Basic
Computer & Information Science
The *Hybrid* Edition

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Basic
Computer & Information Science

for Physiotherapy Students

As per Physiotherapy Curriculum of All Universities of India and Ministry of Health & Family Welfare

Special Features

- First book of Computer & Information Science specifically designed for physiotherapy students
- **200+** Key Terms on computer-related vocabulary
- **50+** Students and Teachers-centeric Activities and Practical Points covered extensively
- **300+** Figures, Screenshots and Tables covered
- **100+** MCQs covered

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Priyanka Randhir

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Amritsar, Punjab

About the Author

Priyanka Randhir has completed her BSc (N), RN, RM and MSc Nursing (Pediatrics) from prestigious institutes affiliated to Baba Farid University of Health Sciences, Faridkot, Punjab. She completed her MA (Sociology) from Guru Nanak Dev University, Amritsar, Punjab. She has been working in the field of Nursing since 2010. She has worked as a Nursing Tutor at Khalsa College of Nursing, Amritsar, for a period of 3 years. She served at different clinical settings at districts Muktsar Sahib and Mohali, Punjab, and worked as Nursing Tutor at SMLD School of Nursing at Amritsar, Punjab. She has also been contributing to the "Nursing Next Live" project as a Senior Content Strategist by providing significant additions in the subjects, like Sociology, Nursing Informatics, Nursing Education, Nursing Management, Nursing Research, etc. She has attended several international workshops and conferences and presented her research papers. She has also rendered her services as a resource person in Youth Red Cross Training cum Study Camp for Girls at National level. She has participated in debates related to nursing profession on different occasions, mainly on International Nurses Day. She is the first teacher to be honored with "Certificate of Appreciation" at Khalsa College of Nursing, Amritsar, for excellence in her work. She has also authored several books, namely Midwifery for ANM, Child Health Nursing and Computer 4 Nurses. With her rich experience of 11 years in the field of Nursing, the author has integrated the knowledge of latest technology with the traditional nursing skills.

Preface

Informatics Physiotherapists are bilingual; they can talk IT and they can talk physiotherapy. Computers are enriching the profession and have become an inevitable part of physiotherapy. This book aims at providing the physiotherapy students a practical study guide for Computer/Information Science and its implementation in their profession. Students must acquire the knowledge of computer and get trained in it as there is an urgent need for all to meet up with the drastic change in health care profession. This book is designed strictly as per the syllabus suggested by **Ministry of Health and Family Welfare** to help the students enhance their professional skills through the knowledge of computer in their respective settings. The book cultivates the basic skills of Computer Science in the readers and enables them to keep pace with the innovation in the field.

"Practice makes a man perfect", for such perfection, this book provides the students with a number of theoretical and practical questions at the end of each chapter that help them to go forth. *"Teachers are the managers of the world's greatest resource: CHILDREN",* therefore, this book does not desert these managers and provides a special column that contains interesting activities for them as well. Out of the ordinary, the book offers "Summary" along with "Must Know" facts that will guide the future physiotherapists and smoothen their way in the professional world of health care delivery system.

In the words of James Joyce, *"Mistakes are the portals of discovery",* therefore, I welcome all the valuable suggestions of dear readers for refining and polishing this book. I promise to continuously work on avoiding the pitfalls and always make sure to keep my strengths sharp.

Without Google and its products, it would have been difficult to provide interactive screenshots for the students to understand things completely. I am grateful to Google for this.

Priyanka Randhir

Acknowledgments

Special Features of the Book

Learning Objectives

On completion of this chapter, the students will be able to:

- ➡ Explain the characteristics of computers.
- ➡ Recognize the basic components of a computer.
- ➡ Explain the importance of various units of a computer.
- ➡ Familiarize themselves with the block diagram of computer.
- ➡ Differentiate between various generations of computer.
- ➡ Identify the different computer languages.

Learning Objectives given in all the chapters focus on the areas that a student will become aware of after completing the chapter.

Every chapter starts with a **Chapter Outline** that gives a glimpse of the content covered in the respective chapter.

Chapter Outline

- ➡ Introduction
- ➡ History of Computer
- ➡ Definition of Computer
- ➡ Characteristics of Computer
- ➡ Block Diagram of Computer
- ➡ Generations of Computers
- ➡ Classification of Computers
- ➡ Computer Languages

Key Terms

Access: To gain entry to data or reading the data or writing the data.
Access control list (ACL): It enlists the services available on a server.
Access time: The time period between seeking the data and retrieving it.
Analog: It represents a number, using a physical quantity, like voltage. This physical quantity changes continuously.
Application: Data processing by a given set of instructions.
ASCII: American Standard Code for Information Interchange.

Important terms used in the chapter are enlisted under **Key Terms** with their brief definitions.

Numerous **Tables** are supplemented with the text to provide necessary data and information in an easy to recall format.

Table 1.2: Unit of time in terms of seconds

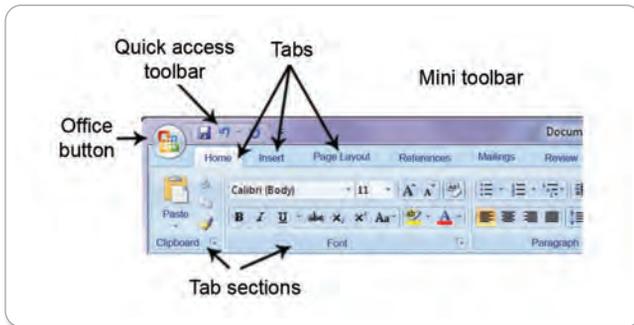| Unit of time	Seconds
Millisecond	One thousandth (10^{-3})
Microsecond	One millionth (10^{-6})
Nanosecond	One billionth (10^{-9})
Picosecond	One trillionth (10^{-12})

MUST KNOW

The ROM and RAM of the computer system are located in primary storage. Your computer uses memory to briefly store data, whereas storage is where you permanently save files. A file is copied from the memory to the storage device when you save it. Because it needs to access data from the storage drive in order to use it, this is why your computer appears to operate more slowly when memory is limited.

Important facts are covered under **Must Know** boxes throughout the book.

PRACTICAL TIP

In Windows 10, Personal folder has been replaced by a better option known as Windows Personal folder. To open it, click on start menu and type "choose which folders appear on start" and the user will get access to his personal folder as shown in Figure 6.1D.

Practical Tip examples have been presented in between the text with important practical considerations.

Fig. 7.6: Quick access toolbar

Several **Images** and **Screenshots** have been used at relevant places to simplify the concepts for the students.

UPGRADER

Upgraders are provided as areas of integrating theoretical rationales in practical scenarios for better understanding.

Scenario: *The student was asked by the teacher to prepare a presentation that describes the musculoskeletal system in humans in details with the use of computer that must be made interactive and interesting with the use of animations.*

Review: Input devices

Level of Cognitive Ability: Applying/Implementing

Student's Needs: Identifying the importance of input devices

Integrated Process: Intake/Output unit

Content Area: Hardware

Priority Concepts: Keyboard, mouse, microphone.

Rationale: Here, the student can use the input devices to enter alpha-numeric data which will help to label the diagram of musculoskeletal system, mention the names of the muscles and add animation by using the mouse. In addition to this, he can add 3D animation just with a click of mouse and he can also give a voiceover to make it more interactive by using microphones.

? Assess Yourself

At the end of every chapter, **Assess Yourself** section has been included to help the students assess their learning.

Short Answer Type Questions

1. Define CPU.
2. What are the basic components of a CPU?
3. Enlist the characteristics of bus.
4. Name the types of Memory.
5. What do you mean by the term "system clock"?

Long Answers Type Questions

1. Explain the functions of the CU and ALU in the CPU of a computer.
2. Briefly explain the types of data storage and its relation with the CPU.

ACTIVITIES

Text is enriched with students as well as teachers-centric practical **Activities**.

Activity for Students

Activity 1: Make a group of four and ask them to make a model of the "Block diagram of Computer".

Activity 2: Make a report on the latest types owf computers.

Activity for Teachers

Activity 1: Show different types of computer used in hospital settings.

Activity 2: Make students use the computer to perform data entry.

BASIC COMPUTER AND INFORMATION SCIENCE
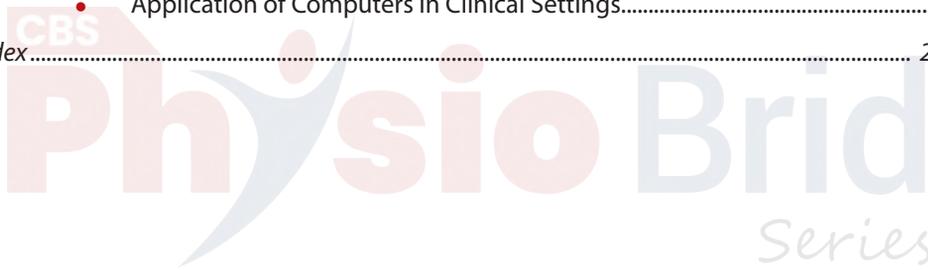
Time: 45 Hours

1. **Introduction to computer:** Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
2. **Input and output devices:** Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices); output devices (monitors, pointers, plotters, screen image projector, voice response systems).
3. **Processor and memory:** The Central Processing Unit (CPU), main memory.
4. **Storage devices:** Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
5. **Introduction to Windows:** History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
6. **Introduction to MS-Word:** Introduction, components of a Word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
7. **Introduction to Excel:** Introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
8. **Introduction to PowerPoint:** Introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
9. **Introduction to operating system:** Introduction, operating system concepts, types of operating system.
10. **Computer networks:** Introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
11. **Internet and its applications:** Definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.
    a. Application of Computers in clinical settings.

Contents

Storage Devices

Learning Objectives

On completion of this chapter, the students will be able to:

→ Explain the meaning of storage devices.
→ Recognize the basic storage devices of a computer.
→ Explain various types of storage devices.
→ Familiarize with different storage devices.
→ Describe sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

Chapter Outline

→ Introduction
→ Storage Device and its Types
→ Sequential and Direct Access Devices
→ Direct Access Storage Devices
→ Mass Storage Devices

Key Terms

CD: It's called a Compact Disk. On its surface are data-storage channels and sections. It is made of polycarbonate plastic and has a round shape.

DVD: It is known as a Digital Versatile Disk. DVDs are round and flat data storage disks. It comes in two sizes: (1) 4.7 gigabyte single disks and (2) 8.5 gigabyte dual disks.

Floppy disk: It is a type of storage device that is used on a personal basis in a computer. Floppy disks are typically made of plastic and are kept safe by using protective cases.

Hard disk drive: It is a hard disk drive (HDD) that stores and retrieves data using magnetic storage. It is a nonvolatile device that stores data that can be changed or deleted indefinitely.

Magnetic disk: It is a card that stores data by rearranging the magnetism of microscopic metal magnetic nanoparticles on the card's band. Another name for it is a swipe card.

Memory card: It is widely used in digital cameras, printers, gaming consoles, and other electronic devices. It can hold a lot of data and comes in a variety of sizes. A memory card reader is required to use a storage device on a computer.

Pen drive: As it has flash memory and a USB interface, it is also known as a USB drive. These devices can be instantly connected to our desktops and laptop computers, allowing us to read data into them even faster and more efficiently.

RAM: RAM stands for random-access memory, and it is used to access any temporary data and obtain intermediate results for the information's use. It is also known as temporary memory because the data is only stored while the computer system is turned on; if it is turned off, the data is lost.

ROM: ROM stands for read-only memory. This is also known as non-volatile memory because the information stored here is permanent until and unless the user deletes it.

SD card: It is known as a Contactless Smart Card. It is commonly used to store more data on electronic devices such as phones and cameras. SD card stands for secure digital card.

SSD: SSD stands for solid-state drive. It refers to a type of mass storage technology similar to hard disk drives. It is far more durable than hard drives because it does not require visual disks. SSD stands for solid-state drive.

INTRODUCTION

Technology used to store digital data on computers and recording media is known as computer data storage. It is a key feature and essential part of computers. In other words, the hardware device that can store information is called a "storage device". A computer storage device allows its user to store and safely access data and applications on a computer device. Knowing and understanding these computer storage devices is essential because they serve as one of the core components of the system.

MUST KNOW

A storage device is a hardware device that can be used to store digital data and applications in the form of images, video, audio, and so on. It is an important component of a computer, and one example is the hard drive.

STORAGE DEVICE AND ITS TYPES

A storage device is a type of hardware that can be used to temporarily or permanently keep information. It is also referred to as storage medium, digital storage, or storage media. It is typically used to store, transfer, and extract data items. It can be used to store information either locally or externally to a computer system, server, or any similar computing device.

Computers employ two types of storage:

1. Primary storage, like random-access memory (RAM).
2. Secondary storage device, such as a hard drive for a computer.

Another classification of storage devices is enlisted in Flowchart 4.1.

Storage devices can be roughly divided into the following two more categories:
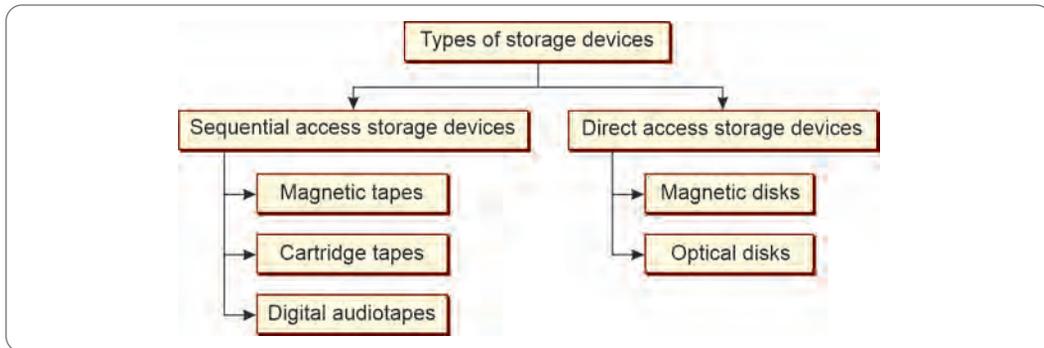
1. Sequential access storage devices
2. Direct access storage devices

SEQUENTIAL AND DIRECT ACCESS DEVICES

Sequential access devices are useful for backup and recovery. However, it is a very slow access method. Direct access devices provide faster access to the item being looked for. Consider a DVD

Flowchart 4.1: Types of storage devices

with the ability to select a specific scene instead of a cassette. Data must be accessed in predefined sequences using sequential access devices. Analog media, such as videotapes and audiotapes, are similarly affected by this. The concept even predates the development of magnetic computer storage; for example, data was once saved by poking holes in paper cassettes. Sequential access storage devices include **magnetic tapes, cartridge/cassette tapes and digital audiotapes (DATs).**

Features of Sequential Access Storage Devices

Sequential access storage devices have the following **features**:
■ Very quick sequential access, no direct access.
■ Resistant to a variety of environmental factors.
■ Cheaper than a disk, simple to store, and transfer.
■ Earlier, it was frequently utilized to store program data; currently, it is primarily utilized for backups or archives (tertiary storage).

Sequential access storage devices include:
■ Magnetic tapes
■ Cartridge tapes
■ Digital audiotapes (DAT)

Magnetic Tapes

Similar to the widely used audiotapes are magnetic tapes. It is a big roll of magnetically coated flexible plastic material (Figs 4.1A and B). A binding substance and tiny iron oxide particles make up the magnetic coating. On tracks that extend the length of the tape, data is stored as a magnetic pattern of bits. A magnetic point denotes a 1, while the absence of one denotes a 0. The read-write heads in a magnetic tape device are kept still while the tape is advanced past them. After going through the read-write mechanism and unwinding off one reel, the tape then winds onto the second reel.

Eight tracks on a tape hold a byte of data, and the ninth track is utilized as a parity bit to check for errors. One bit of each character or byte is captured on each track of the tape as the data is sent across it. The remainder track is utilized to verify if the recording was made accurately. Data recorded on a tape may become corrupted as a result of a system error. Even when the tape is not in use, data corruption like this can still happen. There are numerous ways to find these problems.
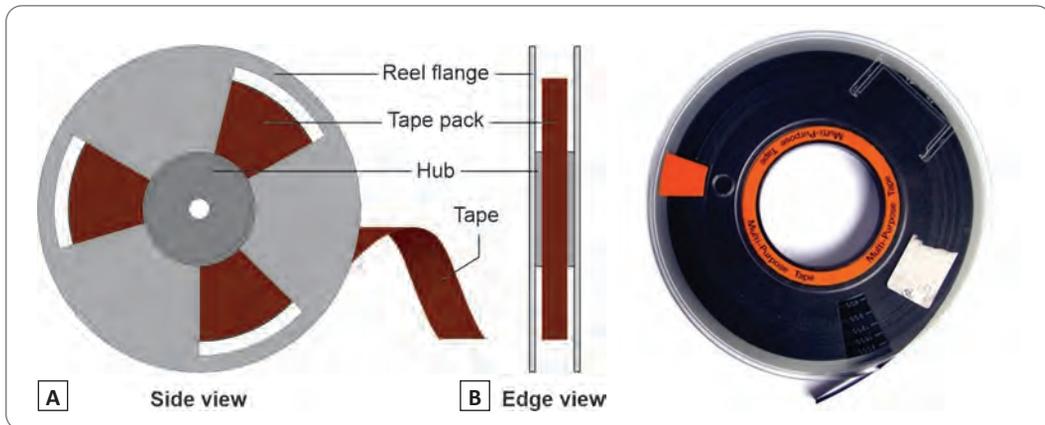
Figs 4.1A and B: Magnetic tapes

Cartridge Tapes

Similar to an audio cassette tape, these quarter-inch wide tapes are enclosed in a cartridge. These tapes, as opposed to the half-inch tape, record data serially in a track with a single head (Figs 4.2A and B). The tape is wound again after reaching the end, and the succeeding track is then used to record data.

The data is recorded in a serpentine pattern over 9–30 tracks. On a track, data bits are written serially, and blocks of around 6,000 bytes are written after error-correction code to allow data to be
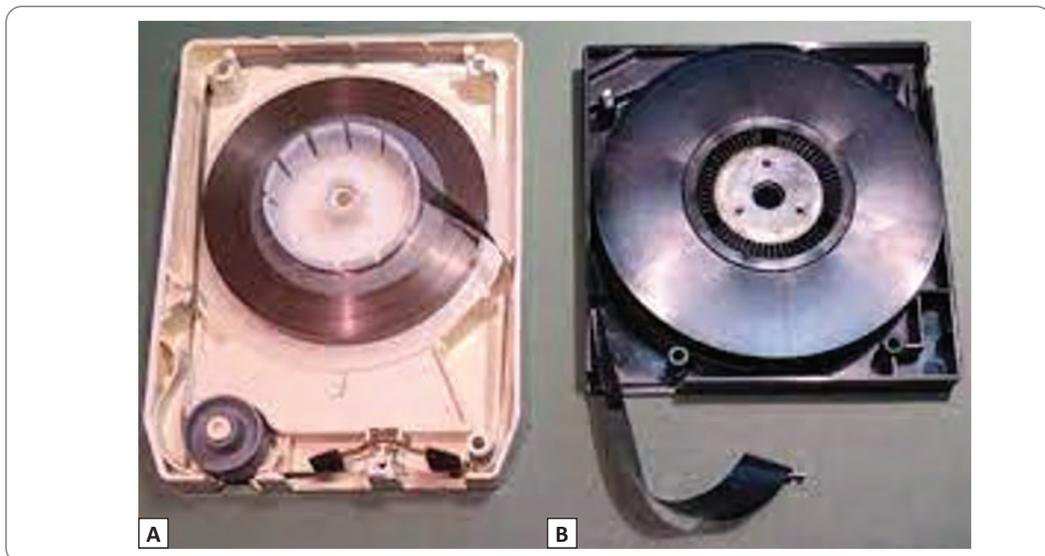
Figs 4.2A and B: Cartridge tapes

corrected upon reading if an error occurs. In contemporary recordings, the density of these tapes is approximately 16,000 bpi.

Digital Audiotapes

An electronic tape with a background recording feature and a singing playback media is called a DAT (digital Audiotape). It is comparable to a compact cassette; however, the primary distinction is that in contrast to earlier analog tapes, DAT is digital. Digital tapes only operate in one direction, in contrast to traditional tapes. The DATs can capture different vibrations or rates—higher or lower—than CD.

DIRECT ACCESS STORAGE DEVICES

Hard disks, portable hard drives, and floppies now dominate direct access storage, but read/write optical and magneto-optical media (DVD, DVD-RAM, and DVD+RW) aims to revolutionize storage systems.

Examples of direct access storage devices are as follows:

■ Magnetic disks
■ Optical disks

Magnetic Disks

A magnetic disk is a metal or plastic platter that looks like a record player without grooves. The data recordings organized on a magnetic tape must be retrieved in the same order they were stored, just like the songs on a sound cassette (Figs 4.3A and B).
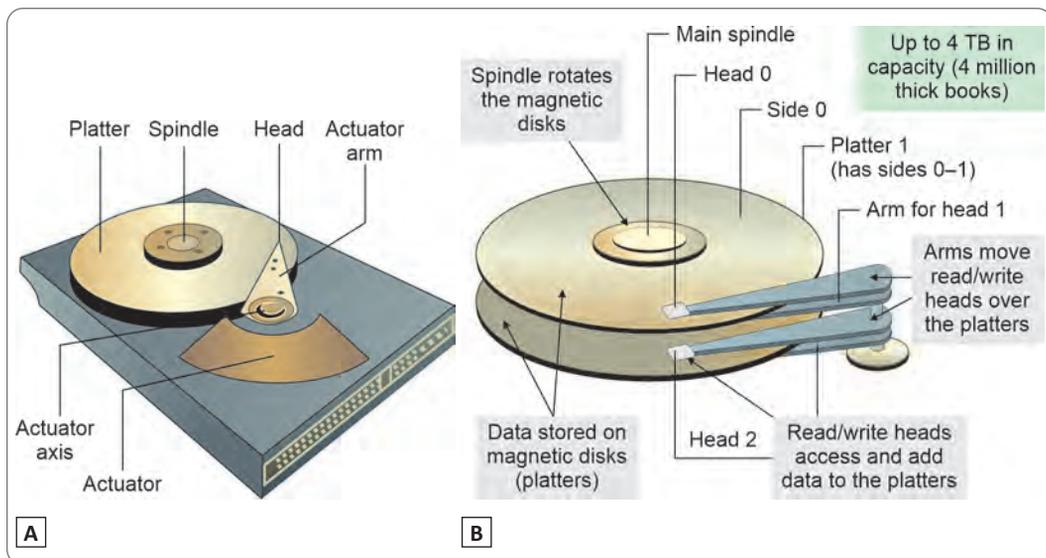
Figs 4.3A and B: Magnetic disks

Types of Magnetic Disks

Cartridge Disk

A Catridge disk is a transportable, removable drive that can contain a lot of data and looks like a floppy disk. Combining the advantages of hard disks and floppy disks promises to revolutionize mass storage in the coming future.

Diskettes (Floppies)

These are square plastic disks with a sliding portion across the top that is typically silver or black. These colorful disks have a storage capacity of 144 million bytes.

Hard Cards

A hard card is a hard drive that plugs directly into an interface card and into an expansion slot on a PC motherboard.

Hard Disks

A hard drive, also known as a hard disk drive, is a magnetic storage medium for your computer. A hard drive is a flat, round platter made of aluminum or glass coated with a magnetic material. Personal computer hard drives can store the information in terabytes (trillions of bytes).

Magneto-optical Disks

A hybrid storage medium is magneto-optical disks. When a low-power laser beam is reflected, spots with distinct magnetization directions produce multiple polarizations in the light.

Optical Disks

Any computer disk that reads and writes data using optical storage methods and technologies is referred to as an **optical disk**. It is a tool for optical (light) energy storage. It is a disk-based computer storage device that reads and writes data using laser beams and stores information digitally.

Types of Optical Disks

The types of optical disks and their functions are given in Table 4.1.

Table 4.1: Types of optical disks and their functions

Type of optical media	Full form	Function
CD-R	Compact Disk Recordable	It reads CD-ROM and CD-R. A CD-R disk is a compact disk that can be written once and that has an infinite number of reading cycles. Contrary to CD-RW disks, most CD readers created before the launch of CD-R can read CD-R disks.
CD-ROM	Compact Disk Read-Only Memory	A prepressed optical compact disk called a CD-ROM is a data-carrying disk. As a sort of read-only memory, CD-ROMs can only be read by computers; they cannot be written to or deleted.

Contd...

Type of optical media	Full form	Function
CD-RW	Compact Disk Rewritable	Compact disk rewritable is a blank compact disk that may be used to read and write data using a particular kind of drive (i.e., computer device). This software can be used to write files using CD-RW devices that are compatible. This disk resembles a typical CD. The sole distinction is that this disk allows for unlimited writing and erasing. A CD-RW disk can carry roughly 650 MB of data.
DVD-RAM	Digital Versatile Disk Random-Access Memory	Data may be read, written, and deleted continuously on DVD-RAM, a type of optical disk storage. It can be used for fundamental data storage, data archiving, and data backup since it offers superior data integrity, data retention, and damage protection.

MASS STORAGE DEVICES

Any storage device that enables the storing and transfer of substantial volumes of data among computers, servers, and within an IT environment is referred to as a mass storage device (MSD). Portable storage devices, or MSDs, offer an interface for storing data that can be either internal to the computer or external.

Types of Mass Storage Devices

Common types of mass storage devices include:
- External hard drives
- Flash memory cards
- Hard drives
- Optical drives
- Redundant Array of Independent Disks (RAID) storage
- Solid-state drives (SSDs)
- Tape drives
- USB storage

Advantages of Mass Storage Devices

- Very portable due to its very small size
- High data transfer rates
- Low power requirements.

Disadvantages of Mass Storage Devices

- Much more expensive than magnetic storage per unit
- It is susceptible to damage
- Slows down over time
- Eventually breaks
- Access time is slower.

⬡ UPGRADER

Scenario: *A teacher asked the student to prepare a presentation on "Healthcare Delivery System in India" and asked to use storage device to bring it to the class.*

Review: Storage devices
Level of Cognitive Ability: Applying/Implementing
Student's Needs: Identifying the commonly used storage devices
Integrated Process: Hardware
Content Area: Mass storage device
Priority Concepts: Pen drives, Flash memory cards.
Rationale: The student can use a flash memory cards or pen drive to do so. Most widely used storage gadgets are:
Hard drives SCSI/IDE: A SCSI hard drive is a storage device that employs a different architecture than the one used by the majority of home PCs. The ability to "daisy-chain" many drives to a single connection is its key benefit. Although the difference is frequently bigger in principle than in fact, it also provides quicker data transfer speeds. SCSI is best suited for servers and other continuously utilised computer systems. An electronic interface standard called Integrated Drive Electronics (IDE) establishes the connection between a bus on the motherboard of a computer and the computer's disk storage devices.

  It is usually used to record audio, and once something is written on it, it cannot be changed or erased.
The DVD-R disk: (Digital Video Recordable) is used to record movies and has a storage capacity of around 4.7 GB.
The less prevalent storage options include: Flash memory sticks, storage tapes, smart media, smart cards, and smart media.

SUMMARY

- A storage device is a hardware device that can be used to store digital data and applications in the form of images, video, audio, and so on. It is an important component of a computer, and one example is the hard drive.
- Direct access devices provide faster access to the item you are looking for.
- Sequential access storage devices include:
  - Magnetic tapes
  - Cartridge tapes
  - Digital audiotapes (DATs)
- Similar to the widely used audiotapes are magnetic tapes. It is a big roll of magnetically coated flexible plastic material.
- Similar to an audio cassette tape, these quarter-inch wide tapes are enclosed in a cartridge.
- An electronic tape with a background recording feature and a singing playback media is called a DAT.
- **Types of Direct Access Storage Devices are:**
  - Magnetic disks
  - Optical disks
- A magnetic disk is a metal or plastic platter that looks like a record player without grooves. The data recordings organized on a magnetic tape must be retrieved in the same order they were stored, just like the songs on a sound cassette.

■ Any computer disk that reads and writes data using optical storage methods and technologies is referred to as an **optical disk**.

■ Any storage device that enables the storing and transfer of substantial volumes of data among computers, servers, and within an IT environment is referred to as a mass storage device (MSD).

■ Common mass storage devices include:

- External hard drives
- Flash memory cards
- Hard drives
- Optical drives
- RAID storage
- Solid-state drives (SSDs)
- Tape drives
- USB storage

? Assess Yourself

Short Answer Type Questions

1. List the common storage devices.
2. What are the features of sequential access storage devices?
3. Write the types of magnetic disks.
4. Enlist some mass storage device.
5. Name different optical disks used as storage devices in computer.

Long Answer Type Questions

1. Explain the storage devices in detail.
2. Describe magnetic tapes with appropriate examples.
3. Write in details about the digital audiotapes.
4. Elaborate different types of optical disks.
5. Write an essay on the use of storage devices in physiotherapy.

Multiple Choice Questions

1. As storage media, the advantage of CD-ROM is:
   a. It is inexpensive
   b. Data and information are retrieved more quickly than magnetic disks
   c. It makes less error than magnetic media.
   d. All of the above

2. _____has smallest storage capacity.
   a. Floppy disk
   b. Zip disk
   c. Hard disk
   d. CD

3. How will know surely that the hard drive has failed?
   a. Scrapping
   b. Clicking
   c. Buzzing sound
   d. All of these

4. The type of device which is 3½ inch floppy drive is nothing but:
   a. Storage
   b. Input
   c. Output
   d. Software

5. The process of dividing the disk into tracks and sectors is called:
   a. Tracking
   b. Allotting
   c. Crashing
   d. Formatting

Answer Key

1. c	**2.** a	**3.** d	**4.** a	**5.** d

ACTIVITIES

Activity for Students

Activity 1: Below are some storage devices.

Pen drive   Magnetic tape   Solid-state drive

DVD   HDD   Blue-ray disk

Correctly segregate them in the following table:

Magnetic media devices	Solid-state media device	Optical media devices

Activity 2: Collect 5 optical disks and diskuss in your classroom.

Activity for Teachers

Activity 1: Make the students understand how storage devices are useful in robotics technology for stroke and brain injury rehabilitation.

Activity 2: Make students prepare an assignment on the use of storage device in physiotherapy.

Basic
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for Physiotherapy Students

Learning Objectives given in all the chapters focus on the areas that a student will become aware of after completing the chapter.

Learning Objectives

On completion of this chapter, the students will be able to:
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- Characteristics of Computer
- Block Diagram of Computer

Practical Tip examples have been presented in between the text with important practical considerations.

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Key Terms

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ACTIVITIES

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? Assess Yourself

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5. What do you mean by the term "system clock"?

Long Answers Type Questions
1. Explain the functions of the CU and ALU in the CPU of a computer.
2. Briefly explain the types of data storage and its relation with the CPU.
3. Explain, what do you understand by registers.
4. What does a microprocessor mean? What all does a microprocessor comprise?
5. What is a Bus? Explain a few types of Bus.

About the Author

Priyanka Randhir has completed her BSc (N), RN, RM and MSc Nursing (Pediatrics) from prestigious institutes affiliated to Baba Farid University of Health Sciences, Faridkot, Punjab. She completed her MA (Sociology) from Guru Nanak Dev University, Amritsar, Punjab. She has been working in the field of Nursing since 2010. She has worked as a Nursing Tutor at Khalsa College of Nursing, Amritsar, for a period of 3 years. She served at different clinical settings at districts Muktsar Sahib and Mohali, Punjab, and worked as Nursing Tutor at SMLD School of Nursing at Amritsar, Punjab. She has also been contributing to the "Nursing Next Live" project as a Senior Content Strategist by providing significant additions in the subjects, like Sociology, Nursing Informatics, Nursing Education, Nursing Management, Nursing Research, etc.