Chapter 3 Objectives

- Data and instructions
- Various techniques of input
- Commonly used input devices
- Hard disk, CD, DVD
- Commonly used output devices
- Processing and organizing input into output
- Various methods of output
What Is Input

- What is *input*?
  - Data or instructions entered into the memory of computer
  - **Input device** is any hardware component that allows users to enter data and instructions
What is a keyboard?

- Input device that contains keys users press to enter data into a computer
- Includes typing area, numeric keypad, and function keys
- Can be cordless or built-in
What is a mouse?

- Pointing device that fits under the palm of your hand
  - Pointing device controls movement of pointer

- Mechanical mouse has rubber or metal ball on its underside
What are a touchpad and a pointing stick?

- **Touchpad** is small, flat, rectangular pointing device sensitive to pressure and motion.
- **Pointing stick** is pointing device shaped like pencil eraser positioned between keys on keyboard.
Keyboard and Pointing Devices

- What is a touch screen?
  - Touch areas of screen with finger
  - Often used with kiosks
What are the types of game controllers?

- Gamepad
- Joystick
- Wheel
- Light gun
- Dance pad
- Motion-sensing game controller
What is a touch-sensitive pad?

- Input device on a portable media player that enables users to scroll through and play music, view pictures, watch videos or movies, adjust volume, and customize settings
- Click Wheel
Other Types of Input

- **Voice input** is the process of entering input by speaking into a microphone.

- **Voice recognition** is the computer’s capability of distinguishing spoken words.

- **Audio input** is the process of entering any sound into the computer.
Other Types of Input

- What is a Tablet PC?
  - Mobile computer
  - Primary input device is a pressure-sensitive digital pen
Other Types of Input

- What is a digital camera?
  - Allows you to take digital pictures
  - Images viewable immediately on camera
    - Download to computer
    - Post pictures to Web
Two factors affect the quality of digital camera photos:

- **Resolution** is the number of horizontal and vertical pixels in a display device.
- A pixel is the smallest element in an electronic image.

- Each pixel consists of one or more bits of data.
- The more bits used to represent a pixel, the more colors and shades of gray that can be represented.
Other Types of Input

What is video input?

- Process of capturing full-motion images and storing them on a computer’s storage medium

- Digital video (DV) camera records video as digital signals
Other Types of Input

What is a PC video camera and a Web cam?

- **PC video camera**—DV camera used to capture video and still images, and to make video telephone calls on Internet
  - Also called **PC camera**
- **Web cam**—video camera that displays its output on a Web page
Other Types of Input

- What is video conferencing?
- Two or more geographically separated people who use a network or the Internet to transmit audio and video data
Other Types of Input

What is a scanner?

- Light-sensing device that reads printed text and graphics
  - Used for image processing, converting paper documents into electronic images
Other Types of Input

- What is an optical reader?

  - **Device that uses light source to read characters, marks, and codes and then converts them into digital data**
    - **Optical character recognition (OCR)** software technology that converts scanned text from images (picture of the text) to an editable text
    - **Optical mark recognition (OMR)** technology that reads "bubbles" marks and converts them into computer-usable form
    - **Bar code reader**
What is an RFID reader?

- RFID (radio frequency identification) uses radio signals to communicate with a tag placed in or attached to an object
  - Can be handheld devices or mounted in a stationary object
- Inventory
- Location of soldiers
- Employee wardrobes
- Airline baggage
- Gauging tire pressure and temperature
- Library books
- Prepaid tolls
RFID can track:

- Inventory
- Location of soldiers
- Employee wardrobes
- Airline baggage
- Gauging tire pressure and temperature
- Library books
- Prepaid tolls
What is a magnetic stripe card reader?

- Reads the magnetic stripe on the back of a credit card
- Exposure to a magnetic field can erase the contents of a card’s magnetic stripe
What is a magnetic-ink character recognition (MICR) reader?

- Can read text printed with magnetized ink
- Banking industry almost exclusively uses MICR for check processing
What is a **point of sale (POS) terminal**?

- Records purchases, processes credit or debit cards, and updates inventory.
Other Types of Input

- What is an **automated teller machine (ATM)**?
  - Self-service banking machine that connects to a host computer through a network
Other Types of Input

- What is biometrics القياسات الحيوية؟
  - Authenticates يصادق
  - person’s identity by verifying a personal characteristic

- **Fingerprint scanner** captures curves and indentations of a fingerprint منحنيات والمسافات البادئة من بصمات الأصابع
What are examples of biometric technology?

- Voice verification system compares live speech with stored voice pattern
- Signature verification system recognizes shape of signature
- Iris recognition system reads patterns in blood vessels in back of eye
  - Biometric data is sometimes stored on smart card, which stores personal data on microprocessor embedded in card
translation

- Fingerprint reader
- Face recognition system

Hand geometry system
- Retinal scanners
- Iris recognition system

Signature verification system
Biometrics authenticates a person’s identity by verifying a personal characteristic.
Other Types of Input

fingerprint reader

iris recognition system
A terminal is a computer that allows users to send data to and/or receive information from a host computer.

- A POS terminal records purchases, processes payment, and updates inventory.
- An automated teller machine (ATM) allows users to access their bank accounts.
- A DVD kiosk is a self-service DVD rental machine.
What is Output

- What is output?
  - Data that has been processed into a useful form
  - Output device is any hardware component that can convey information to one or more people
Display Devices

- What is a display device?
  - Output device that visually transfer text, graphics, and video information
    - Typically used with desktop computers
  - Monitor houses display device as separate peripheral
Display Devices

- What is an **LCD monitor**?
  - Uses liquid crystal display
  - Mobile devices that contain LCD displays include
    - Notebook computer, Tablet PC, ultra personal computer, portable media player, smartphone, and PDA
Display Devices

- What is a plasma monitor?
  - Uses gas plasma technology
    - Larger screen size and richer colors than LCD, but are more expensive
Display Devices

What is a CRT monitor?

- Contains cathode-ray tube (CRT)
- Common sizes are 15, 17, 19, 21, and 22 inches
  - Viewable size is diagonal measurement of actual viewing area
Display Devices

What determines the quality of a CRT monitor?

- Screen resolution
- Text created with a smaller dot pitch is easier to read
- Refresh rate is speed at which monitor redraws images on screen
Printers

What is a **printer**?
Output device that produces text and graphics on a physical medium (hardcopy)

What is a **nonimpact printer**?

- **Ink-jet printer** sprays tiny drops of liquid ink onto paper

Forms characters and graphics without striking paper
- Prints in black-and-white or color on a variety of paper types
Printers

- What is a **photo printer**?
  - Color printer that produces photo-lab-quality pictures
  - Many photo printers have a built-in card slot
  - **PictBridge** is a standard technology that allows you to print pictures directly from a digital camera
Printers

- What is a laser printer?
  - High-speed, high-quality nonimpact printer
  - Prints text and graphics in high-quality resolution, ranging from 1,200 to 2,400 dpi
  - Typically costs more than ink-jet printer, but is much faster
Printers

What is a mobile printer?

- Small, lightweight, battery-powered printer that allows mobile user to print from notebook computer, Tablet PC, PDA, or smart phone while traveling
What is a plotter?

- Sophisticated printer used to produce high-quality drawings, maps, charts, and architectures diagrams
- **Large-format printer** creates photo-realistic-quality color prints
Printers

- What is an impact printer?
  - Forms characters by striking mechanism against inked ribbon that contacts paper
    - **Dot-matrix printer** produces printed images when tiny wire pins strike ribbon
    - **Line printer** prints entire line at a time
What is an audio output device?

- Computer component that produces music, speech, or other sounds
- Speakers, earphones, and ear buds are common devices
- Speakers, مكبرات الصوت
- Earphones سماعات
Other Output Devices

- What is *voice output*?
  - Computer talks to you through speakers on computer
  - Internet telephony allows you to have conversation over the Internet
Other Output Devices

- What is a facsimile (fax) machine?
  - Device that transmits and receives documents over telephone lines

What is a fax modem?

- Modem that allows you to send and receive electronic documents as faxes
Other Output Devices

- What is a *multifunction peripheral*?

  - Provides functionality of a printer, scanner, copy machine, and fax machine
Other Output Devices

- What is a data projector?
  - Device that takes the text and image from computer screen and projects it onto larger screen
Input and Output Devices for Physically Challenged Users

What input devices are available for those with physical limitations?

- Keyboards with larger keys
- Head-mounted pointer controls
  pointer on screen
What other output options are available for visually impaired users?

- Change Window settings, such as increasing size or changing color of text to make words easier to read
- Blind users can work with voice output
- Braille printer outputs information in Braille onto paper
Storage

- What is storage?
  - Holds data, instructions, and information for future use
  - Storage medium is physical material used for storage
    - Also called secondary storage, auxiliary, permanent, and external storage
Storage

What is a storage device?

- **Reading**: Process of transferring items from storage media to memory.
- **Writing**: Process of transferring items from memory to storage media.
- Hardware that records and retrieves items to and from storage media.

Functions as source of input.

Creates output.
What are tracks and sectors?

- **Track**: is narrow recording band that forms full circle on disk
- **Sector**: stores up to 512 bytes of data
Optical Discs

What are optical discs?

- Flat, round, portable metal discs made of metal, plastic, and lacquer
- Can be read only or read/write
- Most PCs include an optical disc drive
Microfilm and Microfiche

What are microfilm and microfiche?

- Store microscopic images of documents on roll or sheet of film
- Images recorded using computer output microfilm recorder

- Microfilm — 100- to 215-foot roll of film
- Microfiche — small sheet of film, usually 4” × 6”
Microfilm and Microfiche

- How do life expectancies of various media compare?

  - Microfilm and microfiche have longest life of any storage media

<table>
<thead>
<tr>
<th>MEDIA LIFE EXPECTANCIES* (when using high-quality media)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Type</td>
</tr>
<tr>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Magnetic disks</td>
</tr>
<tr>
<td>Optical discs</td>
</tr>
<tr>
<td>Microfilm</td>
</tr>
</tbody>
</table>

* according to manufacturers of the media