

Introduction to Information Technology

Lecture 5

IT 111

Operating Systems and Utility Programs

Prepared by
Dr. Eng. Youssef Ntefeh

Learning Objectives

1. Understand the difference between system software and application software.
2. Explain the different functions of an operating system and discuss some ways that operating systems can enhance processing efficiency.
3. List several ways in which operating systems differ from one another.
4. State several devices other than personal computers and servers that require an operating system and list one possible operating system for each type of device.

Learning Objectives

6. Discuss the role of utility programs and outline several tasks these programs perform.
7. Describe what the operating systems of the future might be like.

System Software and Application Software

- System software: The operating system and utility programs that control a computer system and allow you to use your computer.
 - Enables the boot process, launches applications, transfers files, controls hardware configuration, manages hard drive, and protects from unauthorized use.
- Application software: Programs that allow a user to perform specific tasks on a computer.
 - Word processing, playing a game, preparing taxes, browsing the Web, and so forth.

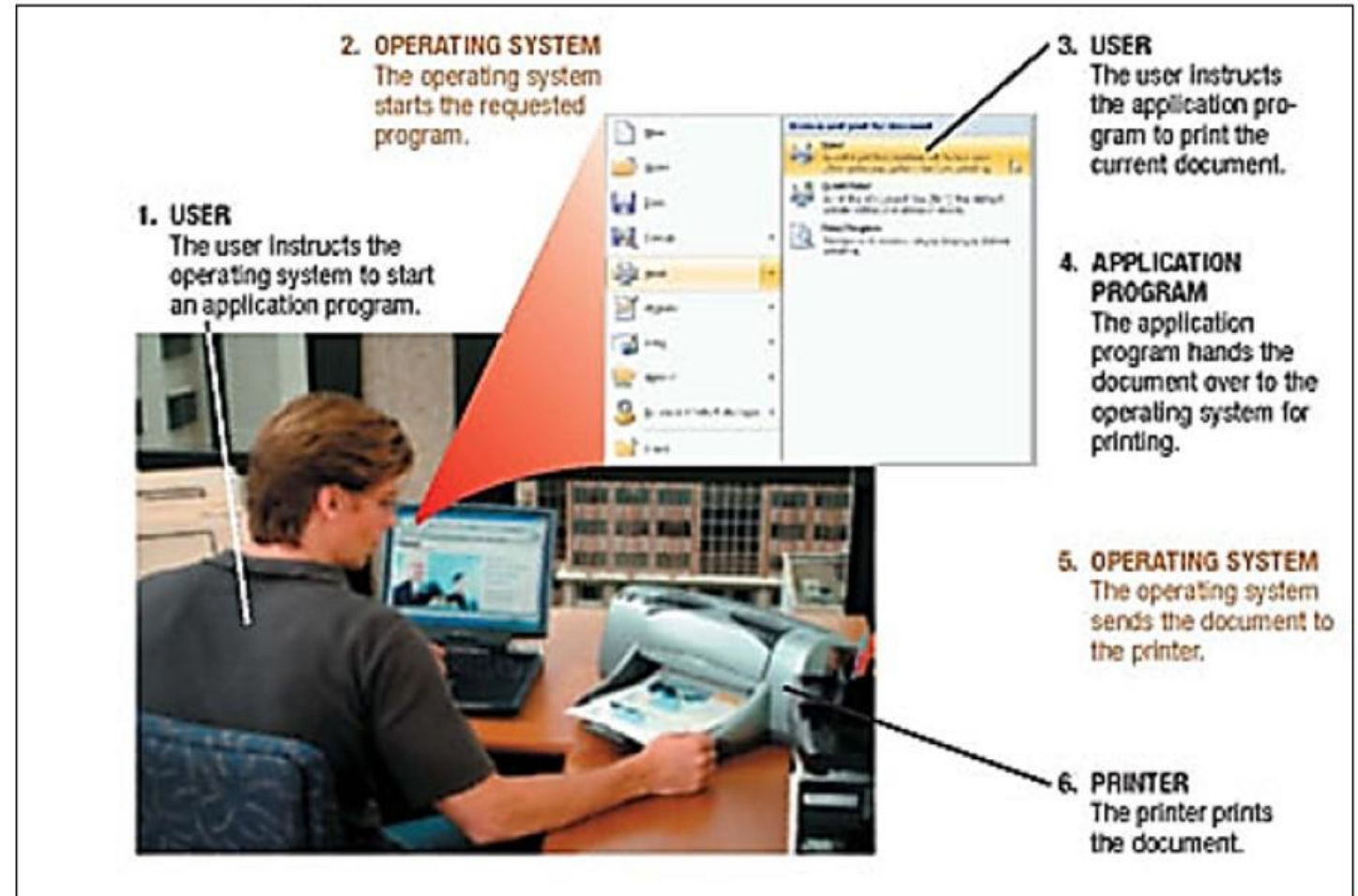


making IT simple

DEFINATION

The Operating System

- Operating system: A collection of programs that manage and coordinate the activities taking place within a computer system.
 - Acts as an intermediary between the user and the computer.



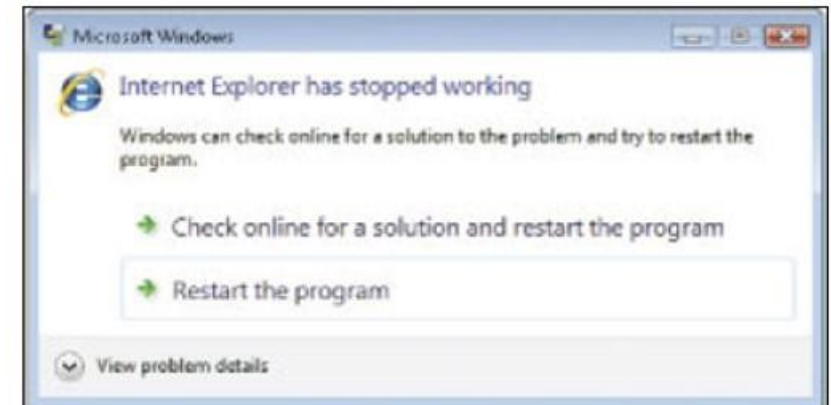
Functions of an Operating System

- Process management
- Managing resources and jobs
 - Makes resources available to devices.
 - Monitors for problems.
 - Scheduling routines.
- Memory management
- File management
 - Keeps track of files stored on computer.
 - Hierarchical format.

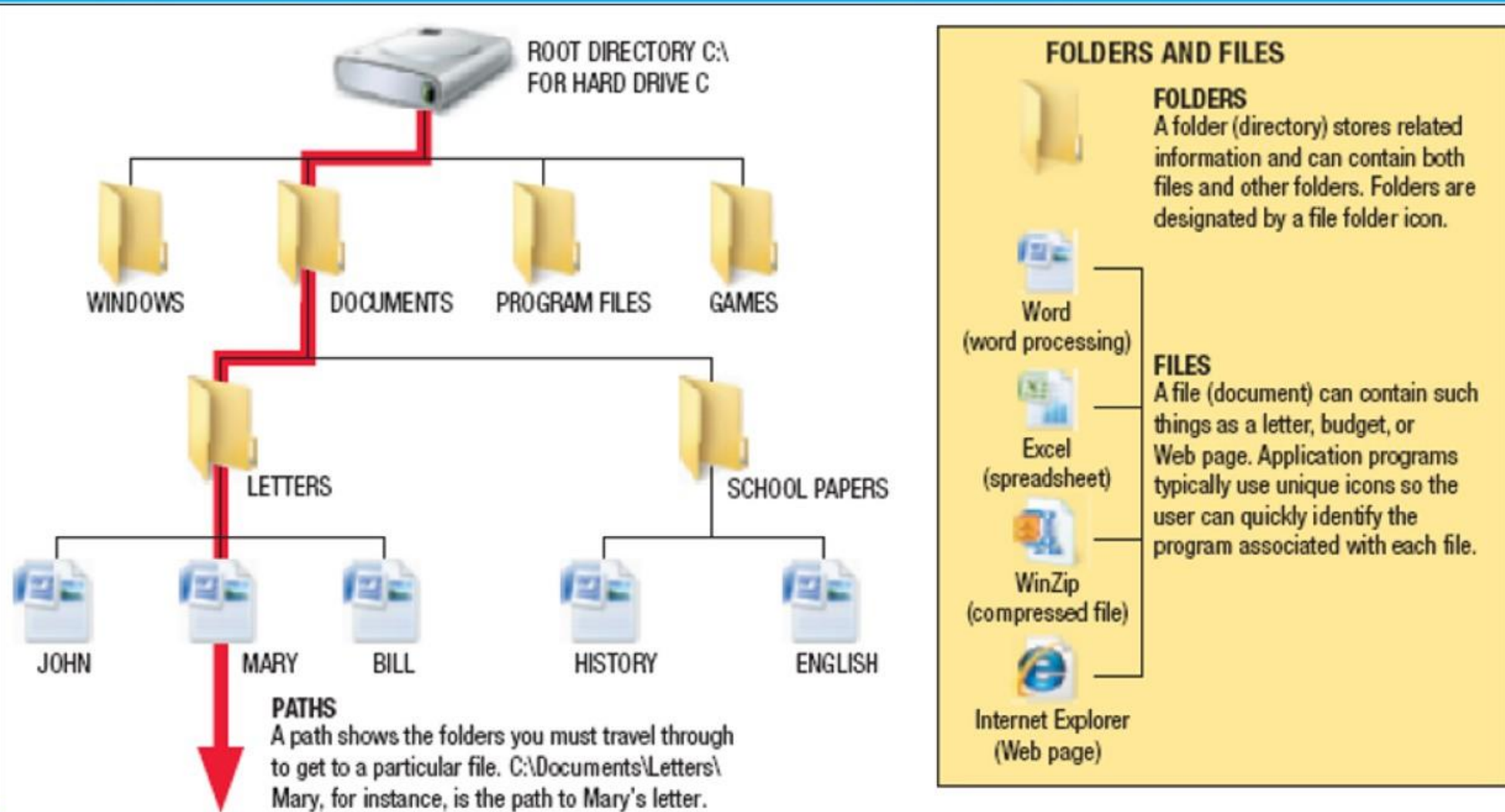


Functions of an Operating System

- Network management.
- I/O devices management.
- Configuring devices
 - Device drivers are often needed; can be reinstalled if needed.
 - Plug and Play devices are recognized automatically.
- Security
 - Passwords.
 - Biometric characteristics.
 - Firewalls.
- Booting the computer.



File Management



- Multitasking: The ability of an operating system to have more than one program (task) open at one time
 - CPU rotates between tasks.
 - Switching is done quickly.
 - Appears as though all programs executing at the same time.

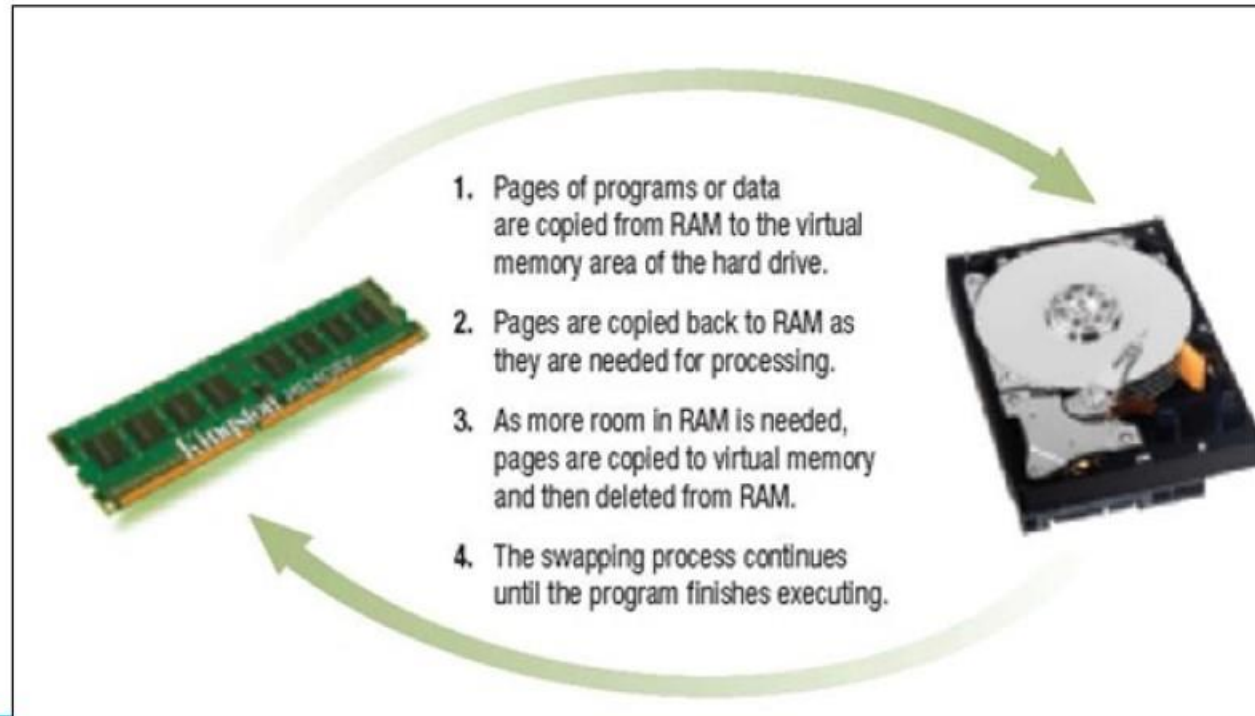
Processing Techniques for Increased Efficiency

- Multiprocessing and parallel processing: Multiple processors (or multiple cores) are used in one computer system to perform work more efficiently.
 - Simultaneous processing: Performs tasks at the same time.
 - Multiprocessing: Each CPU (or core) typically works on a different job.
 - Used with personal computers with multi-core processors.
 - Parallel processing: CPUs or cores typically work together to complete one job more quickly.
 - Used with servers and mainframes.

CPU vs. Core

- The main difference between CPU and Core is that the CPU is an electronic circuit inside the computer that carries out instruction to perform arithmetic, logical, control and input/output operations while the core is an execution unit inside the CPU that receives and executes instructions.

- Memory management: Optimizing the use of main memory (RAM)
 - Virtual memory: Memory-management technique that uses hard drive space as additional RAM.





Differences Among Operating Systems

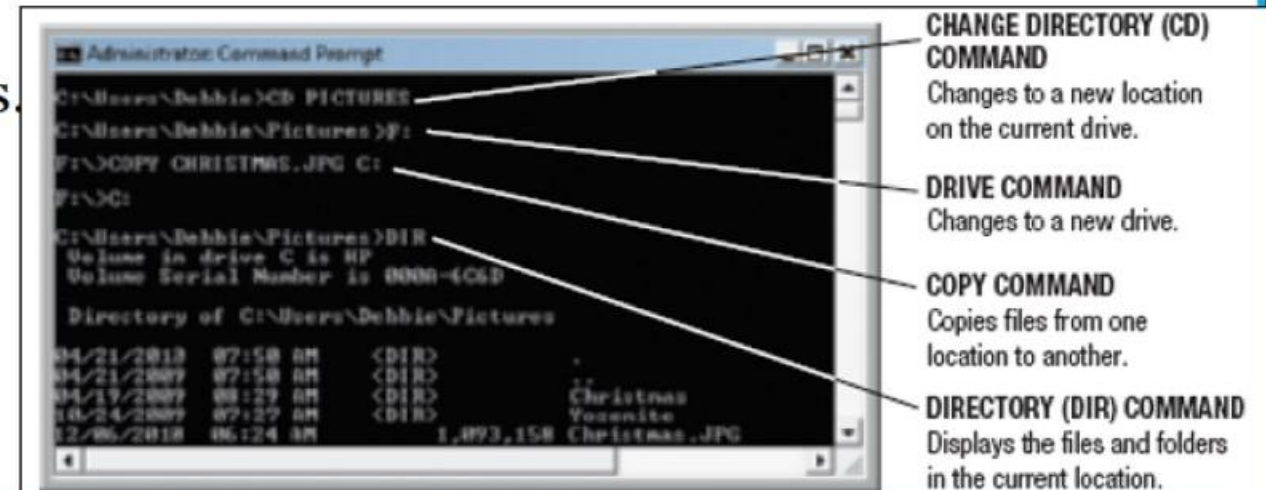
- Personal vs. server operating system
 - Personal operating system: designed to be installed on a single computer.
 - Server operating system: designed to be installed on a network server.
 - Client computers still use a personal operating system.
 - Server operating system controls access to network resources.
 - Many operating systems come in both versions.
- Mobile and embedded operating systems also exist.

Differences Among Operating Systems

- Types of processors supported
 - Desktop, mobile, server, etc.
- Number of processors.
- 32-bit or 64-bit CPUs.
- Support for other technologies:
 - New types of buses.
 - Power-saving features.
 - Touch and gesture input.

Operating Systems for Personal Computers and Servers

- DOS: Disk Operating System.
 - PC-DOS: Created originally for IBM microcomputers.
 - MS-DOS: used with IBM-compatible computers.
 - DOS traditionally used a command-line interface.
 - Can enter DOS commands in Windows.



C:\>_

- Windows: The predominate personal operating system developed by Microsoft Corporation.
 - Windows 1.0 through Windows 3.x: Operating environments for DOS.
 - Windows 95 and Windows 98: Used a similar GUI to the one used with Windows 3.x
 - Windows NT (New Technology): first 32-bit version of Windows designed for high-end workstations and servers.
 - Windows Me (Millennium Edition): designed for home computers, improved home networking and a shared Internet connection.

- Windows 2000: replaced Windows NT; was geared towards high-end business workstations and servers, support for wireless devices.
- Windows XP: Replaced both Windows 2000 and Windows Me.
 - Improved photo, video, and music editing and sharing.
 - Improved networking capabilities .
 - Support for handwriting and voice input.
 - Large user base, MS will support until 2014.

- Windows Vista: Replaced Windows XP
 - Transparency and animations.
 - Live Thumbnails
- Additional features
 - Sidebar, Instant Search, etc..
- The Vista Start menu is more streamlined.
- Improved networking and multimedia.
- Built-in security features.
- Hardware requirements for Vista have increased over earlier versions of Windows.

- Windows 7: best version of Windows released Oct. 2009
 - 32-bit and 64-bit versions in four editions.
 - Home Premium (primary version for home users).
 - Professional (primary version for businesses).
 - Starts up and responds faster than Vista.
 - Will run well on netbooks, unlike Vista.
 - Improved home networking (HomeGroup, etc.).

- Mac OS: Proprietary operating system for computers made by Apple Corporation
 - Based on the UNIX operating system; originally set the standard for graphical user interfaces

- UNIX: Operating system developed in the late 1960s for midrange servers.
 - Multiuser, multitasking operating system.
 - More expensive, requires a higher level of technical knowledge; tends to be harder to install, maintain, and upgrade.
 - “UNIX” initially referred to the original UNIX operating system, now refers to a group of similar operating systems based on UNIX.
 - Single UNIX Specification: A standardized UNIX environment.



- Linux: Version (flavor) of UNIX available without charge over the Internet
 - Increasingly being used with personal computers, servers, mainframes, and supercomputers.
 - Is open-source software: has been collaboratively modified by volunteer programmers all over the world.
 - Originally used a command line interface, most recent versions use a GUI.
 - Strong support from mainstream companies, such as Sun, IBM, HP, and Novell.
 - Much less expensive than Windows or Mac OS.

- Windows Mobile: Designed for mobile phones.
 - Look and feel of desktop versions.
- Android: Linux based OS developed by Open Handset Alliance (including Google).

- iPhone OS: Designed for Apple Mobile phones and mobile devices.
- BlackBerry Operating System: Designed for BlackBerry devices.
- Symbian OS: Designed for use with smart phones.



HISTORY OF iOS

(2007 - 2020)

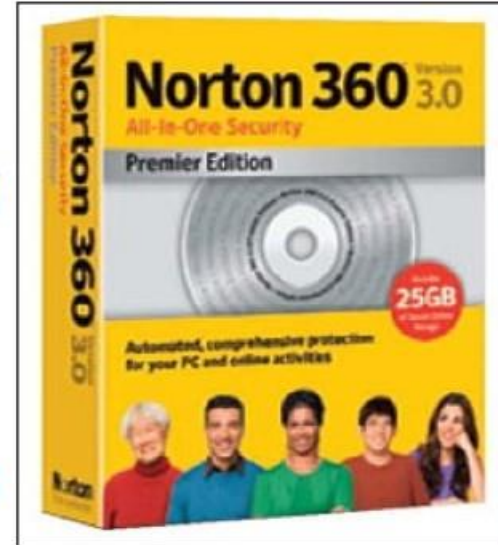


Operating Systems for Larger Computers

- Larger computers sometimes use operating systems designed solely for that type of system.
- IBM's z/OS and i/5OS operating systems are designed for their servers and mainframes.
- Windows, UNIX, and Linux are also used with both mainframes and supercomputers.
- Often a group of Linux computers are linked together to form what is referred to as a Linux supercomputing cluster .

Utility Programs

- Utility program: Software that performs a specific task, usually related to managing or maintaining the computer system.
- Many utilities are built into operating systems (for finding files, viewing images, backing up files, etc.).
- Utilities are also available as stand-alone products and as suites.



File Management Programs

- File management programs: Enable the user to perform file management tasks, such as:
 - Looking at the contents of a storage medium.
 - Copying, moving, and renaming files and folders.
 - Deleting files and folders.
 - File management program in Windows is Windows Explorer.

Use the Organize button to create new folders and copy files and folders.

Use the Back button to go to the previous location.

Use the Views button to specify how the items in the right pane are displayed.

The Address bar shows the current location.

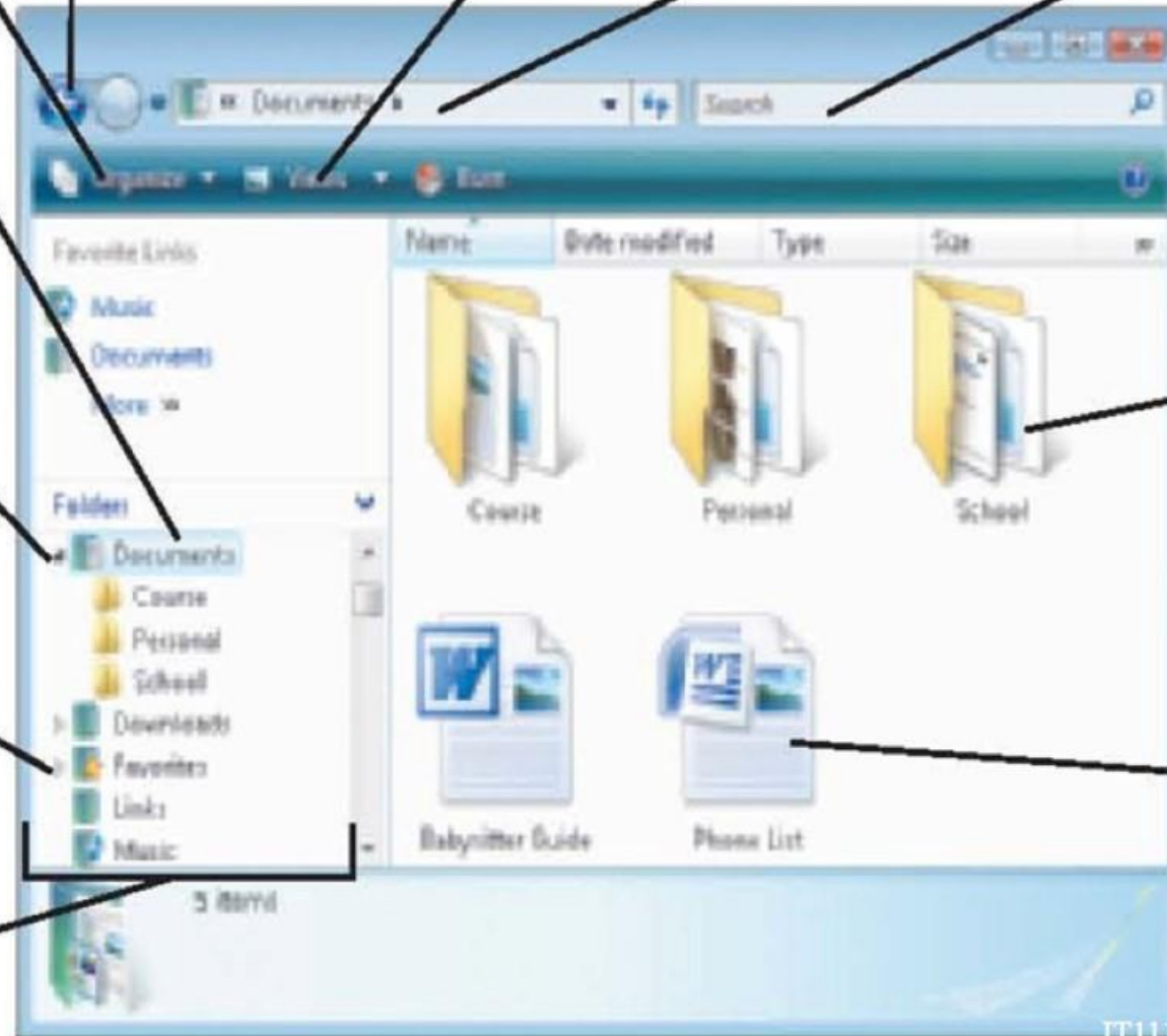
Enter keywords to search for a folder or file meeting the criteria you supply.

Click a drive or folder icon in the left pane to display its contents in the right

Click a dark arrow to close a folder and hide its contents.

Click a clear arrow to open a folder and display its contents.

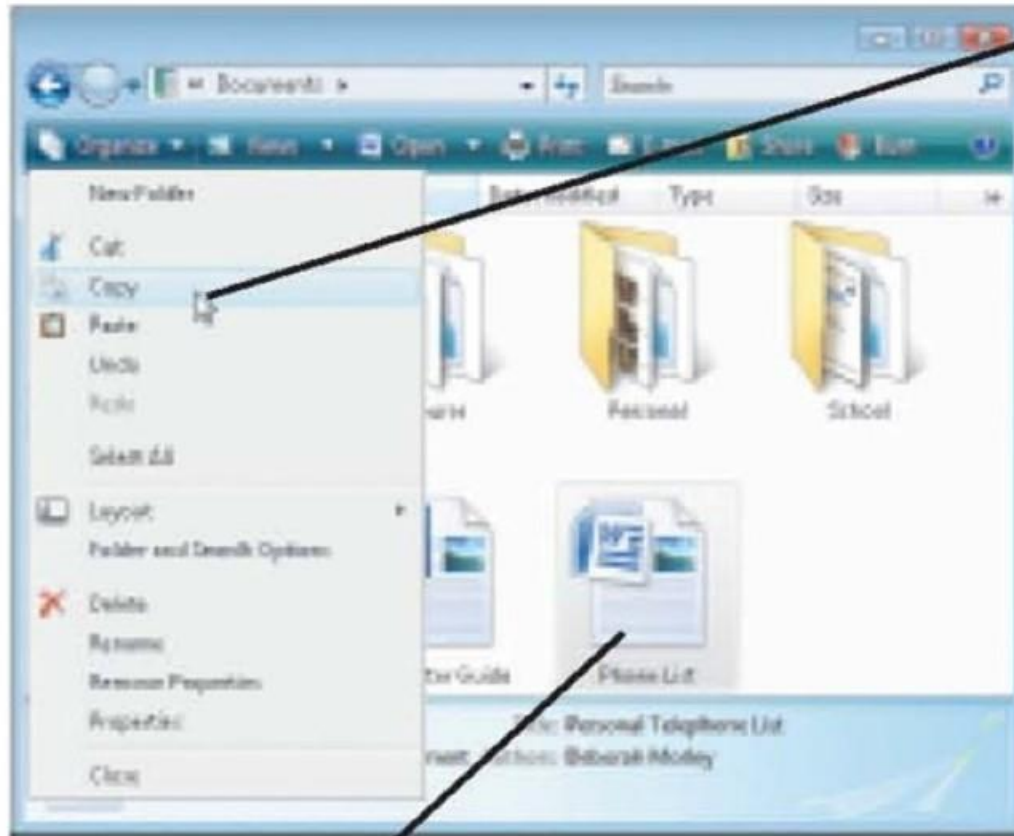
The Navigation pane contains Favorite Links and the Folders list.



Double-click a folder to open it.

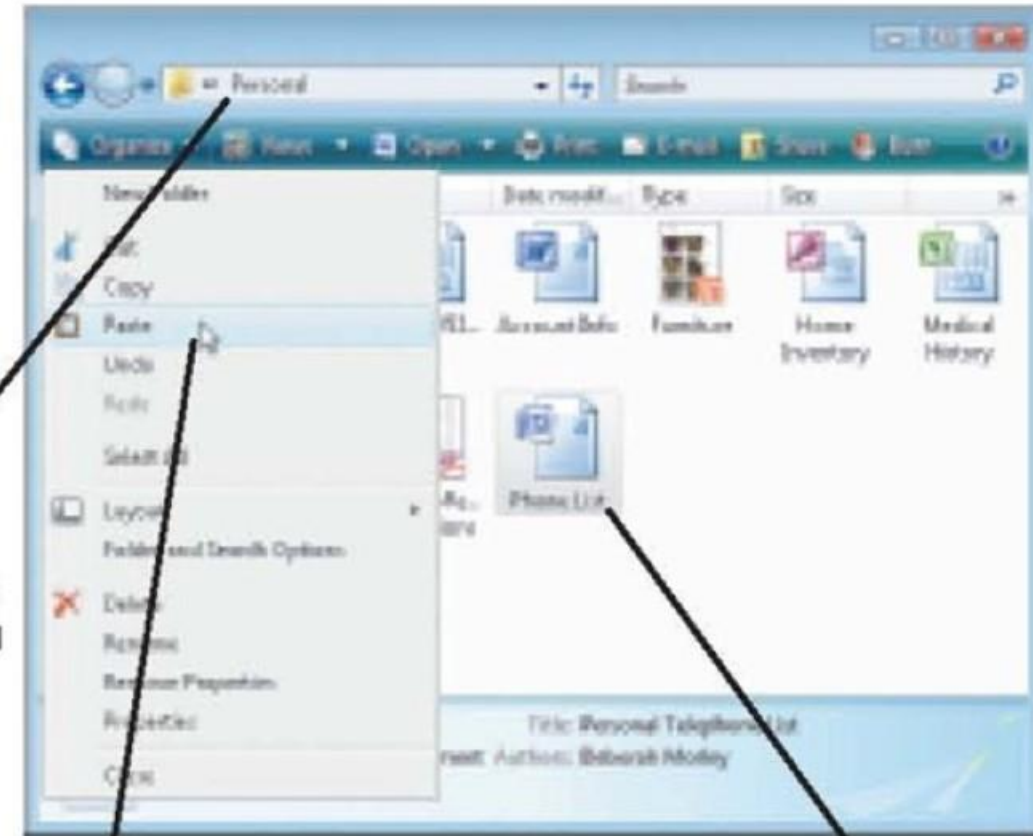
Double-click a document to open it in its associated program.

Using Windows Explorer



1. Navigate to the drive and folder containing the file you want to copy or move, and then select the file.

2. Click the Organize button and select *Copy* to copy the file to the Clipboard.



3. Navigate to the drive and folder where you want the file to go.

4. Click the Organize button and select *Paste* to copy the file to the current location.

5. The file is copied.

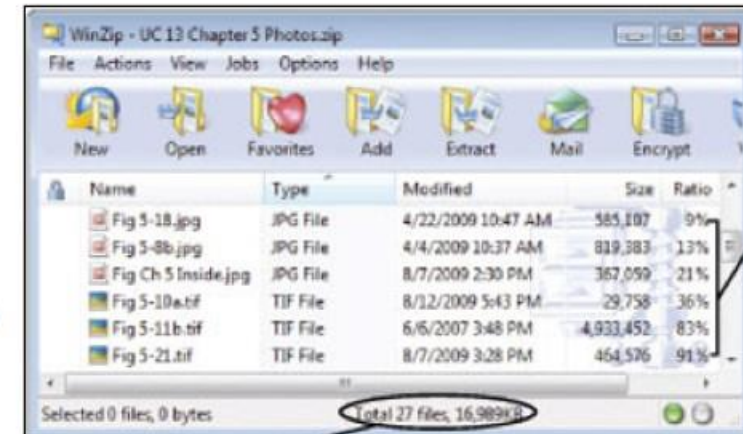
Utility Programs

- Search tools: Designed to search for files on the user's hard drive.
 - Windows includes search tools.
- Diagnostic programs: Evaluate your system and make recommendations for fixing any errors found.
- Disk management programs: Diagnose and repair problems related to your hard drive.
- Uninstall utilities: Remove programs from your hard drive without leaving bits and pieces behind .
 - Important to properly uninstall programs, not just delete them.

Utility Programs

- Clean up utilities: Delete temporary files
- File compression programs: Reduce the size of files so they take up less storage space on a storage medium or can be transmitted faster over the Internet.

- Both zip and unzip files.
- WinZip (Windows users) and Stuffit (Mac users)



The screenshot shows the WinZip interface with a list of files. The status bar at the bottom indicates 'Total 27 files, 16,989,888 bytes'.

Name	Type	Modified	Size	Ratio
Fig 5-18.jpg	JPG File	4/22/2009 10:47 AM	585,107	9%
Fig 5-8b.jpg	JPG File	4/4/2009 10:37 AM	819,383	13%
Fig Ch 5 Inside.jpg	JPG File	8/7/2009 2:30 PM	367,059	21%
Fig 5-10a.tif	TIF File	8/12/2009 5:43 PM	29,758	36%
Fig 5-11b.tif	TIF File	6/6/2007 3:48 PM	4,933,452	83%
Fig 5-21.tif	TIF File	8/7/2009 3:28 PM	454,576	91%

COMPRESSION RATIOS

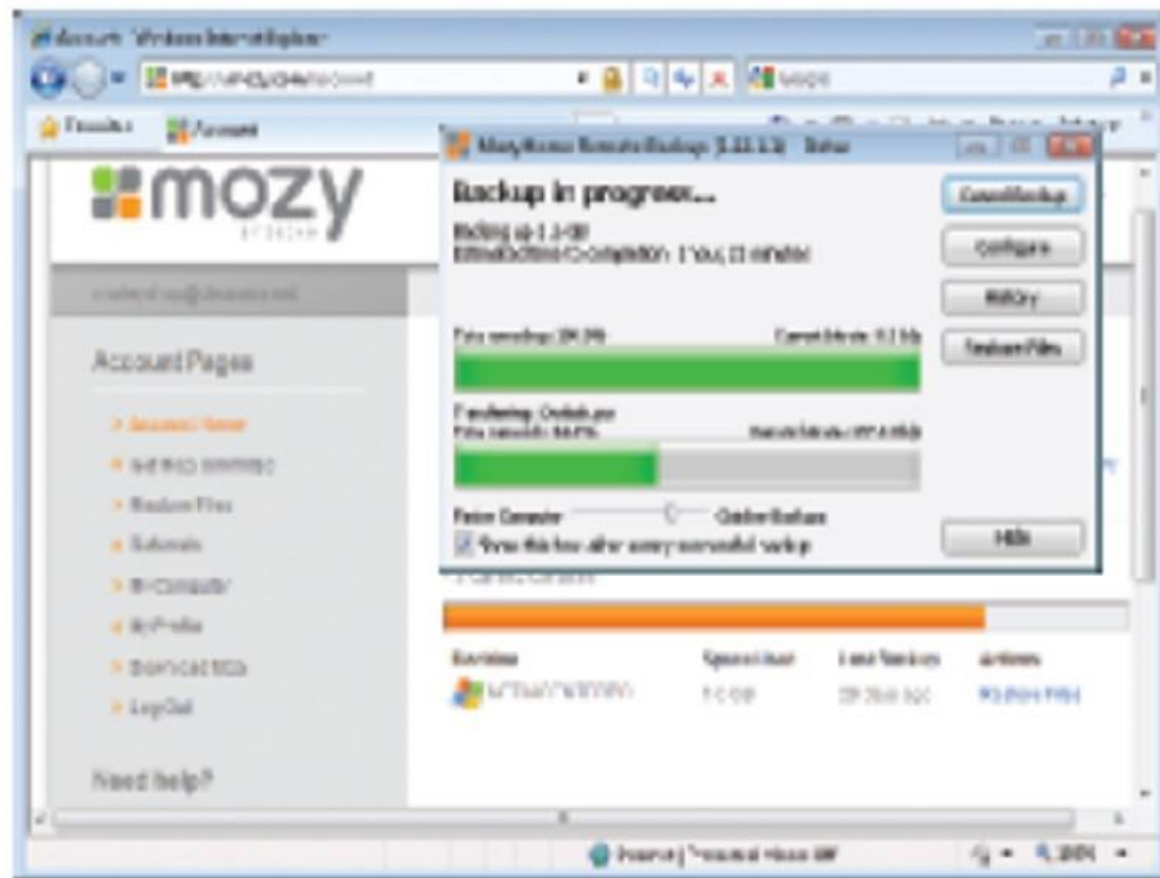
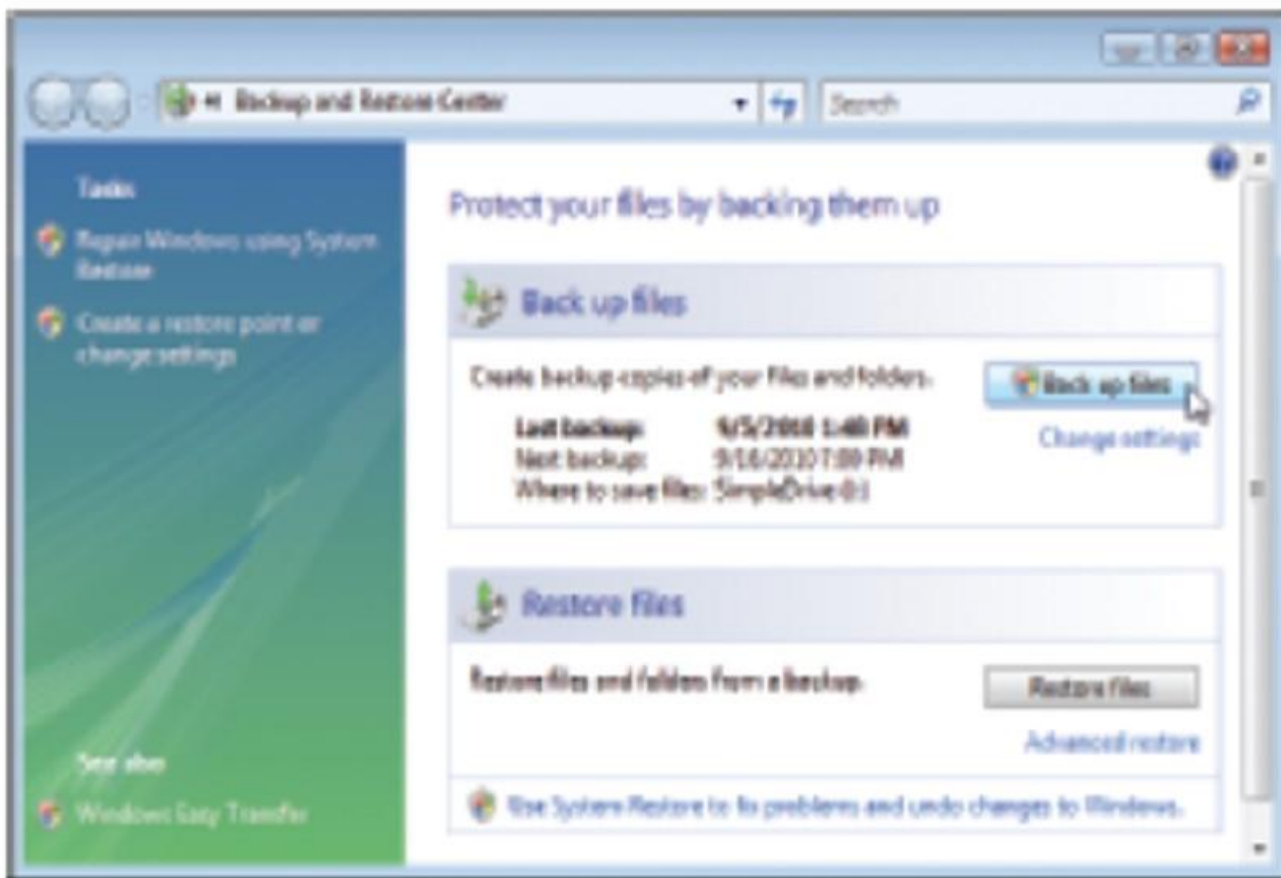
Certain image file formats (such as .tif) compress more than others (such as .jpg, which is already in a compressed format). Documents containing text fall somewhere in between.

FILE SIZE

The 27 files, totalling nearly 17 MB, are zipped into a single 5 MB .zip file.

- Backup and recovery utilities: Make the backup and restoration process easier.
 - Backup: Duplicate copy of data or other computer content.
 - Good backup procedures are critical for businesses.
 - Individuals should back up important documents, e-mail, photos, home video, etc.
 - Store backup data on a CD or DVD, second hard drive, flash memory drive, or upload to the Internet.
 - Back up your entire computer once all programs have been installed, so your system can be restored to that configuration.

Backup Programs



WINDOWS BACKUP PROGRAM

WEB-BASED BACKUP SERVICE

Utility Programs

- Security programs: Protect computers and users.
 - Antivirus programs.
 - Antispyware programs.
 - Firewalls.
 - Many are included in Windows and other operating systems.
 - Discussed in detail in Chapter 9.

The Future of Operating Systems

- Will continue to become more user-friendly.
- Will eventually be driven primarily by a voice interface.
- Likely to continue to become more stable and self-healing.
- Will likely continue to include improved security features and to support multiple processors and other technological improvements.
- May be used primarily to access software available through the Internet or other networks.

Summary

- System Software vs. Application Software.
- The Operating System.
- Operating Systems for Personal Computers and Servers.
- Operating Systems for Mobile Phones and Other Devices.
- Operating Systems for Larger Computers.
- Utility Programs.
- The Future of Operating Systems.

Review: System Software and Application Software

- System software: The operating system and utility programs that control a computer system and allow you to use your computer.
 - Enables the boot process, launches applications, transfers files, controls hardware configuration, manages hard drive, and protects from unauthorized use.
- Application software: Programs that allow a user to perform specific tasks on a computer.
 - Word processing, playing a game, preparing taxes, browsing the Web, and so forth.

Review: Functions of an Operating System

- Process management
- Managing resources and jobs
- Memory management
- File management
- Network management
- I/O devices management
- Configuring devices
- Security
- Booting the computer

Review: Techniques for Increased Efficiency

- Multitasking: CPU rotates between tasks.
- Multiprocessing Each CPU (or core) typically works on a different job.
- Parallel processing: CPUs or cores typically work together to complete one job more quickly.

Review: Differences Among Operating Systems

- Personal vs. server operating system
- Types of processors supported
- Number of processors
- 32-bit or 64-bit CPUs
- Support for other technologies

Review: Utility Programs

- File management programs
- Search tools
- Diagnostic programs
- Disk management programs
- Uninstall utilities
- Clean up utilities
- File compression programs
- Backup and recovery utilities
- Security programs

15th Edition

Understanding Computers

Today and Tomorrow

Comprehensive

