Introduction To Computing

Third Week

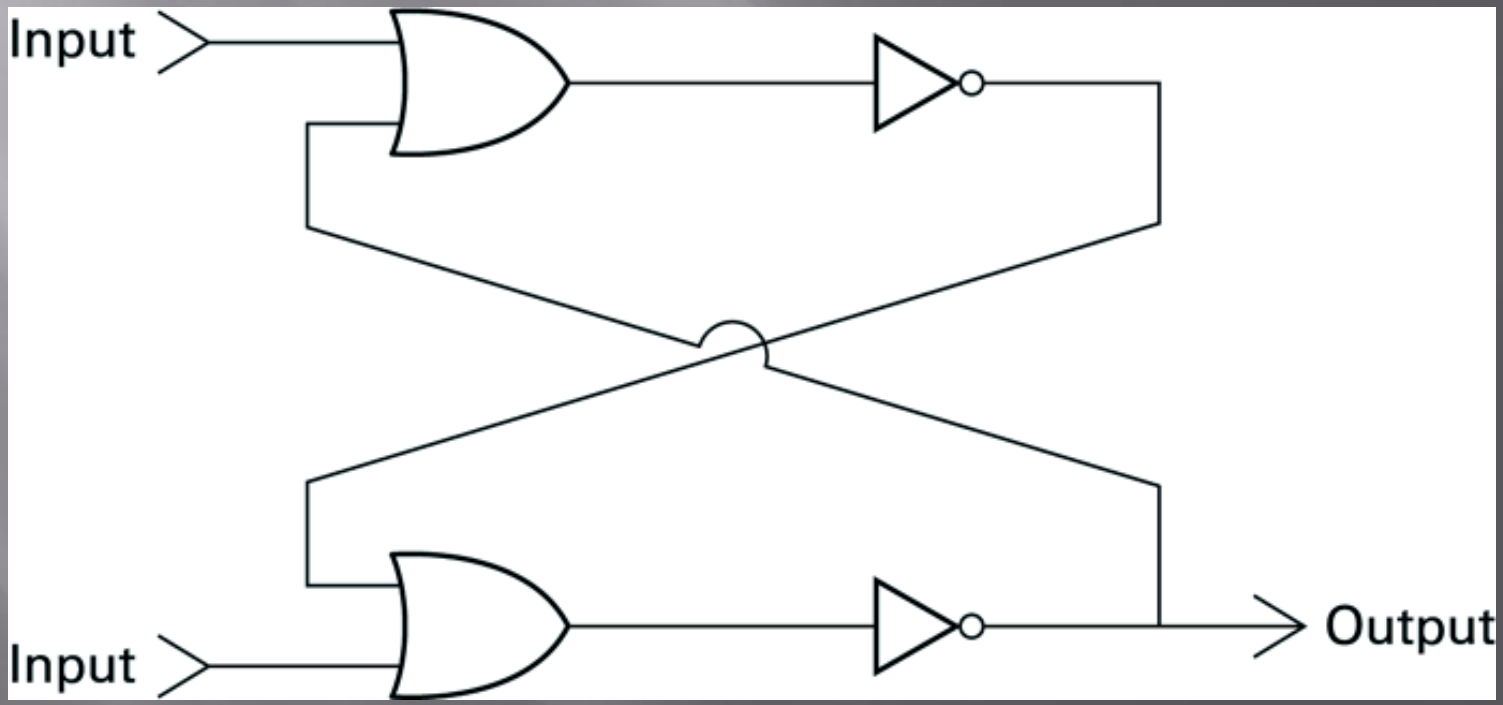
Home Assignment

Solution

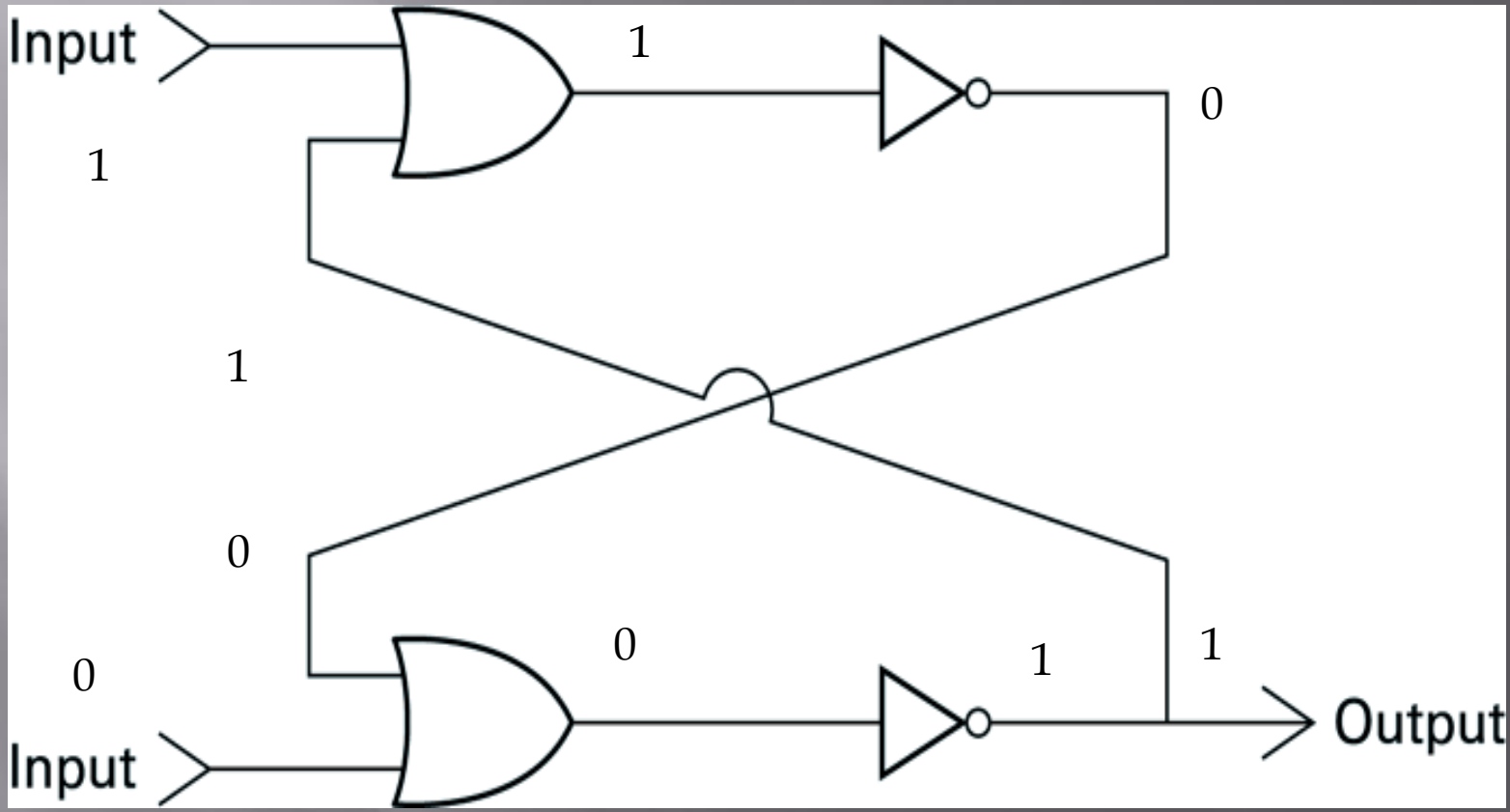
Another way of constructing Flip-Flop

Assignment: **Write outputs & sequence of steps on the basis of following inputs?**

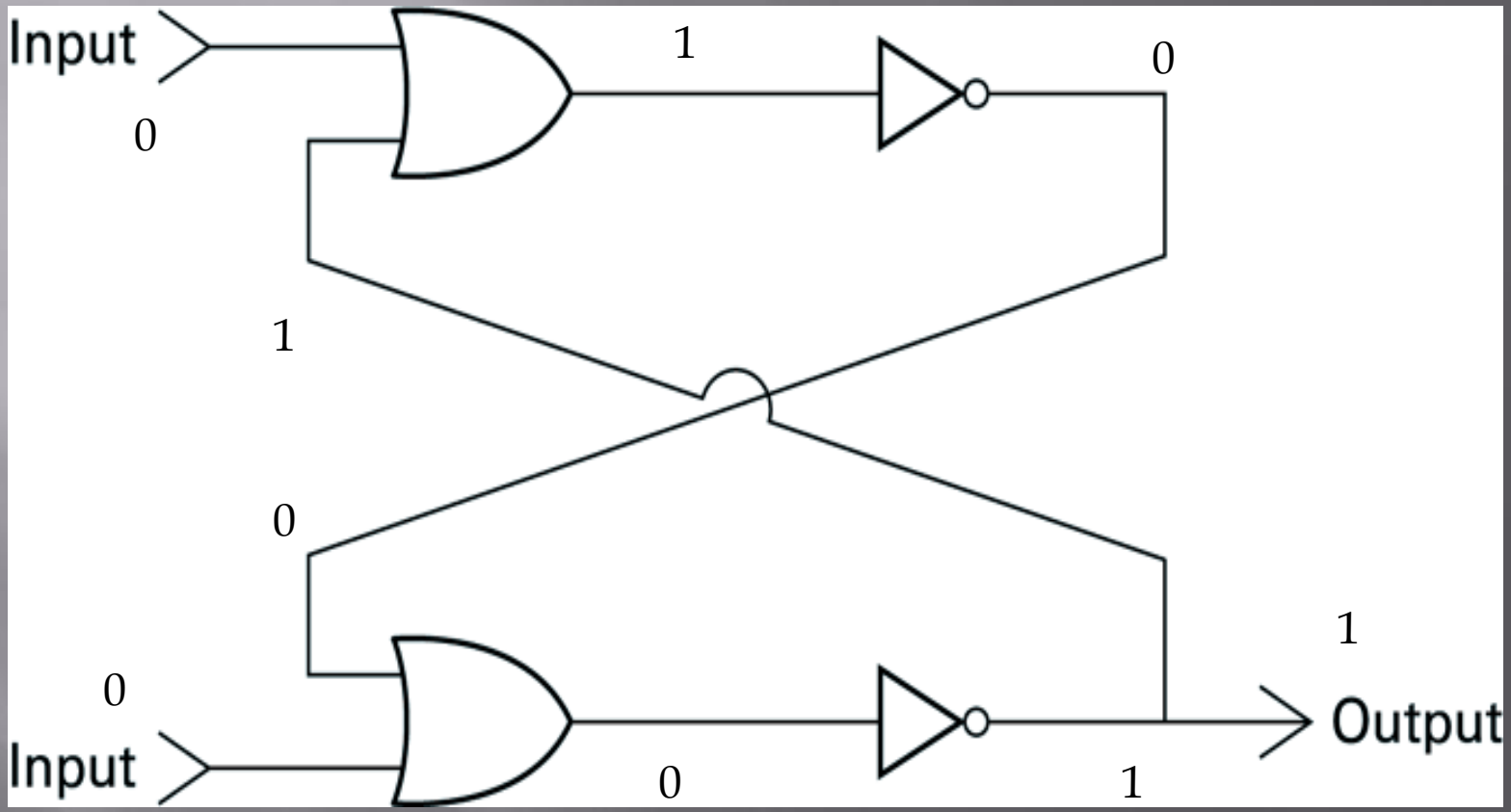
- **upper input = 1 and lower input = 0**
- **upper input = 0 and lower input = 0**



Solution:

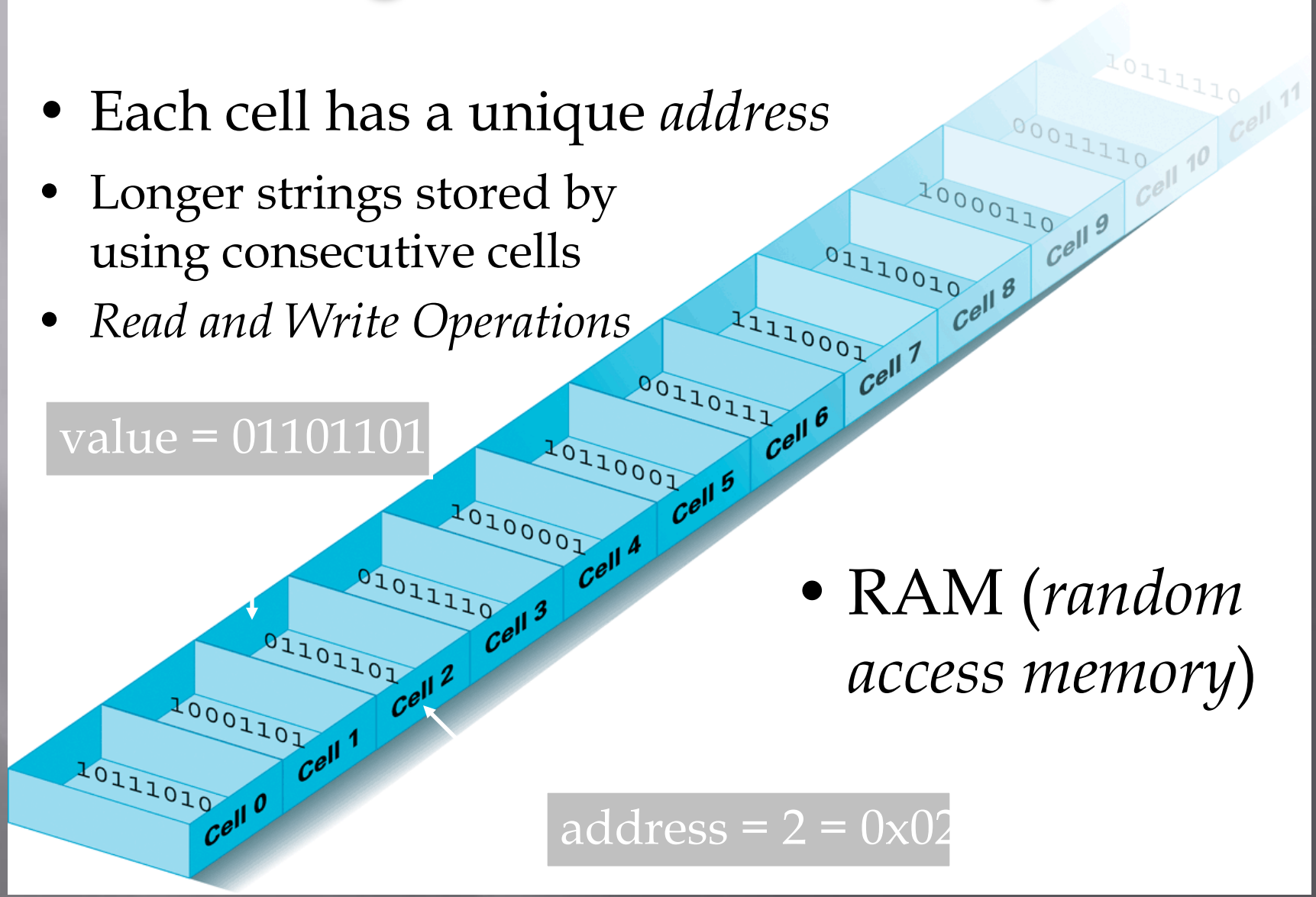


Solution:



1.2 Arrangement of Memory Cells

- Each cell has a unique *address*
- Longer strings stored by using consecutive cells
- *Read and Write Operations*



- RAM (*random access memory*)

1.3 Mass Storage

- Main memory is *volatile* and limited in size

- Additional memory devices for mass storage:
  - a.o.: magnetic disks, optical disks, magnetic tapes
  - Online and Offline Devices
- Advantages over main memory:
  - less volatile, large capacity, capability of removal, generally much cheaper
- Disadvantages over main memory
  - mechanical motion for data access/retrieval (Response time slow!)
  - in general: lesser degree of random access

End of Lecture

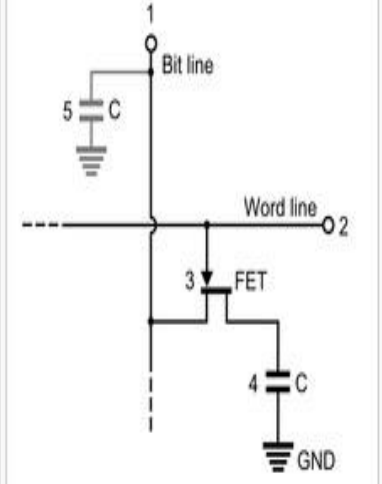
Memory cell [edit]

Main article: Memory cell (binary)

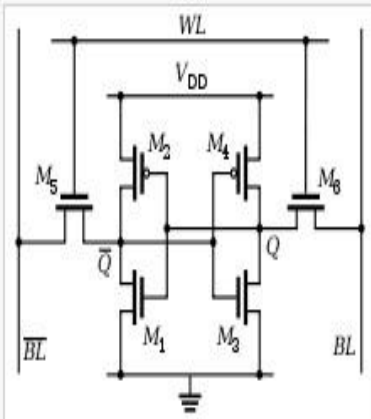
The memory cell is the fundamental building block of computer memory. The memory cell is an electronic circuit that stores one bit of binary information and it must be set to store a logic 1 (high voltage level) and reset to store a logic 0 (low voltage level). Its value is maintained/stored until it is changed by the set/reset process. The value in the memory cell can be accessed by reading it.

The SRAM, static ram memory cell is a type of flip-flop circuit, usually implemented using FETs. These require very low power when not being accessed.

A second type, DRAM is based around a capacitor. Charging and discharging this capacitor can store a '1' or a '0' in the cell. However, this capacitor will slowly leak away, and must be refreshed periodically. Because of this refresh process, DRAM uses more power, but can achieve greater storage densities. However, because of this greater power use, as silicon feature sizes have become smaller, the disadvantages of DRAM's greater power use has outweighed the advantages of smaller size, and very many RAMs sold are now SRAM.



DRAM Cell (1 Transistor and one capacitor)

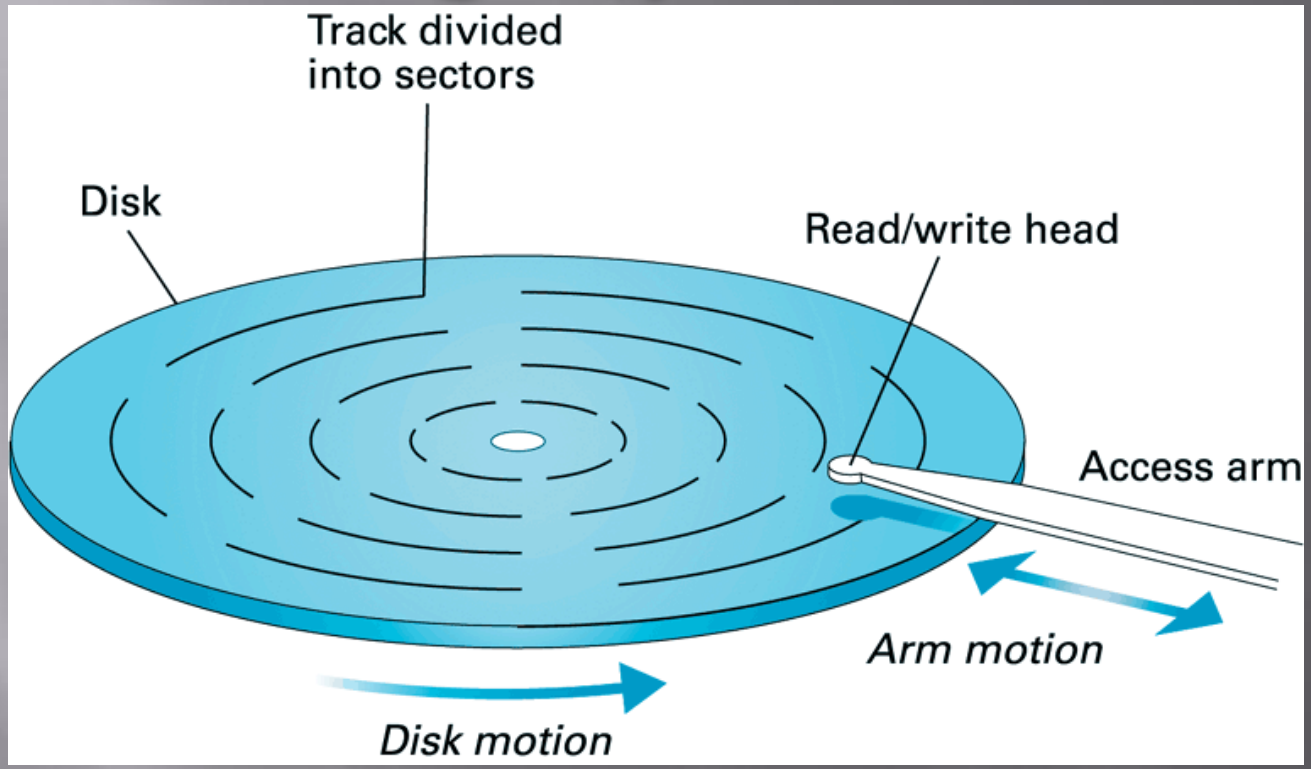


SRAM Cell (6 Transistors)

Disk File Systems

1. What is the difference among FAT 16, FAT 32 and NTFS? Describe them by figures?
2. Describe them by using examples?
3. How to mark Sectors and Tracks in a disk?
4. What is a cluster? How a complete file is retrieved using relevant set of clusters?
5. What is fragmentation and De-fragmentation?

Disk Storage System



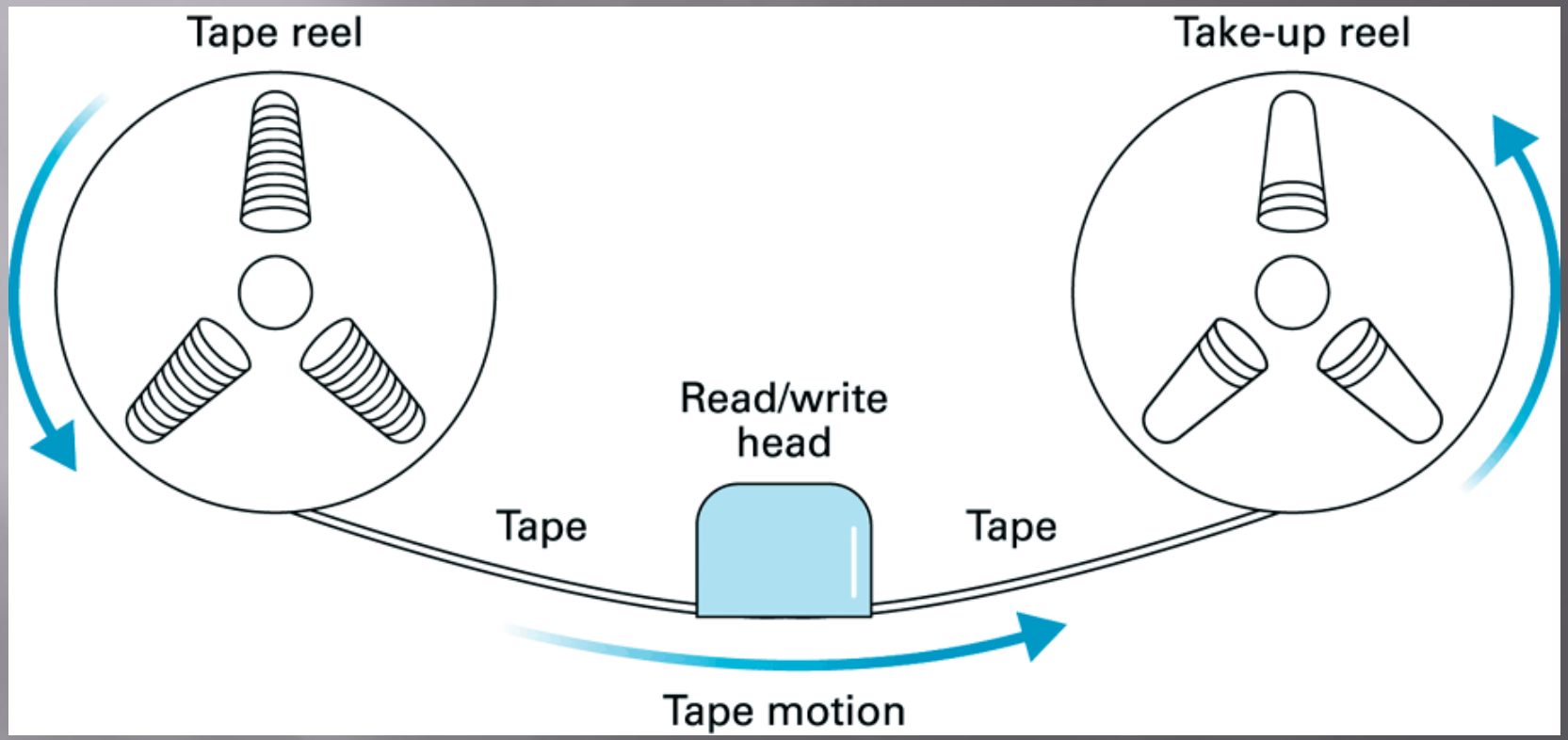
- Each track contains same number of sectors
  - Sector Size -> 512 or 1024 KB
- Location of tracks and sectors not permanent (*formatting*)
- Examples: hard disks, floppy disks, Zip disks, ...
- Evaluating disk's performance: seek, latency and access times
  - transfer rate

End of Lecture

Disk Storage System

- Seek Time is measured defines the amount of time it takes a hard drive's read/write head to find the physical location of a piece of data on the disk.
- Latency is the average time for the sector being accessed to rotate into position under a head, after a completed seek.

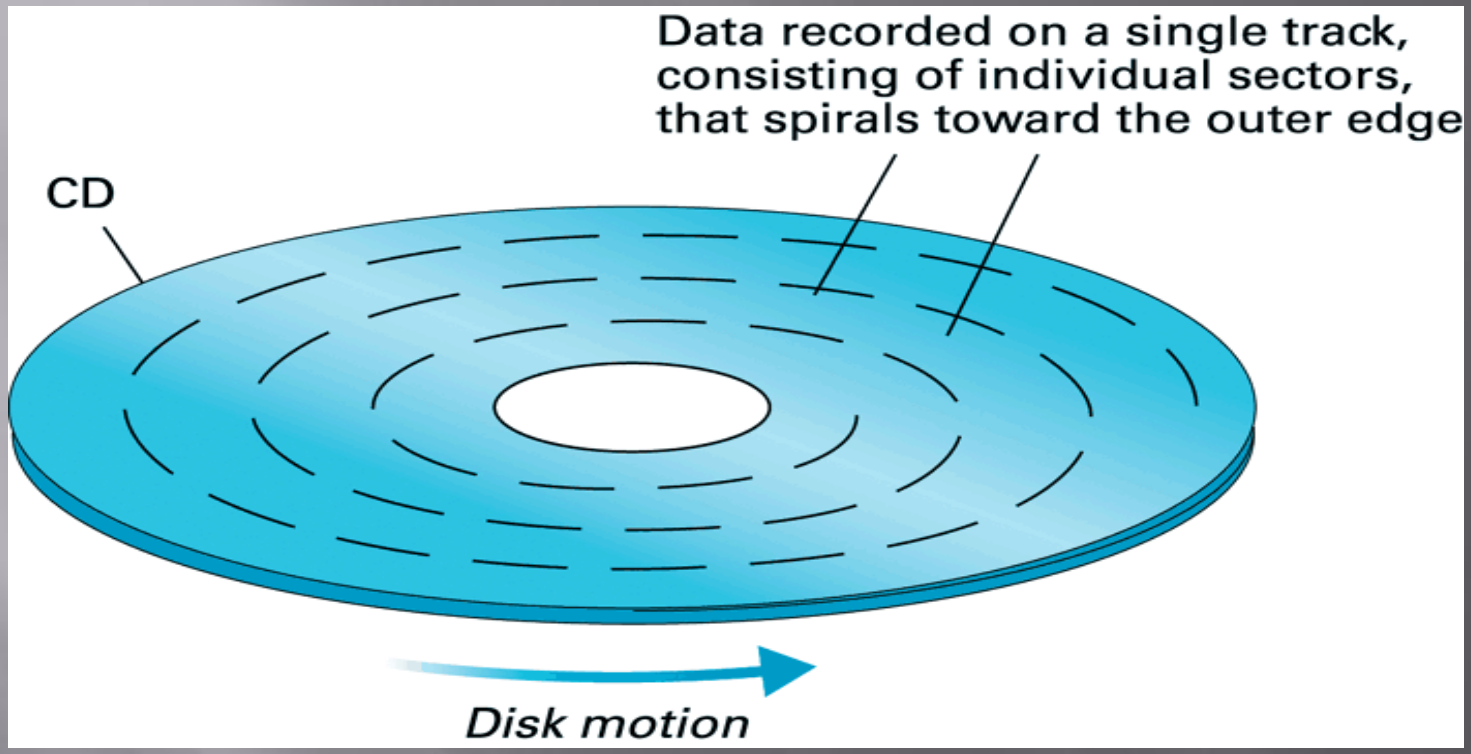
1.3 Old, but still commonly used: Magnetic Tape



- Offers little or no random access (slow!)
- Good choice for off-line data storage (archives)

off-line data storage (archives)

1.3 CD/DVD Storage Format



- Data stored by creating variations in the reflective surface
- Data retrieved by means of a laser beam
- Data stored uniformly (so CD rotation speed varies)
- Random access much slower than for magnetic disks

Media type
High-density optical disc

Capacity
25 GB (single-layer)
50 GB (dual-layer)
100/128 GB (BDXL)
Block size 64 kb

Usage
Data storage
High-definition video (1080p)
High-definition audio
Stereoscopic 3D
PlayStation 3 games

The name Blu-ray Disc refers to the blue laser used to read the disc, which allows information to be stored at a greater density than is possible with the longer-wavelength red laser used for DVDs. The major application of Blu-ray Discs is as a medium for video material such as feature films.

What is a flash drive and what is it used for?

- A USB **flash drive**, also known under a variety of other names, is a data storage device that includes **flash** memory with an integrated USB interface.
- USB **flash drives** are typically removable and rewritable, and physically much smaller than an optical disc.

Kingston DataTraveler HyperX Predator 3.0 USB 1TB

File Storage and Retrieval

- Storage in mass storage medium->Files
- A block of data conforming to the physical characteristics of storing device is called **Physical records.**
- A file usually has natural divisions determined by the information represented. It describes **Logical records.**
- Problem: scattered data
- Solution: **Buffer**
- **Degree of random access of the data**

Home Assignment:

- Create and Fill Student Information Form.
- Your Form must match with provided specimen.
- Form must be filled only through Computer.

Specimen

End of the Lecture