logical design
  – Physical design
  – Implementation

The Importance of Standards

• Standards help govern the ease with which information can be exchanged and understood between people, businesses and systems
• International Organization for Standardization (ISO) 9000
• World Wide Web Consortium (W3C)
• Internet Engineering Task Force (IETF)
• Institute of Electrical and Electronics Engineers (IEEE)
• Telecommunications Industry Association (TIA)

Lesson 1 Summary

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Lesson 2 Objectives

- Define modern Web technologies
- Define social networking
- Define and use instant messaging and text messaging
- Use Windows Remote Assistance
- Discuss blogging and create a blog
- Discuss effective Internet communication guidelines
- Discuss convergence and unified communications technologies

Modern Web Technologies

- Web 2.0 concentrates on developing the information-sharing and collaboration capabilities of the Web
- Crowdsourcing – a task ordinarily performed by one person is outsourced to a large group or community
- Collective intelligence – the ability of a group to exhibit a greater degree of intelligence by solving problems collaboratively compared to the intelligence of an individual member
Common Technologies and Tools

- Ajax – enables Web applications to interact with users in much the same way they do with desktop applications
- Wikis – Web pages that can be viewed and modified by anybody with a Web browser and access to the Internet
- Folksonomy – tagging of online content so non-technical users can classify and find information

Common Technologies and Tools (cont’d)

- Web feed services – content publicly available to users via Web feeds (e.g., RSS, Atom); syndication
- Podcasts – audio/video digital-media files distributed through Web feeds to subscribed users
- Semantic Web – Web data that is contextualized with the addition of machine-readable metadata

Common Technologies and Tools (cont’d)

- Mashups – Web pages that integrate content and scripts from multiple Web sites to create new applications
Social Networking

• Social networking – the grouping of individuals with common interests or goals into specific groups or communities
• Social networking sites:
  – Generally provide privacy protection for their users
  – Are not responsible for the content that members post
  – Can be used as a business tool by helping members establish business contacts, post résumés and find jobs

Instant Messaging (IM)

• Instant Messaging – computer-based method of communication in which users can type and view messages sent to one or more recipients and view the responses immediately
• Contacts must be online to receive messages
• Can also be used to send files, view photos, send Web links and talk to contacts
• Becoming very popular in the workplace
• Requires an IM client and an account for IM service

Text Messaging (SMS)

• Short Message Service (SMS)
• Text messaging – users type short text messages from mobile phones
• "Short" text messages:
  – Are no larger than 140 bytes
  – Are no longer than 160 English characters, including spaces (other languages will have a different character limit)
• SMS gateway – service that allows you to send text messages to an instant messaging (IM) service, the World Wide Web and desktop computers
• Text message abbreviations are now part of our daily lexicon
<table>
<thead>
<tr>
<th>Windows Remote Assistance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Allows a user to seek assistance from another person in a remote location</td>
<td></td>
</tr>
<tr>
<td>• Used in conjunction with Windows Live Messenger (or e-mail), enabling the remote</td>
<td></td>
</tr>
<tr>
<td>person to offer real-time assistance via instant messaging</td>
<td></td>
</tr>
<tr>
<td>• When you accept a connection from a remote assistant, your Desktop displays on the</td>
<td></td>
</tr>
<tr>
<td>remote computer</td>
<td></td>
</tr>
<tr>
<td>• You can halt remote control at any time by disconnecting</td>
<td></td>
</tr>
<tr>
<td>• Both computers must be running Windows Vista or newer in order to use Remote Assistance</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Blogging</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>• Blog (short for &quot;Web log&quot;) – a collection of personal thoughts posted on a public Web</td>
<td></td>
</tr>
<tr>
<td>site</td>
<td></td>
</tr>
<tr>
<td>• Community blog – all participants express their perspectives without any attempt at</td>
<td></td>
</tr>
<tr>
<td>coming to a consensus</td>
<td></td>
</tr>
<tr>
<td>– The mainstream media can use discussions &quot;in the blogosphere&quot; to gauge public</td>
<td></td>
</tr>
<tr>
<td>opinion about various issues</td>
<td></td>
</tr>
<tr>
<td>• Trackback – a blogger receives notification when other bloggers link to his or her</td>
<td></td>
</tr>
<tr>
<td>blog entry</td>
<td></td>
</tr>
<tr>
<td>• Microformats – allow bloggers to incorporate information from Web sites into their</td>
<td></td>
</tr>
<tr>
<td>blog entries</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communicating Effectively over the Internet</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Create effective messages that are pertinent, appropriate and brief</td>
<td></td>
</tr>
<tr>
<td>• Netiquette encourages common sense and politeness, and establishes general rules for</td>
<td></td>
</tr>
<tr>
<td>Internet etiquette</td>
<td></td>
</tr>
<tr>
<td>• Internet ethics:</td>
<td></td>
</tr>
<tr>
<td>– Apply the same standard of ethics to Internet-based communications that you would to</td>
<td></td>
</tr>
<tr>
<td>face-to-face communication</td>
<td></td>
</tr>
<tr>
<td>– Avoid harassment (i.e., threatening or inappropriate e-mail messages, text messages</td>
<td></td>
</tr>
<tr>
<td>or instant messages)</td>
<td></td>
</tr>
</tbody>
</table>
Convergence and Unified Communication Technologies

- Unified communications – a business trend that seeks to simplify and integrate all forms of communication
- Convergence – the integration of telephony and data networks and technologies
- Voice over IP (VoIP) – converts voice into data packets for transmission over a packet-switched IP network
- Call center – a centralized office used for the purpose of processing a large volume of requests by phone

Convergence and Unified Communication Technologies (cont’d)

- Contact center – a call center that allows consumers to contact agents via avenues other than telephone
- Presence – a status indicator that conveys a person’s willingness and ability to engage in communications in real time
  – Presencing requires collaboration among a number of devices
- Mobile computing – a person’s ability to use technology while "on the go"

Lesson 2 Summary

- Define modern Web technologies
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Lesson 3:
Introduction to
Internet Technology

Lesson 3 Objectives

• Define networks
• Define the Internet
• Identify Internet connection methods
• Define Internet protocols
• Define the Domain Name System (DNS)
• Define cloud computing

Overview of Networks

• Network – two or more computers linked together so they can communicate, share resources and exchange information
• Networks allow users to:
  – Access shared programs and data
  – Transfer data from one computer to another
  – Share peripheral devices such as printers
  – Share storage devices to store data for backup
  – Use programs to communicate with other users
  – Access the Internet
The Client/Server Model

- Client/server model – a network structure in which individual computers and devices interact with one another through a central server, to which they are all connected
  - Client – an individual computer connected to a network
  - Server – a computer that manages network resources
  - Node – an individual computer or other device connected to a network

LANs and WANs

- Local area network (LAN) – a group of computers connected within a confined geographic area
  - The organization owns all network components
- Wide area network (WAN) – two or more connected LANs that span a wide geographic area
  - The organization typically leases some of the components needed to transmit data, such as high-speed telephone lines or wireless transmission equipment

Overview of the Internet

- Internet – a vast network of LANs and WANs that electronically connects millions of people worldwide
- The Internet was formed in 1969 by ARPA, whose network, ARPANET, featured multiple servers and connections
The World Wide Web

• World Wide Web – a set of software programs that enables users to access resources on the Internet via hypertext documents, or Web pages
• Web page – a document created in HTML containing hypertext links that, when clicked, enable users to access a different location or document
• Web site – a collection of related Web pages
• Web browser – a software application that enables users to easily access, view and navigate Web pages on the Internet

How the Internet Works

• Network protocols and packets:
  – Protocol – an agreed-upon format for transmitting data between two devices
  – Packet – a fixed piece of information sent across a network
• Every computer connected to the Internet uses Transmission Control Protocol / Internet Protocol (TCP/IP)
  – TCP/IP – software that makes Internet communication possible

How the Internet Works (cont'd)

• Computers access information from the Internet as follows:
  – You request data from an Internet server
  – The request is divided into packets
  – The packets are routed from your LAN to the Internet backbone
  – The packets are routed from the Internet backbone to the destination server
  – The destination server sends the requested information using the same process
Connecting to the Internet

• Six elements are required to connect to the Internet:
  – Computer
  – Operating system
  – TCP/IP
  – Client software
  – Internet connection (direct through an ISP)
  – Internet address

Internet Service Providers (ISPs)

• Internet Service Provider (ISP) – an organization that provides access to the Internet
  – Most ISPs charge a flat monthly rate
  – Some basic-service ISPs offer Internet connectivity for free
  – ISPs offer dial-up or direct Internet connections

Dial-up and Direct Internet Connections

• Dial-up Internet connections:
  – Standard telephone lines and analog modem
  – Integrated Services Digital Network (ISDN) line and an ISDN modem
• Direct Internet connections:
  – High-speed data links, including fiber-optic
  – Wireless connections, including 802.11 standards and satellite
  – T and E carriers, including fractional T and E lines
  – LAN connections
  – Cable modems
  – Digital Subscriber Line (DSL)
  – 4G mobile hotspot
Internet Protocols

- Internet Protocol version 4 (IPv4) – supports 32-bit dotted quad IP address format
  - Most widely used version of IP
  - Approximately 4 billion possible IP addresses
- Internet Protocol version 6 (IPv6) – supports 128-bit hexadecimal address format
  - Also known as Internet Protocol Next Generation (IPng)
  - Included as part of IP support in many products
  - Approximately 340 undecillion (340 times 10^{36}) possible IP addresses

Internet Protocols (cont’d)

- Remote access protocols:
  - Point-to-Point Protocol (PPP) – allows a computer to connect to the Internet over a phone line
  - Point-to-Point Protocol over Ethernet (PPPoE) – implements PPP over Ethernet (Ethernet is a LAN network standard that allows computers in a network to communicate)
    - PPPoE connects an entire network to the Internet

Internet Protocols (cont’d)

- Hypertext Transfer Protocol (HTTP) – used to transfer Web pages from a Web server to a Web client (Web browser)
- Hypertext Transfer Protocol Secure (HTTPS) – used to access a secure Web server
- File Transfer Protocol (FTP) – used to transfer files between computers on the Internet
Internet Protocols (cont’d)

• Electronic mail (e-mail) protocols:
  – Simple Mail Transfer Protocol (SMTP) – used to transfer e-mail messages to others with an outgoing mail server
  – Post Office Protocol (POP) – used to receive e-mail from an incoming mail server
    • Forces you to download e-mail messages before reading and managing them
    • Current version is POP3
  – Internet Message Access Protocol (IMAP) – used to receive e-mail from an incoming mail server
    • Allows you to manage e-mail messages while they reside on the server
    • Current version is IMAP4

Internet Protocols (cont’d)

• Network News Transfer Protocol (NNTP) – used by news servers to exchange newsgroup articles
  – Newsgroup – a group of messages about a particular subject that is posted to a central Internet site (news server) and redistributed through Usenet
    • Usenet – a public-access worldwide network

Domain Name System (DNS)

• Domain Name System (DNS) – resolves IP addresses into easily recognizable names
  • For example:
    72.44.192.233 = www.CIWcertified.com
  • Domain name and IP address refer to the same Web server
Typical Domain Name

www.CIWcertified.com

Server (host) name

Registered company domain name

Domain category (top-level domain)

Domain Name Syntax

- Domain names are read right to left, signifying general, then specific locations
- For example, www.CIWcertified.com can be interpreted as follows:
  - com – commercial site
  - CIWcertified – registered company domain name
  - www – Web server name at company

Top-Level Domains

- com – commercial or company sites
- edu – educational institutions, typically universities
- org – organizations; originally clubs, associations and non-profit groups; currently, various types of organizations
- mil – U.S. military
- gov – U.S. civilian government
- net – network sites, including ISPs
- int – international organizations (rarely used)
Domain Name Servers and Virtual and Shared Domains

- Domain name server – a server on the Internet that resolves domain names into IP addresses
- Reverse DNS – the process of resolving IP addresses into domain names
- Virtual domain – a hosting service that allows a company to host its domain name on a third-party ISP server
- Shared domain – a hosting service that allows multiple entities to share portions of the same domain name

Cloud Computing

- Cloud computing – a paradigm in which users access software and services remotely over the Internet
- Crowdsourcing – outsourcing a task to an undefined group of people or community to obtain and analyze large amounts of data
- Cloud computing characteristics:
  - Reliance on only a Web browser to access services
  - No browser preference
  - No operating system preference

Cloud Computing (cont'd)

- Software as a Service (SaaS) – another name for cloud computing
- Grid computing – a cluster of multiple, remote systems that are used to create a single solution
- Advantages to cloud computing:
  - Flexibility
  - Scalability
  - Cost reduction
- Problems with cloud computing:
  - Connectivity
  - Speed
  - Lockout
Lesson 3 Summary

- Define networks
- Define the Internet
- Identify Internet connection methods
- Define Internet protocols
- Define the Domain Name System (DNS)
- Define cloud computing

Lesson 4: Web Browsing

Lesson 4 Objectives

- Identify the basic functions of Web browsers
- Install a Web browser
- Identify the components of Web addresses
- Describe the functioning of a Web browser
- Identify considerations in selecting a browser
- Use various browsing techniques
- Define elements of a Web browser
- Configure Web browser preferences
- Identify the function of proxy servers
- Troubleshoot common Internet client problems
Basic Functions of Web Browsers

- Provide a way for users to access and navigate Web pages
- Display Web pages properly
- Provide technology to enable multimedia features
- Provide access to Internet services (such as FTP and e-mail)
- Perform authentication and encryption functions

Installing a Web Browser

- Windows Internet Explorer 9 (IE9) is packaged with Windows 7
- Most browser software is available on the Web or through a vendor CD-ROM
- ISPs provide browser software on installation CD-ROMs
- You should install the latest version of a browser because it will have the most recent security features
- Look for and install browser updates as they become available

Web Addresses

- Every Web page has a unique address called a Uniform Resource Locator (URL)
- URLs typically include the protocol, the Internet resource (server or host name) and the domain name
- You enter absolute URLs into your browser’s Address or Location box
- Relative URLs can be used for coding Web sites
How Browsers Work

1. You enter a URL into the browser
2. Browser divides the URL into three parts: protocol, server and domain name, and file name
3. Browser contacts a domain name server to translate server name into an IP address
4. Browser uses IP address to connect to server
5. Browser uses HTTP to request a page from the server
6. Some level of authentication takes place
7. Server sends the requested page (coded in HTML) to the browser
8. Browser reads and interprets the HTML, and displays the Web page

Browser Choices

- Most popular browsers in use today are Windows Internet Explorer, Google Chrome, and Mozilla Firefox
- Alternative browsers include:
  - Safari
  - RockMelt
  - Opera
  - Konqueror
  - Lynx

Google Chrome

- Google uses the greenfield approach to software and Web development
  - Greenfield – a project that lacks any constraints imposed by prior development
- Chrome features:
  - Clean interface
  - Automatic crash recovery
  - Multi-threading
  - Improved sandboxing
  - Isolated tabs
  - Privacy mode
Browsing Techniques

Techniques available to make your browsing sessions more efficient:

– Using Bookmarks and Favorites
– Using multiple windows and tabs
– Following links

Browser Elements

• Rendering engine
• Interpreter
• Sandbox
• Thread
• Window
• Tab
• Cache
• Supplements
• Network programming
• Download controls
• Plug-in

Configuring Web Browser Preferences

Browser preferences you can configure to suit your working style include:

– Browser fonts
– Home page
– History folder
– Blockers for pop-up and pop-under windows
– Browser cache settings
Proxy Servers

- Proxy servers are placed between corporate networks and the Internet.
- Proxy servers can provide the following services:
  - Web document caching
  - Corporate firewall access
- Browsers must be properly configured to work with proxy servers.
- Mozilla Firefox can be manually configured to work with a proxy server, or can use a proxy server’s URL to automatically configure itself.
- Internet Explorer can use a configuration script, or automatically scan, for a proxy server.

Troubleshooting Internet Client Problems

By adjusting browser functions and settings, you can troubleshoot the following client problems:
- Poor rendering
- Slow connection
- No connection
- Slow browser and other system functions
- Authentication issues
- Disk space usage

Web Feeds

- Web feeds – data formats for delivering Web content that is updated frequently:
  - RSS (Really Simple Syndication, RDF Site Summary or Rich Site Summary)
  - Atom
Lesson 4 Summary

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Lesson 5: Multimedia on the Web

Lesson 5 Objectives

- Define objects and their relationships to multimedia
- Explain the fundamentals of C, C++, Java, JavaScript, JScript, C#, ActiveX and VBScript
- Discuss security issues with objects
- Discuss the relationship between HTML5 and plug-ins
- Define compression and decompression
- Install plug-ins
- Identify plug-ins, add-ons and viewers
- Listen to and view multimedia objects within your browser
- Identify various file formats
- Download files and store them on your computer
Objects, Active Content and Languages

Web authors use the following languages to create active content:

• C – a programming language used to create operating systems and applications
• C++ – a superset of the C language that uses object-oriented programming
• Java – an object-oriented programming language (based on C) that concentrates on distributed objects over a network
• Java applets – programs written in Java that are designed to run within a Web browser when accessed

Objects, Active Content and Languages (cont’d)

• JavaScript – an event-driven scripting language designed to react whenever events occur
• JScript – a Microsoft version of JavaScript
• C# – a Microsoft version of Java
• ActiveX – an open set of technologies for integrating components on the Internet and within Microsoft applications
• VBScript – an object-oriented scripting language that Microsoft derived from the Visual Basic programming language

Objects and Security Issues

• Both ActiveX and Java applets allow information to be downloaded and run on your system
• Some downloaded content can cause problems ranging from inconvenience to loss of data
• Both Internet Explorer and Firefox provide control options to enable or disable the execution of Java programs and other active content
• You can also disable active content entirely
HTML5 vs. Plug-ins

• HTML5 is the latest version of HTML
• One of the major goals of HTML5 is to eliminate the use of browser plug-ins
• HTML5 is a standard provided by the W3C
• Most current browsers support HTML5
• HTML5 can produce dynamic multimedia content with JavaScript and Cascading Style Sheets (CSS)

Introduction to Plug-in Technology

• Plug-ins are programs designed to extend basic browser functionality
• Plug-ins are associated with a specific platform (Windows or Mac OS X) and sometimes with a specific browser
• Plug-ins provide efficient integration of multimedia formats with the browser and computer
• Browsers launch plug-ins to play multimedia files

Data Compression and Decompression

• Compression is the reduction in size of data files
• Audio and video files are compressed before they are transferred across the Internet
• Compressed files must be decompressed so that they can be played
• Compression can be either lossy or lossless
• Plug-ins use standard compression / decompression algorithms called codecs to decompress and play streaming media
Plug-in Installation

- Online installation
- Offline installation
- Chrome, Internet Explorer and Firefox include several native plug-ins
  - It is advisable to occasionally upgrade plug-ins from the appropriate vendor’s site. Upgrades usually include increased functionality and security updates.

Types of Plug-ins and Viewers

- Adobe Flash Player
- Microsoft Silverlight
- Apple QuickTime
- Windows Media Player
- Firefox add-ons
- Microsoft PowerPoint Viewer
- Adobe Reader

Video File Formats

<table>
<thead>
<tr>
<th>File Name</th>
<th>Extension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.avi</td>
<td></td>
<td>Standard video files for Windows</td>
</tr>
<tr>
<td>.mov</td>
<td>.qt</td>
<td>Standard formats for QuickTime movies</td>
</tr>
<tr>
<td>.mp4</td>
<td></td>
<td>Standard format for movies on the Internet</td>
</tr>
<tr>
<td>.ogv</td>
<td></td>
<td>Video format designed for HTML5 video</td>
</tr>
<tr>
<td>.webm</td>
<td></td>
<td>Royalty-free, open video and audio format designed for HTML5 video</td>
</tr>
</tbody>
</table>
### Audio File Formats

<table>
<thead>
<tr>
<th>File Name</th>
<th>Extension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.au</td>
<td></td>
<td>Audio format used by UNIX servers</td>
</tr>
<tr>
<td>.aiff</td>
<td></td>
<td>High-quality audio format developed by Apple Computer</td>
</tr>
<tr>
<td>.mp3</td>
<td></td>
<td>Format for compressing audio files that uses the MPEG-1 standard</td>
</tr>
<tr>
<td>.ogg</td>
<td></td>
<td>Free alternative to MP3 format</td>
</tr>
<tr>
<td>.wav</td>
<td></td>
<td>Native sound format for Windows</td>
</tr>
</tbody>
</table>

### Graphics File Formats

<table>
<thead>
<tr>
<th>File Name</th>
<th>Extension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.png</td>
<td></td>
<td>Free open-source file format that has become an Internet standard for graphics</td>
</tr>
<tr>
<td>.gif</td>
<td></td>
<td>Bitmap format that can use lossless compression and supports various resolutions limited to 256 colors; most effective for drawings or illustrations</td>
</tr>
<tr>
<td>.jpg</td>
<td></td>
<td>Format that supports 16 million colors, uses lower compression; widely used for photographs and complex graphics</td>
</tr>
<tr>
<td>.tif</td>
<td></td>
<td>Popular customizable format that supports grayscale, 8-bit and 24-bit color, and monochrome; commonly used for medical imaging and desktop publishing</td>
</tr>
<tr>
<td>.ps</td>
<td></td>
<td>Format designed for printing on PostScript printers</td>
</tr>
<tr>
<td>.eps</td>
<td></td>
<td>Format used to import and export graphics files between operating systems and applications</td>
</tr>
</tbody>
</table>

### Document File Formats

<table>
<thead>
<tr>
<th>File Name</th>
<th>Extension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.txt</td>
<td></td>
<td>Plain (ASCII) text file; does not support formatting or images</td>
</tr>
<tr>
<td>.pdf</td>
<td></td>
<td>Format that supports formatting and images that can be read on any computer regardless of operating system; requires Adobe Reader for viewing the documents</td>
</tr>
<tr>
<td>.docx</td>
<td></td>
<td>Formats for files created with Microsoft Word for Windows</td>
</tr>
<tr>
<td>.doc</td>
<td></td>
<td>Format for files created with Open Office Writer</td>
</tr>
<tr>
<td>.rtf</td>
<td></td>
<td>Supports images and formatting; compatible with many operating systems</td>
</tr>
</tbody>
</table>
**Downloading Files with a Browser**

- You can use a browser to:
  - Save an entire Web page
  - Save elements of a Web page
  - Download executable files or other types of files from the Internet to a specific location on your hard drive
  - Copy selections to the Clipboard

**Lesson 5 Summary**

- Define objects and their relationships to multimedia
- Explain the fundamentals of C, C++, Java, JavaScript, JScript, C#, ActiveX and VBScript
- Discuss security issues with objects
- Discuss the relationship between HTML5 and plug-ins
- Define compression and decompression
- Install plug-ins
- Identify plug-ins, add-ons and viewers
- Listen to and view multimedia objects within your browser
- Identify various file formats
- Download files and store them on your computer

**Lesson 6: Databases and Web Search Engines**
Lesson 6 Objectives

- Define databases and database components
- Define relational database concepts
- Define Web search engines and explain Web search types
- Register a Web site with a search engine
- Conduct basic and advanced Web searches
- Define Boolean operators
- Use Web searches to perform job tasks
- Explain Web search strategies and unexpected Web search results
- Evaluate Web site information and organize Internet research
- Cite copyrighted Web site information as a resource

Overview of Databases

- Database – an organized collection of information that pertains to a particular subject or purpose
- Table – a collection of data about a specific topic, organized into columns and rows
- Field – a category of information in a table (a column)
- Record – a collection of information consisting of one or more related fields about a specific entity (a row)

Relational Databases

- Relational database – a database that contains multiple tables related through common fields
- Common field – a field, contained in two or more tables, that forms a relationship between the tables
- Relationship – a connection between two or more tables based on a common field
- Relating tables eliminates the duplication of data
Relational Databases (cont’d)

- Tables are related through their common fields
- The common field is the primary key in one table and the foreign key in another table
  - Primary key – a field containing a value that uniquely identifies each record in a table
  - Foreign key – a field in a related table that refers to the primary key in another table

Relating Database Tables

- One-to-one relationship – each record in Table A can have only one matching record in Table B
- One-to-many relationship – a record in Table A can have many matching records in Table B, but a record in Table B has only one matching record in Table A (the most common table relationship)
- Many-to-many relationship – one record in either Table A or B can relate to many matching records in the other table
  - Established by creating multiple one-to-many relationships with a third table (junction table)
Querying Databases Using SQL

- Query databases using:
  - Menu queries
  - Query by example
  - Query languages, such as SQL
- Structured Query Language (SQL) – the standard interactive and programming language for accessing information from and updating information in relational databases

Introduction to Web Search Engines

- Search engine – a powerful software program that makes it easy to find information on the Internet
  - Use keywords to find information about any subject you want to investigate
  - Many engines use “robots” or “spiders” to automatically search the Web and index Web sites

Registering a Web Site with a Search Engine

- Add your Web site to search engines to make it available to Web users
  - Register your site by completing an online form and entering the URL of your site
  - Robots search your site for relevant keywords found in the <meta> tag
  - Search engines that scan Web pages for <meta> tags are called meta search engines
Search Engines vs. Information Portals

- The term search engine is used loosely to refer to search engines and information portals
  - Search engine – uses a robot or spider program to browse the Web following hyperlinks, and index the content that it finds
  - Information portal – only finds Web sites based on manual submissions
- Information portals are more likely to contain high-quality content matches to any given query

Types of Web Searches

- Directory search – search engine displays a list of categories and subcategories that you can browse to find information
- Keyword search – you enter keywords in a search engine to query an index

Basic Web Searching Techniques

- Click hyperlinks in an information portal to access categories and subcategories to reach the desired information (e.g., Yahoo!)
- Enter a single keyword to find Web pages containing the keyword
- Enter multiple keywords to find Web pages containing all keywords
- Enter multiple keywords within quotation marks to find Web pages in which the keywords must appear together in order
Popular Search Engines

• Yahoo!
  – One of the oldest and most basic information portals
  – Yahoo was not intended to be a search engine; it was intended to provide multiple links relating to each topic

• Google
  – Ranks relevance of a site based on keywords entered by the user
  – Also determines relevance based upon how many hyperlinks are made to a site

Popular Search Engines (cont’d)

• Bing
  – Provides search suggestions as queries
  – Searches a user’s social network (Facebook and Twitter)

• Excite
  – Allows keyword searches
  – Contains cross-referencing fields for conceptual searches

• WebCrawler
  – Fast, simple and reliable
  – Good for general searches

Boolean Operators

• Boolean operators – symbols or words used to narrow Internet search results by including or excluding certain words or phrases from the results

• Common operators:
  – AND, OR, NOT, NEAR, FAR, BEFORE, ADJ (adjacent)
  – Plus sign (+)
  – Minus sign (-)
  – Brackets ([ ])
  – Quotation marks (“ “)
  – Asterisk (*)
  – Period (.)
**Advanced Web Searching Techniques**

- Use Boolean operators to narrow the focus of your search
- Examples:
  - `keyword1 AND keyword2` (results must include both keywords)
  - `keyword1 OR keyword2` (results must include at least one of the keywords)
  - `keyword1 NOT keyword2` (results must exclude `keyword2`)
  - `keyword1 + keyword2` (results must include both keywords)
  - `keyword1 – keyword2` (results must exclude `keyword2`)

**Using Web Searches to Perform Job Tasks**

- Use search engines to search the Internet for information you need to complete a job task
  - Use the Internet to perform research about a topic you need to learn more about in order to complete a project
  - Gain instant access to maps, travel services, product comparisons, couriers, supply ordering and delivery, Web hosting services, yellow pages, news, weather reports, people searches, and much more

**Unexpected Web Search Results**

- Search engines may sometimes yield an error page, alternate search engine or advertisement instead of the topic for which you were searching
- Error pages occur if you:
  - Enter erroneous search criteria
  - Click a dead link
  - Try to access a busy server
- Unrelated Web pages may display because they may have been added to a search engine’s database by its spider program
### Web Search Strategies

- Check the default settings for each search engine (some default to Boolean AND; others to OR)
- Use keywords that are specific
- Try to use nouns rather than verbs
- Combine keywords into phrases by using quotation marks to indicate exact wording
- Use all uppercase letters when typing Boolean operators
- Use all lowercase letters when typing keywords

### Web Search Relevancy

- Each search engine uses its own scoring system to determine search results relevancy
- The more frequently your specified keywords are found in a particular document, the higher the relevancy score that document receives
- The more powerful search engines use both the words you enter and their synonyms to perform a search; these engines yield more relevant Web pages

### Evaluating Resources

- Resources that describe the verified level of expertise that its contributors possess:
  - Authoritative peer-reviewed
  - Open peer-reviewed
  - Individual
- Resources that describe the proximity to original data that the resource possesses:
  - Primary
  - Secondary
  - Indexes
Evaluating Resources (cont’d)

- Resources that are popular or scholarly:
  - Popular – generally bases information on secondary resources
  - Scholarly – bases its research on primary resources
- Resources that provide information themselves or provide a listing of other resources:
  - Directional
  - Informational

Developing Evaluation Skills

- Differentiate between fact and opinion
- Identify bias
- Consider your sources
- Identify the contributor
- Consult authoritative, peer-reviewed resources
- Compare information you obtain
- Compare information you obtain with information you find in print
- Withhold judgment
- Identify essential concepts
- Consult with trusted individuals

Organizing Internet Research

- Software tools are available you can use to collect, manage and cite reference material you find on the Internet, such as Zotero
- There are also online sources for conducting Internet research about advances in the IT industry, particularly new software as it becomes available
Citing Copyrighted Online Resources

- Cite information that you obtain from an Internet search
- Examples of references you can use to determine accepted citation standards:
  - MLA Handbook for Writers of Research Papers
  - Chicago Manual of Style

Lesson 6 Summary

- Define databases and database components
- Explain relational database concepts
- Define Web search engines and explain Web search types
- Register a Web site with a search engine
- Conduct basic and advanced Web searches
- Define Boolean operators
- Use Web searches to perform job tasks
- Explain Web search strategies and unexpected Web search results
- Evaluate Web site information and organize Internet research
- Cite copyrighted Web site information as a resource

Lesson 7: Business E-Mail and Personal Information Management
Lesson 7 Objectives

- Explain the way that electronic mail (e-mail) works
- Configure an e-mail client
- Identify e-mail message components
- Create and send e-mail messages
- Receive and view e-mail messages
- Identify ways to use e-mail effectively in the workplace
- Identify e-mail problems and solutions
- Identify the functions of personal information management (PIM) software

How E-Mail Works

- To send and receive e-mail you need:
  - A unique IP address
  - An account name
  - A password
- Your service provider

E-Mail Protocols

- Outgoing mail protocol
  - Simple Mail Transfer Protocol (SMTP)
- Incoming mail protocols
  - Post Office Protocol version 3 (POP3)
  - Internet Message Access Protocol (IMAP)
E-Mail Addresses

- E-mail addresses use the following format:

  `username@domain`

- The part of the address before the `@` identifies the user within a domain
- The part of the address after the `@` is the domain name of the organization or company that issues the e-mail account

E-Mail Services and Programs

- E-mail client – independent of any specific Web browser
- Browser e-mail – program that comes bundled with a Web browser
- Web-based e-mail – free service from a Web-based provider

MIME, S/MIME, PGP and GPG

- Multipurpose Internet Mail Extensions (MIME) – enables operating systems to map file name extensions to corresponding applications
- Secure MIME (S/MIME) – secure version of MIME that adds encryption to MIME data
- Pretty Good Privacy (PGP) – a method of encrypting and decrypting e-mail messages
- GNU Privacy Guard (GPG) – an open-source version of PGP
E-Mail Configuration Requirements

- E-mail address
- Name of the outgoing (SMTP) mail server
- Name of the incoming (POP3) mail server
- POP3 account name (user name)
- POP3 account password

E-Mail Message Components

- E-mail message header
  - To field
  - Cc field
  - Bcc field
  - Subject field
  - Attachment field
- Message (body of the message)
- Signature (lines of text at the end of the message)

Creating and Sending E-Mail Messages

- Click the command to create a new message
- Enter at least one address in the To field
- Enter additional addresses in the Cc and/or Bcc field (optional)
- Enter a subject in the Subject field
- Type the message
- Attach any necessary files (optional)
- Click the command to send the message
E-Mail Signatures

- An e-mail signature displays at the bottom of an e-mail message
- An e-mail signature usually identifies the sender and provides contact information
- Some companies require that signatures follow specific guideline for content and structure
- Signatures can be added automatically to outgoing messages
- You may create several signatures, but only one can be the default signature at any given time

Address Books

- Address books store names and contact information for your e-mail contacts
- Most clients allow you to import address books from other applications
- Using an address book to insert e-mail addresses is fast, convenient and accurate
- Most company systems include a global address book that contains the e-mail addressees of all company employees

E-Mail Attachments

- You can attach almost any kind of file to an e-mail message
- The ability to send e-mail attachments makes e-mail a powerful tool for sharing files and documents
- E-mail clients use MIME to identify attached files by their file type
- Most company servers scan e-mail attachments
- Some company servers may block certain types of attachments, or all attachments, depending on the company security policy
Receiving and Viewing E-Mail Messages

- The e-mail client's folder structure provides tools for viewing, storing and organizing items.
- Most e-mail programs include:
  - An Inbox folder
  - A folder for sent messages
  - A folder for deleted items
  - A folder for drafts
  - An Outbox folder

Viewing E-Mail Messages

E-Mail in the Workplace

- Response commands
  - Reply
  - Reply All
  - Forward
- Professional communication
  - Respond within 24 hours
  - Keep messages clear and concise
  - Ensure that tone is respectful and restrained

- Can e-mail messages be recalled?
- E-mail is permanent
- Should e-mail threads be included?
- Reply vs. Reply All
- Is e-mail private?
- Out-of-office messages
E-Mail Problems and Solutions

- Sexual harassment
- Offensive language
- Disclosure of confidential information
- Live communication better in some situations
- Spam
  - Spam filters
  - CAPTCHA
- Storing e-mail messages
  - Make local copies
  - Remove messages from the server

Personal Information Management (PIM)

- Keep track of appointments
- Store contact information
- Provide e-mail capabilities (some programs)
- Provide a centralized electronic calendar (some programs)
- Set reminders and alarms
- Many packages available for smartphones
- Synchronize data between smartphone and desktop computer

Lesson 7 Summary

- Explain the way that electronic mail (e-mail) works
- Configure an e-mail client
- Identify e-mail message components
- Create and send e-mail messages
- Receive and view e-mail messages
- Identify ways to use e-mail effectively in the workplace
- Identify e-mail problems and solutions
- Identify the functions of personal information management (PIM) software
Lesson 8: Protecting Yourself Online

Lesson 8 Objectives

- Discuss "The Right to Be Forgotten"
- Identify ways to minimize the spam you receive
- Define and manage cookies
- Configure your browser for added security
- Identify ways that authentication provides Web security
- Identify the three types of encryption
- Identify malware (malicious software)
- Identify ways to detect and prevent virus attacks
- Define spyware and discuss ways to remove viruses
- Define patches and updates
- Identify ways to lock your computer for added security
- Define typosquatting
- Identify ways that firewalls provide Web security
- Identify security-related ethical and legal issues faced by IT professionals

The Right to Be Forgotten

- You are ultimately responsible for protecting your image and personal information in the world of social networking
- "The Right to Be Forgotten" – An argument that asks "Do people have the right to remove damaging information about themselves on the Internet so the information can be forgotten?"
Spam

- Some actions you can take to minimize the spam you receive include:
  - Avoid adding yourself to unwanted mailing lists
  - Conduct online transactions through secure Web sites
  - Do not assume that only the intended recipient will read your messages
  - Be selective when posting information to newsgroups

Cookies

- Cookie types:
  - persistent
  - session
  - first-party
  - third-party
- You can control when and from whom cookies are accepted by specifying the level of privacy you want to maintain
- You can view the file content of cookies to see information about the Web site that sent them to you

Configuring Browser Security

- You can configure your browser’s security settings to accept, reject or prompt before accepting:
  - ActiveX controls
  - JavaScript
- To restrict these items in Internet Explorer or Mozilla Firefox, set safety levels accordingly
Authentication

- Authentication – the process of verifying the identity of a user who logs on to a system, or the integrity of transmitted data
- General authentication types:
  - Anonymous logon – no user name or password are required, and authentication is handled transparently by the browser and server
  - Basic authentication – a user name and password are required, and that information is sent as plain text
  - Secure authentication – a user name and password are required, and they are encrypted before being sent across the Internet
  - Digital certificates – you must have the proper digital certificate to gain access

Authentication (cont’d)

- User names and passwords – used to log on to private and public networks, including the Internet
- Digital certificates – attachments to electronic transmissions that supply a verifiable signature
  - Digital signatures – electronic signatures that verify the identity of the message sender
  - Non-repudiation – digital signatures prove that a transaction or transmission took place; neither the sender nor the receiver can later deny the action

Encryption

- Encryption – the process of converting data into an unreadable form of text
- Decryption – the process of converting the encrypted data back to its original form
- Encryption and decryption are performed using keys
- Key – a mathematical algorithm
- The more complex the encryption algorithm, the harder it is to decipher the encrypted message without access to the key
Encryption (cont'd)

- Three types of encryption:
  - Symmetric (private-key) encryption – The same key is used to encrypt and decrypt messages
  - Asymmetric (public-key) encryption – Two keys are used to encrypt and decrypt messages: a public key and a private key
  - Hash (one-way) encryption – Uses hashes to verify the integrity of transmitted messages

SSL and TLS

- Secure Sockets Layer (SSL) – a protocol for secure exchanges
  - Authenticates using digital certificates
  - Provides for data encryption
- Transport Layer Security (TLS) – successor to SSL
  - Becoming more common
  - Based on SSL 3.0
  - Provides for encryption and authentication

Secure Protocols

Various protocols in the TCP/IP suite can be made secure by running them over SSL/TLS, including:
- HTTPS
- S/FTP
- IMAPS
- POP3S
Malware (Malicious Software)

- Virus – damages computers and networks, often alters files to damage or destroy data
- Worm – resides in active memory and replicates itself until an entire disk is full
- Trojan – appears to be harmless (such as a computer game) but produces harmful results
  - Client code – allows remote access to a computer by an attacker
  - Server code – infects destination computer and enables the attacker to control it
- Illicit server – installs hidden services on systems

Virus Detection and Prevention

- Corporate IT departments are often the first line of defense against viruses
- Common ways to contract viruses:
  - Receive infected disc/drive from colleague or friend
  - Download infected file
  - Download illicit server attachment
  - Copy to your hard disk a document infected with a macro virus

Virus Detection and Prevention (cont’d)

- Common ways to protect against viruses:
  - Do not open e-mail or attachments from unknown senders
  - Configure browser and e-mail security to highest levels
  - Use anti-virus software
  - Keep anti-virus software current
  - Stay informed about the latest virus threats
  - Make backup copies of important files
Virus Detection and Prevention (cont'd)

- If you receive an attachment you do not recognize:
  - Do not open the attachment
  - Contact the sender to determine whether the attachment is legitimate
  - If you cannot contact the sender, delete the attachment from the message
  - Delete the attachment from the Deleted Items folder

Virus Detection and Prevention (cont'd)

- If you suspect a virus attack:
  - Use anti-virus software to remove the virus
  - If you cannot launch anti-virus software, reboot from a known clean system disk, then launch the anti-virus software
  - Remove virus from all disks, files and programs
  - If damage is too extensive, reformat hard disk, restore data and reinstall programs (last resort only)

Spyware and Virus Removal

- Spyware – an application secretly placed on a user’s system to covertly gather information and relay it to outside parties, usually for advertising purposes
- Also known as adware
- Cookies are not spyware because:
  - The user is aware of their presence
  - The user has the option to disable outside access to cookie information
- Use spyware detection applications to detect and eliminate spyware
Updates and Patches

• Update – a software upgrade that permanently fixes known bugs and improves software performance
• Patch – a temporary bug fix
• Virus update – files of virus signature profiles you use to keep your anti-virus software current

Locking Your Computer

• Screen saver – a utility program that displays images or animation on your monitor when your computer is idle
• Used to hide your work while you are away from your desk
• Specify screen saver and amount of time computer is idle before screen saver displays

Typosquatting

• Typosquatting – registering a domain name similar to a high-volume site hoping to receive traffic from users seeking the high-volume site who mistakenly enter an incorrect URL in the browser
• Also known as URL hijacking
• A typosquatter's Web address can be:
  – A common misspelling of the victim's site
  – A foreign language misspelling of the victim's site
  – A misspelling based on the transposition of letters
  – A plural version of a singular domain name, or vice versa
  – A different top-level domain
Protecting Company Resources

- The Internet is a network of shared information and resources
- The connectivity that makes the Internet possible also makes systems vulnerable to unwanted activity

Firewalls

- Firewall – a collection of hardware, software and corporate policies that prevents unauthorized access to or from private networks
- Use firewalls to:
  - Prevent unauthorized Internet users from accessing private networks
  - Retain control of proprietary information
  - Prevent unauthorized export of proprietary information
- Firewalls may prevent access to external e-mail providers or external servers

Security-Related Ethical and Legal Issues

- Privacy concerns:
  - Your computer activities are no longer private
  - You may receive malware and spam
  - Organizations may monitor employee e-mail and restrict access to Internet sites
  - Network administrators may audit the contents of employee hard drives
- Use home computer for personal communications and Internet searches
Security-Related Ethical and Legal Issues (cont'd)

- Copyright issues:
  - Copyright laws extend to works of authorship on the Internet
  - There is no international copyright
  - You must obtain copyrights from the appropriate agency in your home country
  - Court cases have set precedents that copyright-protected material cannot be used or distributed on the Internet without permission

Security-Related Ethical and Legal Issues (cont'd)

- Licensing
  - To license copyright-protected material, you must obtain permission from the author
- Trademarks
  - To register a trademark, you must contact the appropriate agency in your home country

Lesson 8 Summary

- Discuss "The Right to Be Forgotten"
- Identify ways to minimize the spam you receive
- Define and manage cookies
- Configure your browser for added security
- Identify ways that authentication provides Web security
- Identify the three types of encryption
- Identify malware (malicious software)
- Identify ways to detect and prevent virus attacks
- Define spyware and discuss ways to remove viruses
- Define patches and updates
- Identify ways to lock your computer for added security
- Define typosquating
- Identify ways that firewalls provide Web security
- Define security-related ethical and legal issues faced by IT professionals
Lesson 9 Objectives

- Identify mass e-mail and texting services
- Define list servers and listserv groups
- Use FTP to transfer files between computers
- Manage downloaded files
- Use Virtual Network Computing (VNC) and Remote Desktop Connection
- Identify the functions of peer-to-peer networks
- Troubleshoot Internet problems using TCP/IP tools
- Discuss open-source development methodologies
- Discuss proprietary software and end-user license agreements (EULAs)
- Discuss software patents

Mass E-Mail and Texting Services

- Two popular mass-marketing technologies used to push advertisements, promotions and emergency broadcasts to customers are:
  - Opt-in e-mail marketing
  - Opt-in mass texting services
List Servers

- List server – collects and distributes information to and from listserv groups
- List servers:
  - LISTSERV (www.lsoft.com)
  - Majordomo (www.greatcircle.com/majordomo)
  - Lyris (www.lyris.com)
- Listserv group – participants who subscribe to a mailing list through a list server

File Transfer Protocol (FTP)

- Used to transfer files between two computers
- Public FTP servers generally allow anonymous logon and allow downloading of files only
- Files are downloaded via the FTP “get” command
- Corporate FTP servers usually require a user name and password (you may upload files if you have permission)
- Files are uploaded via the FTP “put” command
- You can use command-line FTP, a browser’s built-in FTP client or a specialized FTP client
- Secure versions of FTP include:
  - Secure Copy (SCP)
  - SSH File Transfer Protocol (S/FTP)
  - SSL/TLS-enabled FTP (FTPS)

Managing Download Files

- You may need to define MIME types for files that you download
- Many files downloaded from FTP servers are compressed (using a compression utility) and must be decompressed before you can use them
- Common compression utilities include:
  - Zip/unzip
  - Bzip2/bunzip2
  - Bzip/bunzip
  - Gzip/gunzip
  - Compress/uncompress
  - RAR/WinRAR
**Virtual Network Computing (VNC)**

- VNC allows you to control a computer at a remote location as if you were sitting in front of it
- VNC consists of two components: the server and the viewer
- The viewer and server do not need to be running the same operating system

**Remote Desktop Connection**

- Remote Desktop Connection is part of Microsoft Terminal Services, which is a suite of tools that enables computers to function as dedicated clients to a server running Windows
- You use Remote Desktop Connection to control a remote computer; similar to VNC

**Peer-to-Peer Networks**

- In a peer-to-peer network, each computer has both client and server capabilities
- On the Internet, a peer-to-peer (referred to as P2P) network allows a group of users to connect with each other and directly share files among their hard drives
- P2P networks are inexpensive and allow users to share bandwidth
- BitTorrent is a P2P application used for downloading huge files (more than a gigabyte)
Troubleshooting Using TCP/IP Tools

- The `ipconfig` command – displays your system's IP configurations
- The `ping` command – tests connectivity between a source system and a destination system
- The `tracert` command – determines the path between a source system and a destination system

Open-Source Development

- Open source – a peer-based development process in which the source code is available to anyone and can be developed concurrently
- Open source encourages wide adoption of software because it is not associated with a specific vendor
- Open-source licenses:
  - GNU General Public License (GPL)
  - BSD License
  - Apache License
  - Mozilla Public License (MPL)
  - Common Public License (CPL)

Proprietary Software and EULAs

- Proprietary software – software that is owned by an author or entity
- End-user license agreement (EULA) – a legal contract between the software's author and the end user who uses the software
- A typical EULA:
  - Copyrights the code so that it belongs to the author
  - Specifies exactly how an end user may use the software
Software Patents

- Patent – a set of exclusive rights granted to an inventor for a fixed period of time upon disclosure of the invention
- Patent jurisdiction:
  - Patents do not apply worldwide
  - You must apply to a specific patent office belonging to a particular country or group of countries
- Patent controversy:
  - Patents can squelch creativity
  - Patents can increase cost
  - Patents are difficult to enforce and apply

Lesson 9 Summary

- Identify mass e-mail and texting services
- Define list servers and listserv groups
- Use FTP to transfer files between computers
- Manage downloaded files
- Use Virtual Network Computing (VNC) and Remote Desktop Connection
- Identify the functions of peer-to-peer networks
- Troubleshoot Internet problems using TCP/IP tools
- Discuss open-source development methodologies
- Discuss proprietary software and end-user license agreements (EULAs)
- Discuss software patents

Lesson 10:
IT Project and Program Management
Lesson 10 Objectives

- Identify resources for technical data
- Identify project management fundamentals
- Identify project management skills
- Identify the five project management phases
- Define the project triangle
- Identify the value of project management software
- Create a project schedule
- Identify the value of documenting projects
- Identify the value of planning and scheduling meetings
- Identify the business uses of Web browsers
- Identify the value of reviewing projects
- Identify quality assurance techniques
- Identify the business implications of IT decisions
- Identify project management certifications and resources
- Identify program management concepts

Resources for Technical Data

The following Web sites are among the many you can visit for technical data:

- [http://news.netcraft.com](http://news.netcraft.com)
- [www.w3schools.com/browsers/browsers_stats.asp](http://www.w3schools.com/browsers/browsers_stats.asp)
- [http://whatis.techtarget.com](http://whatis.techtarget.com)
- [www.howstuffworks.com](http://www.howstuffworks.com)
- [www.learnthenet.com](http://www.learnthenet.com)
- [http://technet.microsoft.com](http://technet.microsoft.com)

Project Management Fundamentals

- Project management – applying knowledge, skills and processes to specific activities in order to meet deadlines and achieve desired results
- Project – a sequence of tasks that must be accomplished within a certain time frame to achieve a desired result
- Task – a unit of work during a project
- Resource – a person, department or device needed to accomplish a task
- Assignment – the appointment of a specific resource to a specific task
Scope and Scope Creep

• Scope – the goals and tasks of a project, and the work required to complete them
• Scope creep – gradual increases in project scope that occur in small increments over time
  – A common problem in most projects because not all factors can be accounted for at the beginning of a project

Project Management Skills

• Planning skills
  – Identify project stakeholders
  – Acquire the right staff for the project
  – Develop and manage project teams
• Organizational skills
• Communication skills
• Problem-solving skills
• Leadership skills
  – Understand the needs/characteristics of the group
  – Control group performance
  – Set a good example
  – Provide counseling
  – Teach effectively

Project Management Phases

• Initiating phase
  – Conduct needs analysis
  – Determine objectives, assumptions and constraints
  – Create Statement Of Work (SOW)
• Planning phase
  – Develop project schedule
  – Assemble project team
Project Management Phases (cont'd)

- Executing phase
  - Perform project tasks
- Controlling phase (concurrent with executing phase)
  - Monitor progress and take corrective action as needed
- Closing phase
  - Evaluate schedule, budget, scope, resources and assignments
  - Formal acceptance of project deliverable

Conflicts of Interest

During the controlling phase, conflicts of interest may occur when the project team consists of cross-departmental members whose reporting structures differ.

The Project Triangle

- Factors that affect every project:
  - Time
  - Money
  - Scope
- You must determine how adjusting one factor will affect the other two, and how quality will be affected overall
Project Management Software

- Project schedules are stored in databases
- Schedule information includes:
  - A project start date
  - A project calendar
  - Tasks and task durations
  - Project resources and their costs
- Use software to:
  - Track project progress and status
  - Save plans of successful projects

Creating Project Schedules

Gantt chart – a horizontal bar chart that graphically displays project tasks and durations

Documenting Projects

- Paper trail
  - Documents which team members worked on what task, and when they started and completed them
- Issues log
  - Documents and monitors problems that need to be escalated to managers or executives outside the project team for resolution
Planning and Scheduling Meetings

During the executing and controlling phases:
– Schedule meetings with team members to monitor progress
– Schedule meetings with stakeholders and management around milestones to review project status
– Avoid scope creep by managing requests and changes at regular intervals

Browsers in the Business World

• Intranet – an internal or in-house Web site used only by employees within a company
• Extranet – an internal network designed to provide access to selected external users; is not available to the Internet public
• Webinars and Web conferences – online training or conference sessions that utilize Internet technology to provide interactive and presentation elements to users
• Webcasts – audio/video Web events that are distributed over the Internet
• Voice conferencing – the traditional way to connect groups and individuals via telephone conference calls

Reviewing Projects

During the closing phase:
– Test the product
  • Client evaluates and accepts/rejects project deliverable
– Evaluate performances
  • Review performances of team members
– Document lessons learned
  • Review what went well, what did not, and what could be done differently to improve team performance
Quality Assurance

Three techniques to ensure quality:
– Separation of duties – project teamwork in which team members review the work of another team member and vice versa
– ISO 9000 standards – international benchmark for systemizing processes to help organizations produce products and services that meet government regulations and the quality standards set by customers
– Six Sigma methodology – seeks to identify and eliminate the causes of defects and errors in manufacturing and business processes in an effort to reach near-perfection

Business Implications of IT Projects

• Organizational rules and policies – IT projects are bound by the rules and policies that govern the organization
• IT professionals have the right to:
  – Acquire the necessary tools to accomplish their tasks
  – Receive clear, detailed objectives and instructions so they can produce the proper deliverables
• IT professionals have the responsibility to:
  – Provide services in a timely, cost-effective, secure manner
  – Keep workflow interruptions and system downtime to a minimum

Business Implications of IT Projects (cont’d)

• Effects of IT projects on productivity
  – IT projects and decisions impact employee productivity because they affect systems that employees use to do their jobs
• IT project Return On Investment (ROI)
  – IT project managers must determine the risk and value of each project to justify which projects to preserve and which projects to eliminate
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<thead>
<tr>
<th>Project Management Institute (PMI)</th>
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<tbody>
<tr>
<td>- Non-profit member organization that publishes standards and offers education regarding the project management profession</td>
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<tr>
<td>- Project Management Professional (PMP) – certification for project managers</td>
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<tr>
<td>- Project Management Body of Knowledge (PMBOK) – nine topic areas that define project management</td>
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<tr>
<td>- Project integration management</td>
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<td>- Project scope management</td>
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<td>- Project time management</td>
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<td>- Project cost management</td>
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<th>Program Management Concepts</th>
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<td>- Program management – the process of managing multiple interdependent projects to improve the performance of an organization</td>
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<td>- Program management consists of:</td>
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<td>- Benefits management</td>
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<td>- Stakeholder management</td>
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<td>- Program governance</td>
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<td>- Program management life cycle – five phases that define the activities and events that occur from the beginning of a program through to its conclusion</td>
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Lesson 10 Summary

- Identify resources for technical data
- Identify project management fundamentals
- Identify project management skills
- Identify the five project management phases
- Define the project triangle
- Identify the value of project management software
- Create a project schedule
- Identify the value of documenting projects
- Identify the value of planning and scheduling meetings
- Identify the business uses of Web browsers
- Identify the value of reviewing projects
- Identify quality assurance techniques
- Identify the business implications of IT decisions
- Identify project management certifications and resources
- Identify program management concepts

Internet Business Associate v2.0

- Introduction to IT Business and Careers
- Internet Communication
- Introduction to Internet Technology
- Web Browsing
- Multimedia on the Web
- Databases and Web Search Engines
- Business E-Mail and Personal Information Management
- Protecting Yourself Online
- Internet Services and Tools for Business
- IT Project and Program Management