

Memory Organization

Chapter 12
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Auxiliary Memory

Characteristics

1. Access Mode – Direct , Sequential , Random
2. Access Time
3. Transfer rate
4. Capacity
5. Cost

- The average time required to reach a storage location in memory and obtain its contents is called the **Access time**



- **Hard Disk**

- **Seek Time** : The time to position the read-write head to a location
- **Transfer time** : Required to transfer data to or from the device
- Records and Blocks
- Records is a specified number of characters or words
- **Transfer rate** : It is the number of characters or words that the device can transfer per second

- Magnetic drums and disks have high speed rotating surfaces coated with a magnetic recording medium.
- Rotating surface of the drum is cylinder and that of the disk, a round flat plate
- Bits are as magnetic spots on the surface

Magnetic Disks

- Circular plate constructed of metal or plastic coated with magnetized material
- Bits are stored in the magnetized surface in spots along concentric circles called **tracks**
- Tracks are divided into sections called **sector**
- Single read/write head for each surface
- Separate read/write heads for each track
expensive Hard Disk

- Disk Address – specify disk number, disk surface, sector number and track with in the sector
- Disk permanently attach to the unit assembly and cannot be removed by the occasional user are called Hard disk
- Disk with removable disk is called floppy disk

Floppy Disk

- It is small removable disks made of plastic coated with magnetic recording material
- Two sizes 5.25 and 3.5 inches
- 3.5 inches disk are smaller and can store more data than 5.25

Magnetic Tape

- It is a strip of plastic coated with a magnetic recording medium
- Bits are stored as magnetic spots on the tape
- Usually seven or nine bits are recorded to form a character.
- Information is recorded in blocks referred to as records.
- Gaps of unrecorded tape are inserted between records where the tape can be stopped.

Magnetic Tape Continue

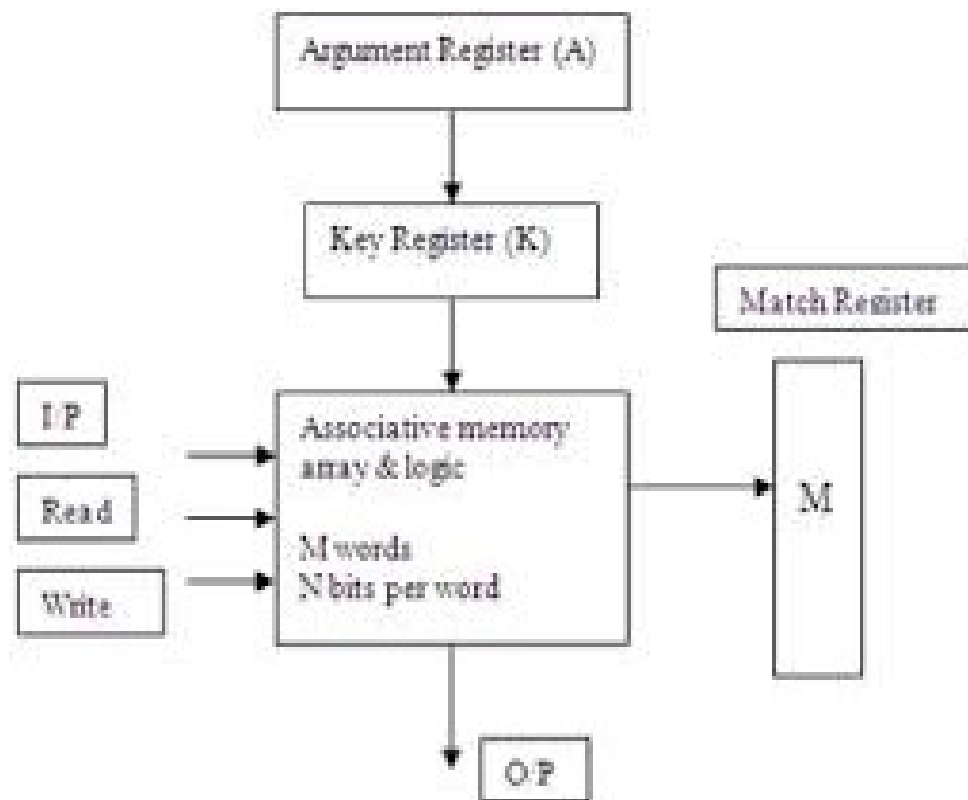
- Each record has an identification bit pattern at the beginning and end
- The tape unit is addressed by record number and the number of characters in the record.
- Records of fixed or variable length.

Associative Memory

- The time required to find an item stored in memory can be reduced if stored data can be identified for access by the content of data
- It is known as associative memory or content addressable memory(CAM)
- The memory is capable of finding an empty unused location to store the word
- The memory locates all words which match the specified content and marks them for reading

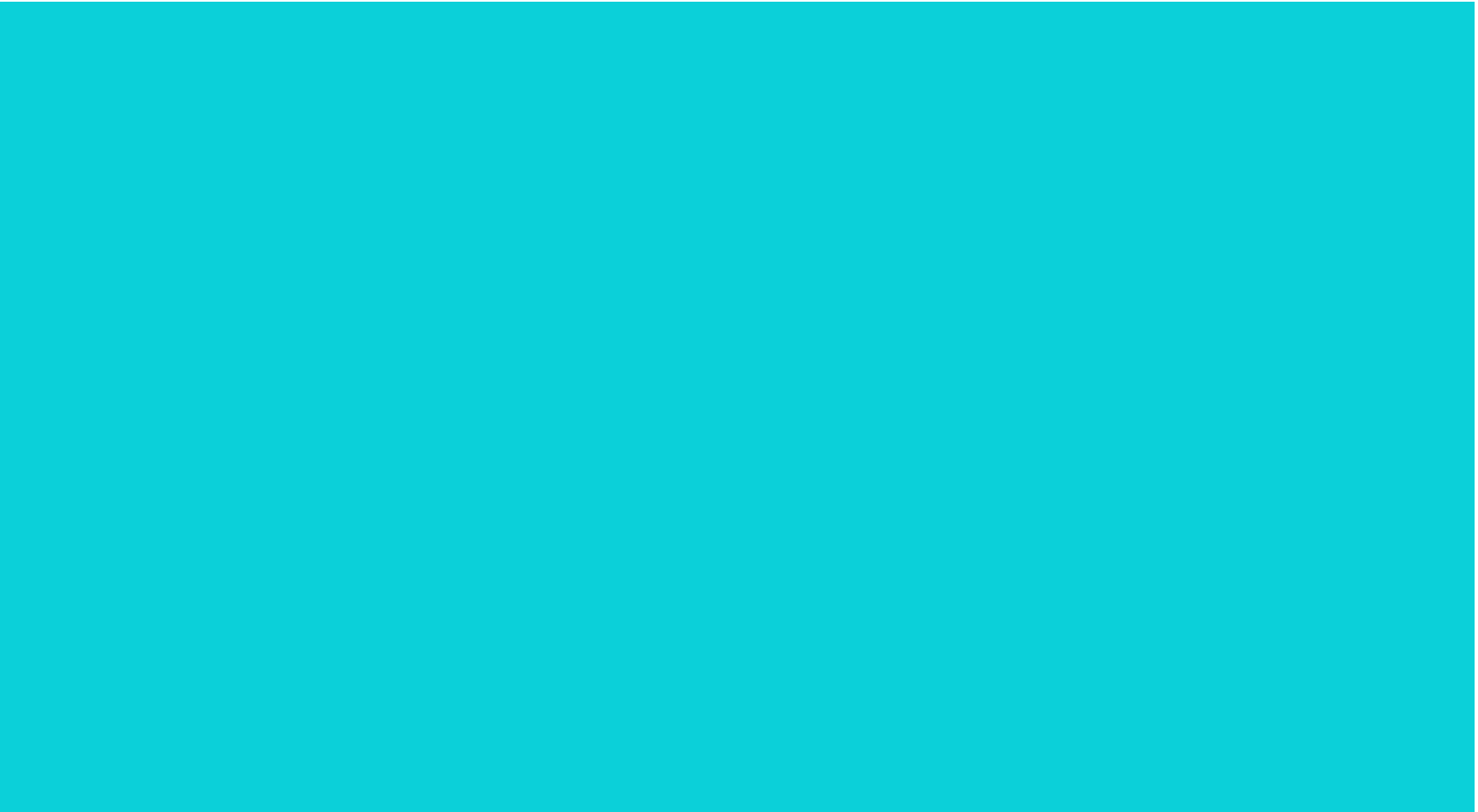
- it is expensive than a random access memory because each cell must have storage capability as well as logic circuits for matching its content with an external argument.
- It is used Where search item is very critical and must be short

Hardware organization

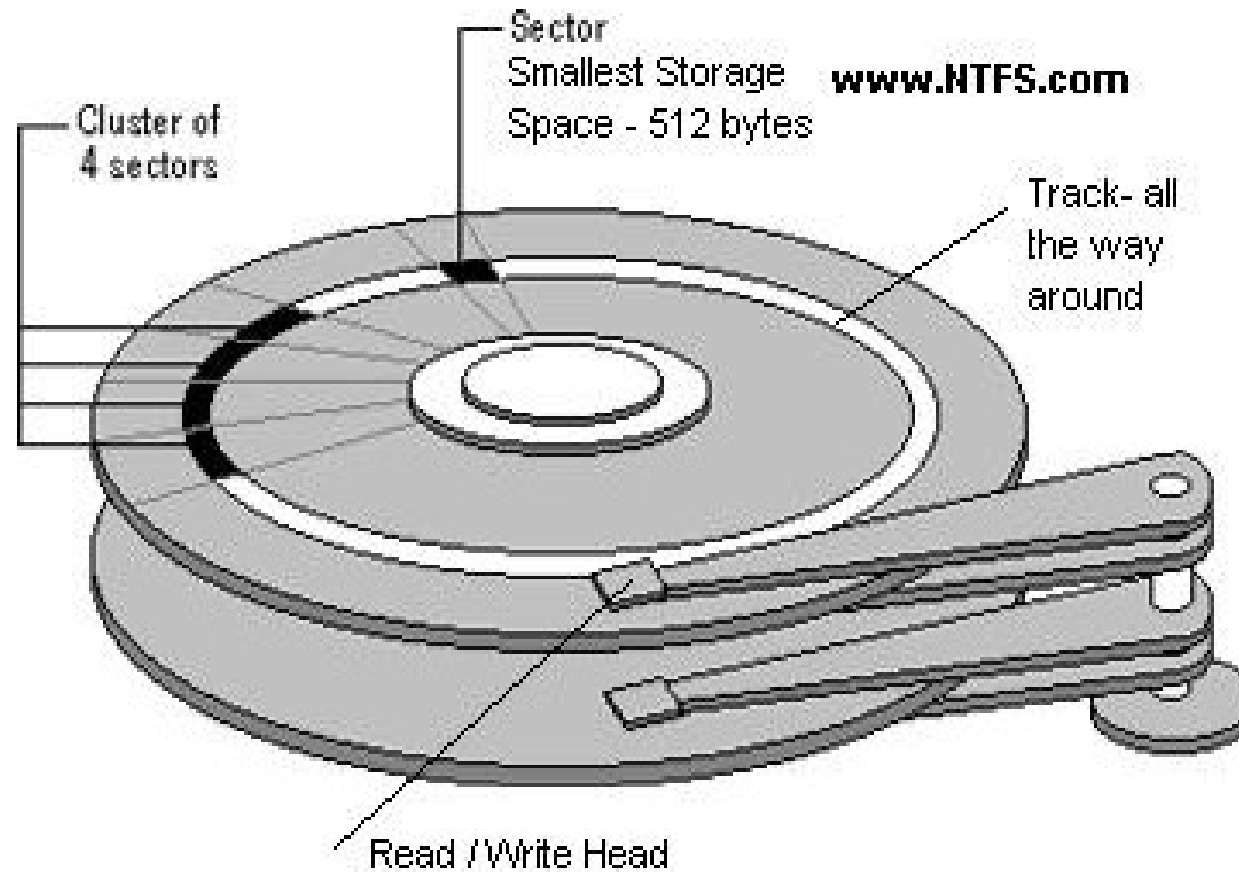


- Argument register A (n bits) (one for each bit of a word)
- Key Register K (n bits) (one for each bit of a word)
- Match register(m bits) (one for each memory word)
- Each word in memory compared with content of A register

- The match register is set if the content of Argument register and memory word is same
- Sequential access to memory for those words whose corresponding bits in match register have been set
- Key register K provides a mask for choosing a particular field or key in the argument word
- The entire argument is compared with each memory word if the key register contains all words



Pictures of Hard disk





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