

SOS POLITICAL SCIENCE AND PUBLIC ADMINISTRATION

MBA FA 401

SUBJECT NAME: COMPUTER APPLICATION IN
FINANCIAL ADMINISTRATION

TOPIC NAME: OPTICAL MEMORIES

What is optical Memory?

- A computer memory that uses optical techniques
- Involves
 - laser beam
 - storage medium
 - a detector

Optical storage devices

CD



DVD



Blue ray



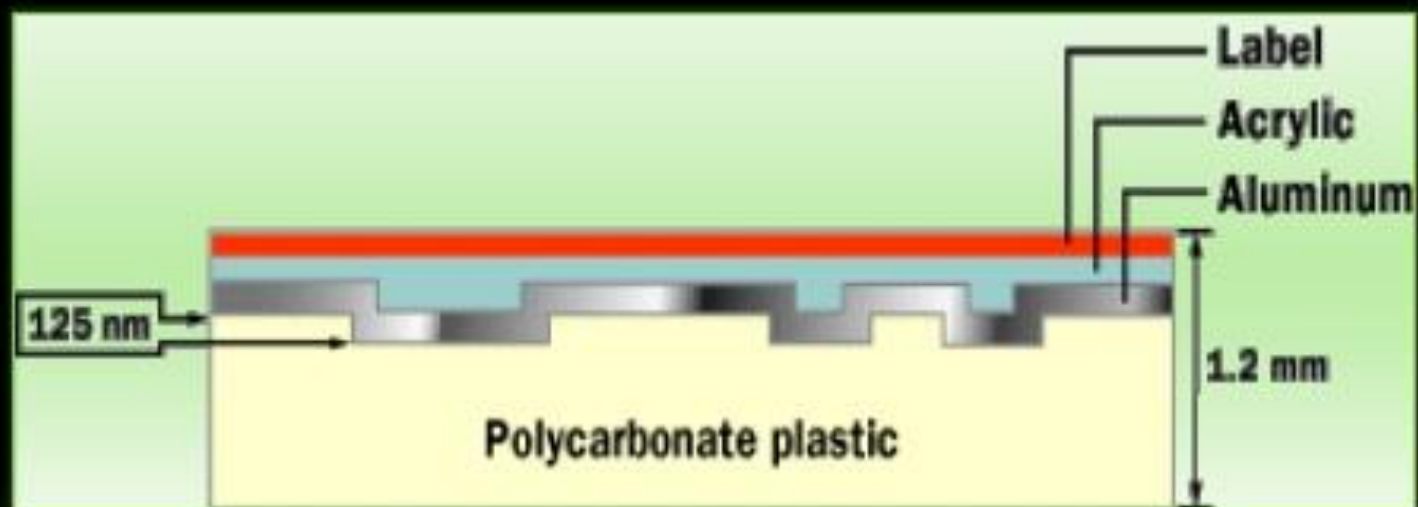
What is a Compact Disc (CD)?

- circular discs
- 4.75 in (12 cm) in diameter
- developed by Philips and Sony in 1980
- Initially for audio
- 1985 CD-ROM (Compact Disc Read Only Memory)
- can hold 720 MB(80 min audio)= 500 floppy disks or 200,000 pages of text.

Structure of CD

- CD is made of a polycarbonate substance and is coated with a metallic film , usually an aluminum alloy .
- This aluminum film is the portion of the disc that the CD-ROM drive reads for information.
- The aluminum film is then covered by a plastic acrylic coating that protects the underlying data.
- A label will usually be placed on the top of the disc and data is read from the bottom of the CD.

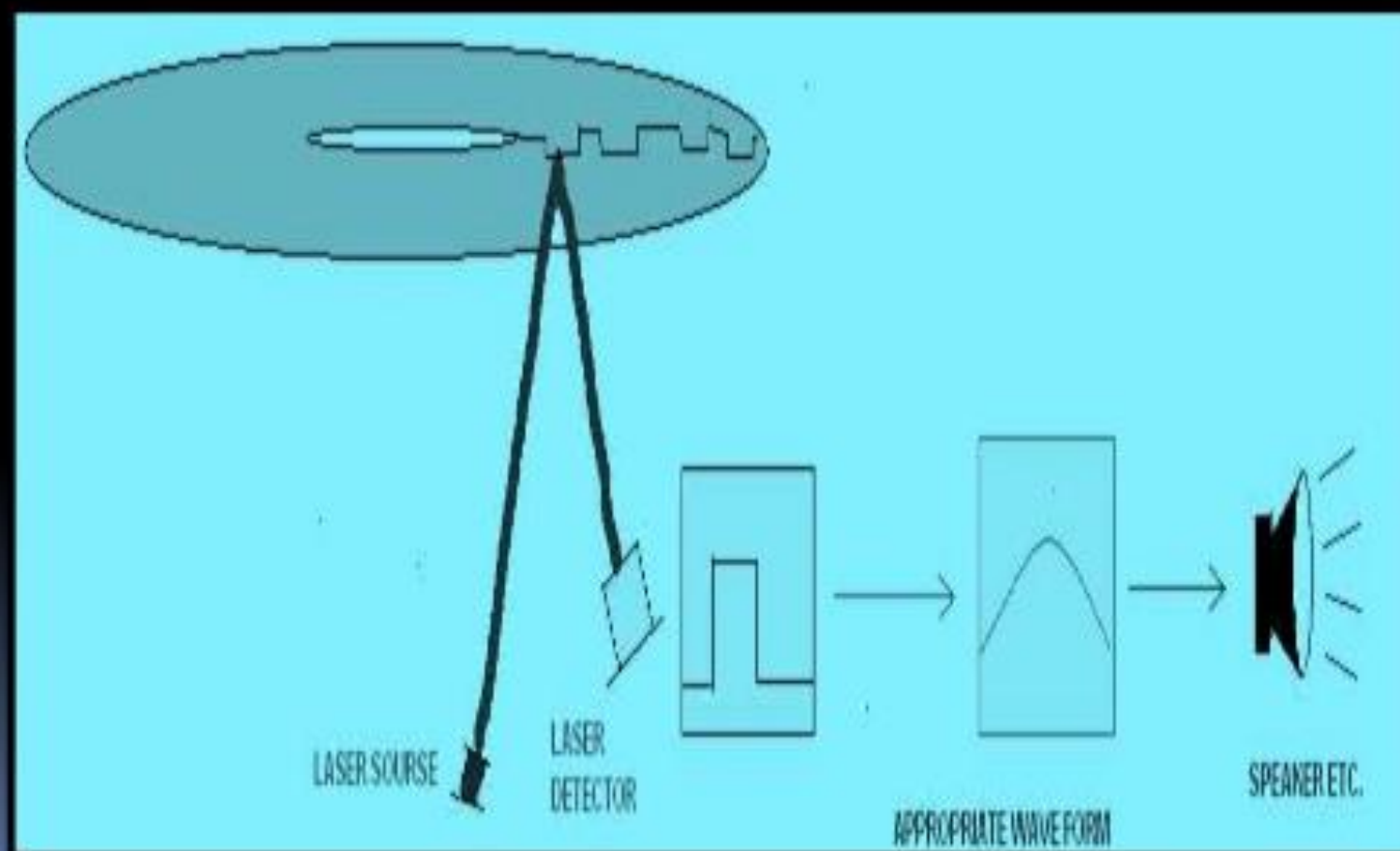
Structure of CD



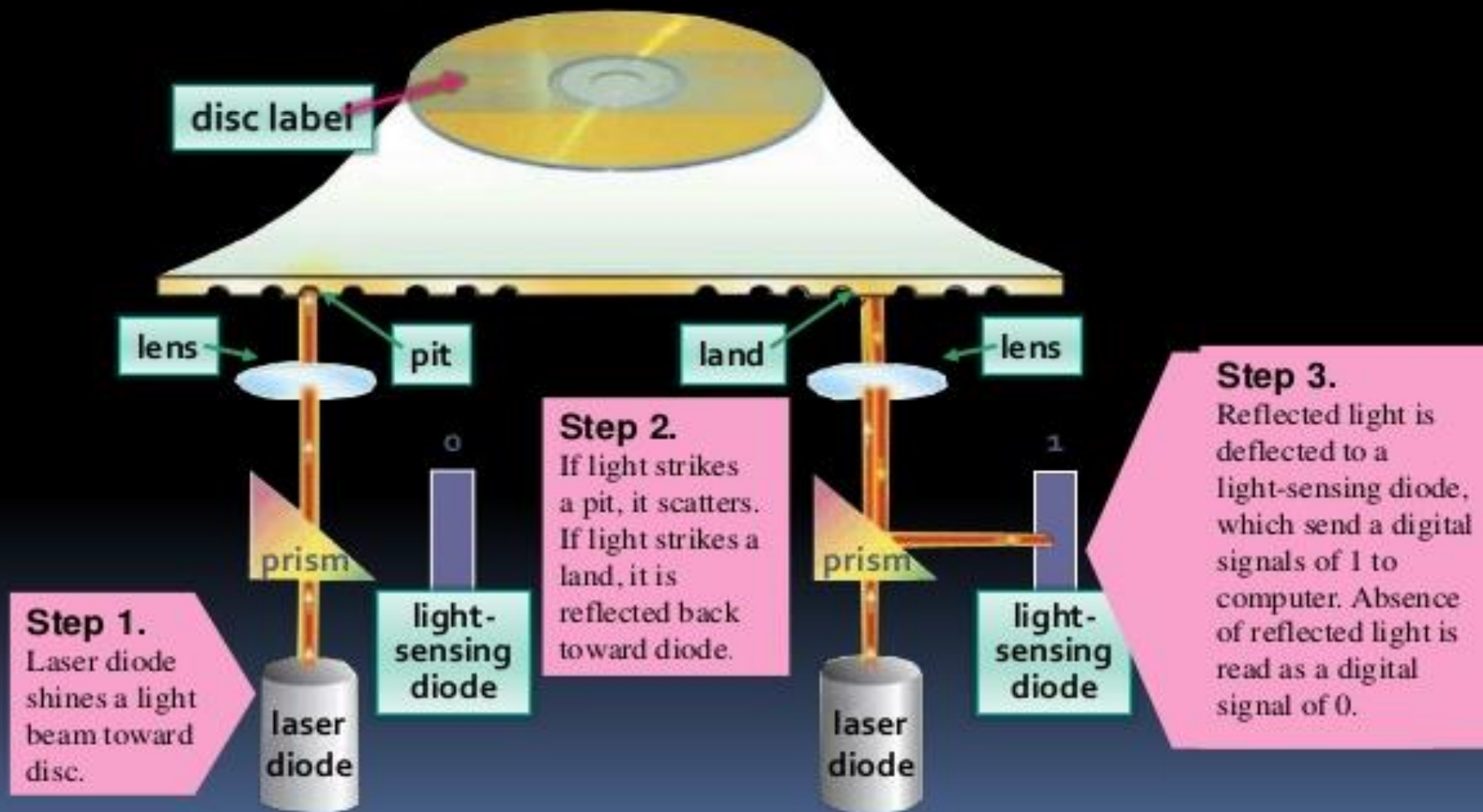
HOW DATA IS STORED ON A DISC?

- *Pits and lands*
 - The CD-ROM holds digital data.
 - Data is stored in the form of lands and pits.
 - Lands are flat areas on the metal surface.
 - Pits are depressions or hollows.

How does a laser read data on a compact disc?



How does a laser read data on an optical disc?



Advantages of CD-ROM

- Large Storage Capacity
- Portability
- Sturdiness



Disadvantages of CD-ROM

- cannot be updated
- access time longer



CD-Recordable(CD-R)

- Can be written to, but cannot be erased and reused
- Used for back up, sending large files to others, creating custom music CDs, storing home movies, etc.



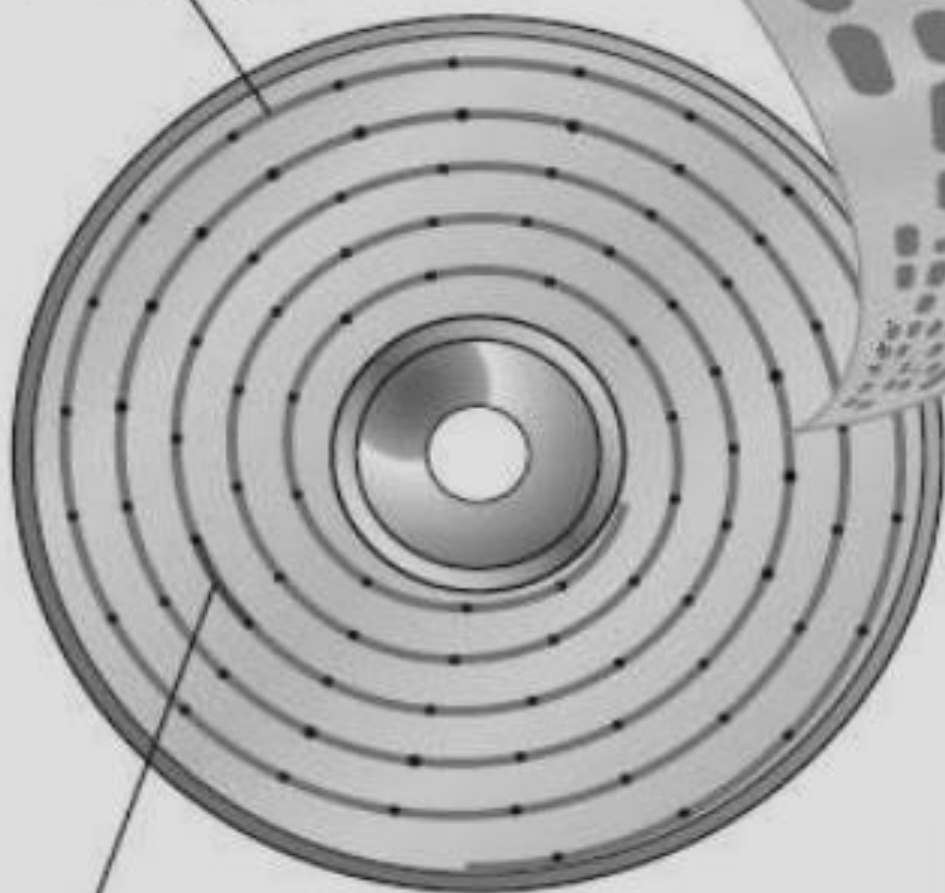
CD-Rewritable(CD-RW)

- Can be recorded on, erased, and overwritten just like magnetic discs
- Phase-change technology: Used to record and erase rewritable optical discs



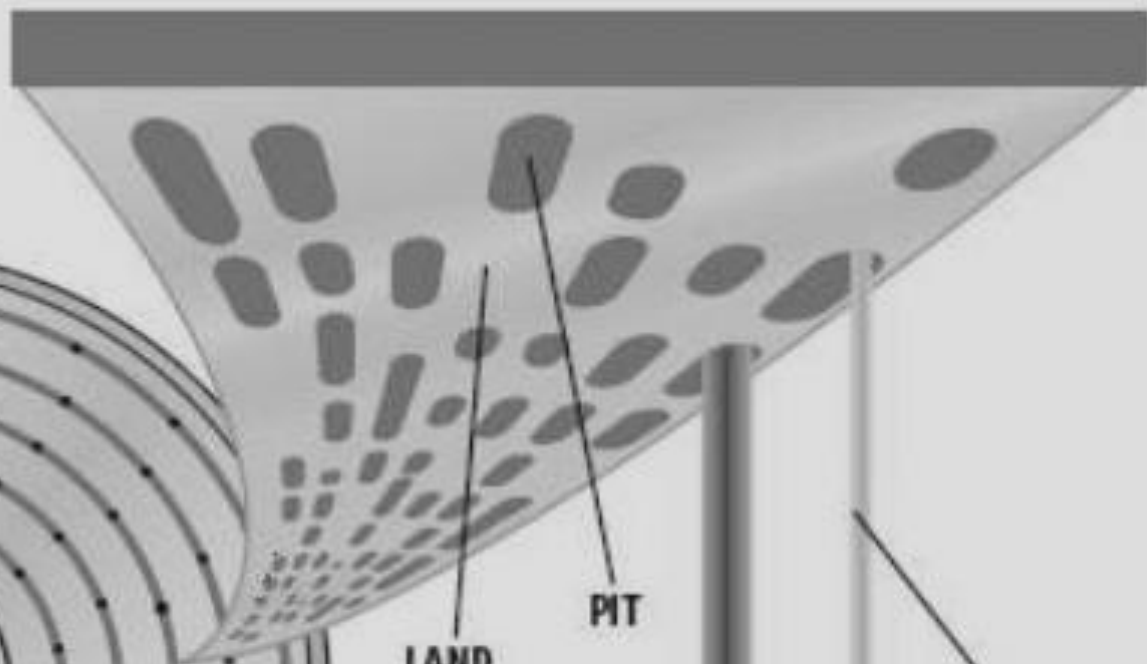
TRACK

A single grooved track spirals from the center of the disc outward; recorded data is stored in the groove.



SECTOR

The track is divided into multiple sectors for data organization.



LAND

PIT

WRITING DATA

When data is written to the disc, a laser beam creates pits, represented by dark, nonreflective areas on the disc.

READING DATA

A low intensity laser beam reads the disc. A transition between the pits and lands is interpreted as a 1; a set period of time between transitions is interpreted as a 0.

DVD



DVD

- **Digital Versatile Disk (Formerly Digital Video Disk)**
- **More capacity than CDs while having the same dimensions.**
- **developed by Philips, Sony, Toshiba, and Panasonic in 1995.**
- **An extremely high capacity compact disc capable of storing from 4.7 GB to 17 GB**

How does a DVD-ROM store data?

- Three storage techniques used to store DVD-ROM data
 - Pits are packed closer together to make the disc more dense
 - Two layers of pits are used, where the lower layer is semitransparent so the laser can read through it to the upper layer
 - Some are double-sided, which means you can remove the DVD-ROM and turn it over to read the other side

Layers

Single-sided, single layer (4.7GB)



Single-sided, double layer (8.5GB)

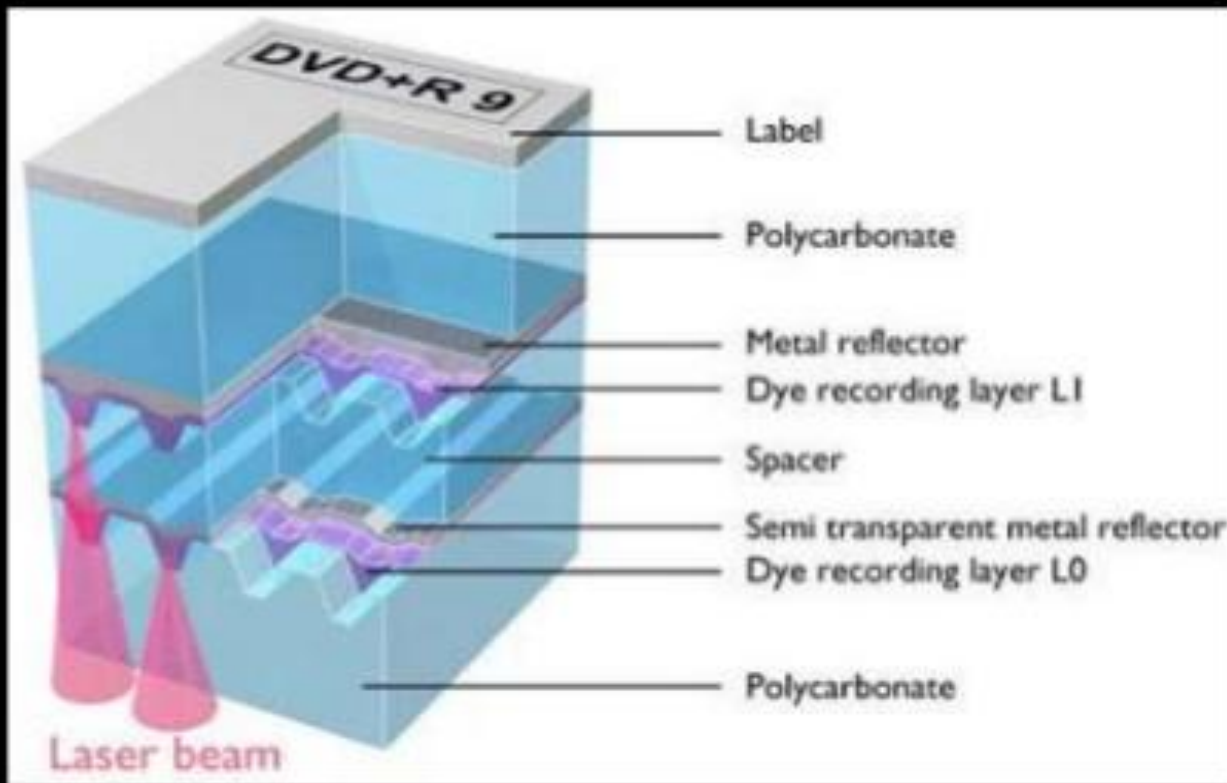


Double-sided, double layer (17GB)



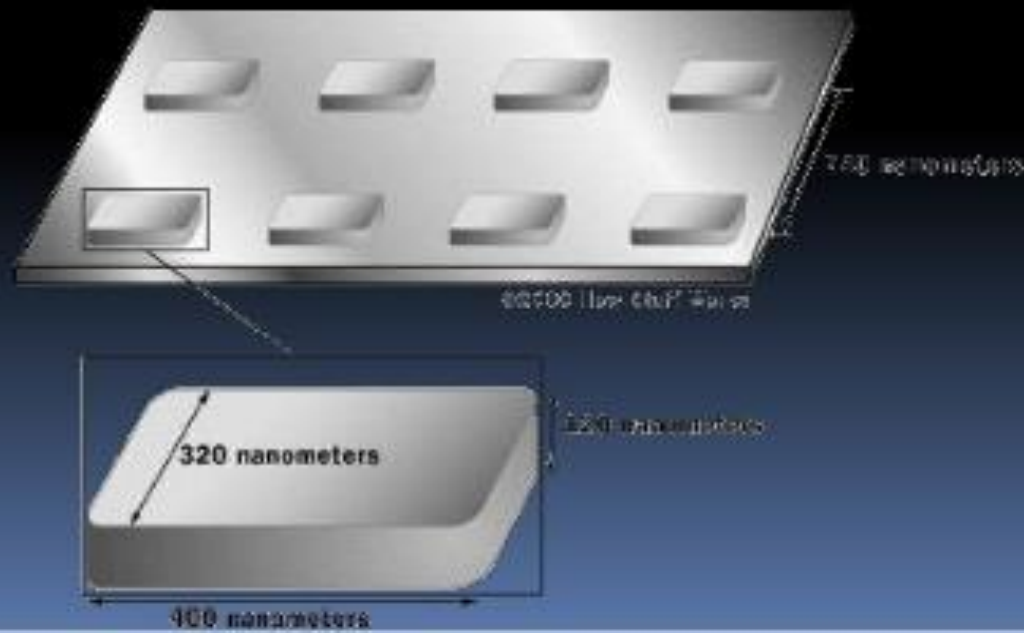
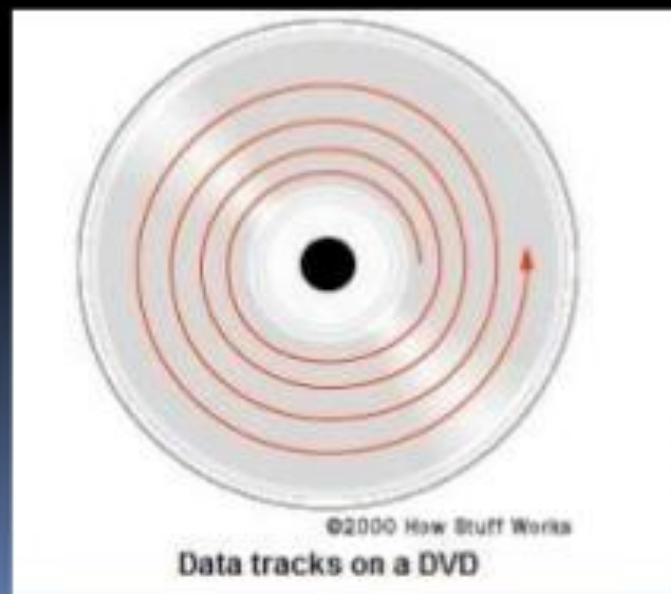
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- A DVD is composed of several layers of plastic, totaling about 1.2 millimeters thick.
- Each layer is created by injection molding polycarbonate plastic.
- This process forms a disc that has microscopic bumps arranged as a single, continuous and extremely long spiral track of data.



- Once the clear pieces of polycarbonate are formed, a thin reflective layer is sputtered onto the disc, covering the bumps. Aluminum is used behind the inner layers, but a semi-reflective gold layer is used for the outer layers, allowing the laser to focus through the outer and onto the inner layers. After all of the layers are made, each one is coated with lacquer, squeezed together and cured under infrared light.

- The data track is just 740 nanometers separate one track from the next (a nanometer is a billionth of a meter). And the elongated bumps that make up the track are each 320 nanometers wide, a minimum of 400 nanometers long and 120 nanometers high.



Blu-ray disc

- Blu-ray Disc (official abbreviation BD) is an optical disc storage medium designed to replace the DVD format.
- The standard physical medium is a 12 cm plastic optical disc, the same size as DVDs and CDs.
- Blu-Ray Discs contain 25 GB per layer, with dual layer discs (50 GB) the norm for feature-length video discs and additional layers possible later.

THANK YOU