# Storage

### Characteristics of Backing Storage

- **Backing storage**: long-term storage used to store data, files, and programs when not in use e.g.:
  - hard disk drives (HDD)
  - solid-state drives (SSD)
  - USB flash drives
  - optical discs (CDs, DVDs)
- Backing storage is typically slower than internal memory but has a larger capacity
- It is non-volatile, meaning it retains data when the computer is powered off

### Differences between Backing Storage & Internal Memory

| | Backing Storage | Internal Memory |
|---|---|---|
| **Function** | Long-term storage of files, programs, and data | Temporary storage of data and essential instructions while the computer is running |
| **Examples** | HDD, SSD, USB flash drives, optical discs (CDs, DVDs) | RAM, ROM |
| **Access Speed** | Slower | Faster |
| **Capacity** | Larger | Smaller |
| **Volatility** | Non-volatile (retains data when powered off) | RAM: volatile, ROM: non-volatile |

### Storage Media

| Storage Media | Examples | Use | Advantages | Disadvantages |
|---|---|---|---|---|
| Magnetic Drives | Hard disks, Magnetic tape | Long-term data storage, backup, and archiving | High capacity, low cost per GB | Slower access time, moving parts, susceptible to magnets |
| Optical Discs | CD, DVD, Blu-ray | Data storage, audio, video, and software distribution | Portable, durable, low cost | Limited capacity, susceptible to scratches |
| Solid-State Media | Memory cards (SD, xD, CFast), USB Drives, Solid State Drives | Fast data storage for portable devices and modern computers | Fast access time, no moving parts | More expensive, limited write cycles |

**Storage Devices**

| Storage Devices | Use | Media | Advantages | Disadvantages |
|---|---|---|---|---|
| Magnetic Drive | Long-term data storage, backup, and archiving | Magnetic | High capacity (10TB), low cost per GB | Slower access time, moving parts, susceptible to magnets |
| Fixed Magnetic Hard Drive | General-purpose storage in computers and servers | Magnetic Hard Disk | Large storage capacity (5TB), relatively fast | Moving parts, vulnerable to physical damage |
| Portable Magnetic Hard Drive | External storage for data transfer and backup | Magnetic Hard Disk | Portable (5TB), large storage capacity | Slower than SSDs, vulnerable to physical damage |
| Magnetic Tape Drives | Backup and archiving, especially for large volumes of data | Magnetic Tape | High storage capacity (10TB), low cost | Slow access time, sequential access |
| CD | Audio and data storage, software distribution | CD | Affordable, widely compatible | Low capacity (700MB), susceptible to scratches |
| DVD | Higher capacity storage for data, video, and software distribution | DVD | Higher capacity than CD (8.5GB), affordable | Susceptible to scratches, lower capacity than Blu-ray |
| Blu-ray | High-definition video and high-capacity data storage | Blu-ray | High capacity (50GB), high-resolution video storage | More expensive, and requires specific hardware |
| Fixed Solid-State Drive (SSD) | Fast internal storage for modern computers | Solid-State | Fast access time, no moving parts, high capacity (30TB) | More expensive, limited write cycles |
| Portable SSD | External storage for fast data transfer and backup | Solid-State | Fast access time, portable, no moving parts, high capacity (2TB) | More expensive, limited write cycles |
| Pen Drive | Portable data storage and transfer for various devices | Solid-State | Small size, fast read/write speeds, high capacity (1TB) | Limited capacity compared to other storage devices |