



# **DIGITAL ELECTRONICS**

## Secondary Memory

- Another form of memory that has a larger storage capacity and from which data and programs are not lost when the computer is turned off. It is also called auxiliary memory.
- It is different from primary memory as it is not directly accessible through the CPU and is non-volatile.
- Portable: Some secondary devices are removable. So, we can easily store or transfer data from one computer or device to another.



# Magnetic Tape

- Magnetic tape is a medium for magnetic storage made of a thin, magnetizable coating on a long, narrow strip of plastic film.
- It was developed in Germany in 1928.



# Floppy Disk

- A floppy disk consists of a magnetic disc in a square plastic case. It is used to store data and to transfer data from one device to another device.

Floppy disks are available in two sizes

(a) Size: 3.5 inches, the Storage capacity of 1.44 MB

(b) Size: 5.25 inches, the Storage capacity of 1.2 MB.



- To use a floppy disk, our computer needs to have a floppy disk drive. This storage device becomes obsolete now

# Magnetic Disk

- A magnetic Disk is a type of secondary memory that is a flat disc covered with a magnetic coating to hold information.
- Magnetic disks are less expensive than RAM and can store large amounts of data, but the data access rate is slower than main memory because of secondary memory.

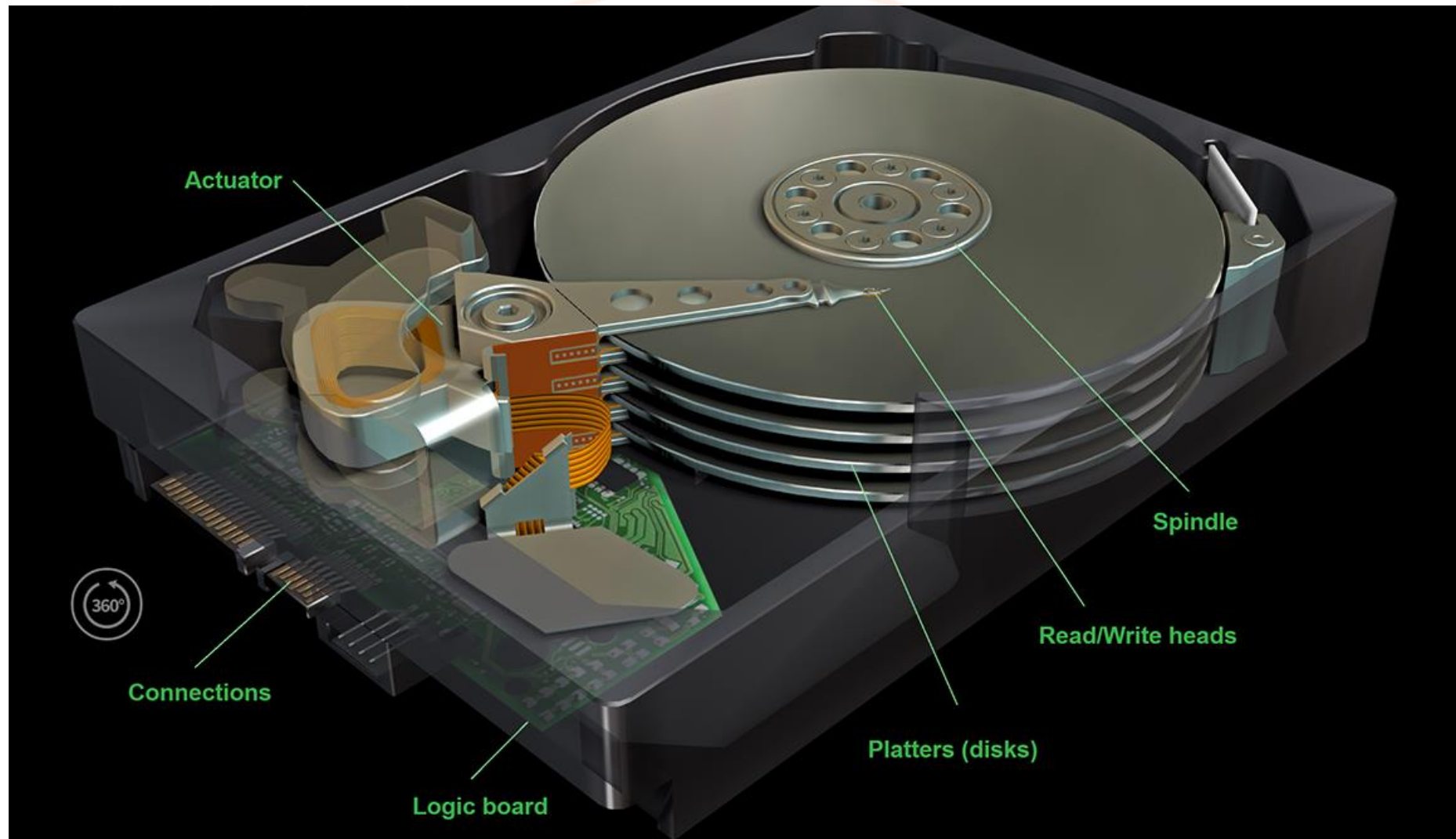


# Magnetic Disk

- Standard diameter of these disks is 14 inches and they rotate with speeds varying from 4200 rpm (rotations per minute) for personal computers to 15000 rpm for servers.
- Data is stored by magnetizing or demagnetizing the magnetic coating. A magnetic reader arm is used to read data from and write data to the disks. A typical modern HDD has capacity in terabytes (TB).







# Magnetic Disk

- A magnetic disk primarily consists of a rotating magnetic surface (called platter) and a mechanical arm that moves over it. The mechanical arm is used to read from and write to the disk. The data on a magnetic disk is read and written using a magnetization process.
- The platter keeps spinning at high speed while the head of the arm moves across its surface. When a small current is applied to the head, tiny spots on the disk surface are magnetized and data is stored.



# Magnetic Disk

- **Data is organized on the disk in the form of tracks and sectors, where tracks are the circular divisions of the disk.**
- **Tracks are further divided into sectors that contain blocks of data. All read and write operations on the magnetic disk are performed on the sectors.**
- **Random access method**

# Optical Disk



# Compact Disc

- A Compact Disc (CD) is a commonly used secondary storage device.
- It contains tracks and sectors on its surface. Its shape is circular and is made up of polycarbonate plastic.
- The storage capacity of CD is up to 700 MB of data.





# Compact Disc



# Digital Versatile Disc

- A Digital Versatile Disc also known as DVD it is looks just like a CD, but the storage capacity is greater compared to CD
- it stores up to 4.7 GB of data.



# Blu-ray Disc

- A Blu-ray disc looks just like a CD or a DVD but it can store data or information up to 25 GB data.
- If you want to use a Blu-ray disc, you need a Blu-ray reader.
- The name Blu-ray is derived from the technology that is used to read the disc 'Blu' from the blue-violet laser and 'ray' from an optical ray.





# Flash Drive

- A flash drive or pen drive comes in various storage capacities, such as 1 GB, 2 GB, 4 GB, 8 GB, 16 GB, 32 GB, 64 GB, up to 1 TB.
- A flash drive is used to transfer and store data.
- To use a flash drive, we need to plug it into a USB port on a computer.
- As a flash drive is easy to use and compact in size.



# SSD(solid-state drive)

- An SSD, or solid-state drive, is a type of storage device used in computers.
- This non-volatile storage media stores persistent data on solid-state flash memory.
- SSDs replace traditional hard disk drives (HDDs) in computers and perform the same basic functions as a hard drive.



# SSD(solid-state drive)

- SSD has no moving parts to break or spin up or down. The two key components in an SSD are the flash controller and NAND flash memory chips.
- An SSD reads and writes data to underlying interconnected flash memory chips made out of silicon.





# What are the advantages of SSDs?

1. **Faster read/write speeds.** SSDs can access large files quickly.
2. **Quicker boot times and better performance.** Because the drive does not need to spin up as an HDD would, it is more responsive and provides better load performance.
3. **Durability.** SSDs are more shock-resistant and can handle heat better than HDDs because they do not have moving parts.
4. **Power consumption.** SSDs need less power to operate than HDDs due to their lack of moving parts.
5. **Quieter.** SSDs produce less audible noise because there are no moving or spinning parts.

# SD Card

- It is known as a Secure Digital Card.
- It is generally used in portable devices like mobile phones, cameras, etc., to store data. It is available in different sizes like 1 GB, 2 GB, 4 GB, 8 GB, 16 GB, 32 GB, 64 GB, etc.
- To view the data stored in the SD card you can remove them from the device and insert them into a computer with help of a card reader.
- The data stores in the SD card is stored in memory chips(present in the SD Card)



<i>Primary Memory</i>	<i>Secondary Memory</i>
<i>(i) Primary memory devices are semiconductor memories.</i>	<i>(i) Secondary memory devices are magnetic, optical and electronic memories.</i>
<i>(ii) Primary memory can be volatile as well as non-volatile. RAM is the volatile memory and ROM is the non-volatile memory,</i>	<i>(ii) Secondary memory is always non-volatile</i>
<i>(iii) Primary memory is more effective and interacts more quickly with the microprocessor</i>	<i>(iii) Secondary memory is somewhat slower in interacting with the microprocessor than primary memory.</i>





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Convert the binary equivalent 10101 to its decimal equivalent.

**A**

21

**B**

12

**C**

22

**D**

31

The octal equivalent of 1100101.001010 is

**A**

624.12

**B**

145.12

**C**

154.12

**D**

145.21

The decimal equivalent of  $(0.101)_2$  will be

**A**

0.5

**B**

0.625

**C**

0.25

**D**

0.875

Convert  $(22)_8$  into its corresponding decimal number.

**A**

28

**B**

18

**C**

81

**D**

82



**Conversion of Octal number  $(352.56)_8$  to binary number is**

**A** $(011101010.101110)_2$ **B** $(011010101.101110)_2$ **C** $(011101010.101010)_2$ **D** $(011010110.101110)_2$

Octal subtraction of  $(232)_8$  from  $(417)_8$   
will give \_\_\_\_\_

**A**

165

**B**

185

**C**

815

**D**

516

Convert  $(5401)_8$  to hexadecimal.

**A**

A01

**B**

A02

**C**

B01

**D**

C01

The hexadecimal equivalent of the binary number  $(0010010100)_2$  is :

**A**

$(094)_{16}$

**B**

$(0A4)_{16}$

**C**

224

**D**

0114



**Conversion of Octal number  $(540)_8$  to binary number is**

**A** $(101100000)_2$ **B** $(100110000)_2$ **C** $(101010000)_2$ **D** $(101100100)_2$

Convert the Binary number  $(110011.100)_2$  to  
Decimal number.

**A** $(56.4)_8$ **B** $(64.4)_8$ **C** $(63.4)_8$ **D** $(67.3)_8$

Conversion of binary number  $(101110)_2$  to hexadecimal is

**A**

$(56)_{16}$

**B**

$(40)_{16}$

**C**

$(49)_{16}$

**D**

$(2E)_{16}$

Convert  $(285)_{10}$  to octal.

**A**

$(435)_8$

**B**

$(453)_8$

**C**

$(345)_8$

**D**

$(354)_8$



Convert the hexadecimal number  $(C35D)_{16}$  to a binary number.

**A** $(1101001101010101)_2$ **B** $(1100001100011001)_2$ **C** $(1100001101011101)_2$ **D** $(1111001101011101)_2$

**Q. What is the binary equivalent of the decimal number 67.625?**

- (1) 1000010.110**
- (2) 1000011.110**
- (3) 1000010.101**
- (4) 1000011.101**

**Q. Given below are two statements:**



**Statement I: 8 megabytes =  $2^{13}$  gigabytes**

**Statement II: The decimal equivalent of the binary number  $(11101.101)_2$  is  $(29.625)_{10}$ .**

**In the light of the above statements, choose the correct answer from the options given below:**

- A. Both Statement I and Statement II are true**
- B. Both Statement I and Statement II are false**
- C. Statement I is true but Statement II is false**
- D. Statement I is false but Statement II is true**



**Q. Given below are two statements:**

**Statement I: The base of the binary number system is 2.**

**Statement II: Binary addition is just like decimal addition except that the rules are much simpler.**

**the light of the above statements, choose the correct answer from the options given below:**

- A. Both Statement I and Statement II are true**
- B. Both Statement I and Statement II are false**
- C. Statement I is true but Statement II is false**
- D. Statement I is false but Statement II is true**

**Q. Which of the following statement(s) is/are TRUE ?**

**S1 : The decimal number 11 is larger than the hexadecimal number 11.**

**S2 : In the binary number 1110.101, the fractional part has the decimal value as 0.625.**

- (1) S1 only**
- (2) S2 only**
- (3) Both S1 and S2**
- (4) Neither S1 nor S2**