Module 5- Storing Data

Types of storage devices

Discuss in previous Module.

Magnetic storage devices

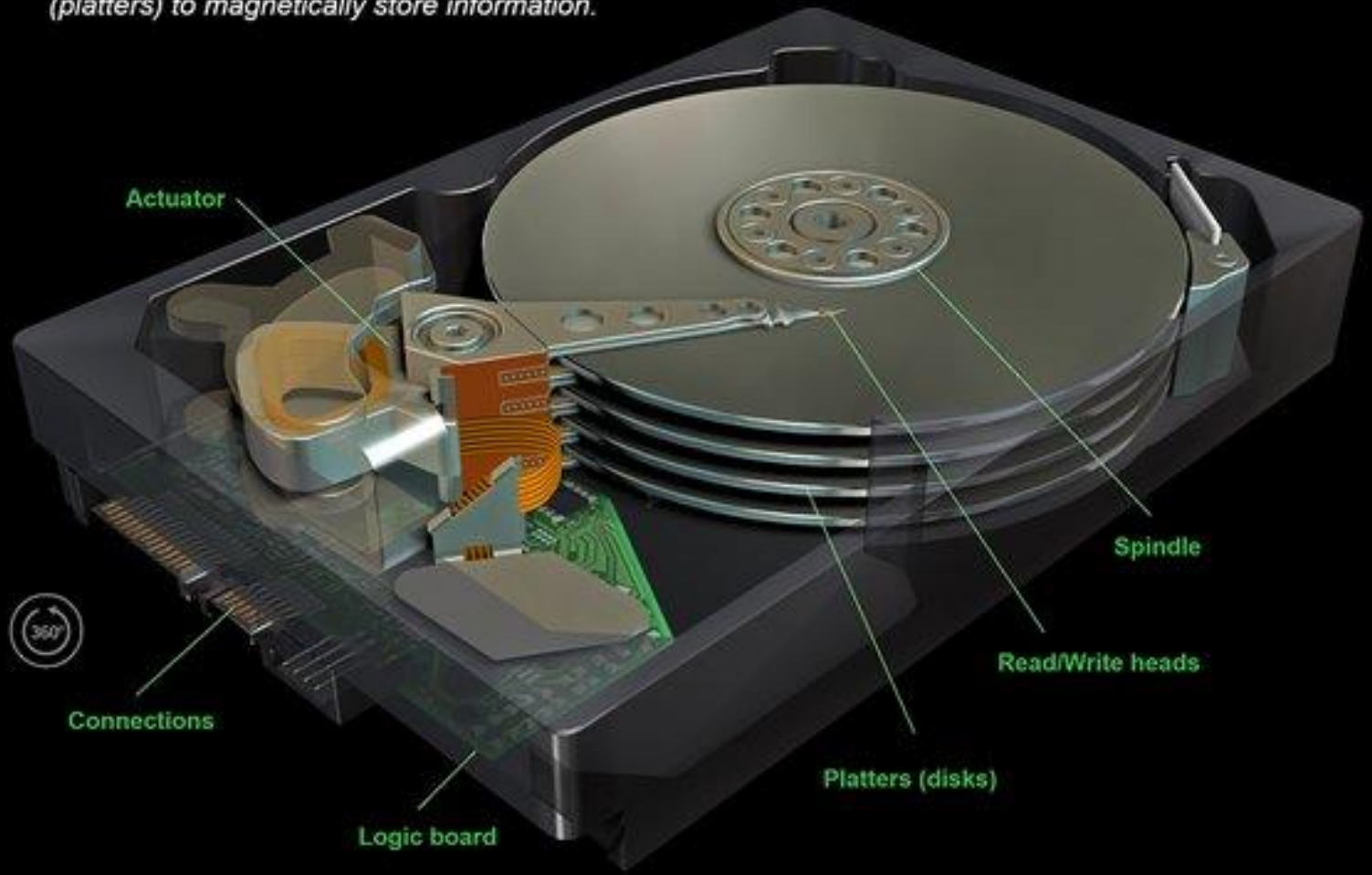
- **HDD**
- **Magnetic Tape**
- **Floppy Disk**
- **Magnetic Stripe Cards:** These are used for storing data on credit cards, ID cards, and other types of cards. The magnetic stripe on the back of the card contains the cardholder's information.

- Data is stored on a disk using a magnetic recording method. The disk is coated with a magnetic material, and a read/write head is used to magnetize the surface of the disk in order to store data.
- When data is written to the disk, the read/write head applies a magnetic field to a specific location on the disk surface, which magnetizes the material in that location either in a positive or negative direction. This creates a magnetic pattern that represents the data being stored.
- When data is read from the disk, the read/write head senses the magnetic pattern on the disk and converts it into electrical signals, which are then processed by the computer to retrieve the data.
- The disk is divided into a number of sectors, which are the smallest units of storage on the disk. Each sector can store a fixed amount of data, typically a few kilobytes or megabytes. The sectors are grouped together into larger units called clusters, which are used by the file system to organize and manage the data on the disk.
- The disk is constantly spinning while in use, and the read/write head moves back and forth across the disk surface to read and write data to the different sectors. This process of reading and writing data to the disk is called disk I/O (input/output), and it is a critical component of computer performance.

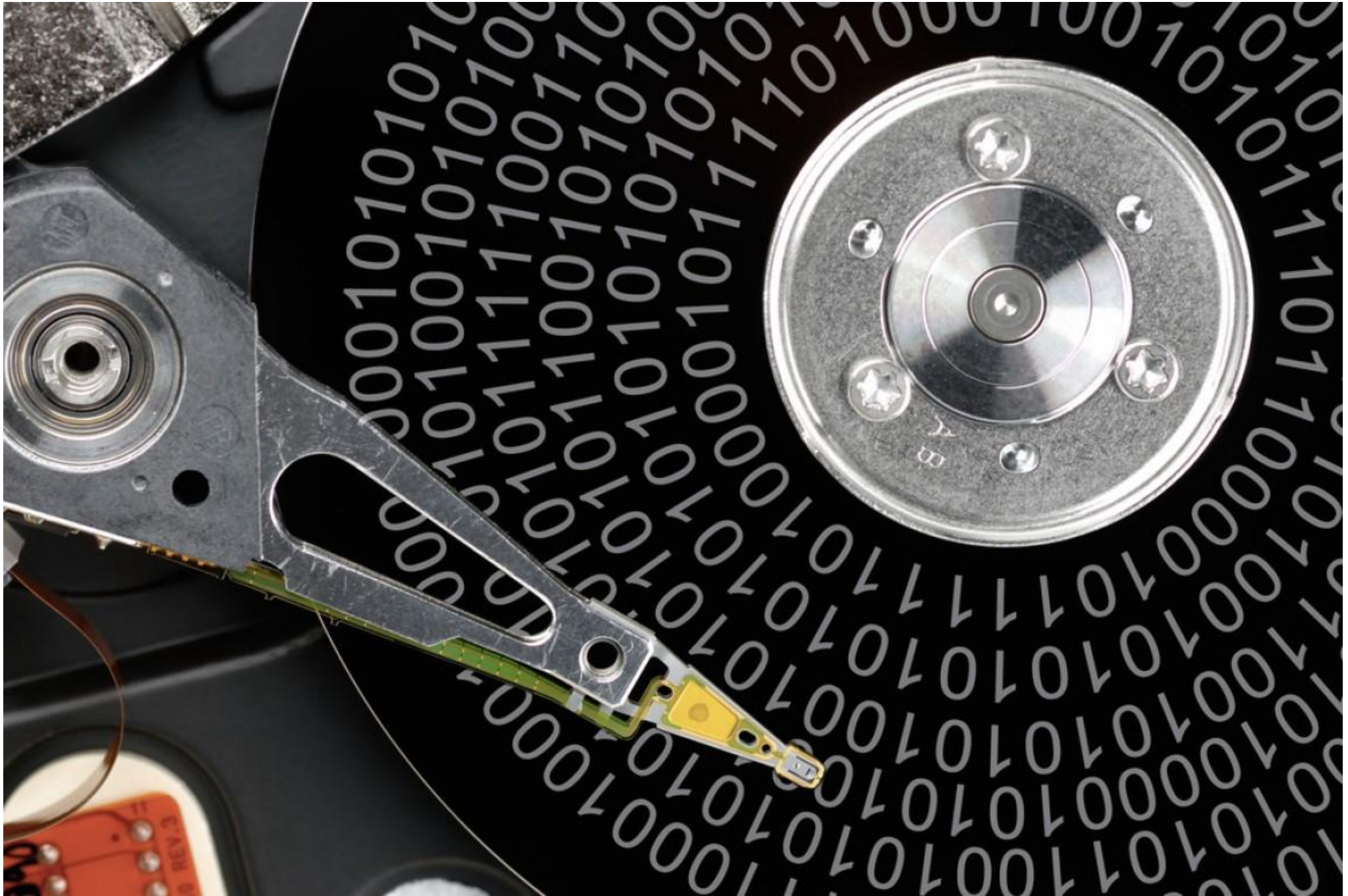
How Hard Disk Drives Work

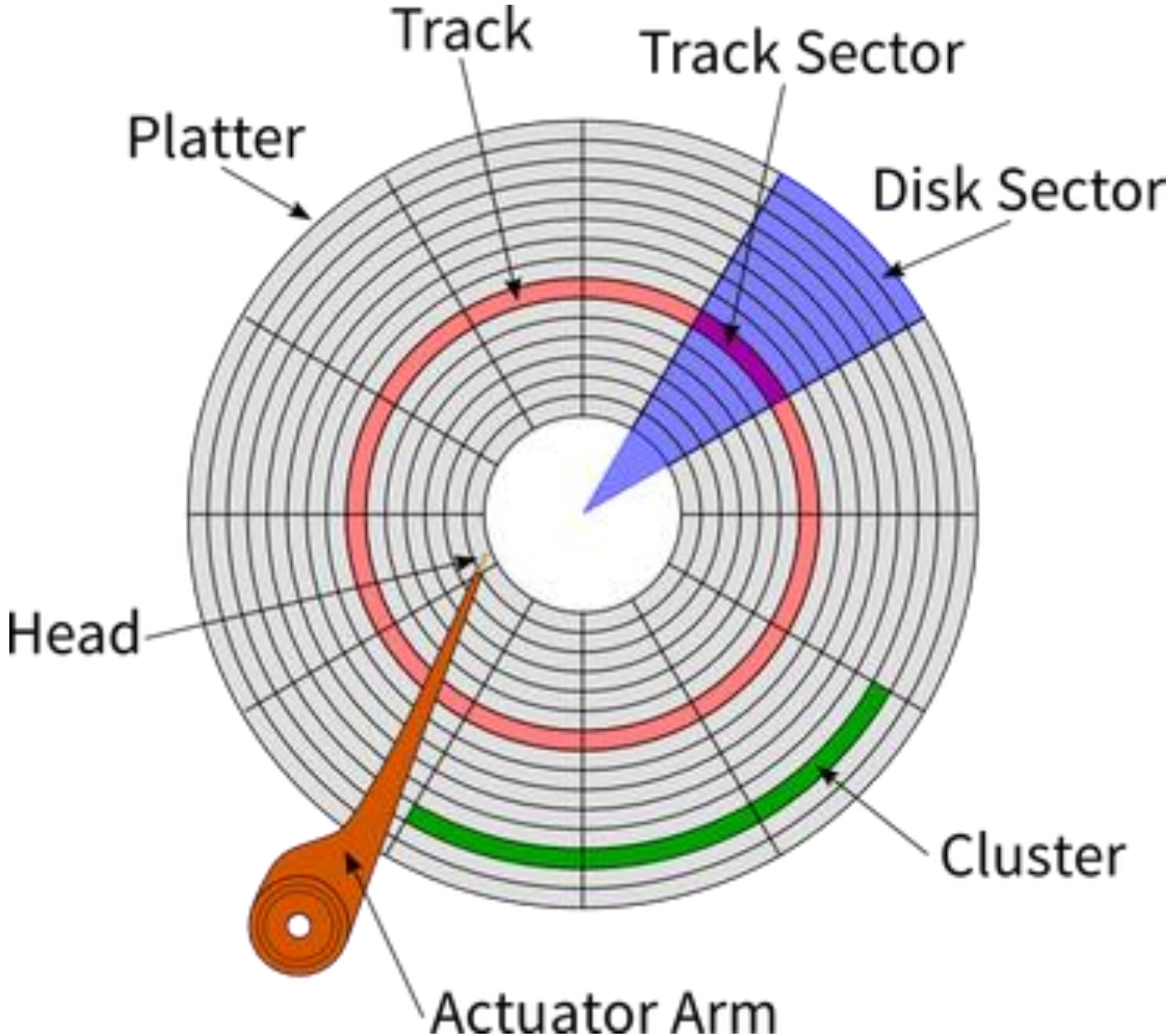
Presented by SEAGATE.COM
Designed & research by ANIMAGRAFFS

Hard Disk Drives (HDDs) use spinning disks (platters) to magnetically store information.



Presented by SEAGATE.COM • Design & research by ANIMAGRAFFS




Track
Track Sector
Platter
Disk Sector
Head
Cluster
Actuator Arm

How data is organized on a disk

- Data on a disk is organized using a **file system**, which is a **software layer** that manages the **storage** and **retrieval** of **data** on the disk.
- The file system is responsible for organizing data into **files** and **directories**, and for **keeping track** of the **location** of each file and how it is stored on the disk.
- There are several **different file systems** in use on different types of disks and **operating systems**, but they all have some common characteristics.
- Here are some key concepts related to how data is organized on a disk:
- **Files**: A file is a collection of related data that is stored as a unit on the disk. Files can contain text, images, audio, video, and other types of data.
- **Directories**: A directory (also called a folder) is a container that holds files and other directories. Directories can be nested within each other to create a hierarchical structure.

- **File attributes**: Each file has a set of attributes that describe its properties, such as its **name**, **size**, **creation date**, and **access permissions**.
- **Allocation**: The file system determines how to allocate space on the disk for each file. It may use **contiguous allocation** (storing a file in a single block of contiguous space) or **fragmented allocation** (storing a file in multiple non-contiguous blocks).
- **File system metadata**: The file system stores **metadata** (data about the data) on the disk to manage the file system structure and **track** the **location** of **files** and **directories**. Examples of metadata include the file allocation table (**FAT**), master file table (**MFT**), or inode table.
- By organizing data in this way, the file system makes it easier for users and applications to access and manage files on the disk.
- It provides a logical structure that allows files to be stored and retrieved efficiently, and makes it possible to organize data in a way that makes sense for the user's needs.

Optical storage devices

Discuss in previous Module.

Recordable optical technologies

- Recordable optical technologies are types of optical storage devices that allow users to write data to the disc. Some common examples of recordable optical technologies include:
- **CD-R (Compact Disc Recordable):** This type of disc can be **written** to **once**, but **cannot** be **erased** or **rewritten**. CD-R discs are commonly used for data **backup** and **storage**, as well as for **creating music** and data CDs.
- **CD-RW (Compact Disc Rewritable):** This type of disc can be **erased** and **rewritten multiple times**. CD-RW discs are commonly used for **temporary storage** and for **testing** and **development purposes**.
- **DVD-R (Digital Versatile Disc Recordable):** This type of disc can be **written** to **once**, but **cannot** be **erased** or **rewritten**. DVD-R discs are commonly used for data backup and storage, as well as for creating movies and other video content.

- **DVD+R (Digital Versatile Disc Recordable):** This is a similar format to DVD-R, but with **some technical differences** in the **way** the **data is written** to the disc. DVD+R discs are also commonly used for data backup and storage, as well as for creating movies and other video content.
- **DVD-RW (Digital Versatile Disc Rewritable):** This type of disc can be **erased** and **rewritten multiple times**. DVD-RW discs are commonly used for temporary storage and for testing and development purposes.
- **Blu-ray Disc Recordable:** This is a recordable version of the Blu-ray Disc format, and is commonly used for **high-definition video recording** and **data backup**.
- Recordable optical technologies have become popular for creating backups, distributing data, and archiving digital content. They offer relatively high storage capacity at a low cost, making them a convenient and affordable solution for storing and sharing large amounts of data.