

Chapter Eight

Operating Systems and Utility Programs

Discovering Computers 2012

Your Interactive Guide
to the 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



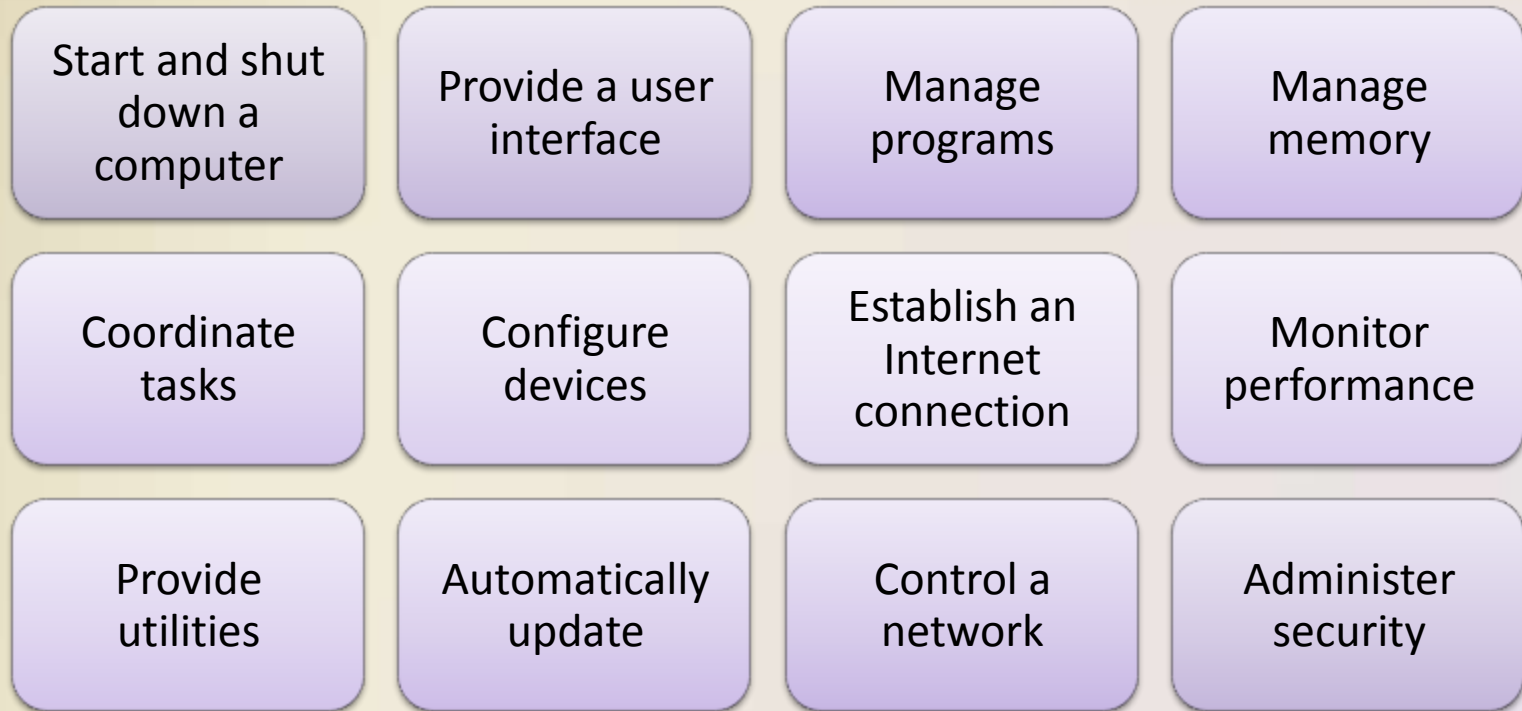
Operating
systems



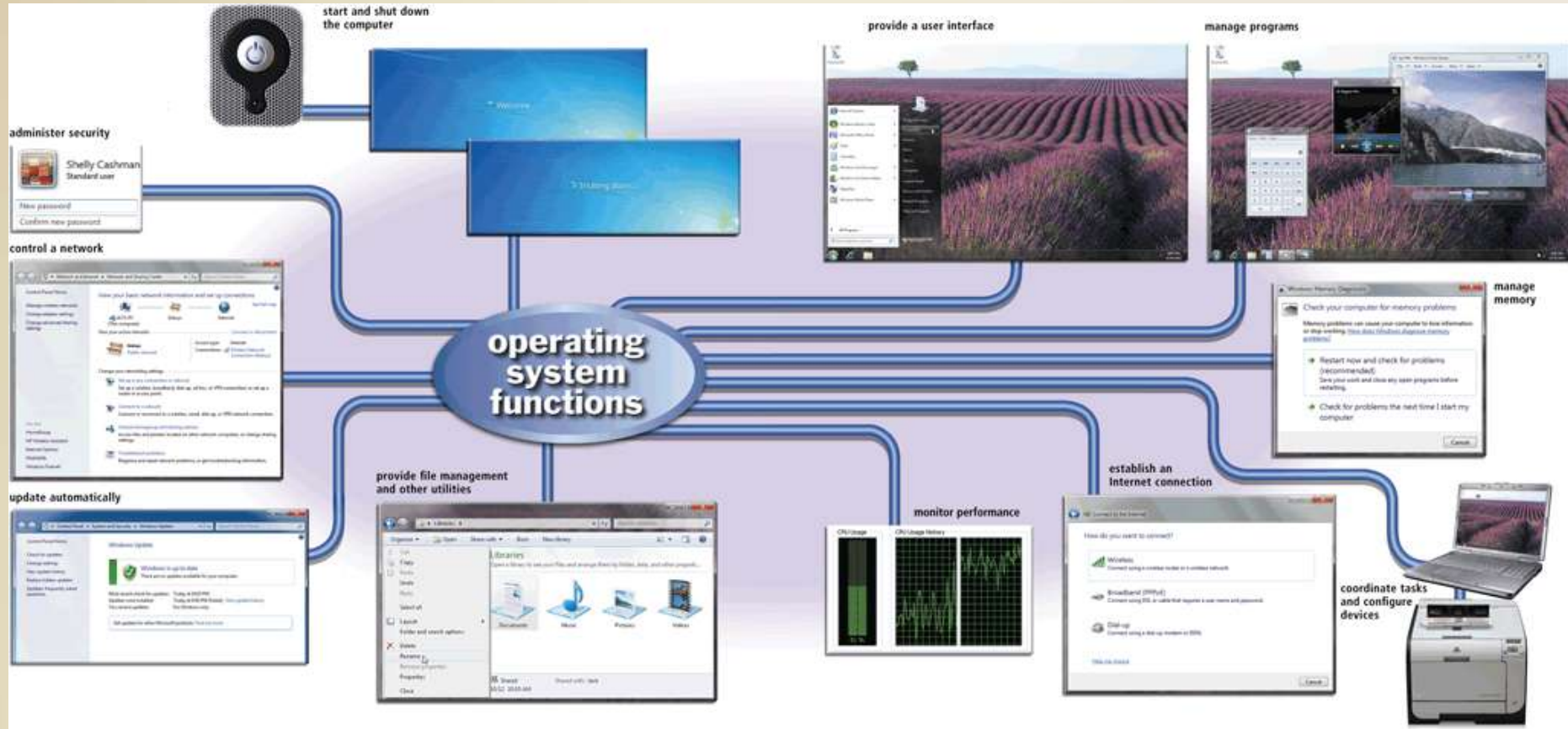
Utility
Programs

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

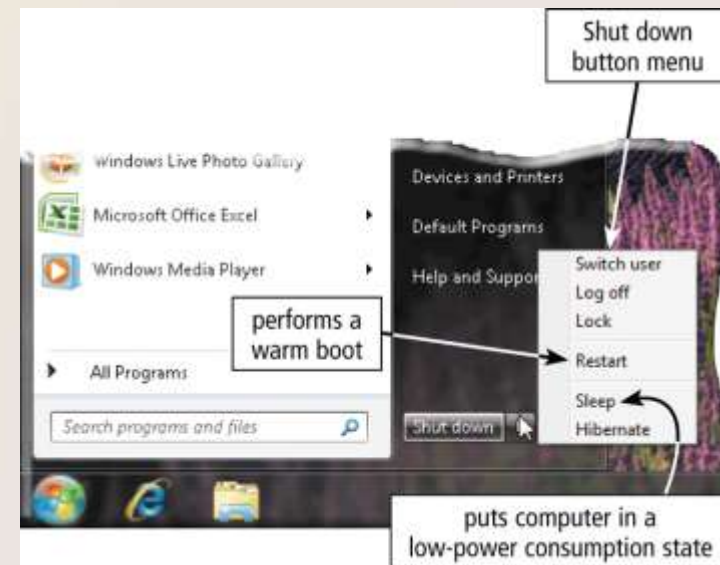
- The process of starting or restarting a computer is called **booting**

Cold boot

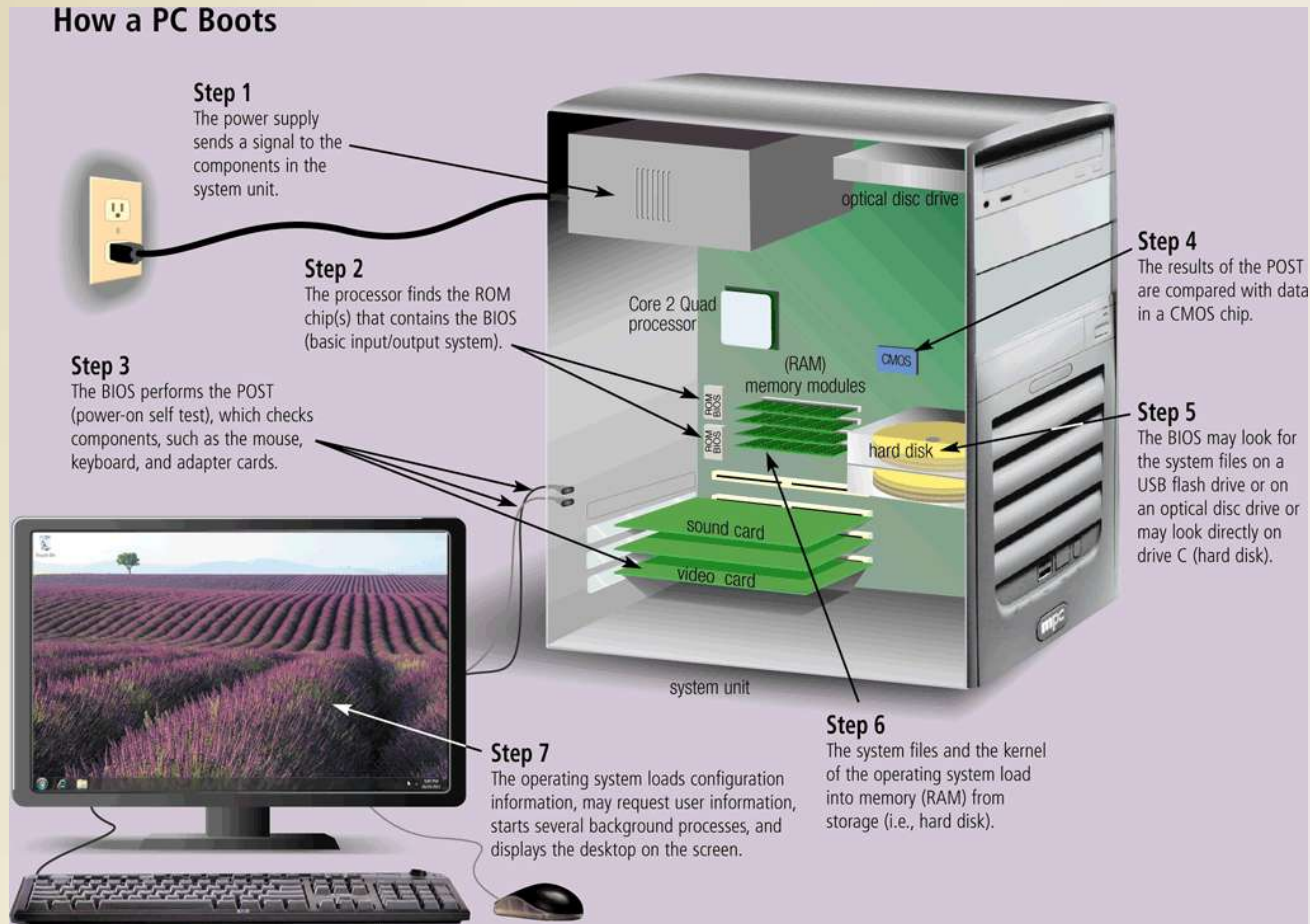
- Turning on a computer that has been powered off completely

Warm boot

- Using the operating system to restart a computer



Operating System Functions



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

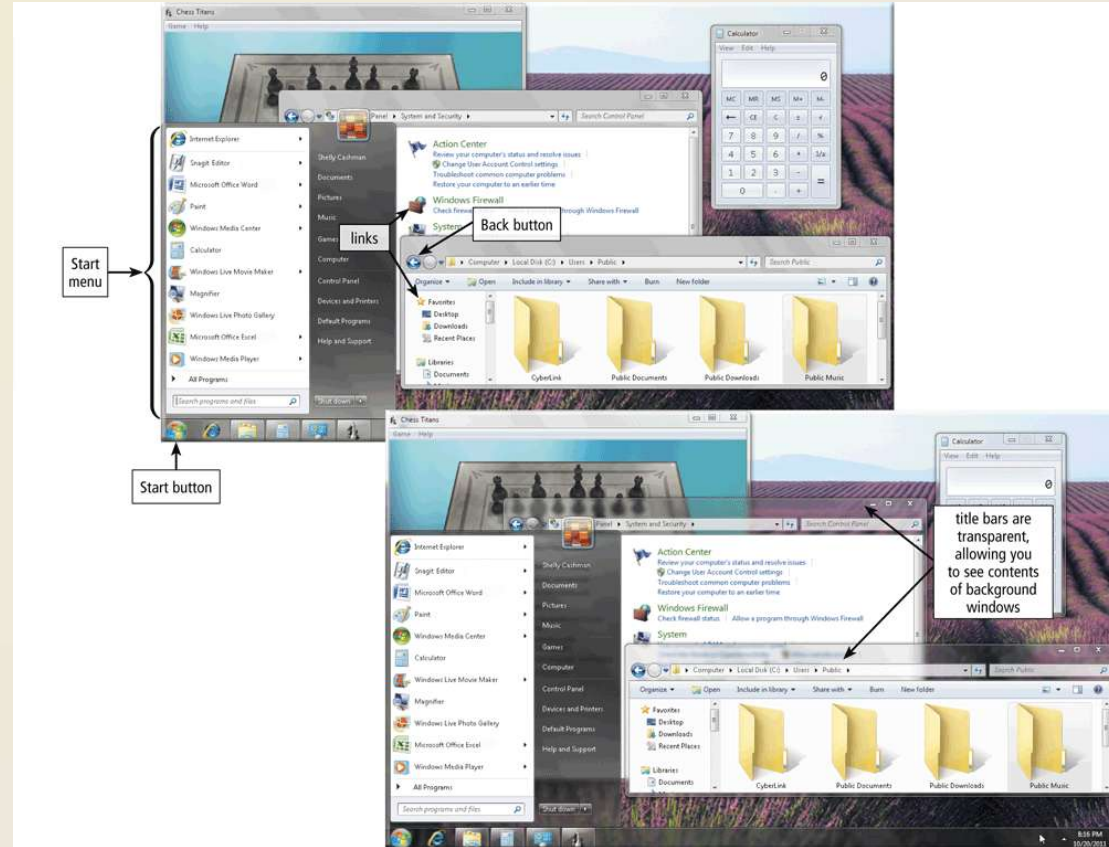
- An operating system includes various shut down options

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

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 ms
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 in the image:

- A box labeled "command entered by user" points to the command `ping -q -c1 en.wikipedia.org`.
- A box labeled "command prompt" points to the prompt `bash-2.05b$` at the end of the output.

Operating System Functions

- How an operating system handles programs directly affects your productivity

Single user and
multiuser

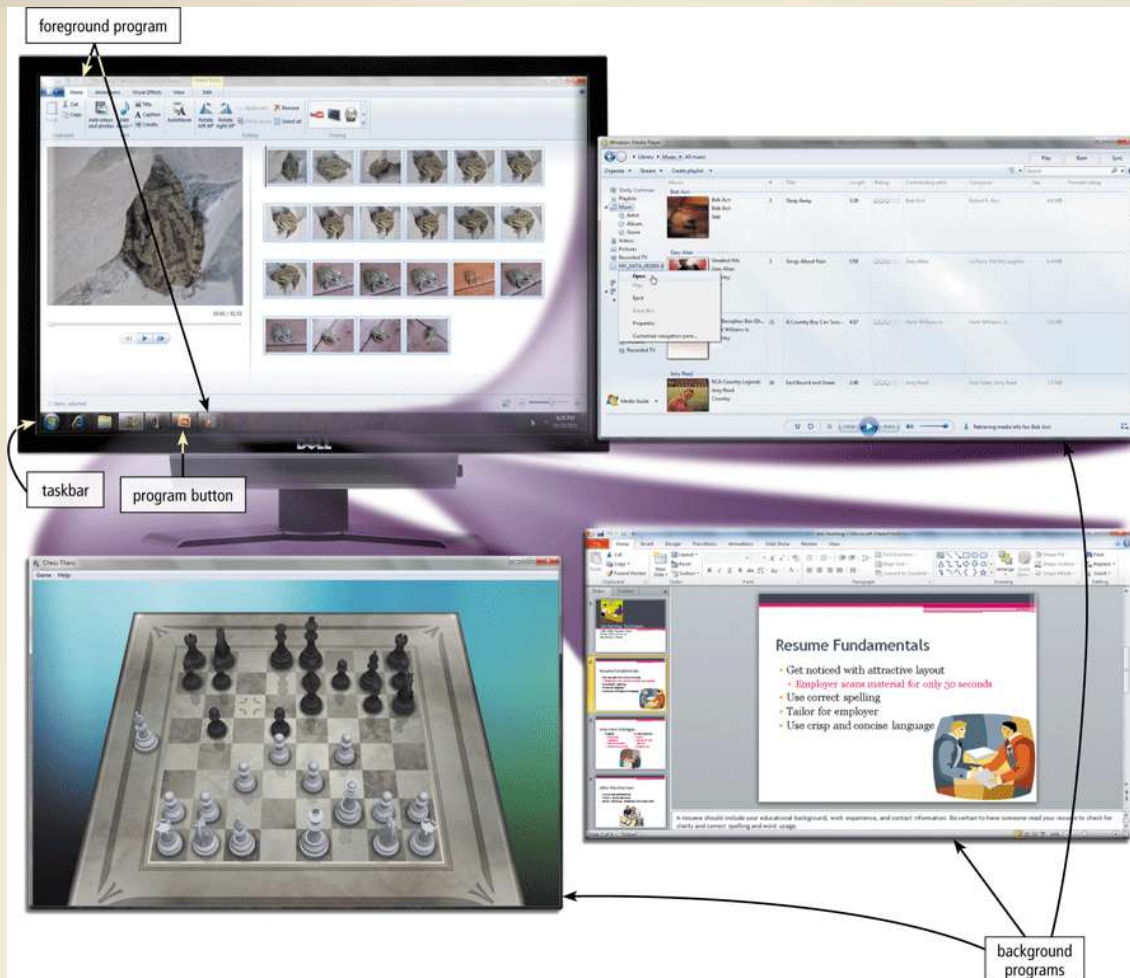
Single tasking
and
multitasking

Foreground and
background

Preemptive
multitasking

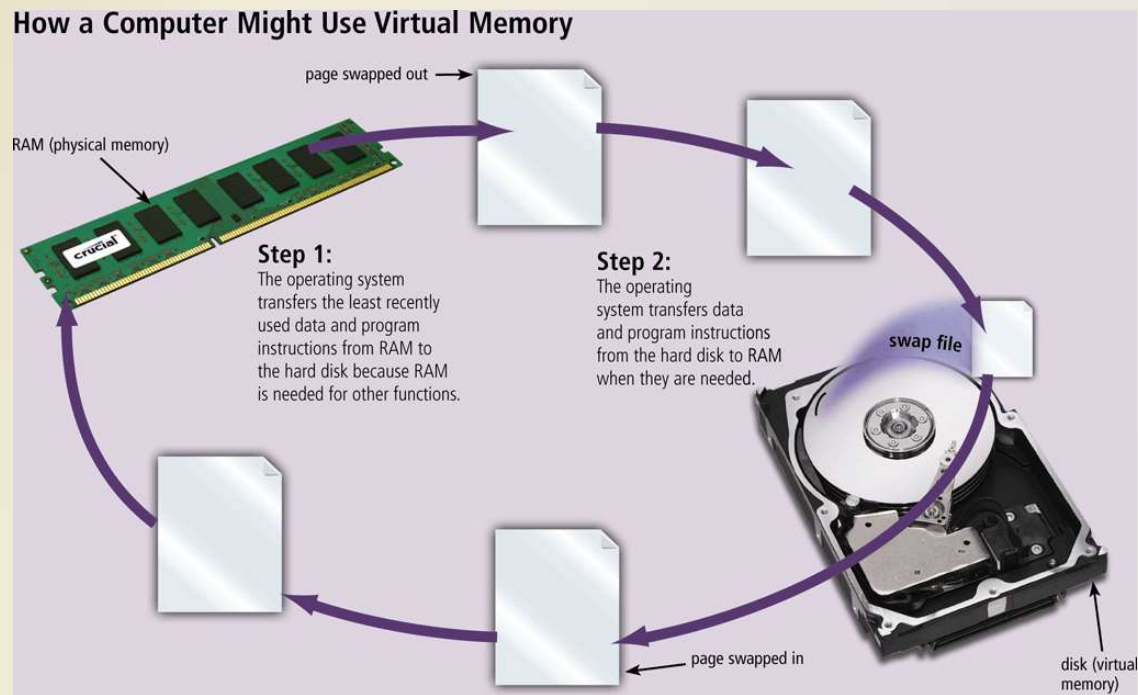
Multiprocessing

Operating System Functions



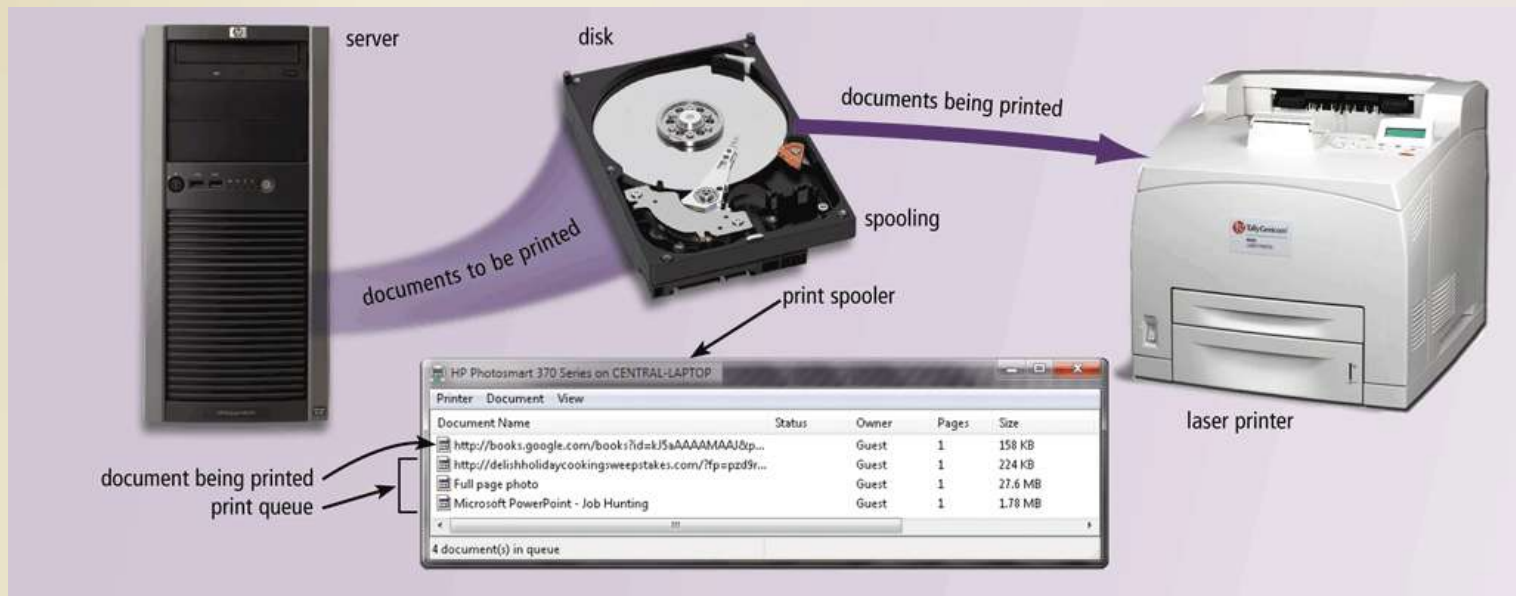
Operating System Functions

- **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



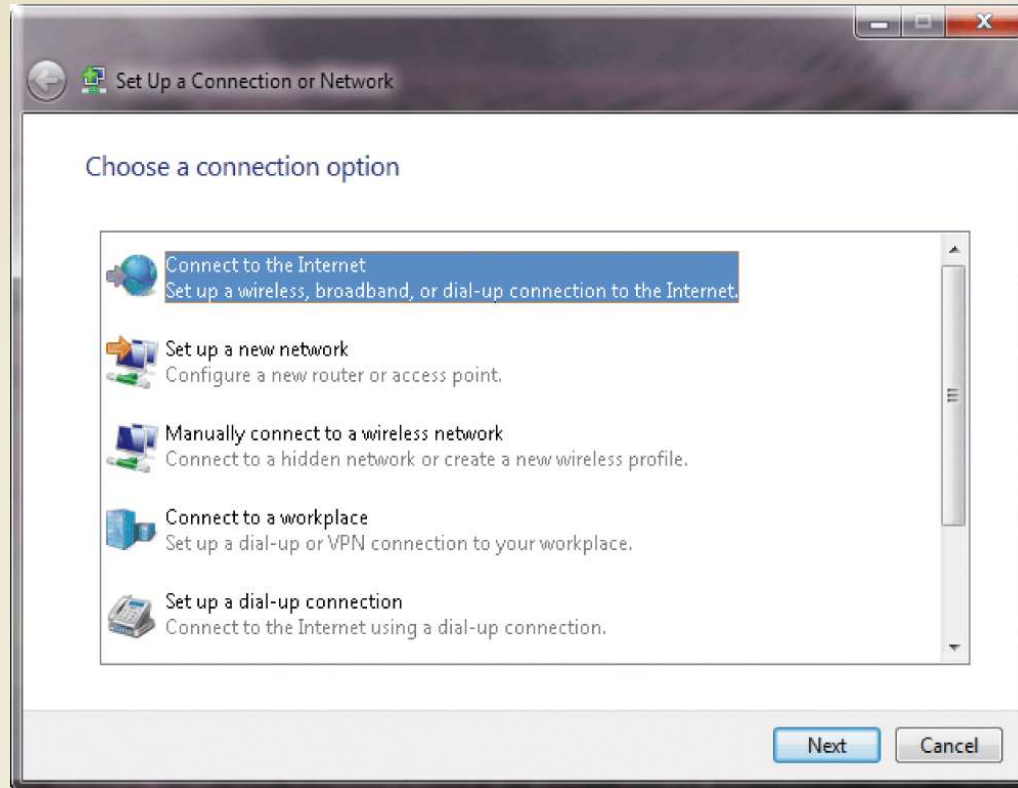
Operating System Functions

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

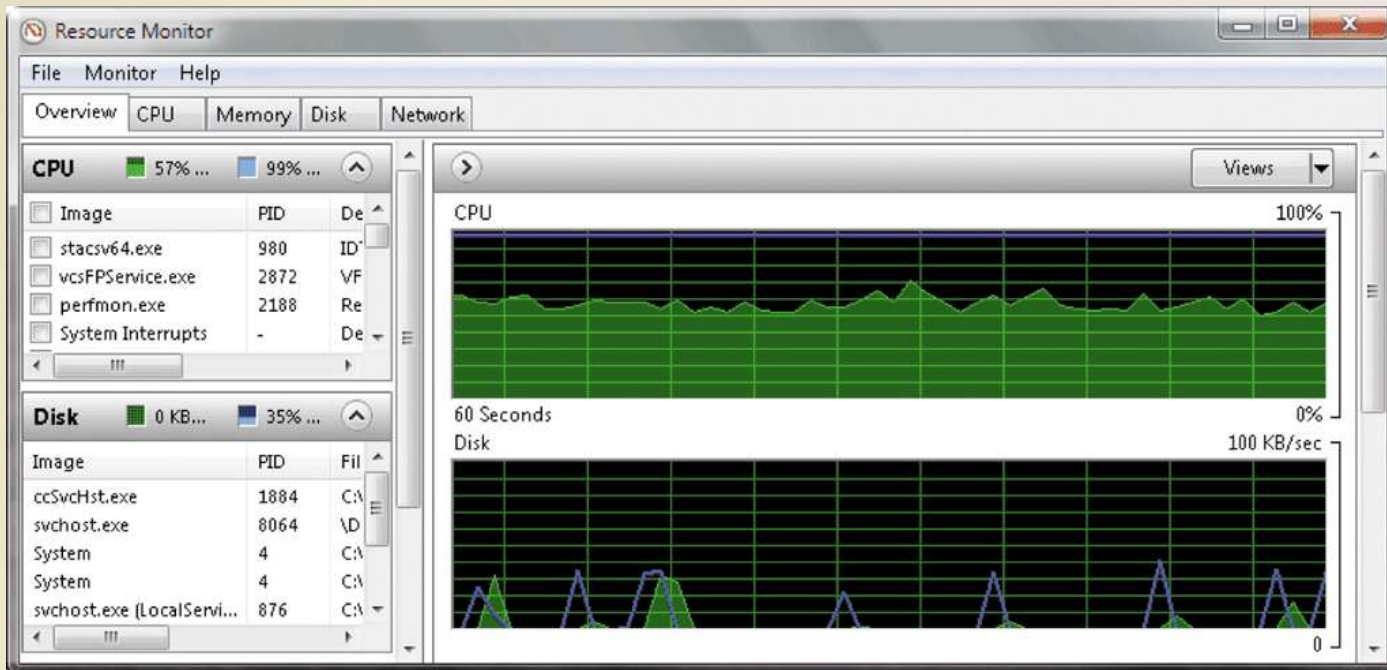
Operating System Functions

- 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

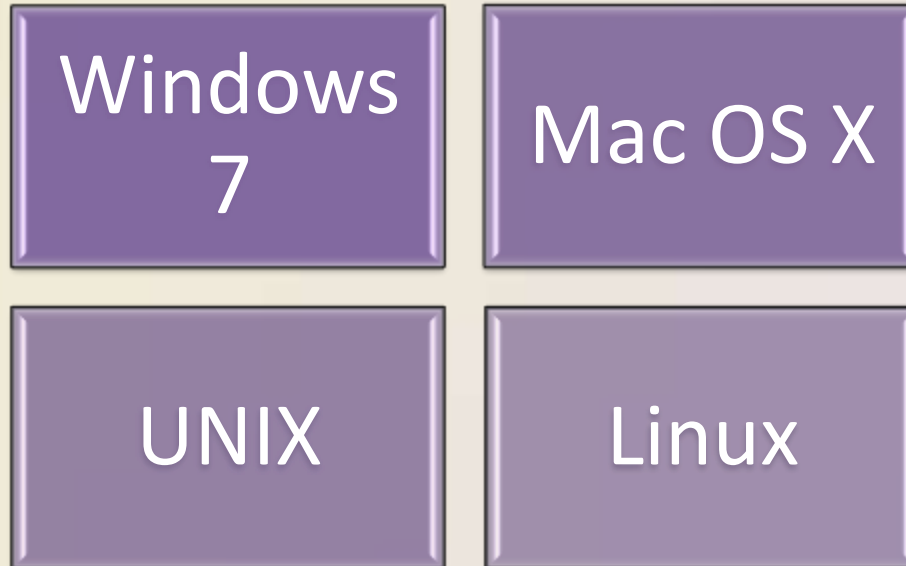


Types of Operating Systems

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

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:

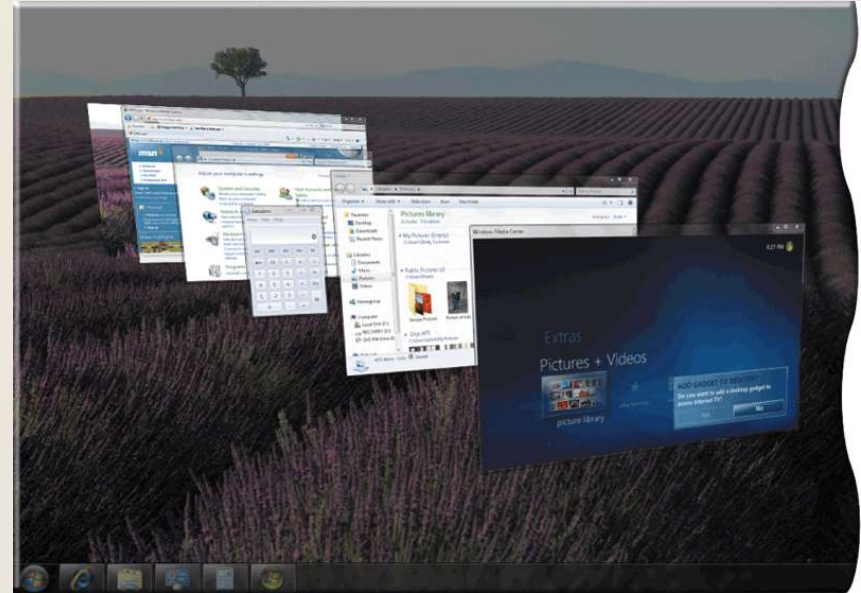


Stand-Alone Operating Systems

- Windows 7 provides programs such as:



Stand-Alone Operating Systems



Stand-Alone Operating Systems

Additional Windows 7 Features

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

Stand-Alone Operating Systems

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



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

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

Embedded Operating Systems

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

**Windows
Embedded CE**

**Windows
Phone 7**

Palm OS

iPhone OS

BlackBerry

Google
Android

Embedded
Linux

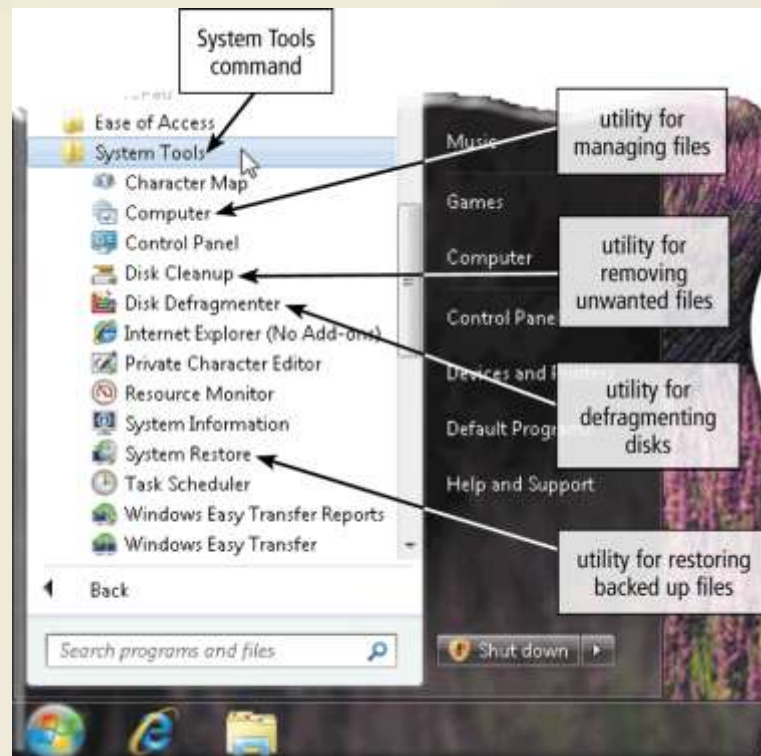
Symbian OS

Embedded Operating Systems



Utility Programs

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



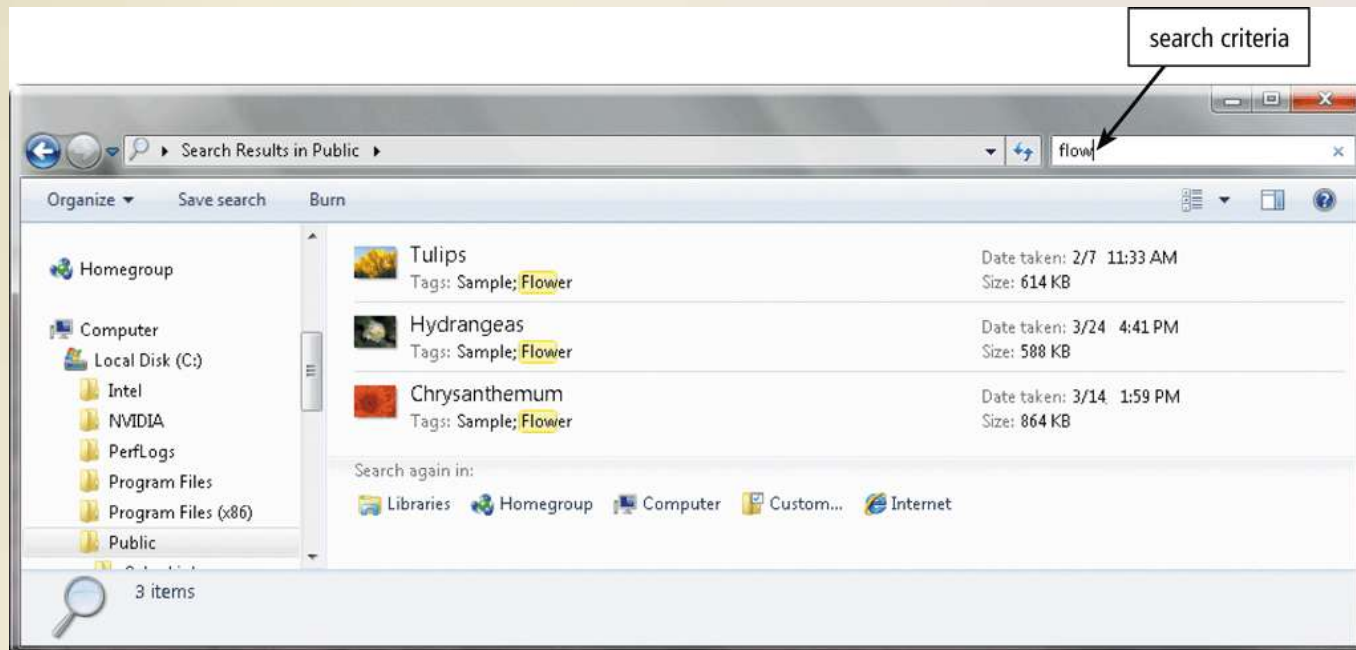
Utility Programs

- 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



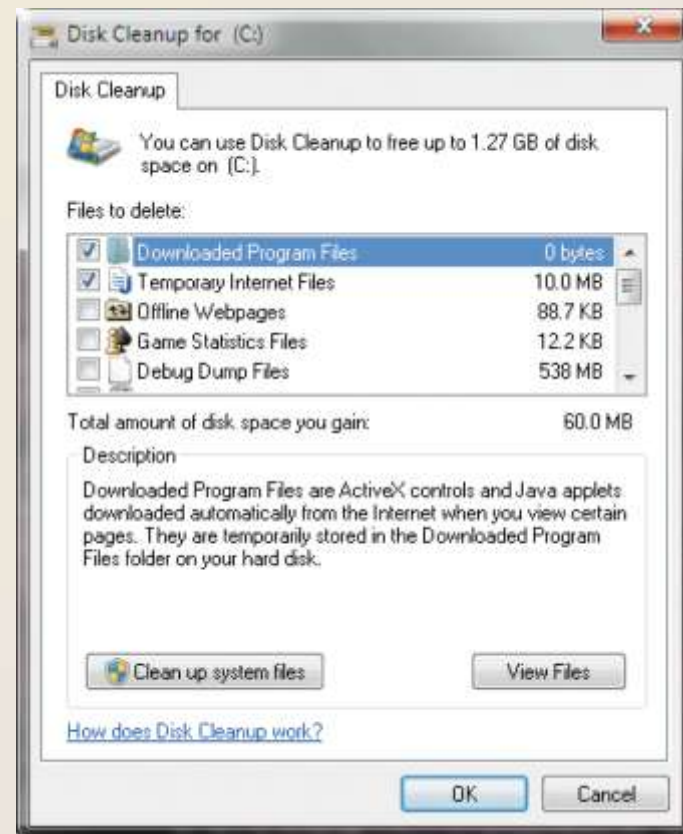
Utility Programs

- 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



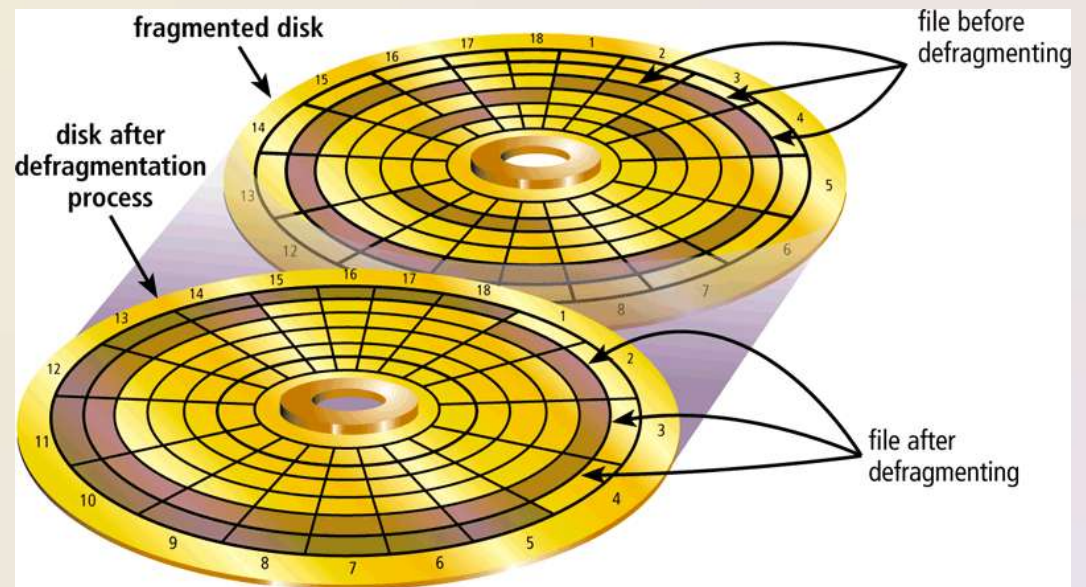
Utility Programs

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



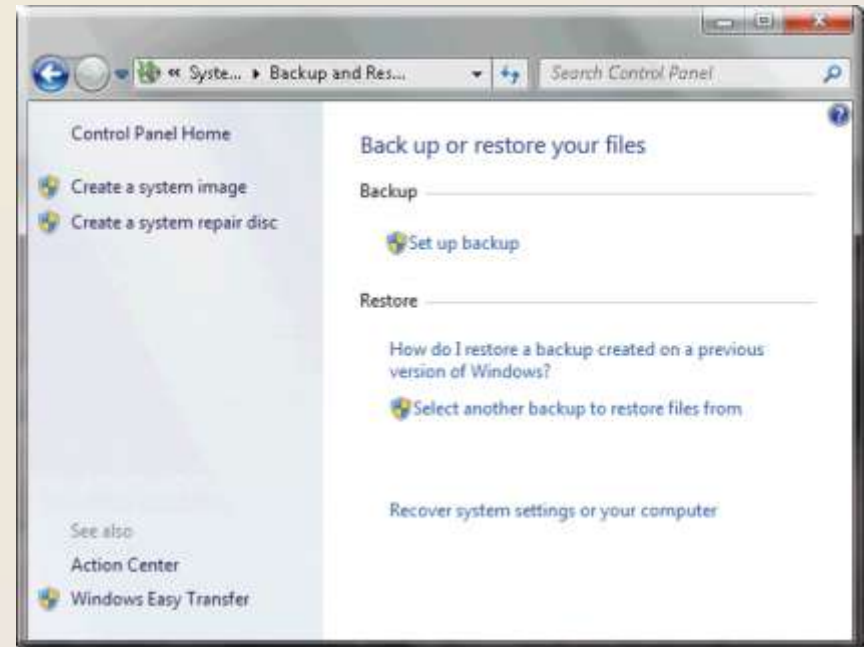
Utility Programs

- 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 filtering
software**

**Anti-spam
programs**

**Phishing
filters**

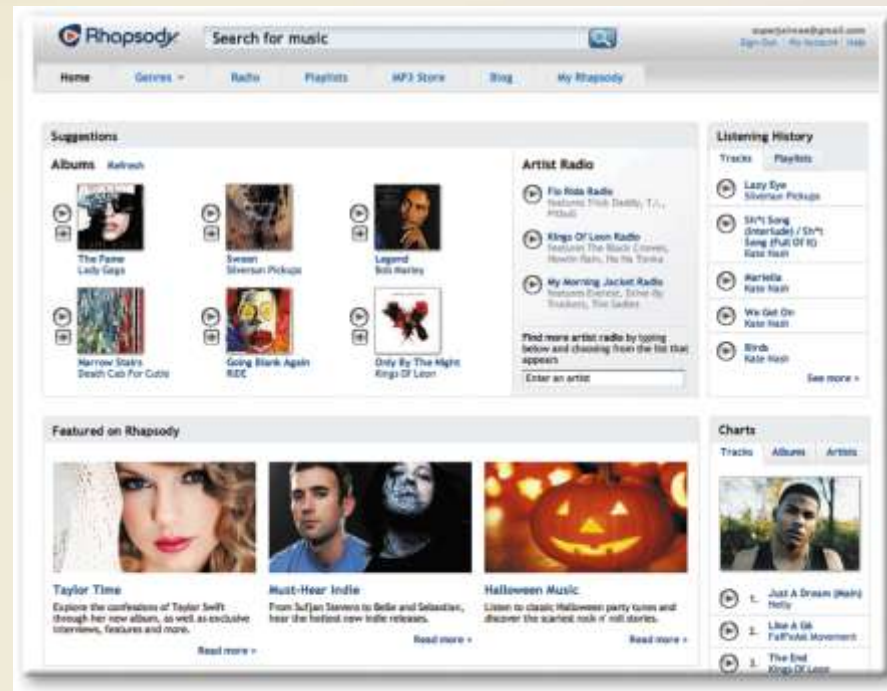
**Pop-up
blockers**

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**

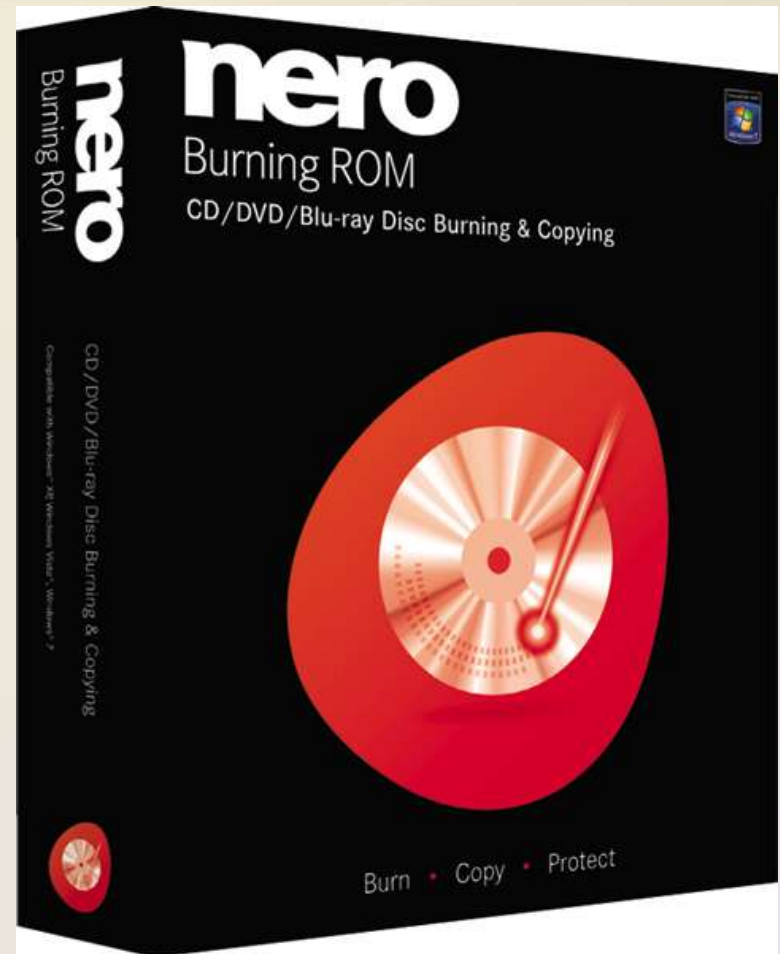
Utility Programs

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

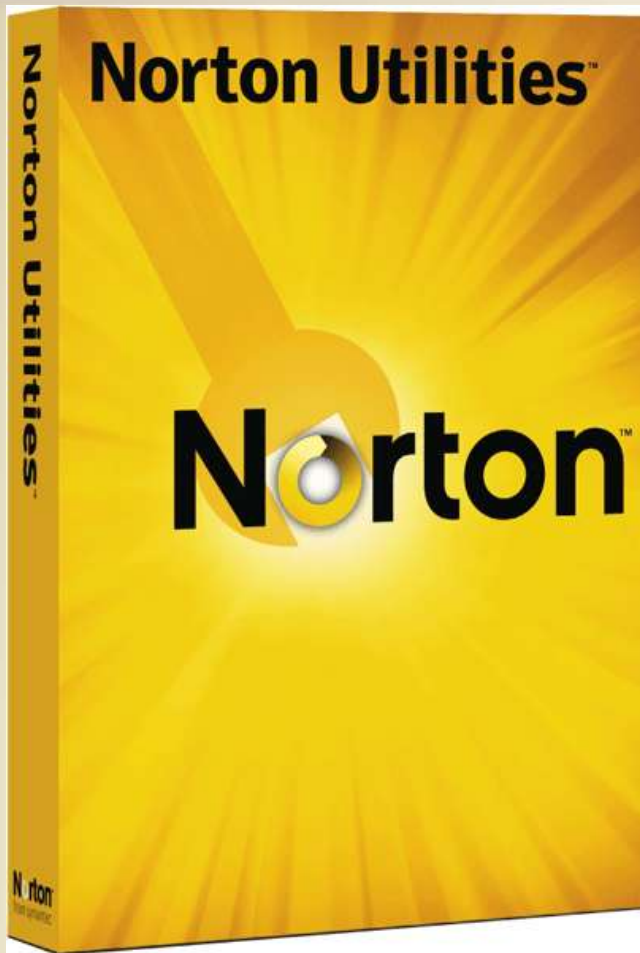


Utility Programs

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



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

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Chapter 8 Complete

