COURSE TECHNOLOGY
CENGAGE Learning

A+ Guide to Managing and Maintaining Your PC, 7e

Chapter 2
Introducing Operating Systems

Objectives

- Learn about the various operating systems and the differences between them
- Learn about the components of Windows operating systems
- Learn how operating systems interface with users, files and folders, applications, and hardware

Operating Systems Past And Present

- Operating system (OS) software
  - Controls a computer
- OS services
  - Manages hardware
  - Runs applications
  - Provides an interface for users
  - Retrieves and manipulates files
- OS acts as a “middleman”
- Computer needs only one operating system

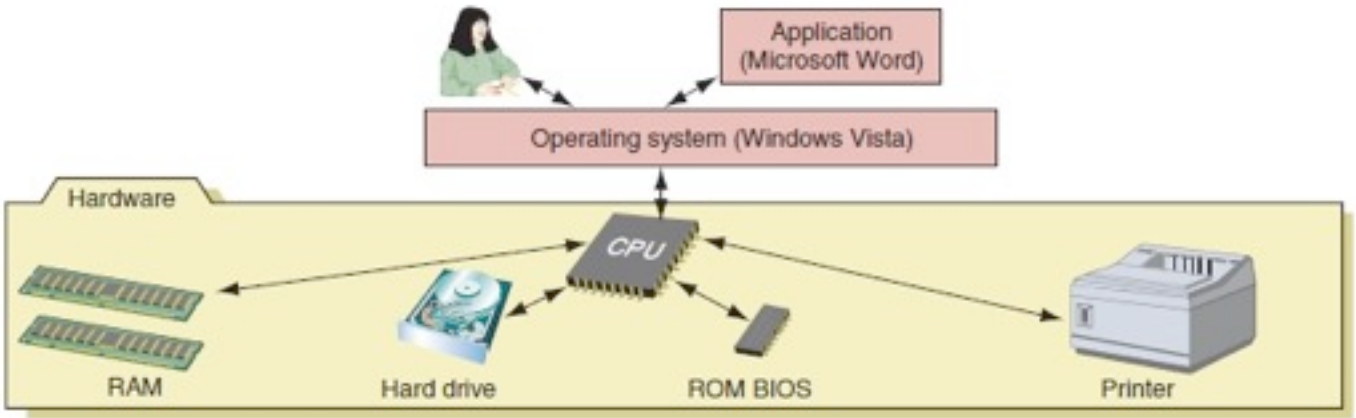

Figure 2-1 Users and applications depend on the OS to relate to all applications and hardware components
Courtesy: Course Technology/Cengage Learning

DOS (Disk Operating System)

- First OS used by IBM computers/compatibles
- Command line driven set of programs
- Outdated as desktop computer operating system
  - Still available on troubleshooting disks or CDs

DOS with Windows 3.X

- Refers to Windows 3.1 and windows 3.11
- Uses DOS as the operating system
- Provides user friendly intermediate program between:
  - DOS, applications, and the user
- Long lasting features provided:
  - Graphical user interface (GUI)
  - Windows desktop
  - Windows concept
  - Ability to keep more than one application open at the same time

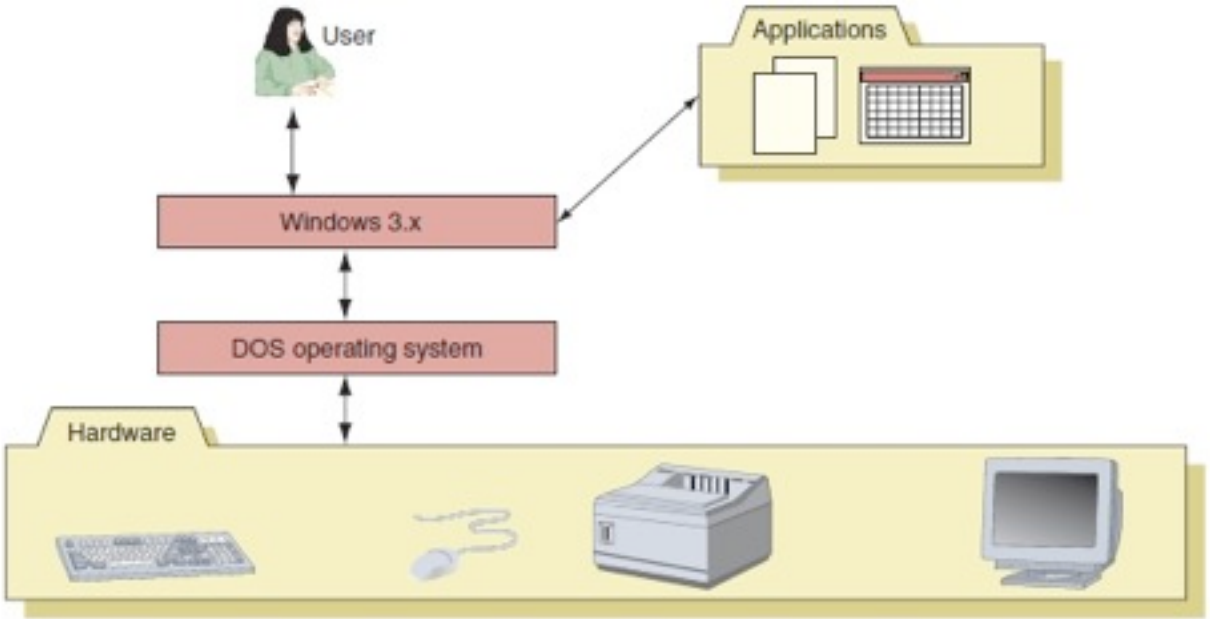

Figure 2-3 Windows 3.x was layered between DOS and the user and applications to provide a graphics interface for the user and a multitasking environment for applications
Courtesy: Course Technology/Cengage Learning

Windows 9x/ME

- Refers to Windows 95, Windows 98, Windows Me
- True operating system
  - Combines DOS core with GUI

Windows NT

- Two versions of Windows NT (New Technology):
  - Windows NT Workstation for desktops
  - Windows NT Server to control a network
- Microsoft completely rewrote OS core
  - Totally eliminates DOS core
  - Introduced many new problems
- First Windows OS using 32 bits at a time

Windows 2000

- Upgrades Windows NT (desktop and server)
- Came in several versions
  - Popular desktop OS
- Improvements
  - Stable environment, Plug and Play support
  - Device Manager, Recovery Console, Active Directory
  - Better network support
  - Features specifically targeting notebook computers
- Targeted towards corporate environment
- Not backward compatible

Windows XP

- Integrates Windows 9x/Me and Windows 2000
- Two main versions: Home Edition and Professional
- Noteworthy new features:
  - Allows multiple users to log on simultaneously
    - Each with their own applications open
  - Incorporates Windows Messenger and Media Player
  - Adds advanced security, such as Windows Firewall
- Stable
  - Service pack: major update or fix to an OS
  - Patch: minor fix

Windows Vista

- Upgrade from Windows XP
  - Comes in five versions
- Aero user interface
  - New 3D user interface (not available on all versions)
- Windows XP Start button
  - Replaced by Vista sphere with a Windows flag
- Complaints
  - Lack of backward compatibility
  - Computer resources required
  - Slow performance

Windows 7

- Next generation of Microsoft OS
- Should correct Vista complaints
- Expected to run on netbooks
  - Low-end inexpensive laptop
    - Small 9- or 10-inch screen, no optical drive
  - Generally used for Web browsing, e-mail, word processing

MAC OS

- Introduced in 1984 with Macintosh computers
  - Current version: Mac OS X (ten)
  - Can work on Intel-based computers
- Boot Camp dual boot software by Apple available
- VMWare Fusion creates a virtual machine
- Features:
  - Support for graphics and multimedia capabilities
  - Use of the Finder program to provide the desktop
  - Superior Plug and Play capabilities
  - Excellent support for multitasking

Linux

- Variation on UNIX
- OS kernel and source code freely distributed
- Many popular distributions
- Well suited for server applications
  - Sometimes used as a desktop OS
    - Not easy to install, use
    - Fewer applications than Windows, MAC OS
- Used on netbooks (Small footprint)
- Embedded operating system on mobile devices
- Excellent training tool for learning Unix

How Windows 2000/XP/Vista Works

- Windows 2000, XP, Vista
  - Three evolutions
    - Same basic operating system
  - Many things in common
    - Way they are built
    - Main components
    - User interface
    - Other interfaces
    - Four main functions

What an Operating System Does

- Four functions common to all operating systems
  - Providing a user interface
  - Managing files
  - Managing applications
  - Managing hardware

Components of Windows

- Shell: relates to the user and to applications
- Kernel: responsible for interacting with hardware
- Configuration data
  - Information OS keeps about hardware, applications, data, users
- Shell made up of subsystems
  - Operate in user mode
    - Subsystems have limited access to system information and can access hardware only through other OS services
  - Win32 security subsystem

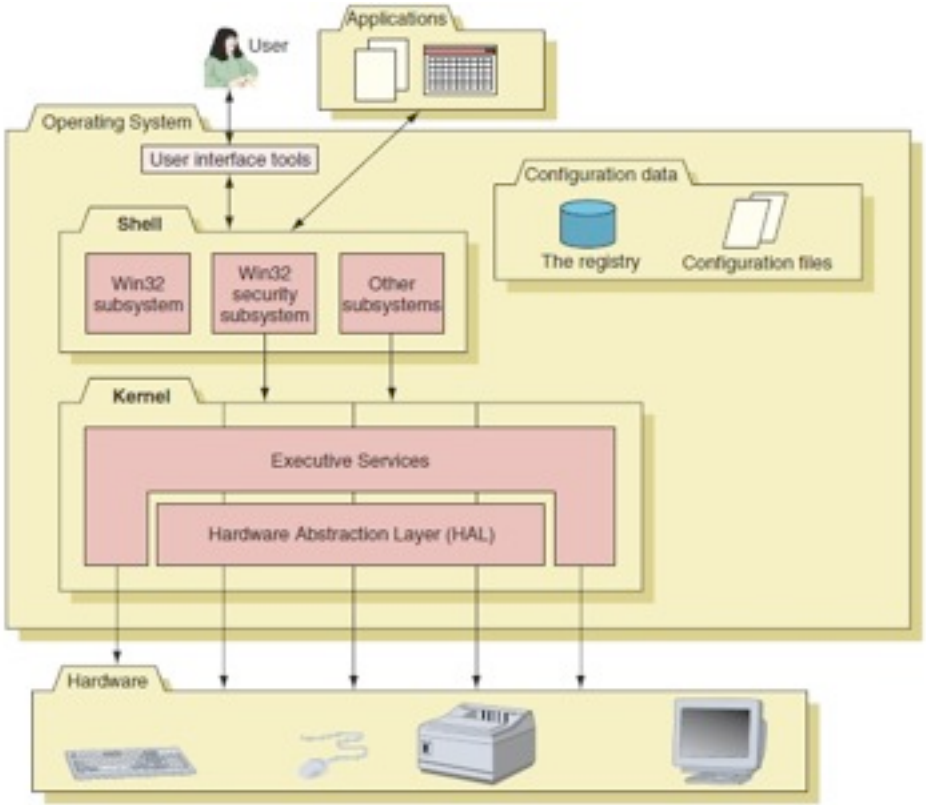

Figure 2-10 Inside an operating system, different components perform various functions
Courtesy: Course Technology/Cengage Learning

Components of Windows (cont'd.)

- Windows kernel
  - More power to communicate with hardware devices than the shell has
  - Operates in kernel mode
  - Applications cannot get to hardware devices without the shell passing those requests to the kernel
  - Two main components
    - The HAL (hardware abstraction layer)
    - Executive services interface

Components of Windows (cont'd.)

- Configuration data
  - Used when OS first loaded and when needed by hardware, applications, users
  - Stored in:
    - Registry
    - Initialization files

How Windows Manages Applications

- Launching an application
  - Move from hard drive into memory
- Process
  - Program running, together with the system resources assigned to it
  - Request resources through Win32 subsystem
    - Called a thread
- Thread
  - Single task
- Multitasking

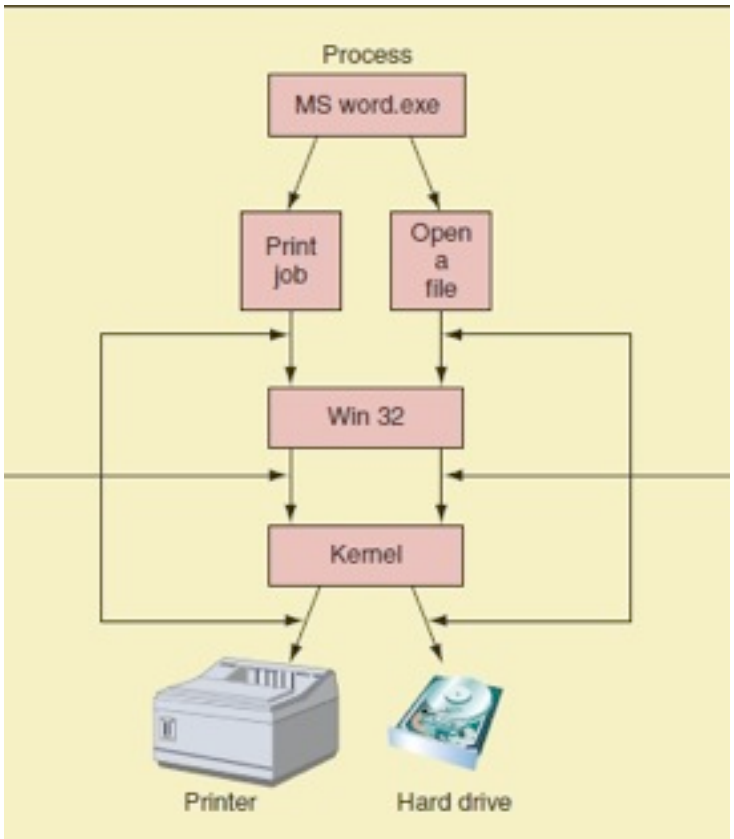

Figure 2-11 A process with two threads
Courtesy: Course Technology/Cengage Learning

How Windows Manages Hardware

- Device drivers
  - Small programs stored on the hard drive
  - Allow kernel to communicate with hardware
  - Provided by OS, vendors
- At system startup:
  - BIOS provides instructions to the CPU for device communication
- Drivers written to work for a specific OS
- Four types of software
  - Operating system, applications, device drivers, BIOS

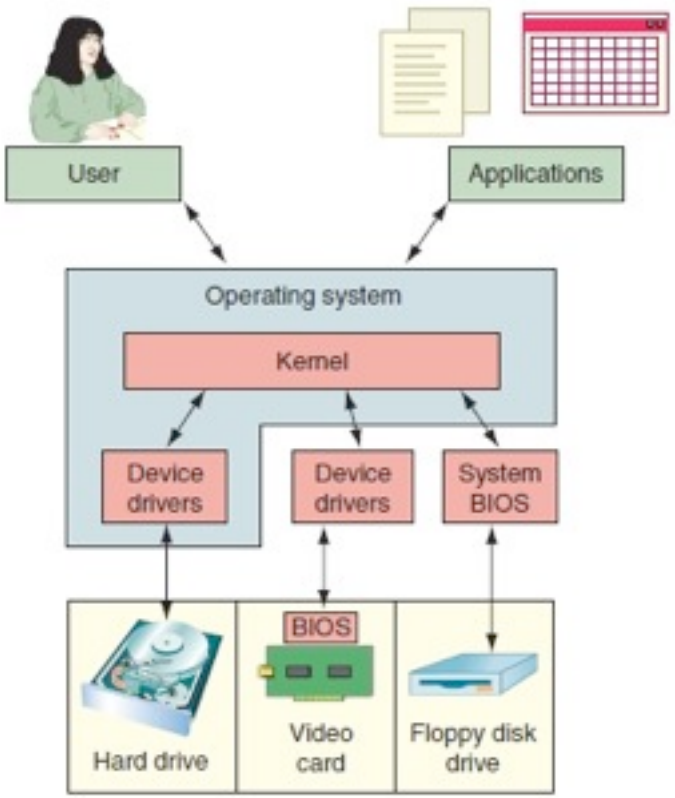

Figure 2-12 An OS relates to hardware by way of device drivers and possibly system BIOS
Courtesy: Course Technology/Cengage Learning

How Many Bits At A Time?

- Central Processing Unit (CPU)
  - Also called a processor
  - Partly determines which operating system can be installed
- Major consideration
  - Number of bits CPU processes at a time
  - Intel or AMD desktop and laptop processors sold today
    - Process 64 bits at a time
  - Older processors handled only 32 bits

How Many Bits At A Time? (cont'd.)

- 32-bit processors
  - x86 processors
    - Intel used the number 86 in the model number of these earlier processors
- Processors using underlying 32-bit processing with 64-bit instructions
  - Hybrid processors known as x86-64 bit processors
  - Handle a 32-bit OS or a 64-bit OS
- 64-bit processors
  - Fully implement 64-bit processing
    - Intel Itanium and Xeon processors

How Many Bits At A Time? (cont'd.)

- Windows 2000: 32-bit OS
- Windows XP Professional x64 Edition: 64-bit OS
  - All other Windows XP editions: 32-bit OSs
- Vista Home Basic, Home Premium, Business, Enterprise, Ultimate editions
  - 32-bit or 64-bit versions
- Modern desktop, laptop processors today
  - Can handle either a 32-bit or 64-bit OS
    - Sometimes referred to as an x86 or x64 OS

How Many Bits At A Time? (cont'd.)

- Discussion points
  - 64-bit processing is faster than 32-bit processing
  - 64-bit OS requires that device drivers operating in kernel mode be 64-bit drivers
  - Application is compiled to process 64 bits or 32 bits
  - 32-bit OS can only address up to 4 GB of memory
  - Benefit from 64-bit computing if:
    - Many applications open at the same time
    - You have high computing needs and enough hard drive space and memory

Using Windows 2000/XP/Vista

- PC support technician
  - Needs to be a Windows power user
- Technician knowledge required
  - How Windows desktop organized and how it works
  - How to use Windows utilities
    - My Computer, Windows Explorer, Control Panel, System Information, Command Prompt window

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- 5. The term _____ refers to one or more characters following the last period in a filename.
- Answer: file extension

The Windows Vista Desktop

- Primary tool provided by the Windows shell
- Start menu
  - Username shown at the top right
  - Applications at the top left
    - "pinned" to the menu
  - Applications used often
    - Listed below the pinned applications (can change)
  - User-oriented applications
    - In the white column on the left side
  - Use files and OS utilities
    - Entries in the black column on the right side

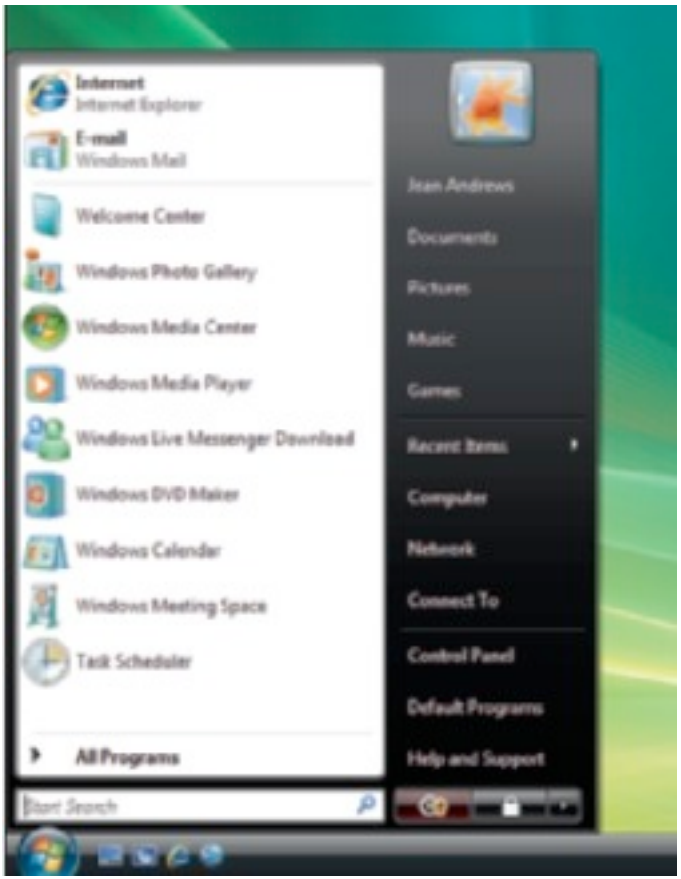

Figure 2-15 The Vista desktop and Start menu
Courtesy: Course Technology/Cengage Learning

The Windows Vista Desktop (cont'd.)

- Vista sidebar and gadgets
  - New with Windows Vista
  - Windows Sidebar Properties box used to:
    - Start the sidebar each time Windows starts
    - Decide where sidebar appears
    - Remove gadgets in sidebar
- Four ways to launch an application
  - Use the Start menu
  - Use the Search box
  - Use Windows Explorer or the Computer window
  - Use a shortcut icon

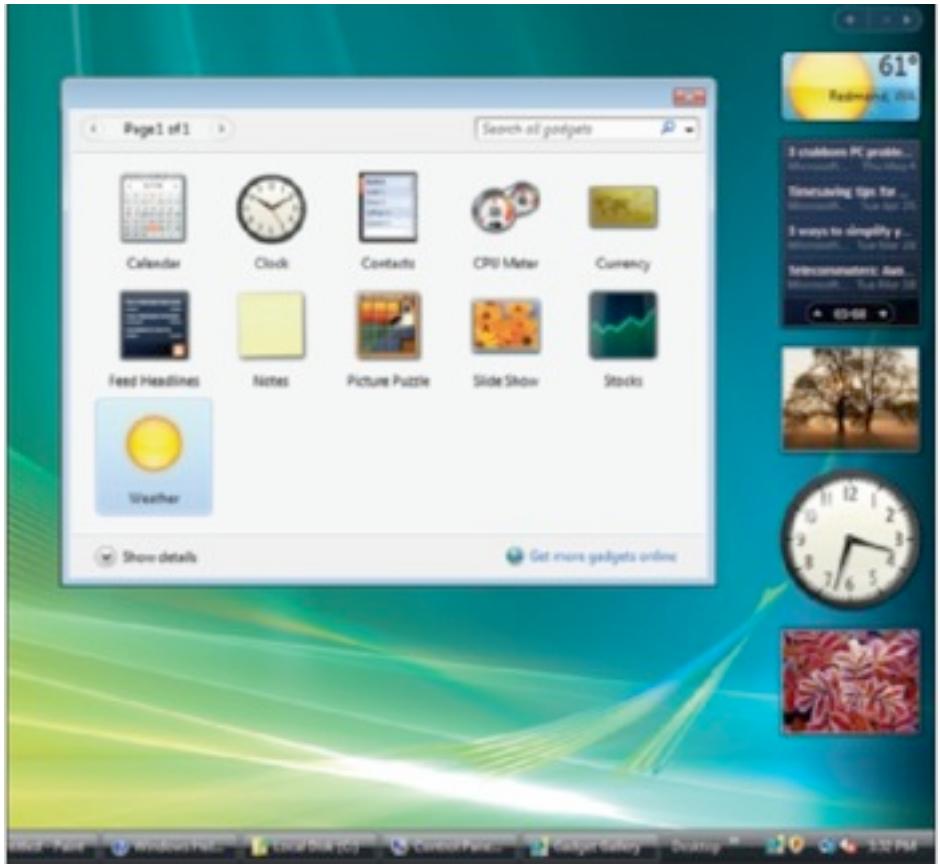

Figure 2-16 Windows Sidebar can be customized with installed and downloaded gadgets
Courtesy: Course Technology/Cengage Learning

The Windows Vista Desktop (cont'd.)

- Taskbar
  - Bottom of Windows desktop
    - Information about open programs, quick access to others
    - Quick launch icons
  - Notification (system tray or systray)
  - Service: program that runs in the background
    - Supports or serves Windows or an application
  - Right-click the taskbar, use the shortcut menu
    - Control Start menu, taskbar, notification area, open applications

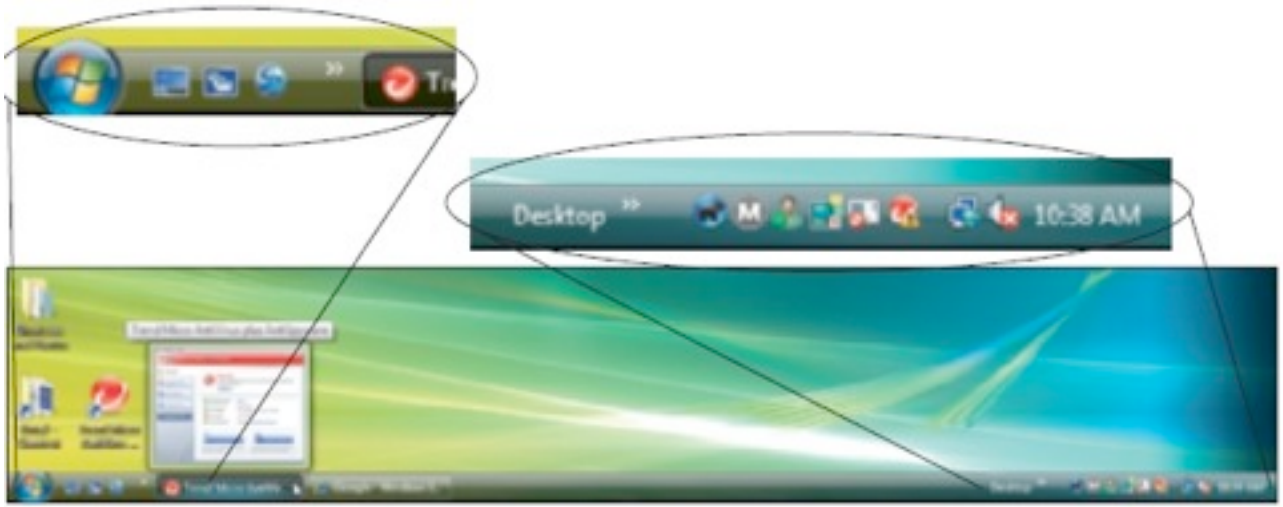

Figure 2-21 The Windows Vista taskbar with a thumbnail of one open application
Courtesy: Course Technology/Cengage Learning

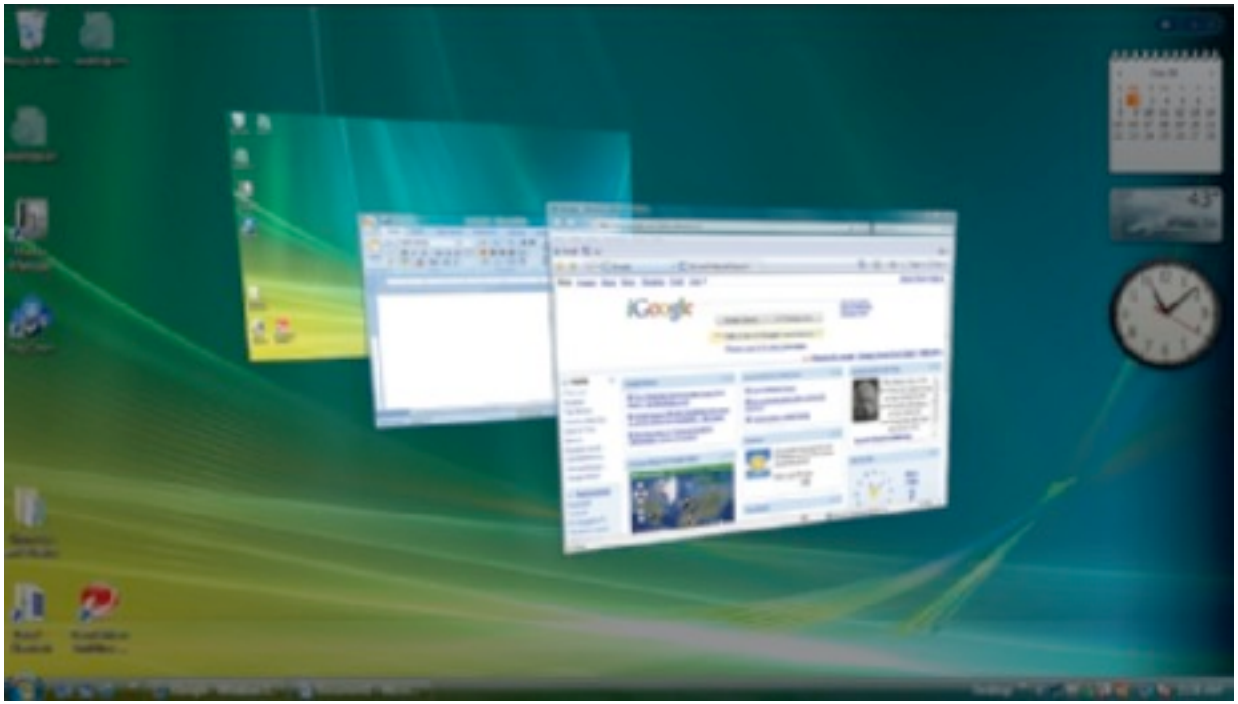

Figure 2-22 Press Win+Tab to view open applications in a flip 3D view when using the Vista Aero interface
Courtesy: Course Technology/Cengage Learning

The Windows Vista Desktop (cont'd.)

- Personalize the Windows desktop
  - Right-click anywhere on the desktop
    - Choose Personalize from the shortcut menu
- Default programs and file associations
  - Located in right column of the Start menu
  - Can change default programs associated with certain file extensions and activities
  - File extension
    - One or more characters following the last period in a filename

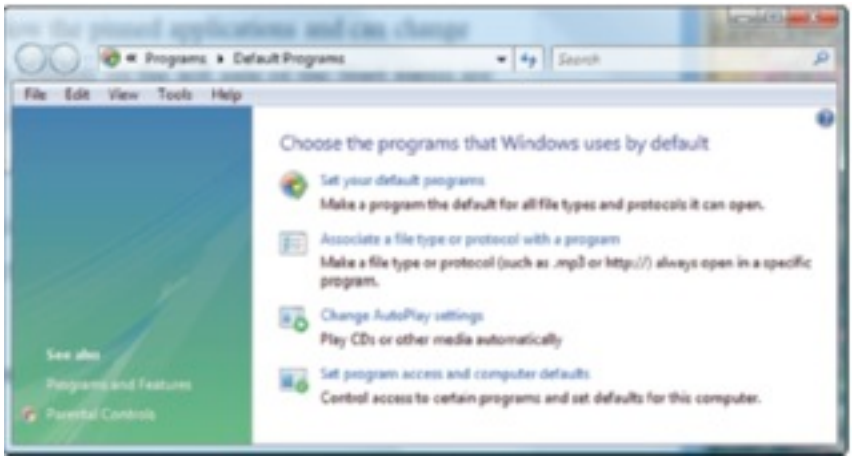

Figure 2-25 The Default Programs window is used to change file associations
Courtesy: Course Technology/ Cengage Learning

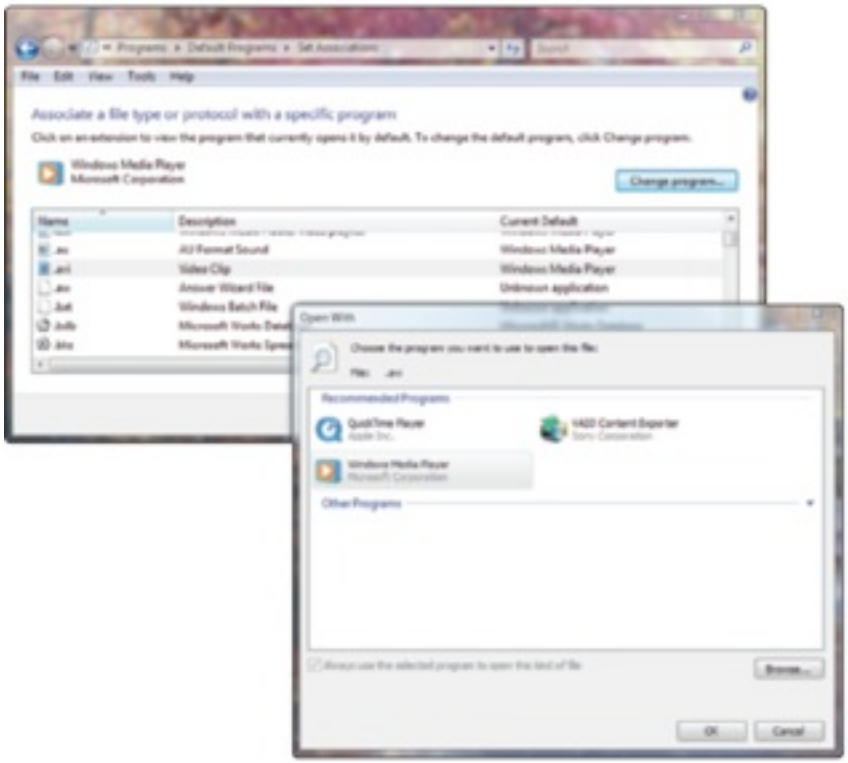

Figure 2-26 Select the default program to play an .avi video file
Courtesy: Course Technology/Cengage Learning

Differences In The Windows XP/2000 Desktop and The Vista Desktop

- Point to All Programs
  - List of currently installed software appears
- System tools
  - Back up data, clean up a hard drive, schedule tasks, restore Windows settings, various other things
  - New Vista tool
    - Internet Explorer (No Add-ons)
- Controlling Windows appearance
  - Vista uses Personalization window
  - Windows XP/2000 uses the Display Properties window

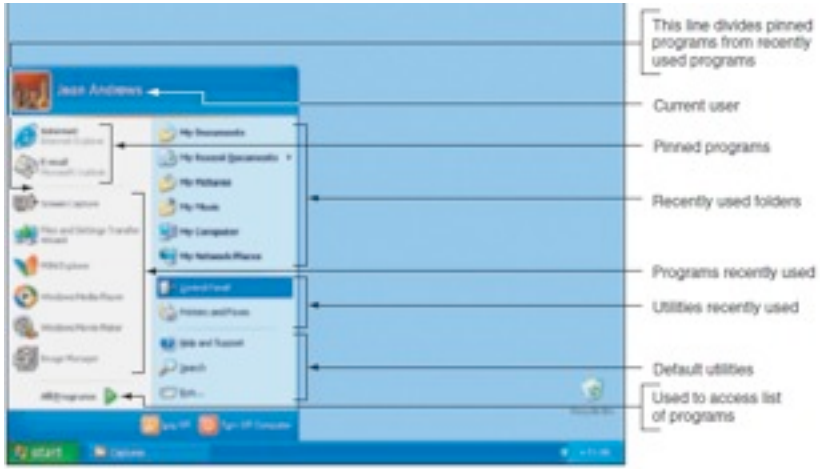

Figure 2-27 The Windows XP desktop and Start menu
Courtesy: Course Technology/ Cengage Learning

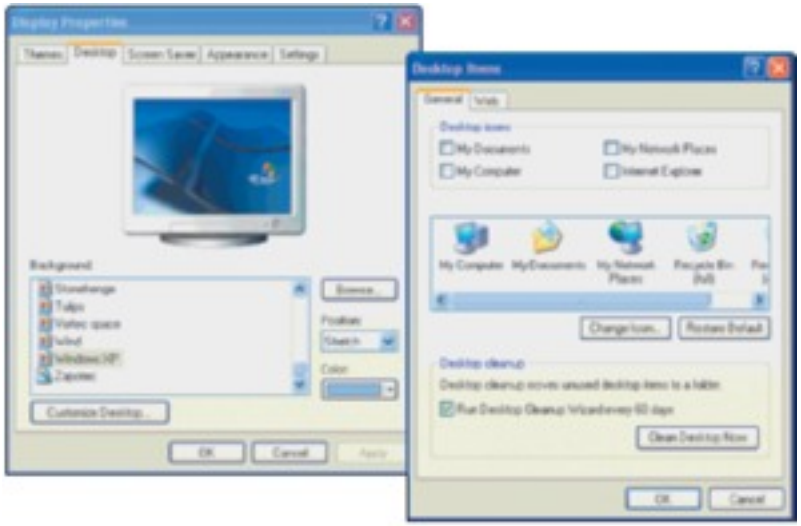

Figure 2-29 Windows XP Display Properties window lets you change settings for your desktop
Courtesy: Course Technology/ Cengage Learning

Differences In The Windows XP/2000 Desktop and The Vista Desktop (cont'd.)

- Vista user account control (UAC) box
  - Appears when action requires administrative privileges
  - Two Vista account types
    - Administrator account, standard account
  - Purposes
    - Prevent malicious background tasks from doing harm
    - Allow administrator to use less powerful account
  - Can be disabled
  - Uses color codes
    - Red, yellow, green, grey

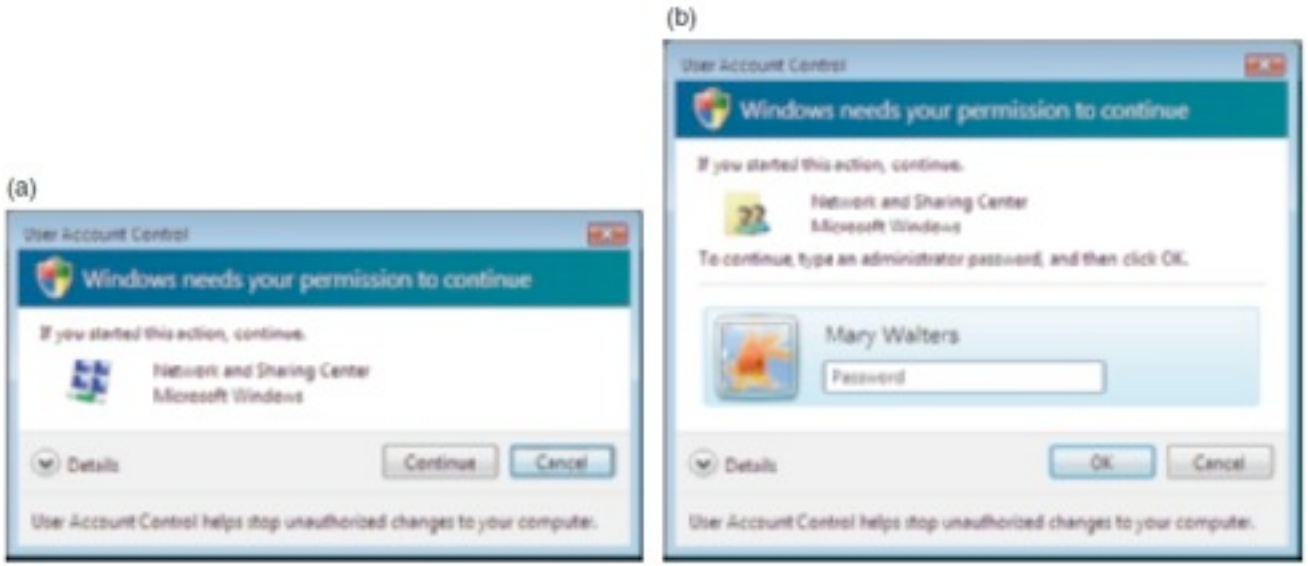

Figure 2-30 The User Account Control box appears each time a user attempts to perform an action requiring administrative privileges: (a) the current account has administrative privileges; (b) the current account does not have administrative privileges
Courtesy: Course Technology/Cengage Learning

Windows Explorer And The Computer Window

- Two most useful tools to explore files and folders
- Access Computer or My Computer window
  - Windows Vista: click Start and click Computer
  - Windows XP: click Start and click My Computer
  - Windows 2000: double-click My Computer on the desktop
- Open Windows Explorer
  - Right-click Computer or My Computer and select Explore from the menu
  - Right-click Start and select Explore from the menu

Windows Explorer And The Computer Window (cont'd.)

- Files and directories
- Drives organized with single root directory
  - At top of the top-down hierarchical structure of subdirectories
  - Exception: hard drive
    - Divided into partitions
    - Each volume has its own root directory and hierarchical structure of subdirectories

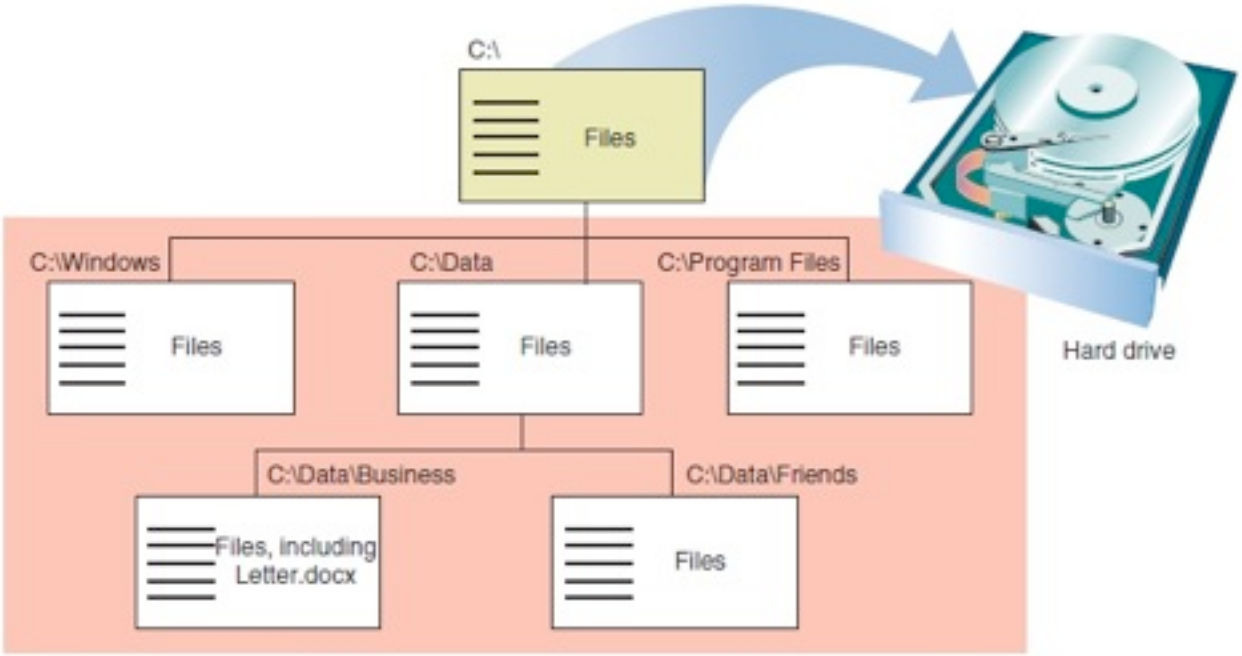

Figure 2-33 Storage devices such as a USB drive, CD, or hard drive, are organized into directories and subdirectories that contain files
Courtesy: Course Technology/Cengage Learning

Windows Explorer And The Computer Window (cont'd.)

- Files and directories (cont'd.)
- Path: location of a file referenced by a drive and directories

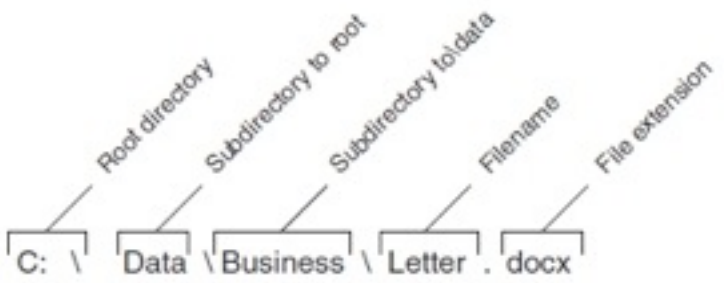

Figure 2-34 The complete path to a file includes the volume letter, directories, filename, and file extension; the colon, backslashes, and period are required to separate items in the path
Courtesy: Course Technology/Cengage Learning

Windows Explorer And The Computer Window (cont'd.)

- Tips to navigate the directory structure
  - Double-click to drill down to subfolders inside folders
  - Right-click heading bar controls what information appears
  - Use top of the left pane in the Favorite Links area
  - Find a folder or file using the Search box (Vista)
  - Use forward and back arrows (Vista)
- Default layout for files and folders
  - %SystemDrive%\Users folder
  - %SystemDrive%\Documents and Settings folder

Windows Explorer And The Computer Window (cont'd.)

- Changing folder options
  - Controls how users view files in a folder, what users can do with the files
  - File extension
    - Used to identify file types (Windows)
    - Default: hide file types
    - Can view hidden files and file extensions

Windows Explorer And The Computer Window (cont'd.)

- Methods to create a file
  - Use a particular application
  - Use Windows Explorer or the Computer window

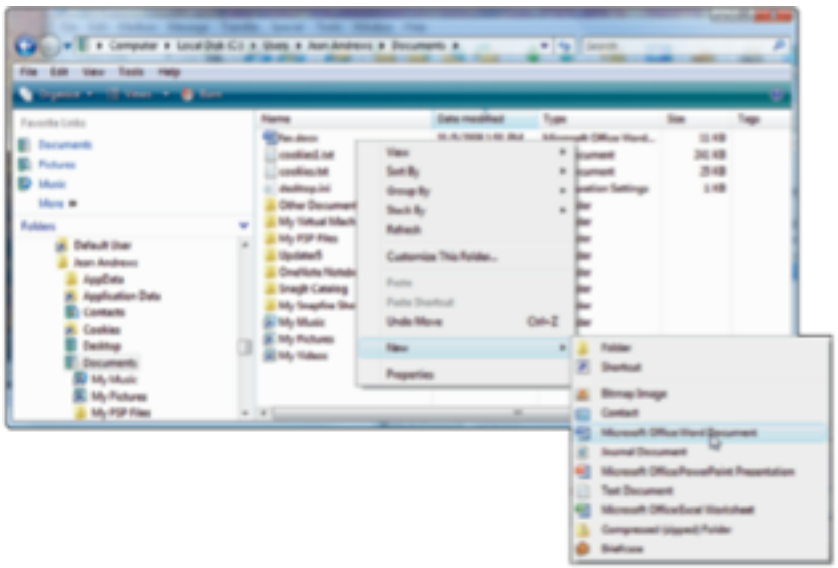

Figure 2-37 Create a new file using Windows Explorer
Courtesy: Course Technology/Cengage Learning

Windows Explorer And The Computer Window (cont'd.)

- Create a folder
  - Select parent folder
    - Right-click in the white area of the right pane
    - Select New from the shortcut menu
    - Select one of three choices for folder types
    - Make a selection
    - Folder is created and highlighted so that it may be renamed
  - Can create folders within folders within folders
  - Windows desktop is itself a folder

Windows Explorer And The Computer Window (cont'd.)

- Copy or delete files or folders
  - Copy
    - Right-click file, select Copy from the shortcut menu
    - Click in folder white area where the copied item goes
    - Select Paste from the shortcut menu
  - Alternative way to copy
    - Drag and drop item to its new location
  - Delete
    - Using Explorer, right-click the file or folder, select Delete from the shortcut menu
  - Recycle bin does not really delete files

Windows Explorer And The Computer Window (cont'd.)

- Change file attributes
  - Use the Properties window

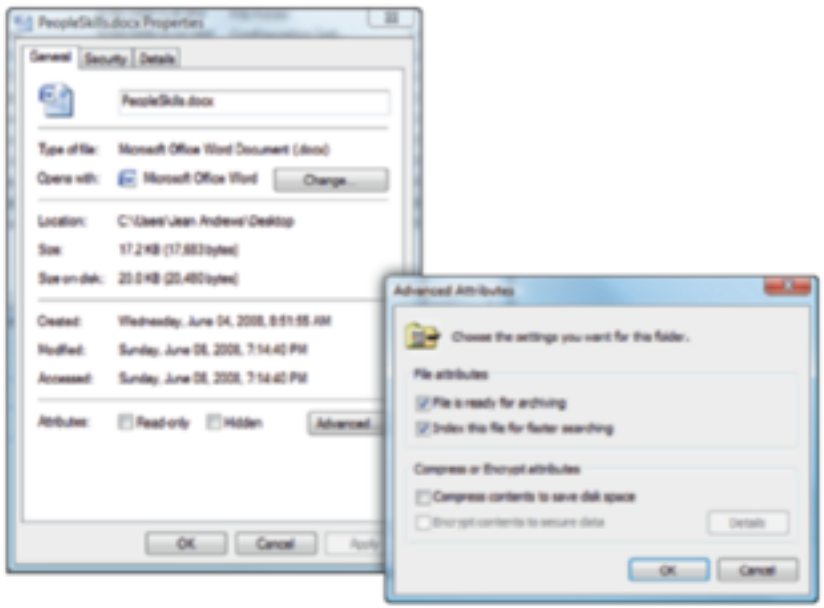

Figure 2-39 Properties of a file in Windows
Courtesy: Course Technology/Cengage Learning

The Control Panel

- Contains applets used to manage the system
- Accessing Control Panel in Vista and XP
  - Click Start and the click Control Panel
- Two views: Category View and Classic View
- Applets can be accessed directly
  - Launched using the Vista Start dialog box (Run dialog box in Windows 200/XP)
  - Example: enter Main.cpl to open Mouse Properties

System Information Utility

- Used to view detailed information about the system
- Important features
  - Processor or BIOS version installed
  - RAM is installed
  - OS installation directory
  - Hard drive size
  - Names of currently running drivers
- Open utility in Vista
  - Click Start, and enter Msinfo32.exe in the Start box and press Enter

Command Prompt Window

- Used to enter multiple commands to perform a variety of tasks
- Ways to open
  - Vista Start box or Windows 2000/XP Run box
    - Enter cmd.exe and press Enter
  - Click Start, All Programs, Accessories, and Command Prompt
- Clear text: type cls
- Close the window
  - Type exit and press Enter or click the X close window icon in the upper-right corner of the window

Command Prompt Window (cont'd.)

- Two levels of command prompt windows
  - Standard window and elevated window

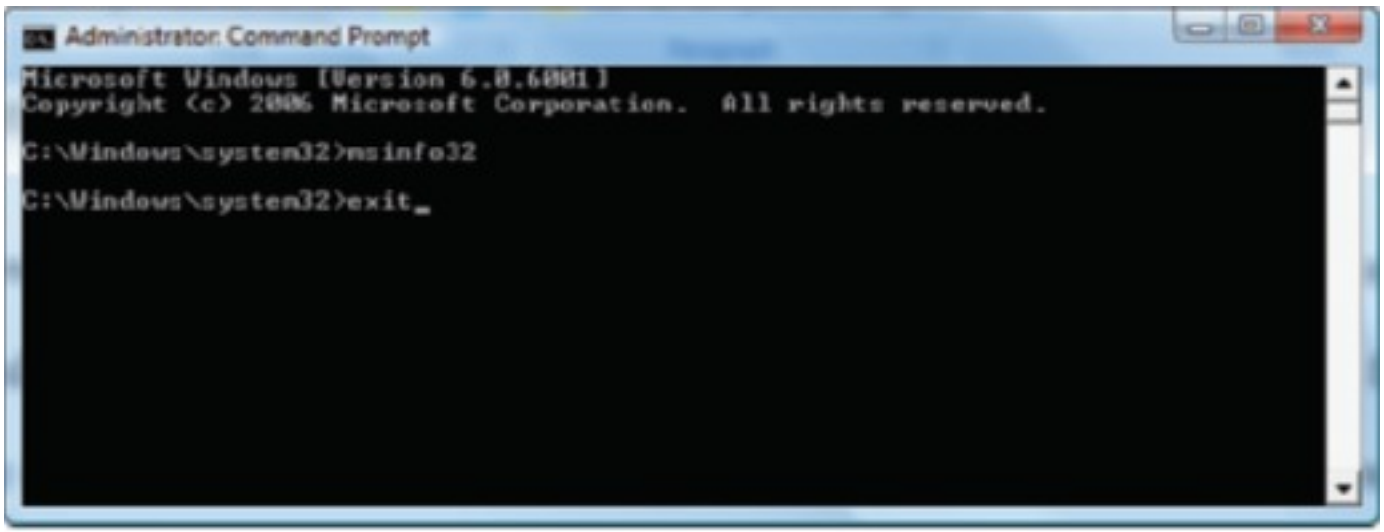

Figure 2-44 An elevated command prompt window
Courtesy: Course Technology/Cengage Learning

Summary

- OS manages system resources for users and applications
- Many operating systems have evolved over time
- Operating systems
  - Divided into a kernel and user shell
  - Provide user interface, manage files, manage applications, manage hardware
- Tools
  - Windows desktop, Windows Explorer, System Properties, Control Panel, Device Manager, System Information, Windows Help