INPUT DEVICES

INPUT is any data and instructions entered into the memory of a computer.

An **INPUT DEVICE** is any hardware component that allows users to enter data and instructions (programs, commands, and user responses) into a computer.

The following are a variety of input devices:

KEYBOARD is an input device that contains keys users press to enter data and instructions into a computer.

- **DESKTOP COMPUTER KEYBOARDS** typically have from 101 to 105 keys.
- Keyboards also often have a windows key(s) and an application key.
- A **GAMING KEYBOARD** is a keyboard designed specifically for users who enjoy playing games.
- An **ERGONOMIC KEYBOARD** has a design that reduces the chance of wrist and hand injuries.

POINTING DEVICE is an input device that allows a user to control a pointer on the screen. In a graphical user interface, a pointer is a small symbol on the screen whose location and shape change as a user moves a pointing device.

- A **MOUSE** is a pointing device that fits under the palm of your hand comfortably. The mouse is the most widely used pointing device on desktop computers.
- A **WIRELESS MOUSE**, or cordless mouse, is a battery-powered device that transmits data using wireless technology, such as radio waves (Bluetooth) or infrared light waves (IrDA).
- A **TRACKBALL** is a stationary pointing device with a ball on its top or side. The ball in most trackballs is about the size of a Ping-Pong ball.
- A **TOUCHPAD** is a small, flat, rectangular pointing device that is sensitive to pressure and motion.
- A **POINTING STICK** is a pressure-sensitive pointing device shaped like a pencil eraser that is positioned between keys on a keyboard.
- A **TOUCH SCREEN** is a touch-sensitive display device. Touch screens that recognize multiple points of contact at the same time are known as multi-touch. Users can interact with touch screens by touching areas of the screen.
- **PORTABLE MEDIA PLAYERS** that do not have touch screens typically have a touch sensitive pad, which is an input device that enables users to scroll through and play music, view pictures, watch videos or movies, adjust volume, and/or customize settings. Touch sensitive pads typically contain buttons and/or wheels that are operated with a thumb or finger.
- With pen input, you touch a stylus or digital pen on a flat surface to write, draw, or make selections. The flat surface may be a screen on a monitor or mobile device, a signature capture pad, or a graphics tablet.

- A **STYLUS** is a small metal or plastic device that looks like a tiny ink pen but uses pressure instead of ink.
- A **DIGITAL PEN**, which is slightly larger than a stylus, typically provides more functionality than a stylus, featuring electronic erasers and programmable buttons.
- A **DIGITAL CAMERA** is a mobile device that allows users to take pictures and store the photographed images digitally, instead of on traditional film.

OUTPUT DEVICES

OUTPUT is data that has been processed into a useful form. That is, computers process data (input) into information (output).

An **OUTPUT DEVICE** is any type of hardware component that conveys information to one or more people.

Types of Output

TEXT - Contains text are memos, letters, press releases, reports, classified advertisements, envelopes mailing labels, and text messages. On the web, users view and print many other types of text- based output.

GRAPHICS - Many forms of output include graphics to enhance visual appeal and convey information.

AUDIO - Software such as games, encyclopedias, and simulations often have musical accompaniments for entertainment and audio clips. Users downloaded songs and listen to the music while working on the computer.

VIDEO - As with audio, software and Web sites often include video clips to enhance understanding.

Commonly used output devices include display devices:

- A **DISPLAY DEVICE**, or simply display, is an output device that visually conveys text, graphics, and video information.
- A **MONITOR** is a display device that is packaged as a separate peripheral.

An **LCD MONITOR** is a desktop monitor that uses a liquid crystal display to produce images. These monitors produce sharp, flicker-free images.

A **LIQUID CRYSTAL DISPLAY (LCD)** uses a liquid compound to present information on a display device. Computer LCDs typically contain fluorescent tubes that emit light waves toward the liquid-crystal cells, which are sandwiched between two sheets of material.

A newer type of TFT technology, called **ORGANIC LED (OLED)**, uses organic molecules that produce an even brighter, easier-to-read display than standard TFT displays.

The quality of an LCD monitor or LCD screen depends on these things:

- **RESOLUTION** is the number of horizontal and vertical pixels in a display device.
- **RESPONSE TIME** of an LCD monitor or screen is the time in milliseconds (ms) that it takes to turn a pixel on or off
- Brightness of an LCD monitor or LCD screen is measured in **nits**. A **NIT** is a unit of visible light intensity equal to one candela (formerly called candlepower) per square meter. The candela is the standard unit of luminous intensity. LCD monitors and screens today range from 250 to 550 nits.

- **DOT PITCH**, sometimes called pixel pitch, is the distance in millimeters between pixels on a display device.
- **CONTRAST RATIO** describes the difference in light intensity between the brightest white and darkest black that can be displayed on an LCD monitor.

GRAPHICS CHIP AND PORTS

- A cable on a monitor plugs in a port on the system unit, which enables communications from a graphics chip. This chip, called the **GRAPHICS PROCESSING UNIT (GPU)**, controls the manipulation and display of graphics on a display device. The graphics processing unit either is integrated on the motherboard or resides on a video card (graphics card) in a slot in the motherboard. Video cards usually contain a fan or heat sink to keep this and other chips from overheating.
- The **DISPLAY PORT** is an alternative to DVI that also supports HDMI.

PLASMA MONITORS

- A **PLASMA MONITOR** is a display device that uses gas plasma technology, which sandwiches a layer of gas between two glass plates.

TELEVISIONS

- Home users sometimes use their **TELEVISION** as a display device. Connecting a computer to an analog television requires a converter that translates the digital signal from the computer into an analog signal that the television can display.
- **HDTV (HIGH-DEFINITION TELEVISION)** is the most advanced form of digital television, working with digital broadcast signals, transmitting digital sound, supporting wide screens, and providing resolutions up to 1920 3 1080 pixels.

CTR MONITORS

- A **CRT MONITOR** is a desktop monitor that contains a cathode-ray tube. A cathode-ray tube (CRT) is a large, sealed glass tube.

PRINTERS

- A **PRINTER** is an output device that produces text and graphics on a physical medium such as paper. Printed information, called hard copy, exists physically and is a more permanent form of output than that presented on a display device (soft copy).

NONIMPACT PRINTERS

- A **NONIMPACT PRINTER** forms characters and graphics on a piece of paper without actually striking the paper.
    - An **INK-JET PRINTER** is a type of nonimpact printer that forms characters and graphics by spraying tiny drops of liquid ink onto a piece of paper.
    - A **PHOTO PRINTER** is a color printer that produces photo-lab-quality pictures.
    - A **LASER PRINTER** is a high-speed, high-quality nonimpact printer.

- A **MULTIFUNCTION PERIPHERAL (MFP)**, also called an all-in-one device, is a single device that looks like a printer or a copy machine but provides the functionality of a printer, scanner, copy machine, and perhaps a fax machine.
- A **THERMAL PRINTER** generates images by pushing electrically heated pins against heat sensitive paper.
- A **MOBILE PRINTER** is a small, lightweight, battery-powered printer that allows a mobile user to print from a notebook computer, smart phone, or other mobile device while traveling.
- A **LABEL PRINTER** is a small printer that prints on an adhesive-type material that can be placed on a variety of items such as envelopes, packages, optical discs, photos, file folders, and toys.
- A **POSTAGE PRINTER** is a special type of label printer that prints postage stamps.
- Plotters are sophisticated printers used to produce high-quality drawings such as blueprints, maps, and circuit diagrams. These printers are used in specialized fields such as engineering and drafting and usually are very costly.
- An **IMPACT PRINTER** forms characters and graphics on a piece of paper by striking a mechanism against an inked ribbon that physically contacts the paper.

SPEAKERS, HEADPHONES, AND EARBUDS

- An **AUDIO** output device is a component of a computer that produces music, speech, or other sounds, such as beeps.
  - **SPEAKERS** typically have tone and volume controls, allowing users to adjust settings.
  - **HEADPHONES** cover or are placed outside of the ear include noise-cancelling technology to reduce the interference of sounds from the surrounding environment.
  - **EARBUDS** or earphones rest inside the ear canal include noise-cancelling technology to reduce the interference of sounds from the surrounding environment.
  - A **HEADSET** is a device that functions as both headphones and a microphone.

OTHER OUTPUT DEVICES

- A **DATA PROJECTOR** is a device that takes the text and images displaying on a computer screen and projects them on a larger screen so that an audience can see the image clearly.
- An **INTERACTIVE WHITEBOARD** is a touch-sensitive device, resembling a dry-erase board, that displays the image on a connected computer screen. A presenter controls the computer program by clicking a remote control, touching the whiteboard, drawing on or erasing the whiteboard with a special digital pen and eraser, or writing on a special tablet.
  - Three basic technologies exist for displaying computer images on an interactive whiteboard:
    - **FRONT PROJECTION**: separate projector displays an image from the computer screen on the interactive whiteboard;
    - **REAR PROJECTION**: a projector built into the back of the interactive whiteboard displays an image from the computer screen on the whiteboard;
    - an **INTERACTIVE WHITEBOARD** fits over an LCD screen or a plasma display

STORAGE

STORAGE holds data, instructions, and information for future use. Every computer stores system software and application software.

A **STORAGE MEDIUM** (media is the plural), also called secondary storage, is the physical material on which a computer keeps data, instructions, and information.

The term **CAPACITY** is the number of bytes (characters) a storage medium can hold.

- A **STORAGE DEVICE** is the computer hardware that records and/or retrieves items to and from storage media. Writing is the process of transferring data, instructions, and information from memory to a storage medium. Reading is the process of transferring these items from a storage medium into memory.
- A **HARD DISK**, also called a hard disk drive or hard drive, is a storage device that contains one or more inflexible, circular platters that use magnetic particles to store data, instructions, and information.

FLASH MEMORY STORAGE

- A **SOLID-STATE DRIVE** (SSD) is a storage device that typically uses flash memory to store data, instructions, and information.
- **MEMORY CARDS** enable mobile users easily to transport digital photos, music, or files to and from mobile devices and computers or other devices.
- **USB (UNIVERSAL SERIAL BUS) FLASH DRIVE**, sometimes called a thumb drive, is a flash memory storage device that plugs in a USB port on a computer or mobile device.
- **EXPRESS CARD MODULE** is a removable device, about 75 mm long and 34 mm wide or L-shaped with a width of 54 mm, that fits in an Express Card slot.

CLOUD STORAGE

- **CLOUD STORAGE** is an Internet service that provides storage to computer users.

OPTICAL DISCS

- An **OPTICAL DISC** is a type of storage media that consists of a flat, round, portable disc made of metal, plastic, and lacquer that is written and read by a laser.

TYPES OF CDs

- A **CD-ROM**, or **COMPACT DISC READ-ONLY MEMORY**, is a type of optical disc that users can read but not write (record) or erase — hence, the name read-only.
- **CD-R (COMPACT DISC- RECORDABLE)** is a multisession optical disc on which users can write, but not erase, their own items such as text, graphics, and audio.
- **CD-RW (COMPACT DISC-REWRITABLE)** is an erasable multisession disc you can write on multiple times.

OTHER TYPES OF STORAGE

- **TAPE** is a magnetically coated ribbon of plastic capable of storing large amounts of data and information at a low cost.

- A **MAGNETIC STRIPE CARD** is a credit card, entertainment card, bank card, or other similar card, with a stripe that contains information identifying you and the card.
- A **SMART CARD**, which is similar in size to a credit card or ATM card, stores data on a thin microprocessor embedded in the card.
- **MICROFILM** store microscopic images of documents on roll or sheet film. Microfilm is a 100- to 215-foot roll of film. The stored images are so small that you can read them only with a microfilm reader.
- **MICROFICHE** store microscopic images of documents on roll or sheet film. It is a small sheet of film, usually about 4 3 6 inches. A computer output microfilm recorder is the device that records the images on the film. The stored images are so small that you can read them only with a microfiche reader.
- **ENTERPRISE STORAGE**, a large business commonly referred to as enterprise has hundreds or thousands of employees in offices across the country or around the world. Enterprises use computers and computer networks to manage and store huge volumes of data and information about customers, suppliers, and employees.

APPLICATION SOFTWARE

APPLICATION SOFTWARE consists of programs designed to make users more productive and/or assist them with personal tasks.

Application software has a variety of uses:

1. To make business activities more efficient .
2. To assist with graphics and multimedia projects.
3. To support home, personal, and educational tasks.
4. To facilitate communications.

Application software is available in a variety of forms:

PACKAGED SOFTWARE is mass-produced, copyrighted retail software that meets the needs of a wide variety of users, not just a single user or company.

Custom software performs functions specific to a business or industry.

A **WEB APPLICATION** is a Web site that allows users to access and interact with software from any computer or device that is connected to the Internet.

OPEN-SOURCE SOFTWARE is software provided for use, modification, and redistribution. This software has no restrictions from the copyright holder regarding modification of the software's internal instructions and its redistribution. Open-source software usually can be downloaded from the Internet, often at no cost.

SHAREWARE is copyrighted software that is distributed at no cost for a trial period. To use a shareware program beyond that period, you send payment to the program developer.

FREEWARE is copyrighted software provided at no cost by an individual or a company that retains all rights to the software.

PUBLIC-DOMAIN SOFTWARE has been donated for public use and has no copyright restrictions. Anyone can copy or distribute public-domain software to others at no cost.

THE ROLE OF SYSTEM SOFTWARE

- **SYSTEM SOFTWARE** serves as the interface between the user, the application software, and the computer's hardware.
- A **UTILITY PROGRAM** is a type of system software that assists users with controlling or maintaining the operation of a computer, its devices, or its software.