Computers Are Your Future

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Chapter 7

Input/Output and Storage

What You Will Learn About

- ✓ The purpose of special keys and the most frequently used pointing devices
- ✓ The characteristics of a monitor's quality and the various types of monitors
- ✓ The two major types of printers
- ✓ The difference between memory and storage



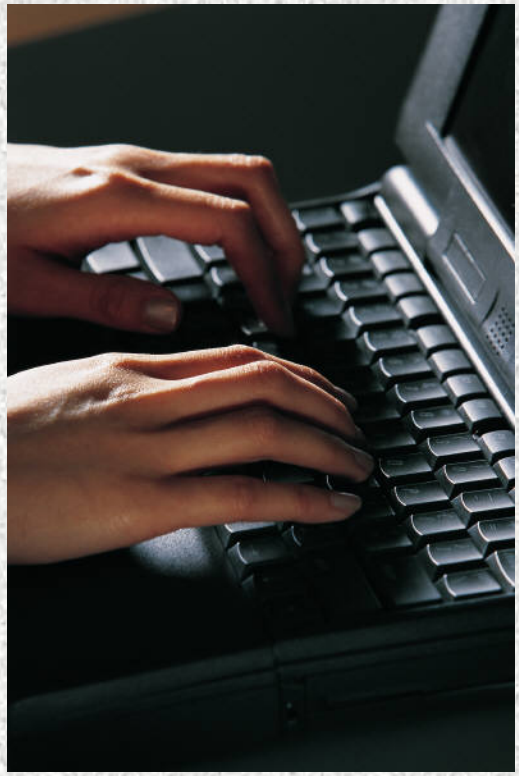

What You Will Learn About

- ✓ The categories of storage devices
- ✓ The performance characteristics of hard drives
- ✓ How data is stored on both hard and floppy disks
- ✓ The various optical storage media available for personal computers




Input

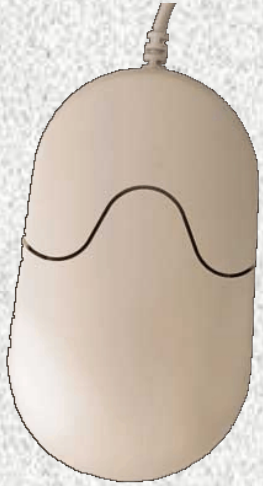
- **Input** is any data entered into the computer's memory



Input Devices: Giving Commands

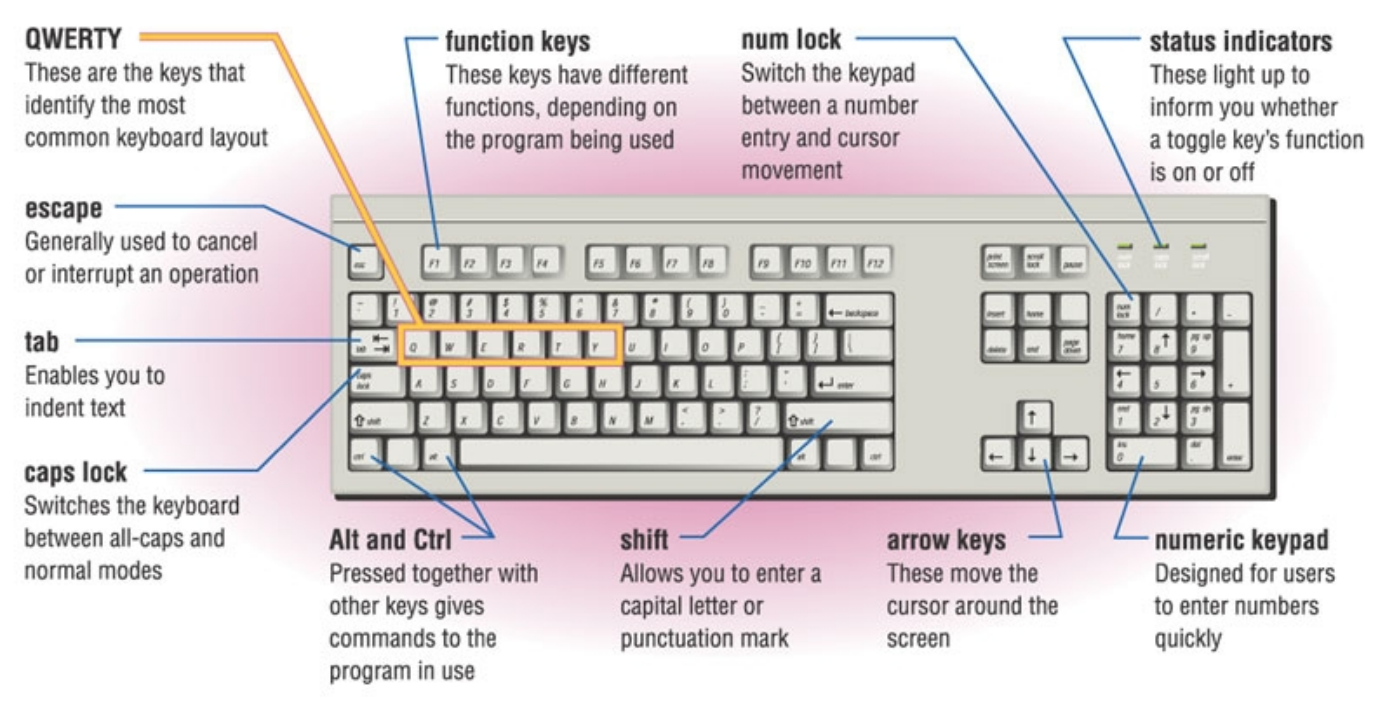
Keyboard

Mouse



Other Pointing Devices

Keyboard



- ✓ The keyboard allows the computer user to enter words, numbers, punctuation, symbols, and special function commands into the computer's memory

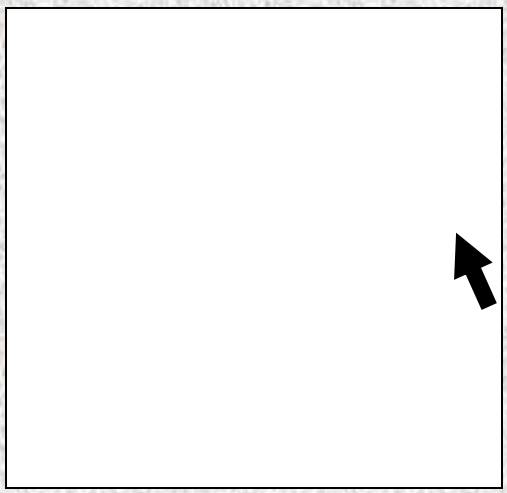
Types of Keyboards

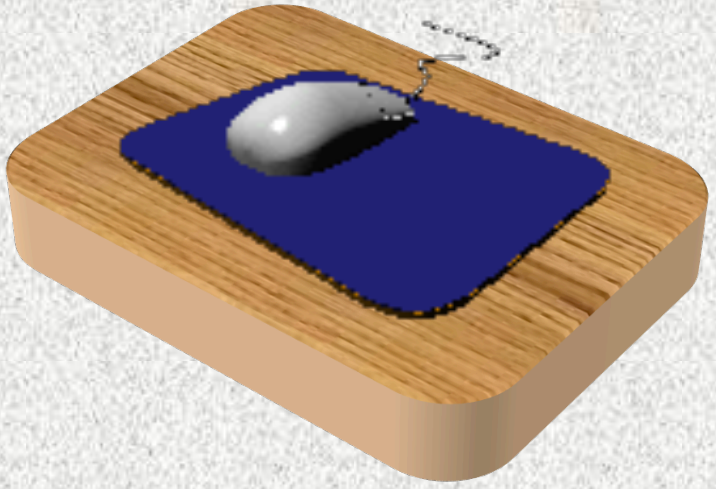
Enhanced / Extended Keyboard

Ergonomic Keyboard

- ✓ **Enhanced** or **Extended keyboard** – Typically 101 keys laid out in the QWERTY fashion; connected to the computer by a cable
- ✓ **Cordless keyboard** – Uses infrared or radio wave signals
- ✓ **Ergonomic keyboard** – Designed to help prevent cumulative trauma disorder (CTD) or damage to nerve tissues in the wrist and hand due to repeated motion

The Mouse





- ✓ The mouse is the most widely used pointing device
- ✓ A mouse is palm sized
- ✓ As the mouse is moved, its movements are mirrored by the on-screen pointer

Types of Mice

Wheel Mouse

Cordless Mouse

- ✓ **Wheel mouse** – Contains a rotating wheel used to scroll vertically within a text document; connects to PS/2 port or USB port
- ✓ **Cordless mouse** – Uses infrared signals to connect to the computer's IrDA port; it must be within sight of the receiving port

Other Types of Pointing Devices

Trackball

Touch Screen

Pointing Stick

Joystick

Touch Pad

Pen

Using the Mouse

- Mouse buttons enable the user to initiate actions
  - **Clicking** (left-, right-, or double-clicking) allows the user to select an item on the screen or open a program or dialog box
  - **Click and drag** – Holding down the left mouse button and moving the mouse enables the user to move objects on the screen

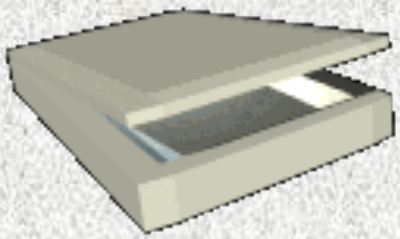
Audio Input: Speech Recognition

- **Speech recognition** is a type of input in which the computer recognizes words spoken into a microphone
- Special software and a microphone are required
- Latest technology uses continuous speech recognition where the user does not have to pause between words

Alternative Input Devices

Scanners

Flatbed



Barcode reader

Fax Machines

Monitors

CRT

LCD

- ✓ A monitor is a peripheral device which displays computer output on a screen
- ✓ Screen output is referred to as **soft copy**
- ✓ Types of monitors:
  - ➢ **Cathode-ray tube (CRT)**
  - ➢ **Liquid Crystal Display (LCD or flat-panel)**

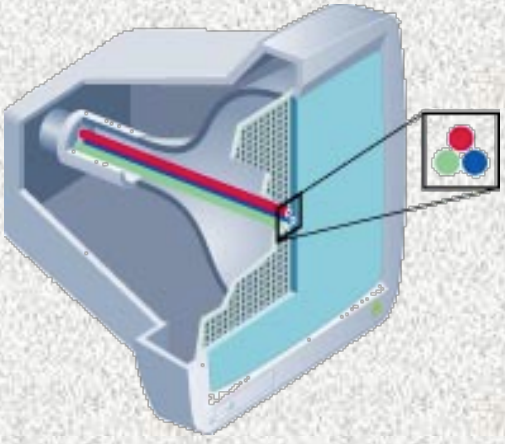
Cathode-ray tube (CRT)

- ✓ Resemble televisions
- ✓ Use picture tube technology
- ✓ Less expensive than a LCD monitor
- ✓ Take up more desk space and use more energy than LCD monitors

Liquid Crystal Display (LCD)

- ✓ Cells sandwiched between two transparent layers form images
- ✓ Used for notebook computers, PDAs, cellular phones, and personal computers
- ✓ More expensive than a CRT monitor
- ✓ Take up less desk space and use less energy than CRT monitors
- ✓ Types of LCD monitors:
  - ➢ Passive-matrix LCD
  - ➢ Active-matrix LCD
  - ➢ Gas plasma display
  - ➢ Field emission display

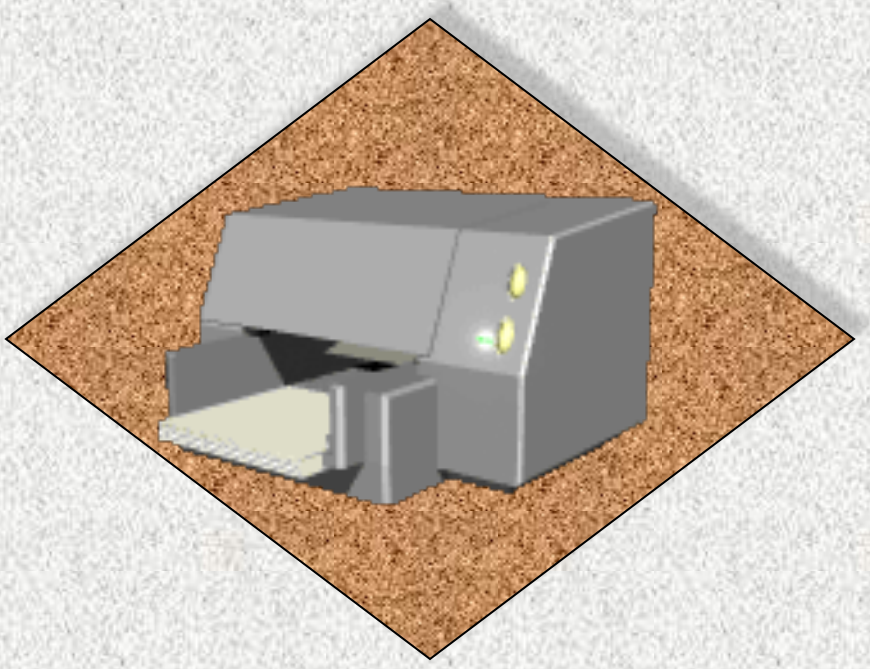
Monitor Specifications



- ✓ **Screen size** – The diagonal measurement of the screen surface in inches (15, 17, 19, 21)
- ✓ **Resolution** – The sharpness of the image determined by the number of horizontal and vertical dots (pixels) that the screen can display (800 x 600, 1024 x 768, 1600 x 1200)
- ✓ **Refresh rate** – The speed at which the screen is redrawn (refreshed) and measured in Hertz (Hz) (60Hz, 75Hz)

Printers

- A printer is a peripheral device that produces a physical copy or **hard copy** of the computer's output



Types of Printers

Inkjet

- ✓ **Inkjet printer**, also called a bubble-jet, makes characters by inserting dots of ink onto paper
- ✓ Letter-quality printouts
- ✓ Cost of printer is inexpensive but ink is costly

Laser

- ✓ **Laser printer** works like a copier
- ✓ Quality determined by dots per inch (dpi) produced
- ✓ Color printers available
- ✓ Expensive initial costs but cheaper to operate per page

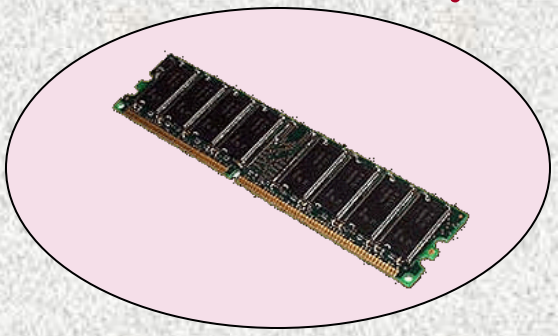
Plotter

- ✓ A plotter is a printer that uses a pen that moves over a large revolving sheet of paper
- ✓ It is used in engineering, drafting, map making, and seismology

Memory vs. Storage

Hard Drive – storage

RAM – memory

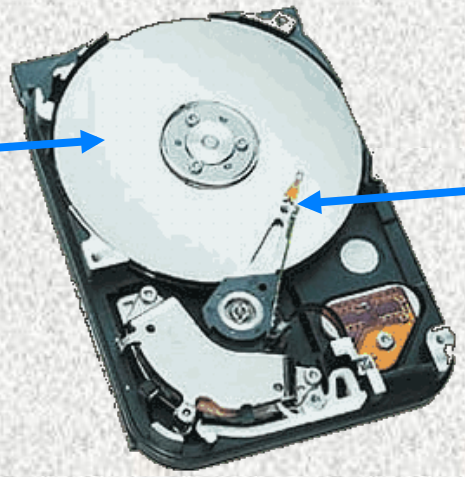


- ✓ **Storage**, also known as **mass media** or **auxiliary storage**, refers to the various media on which a computer system can store data
- ✓ Storage devices hold programs and data in units called **files**
- ✓ **Memory** is a temporary workplace where the computer transfers the contents of a file while it is being used

Why Is Storage Necessary?

- Storage devices:
  - Retain data when the computer is turned off
  - Are cheaper than memory
  - Play an important role during startup
  - Are needed for output

Hard Disks



- ✓ Hard disks are high-speed, high-capacity storage devices
- ✓ They contain metal disks called **platters**
- ✓ They contain two or more stacked platters with **read/write heads** for each side
- ✓ Hard disks can be divided into **partitions** to enable computers to work with more than one operating system

More Hard Drives

- **Removable Hard Disks**
  - Platter is enclosed in a cartridge
  - Can be inserted into a drive bay
  - Secondary storage – storage that isn't directly available
- **Internet Hard Drives**
  - Storage space on a server
  - Subscription service

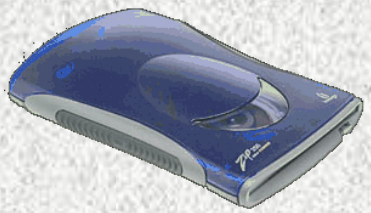
Factors Affecting a Hard Disk's Performance

- **Seek time** or **positioning performance** – How quickly the read/write head positions itself and begins transferring information. It is measured in milliseconds (ms)
- **Spindle speed** or **transfer performance** – How quickly the drive transfers data. It is measured in rotations per minute (RPM)

Floppy and Zip Disks and Drives

Floppy Drive

Zip Drive



Floppy Disk

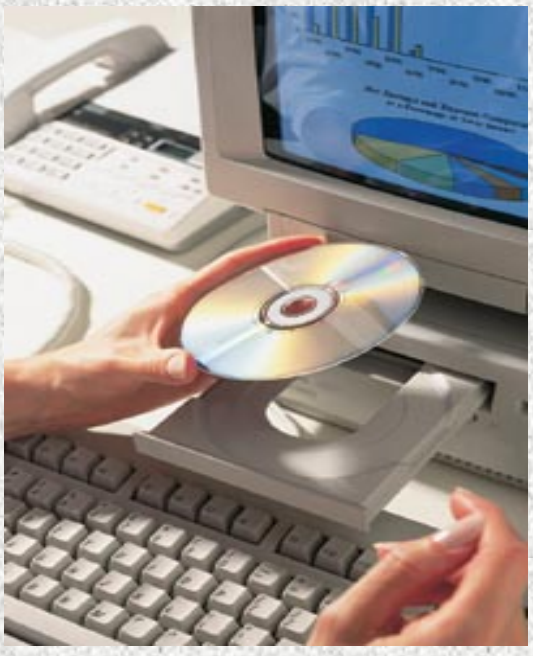
- ✓ A disk or diskette is a portable storage medium
- ✓ High-density **floppy disks** that are commonly used today store 1.44 MB of data
- ✓ Disks work with a disk drive
- ✓ **Zip disks** store up to 750 MB of data and are not downwardly compatible with floppy disks

Protecting the Data on Your Disks

- ✓ Don't touch the surface of the disk
- ✓ Don't expose disk to magnetic fields
- ✓ Avoid contamination (food, drink)
- ✓ Avoid condensation
- ✓ Avoid excessive temperatures

CD-ROM Discs and Drives

- ✓ CD-ROM stands for Compact Disc-Read Only Memory
- ✓ CD-ROM drives can not write data to discs
- ✓ They are capable of storing 650 MB of data
- ✓ They are used for storing operating systems, large application programs, and multimedia programs



CD-R and CD-RW Discs and Recorders

CD-R

- ✓ Discs can be read and written to
- ✓ Discs can only be written to "once"
- ✓ CD-R drives are capable of reading and writing data

CD-RW

- ✓ Discs can be read and written to
- ✓ Discs are erasable
- ✓ Discs can be written to many times
- ✓ CD-RW drives are capable of reading, writing, and erasing data

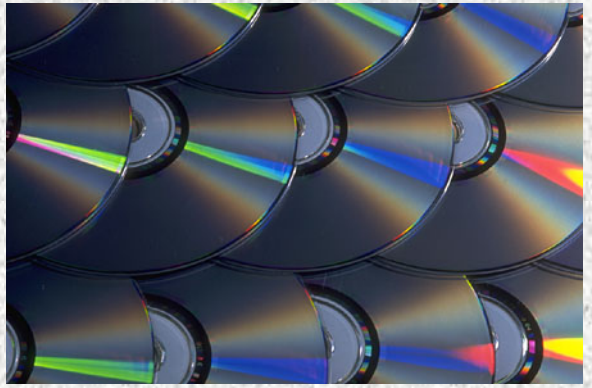
DVD-ROM Discs and Drives

- ✓ DVD stands for Digital Video Disc
- ✓ DVD technology is similar to CD-ROM technology
- ✓ DVDs are capable of storing up to 17GB of data
- ✓ The data transfer rate of DVD drives is comparable to that of hard disk drives

DVD-RW and DVD+RW Discs

DVD-R and DVD+R drives have the ability to read/ write data

DVD-RW and DVD+RW drives allow you to write, erase, and read from a disc many times



Protecting Data on Discs

- ✓ Do not expose discs to excessive heat
- ✓ Do not touch underside of discs
- ✓ Do not write on the label side of discs with a hard instrument
- ✓ Do not stack discs
- ✓ Store discs in original boxes

The Future of Storage

- FMD-ROM
  - Fluorescent multilayer disc-read-only memory
  - Each layer of the disc contains data
  - Layer is transparent enough for light to shine through
  - Laser can focus on one layer at a time
  - Allows for additional storage capability

Solid State Storage Devices

- ✓ Solid state storage devices use nonvolatile memory chips to retain data
- ✓ They do not have moving parts
- ✓ They are small, lightweight, reliable, and portable

Solid State Storage Devices

Smart Card

Memory Stick

Flash Memory

Compact Flash Memory

PC Card

Micro Drive

Chapter 7 Summary

- Input is the software, data, and information that is entered into the computer's memory
- Input devices such as the keyboard, mouse, and trackball enable the user to enter data
- A pointing device enables the user to control movements of an on-screen pointer
- Speech recognition software enables the user to enter data into a computer by speaking into a microphone
- Monitors enable the user to view the computer's processed data; the output is known as soft copy

Chapter 7 Summary (continued)

- The two types of monitors are the CRT and the LCD
- A monitor's quality is measured by screen size, resolution, and refresh rate
- Printers produce permanent versions (hard copies) of the computer's output
- The two basic types of printers are the inkjet and laser
- Memory makes software and data available for the CPU's use
- Storage devices are categorized by:
  - Read-only
  - Read/write
  - Random access
  - Near online (secondary)

Chapter 7 Summary (continued)

- A hard disk's performance is measured by its positioning performance and transfer rate
- Optical storage devices include:
  - CD-ROM– Read-only
  - CD-R– Record once
  - CD-RW– Erasable, write repeatedly
  - DVD-ROM/DVD+ROM – Read-only
  - DVD-R/DVD+R– Read/write
  - DVD-RW/DVD+RW – rewritten many times
- Solid state storage devices include:
  - PC cards
  - Flash memory cards
  - Smart cards