Computer - UOMU000003

Lecture 6
Operating System

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Objectives Overview

Explain the role and functions of an operating system.

Describe the boot-up sequence and power-off options for computers and mobile devices.

Explain how an operating system offers a user interface, handles applications, allocates memory, and synchronizes operations.
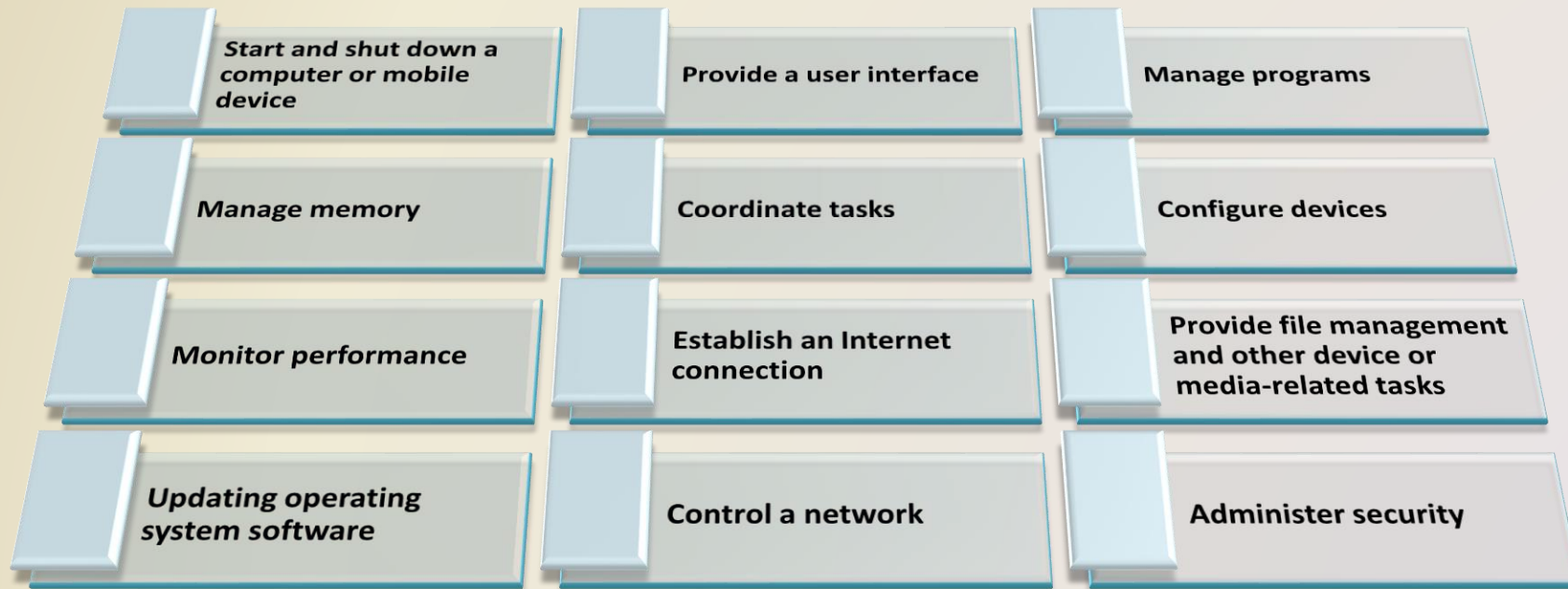
Describe how an operating system allows users to set up hardware, connect to the Internet, and assess system performance.

Identify file management utilities and other built-in tools in an operating system, as well as methods to update its software.

Explain how an operating system lets users manage a network or enforce security measures and Windows features

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. Most operating systems perform similar functions that include:

Start and shut down a computer or mobile device	Provide a user interface	Manage programs
Manage memory	Coordinate tasks	Configure devices
Monitor performance	Establish an Internet connection	Provide file management and other device or media-related tasks
Updating operating system software	Control a network	Administer security

Operating Systems

Operating System Functions

- Starting Computers and Mobile Devices
  - If a computer or mobile device is off, you press a power button to turn it on
  - Booting is the process of starting or restarting a computer.
  - When turning on a computer that has been powered off completely, you are performing **a cold boot**.
  - **A warm boot**, by contrast, is the process of using the operating system to restart a computer.
  - With Windows, for example, you can perform a warm boot by clicking a menu command

power button on desktop

power button on smartphone

power button on laptop

Operating System Functions

- Although some users leave their computers running continually and never turn them off, others choose to shut them down.

- An operating system includes various power options.

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

Hibernate mode saves any open documents and running programs or apps to an internal hard drive before removing power from the computer or device

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Operating System Functions

- A **user interface** (**UI**) controls how you enter data and instructions and how information is displayed on the screen. **Two types of user interfaces** are *graphical and command-line*

- With a *graphical user interface* (GUI), you interact with menus and visual images such as buttons and other graphical objects to issue commands
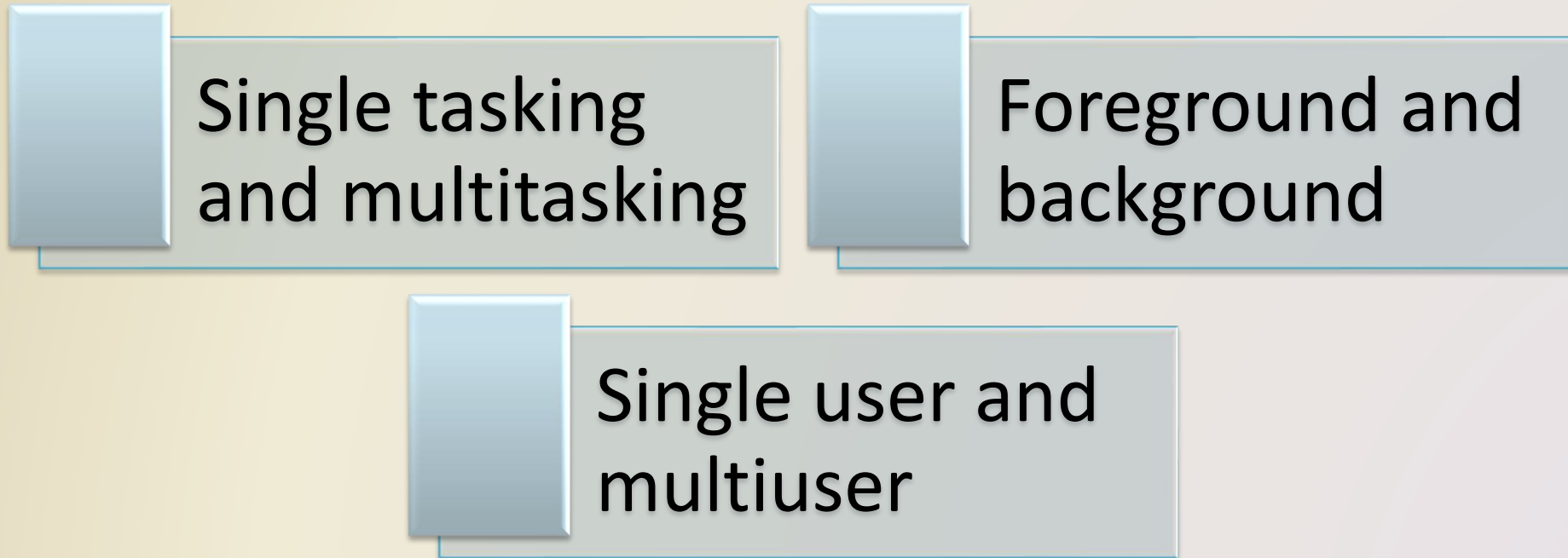
Operating System Functions

- **In a command-line interface**, a user types commands represented by short keywords or abbreviations or presses special keys on the keyboard to enter data and instructions

- To configure devices, manage system resources, and troubleshoot network connections, network administrators and other advanced users work with a command-line interface.
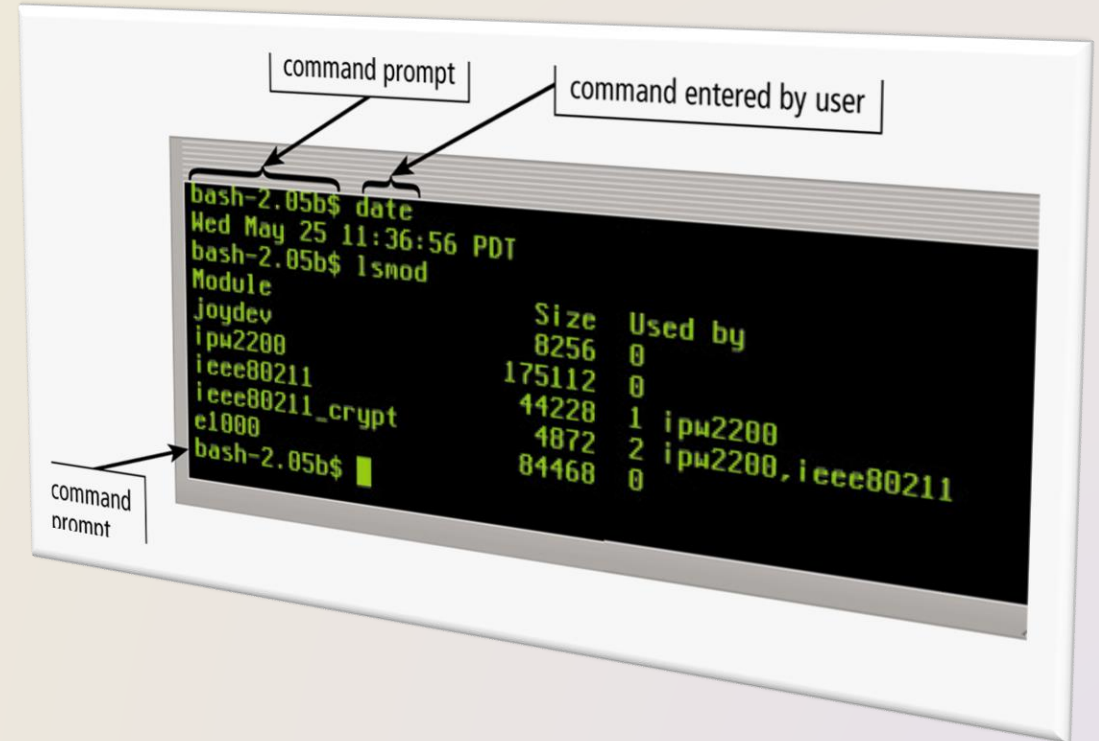
Operating System Functions

- How an operating system handles programs directly affects your productivity

Single tasking and multitasking

Foreground and background

Single user and multiuser

Operating System Functions

- **Single User/Single Tasking OS:**
  – Allows one user to run one program at a time (e.g., smartphones, basic devices).

- **Single User/Multitasking OS:**
  – Enables one user to run multiple programs concurrently (e.g., email, web browser, word processing).

- **Foreground and Background Programs:**
  – Foreground: The active program currently in use.
  – Background: Programs running but not actively used.
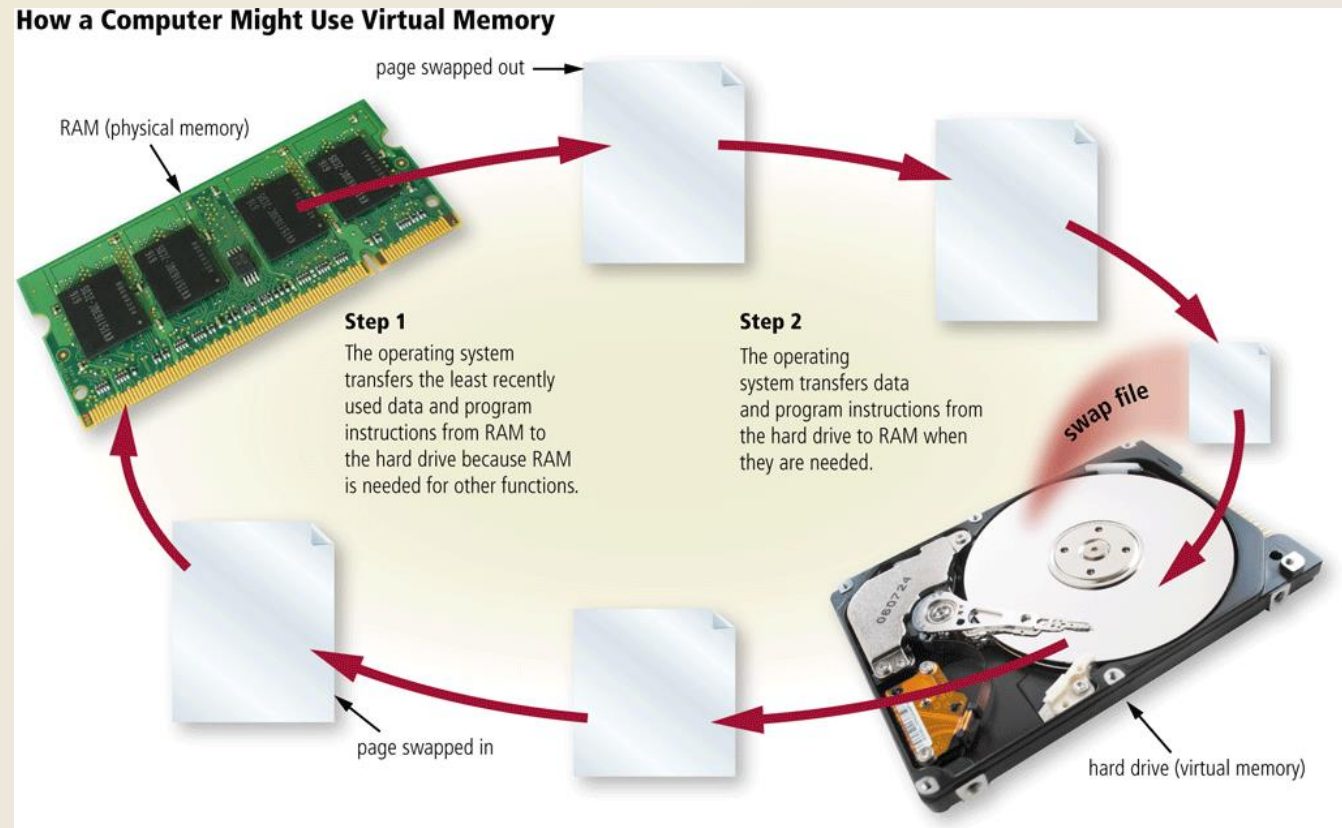
Operating System Functions

- **Multiuser Operating System:**
  - Allows multiple users to run programs simultaneously.
  - Used in networks, servers, mainframes, and supercomputers, supporting hundreds or thousands of users at once.

- **Multiprocessing Operating System:**
  - Supports multiple processors running programs simultaneously, increasing processing speed through coordinated processing.
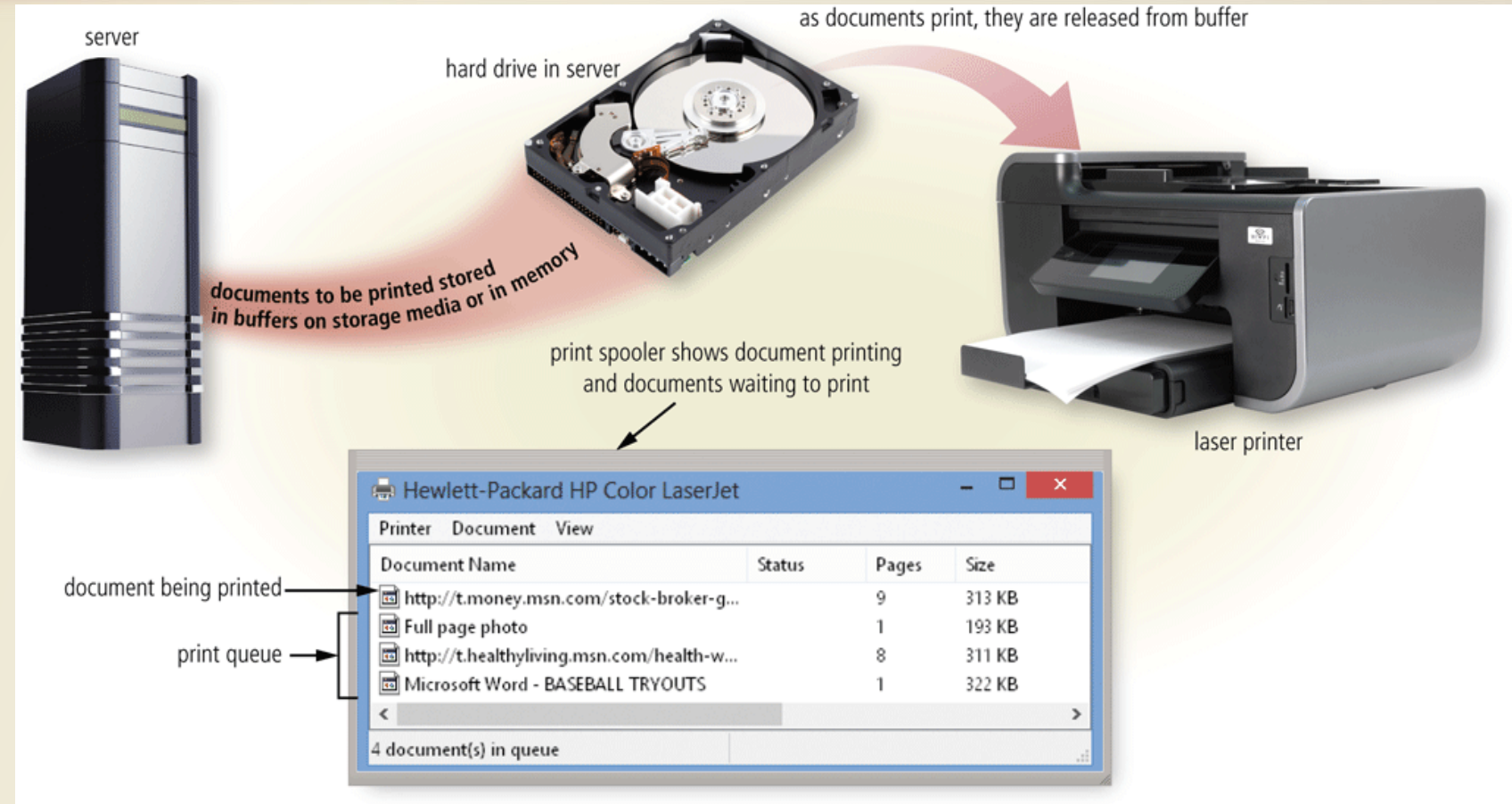
Operating System Functions
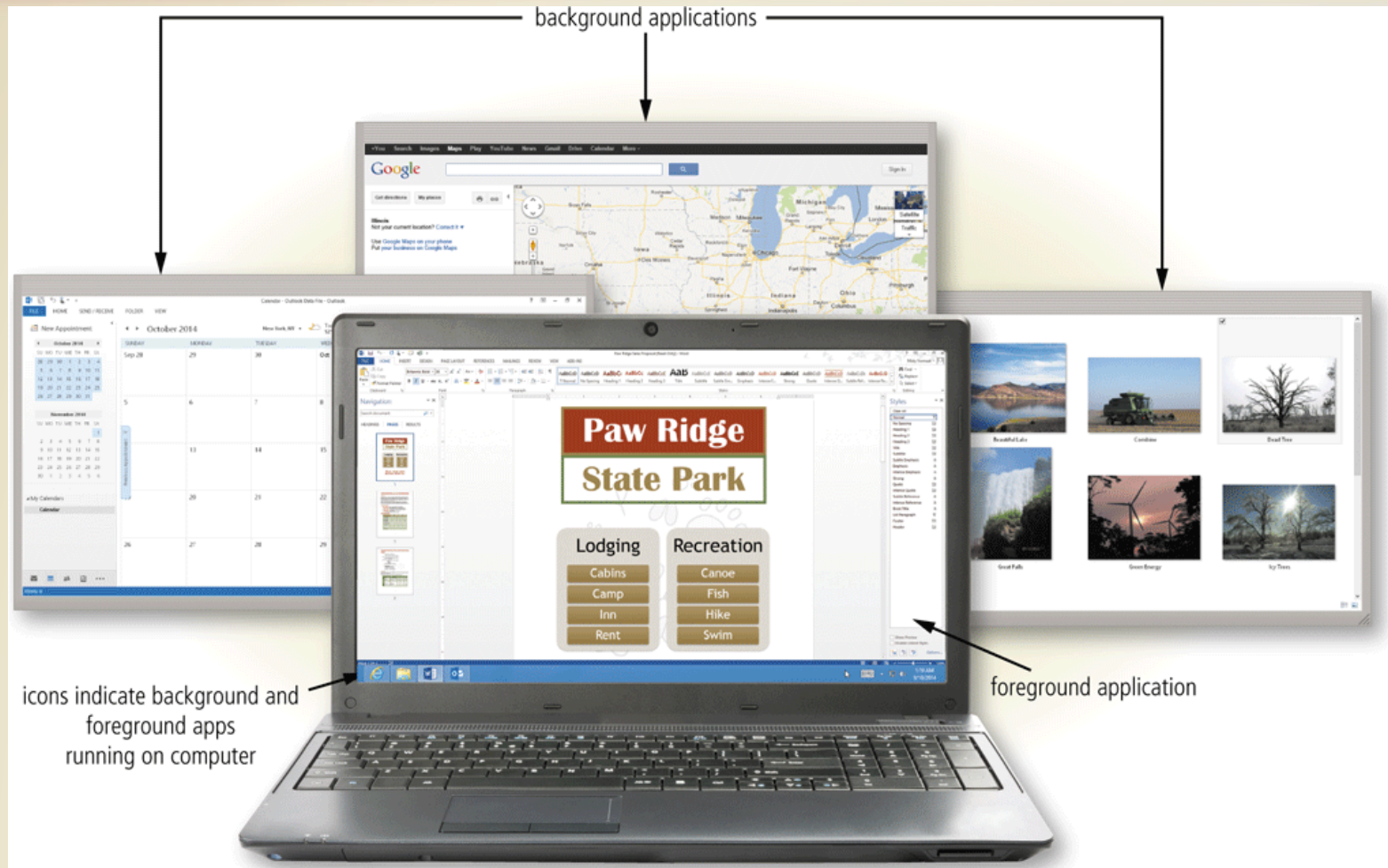
Operating System Functions

- Memory management optimizes the use of the computer or device's internal memory

- **Virtual memory** is a portion of a storage medium functioning as additional RAM

How a Computer Might Use Virtual Memory

RAM (physical memory)

page swapped out

Step 1
The operating system transfers the least recently used data and program instructions from RAM to the hard drive because RAM is needed for other functions.

Step 2
The operating system transfers data and program instructions from the hard drive to RAM when they are needed.

swap file

page swapped in

hard drive (virtual memory)

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 or connect them

Operating System Functions

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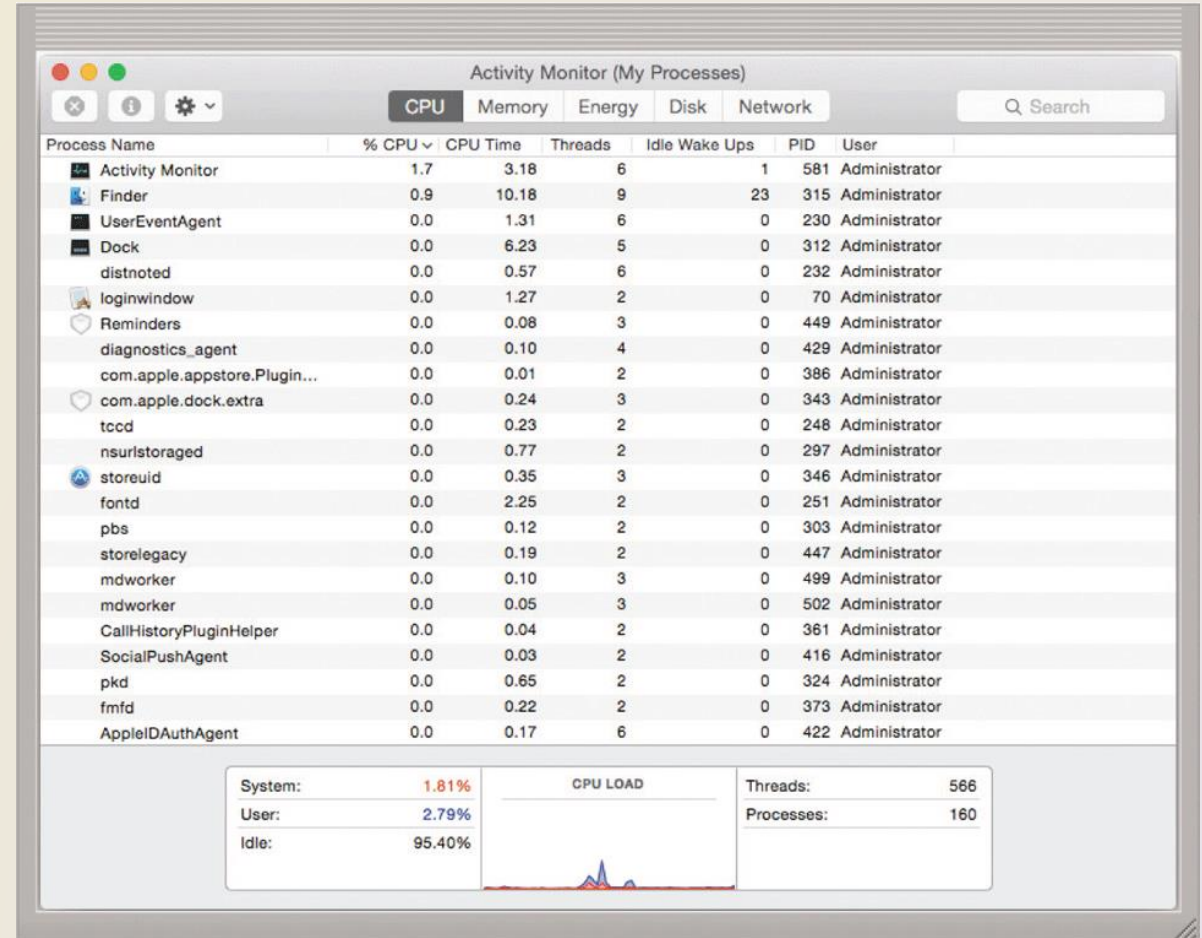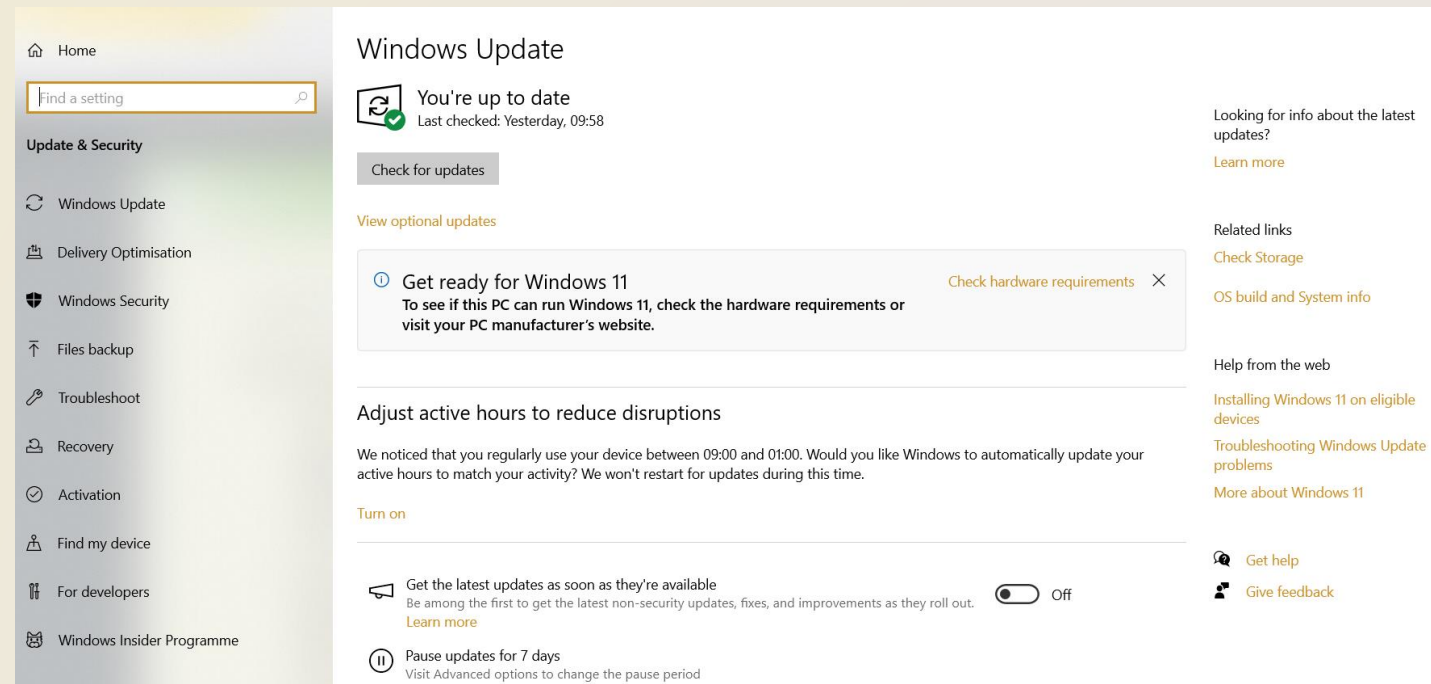
Operating System Functions

- Operating systems typically provide a means to establish Internet connections.

- You can establish;
  - **wired connections**, such as cable and DSL.
  - **wireless connections**, such as Wi-Fi, mobile broadband, and satellite.
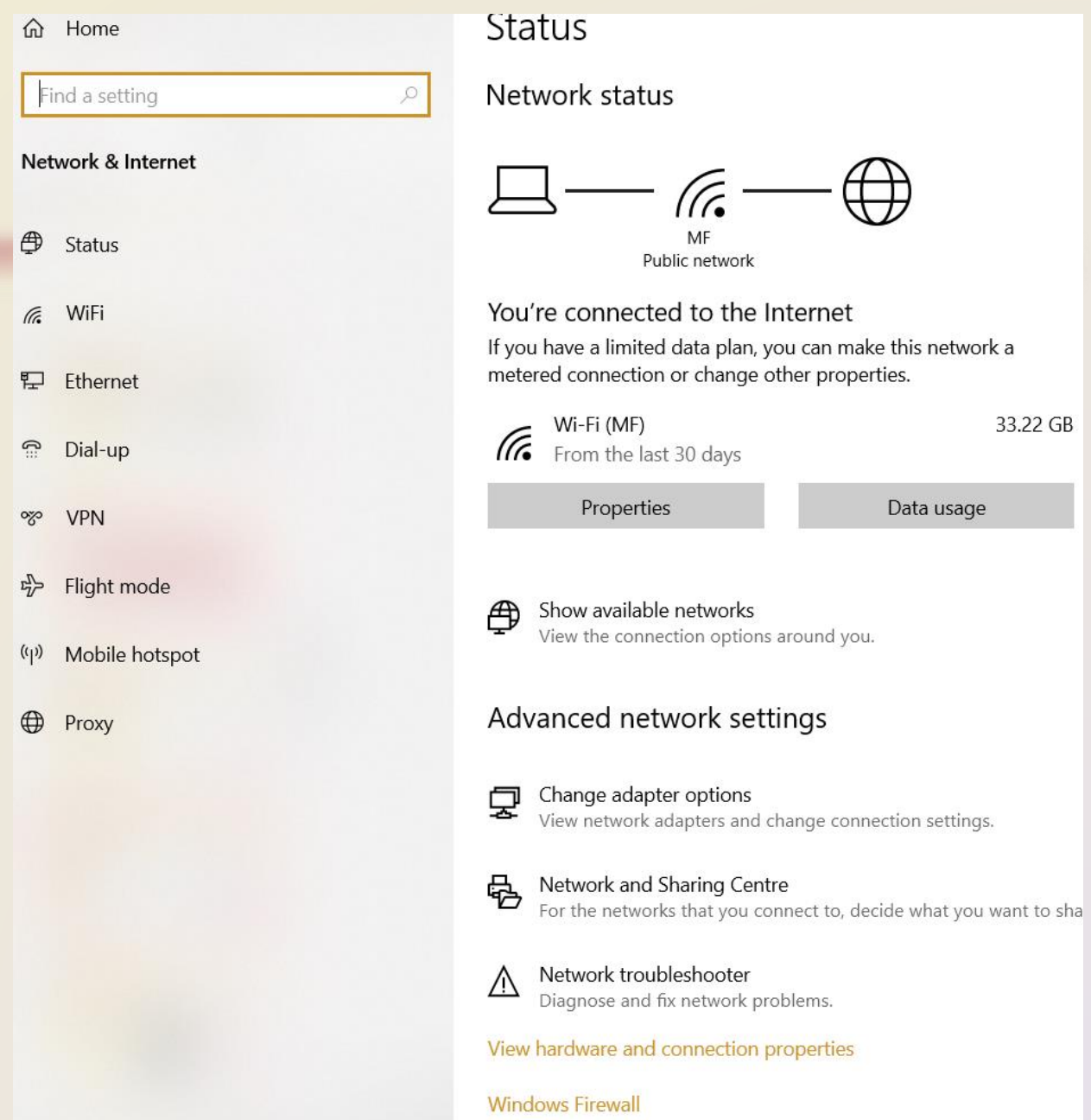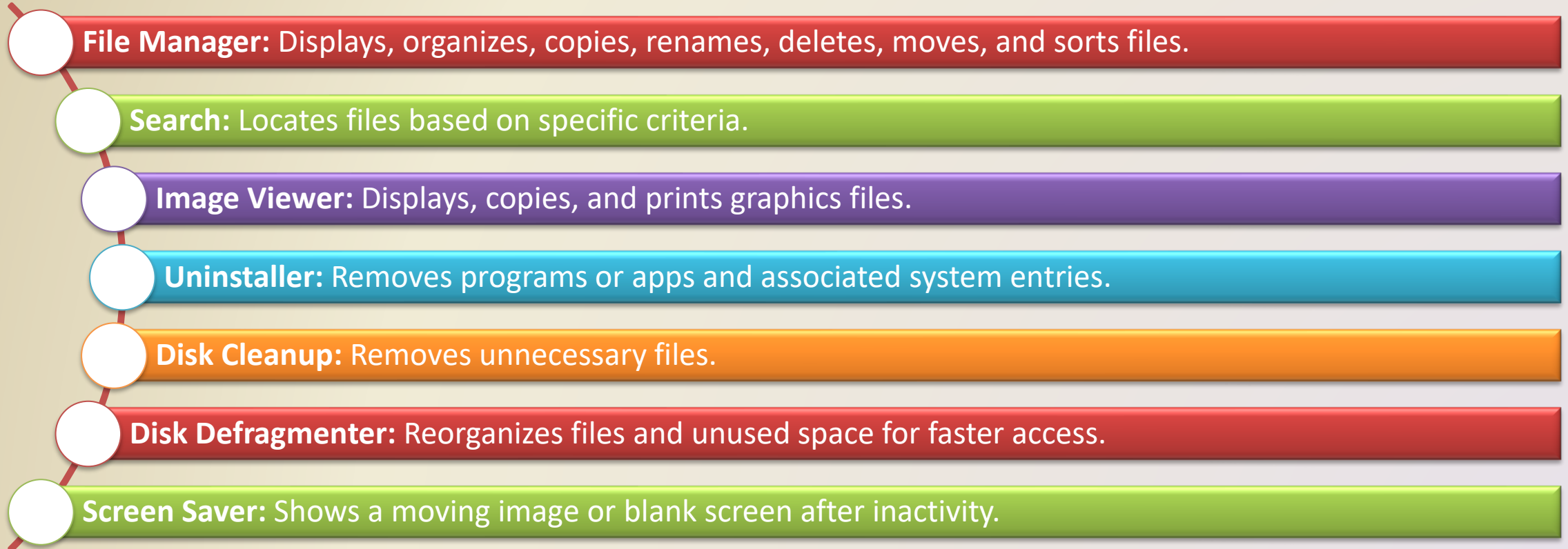
Operating System Functions

- Many programs, including operating systems, include an **automatic update** feature that regularly provides new features or corrections to the program

- Keeping Windows up-to-date is a critical part of keeping your computer in working order

Operating System Functions

- Operating systems often provide users with a variety of tools related to managing a computer, its devices, or its programs

File Manager: Displays, organizes, copies, renames, deletes, moves, and sorts files.

Search: Locates files based on specific criteria.

Image Viewer: Displays, copies, and prints graphics files.

Uninstaller: Removes programs or apps and associated system entries.

Disk Cleanup: Removes unnecessary files.

Disk Defragmenter: Reorganizes files and unused space for faster access.

**Screen Saver:** Shows a moving image or blank screen after inactivity.

Operating System Functions

- **Network administrators** and computer owners usually have an *administrator account*.

- This account allows them to access all files and programs, install programs, and set settings that affect all users on a computer, mobile device, or network.

- **A user account** enables a use to sign in to, or access resources on, a network or computer
  - A **user name**, or user ID, identifies a specific user
  - A **password** is a private combination of characters associated with the user name
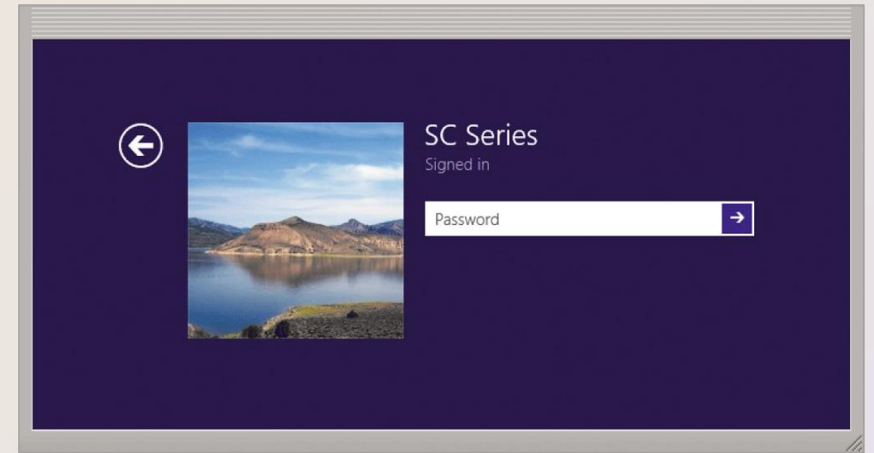
Desktop Operating Systems

- A **desktop operating system** is a complete operating system that works on desktops, laptops, and some tablets

Windows	Mac OS	UNIX	Linux	Chrome OS
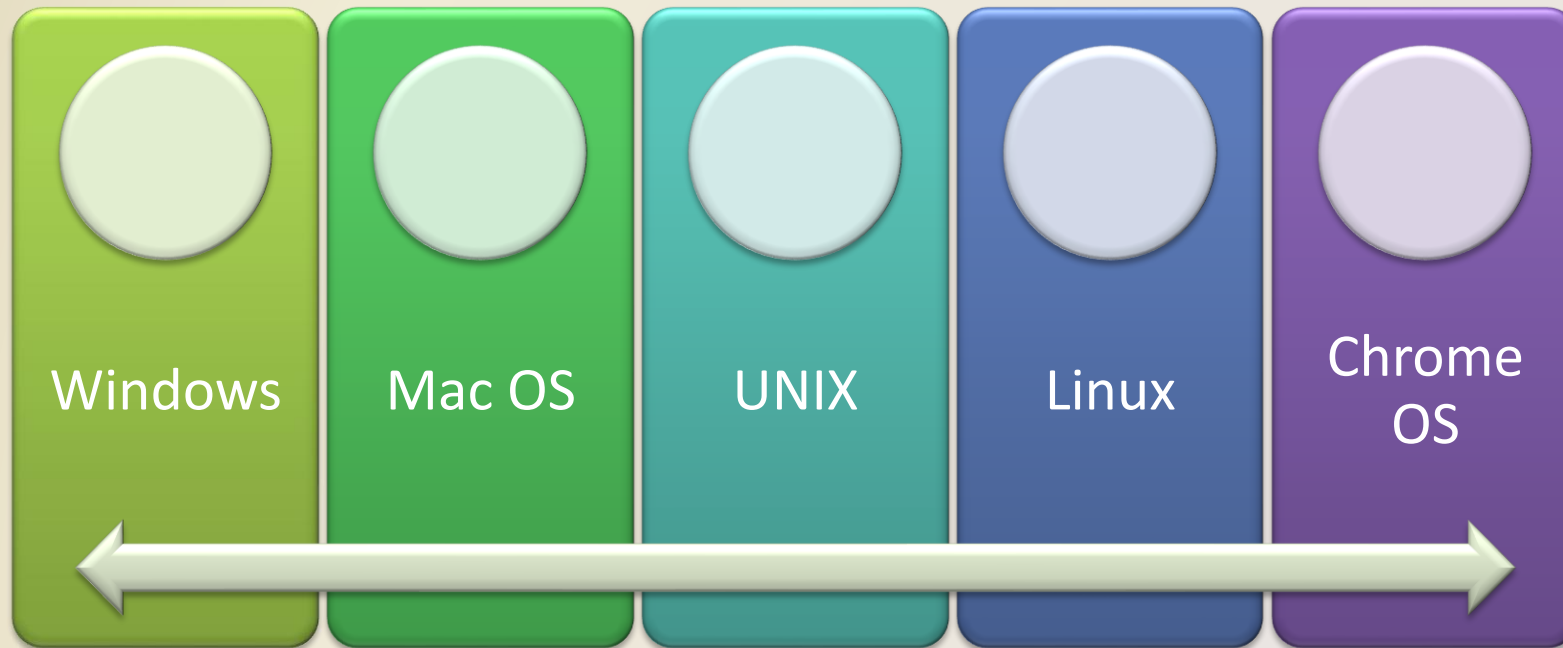
Desktop Operating Systems

- **Windows OS offers the following features:**
  - **Smart App Control**: Available only on the latest version of Windows 11 after a fresh system reset. Limited to North America and Europe.
  - **Microsoft Copilot**: May require a Windows Update or app download from the Microsoft Store.
  - **Bluetooth Connectivity**: Required for certain features.
  - **iPhone Compatibility:**
    - Supports iOS 14+ (no iPadOS support).
    - Limited messaging (no group messaging or media sharing). Messages are session-based and require an active phone connection.
  - **Microsoft Clipchamp**: Advanced features require a paid subscription (e.g., 4K output, premium effects).
  - **Hardware-Specific Features:**
    - Microphone required for voice features.
    - Touchscreen capability for certain functionalities.
    - Pen support requires a compatible device and pen accessory.
  - **PC Health Check App**: Required for Windows 10 S mode users.
  - **Upgrade Eligibility**: Windows 11 is available for PCs meeting minimum specifications; some features depend on hardware and region.
  - **OneDrive Integration**: Access images and files linked to your Microsoft account.

Summary

Highlight features shared by most operating systems.

Explore features shared by Windows OS.

THANK YOU ☺