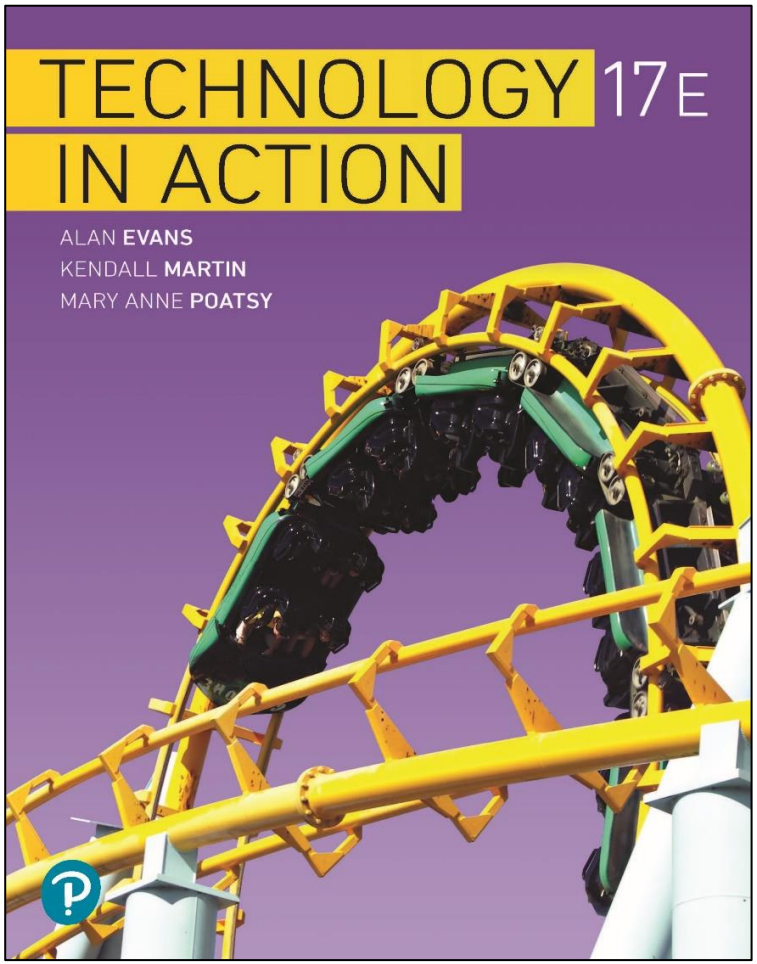
Technology in Action

Seventeenth Edition



Chapter 2

Looking at Computers:
Understanding the Parts

Learning Objectives (1 of 3)

2.1 Describe the four main functions of a computer system and how they interact with data and information.

2.2 Define bits and bytes, and describe how they are measured, used, and processed.

2.3 List common types of computers and discuss their main features.

2.4 Identify the main types of keyboards and touch screens.

2.5 Describe the main types of mice and pointing devices.

Learning Objectives (2 of 3)

2.6 Explain how images, sounds, and sensor data are input into computing devices.

2.7 Describe options for outputting images and audio from computing devices.

2.8 Describe various types of printers and explain when you would use them.

2.9 Describe the functions of the motherboard and RAM.

2.10 Explain the main functions of the CPU.

Learning Objectives (3 of 3)

2.11 Describe the various means of storing data and information with computing devices.

2.12 Describe common types of ports used today.

2.13 Describe how to manage power consumption on computing devices.

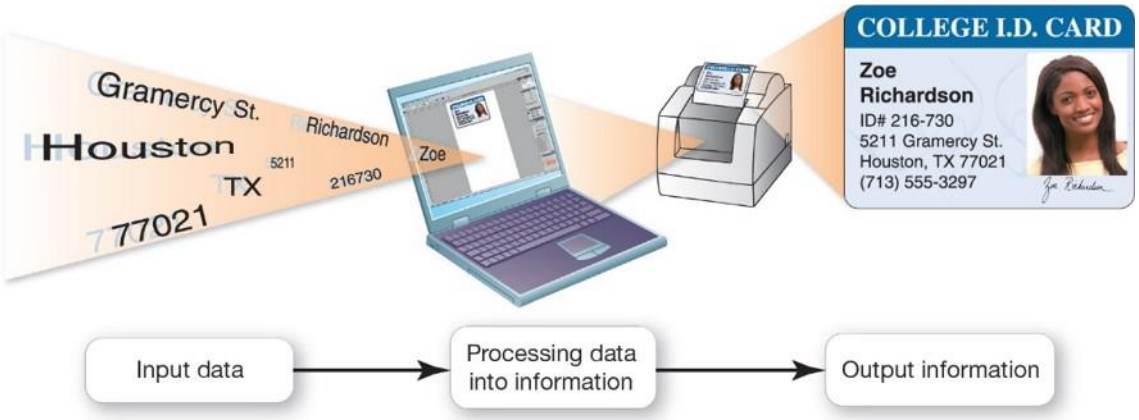
2.14 Define ergonomics and discuss the ideal physical setup for using computing devices.

Understanding Your Computer

Computers are Data Processing Devices (Objective 2.1)

Computer performs four major functions

1. Input: Gathers data, allows entering data
2. Process: Manipulates, calculates, or organizes data
3. Output: Displays data and information
4. Storage: Saves data and information



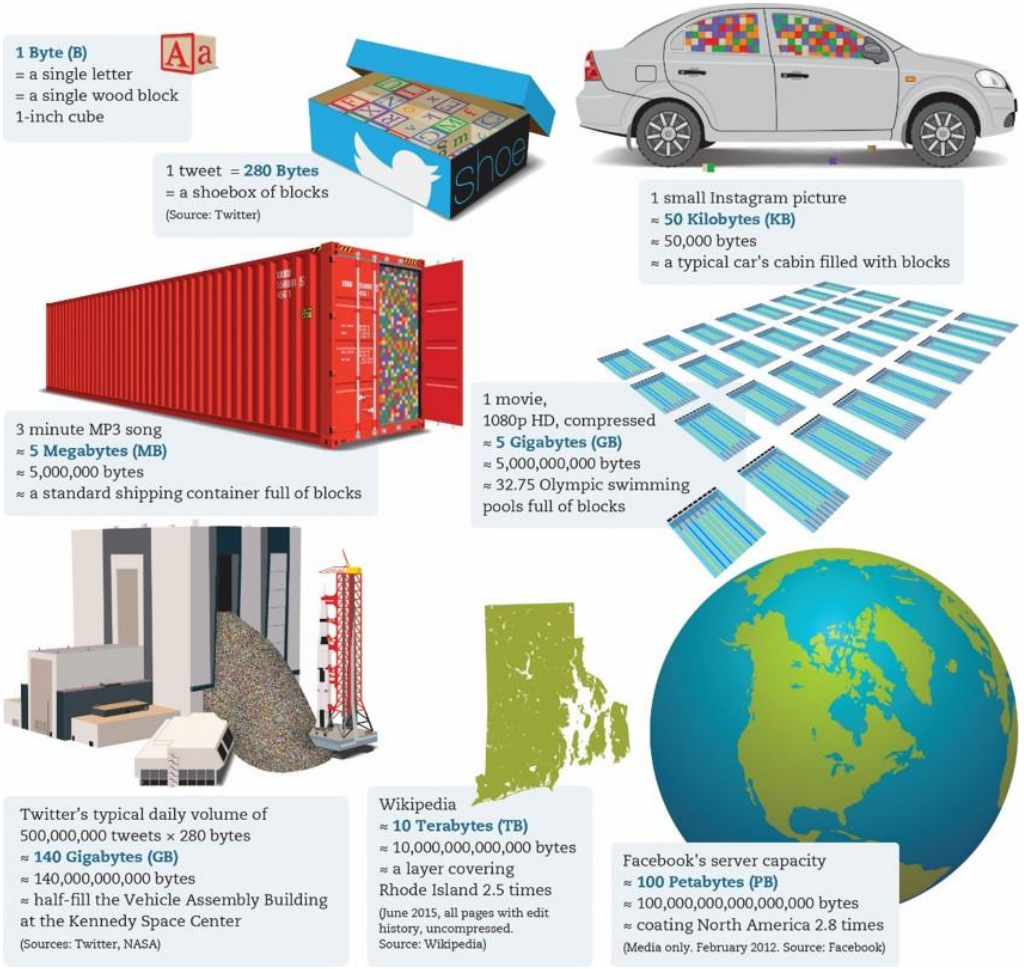
Understanding Your Computer (1 of 2)

Binary: The Language of Computers (Objective 2.2)

- Bit
  - Binary digit
  - 0 or 1
- Byte
  - Unique combinations of 8 bits of 0s and 1s
- Kilobytes, megabytes, gigabytes, terabytes, and petabytes

Understanding Your Computer (2 of 2)

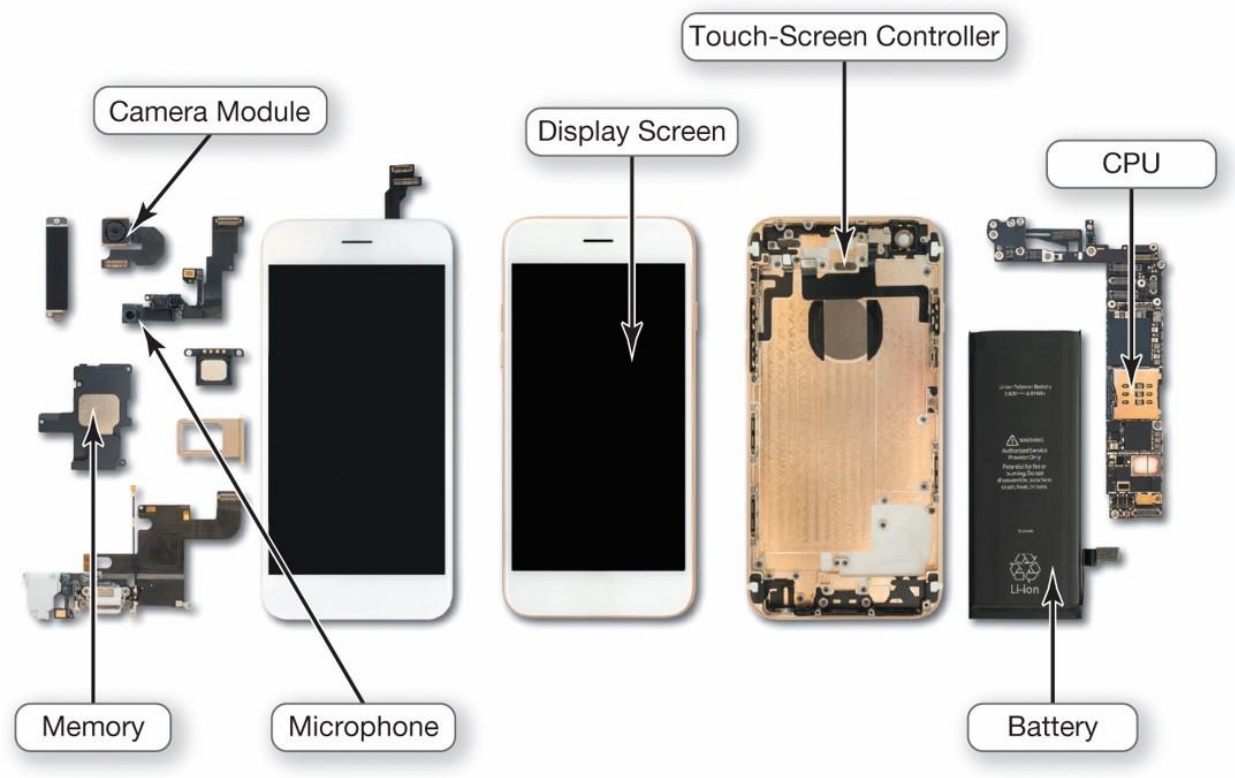
Binary: The Language of Computers (Objective 2.2)



Understanding Your Computer (1 of 4)

Types of Computers (Objective 2.3)

- Cell phones



Understanding Your Computer (2 of 4)

Types of Computers (Objective 2.3)

- Tablets
- Laptops and their variants
  - Ultrabook
  - Chromebook
  - 2-on-1

Understanding Your Computer (3 of 4)

Types of Computers (Objective 2.3)

- Stationary computers
  - All-in-one computer

Understanding Your Computer (4 of 4)

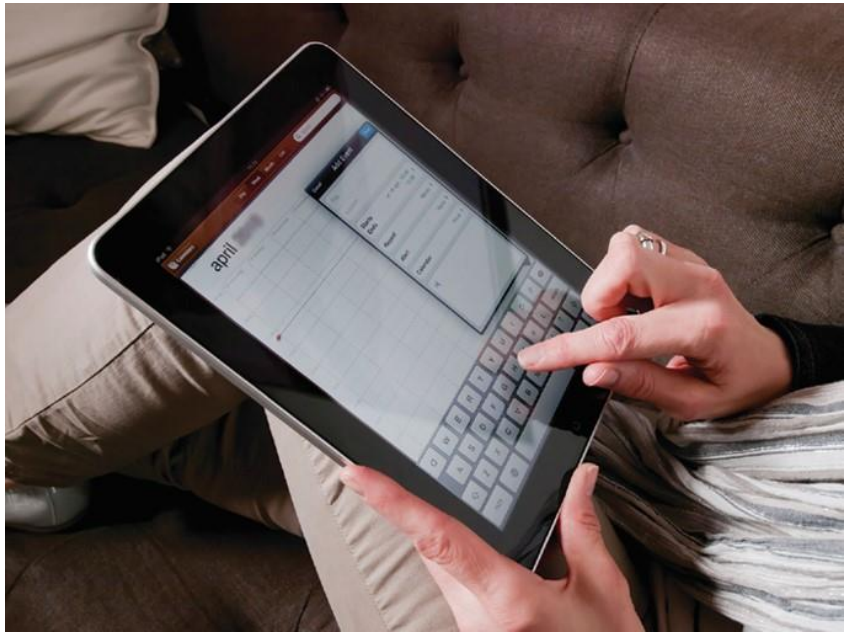
Types of Computers (Objective 2.3)

- Other types of computers
  - Mainframe computer
  - Supercomputer
  - Embedded computer

Input Devices

Physical Keyboards and Touch Screens (Objective 2.4)

- Used to enter data and instructions
- Examples
  - Keyboard
  - Touch screen
  - Stylus
  - Virtual keyboard



Input Devices

Mice and Other Pointing Devices (Objective 2.5)

- Mouse
- Touch pad (trackpad)
- Game controllers

Input Devices (1 of 2)

Image, Sound, and Sensor Input (Objective 2.6)

- Popular for images
  - Digital cameras
  - Camcorders
  - Mobil device cameras
  - Flatbed scanners
  - Webcams
- Popular for sound
  - Microphone with voice recognition software

Input Devices (2 of 2)

Image, Sound, and Sensor Input (Objective 2.6)

- Magnetometer
- Proximity sensor
- Light sensor
- Accelerometer
- Gyroscope
- Barometer
- Thermometer
- Pedometer
- Fingerprint sensor
- Heart rate monitor

Output Devices (1 of 4)

Image and Audio Output (Objective 2.7)

- Send data out of the computer in the form of:
  - Text
  - Pictures
  - Sounds
  - Video
- Examples
  - Monitors
  - Printers
  - Speakers and headphones/earbuds

Output Devices (2 of 4)

Image and Audio Output (Objective 2.7)

- Types of display screens
  - Liquid crystal display (LCD)
  - Light-emitting diode (LED)
  - Organic light-emitting diode (O LED)
- How they work
  - Pixels (picture elements)
  - Aspect ratio (relationship between the height and width of the screen.)
  - Resolution (number of pixels that can be displayed)

Output Devices (3 of 4)

Image and Audio Output (Objective 2.7)

- Large group displays
  - Projectors
  - Interactive whiteboards

Output Devices (4 of 4)

Image and Audio Output (Objective 2.7)

- Speaker
  - Output device for sound
  - Surround-sound speakers
  - Wireless speaker systems
- Headphones or earbuds
  - Hearing might be damaged by excessive volume when using earbuds

Output Devices (1 of 2)

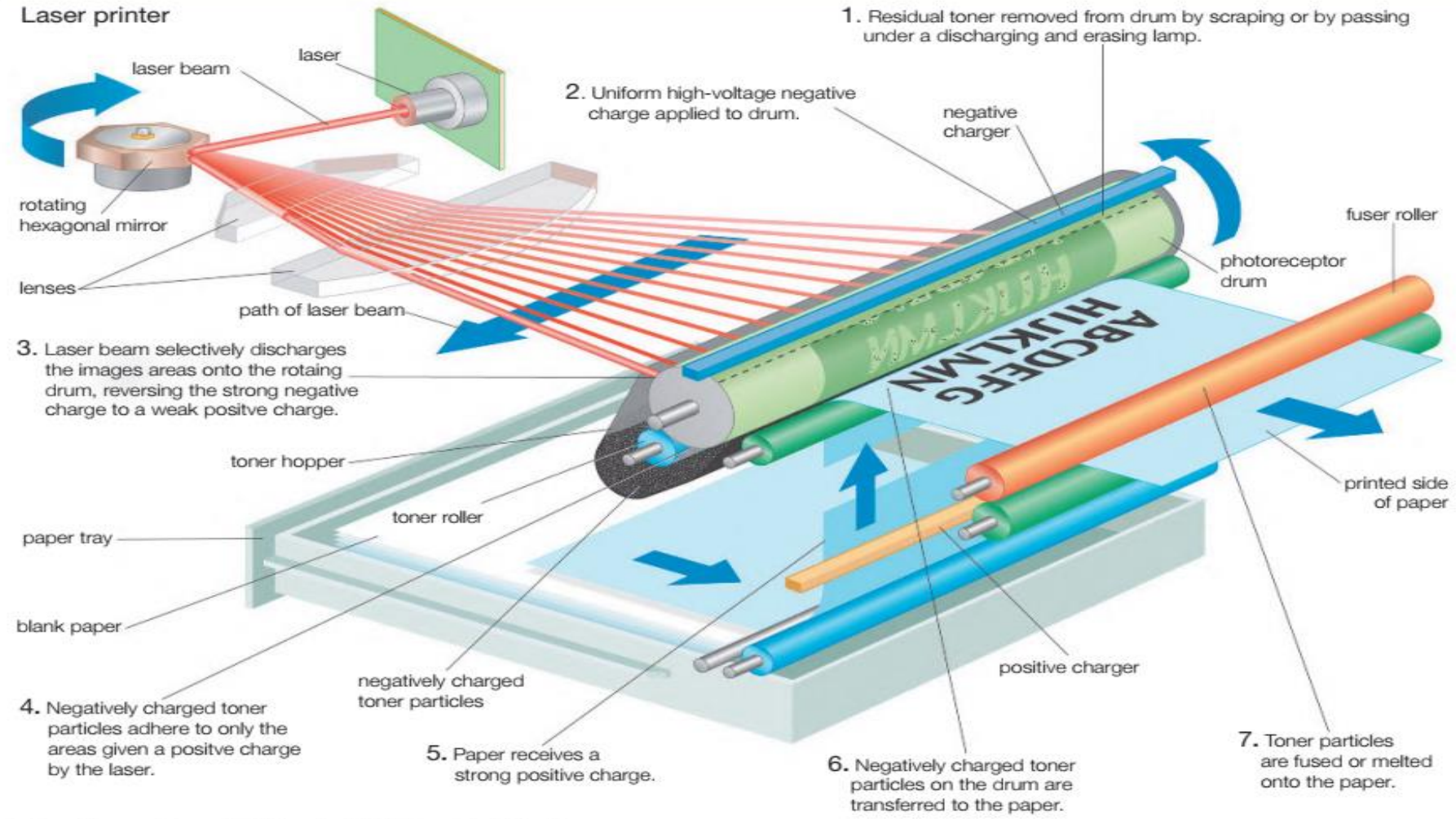
Printers (Objective 2.8)

- Inkjet
  - Affordable
  - High-quality color
  - Quick and quiet
- Laser
  - Faster printing speed
  - Higher-quality printouts
  - More expensive

Output Devices (1 of 2)

Printers (Objective 2.8)

Figure 2.27 How Laser Printers Work



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Output Devices (2 of 2)

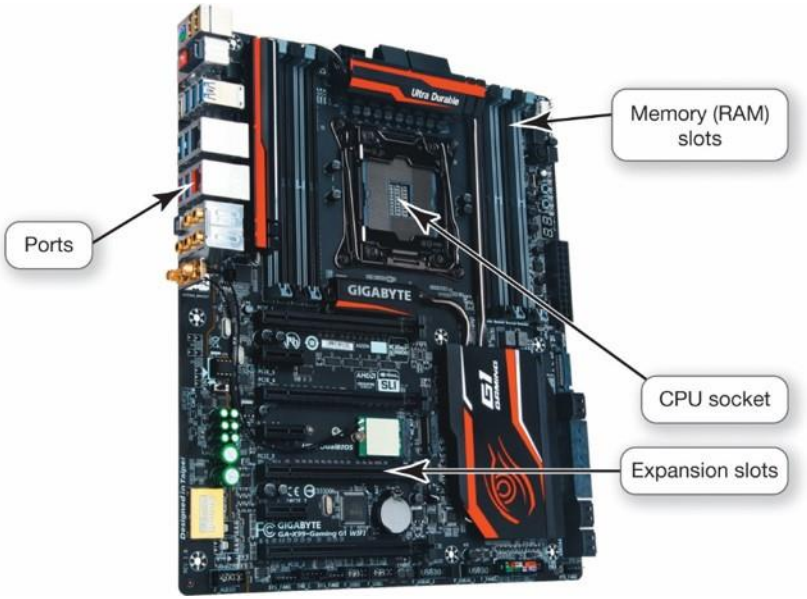
Printers (Objective 2.8)

- All-in-one printer
  - Printer, scanner, copier, and fax
- Large format printer
  - Prints oversize images
- 3D printer

Processing and Memory on the Motherboard

The Motherboard and Memory (Objective 2.9)

- Motherboard
  - CPU
  - ROM, RAM, and cache
  - Slots for expansion cards
  - Sound/video cards
  - Network interface card



Processing and Memory on the Motherboard (1 of 2)

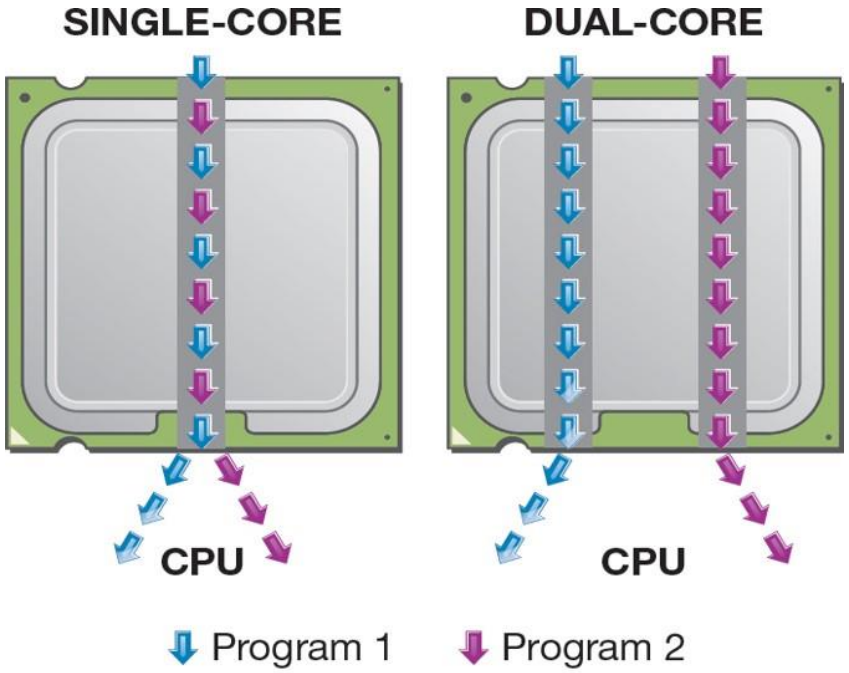
Processing (Objective 2.10)

- Central processing unit (CPU) or processor
  - "Brains" of the computer
  - Controls all functions of the computer's components
  - Processes all commands and instructions
  - Gigahertz (billions of tasks per second)

Processing and Memory on the Motherboard (2 of 2)

Processing (Objective 2.10)

- CPU performance measures
  - Processor speed measured in hertz (Hz)
    - Gigahertz (GHz)
  - Number of cores
    - Single
    - Dual
    - Quad
    - Ten



Storing Data and Information (1 of 3)

Storage Options on Computing Devices (Objective 2.11)

- Local storage devices
  - Hard disk drive
    - Primary storage device
    - Nonvolatile storage
    - Internal drive
    - External hard drive
  - Solid-state drive (SSD)

Storing Data and Information (2 of 3)

Storage Options on Computing Devices (Objective 2.11)

- Portable storage options
  - Portable external drives
  - Flash drive
  - Flash memory card

Storing Data and Information (3 of 3)

Storage Options on Computing Devices (Objective 2.11)

- Cloud storage
  - Files stored on the Internet
  - Some amount is free
  - Can purchase additional storage

Connecting Peripherals to the Computer

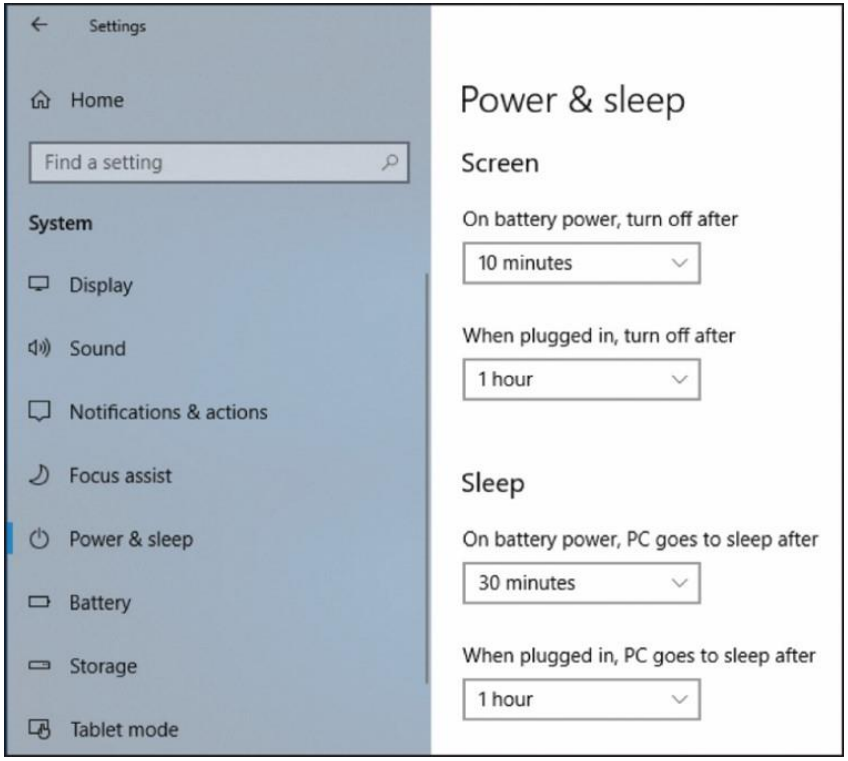
Computer Ports (Objective 2.12)

- Thunderbolt
  - Transfer speeds up to 40 Gbps
- Universal serial bus (USB) port
  - Transfer speeds of 10 Gbps
- Connectivity port
  - Ethernet port
  - Up to 10,000 Mbps
- HDMI port

Power Management and Ergonomics

Power Controls and Power Management (Objective 2.13)

- Battery drain
- Power supply
- Sleep mode
- Warm/cold boot
- Hibernate



Power Management and Ergonomics (1 of 2)

Setting It All Up: Ergonomics (Objective 2.14)

- Ergonomics
- Guidelines
  - Monitor position
  - Adjustable chair
  - Proper typing position
  - Breaks
  - Adequate lighting

Power Management and Ergonomics (2 of 2)

Setting It All Up: Ergonomics (Objective 2.14)

- Assistive (adaptive) technologies
  - Voice recognition or special keyboards for visually impaired
  - Special trackballs for users with motor control issues