Al Mustaqbal University
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Computer Science

Lecture 6
Operating System

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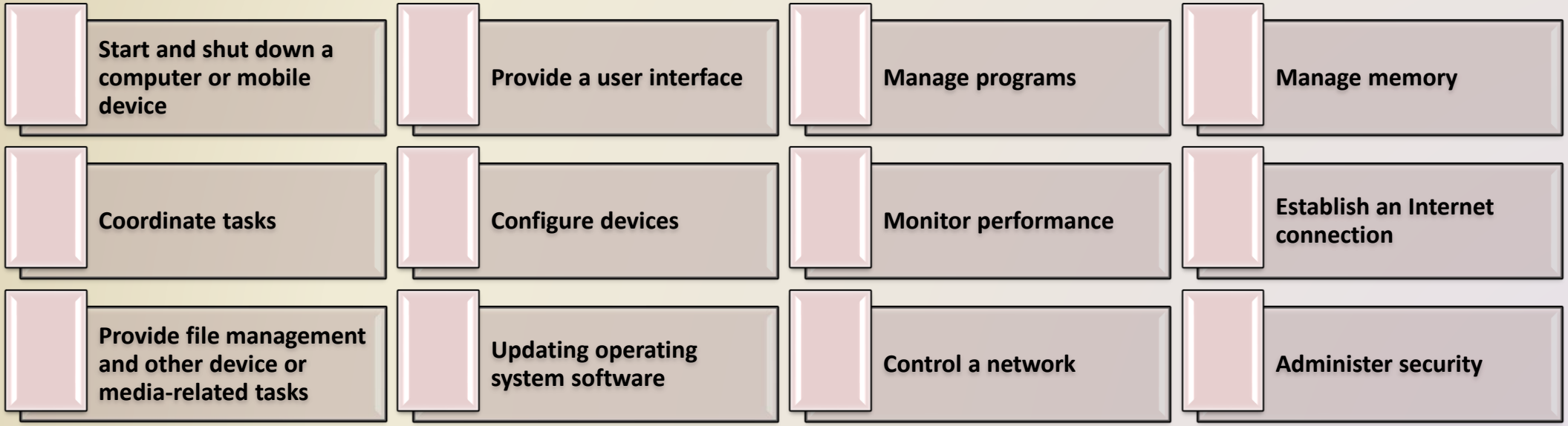
Objectives Overview

- 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:



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

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

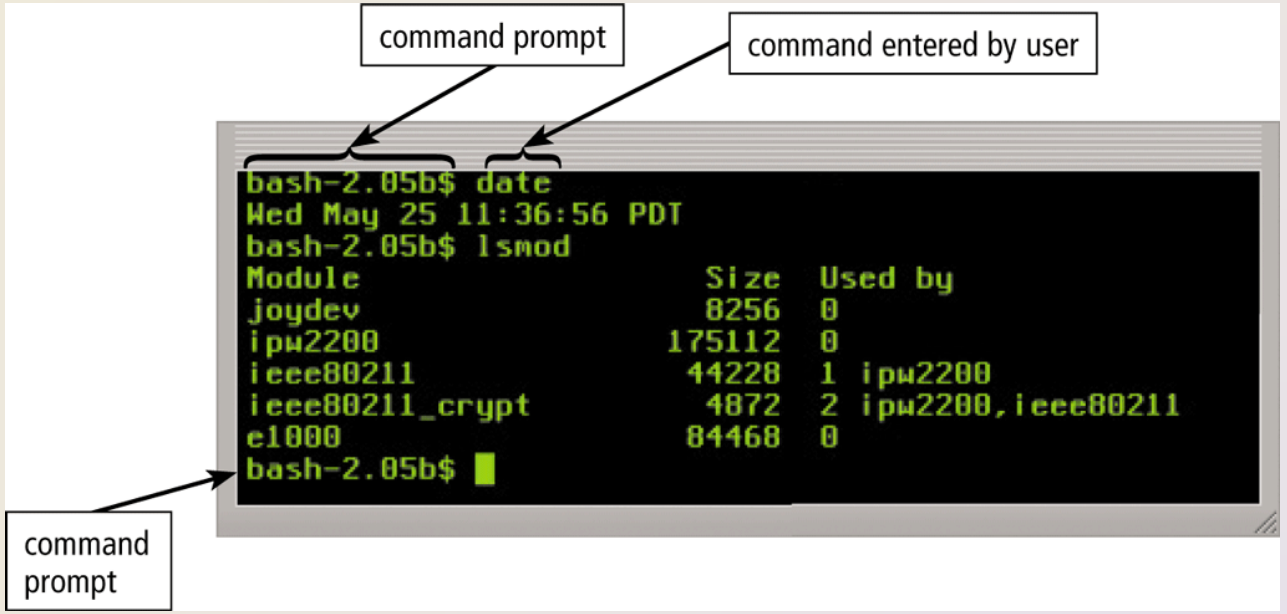
Operating System Functions

- 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

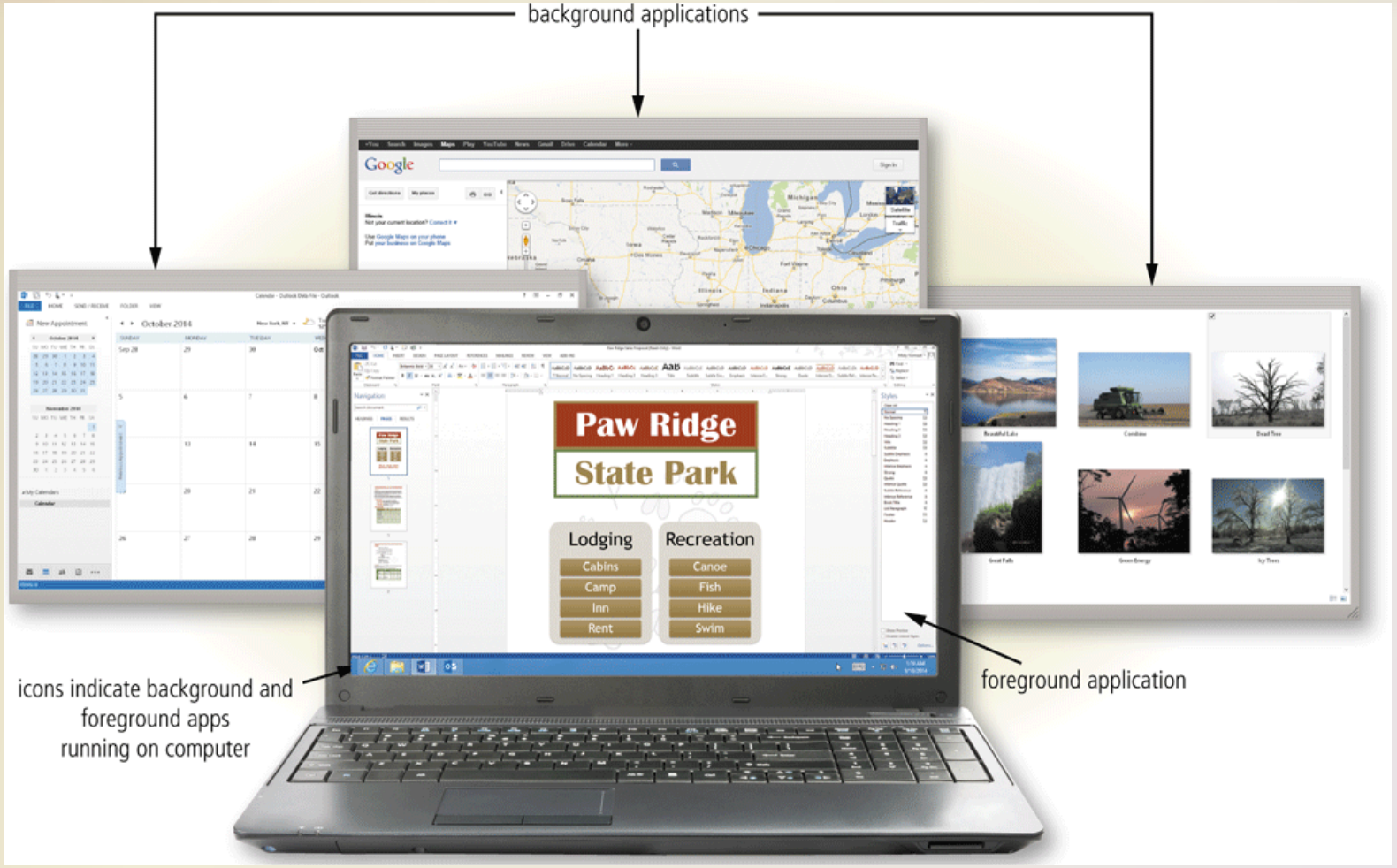
Operating System Functions

- **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

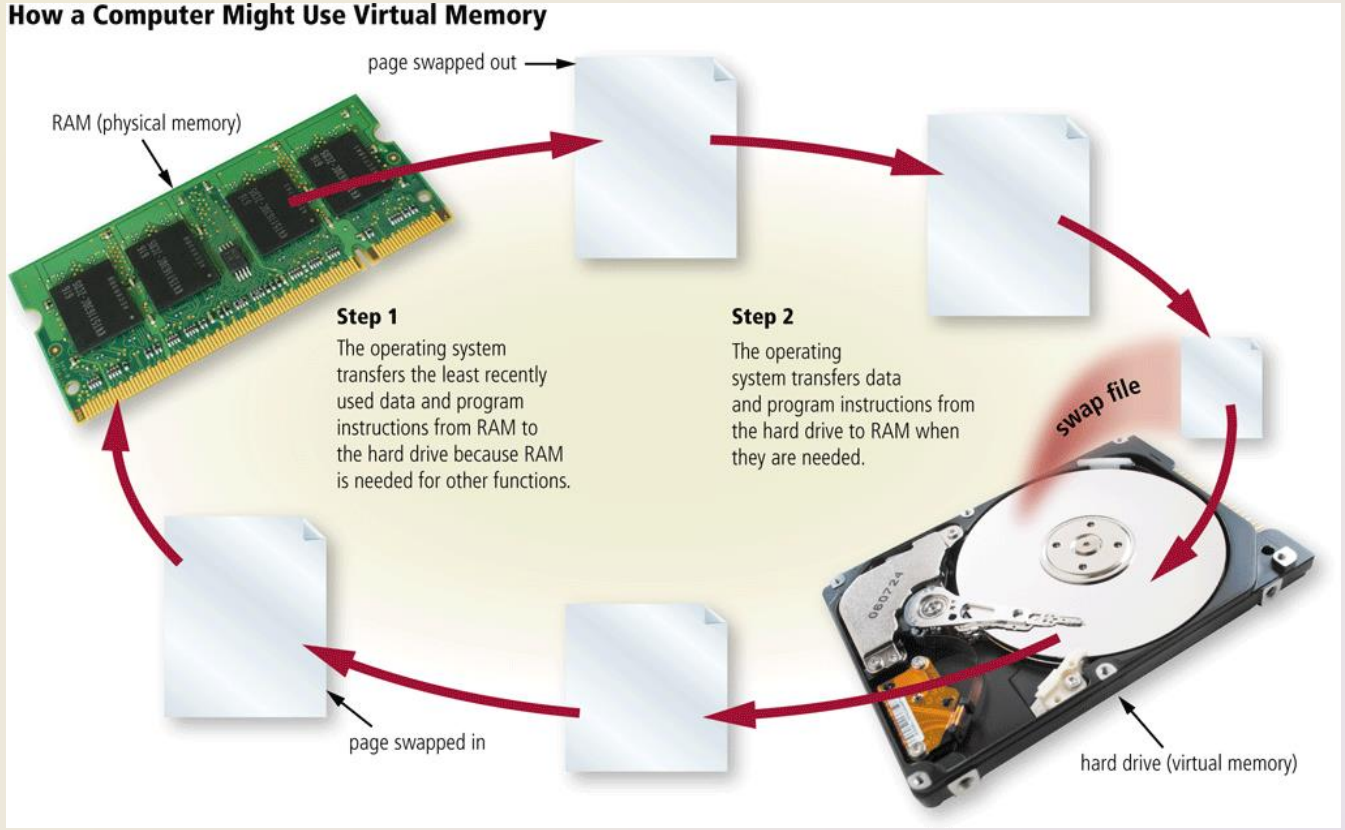
- **Multiuser Operating System:**
  - Allows multiple users to run programs simultaneously.
  - Used in networks, servers, mainframes, and supercomputers, supporting hundreds or thousands of users at once.
- **Multiprocessing Operating System:**
  - Supports multiple processors running programs simultaneously, increasing processing speed through coordinated processing.

Operating System Functions



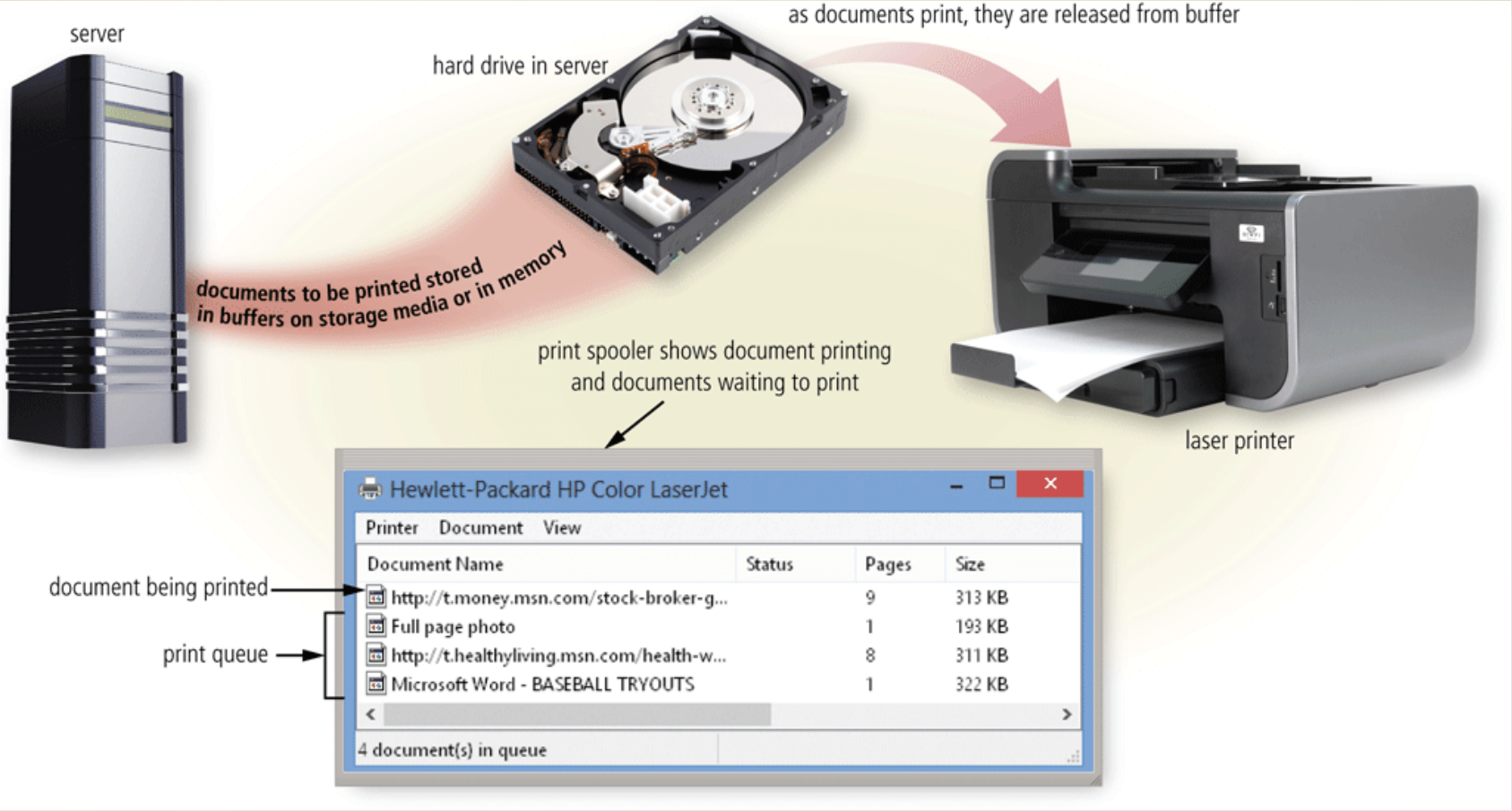
Operating System Functions

- 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



Operating System Functions

- The **operating system** determines the order in which tasks are processed



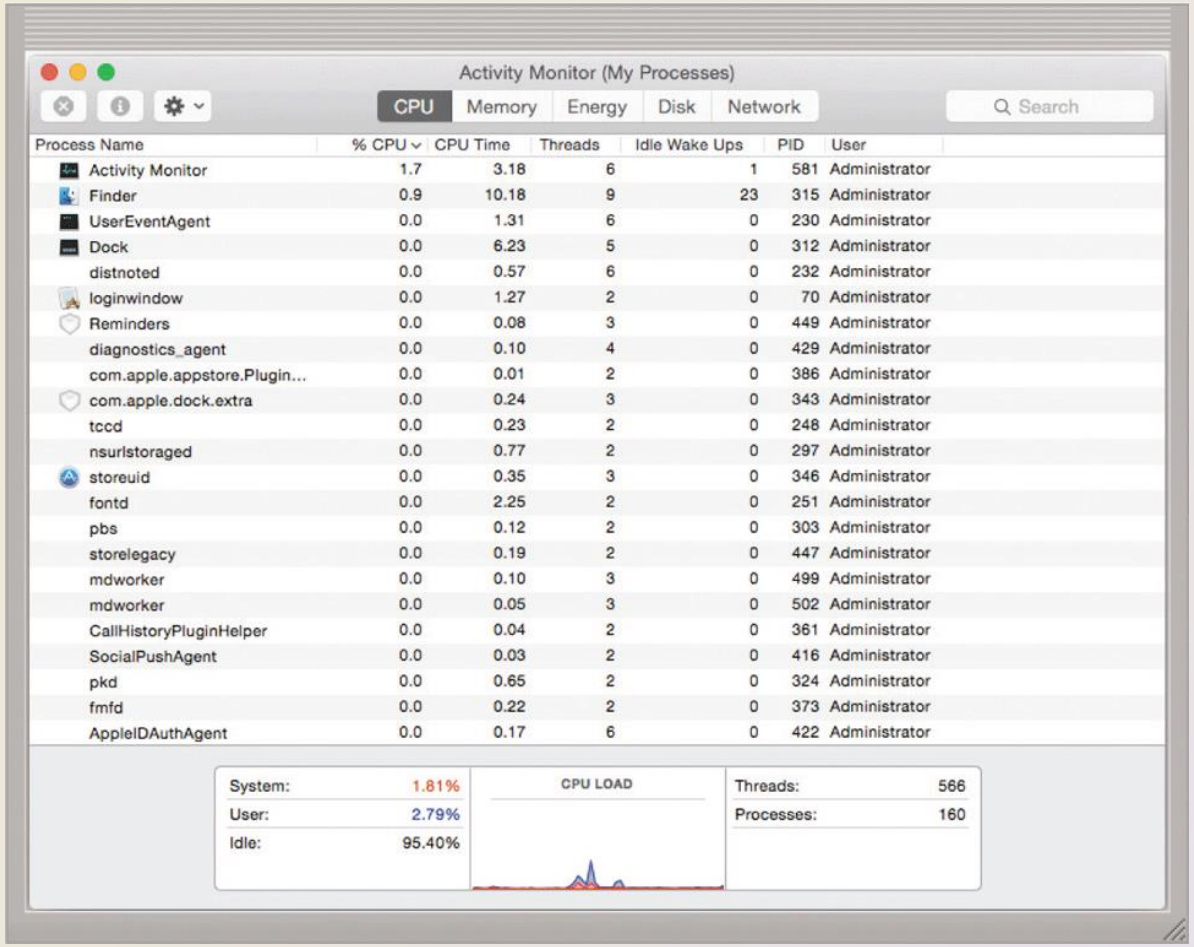
Operating System Functions

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

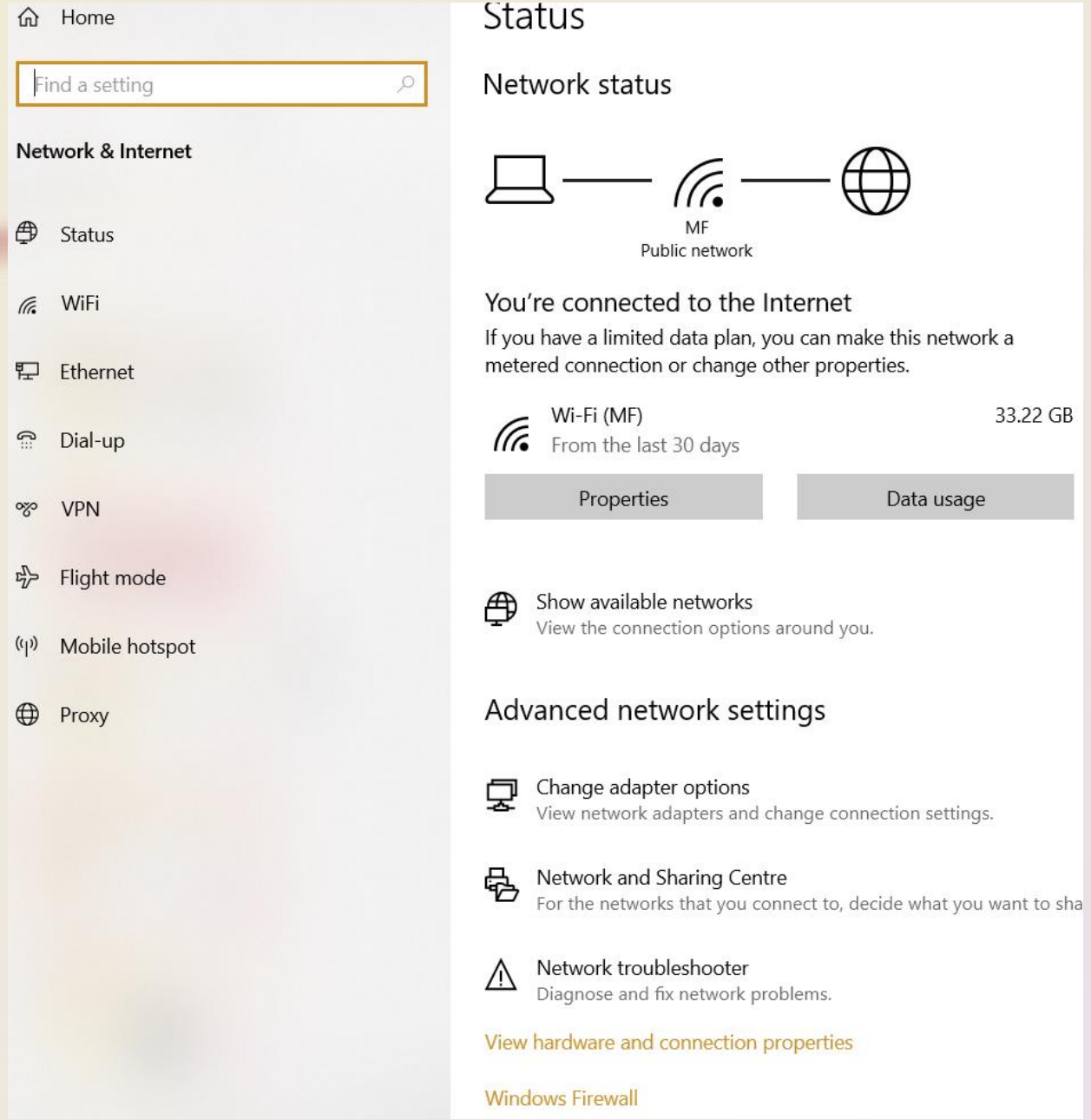
Operating System Functions

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



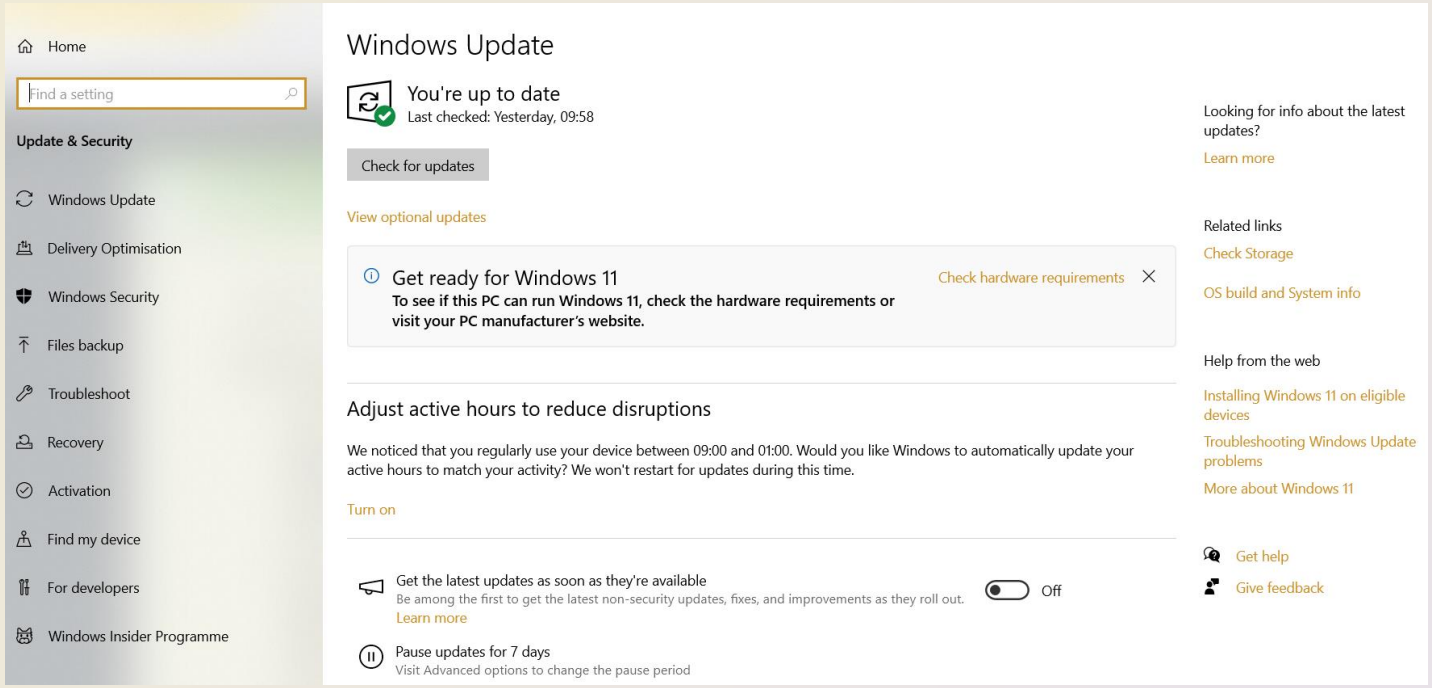
Operating System Functions

- 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

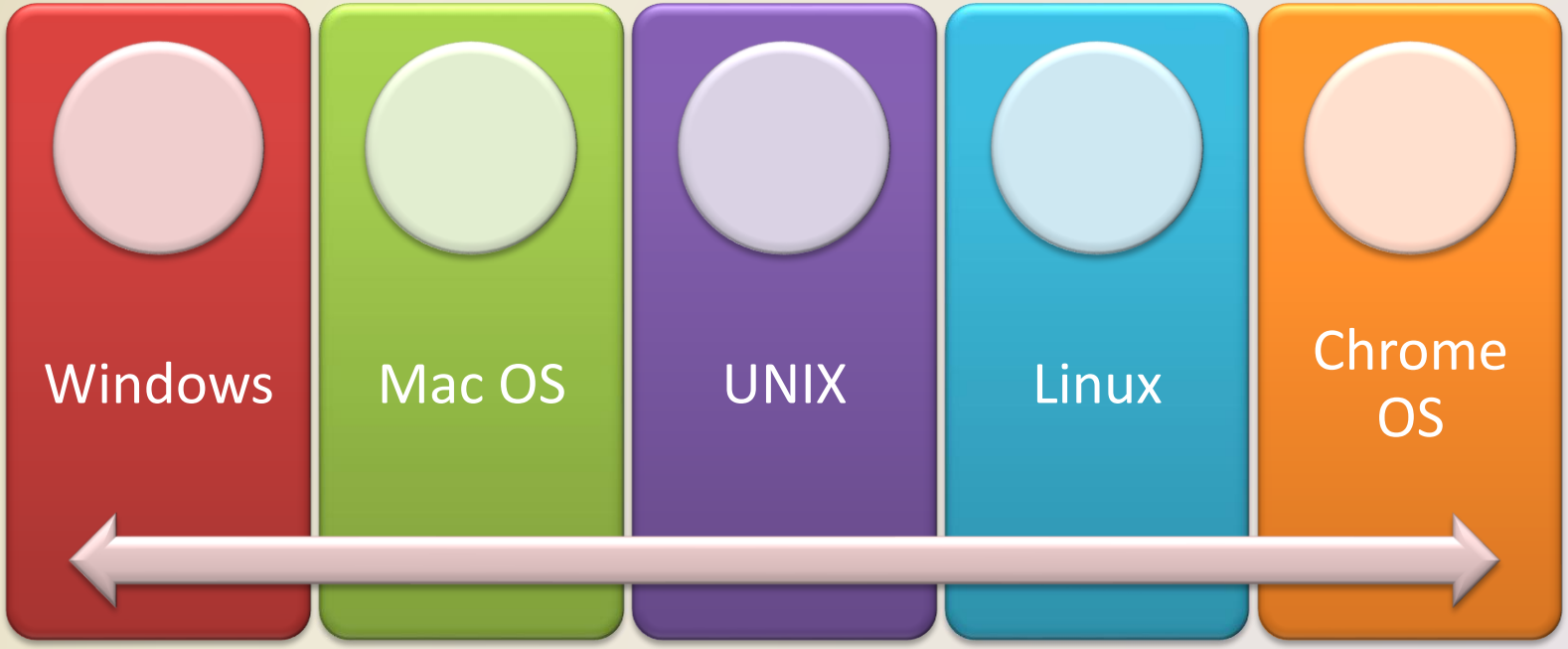
- **File Manager:** Displays, organizes, copies, renames, deletes, moves, and sorts files.
- **Search:** Locates files based on specific criteria.
- **Image Viewer:** Displays, copies, and prints graphics files.
- **Uninstaller:** Removes programs or apps and associated system entries.
- **Disk Cleanup:** 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



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 ☺