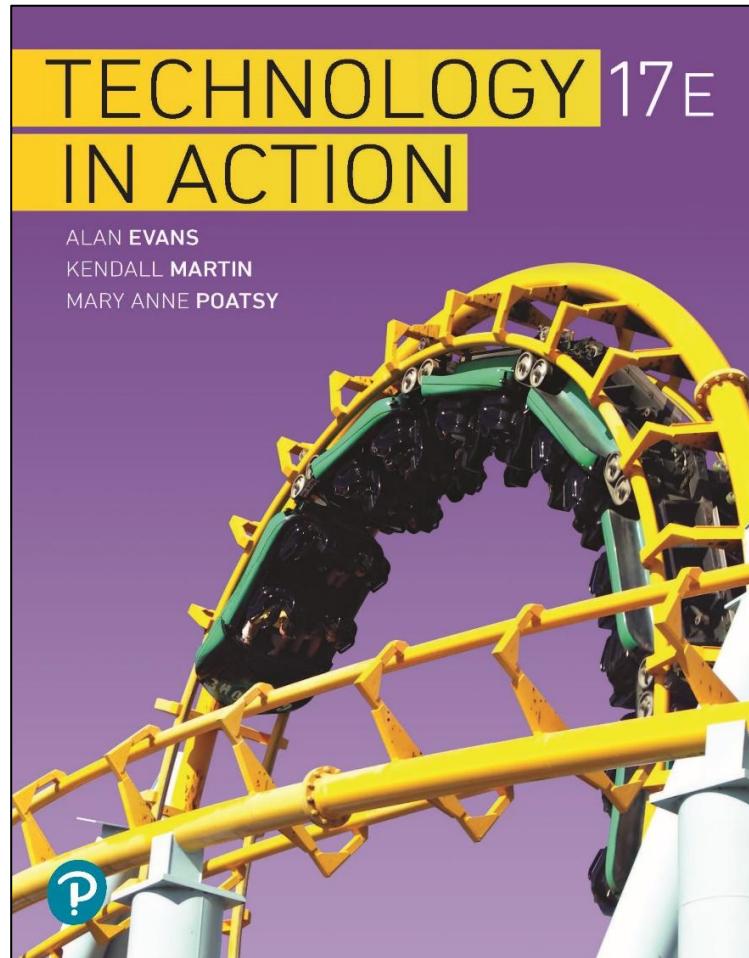


Technology in Action

Seventeenth Edition



Chapter 5

System Software: The
Operating System, Utility
Programs, and File
Management

Learning Objectives (1 of 2)

- 5.1** Discuss the functions of the operating system.
- 5.2** Explain the most popular operating systems for personal use.
- 5.3** Explain the different kinds of operating systems for machines, networks, and business.
- 5.4** Explain how the operating system provides a means for users to interact with the computer.
- 5.5** Explain how the operating system helps manage hardware such as the processor, memory, storage, and peripheral devices.

Learning Objectives (2 of 2)

- 5.6** Explain how the operating system interacts with application software.
- 5.7** Discuss the process the operating system uses to start up the computer and how errors in the boot process are handled.
- 5.8** Describe the main features of the Windows interface.
- 5.9** Summarize how the operating system helps keep your computer organized and manages files and folders.
- 5.10** Outline the tools used to enhance system productivity, back up files, and provide accessibility.

Operating System Fundamentals (1 of 2)

Operating System Basics (Objective 5.1)

- System software
 - Operating system (OS)
 - Utility programs
- Operating system functions
 - Manages computer's hardware
 - Allows application software to work with CPU
 - Manage, schedule, coordinate tasks

Operating System Fundamentals (2 of 2)

Operating System Basics (Objective 5.1)

- User interface
 - How user communicates with computer
 - Desktop, icons, and menus
- OS categories
 - Single- or multi-user
 - Single- or multi-task

Understanding System Software (1 of 3)

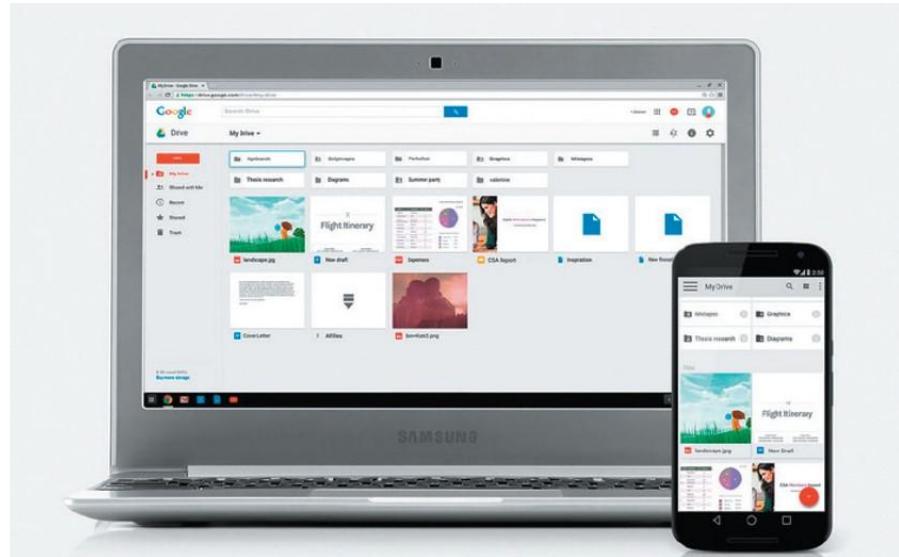
Operating Systems for Personal Use (Objective 5.2)

Operating System Name	Windows	macOS	iOS	Android	Linux	Chrome OS
Developed By	Microsoft	Apple	Apple	Google	Open source	Google
Available On	Laptops, tablets, desktops, all-in-ones, smartphones	Laptops, desktops, all-in-ones	Tablets, iPhones, iPod touches	Smartphones, tablets	Laptops, desktops, tablets	Chromebooks

Understanding System Software (2 of 3)

Operating Systems for Personal Use (Objective 5.2)

- Top three for personal computers
 - Windows
 - macOS
 - Linux
- Mobile OS
 - Android
 - iOS
- Web-based
 - Google Chrome OS



Understanding System Software (3 of 3)

Operating Systems for Personal Use (Objective 5.2)

- Linux
 - Open source
 - Personal computers
 - Web servers
 - Distributions (distros)
- Upgrade OS decision

Understanding System Software (1 of 2)

Operating Systems for Machinery, Networks, and Business (Objective 5.3)

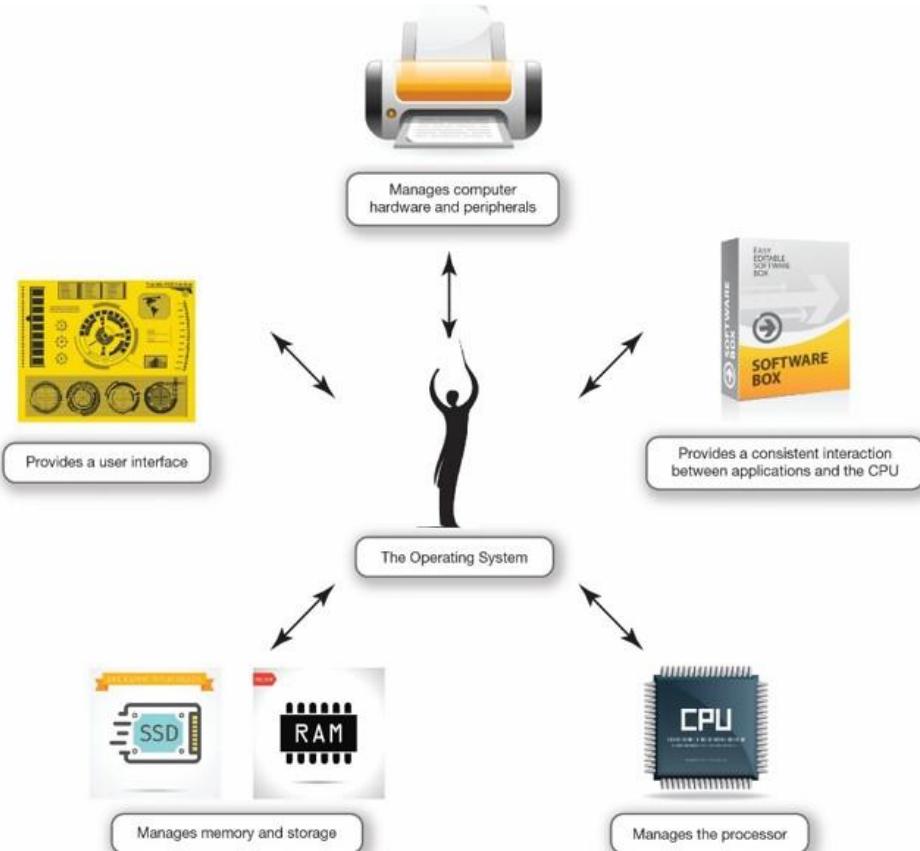
- Real-time OS (RTOS)
 - Machine that performs repetitive series of specific tasks in precise time
- Multiuser operating system
 - Known as network OS
 - Allows multiple users access to the computer at the same time
 - Unix



Understanding System Software (2 of 2)

Operating Systems for Machinery, Networks, and Business (Objective 5.3)

- OS—coordinates and directs the flow of data and information



What the Operating System Does

The User Interface (Objective 5.4)

- Enables user to interact with the computer
- Types of interfaces
 - Command-driven interface
 - Menu-driven interface
 - Graphical user interface (GUI)

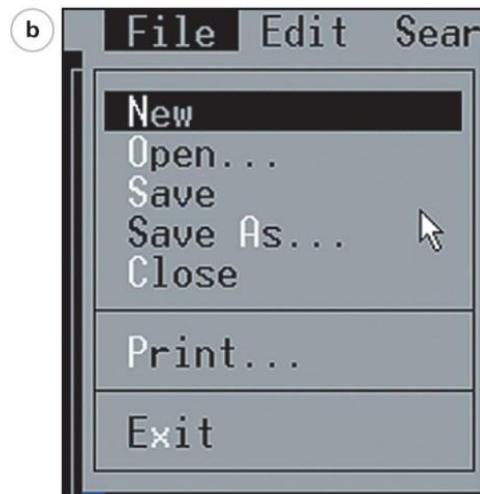
a

```
C:\>cd c:\wordproc\memos
C:\wordproc\memos>dir/w
Volume Serial Number is 216C-11F8
Directory of C:\wordproc\memos

[.]          0 file(s)      4,266.55 MB Free
[..]          0 file(s)      4,266.55 MB Free
2 dir(s)

C:\wordproc\memos>cd..
C:\wordproc>rd memos
C:\wordproc>dir/w
Volume Serial Number is 216C-11F8
Directory of C:\wordproc

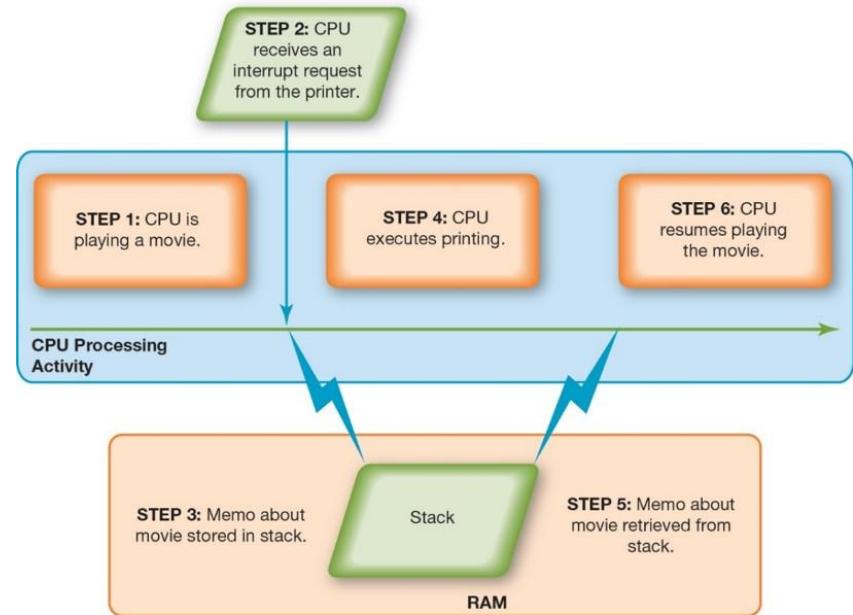
[.]          0 file(s)      4,266.50 MB Free
2 dir(s)      4,266.50 MB Free
C:\wordproc>cd..
C:\>rd wordproc
C:\>
```



What the Operating System Does (1 of 3)

Hardware Coordination (Objective 5.5)

- Processor Management
 - Event
 - Interrupt handler
 - Preemptive multitasking
 - Spooler



What the Operating System Does (2 of 3)

Hardware Coordination (Objective 5.5)

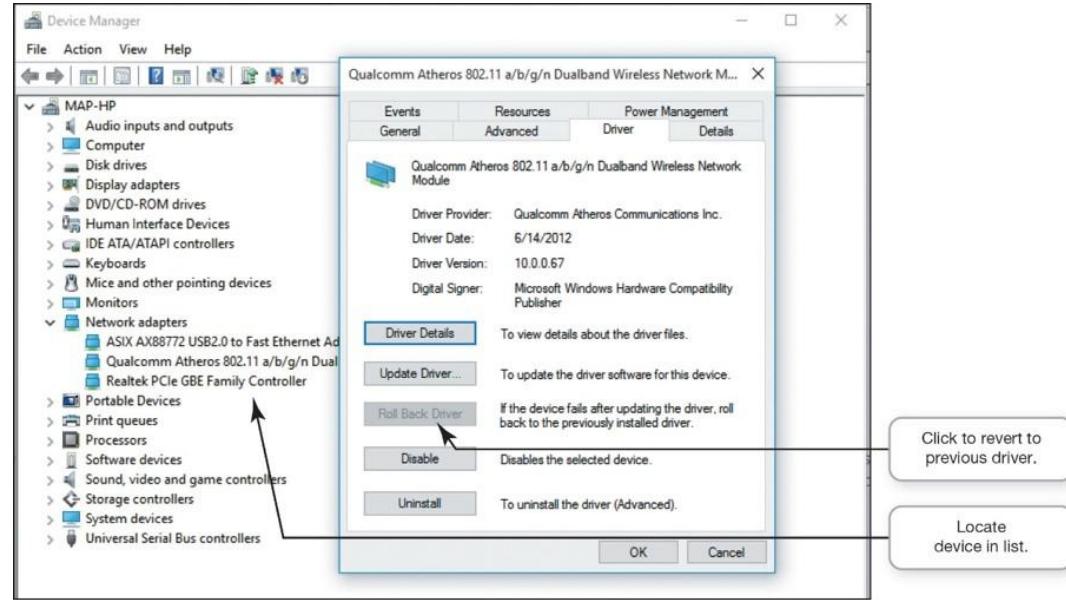
- Memory and storage management
 - RAM—limited capacity
 - Borrowing drive space is called virtual memory
 - Increase RAM to avoid using virtual memory
 - Swap file
 - Paging
 - Thrashing



What the Operating System Does (3 of 3)

Hardware Coordination (Objective 5.5)

- Hardware and peripheral management
 - Device driver
 - Plug and Play (PnP)
 - Roll Back



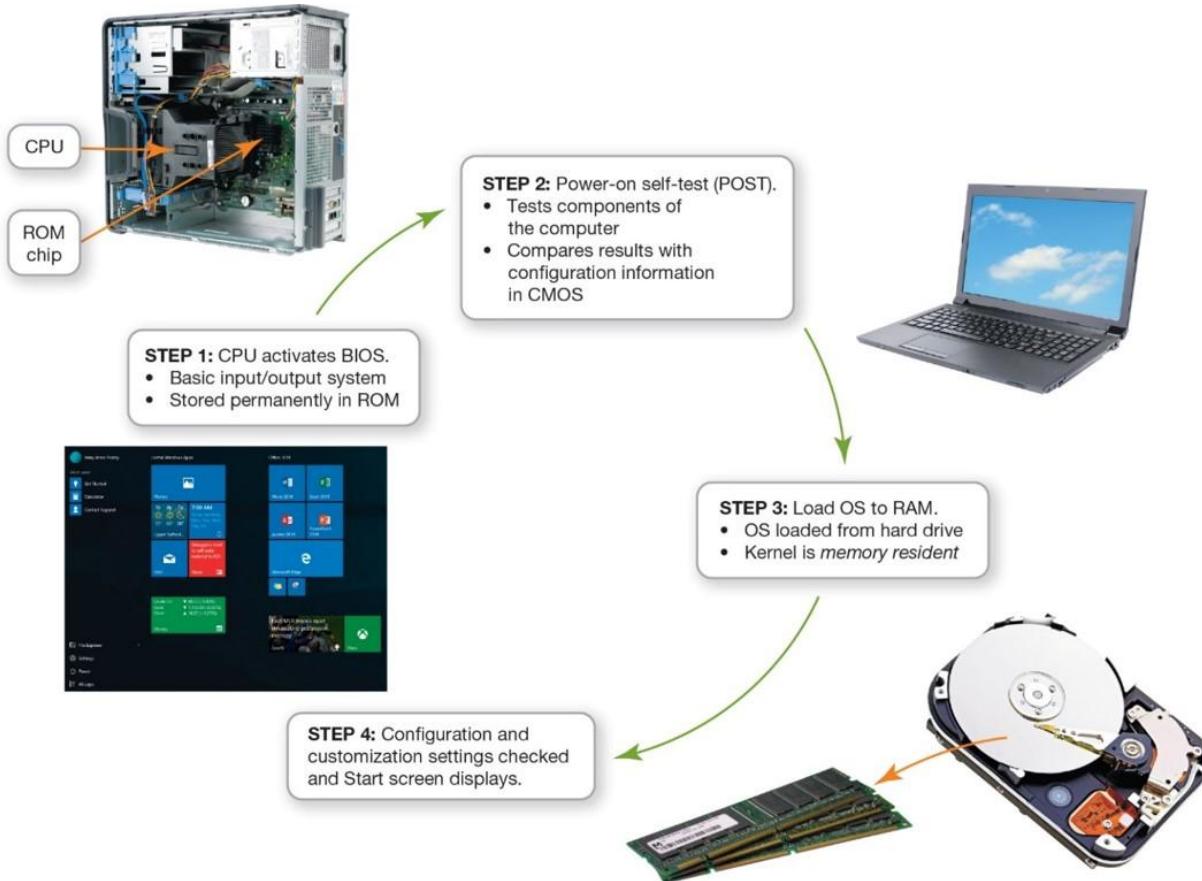
What the Operating System Does

Software Application Coordination (Objective 5.6)

- Application programming interface (API)
 - Blocks of code the CPU recognizes
 - Used for similar procedures
 - Example: Microsoft Direct X

Starting Your Computer (1 of 4)

The Boot Process (Objective 5.7)



Starting Your Computer (2 of 4)

The Boot Process (Objective 5.7)

- Step 1: Activating BIOS
 - Manages the exchange of data between the OS and the input and output devices
 - BIOS is also responsible for loading the OS into RAM
- Step 2: Performing the Power-On Self-Test
 - Ensures that essential peripheral devices are attached and operational

Starting Your Computer (3 of 4)

The Boot Process (Objective 5.7)

- Step 3: Loading the OS
 - System files loaded into RAM
 - Kernel, essential component of the OS, is then loaded
- Step 4: Checking Further Configurations and Customizations
 - Registry contains configurations used by the OS and applications

Starting Your Computer (4 of 4)

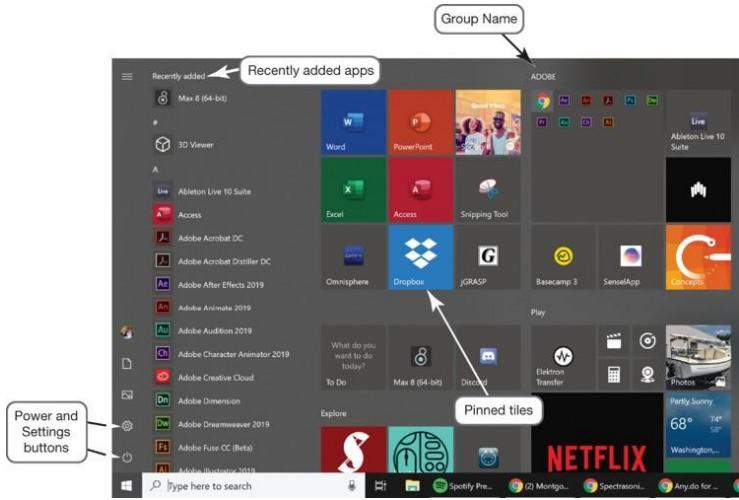
The Boot Process (Objective 5.7)

- Handling Errors in the Boot Process
 - Power the computer off and on again
 - Try uninstalling newly added software/hardware
 - Try accessing the Windows Advanced Options Menu
 - Try resetting the computer from the Update & Security Settings screen
 - Try Go back

The Windows Interface (1 of 2)

Using Windows 10 (Objective 5.8)

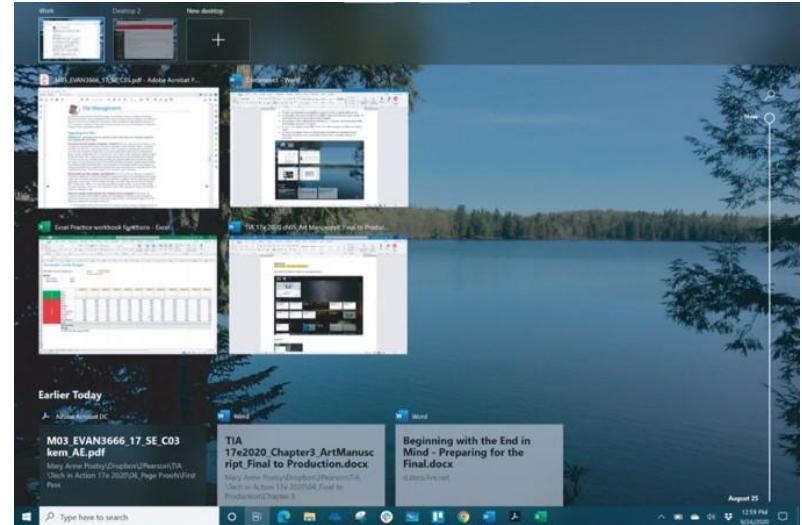
- Desktop
 - Primary working area
- Taskbar
 - Displays open and favorite applications for easy access
- Start menu
 - Provides access to all applications and apps installed on your device



The Windows Interface (2 of 2)

Using Windows 10 (Objective 5.8)

- Pinning
 - Choosing which applications are tiles on the Start menu
- Virtual desktops
 - Allow you to organize groups of windows into different displays



The Windows Interface (1 of 2)

User Interfaces for Other OSs (Objective 5.8)

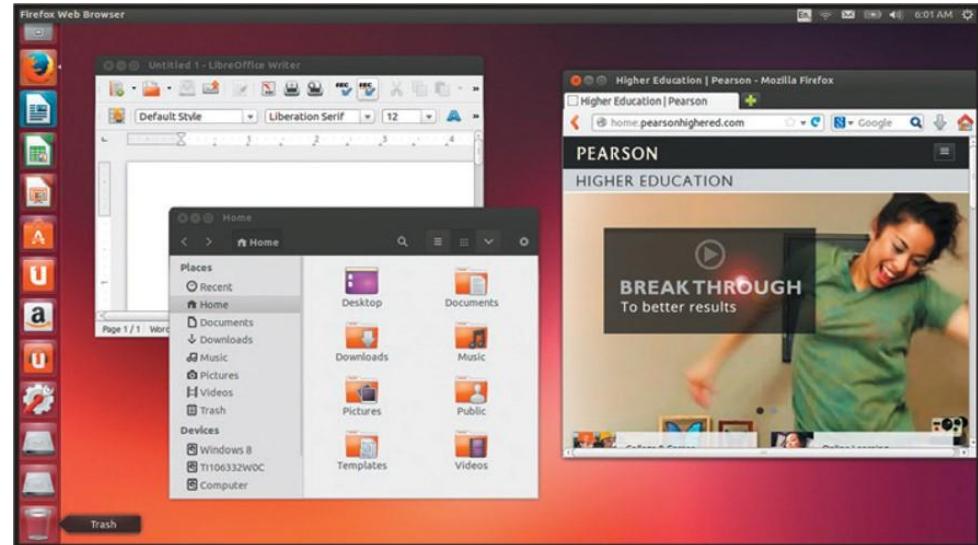
- MacOS vs Windows
 - Not compatible with each other
 - Similar in functionality



The Windows Interface (2 of 2)

User Interfaces for Other OSs (Objective 5.8)

- Linux vs macOS and Windows
 - Also similar in functionality



File Management (1 of 8)

Organizing Your Files (Objective 5.9)

- Directory
 - Hierarchical structure of the computer's contents
 - Drives
 - Libraries
 - Folders
 - Subfolders
 - Files
 - Root directory (C:)
 - Top of the filing structure

File Management (2 of 8)

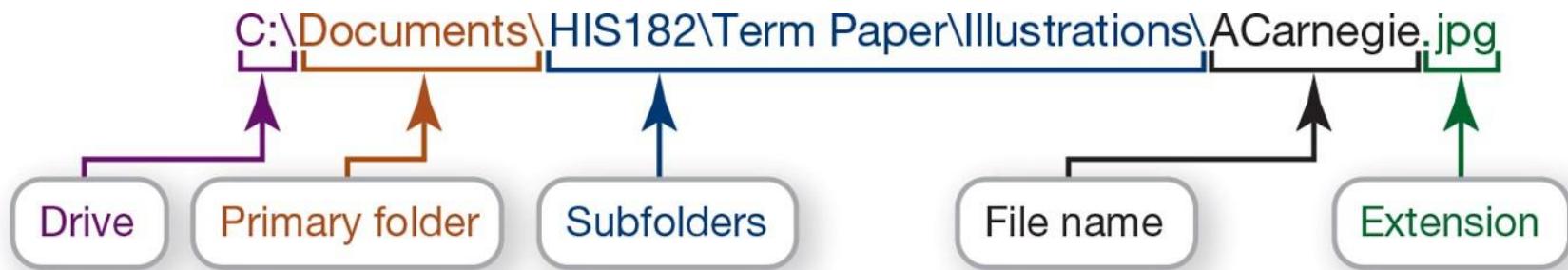
Organizing Your Files (Objective 5.9)

- File
 - Collection of program instructions or data
 - Treated as a single unit
 - Stored on permanent storage device
- Folder/subfolder—collection of files

File Management (3 of 8)

Organizing Your Files (Objective 5.9)

- File path
 - Windows—backslash \
 - Linux—forward slash /
 - MacOS—colon:



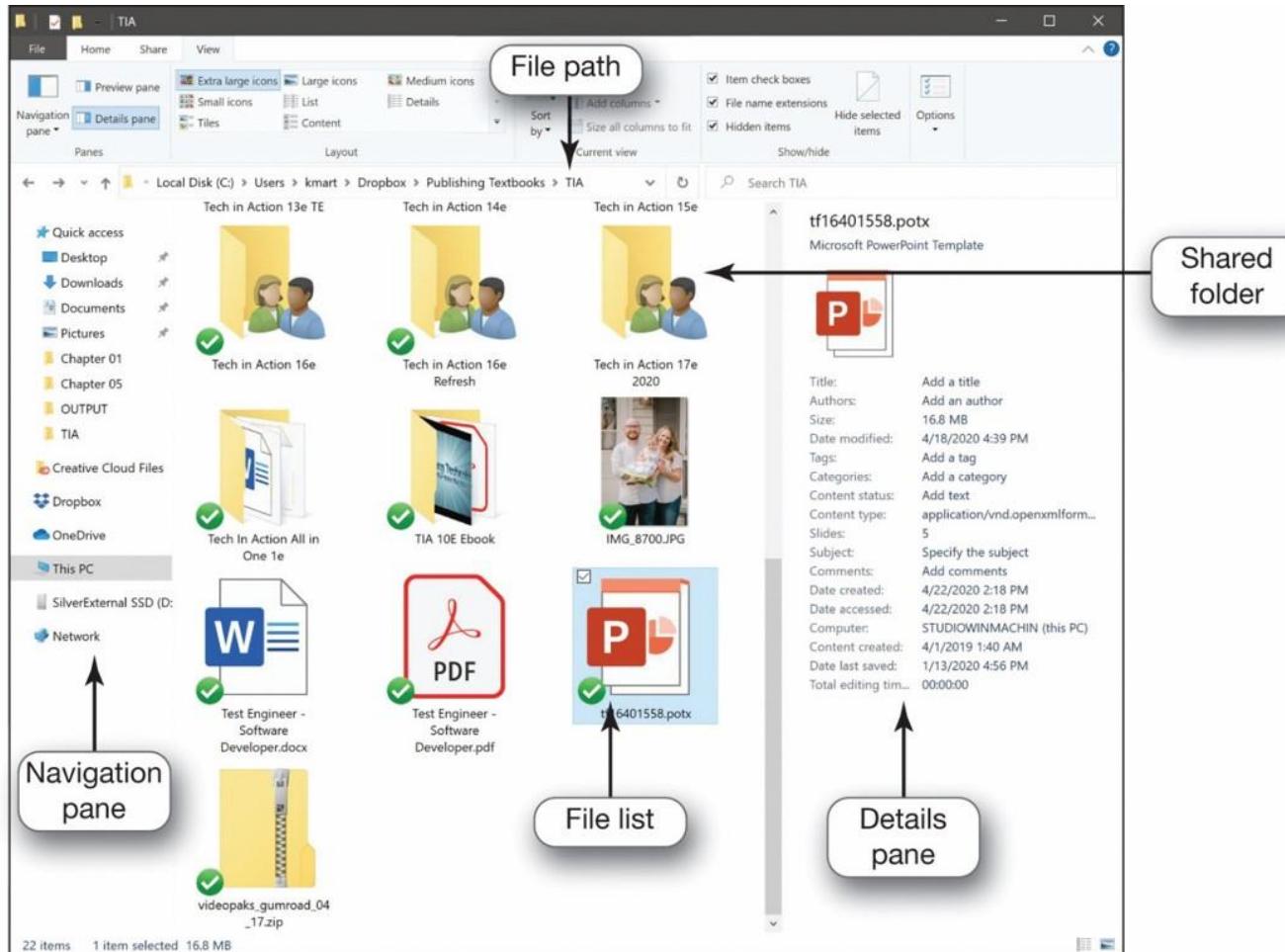
File Management (4 of 8)

Organizing Your Files (Objective 5.9)

- File Explorer
 - Main tool for finding, viewing, and managing computer contents
 - Shows the location and contents of every drive, folder, and file

File Management (5 of 8)

Organizing Your Files (Objective 5.9)



File Management (6 of 8)

Organizing Your Files (Objective 5.9)

- Naming files
 - File name
 - Extension (file type)

Extension	Type of Document	Application
.docx	Word processing document	Microsoft Word 2007 and later
.xlsx	Workbook	Microsoft Excel 2007 and later
.accdb	Database	Microsoft Access 2007 and later
.pptx	Presentation	Microsoft PowerPoint 2007 and later
.pdf	Portable Document Format	Adobe Acrobat or Adobe Reader
.rtf	Text (Rich Text Format)	Any program that can read text documents
.txt	Text	Any program that can read text documents
.htm or html	HyperText Markup Language (HTML) for a web page	Any program that can read HTML
.jpg	Joint Photographic Experts Group (JPEG) image	Most program capable of displaying image
.zip	Compressed file	Various file compression program

File Management (7 of 8)

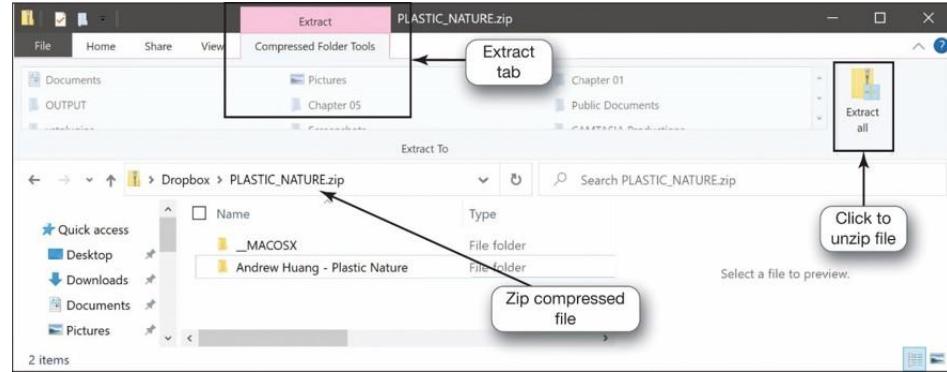
Organizing Your Files (Objective 5.9)

- Copying, moving, and deleting files and Folders
 - Copy
 - Cut
 - Rename
 - Delete
 - Recycle bin

File Management (8 of 8)

Organizing Your Files (Objective 5.9)

- File compression utility
 - Make a large file more compact
 - Easier and faster to send files
 - Built-in file compression



Utility Programs (1 of 4)

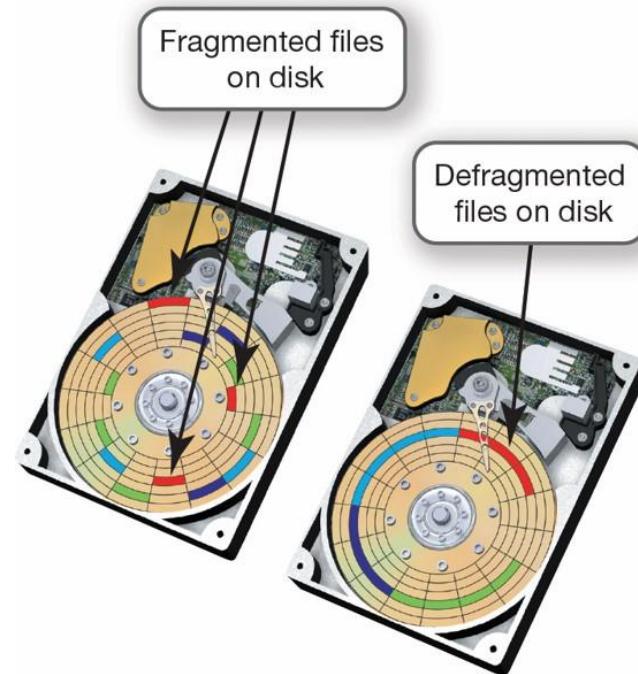
Windows Administrative Utilities (Objective 5.10)

- Utility programs
 - Incorporated into the operating system
 - Firewall and file-compression utilities
 - Standalone utility programs
 - Antivirus and security programs
 - Freeware

Utility Programs (2 of 4)

Windows Administrative Utilities (Objective 5.10)

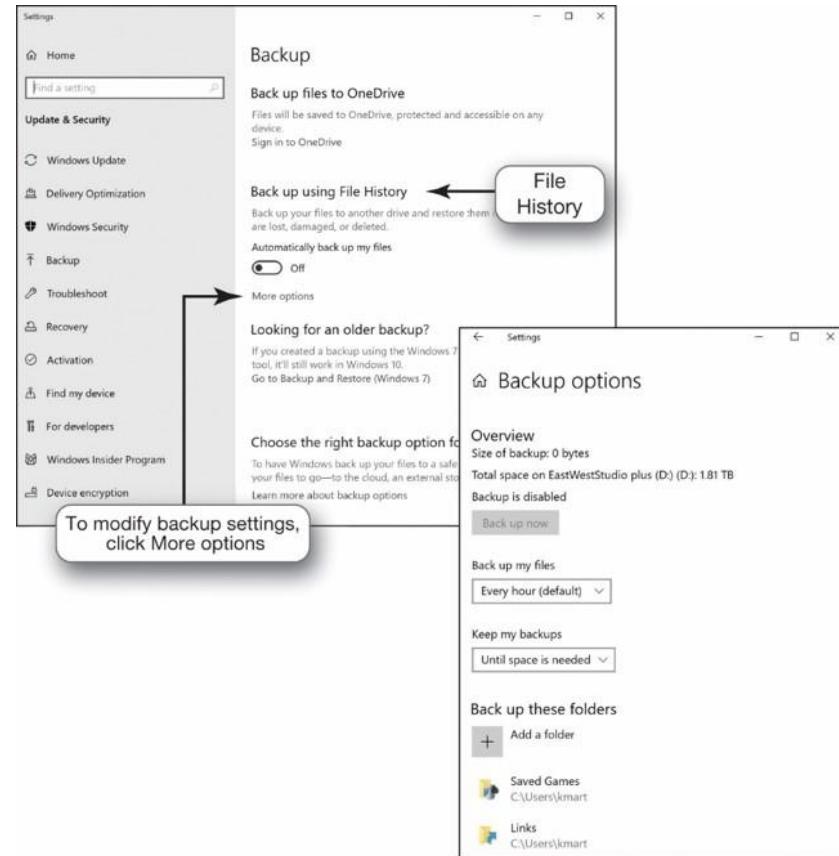
- System performance utilities
 - Disk Cleanup
 - Task Manager
 - Disk Defragmenter



Utility Programs (3 of 4)

Windows Administrative Utilities (Objective 5.10)

- File and system backup utilities
 - File History
 - System Restore
 - Time Machine



Utility Programs (4 of 4)

Windows Administrative Utilities (Objective 5.10)

- Accessibility utilities
 - Designed for users with special needs

Magnifier

- Creates a separate window that displays a magnified portion of the screen



Narrator

- Reads what is on screen
- Can read the contents of a window, menu options, or text you have typed



Speech Recognition

- Allows you to dictate text and control your computer by voice



On-Screen Keyboard

- Allows you to type with a pointing device



High Contrast

- Color schemes invert screen colors for vision-impaired individuals

Easier to
Read!