

UNIT 19 MAGNETIC DISCS

Structure

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19.0 OBJECTIVES

In this unit our aim is to give you practice in reading comprehension by (a) setting a passage dealing with magnetic discs, (b) giving a glossary of difficult words and (c) asking various types of questions relating to comprehension of the passage. In the vocabulary section, we have set exercises asking you to (a) find synonyms and antonyms from the passage for the words given, and (b) fill in the blanks with same technical words used in the passage. The section on Grammar deals with the words or constructions used in making comparisons. In Writing we have asked you to write a paragraph based on the information consolidated in the reading comprehension section.

19.1 READING COMPREHENSION

19.1.1 Study Guide

The passage first describes the advantages of storing data on magnetic discs. Second, it mentions different types of discs and their characteristics. Third, it mentions the typical speeds of the discs. Fourth, it describes two types of disc drives. Finally, it mentions the importance of disc devices in any data or information processing installation.

After you have read the passage, answer all the questions and check your answers with the answers given at the end of the unit.

19.1.2 Comprehension Passage

Magnetic discs have become the most commonly used form of storage media for retaining large volumes of data and for the temporary storage of data that is awaiting entry to the main memory of the computer. Each individual item of data stored on disc is directly accessible. This distinct advantage means that data is retrievable at random, i.e in any order.

A disc is about the size of a long playing LP record though thicker. It is hard (made of aluminium) unlike the smaller floppy disc which is flexible (made of plastic). Both surfaces are coated with oxide material, just like tape, and this allows the recording of data in the form of magnetized spots. The presence of a spot signifies a 1 bit and the absence a 0 bit. The data is stored as a string of bits along a track. There are typically 800 tracks on a surface laid out in the form of concentric circles. Each track can hold the same amount of information. Thus the characters on the inner tracks are simply packed more tightly together. To enable data to be stored in addressable locations, the surface is further divided up into sectors (Fig. 19.1).

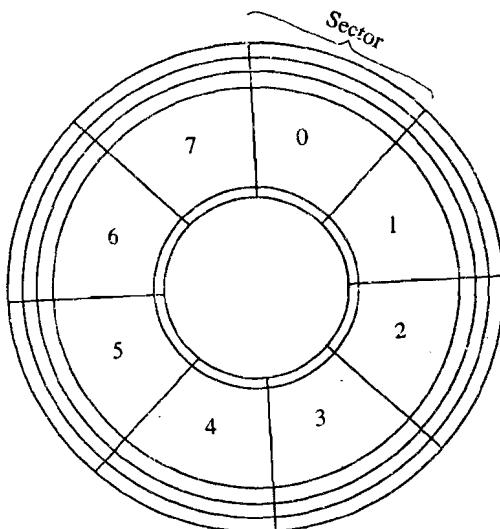


Fig. 19.1: Magnetic disc surface divided into sectors.

Typically six or more discs are mounted together on a spindle to form a stack (Fig. 19. 2). Storage capacity varies from several million characters to 1000 million, depending on the number of discs in the stack.

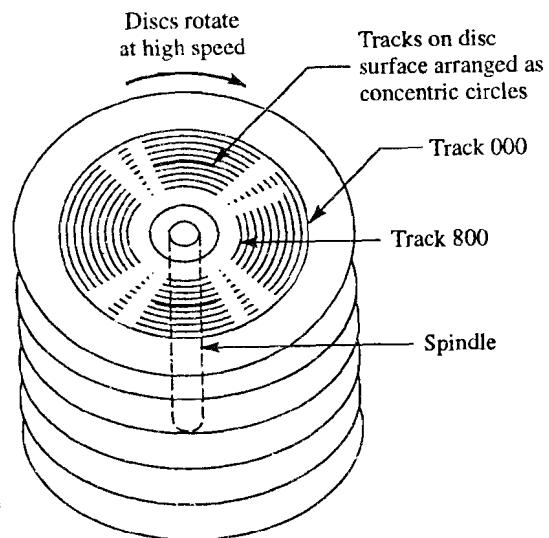


Fig. 19.2: A stack of magnetic discs mounted on a spindle.

A disc unit is the device responsible for both the recording and the retrieval of information. The discs stack may be permanently fixed to the drive or it may be removable as a completed pack. The removable disc pack feature is very useful as it allows a pack to be set aside for the storage of data files for a particular application. The pack is only mounted on the drive when required. By purchasing a number of packs the capacity of the disc unit is increased. Not all discs are arranged in stacks. A single removable disc is usually referred to as a cartridge disc.

The drive rotates the disc pack constantly. Typical speeds are between 21900 and 3600 revolutions per minute. As the discs rotate, read/write heads can either pick up or record data. The speed of rotation causes the heads to 'float' approximately 1/1900th of an inch (0.0619 mm)from the surface. Because the gap between the head and the surface is so small, dust particles can be a problem. As with magnetic tape data can be repeatedly retrieved (copied) without being actually removed and new data can be placed on the disc by overwriting data no longer required. Disc space can therefore be used and re-used repeatedly.

There are two classifications of drives relating to the operation of the read/write mechanism. These are fixed-head and moving-head. On a fixed-head drive (Fig. 19.3), for every usable surface (not usually the very top one or very bottom one of the stack) there is a set of read/write heads equal in number to the number of tracks. The time taken to find an item of data is of the order of 10-50 milliseconds. On a

moving-head drive (Fig. 19.4) there is only one read/write head per disc surface. The heads are fixed to arms that move in and out in unison between the discs. Access time is slightly slower, 25-100 milliseconds, since the arm has to move to the right position to seek out the specified track. Transfer rates to and from disc and main memory are in the order of 100,000 to 20,00,000 characters per second.

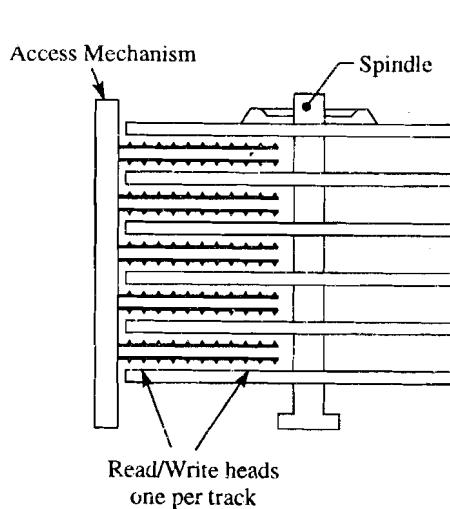


Fig. 19.3: Fixedhead magnetic disc drive

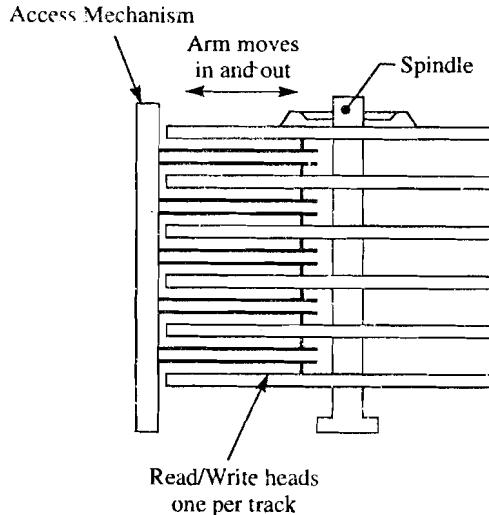


Fig. 19.4: Moving-head magnetic disc drive

Many computer systems are dependent on discs for their secondary or back-up storage. Disc devices are an essential part of any data or information processing installation where files of information have to be retained for referencing or updating, as in banking, insurance, local government, law and order, and public health applications. There are a number of factors in their favour: large storage capacity, direct access to data items selected at random, very fast character transfer rate, and the fact that they can be re-used again and again. Disc drives are expensive pieces of equipment but the replaceable pack feature allows storage capacity to be built up relatively cheaply. Disc packs though are more expensive than magnetic tape reels.

From : Computer Studies: A first course, John Shelley and Roger Hunt, second edition, 1987.

Glossary

- storage medium** : any physical substance upon which data are recorded, such as floppy disc, magnetic, paper tape, magnetic tape, punch cards, and paper.
- main memory** : the internal storage locations of a computer. It is also called real storage or primary memory.
- disc** : A storage device which is made up of one or more circular plates which can be magnetized on both sides. Discs can be either floppy or hard.
- accessible** : the information which can be reached.
- retrievable** : whenever the stored data is needed it is made available.
- at random** : irrespective of any order. It is contrasted with sequential.
- string of bits** : connected sequence of characters or bits treated as a single data item. The word 'windsurfer' is a string of ten characters.
- tracks** : path along which data are recorded on a continuous or rotational medium such as magnetic tape or magnetic disc.
- concentric** : circles having a common centre.
- addressable** : identifiable

location	: place in the computer's memory where information is to be stored.
sectors	: one of the peripheral elements into which each track of a disc surface is divided.
mounted	: put and fixed in position
spindle	: bar or pin which turns round, or on which something turns (e.g. an axle or a shaft)
stack	: sequential data stored in internal storage. The computer retrieves information from the stack by popping elements from the top or from the bottom.
drive	: short name for disc drive. It is a device that reads data from a magnetic disc and copies it into the computer's memory so that it can be used by the computer's memory onto a disc so that it can be stored.
pack	: a hard disc which is made up of a number of platters (circular discs)
data files	: collection of data records that have been organised in a specific manner.
float	: rise up in the air.
over writing	: to cover over with writing.
mechanism	: structure or arrangement of parts that work together as the parts of a machine.
unison	: harmony; agreement
access	: to locate the desired data.
seek out	: reach
back up storage	: copy of a file or data set kept for reference in case the original file or data set is destroyed.
information processing	: totality of operations performed by a computer. It involves evaluating, analysing, and processing data to produce usable information.
installation	: computing system.
retained	: stored
updating	: bring upto date.
replaceable pack	: the pack that can be substituted.
magnetic tape reel	: plastic tape having a magnetic surface for storing data in a code of magnetized spots. A reel of tape is about 750 metres (2190 feet) in length.

19.1.3 Answer the following questions:

Exercise 1

1. Why have magnetic discs become very popular ?
2. How is data stored on a magnetic disc?
3. How is the surface of a magnetized disc divided to have an easy access to data ?
4. What is a magnetized spot called ?
5. How many concentric circles does the surface of a magnetic disc have?
6. Why are the inner tracks more tightly packed ?

8. What makes a gap appear between the read/write head and a disc surface when the disc drive is rotating?

9. On what basis is the number of read/write heads decided for each disc surface on a fixed head drive?

10. Which of the disc drives is slower and why?

19.1.4 True and False statements

Exercise 2

Identify the false statements and correct them.

1. Access to specified data recorded on the magnetic disc takes a long time.
2. A hard disc and floppy disc though made of different materials have the same size.
3. Each concentric circle has the same length and the same storage capacity.
4. Fresh data can be recorded on a disc without first erasing the old data.
5. A magnetic disc is also known as a cartridge disc.
6. The arms that carry the read/write heads and move in and out between the discs have complete coordination amongst themselves.
7. Disc packs are as expensive as magnetic tape reels.
8. Removable disc packs are more commonly used than the fixed disc stacks.

19.1.5 Contextual Reference

Exercise 3

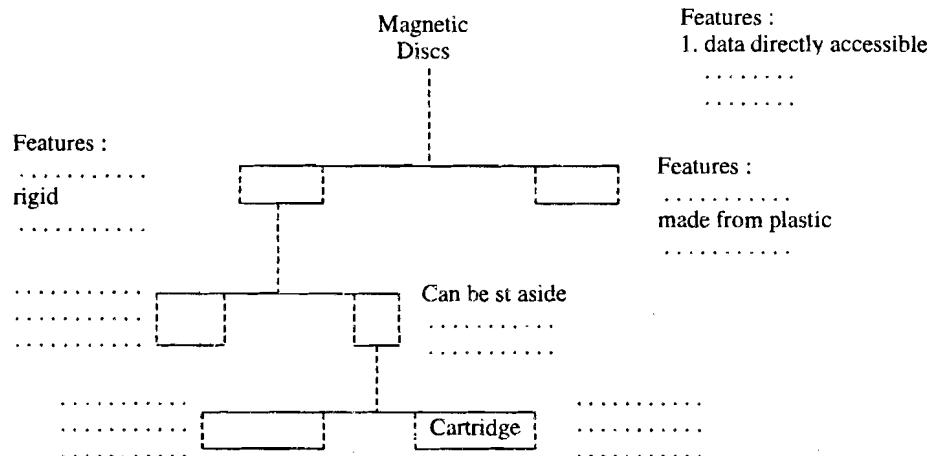
Read the passage again and decide what the underlined words refer to.

1. that is awaiting entry to the main memory of the computer (para 1) _____
2. it may be removable (para 1) _____
3. it allows a pack to be set aside _____
4. these are fixed-head and moving-head (para 7) _____
5. usually the very top one (para 6) _____
6. that move in and out (para 6) _____
7. for their secondary or back-up storage(para 7) _____
8. There are a number of factors in their favour(para 7) _____

19.1.6 Complete the Diagram

Exercise 4

Complete the following diagram by giving the main features of each type of magnetic disc.



19.2 VOCABULARY

19.2.1 Synonyms

Exercise 5

Find out from the passage synonyms for the words given below:

- | | | |
|-------------------|----------|-------|
| 1. Approachable | (para 1) | _____ |
| 2. Covered | (para 2) | _____ |
| 3. Path | (para 2) | _____ |
| 4. Identifiable | (para 2) | _____ |
| 5. Specific | (para 4) | _____ |
| 6. Turns | (para 5) | _____ |
| 7. Nearly | (para 5) | _____ |
| 8. Copied | (para 5) | _____ |
| 9. Harmony | (para 6) | _____ |
| 10. Comparatively | (para 7) | _____ |

19.2.2 Antonyms

Exercise 6

Find out from the passage antonyms for the words given below :

- | | | |
|-----------------|----------|-------|
| 1. Exit | (para 1) | _____ |
| 2. Rigid | (para 1) | _____ |
| 3. Absence | (para 1) | _____ |
| 4. Loosely | (para 1) | _____ |
| 5. Retrieval | (para 1) | _____ |
| 6. Considerably | (para 1) | _____ |
| 7. Primary | (para 1) | _____ |
| 8. Unnecessary | (para 1) | _____ |

19.2.3 Fill the Blanks

Exercise 7

Complete the following sentences with the appropriate words. The words are given below :

sectors, disc pack, bit, file, disc drive

2. A binary digit which is either 0 or 1 is known as_____

3. _____ is a device that reads data from a magnetic disc and copies it into the computer's memory so it can be used by the computer, and the writes data from the computer's memory onto a disc so it can be stored.

4. Each track of a disc surface is divided into _____

5. _____ is a group of removable hard disc mounted on a shaft and treated as a unit.

19.3 GRAMMAR AND USAGE

Comparisons

Exercise 8

The use of comparisons is very common both in our speech and writing. Sometimes a comparison is made in order to show that the items compared are the same or similar. In such cases words or constructions such as the following are generally used.

are similar, as....as, each, both, equally, either, all

Examples

1. Both are coated with oxide material.
2. Each track can hold the same amount of information.
3. Word processing skills are as fundamental today as typing ability was five years ago.

When comparisons are made to convey that the items being compared are not the same or similar, the following words or constructions are used:

not all, more....than, word + er, unlike, not the same as, greater than, less than, fewer than

1. Not all discs are arranged in stacks.
2. Discs are more expensive than magnetic tape reels.
3. A magnetic disc is unlike a floppy.
4. Transistors required less energy than tubes.
5. Transistors are faster than tubes and relays.

Sometimes a comparison is made to convey superiority or inferiority of an item over another. In such cases words or expressions such as the following are used:

the most, the least , the word+est

Examples

1. Magnetic discs have become the most commonly used form of storage media.
2. Of the four size of computers, micros are the slowest.
3. Personal computers are the least expensive computers available today.

In the following sentences underline the words or constructions expressing comparisons. Also indicate which of the following is conveyed by each comparison.

- i) the items compared are the same.
 - ii) the items compared are not the same.
 - iii) an item is superior/inferior to all others.
1. Random access memory has remained the most effective memory device.
 2. The development of computers has produced less expensive computers.
 3. The numbering systems operate exactly in the same manner.
 4. The data banks are growing as fast as the scientific ones.
 5. All digital computers today still perform calculations using switching techniques.
 6. Computers have become more powerful over the years of their development.
 7. Unlike earlier computers, personal computer does not require programmers and analysts.
 8. The best way to learn to use a computer is by using one.
 9. Electronics is today the most convenient technology for constructing computers.
 10. Control keys work just like the shift keys on a keyboard.

19.4 WRITING

Exercise 9

Write a short paragraph on using the information obtained after completing the diagram in section 19.1.6.

19.5 LET US SUM UP

In this unit we have given you practice in

- a) understanding a passage dealing with magnetic discs.
- b) identifying false statements and correcting them.
- c) finding out objects or persons who have been referred to by certain pronouns and demonstratives used in the passage.
- d) filling the blanks with technical words from the passage.
- e) finding out synonyms and antonyms.
- f) making comparisons
- g) writing a paragraph on magnetic disc based on the information given.

Answers

Exercise 1

1. The magnetized discs have become more popular because they can store large amounts of data and permit direct access to data items selected at random. They can be re-used again and again and have a very fast transfer rate.
2. The data is stored in the form of a string of magnetized spots. Presence of a magnetized spot represents 1 and the absence 0.

3. The surface is divided into tracks and each track is further divided into sectors.

4. A magnetized spot is called a bit.

5. 800

6. They are smaller in length but have the same amount of information which the outer circles have.

7. A read/write head records or retrieves data.

8. The speed of rotation makes a gap appear between a head and a disc surface.

9. The number of heads equals the number of tracks on a disc surface.

10. Moving head drive is slower because the arm has to move to the right position to seek out the specified track.

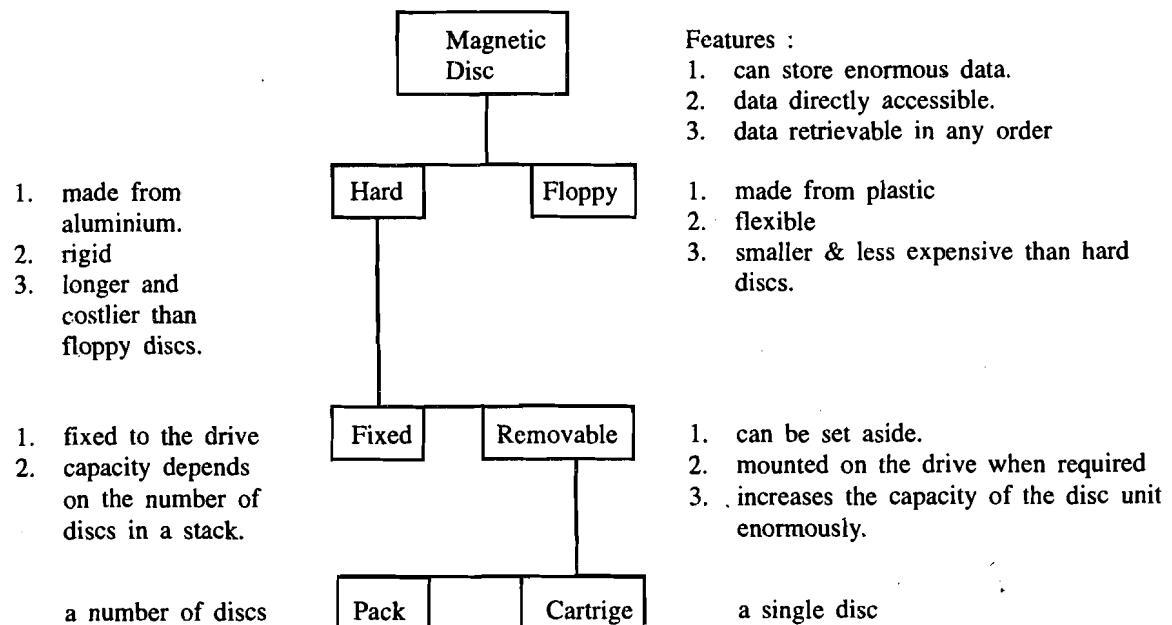
Exercise 2

1. False. Access to specified data recorded on the magnetic disc takes a very little time.
 2. False. A hard disc and a floppy disc are not only made of different materials but are also different in size.
 3. False. Each concentric circle has a different length but the same storing capacity.
 4. True.
 5. False. A removable disc is called a cartridge disc.
 6. True.
 7. False. Disc packs are costlier than magnetic tape reels.
 8. True.

Exercise 3

- | | | |
|----------------------|--------------------|-----------------------------|
| 1. data, | 2. the disc stack, | 3. the removable disc pack, |
| 4. drives, | 5. surface, | 6. arms, |
| 7. computer systems, | 8. disc drives. | |

Exercise 4



Exercise 5

- | | | |
|-------------------|----------------|---------------------------------|
| 1. accessible, | 2. coated, | 3. track, |
| 4. addressable, | 5. particular, | 6. rotates, |
| 7. approximately, | 8. retrieved | 9. unison, 10. relatively. |

Exercise 6

- | | | | |
|---------------|--------------|---------------|---------------|
| 1. entry, | 2. flexible, | 3. presence, | 4. tightly, |
| 5. recording, | 6. slightly, | 7. secondary, | 8. essential. |

Exercise 7

- | | | | | |
|---------|--------|---------------|------------|--------------|
| 1. file | 2. bit | 3. disc drive | 4. sectors | 5. disc pack |
|---------|--------|---------------|------------|--------------|

Exercise 8

- | | | |
|--------------------|-------------------------|---------------------------------------|
| 1. the most (iii) | 2. less expensive (iii) | 3. exactly in the same manner (i) |
| 4. as fast as (ii) | 5. still (ii) | 6. more (iii) |
| 7. unlike (iii) | 8. best (iii) | 9. most (iii) 10. just like (ii) |