

Chapter Eight

# Operating Systems and Utility Programs

**Discovering  
Computers 2011**

**Living in a Digital World**



# Objectives Overview

Define system software and identify the two types of system software

Describe the functions of an operating system

Summarize the startup process on a personal computer

Summarize the features of several stand-alone operating systems


Briefly describe various server operating systems

Summarize the features of several embedded operating systems

Explain the purpose of several utility programs

# System Software

- **System software** consists of the programs that control or maintain the operations of the computer and its devices



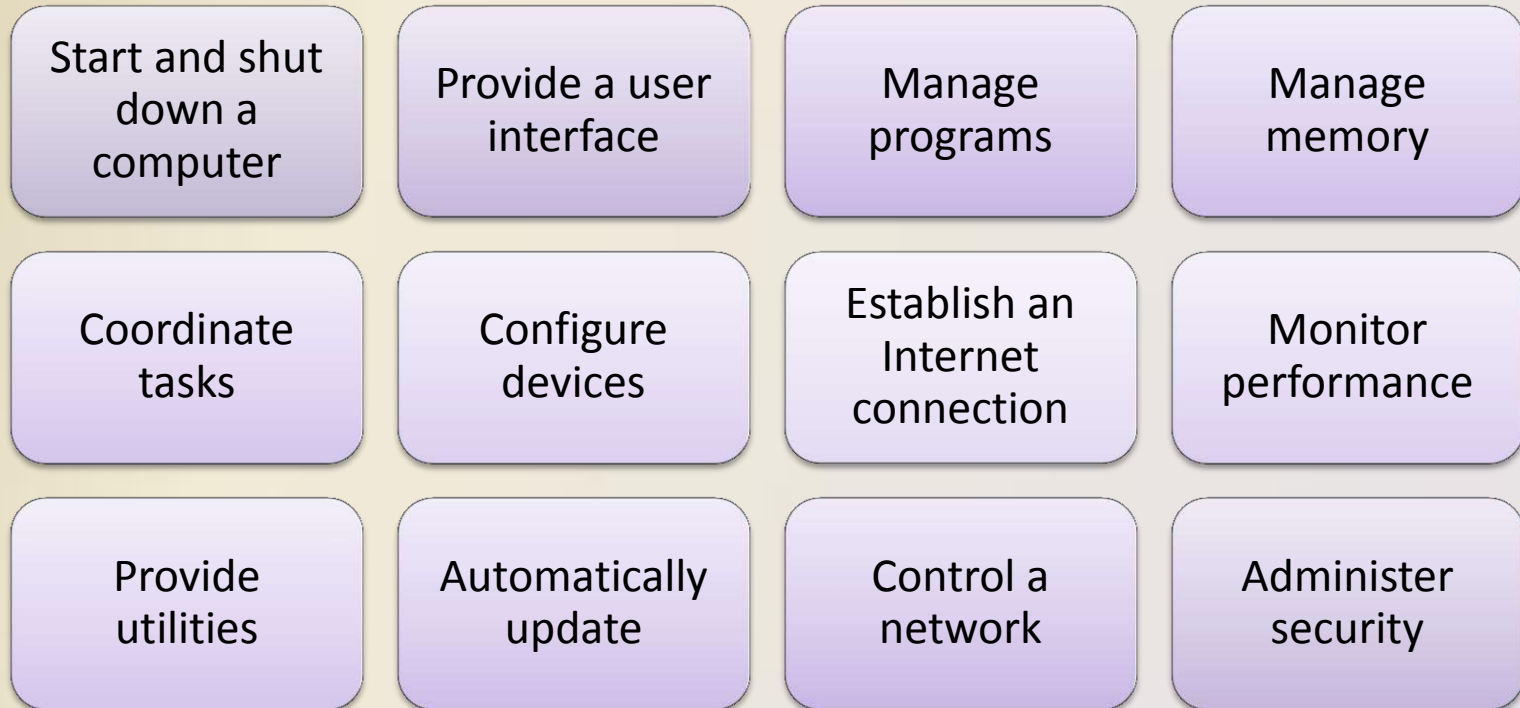
Operating  
systems



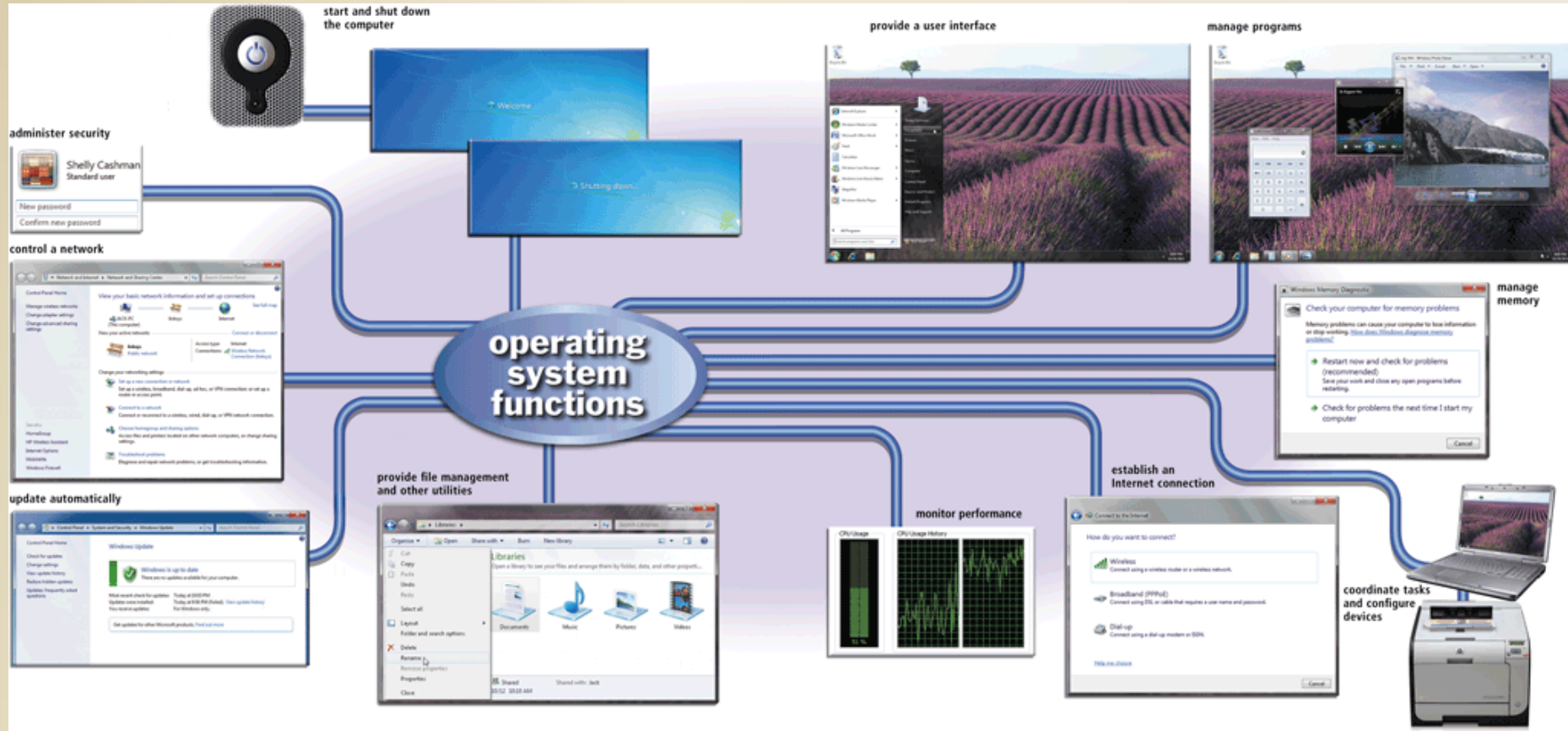
Utility  
Programs

# Operating Systems

- An **operating system (OS)** is a set of programs containing instructions that work together to coordinate all the activities among computer hardware resources



# Operating Systems



# Operating System Functions

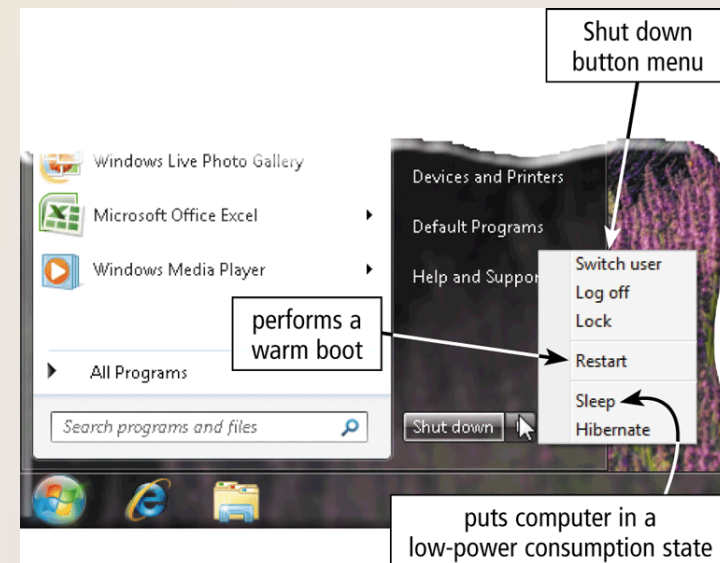
- The process of starting or restarting a computer is called **booting**

## Cold boot

- Turning on a computer that has been powered off completely

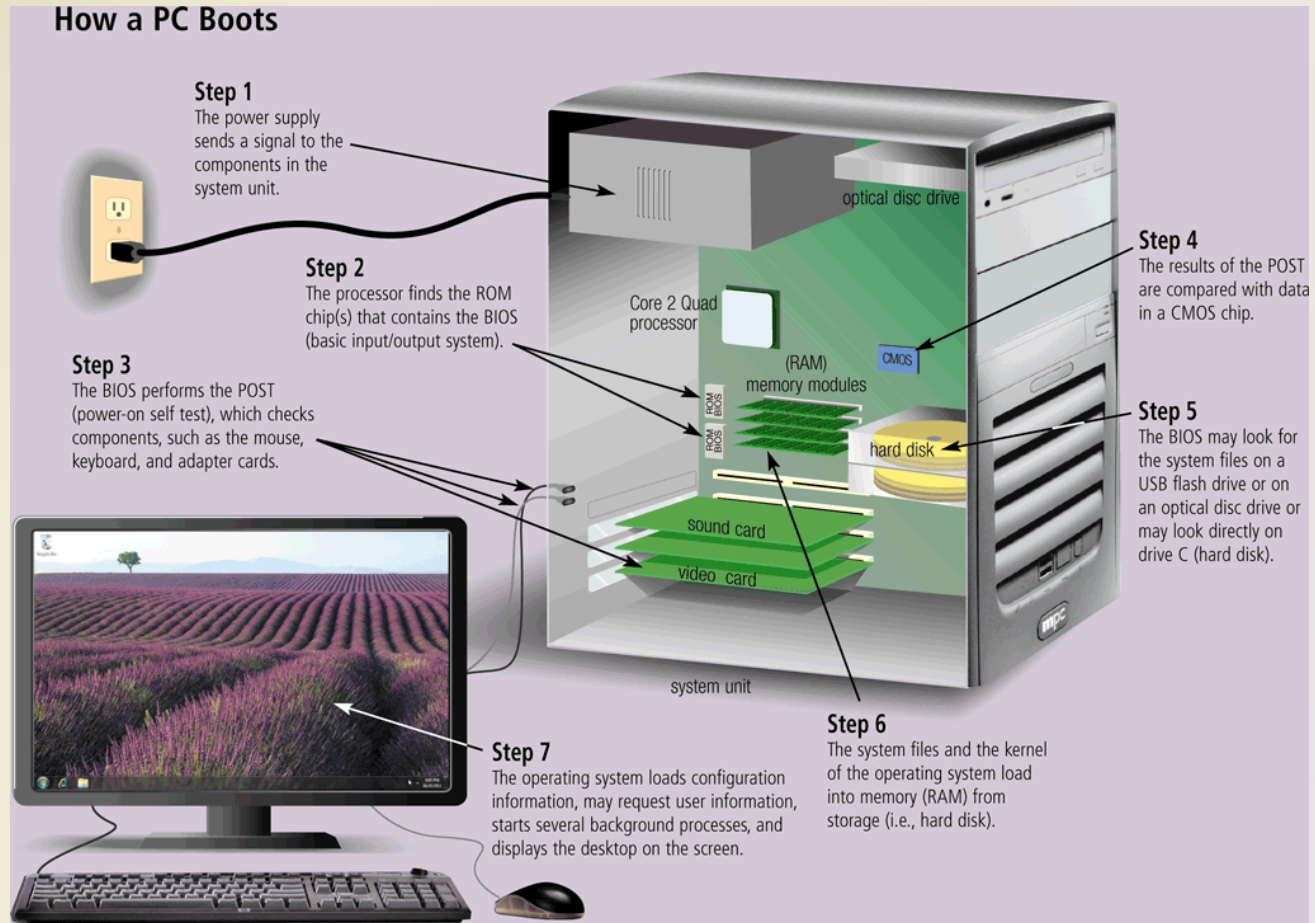
## Warm boot

- Using the operating system to restart a computer





# Operating System Functions



Click to view Web Link, click Chapter 8, Click Web Link from left navigation, then click Windows Registry below Chapter 8

# Operating System Functions

A **boot drive** is the drive from which your computer starts

- You can boot from a **boot disk**
- A **recovery disk** contains a few system files that will start the computer



# Operating System Functions

- An operating system includes various shut down options

Sleep mode saves any open documents and programs to RAM, turns off all unneeded functions, and then places the computer in a low-power state

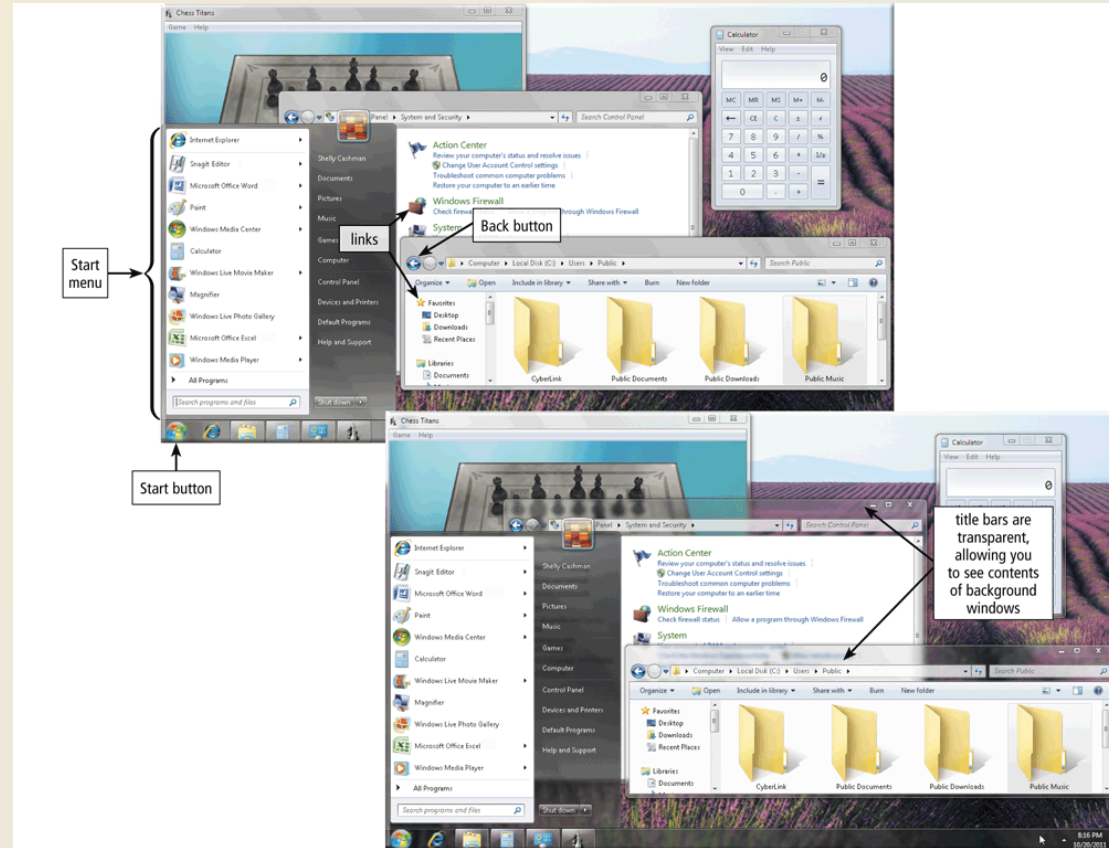
Hibernate saves any open documents and programs to a hard disk before removing power from the computer



Click to view Web Link, click Chapter 8, Click Web Link from left navigation, then click Sleep Mode below Chapter 8

# Operating System Functions

- A user interface controls how you enter data and instructions and how information is displayed on the screen
- With a graphical user interface (GUI), you interact with menus and visual images



# Operating System Functions

- With a command-line interface, a user uses the keyboard to enter data and instructions

```
bash-2.05b$ ping -q -c1 en.wikipedia.org
PING rr.chtpa.wikimedia.org (207.142.131.247) 56(84) bytes of data.

--- rr.chtpa.wikimedia.org ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/ndev = 112.076/112.076/112.076/0.000 ns
bash-2.05b$ grep -i /dev/sda /etc/fstab | cut --fields=-3
/dev/sda1          /mnt/usbkey
/dev/sda2          /mnt/ipod
bash-2.05b$ date
Wed May 25 11:36:56 PDT
bash-2.05b$ lsmod
Module              Size  Used by
joydev              8256  0
ipw2200             175112  0
ieee80211           44228  1 ipw2200
ieee80211_crypt     4872   2 ipw2200,ieee80211
e1000               84468  0
bash-2.05b$
```

Annotations:

- command entered by user (points to `ping -q -c1 en.wikipedia.org`)
- command prompt (points to `bash-2.05b$`)

# Operating System Functions

- How an operating system handles programs directly affects your productivity

Single user and multiuser

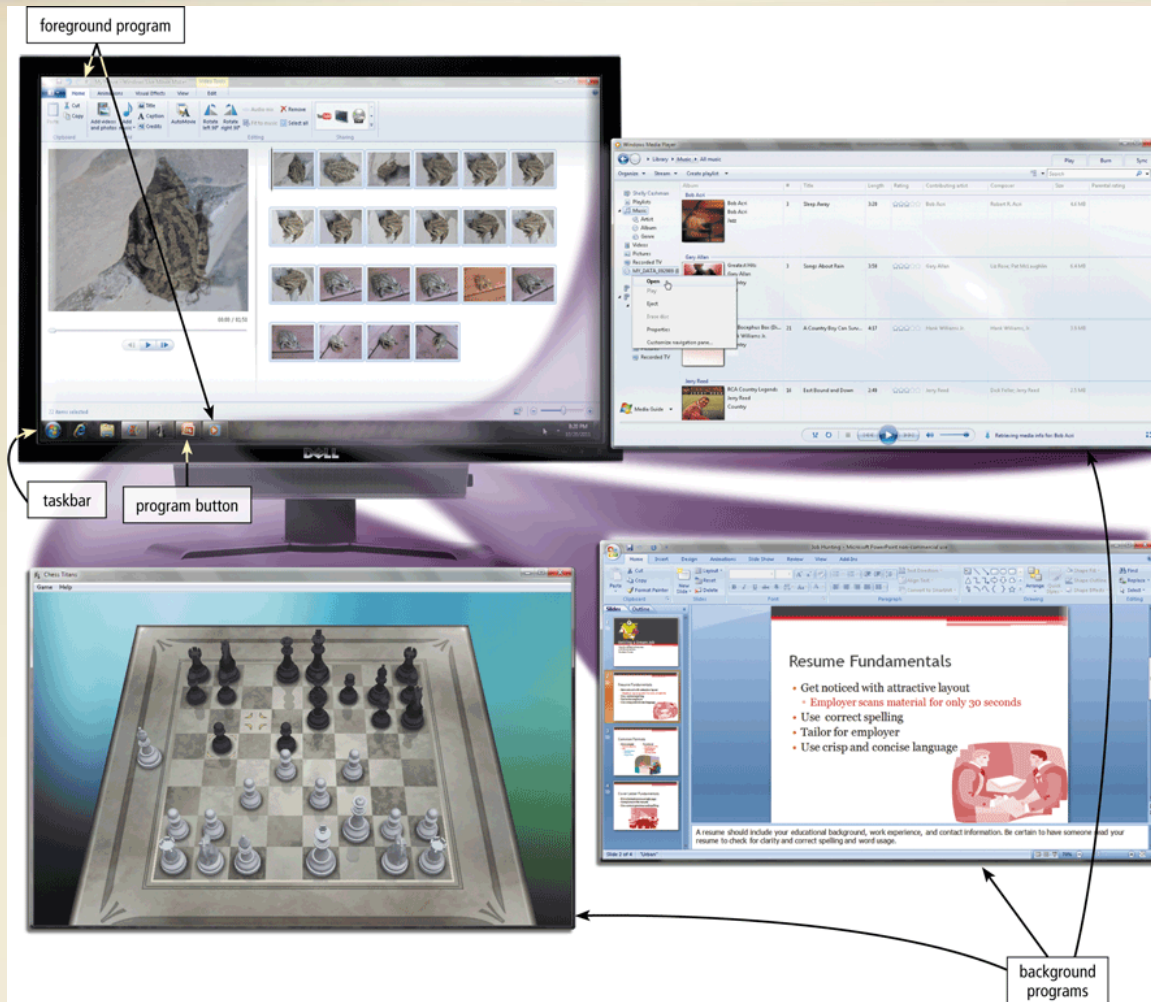
Single tasking and multitasking

Foreground and background

Preemptive multitasking

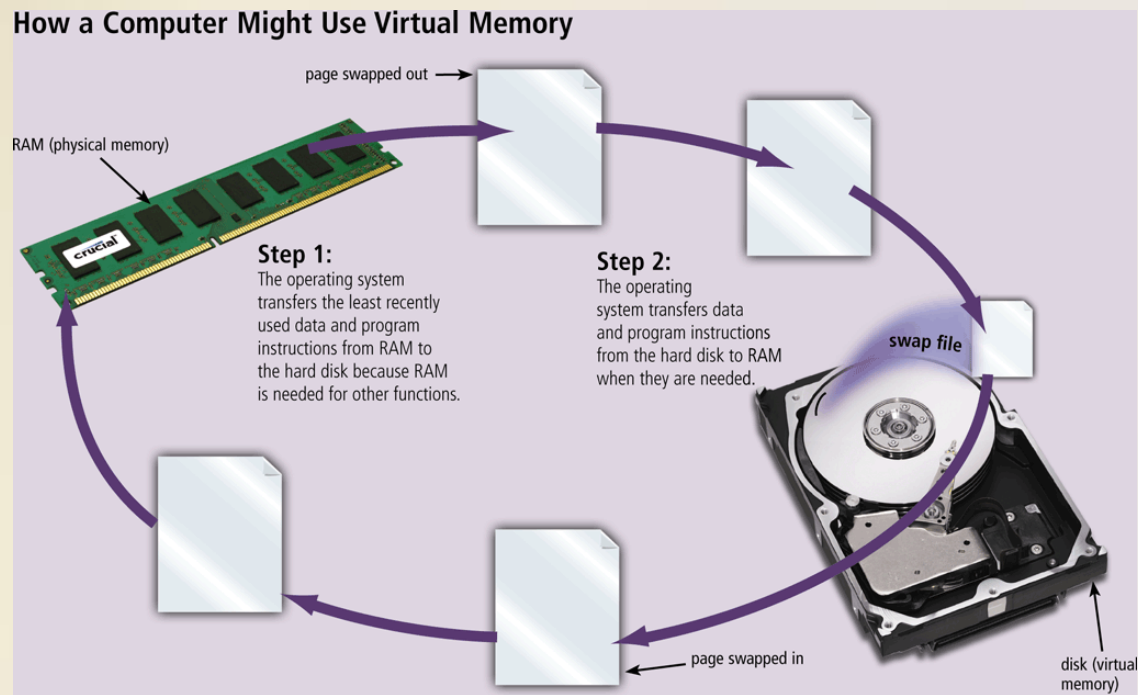
Multiprocessing

# Operating System Functions



# Operating System Functions

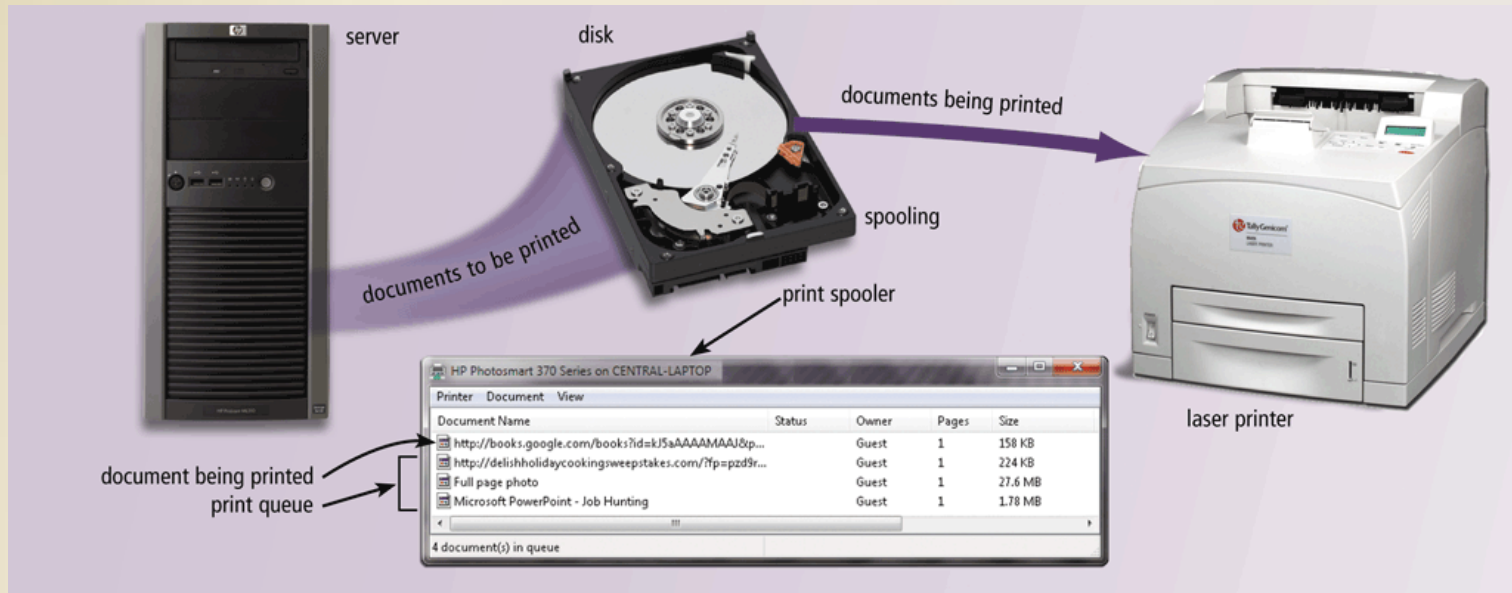
- **Memory management** optimizes the use of RAM
- **Virtual memory** is a portion of a storage medium functioning as additional RAM





# Operating System Functions

- The operating system determines the order in which tasks are processed



Click to view Web Link, click Chapter 8, Click Web Link from left navigation, then click Spooling below Chapter 8

# Operating System Functions

A **driver** is a small program that tells the operating system how to communicate with a specific device

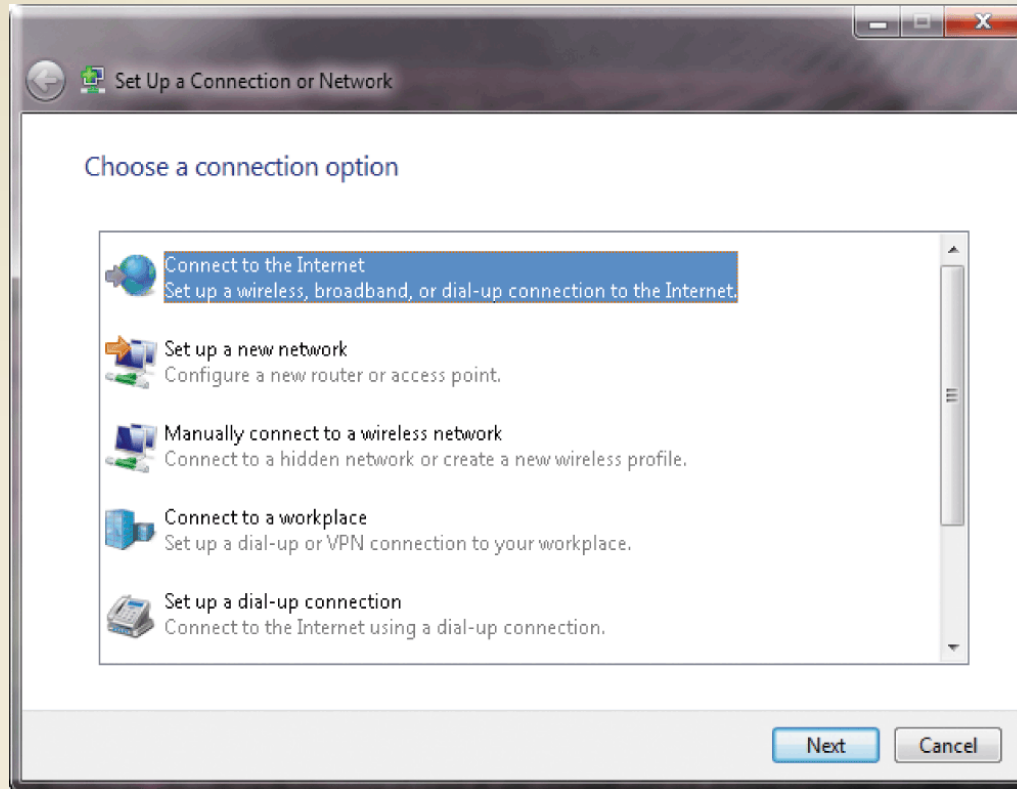
**Plug and Play** automatically configures new devices as you install them



Click to view Web Link, click Chapter 8, Click Web Link from left navigation, then click Plug and Play below Chapter 8

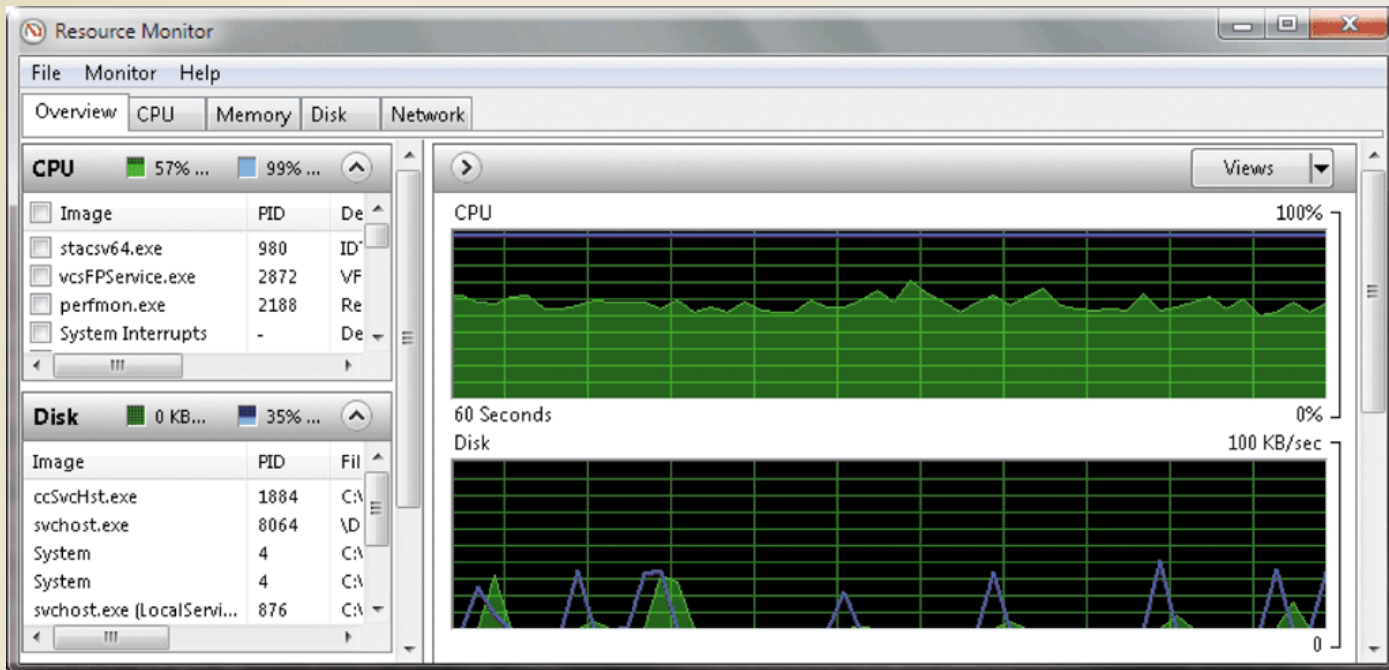
# Operating System Functions

- Operating systems typically provide a means to establish Internet connections



# Operating System Functions

- A **performance monitor** is a program that assesses and reports information about various computer resources and devices



# Operating System Functions

- Operating systems often provide users with the capability of:

Managing files

Searching for files

Viewing images

Securing a computer

Uninstalling programs

Cleaning up disks

Defragmenting disks

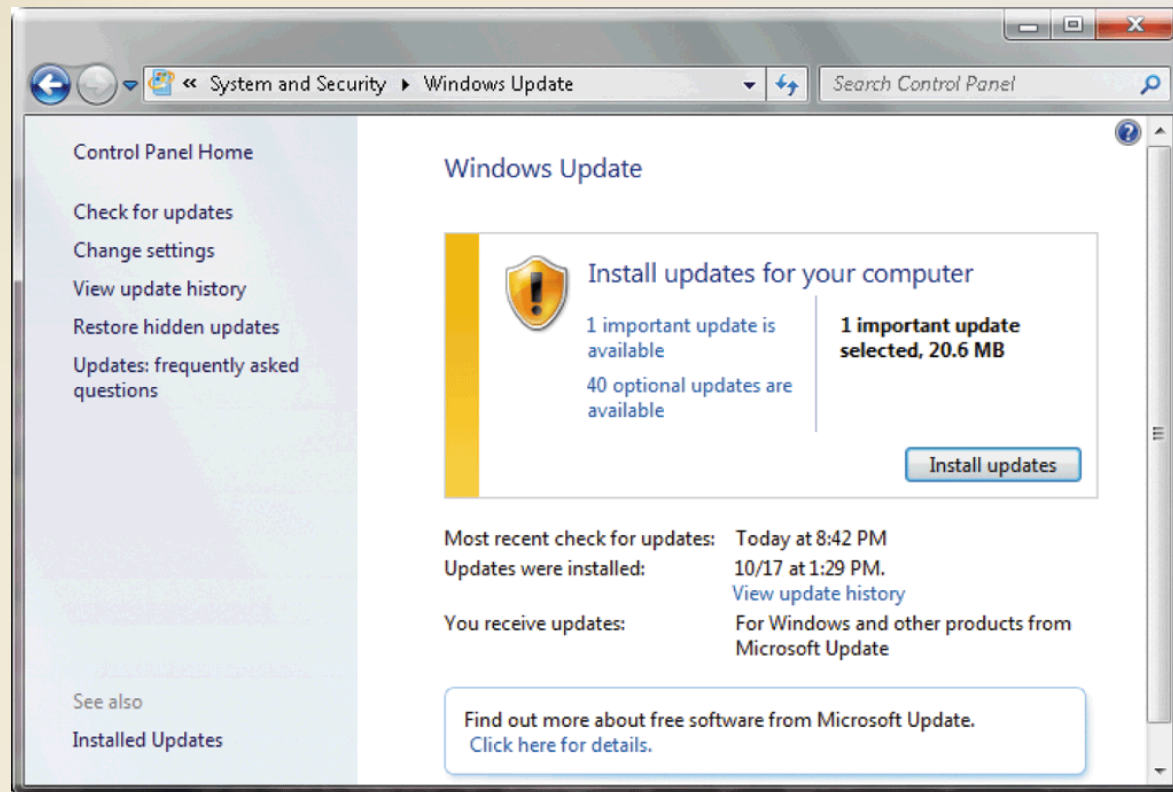
Diagnosing problems

Backing up files and disks

Setting up screen savers

# Operating System Functions

- **Automatic update** automatically provides updates to the program





# Operating System Functions

- Some operating systems are designed to work with a server on a network
- A **server operating system** organizes and coordinates how multiple users access and share resources on a network
- A network administrator uses the server operating system to:
  - Add and remove users, computers, and other devices
  - Install software and administer network security

# Operating System Functions

- Each user has a user account
  - A **user name**, or **user ID**, identifies a specific user
  - A **password** is a private combination of characters associated with the user name

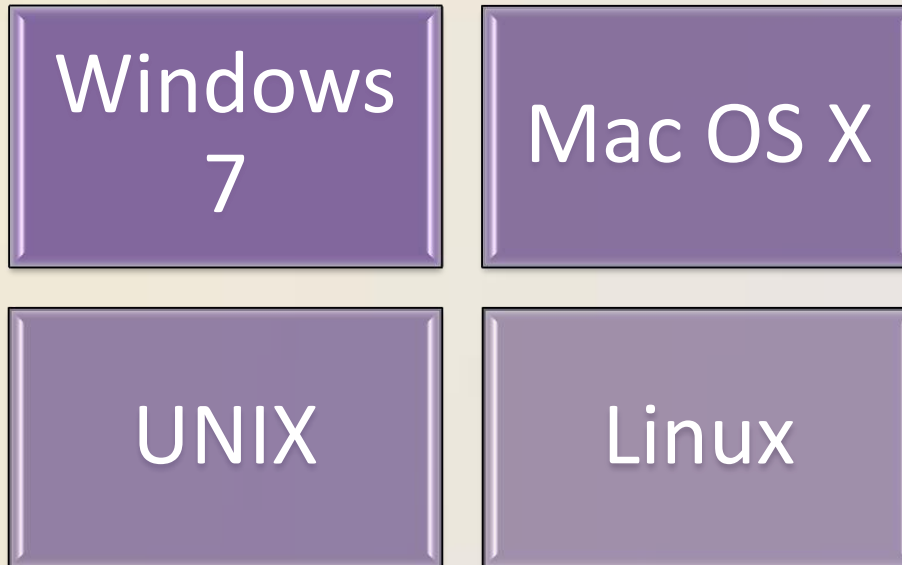


# Types of Operating Systems

Categories of Operating Systems	
Category	Operating System Name
<b>Stand-alone</b>	<ul style="list-style-type: none"><li>• DOS</li><li>• Early Windows versions (Windows 3.x, Windows 95, Windows NT Workstation, Windows 98, Windows 2000 Professional, Windows Millennium Edition, Windows XP, Windows Vista)</li><li>• Windows 7</li><li>• Mac OS X</li><li>• UNIX</li><li>• Linux</li></ul>
<b>Server</b>	<ul style="list-style-type: none"><li>• Early Windows Server versions (Windows NT Server, Windows 2000 Server, Windows Server 2003)</li><li>• Windows Server 2008</li><li>• UNIX</li><li>• Linux</li><li>• Solaris</li><li>• NetWare</li></ul>
<b>Embedded</b>	<ul style="list-style-type: none"><li>• Windows Embedded CE</li><li>• Windows Mobile</li><li>• Palm OS</li><li>• iPhone OS</li><li>• BlackBerry</li><li>• Google Android</li><li>• Embedded Linux</li><li>• Symbian OS</li></ul>

# Stand-Alone Operating Systems

- A **stand-alone operating system** is a complete operating system that works on a desktop computer, notebook computer, or mobile computing device



# Stand-Alone Operating Systems

- **Windows 7** is Microsoft's fastest, most efficient operating system to date and is available in multiple editions:

Windows 7  
Starter

Windows 7  
Home  
Premium

Windows 7  
Ultimate

Windows 7  
Professional



Click to view Web Link,  
click Chapter 8, Click  
Web Link from left navigation,  
then click Windows 7  
below Chapter 8

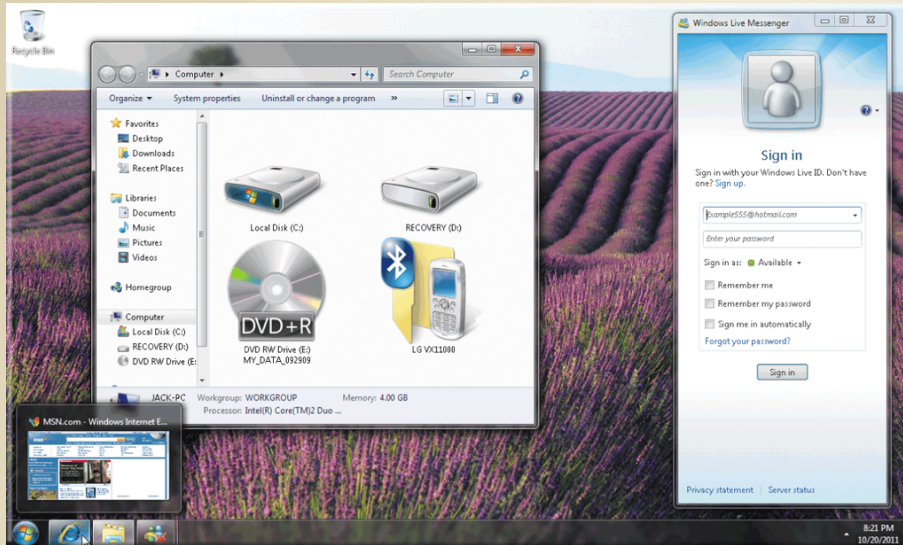
# Stand-Alone Operating Systems

- Windows 7 provides programs such as:





# Stand-Alone Operating Systems



# Stand-Alone Operating Systems

## Additional Windows 7 Features

<b>Reliability and Performance</b>	<ul style="list-style-type: none"><li>• Low-powered Sleep state allows you to resume work quickly when you return to the computer</li><li>• Programs start faster with Windows SuperFetch technology</li><li>• Automatically detects and fine-tunes performance problems</li><li>• Built-in hardware diagnostics detect and repair problems automatically</li><li>• Automatically recovers from failures, including restoring an unbootable computer to a usable state</li></ul>
<b>Security</b>	<ul style="list-style-type: none"><li>• User Account Control allows administrators to restrict permissions</li><li>• Protects users from dangerous Web sites</li><li>• Improved firewall and <i>Windows Defender</i> protects your computer from external threats</li><li>• Parental controls allow parents to monitor and control computer usage</li></ul>
<b>Information Management</b>	<ul style="list-style-type: none"><li>• Improved and redesigned windows help users locate files by showing thumbnails that preview content</li><li>• Use Search to locate files based on file name or any other property saved with the file</li><li>• Coordinate your schedule with others' schedules in <i>Windows Calendar</i></li><li>• Use the <i>Snipping Tool</i> to copy screen elements to a file on your computer</li><li>• Easily share files with other users</li></ul>
<b>Appearance and Navigation</b>	<ul style="list-style-type: none"><li>• Easy-to-navigate user interface with translucent windows</li><li>• Display a preview of windows open in a particular program when you point to that program button on the taskbar</li><li>• Windows Snap and Aero Shake make it easier to manage the appearance of open windows</li><li>• Jump Lists make it easier to open recent files quickly in their respective program</li><li>• <i>Windows Touch</i> supports computers with multi-touch technology</li></ul>
<b>Communications and the Internet</b>	<ul style="list-style-type: none"><li>• Enhanced Internet Explorer</li><li>• Free access to <i>Windows Live Essentials</i>, which includes programs such as <i>Windows Live Messenger</i> for instant messaging, <i>Windows Live Photo Gallery</i> for photo editing and sharing, <i>Windows Live Mail</i> for e-mail, <i>Windows Live Writer</i> for blogging, and <i>Windows Live Movie Maker</i> for video editing and sharing</li><li>• Consistent and secure wireless network connections</li><li>• Speech recognition allows you to interact with the computer by voice</li></ul>

# Stand-Alone Operating Systems

- The **Macintosh operating system** has set the standard for operating system ease of use
- Latest version is **Mac OS X**



Click to view Web Link,  
click Chapter 8, Click  
Web Link from left navigation,  
then click Mac OS X  
below Chapter 8

# Stand-Alone Operating Systems



**UNIX** is a multitasking operating system developed in the early 1970s



**Linux** is an open-source, popular, multitasking UNIX-type operating system



Click to view Web Link,  
click Chapter 8, Click  
Web Link from left navigation,  
then click Linux  
below Chapter 8

# Server Operating Systems

---

Windows  
Server 2008

UNIX

Linux

Solaris

NetWare



# Server Operating Systems

- **Windows Server 2008** is an upgrade to Windows Server 2003
  - Part of the **Windows Server 2008 family**
  - Multiple editions
- Most editions include Hyper-V, a virtualization technology
  - Virtualization is the practice of sharing or pooling computing resources



Click to view Web Link,  
click Chapter 8, Click  
Web Link from left navigation,  
then click Virtualization  
below Chapter 8

# Embedded Operating Systems

- An **embedded operating system** resides on a ROM chip on a mobile device or consumer electronic device

**Windows  
Embedded CE**

**Windows  
Mobile**

Palm OS

**iPhone OS**

BlackBerry

Google  
Android

Embedded  
Linux

Symbian OS



# Embedded Operating Systems



Click to view Web Link,  
click Chapter 8, Click  
Web Link from left navigation,  
then click iPhone OS  
below Chapter 8

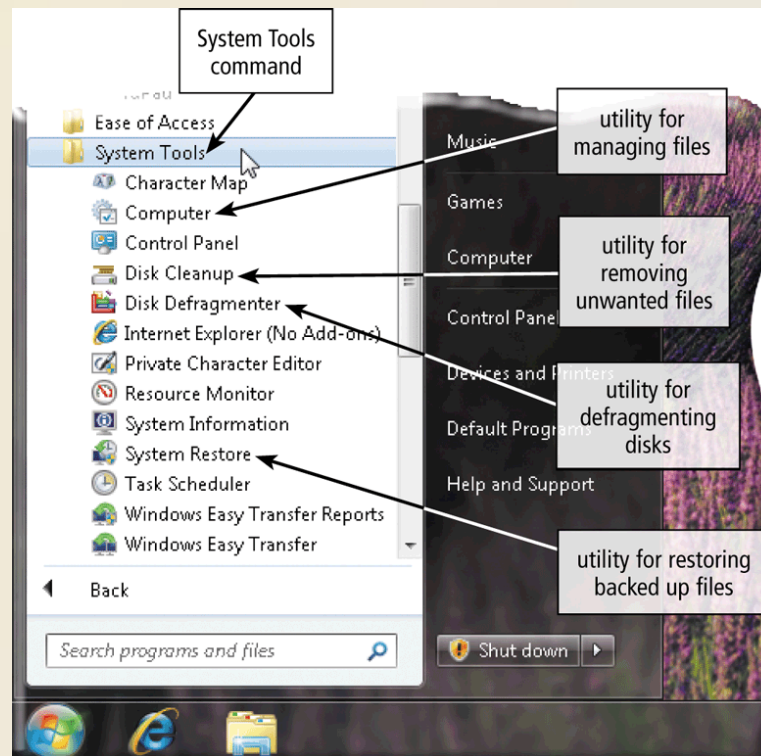


Click to view Web Link,  
click Chapter 8, Click  
Web Link from left navigation,  
then click BlackBerry  
below Chapter 8



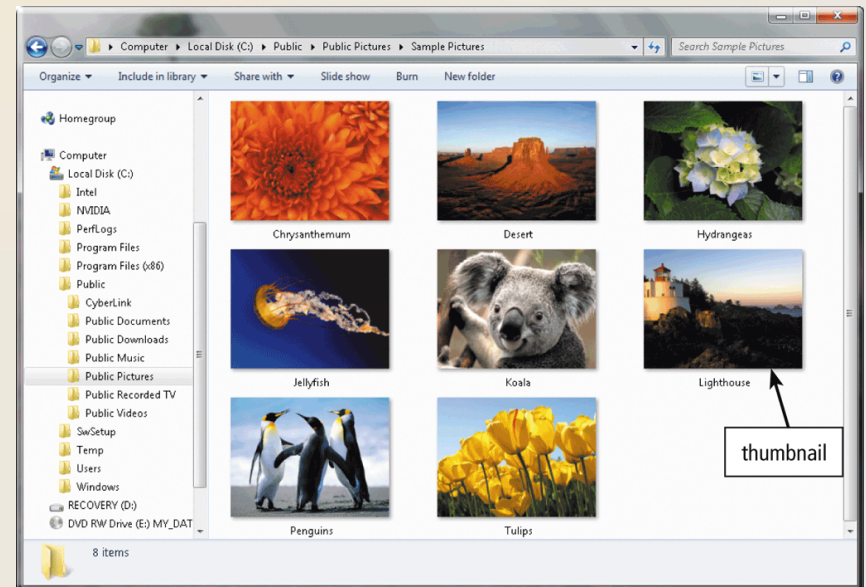
# Utility Programs

- A **utility program** is a type of system software that allows a user to perform maintenance-type tasks



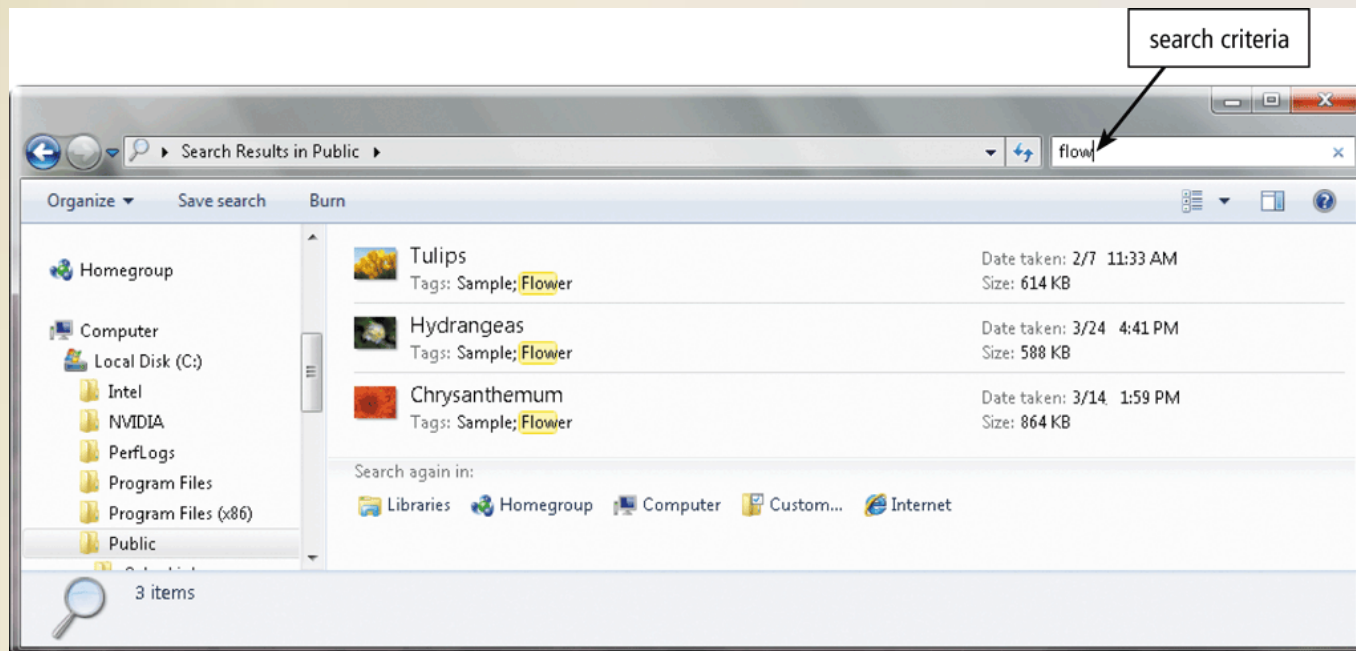
# Utility Programs

- A **file manager** is a utility that performs functions related to file management
  - Displaying a list of files
  - Organizing files in folders
  - Copying, renaming, deleting, moving, and sorting files and **folders**
  - Creating **shortcuts**



# Utility Programs

- A **search utility** is a program that attempts to locate a file on your computer based on criteria you specify



# Utility Programs

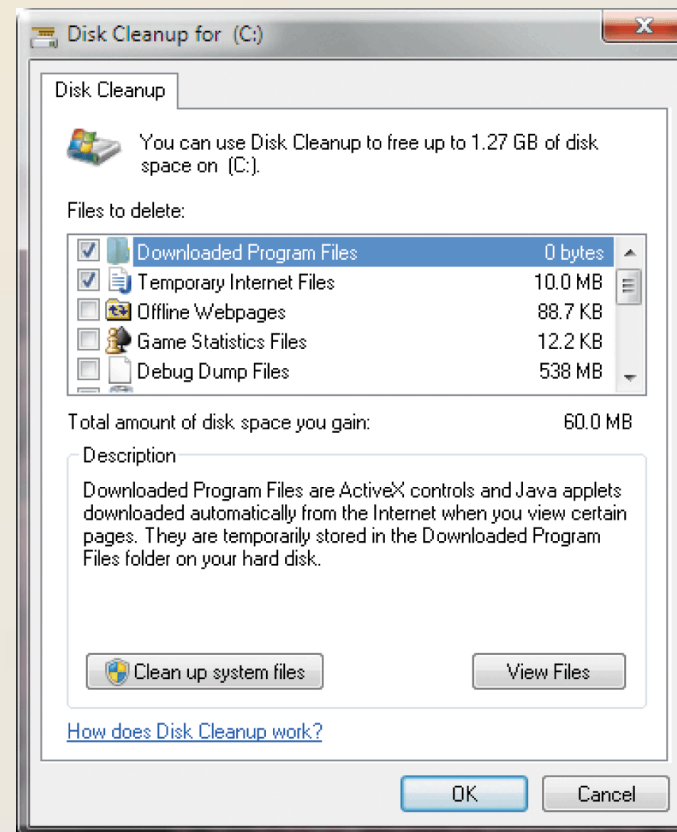
- An **image viewer** allows users to display, copy, and print the contents of a graphics file
- An **uninstaller** removes a program, as well as any associated entries in the system files





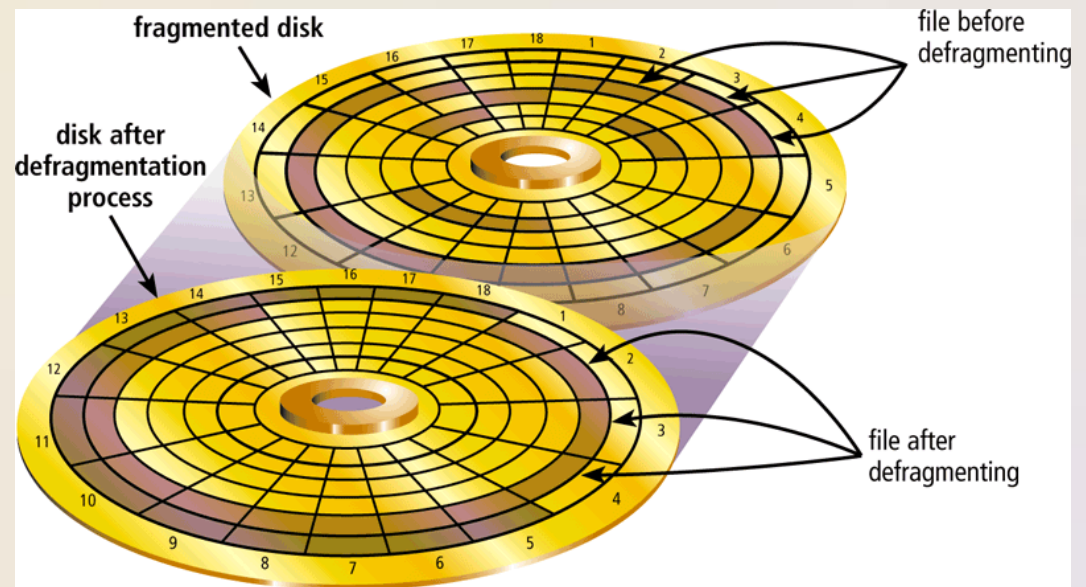
# Utility Programs

- A disk cleanup utility searches for and removes unnecessary files
  - Downloaded program files
  - Temporary Internet files
  - Deleted files
  - Unused program files



# Utility Programs

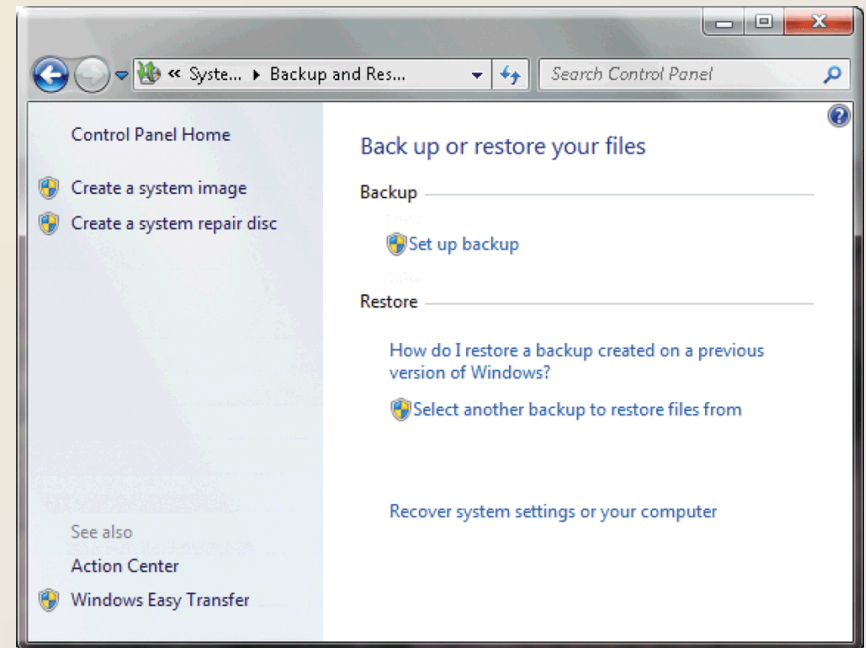
- A **disk defragmenter** reorganizes the files and unused space on a computer's hard disk so that the operating system accesses data more quickly and programs run faster
  - **Defragmenting**





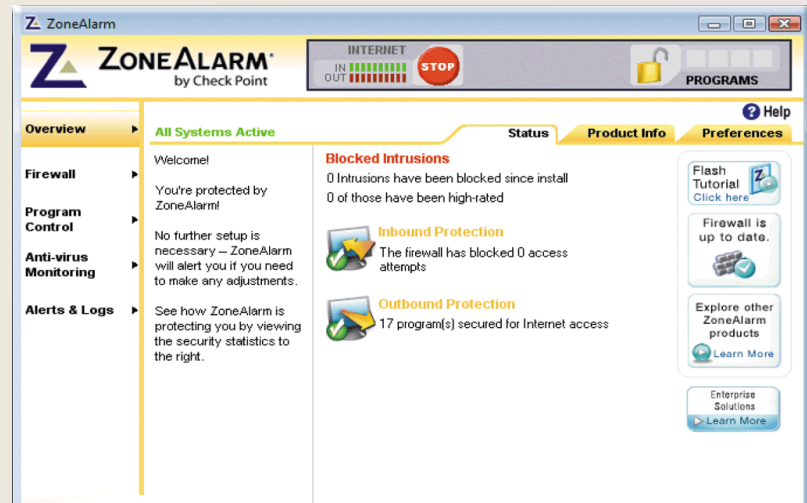
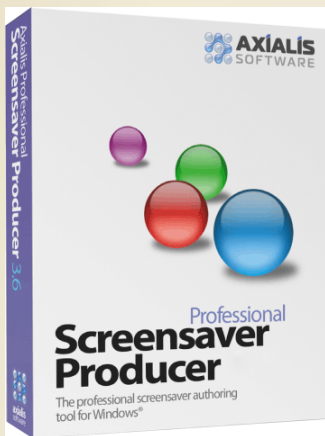
# Utility Programs

- A **backup utility** allows users to copy files to another storage medium
- A **restore utility** reverses the process and returns backed up files to their original form



# Utility Programs

- A **screen saver** causes a display device's screen to show a moving image or blank screen if no activity occurs for a specified time
- A **personal firewall** detects and protects a personal computer from unauthorized intrusions



# Utility Programs

A **virus** describes a potentially damaging computer program that affects a computer negatively

A **worm** copies itself repeatedly in memory or over a network

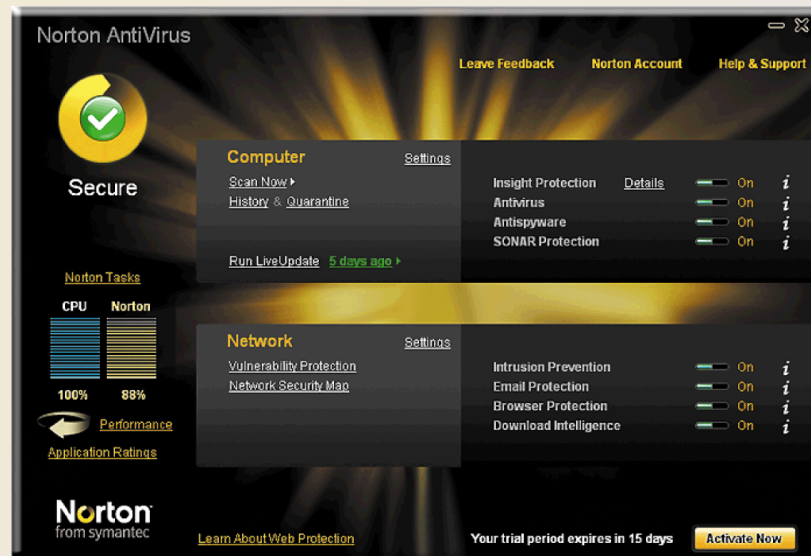
A **Trojan horse** hides within or looks like a legitimate program

An **antivirus program** protects a computer against viruses

# Utility Programs

## Signs of Virus Infection

- An unusual message or image is displayed on the computer screen
- An unusual sound or music plays randomly
- The available memory is less than what should be available
- A program or file suddenly is missing
- An unknown program or file mysteriously appears
- The size of a file changes without explanation
- A file becomes corrupted
- A program or file does not work properly
- System properties change
- The computer operates much slower than usual



# Utility Programs

Spyware is a program placed on a computer without the user's knowledge that secretly collects information about the user

- A **spyware remover** detects and deletes spyware and other similar programs

Adware displays an online advertisement in a banner or pop-up window

- An adware remover is a program that detects and deletes adware

# Utility Programs

- Filters are programs that remove or block certain items from being displayed

**Web  
filters**

**Anti-spam  
programs**

**Phishing  
filters**

**Pop-up  
blockers**

# Utility Programs

- A **file compression utility** shrinks the size of a file(s)
  - Compressing files frees up room on the storage media
  - Two types of compression
    - Lossy
    - Lossless
- Compressed files sometimes are called **zipped files**
  - Can be **uncompressed**

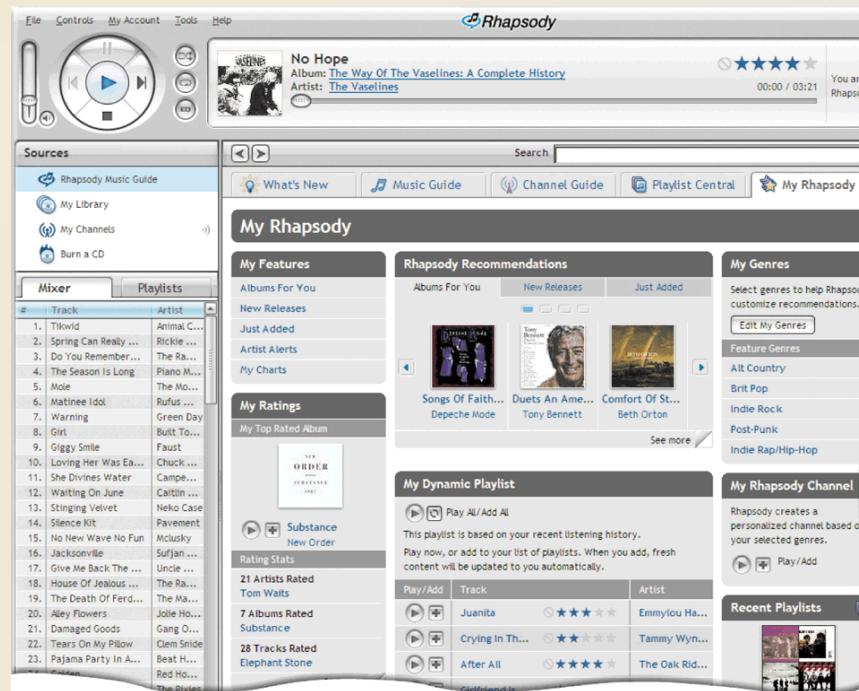


Click to view Web Link,  
click Chapter 8, Click  
Web Link from left navigation,  
then click WinZip  
below Chapter 8



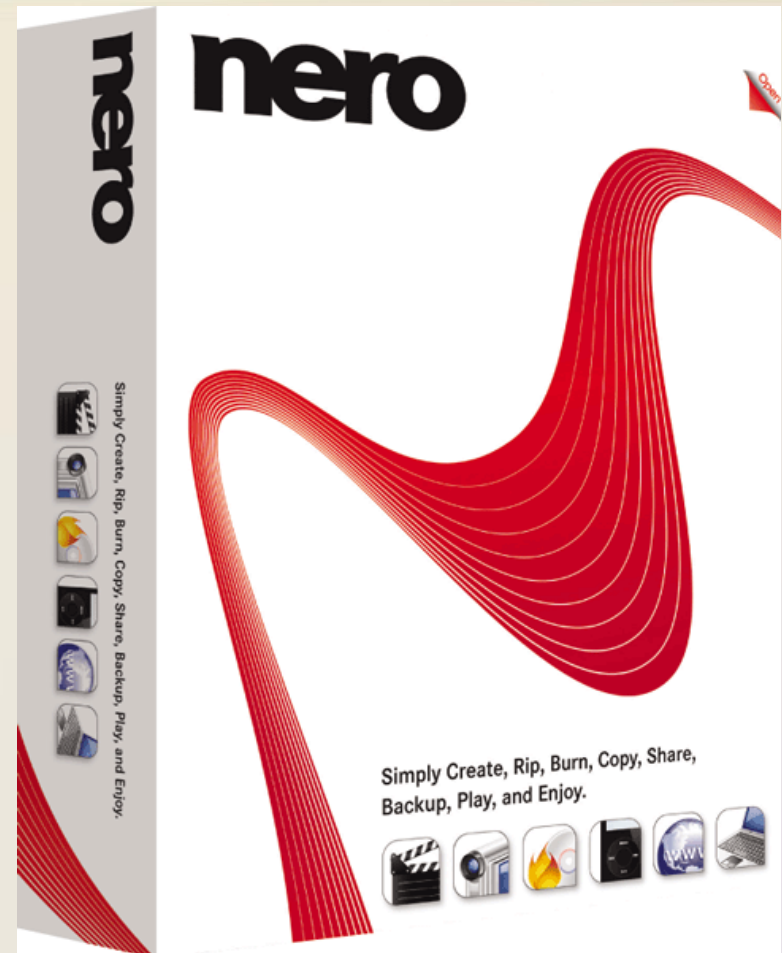
# Utility Programs

- A **media player** allows you to view images and animation, listen to audio, and watch video files on your computer



# Utility Programs

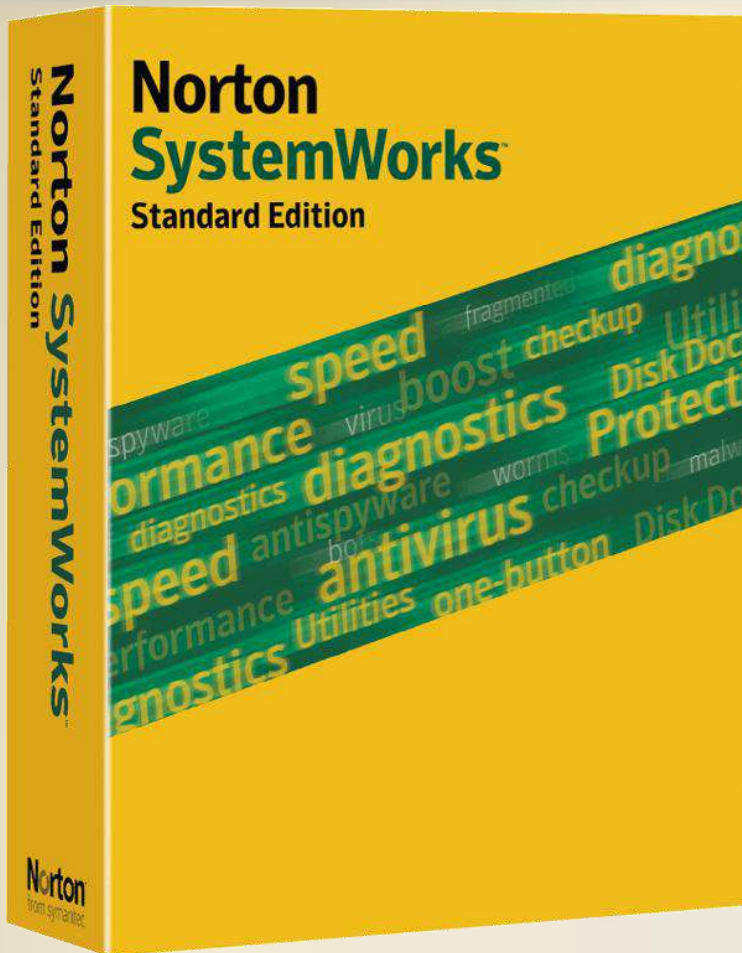
- **Disc burning software** writes text, graphics, audio, and video files on a recordable or rewritable optical disc



Click to view Web Link,  
click Chapter 8, Click  
Web Link from left navigation,  
then click Burning Discs  
below Chapter 8



# Utility Programs



- A **personal computer maintenance utility** identifies and fixes operating system problems, detects and repairs disk problems, and includes the capability of improving a computer's performance

# Summary

Definition of an operating system

Functions common to most operating systems

Variety of stand-alone operating systems, server operating systems, and embedded operating systems

Several utility programs

Chapter Eight

# Operating Systems and Utility Programs

**Discovering  
Computers 2011**

**Living in a Digital World**

**Chapter 8 Complete**

