

Discovering Computers

Technology in a World of Computers,
Mobile Devices, and the Internet

Chapter 7

Input and Output



Objectives Overview

Differentiate among various types of keyboards: standard, compact, on-screen, virtual, ergonomic, gaming, and wireless

Describe characteristics of various pointing devices: mouse, touchpad, pointing stick, and trackball

Describe various uses of touch screens

Describe various types of pen input: stylus, digital pen, and graphics tablet

Describe various uses of motion input, voice input, and video input

Objectives Overview

Differentiate among various scanners and reading devices

Explain the characteristics of various displays

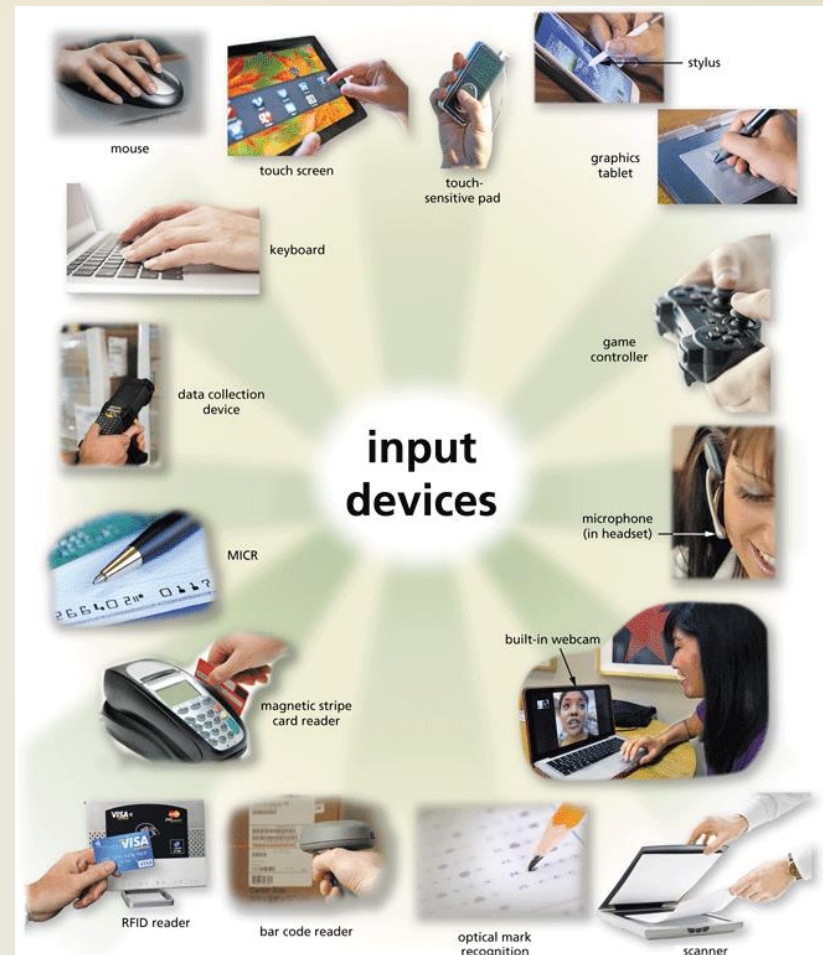
Summarize the various types of printers

Identify the purpose and features of speakers, headphones and earbuds, data projectors, interactive whiteboards, and force-feedback game controllers and tactile output

Identify various assistive technology input and output methods

What Is Input?

- **Input** is any data and instructions entered into the memory of a computer



What Is Input?

- Commonly used input methods include:

Keyboard

Pointing
devices

Touch screens

Pen input

Motion input

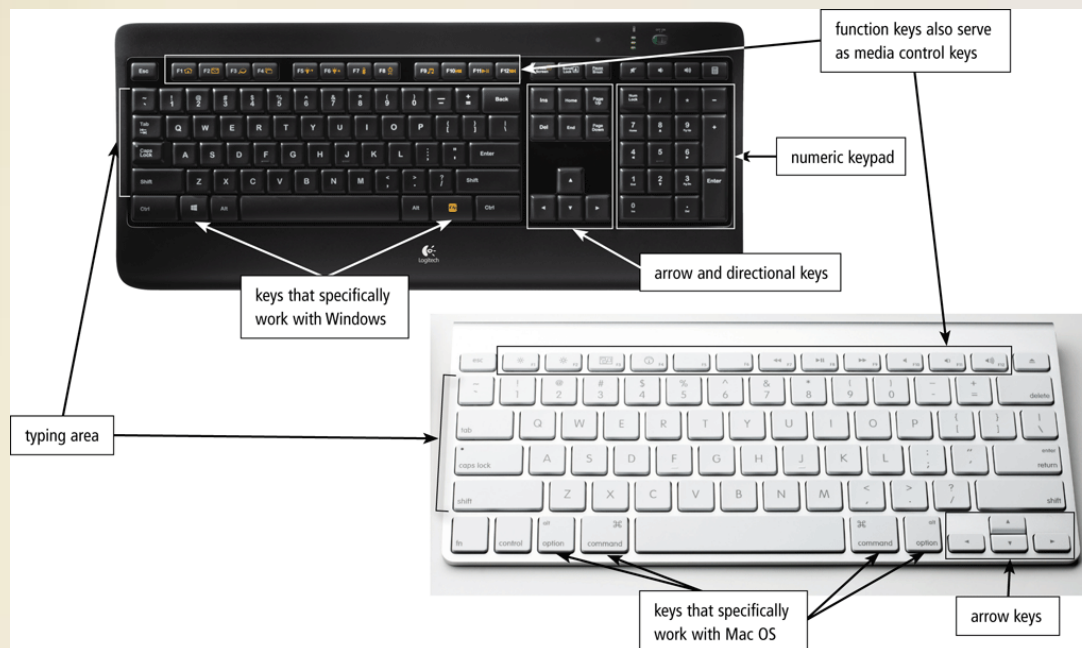
Voice input

Video input

Scanners and
reading
devices

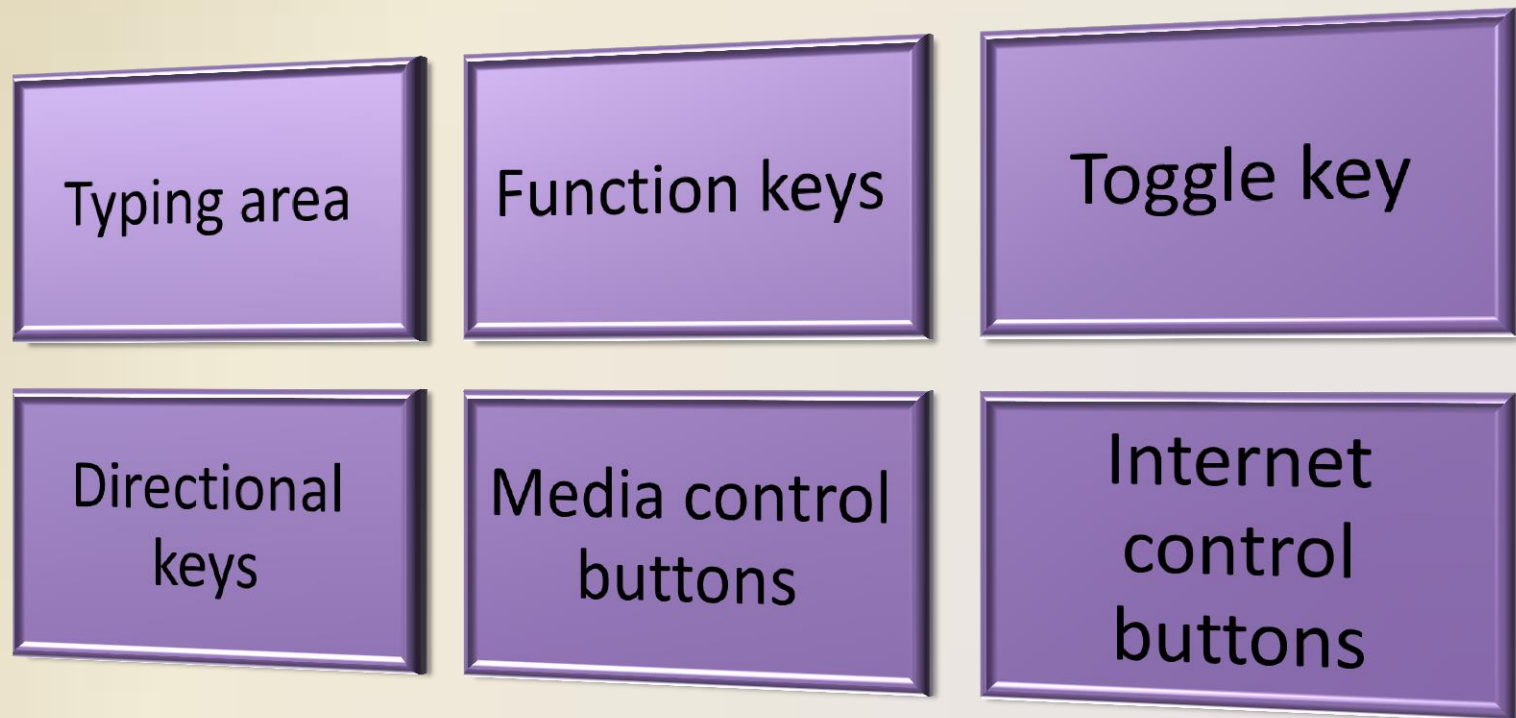
Keyboards

- A **keyboard** is an input device that contains keys users press to enter data and instructions into a computer or mobile device



Keyboards

- Most desktop computer keyboards have...



Keyboards

- There are various types of keyboards in addition to standard keyboards found on desktops



Keyboards

- An ergonomic keyboard has a design that reduces the chance of repetitive strain injuries
- Ergonomics incorporates comfort, efficiency, and safety into the design of the workplace

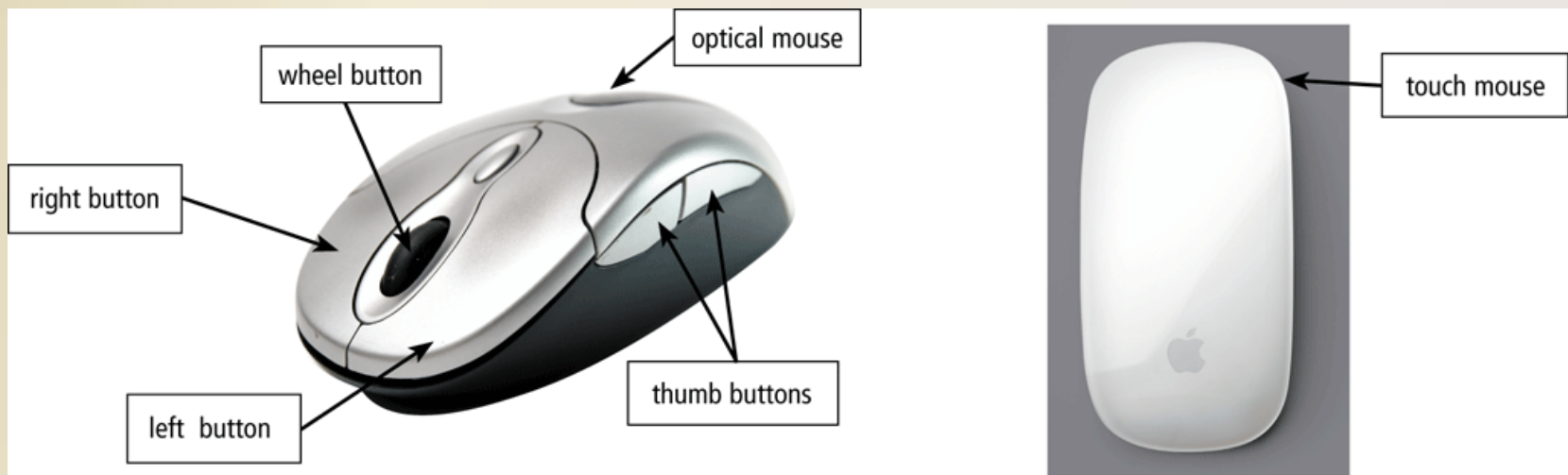


Pointing Devices

A **pointer** is a small symbol on the screen whose location and shape change as a user moves a pointing device

Pointing Devices

- A **mouse** is a pointing device that fits under the palm of your hand comfortably
 - Optical mouse, laser mouse, and touch mouse



Pointing Devices



Touchpad

- A **touchpad** is a small, flat, rectangular pointing device that is sensitive to pressure and motion



Pointing Stick

- A **pointing stick** is a pressure-sensitive pointing device shaped like a pencil eraser that is positioned between keys on a mobile computer keyboard



Trackball

- A **trackball** is a stationary pointing device with a ball on its top or side

Touch Screens

- A **touch screen** is a touch-sensitive display device



Pen Input

- With **pen input**, you touch a **stylus** or **digital pen** on a flat surface to write, draw, or make selections



Pen Input

- A **graphics tablet**, also called a digitizer, is an electronic plastic board that detects and converts movements of a stylus or digital pen into signals that are sent to the computer



Motion Input

- With motion input, sometimes called gesture recognition, users can guide on-screen elements using air gestures



Voice Input

- Voice input is the process of entering input by speaking into a microphone
- **Voice recognition**, also called speech recognition, is the computer or mobile device's capability of distinguishing spoken words



Audio Input

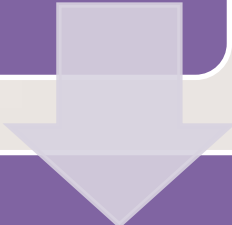
- Audio input is the process of entering any sound into the computer such as speech, music, and sound effects
- Music production software allows users to record, compose, mix, and edit music and sounds



Video Input

- **Video input** is the process of capturing full-motion images and storing them on a computer or mobile device's storage medium

Record video on a **digital video (DV) camera**



Transfer video to a
computer or mobile device

Video Input

- A **webcam** is a type of DV camera that enables a user to:

Capture video and still images

Send email messages with video attachments

Add live images to instant messages

Broadcast live images over the Internet

Conduct videoconferences

Make **video calls**

Video Input

- A **videoconference** is a meeting between two or more geographically separated people



Scanners and Reading Devices

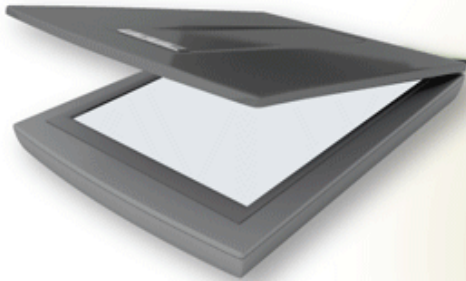
- A **scanner** is a light-sensing input device that reads printed text and graphics and then translates the results into a form the computer can process
 - A flatbed scanner works in a manner similar to a copy machine except it creates a file of the document in memory instead of a paper copy

Scanners and Reading Devices

How a Flatbed Scanner Works

Step 1

Place the document to be scanned face down on the glass window. Using buttons on the scanner or the scanner program, start the scanning process.



Step 2

The scanner converts the document content to digital information, which is transmitted through the cable to the computer's memory and saved on the computer's hard disk or SSD.



Step 3

Once in the computer, users can display the image, print it, send it in an email message, include it in a document, or place it on a webpage.

Scanners and Reading Devices

- An optical reader is a device that uses a light source to read characters, marks, and codes and then converts them into digital data that a computer can process
 - Optical character recognition (OCR)
 - Optical mark recognition (OMR)

Scanners and Reading Devices



- A **bar code reader**, also called a bar code scanner uses laser beams to read **bar codes**
- A **QR code** stores information in both a vertical and horizontal direction

Scanners and Reading Devices

- **RFID** (radio frequency identification) uses radio signals to communicate with a tag placed in or attached to an object
- An **RFID reader** reads information on the tag via radio waves
- RFID can track:

Tracking times of
runners in a
marathon

Tracking location of
people and other
items

Checking lift tickets
of skiers

Managing
inventory

Gauging
temperature and
pressure of tires on
a vehicle

Checking out
library books

Providing access to
rooms or buildings

Scanners and Reading Devices

- **Magstripe readers** read the magnetic stripe on the back of cards such as:

Credit cards

Entertainment cards

Bank cards

Identification cards

Other similar cards



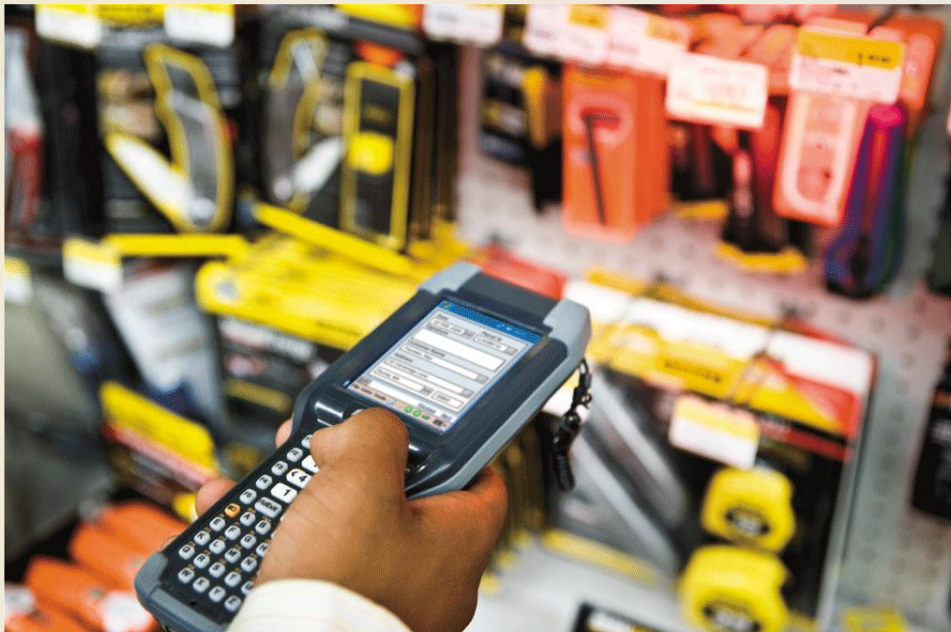
Scanners and Reading Devices

- MICR (magnetic ink character recognition) devices read text printed with magnetized ink
- An MICR reader converts MICR characters into a form the computer can process
- Banking industry uses MICR for check processing



Scanners and Reading Devices

- A data collection device obtains data directly at the location where the transaction or event takes place



What Is Output?

- **Output** is data that has been processed into a useful form



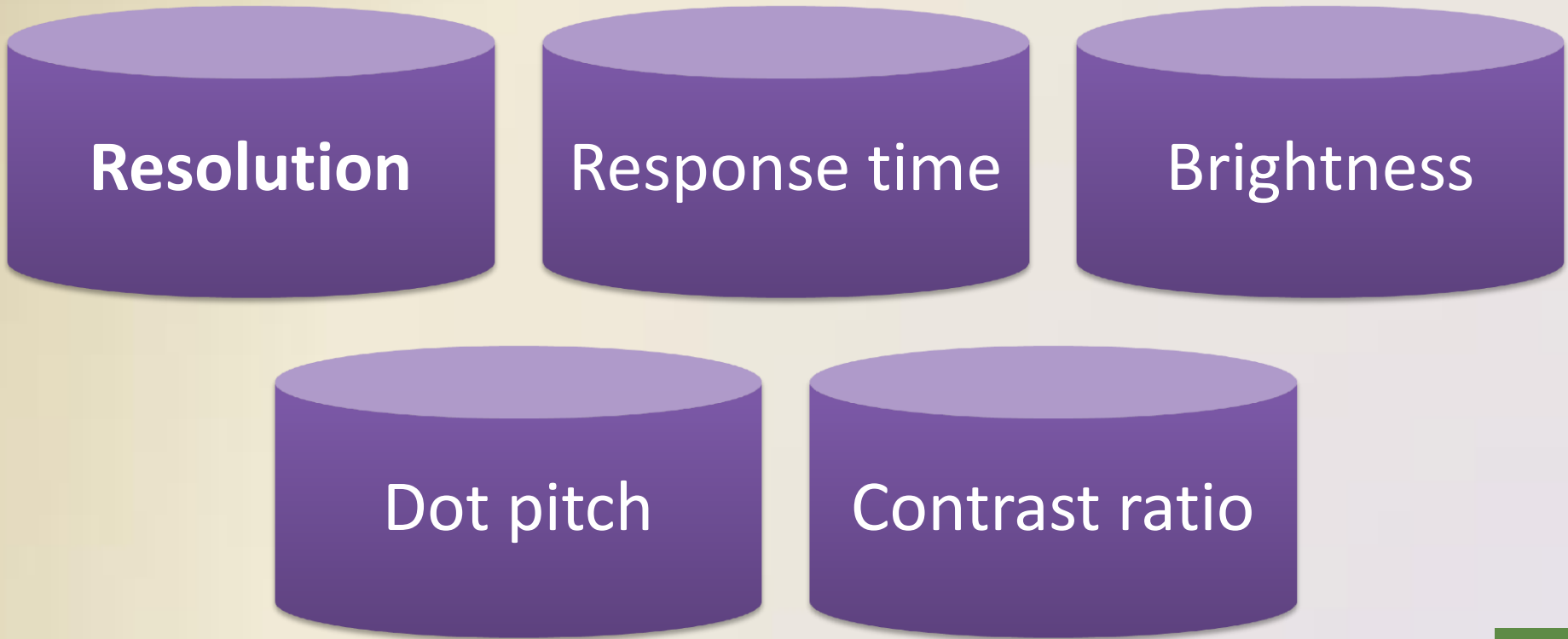
Displays

- A **display** visually conveys text, graphics, and video information
- A **monitor** is a display that is packaged as a separate peripheral device
 - **LCD** monitor



Displays

- The quality of a display depends primarily on its:



Resolution

Response time

Brightness

Dot pitch

Contrast ratio

Displays

- Today's monitors use a digital signal to produce a picture
- To display the highest quality images, the monitor should plug into:
 - A DVI port
 - An HDMI port
 - A DisplayPort

Displays

- Home users sometimes use a digital television (DTV) as a display
- **HDTV** is the most advanced form of digital television
- A Smart TV is an Internet-enabled HDTV



Printers

- A **printer** produces text and graphics on a physical medium
- Before purchasing a printer, ask yourself a series of questions

1. What is my budget?
2. How fast must my printer print?
3. Do I need a color printer?
4. What is the cost per page for printing?
5. Do I need multiple copies of documents?
6. Will I print graphics?
7. Do I want to print photos?
8. Do I want to print directly from a memory card?
9. What types of paper does the printer use?
10. What sizes of paper does the printer accept?
11. Do I want to print on both sides of the paper?
12. How much paper can the printer tray hold?
13. Will the printer work with my computer and software?
14. How much do supplies such as ink, toner, and paper cost?
15. Can the printer print on envelopes?
16. How many envelopes can the printer print at a time?
17. How much do I print now, and how much will I be printing in a year or two?
18. Will the printer be connected to a network?
19. Do I want wireless printing capability?

Printers

- A **nonimpact printer** forms characters and graphics on a piece of paper without actually contacting the paper

Ink-jet
printers

Photo
printers

Laser
printers

All-in-one
printers

Thermal
printers

Mobile
printers

Plotters

Large-
format
printers

Printers

- An **ink-jet printer** forms characters and graphics by spraying tiny drops of liquid ink onto a piece of paper
 - Color or black-and-white
 - Speed is measured by the number of pages per minute (ppm) it can print



Printers

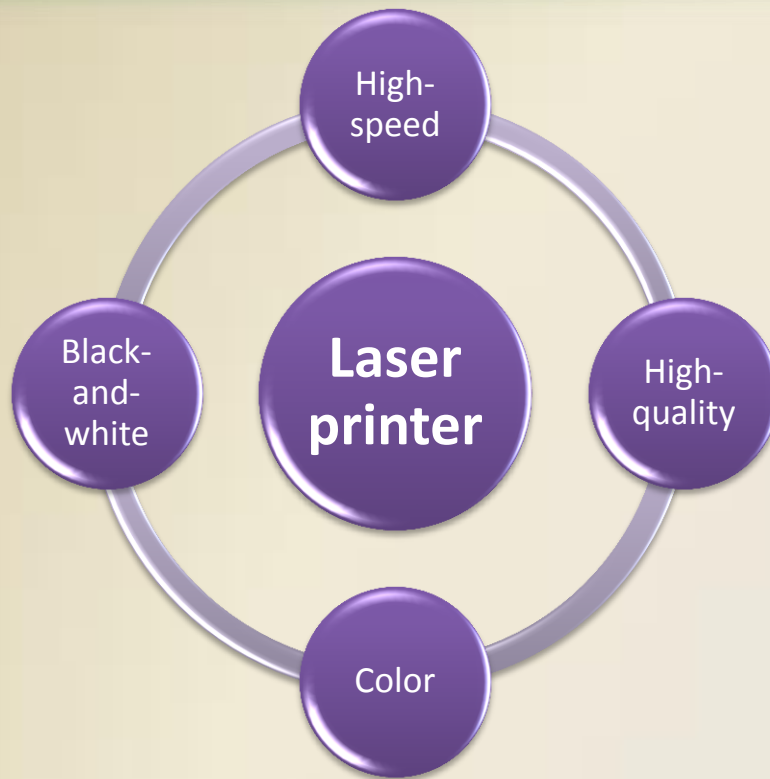
A photo printer produces lab-quality pictures

- Many use ink-jet technology
- PictBridge allows you to print photos directly from a digital camera
- Print from a memory card

Printers



Printers



Printers

- An **all-in-one printer** is a single device that prints, scans, copies, and in some cases, faxes
 - Sometimes called a multifunction printer



Printers

- A **thermal printer** generates images by pushing electrically heated pins against the heat-sensitive paper

Dye-
sublimation
printer



Printers

- A **mobile printer** is a small, lightweight, battery-powered printer that allows a mobile user to print from a mobile device



Printers

- A **label printer** is a small printer that prints on an adhesive-type material that can be placed on a variety of items



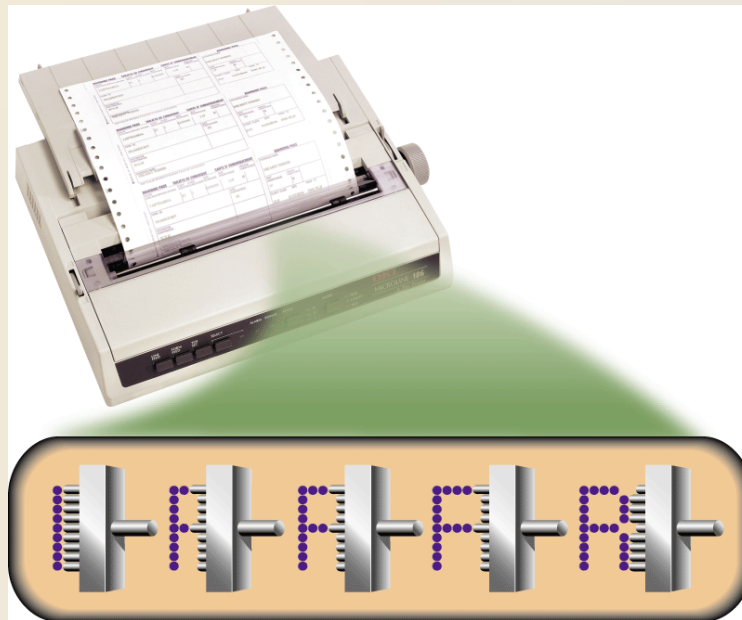
Printers

- **Plotters** are used to produce high-quality drawings
- **Large-format printers** create photo-realistic quality color prints



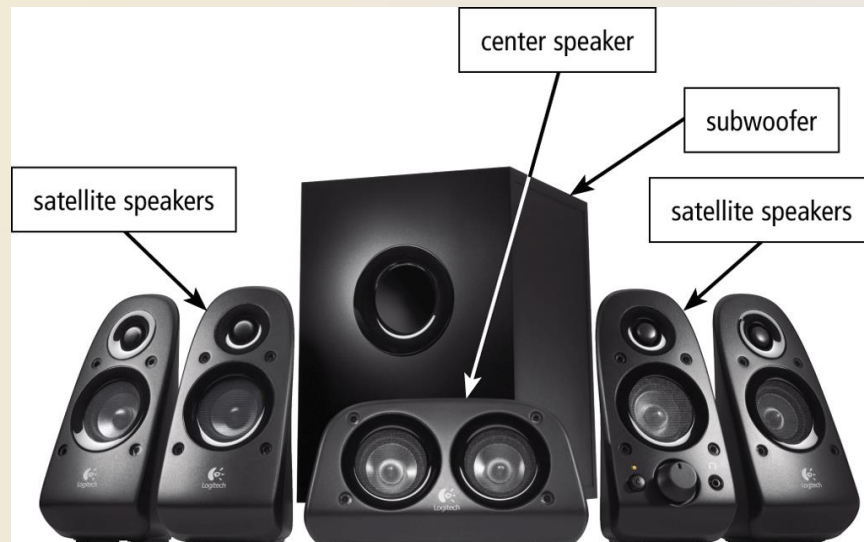
Printers

- **Impact printers** form characters and graphics on a piece of paper by striking a mechanism against an inked ribbon that physically contacts the paper



Other Output Devices

- Many users attach surround sound **speakers** or speaker systems to their computers, game consoles, and mobile devices to generate higher-quality sounds



Other Output Devices

- **Headphones** are speakers that cover or are placed outside of the ear
- **Earbuds** (also called earphones) rest inside the ear canal



Other Output Devices

- A **data projector** is a device that takes the text and images displaying on a computer or mobile device screen and projects them on a larger screen



Other Output Devices

- An **interactive whiteboard** is a touch-sensitive device, resembling a dry-erase board, that displays the image on a connected computer screen



Other Output Devices

- Joysticks, wheels, gamepads, and motion-sensing game controllers can be considered output devices when they include force feedback
 - Technology that sends resistance to the device in response to actions of the user



Assistive Technology Input and Output

Head-mounted pointer



Braille printer



Summary

Variety of options
for input and
output

Several assistive
technology options
for input and
output

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Chapter 7

Input and Output

Chapter 7 Complete

