

Common Storage Devices (Lesson 3-1)
Classifying Storage Devices (Lesson 3-2)
Common Storage Devices (Lesson 3-3)



Computer Fundamentals

Common Storage Devices

Objectives:

- Explain the need for storage devices for computers.
- Distinguish between memory and storage.
- Distinguish between storage devices and media.

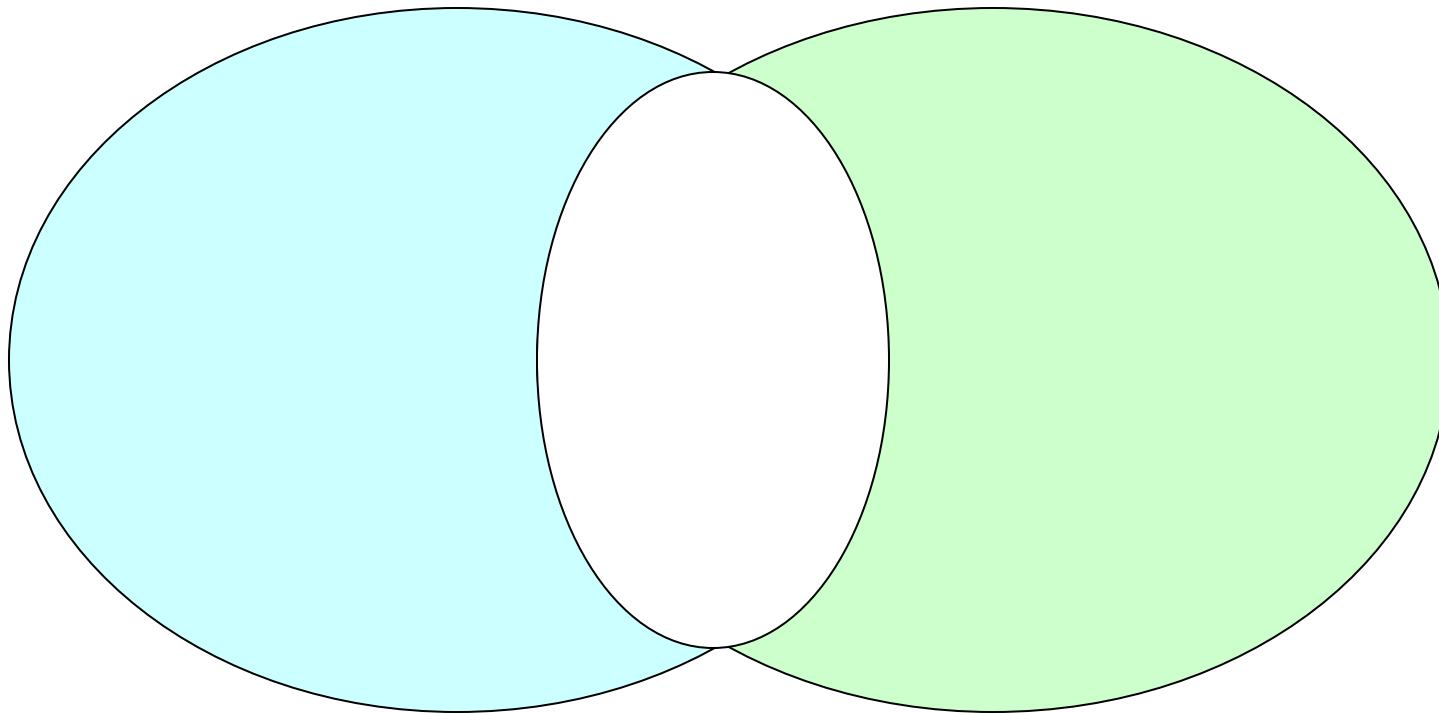
Key Terms:

- storage device
- memory
- Basic Input/Output System (BIOS)
- file

Compare and Contrast

Backpack

Storage Device



What are Storage Devices?

They are the computer's hardware components that retain data even after the power is turned off.



System Startup

Computer storage devices are a key part of a computer's startup process. Without a storage device to hold startup information permanently, a computer would not know what to do when you turned it on.

When you start a computer, it looks for information that tells it what to do. The **Basic Input/Output System**, or BIOS, is a set of programs that tells the computer equipment how to start up.

Connections



Science The study of memory does not only apply to computer science. Some psychologists have noted similarities in the ways human and computer memories function.

Some research supports an input output model of human memory. They see memory as a storage device that is limited in capacity. According to this theory, how much a person can learn (input) may be limited by how much he or she forgets (output).

Memory VS Storage

When people talk about computer **memory**, they usually mean a set of chips that acts as a **temporary** workspace in the computer.

This memory, called random access memory, or RAM, stores data and program instructions needed by the CPU.

RAM holds data and programs while they are being used. As you use the computer, you constantly work with the contents of RAM.

Storage VS Memory

Differences between storage and memory:

- The two work differently. Remember that RAM uses chips to temporarily store information. These chips depend on a constant supply of power to keep their contents; when the power is lost, the chips lose their contents.

Storage uses different methods to store information permanently, so it isn't lost when the power is turned off.

- A PC has more storage capacity than memory. Even though some PCs can hold as much as 1GB of RAM, their hard drives will be many times larger.

Storage Media and Storage Devices

Storage has two components: storage media and storage devices.

Storage Media

In terms of storage, a medium is an object that physically holds information or program instructions. **Floppy disks, magnetic tapes, and compact discs are examples of storage media.** (The word *media* is the plural of *medium*.)

Storage Devices

A storage device is a piece of hardware that holds the storage medium, sends data to the medium, and retrieves data from the medium. **Floppy disk drives, hard drives, CD-ROM and DVD-ROM drives, and tape drives are all examples of storage devices.**

A square button with a gold border and a white center, containing the word "home" in a black serif font.

home

Classifying Storage Devices

Objectives:

- Explain how computer storage devices are classified.
- Compare and contrast primary, secondary, and archival storage devices.
- Describe other categories of storage devices.

Key Terms:

- primary storage • secondary storage • archival storage
- read-only device • read/write device • sequential storage device
- random access storage device • optical storage device

Hierarchy of Storage Devices

Computer storage devices are sometimes classified in a hierarchical structure that is, primary or secondary.

Which are the **PRIMARY** “Storage Devices”?

The term **primary storage** is sometimes used to Describe the main memory, or RAM, in a computer. This is because when the CPU needs data or instructions, it looks in memory before looking anywhere else. Most knowledgeable computer users, however, avoid using the term *storage* when talking about RAM. This is because RAM works very differently from storage devices such as disks or tapes. RAM also loses any data it contains when the computer is turned off, while disks and tapes can hold data permanently.

Hierarchy of Storage Devices

Which are the **SECONDARY** Storage Devices”?

The term **secondary storage** is sometimes used to describe devices that can store data permanently, such as a hard drive, floppy disk, compact disc, or tape. This is because the computer will look for data on one of these devices if the data is not in RAM. Many kinds of secondary storage devices can hold much more data than a computer's RAM can. Because they can store information permanently (or until you erase it), secondary storage devices are sometimes called **archival storage** devices. This refers to the fact that you can store information on a disk or tape and then put it away for a long time, only using it again when you need it.

Categories of Storage Devices

Storage devices are divided into three categories. Each category has two options based on the device.

Read-Only Versus Read/Write

A read-only device can only read information from the storage medium. You cannot change the information on the medium or save new information onto it. A **CD-ROM drive** is an example of a read-only device, because it does not have the capability to write information onto a disc.

The media used with read-only devices come with information already saved on them. Music CDs or software programs on CDs are CD-Rs. Your CD-ROM drive will be able to play the music or read the program instructions from the disc, but you can't change the disc's contents. Standard DVD players are another example of a read-only device.

Categories of Storage Devices

Read-Only Versus Read/Write

A read/write device not only can read information from the storage medium, but can write information onto the medium, as well. These devices let you read information from a disk or tape, make changes to the information, and save new information onto the medium.

Hard drives, Floppy disk drives, tape drives, CD-Rewritable drives (CD-RW), and DVD-RAM drives are commonly used examples of read/write devices.

Categories of Storage Devices

Sequential Versus Random Access

When equipped with a tape drive, a computer can store information on a long piece of tape, similar to a cassette tape. A tape drive is an example of a **sequential storage device**, which requires the computer to scan from the beginning of the medium to the end until it finds the information it needs. This type of storage is cheaper but slower than other types of storage. Today's computer tapes can store 200 GB or more of information. But it can take several minutes to locate a piece of information on a high-capacity tape.

A random access storage device lets a computer go directly to the needed information. The device does not have to search the entire medium to find information. For this reason, random access storage devices are much faster, and more expensive, than sequential devices. A hard drive is an example of a random access storage device.

Categories of Storage Devices

Magnetic Versus Optical Storage

Magnetic storage devices are specially treated disks or tapes that record information using magnetically sensitive materials. These devices use electricity to shift magnetic particles so they form a pattern. That way, the computer can read and store the information. **Common magnetic storage devices include hard drives, floppy disk drives, and tape drives.**

Other storage devices use laser beams to read information that has been stored on the reflective surface of a disk. These are called **optical storage devices**. **Popular types of optical storage devices for computers include CD-ROM and DVD-ROM drives.**



- Do you think Ipods are “Storage Devices”?
 - Why?
 - How can we categorize them?



Common Storage Devices

Objectives:

- Differentiate between internal and external storage devices.
- List commonly used magnetic storage devices.
- Summarize optical storage options.

Key Terms:

- hard drive
- floppy disk drive
- CD-ROM drive

Internal and External Storage Devices

- An **internal storage device** is a device installed inside your computer
 - An **external storage device** is a device positioned outside your computer
- Internal & External Storage Devices can be installed or connected to your computer



Magnetic Storage Devices

- Magnetic Storage Devices are a storage device that is installed in your computer.

Hard Drive

- The most common magnetic storage device is a **hard drive**

Magnetic Storage Devices

Floppy Disk Drives

- A floppy disk drive is a storage device with a slot that accepts floppy disks. Often internal, but can also be external.





Magneto–Optical Storage Devices

Zip and Jaz Drives

Other forms of magnetic storage devices are Apple's iPod, a portable storage/playback device, and Zip and Jaz drives. These drives are similar to floppy disk drives; however, they are slightly larger in size and use a special disk or cartridge to store much more information often 100 times more!

Magneto-Optical (MO) Drives

- This drive combines both magnetic & optical drive technologies.
- It uses a removable disk that is inserted in a slot in front of the drive.
- Can be internal or External.
- Their disks can store several gigabytes of information.

Online Storage

- It is a storage that can be used in a remote computer.
- Usually located in the internet



Common Optical Storage Devices

- Let you store a lot of info and lets it be transported easily
- Most commonly known: CD-ROM drive
- These drives are read-only drives.
- You can access data from them but cannot use them to write data onto a CD.
- A button on the front of the drive opens a tray on which you insert a CD. You push the button to close the tray, so you can use the disc's contents. Laserdisc drives, still used in some settings, operate in much the same way. The tray must be opened and the disc inserted before a laser can read the microscopic patterns of data encoded on the surface of the disc.

Compact Discs & Digital Video Discs

- Compact Discs, or CD's capacity: A standard disc can hold 650 MB & newer kinds can store 700 MB
- Digital Video Discs, or DVD's, have larger storage and holds at least seven times more info than CD's.



Review

Key Terms:

storage device

Basic Input/Output System (BIOS)

file

memory

hard drive

floppy disk drive

CD-ROM drive

primary storage

secondary storage

archival storage

read-only device

read/write device

sequential storage device

random access storage device

optical storage device