DATA IN & DATA OUT

EGCO342 INFORMATION TECHNOLOGY IN DAILY LIFE

KANAT POOLSAWASD
DEPARTMENT OF COMPUTER ENGINEERING
MAHIDOL UNIVERSITY

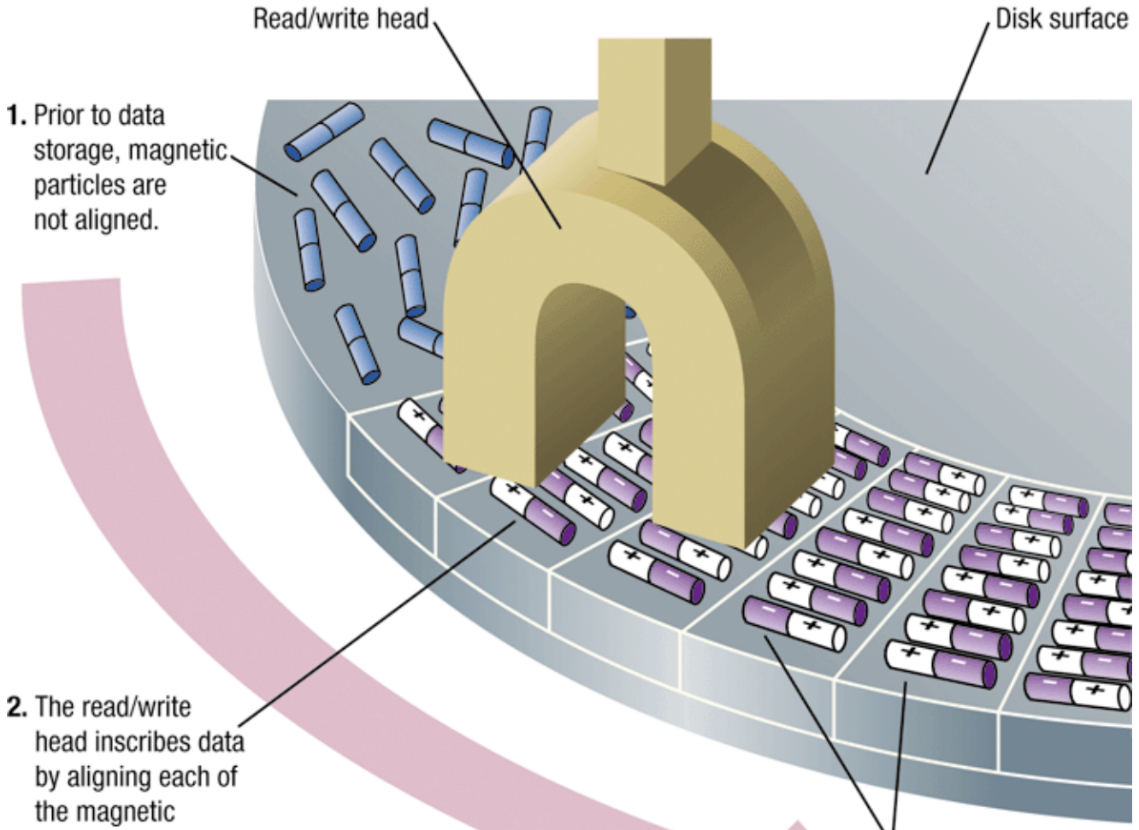
Covered Topics

- Data Storing
- Displaying (Output Devices)
- Input Devices
- The Cutting Edge

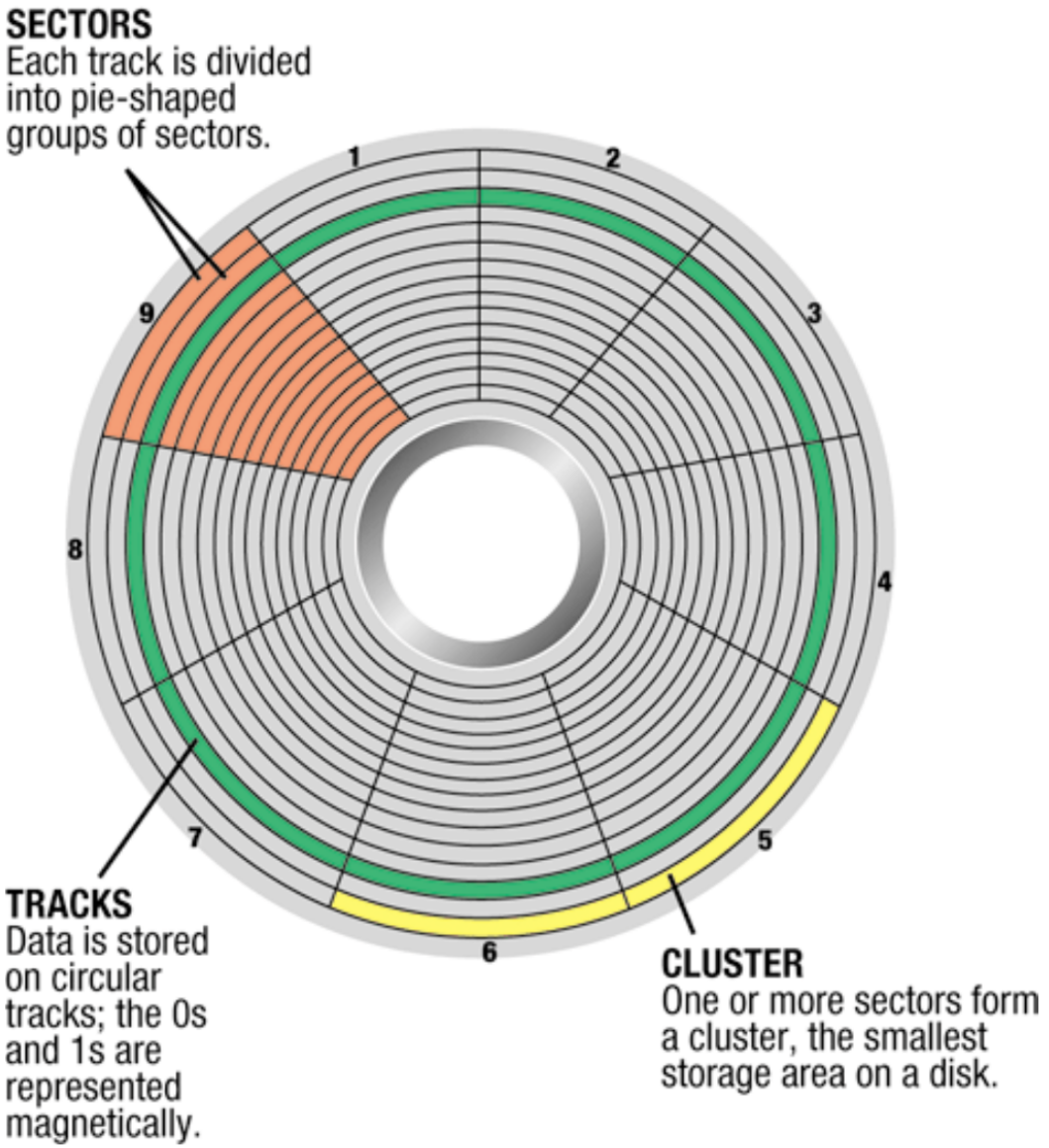
Data Storing

Magnetic Disk Systems (1)

FIGURE 3-3
Storing data on magnetic disks.



Magnetic Disk Systems (2)



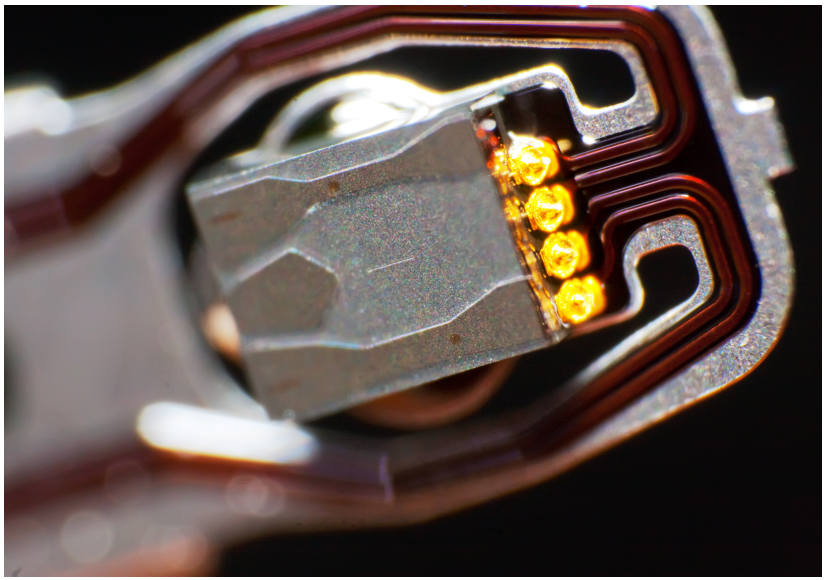
Hard Disk Drive (1)

Read/write head doesn't touch the surface of the disc

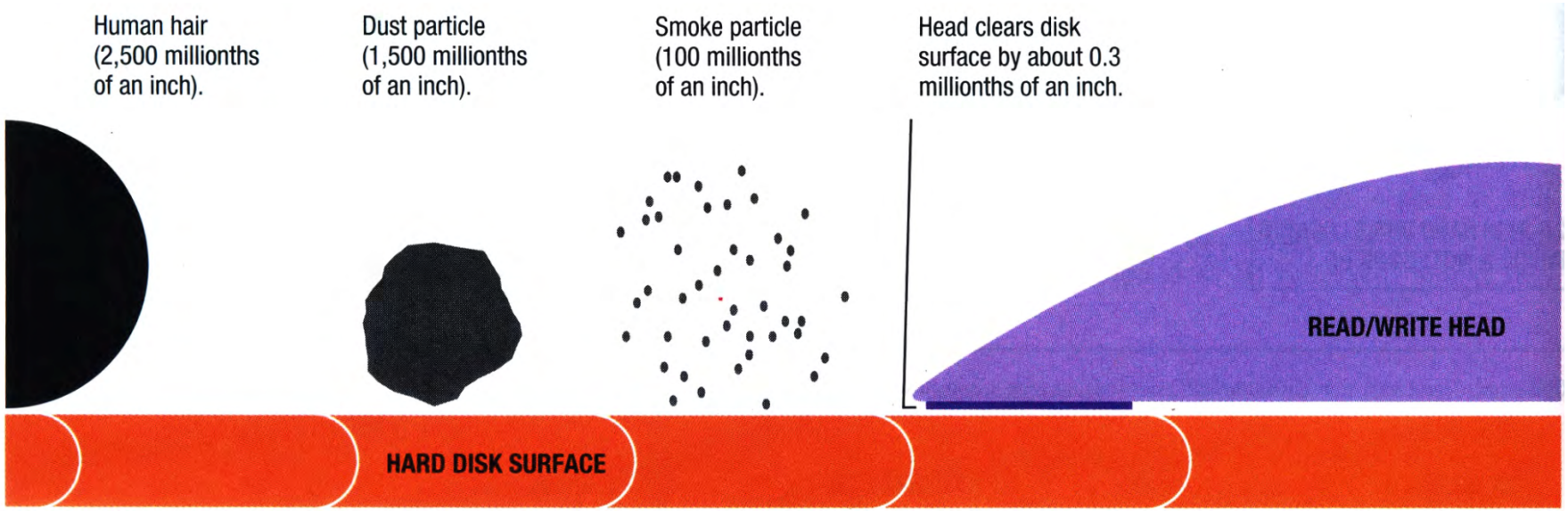
- Head crashes can occur
- Backing up is important

Most hard disks are sealed inside the drive

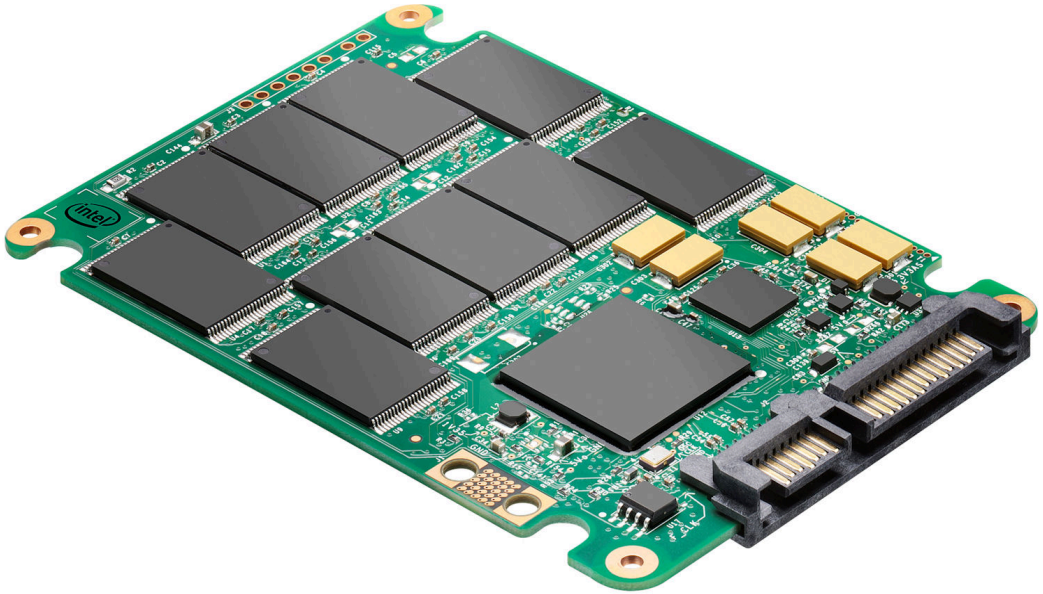
- Some hard drive systems use hard disk cartridges



Hard Disk Drive (2)



Solid-State Drive (SSD)

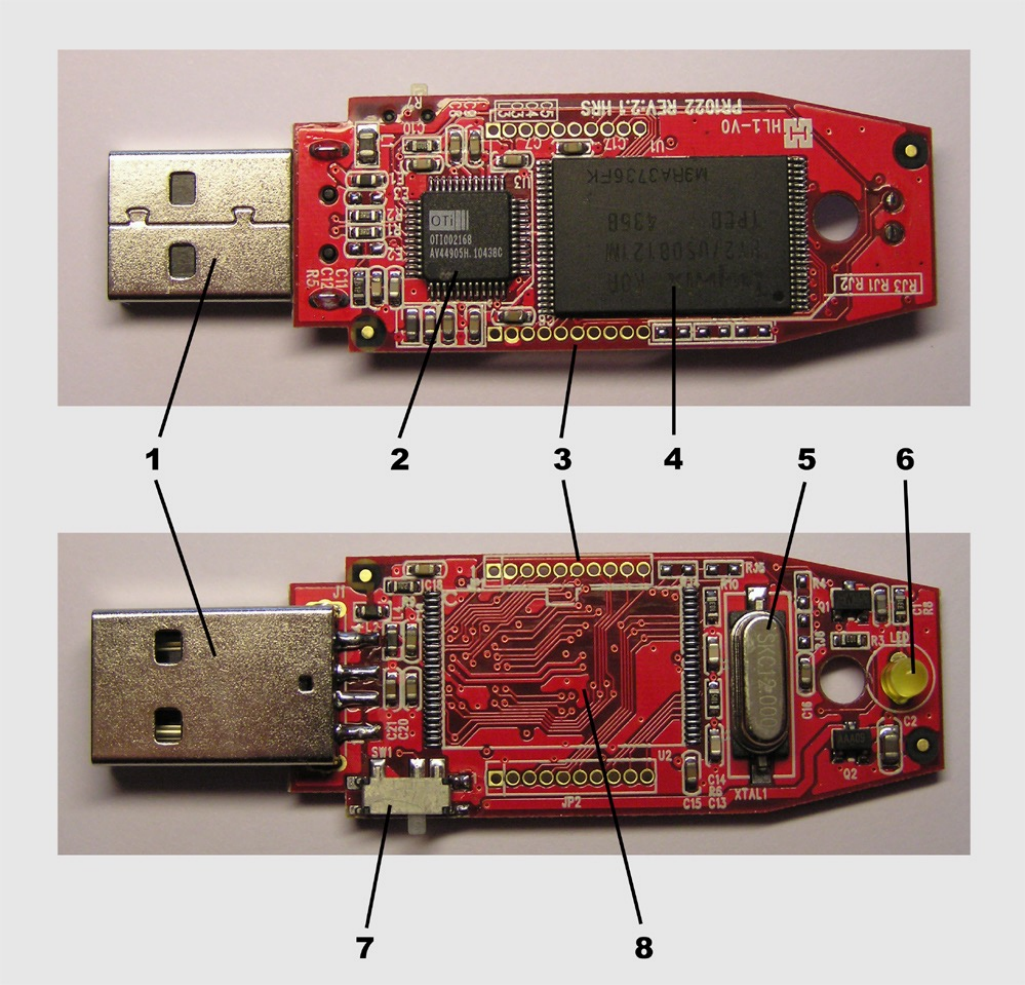


Internal and External HD

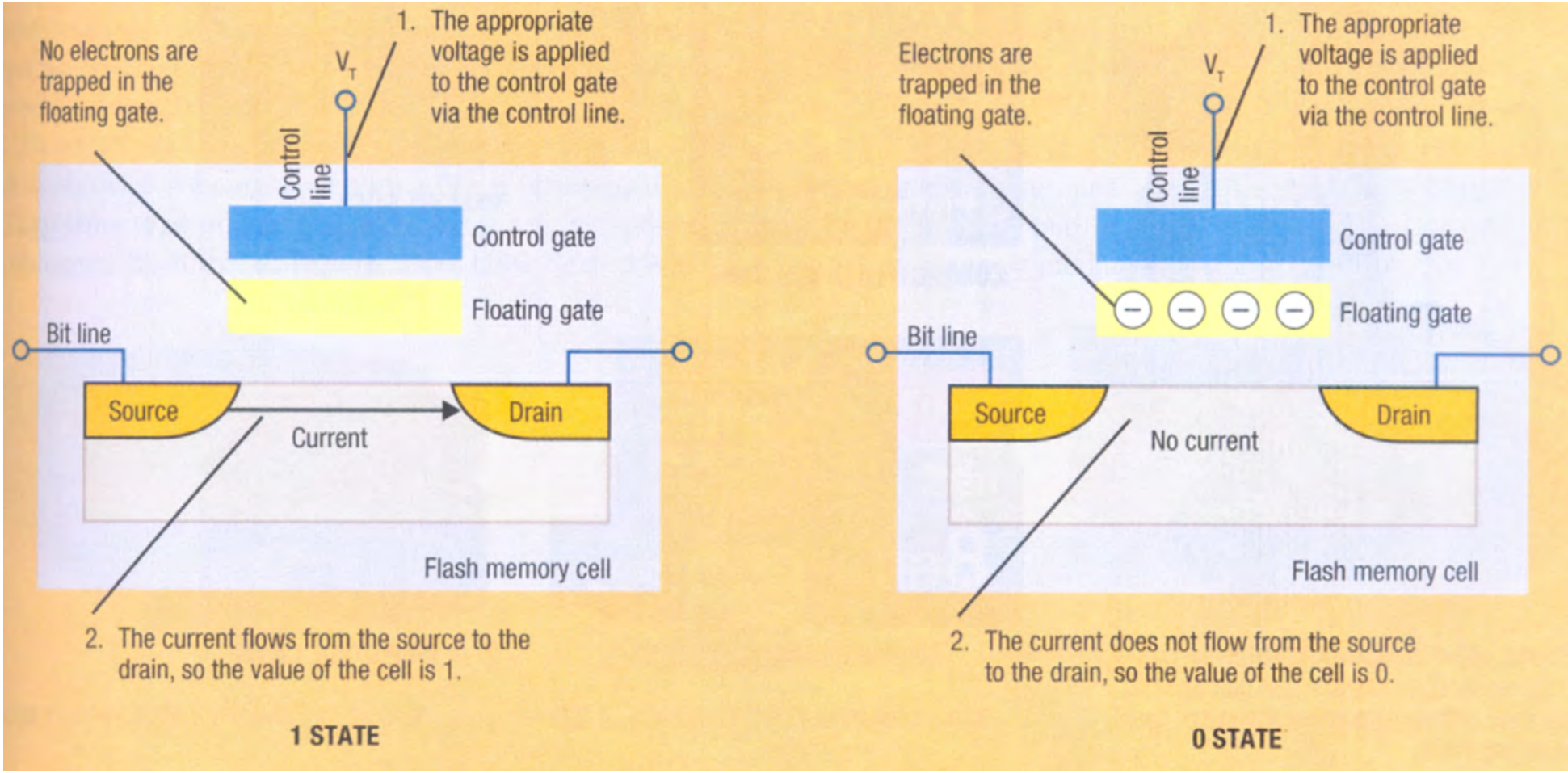
- External HD is a hard disk with an external enclosure.
- You can take hard drive from your broken notebook. Buy an external enclosure (Get the right size) => Your new external HD.

Making External HD

Thumb Drive / Flash Drive



Flash Memory Systems



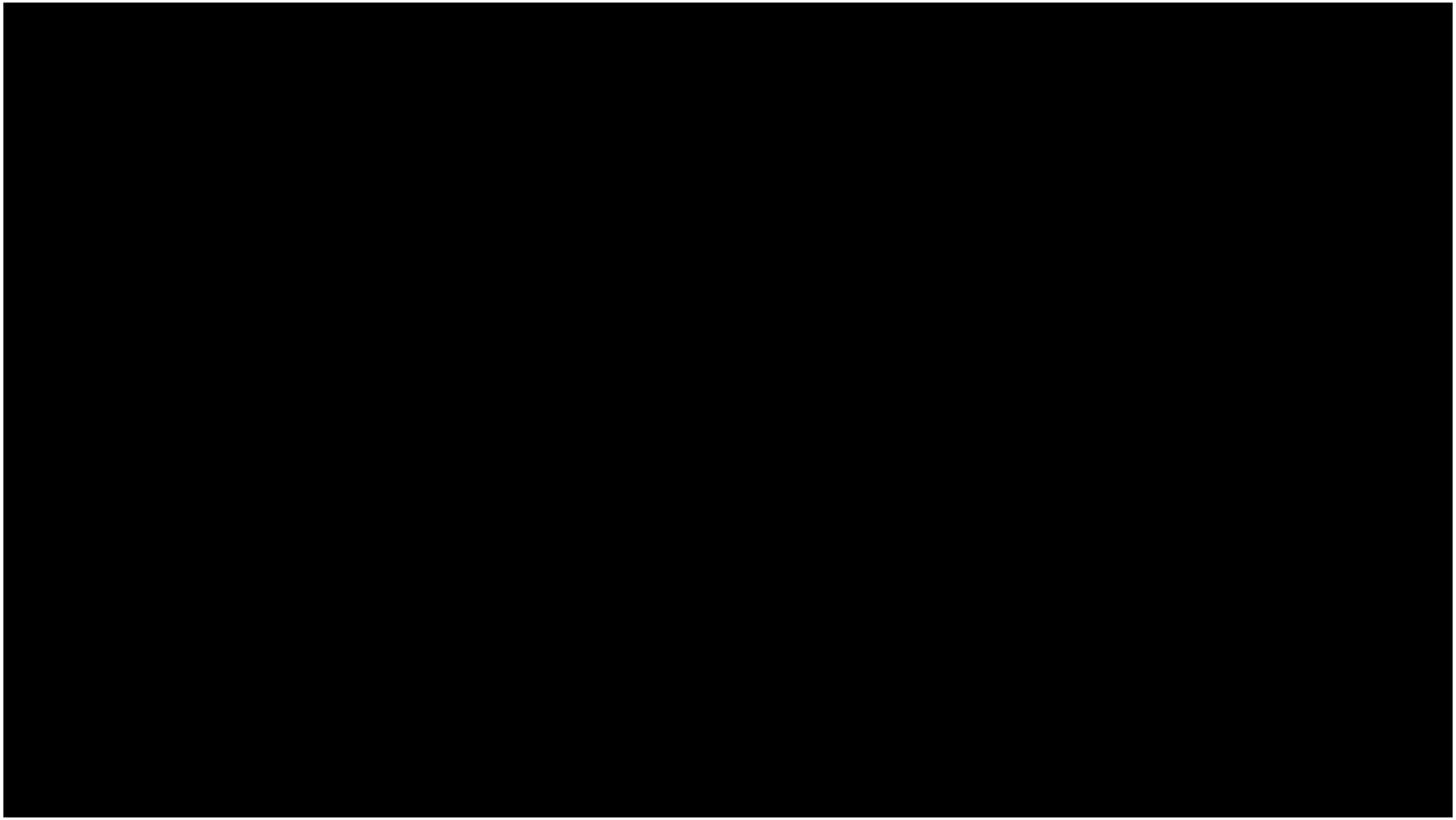
Flash Memory Card

The number within the C symbol denotes the class of a card and if there is a U symbol on the label as in the case of the card on the extreme right, it means that the card is UHS or Ultra High Speed card, the number within the U indicating the class rating.

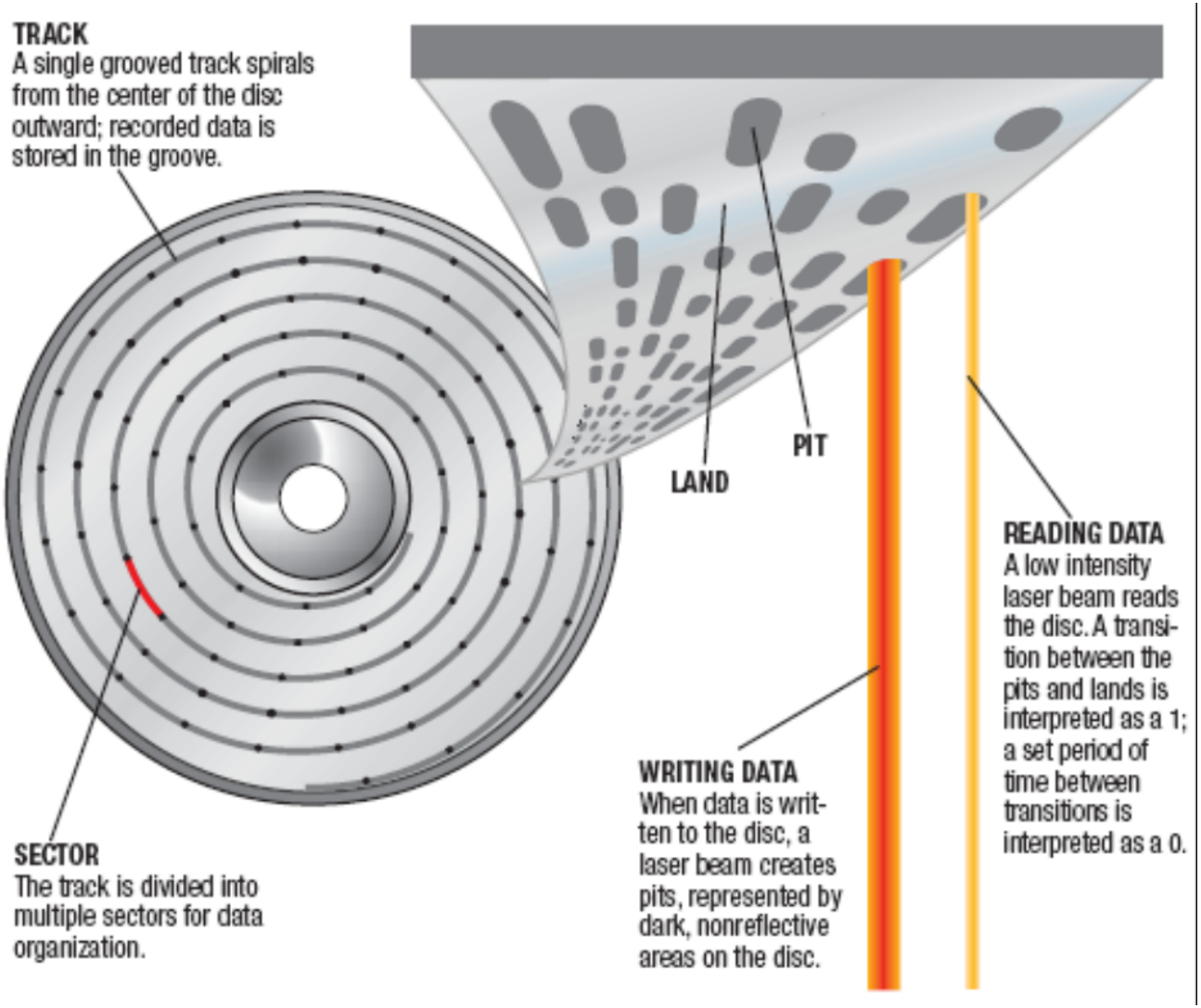
Optical Disc

- CD, DVD and BLUERAY
- Use laser beam to write and read information

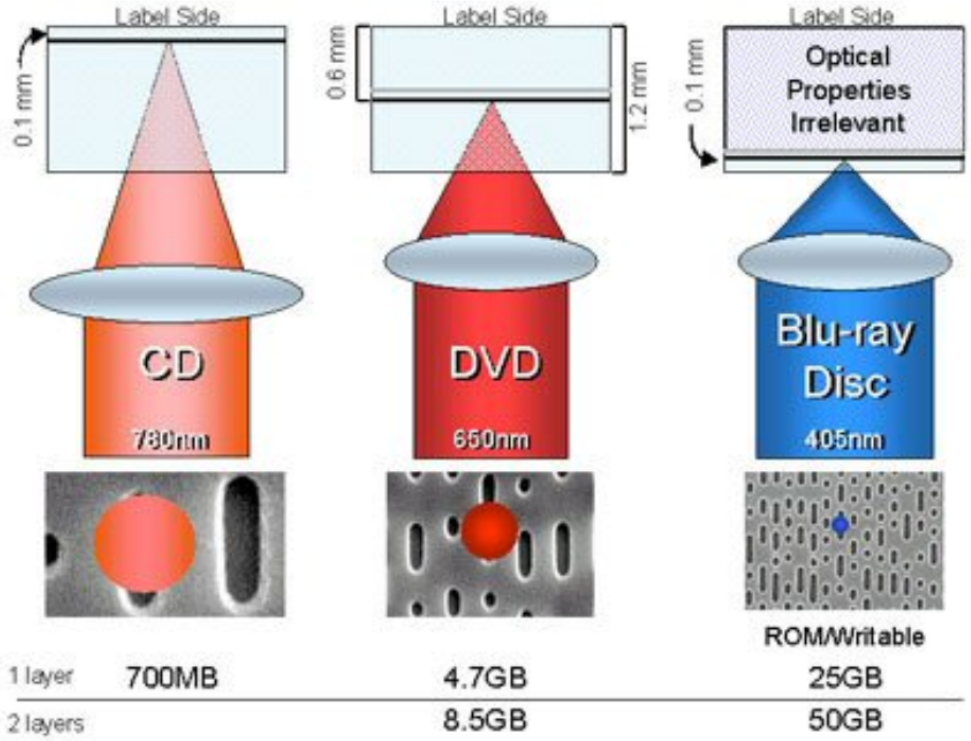
How a optical disc player works ?



Optical Disc Systems (1)



Optical Disc Systems (2)

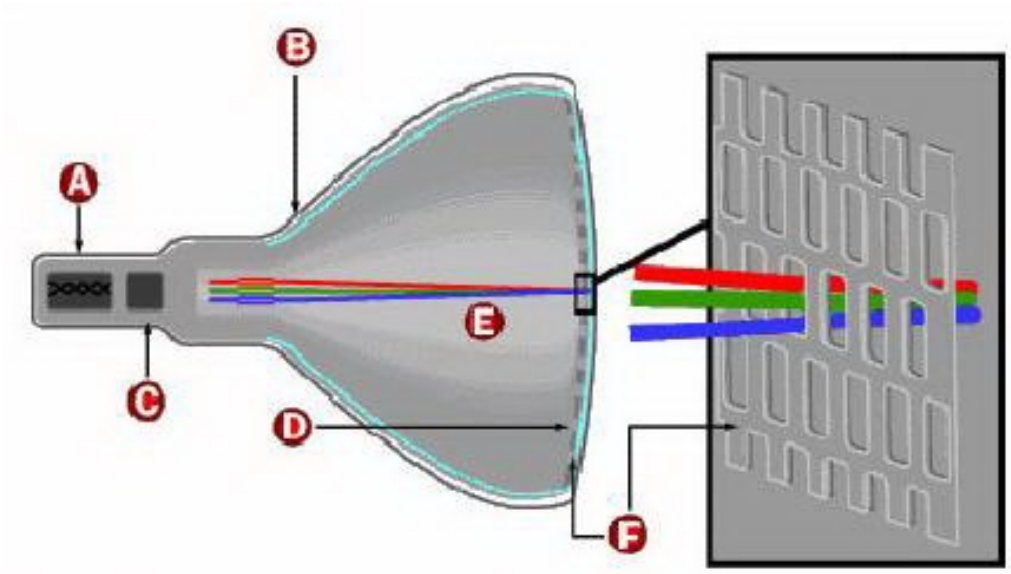


R and RW

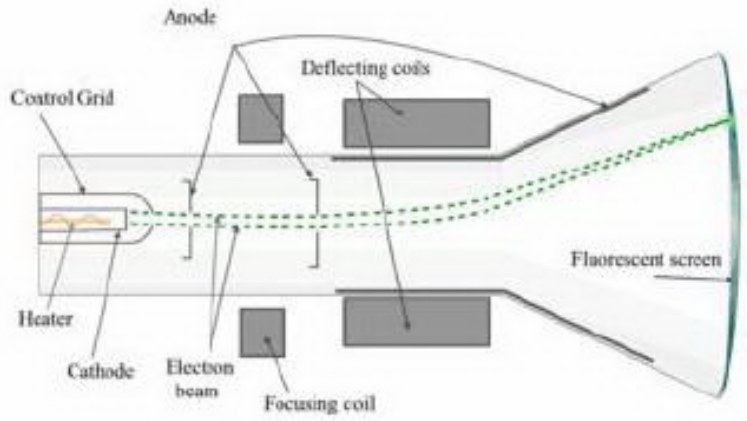
- R (CD-R DVD-R) means you can write in it once.
- RW means you can rewrite.
- Technology ?
  - Use dye to cover the mirror.
  - Use laser to burn dye away = write.
  - For RW, dye can be reverted back.

Displaying
(Data Out)

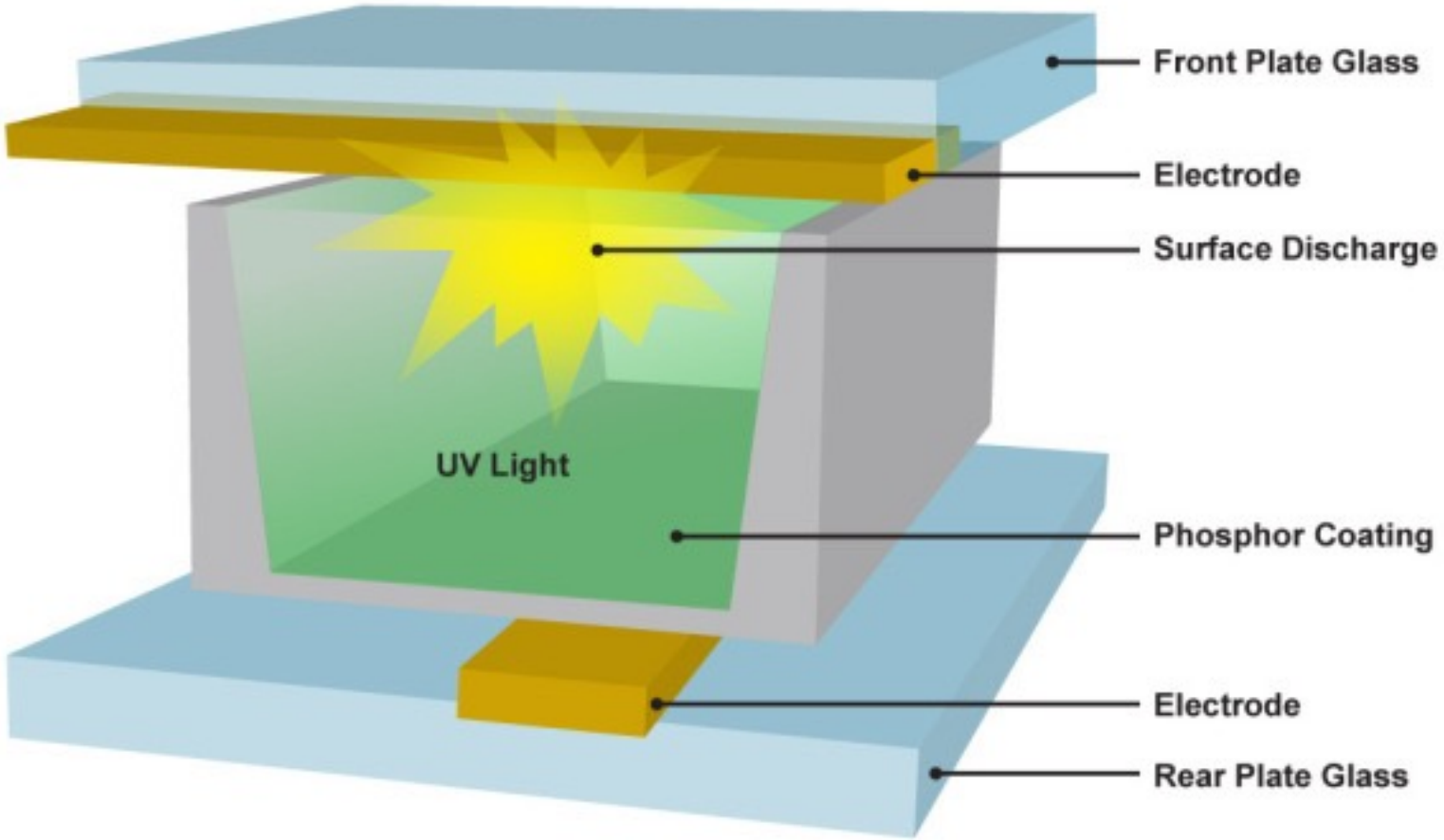
Cathode Ray Tube (CRT)



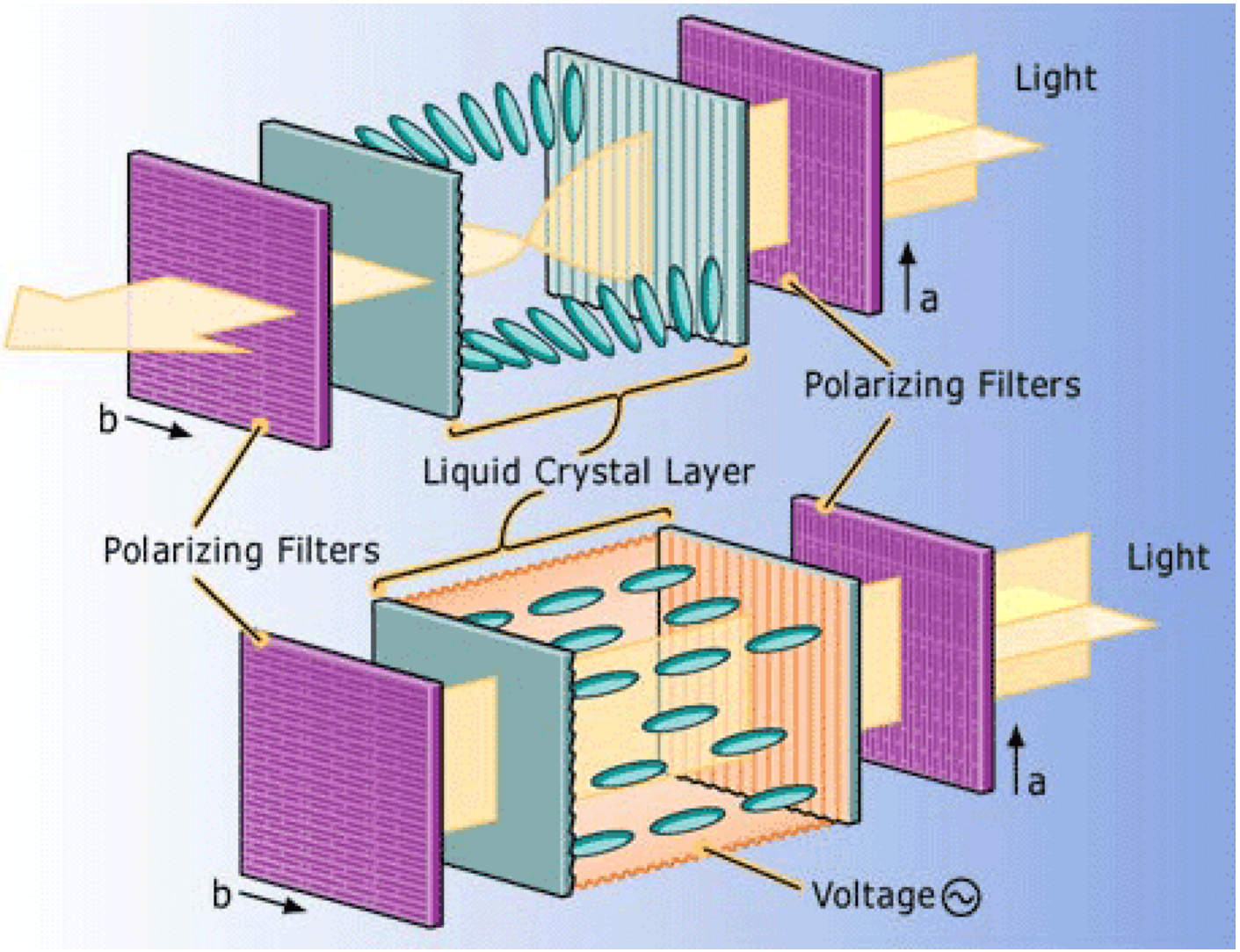
A Cathode
B Conductive coating
C Anode
D Phosphor-coated screen
E Electron beams
F Shadow mask



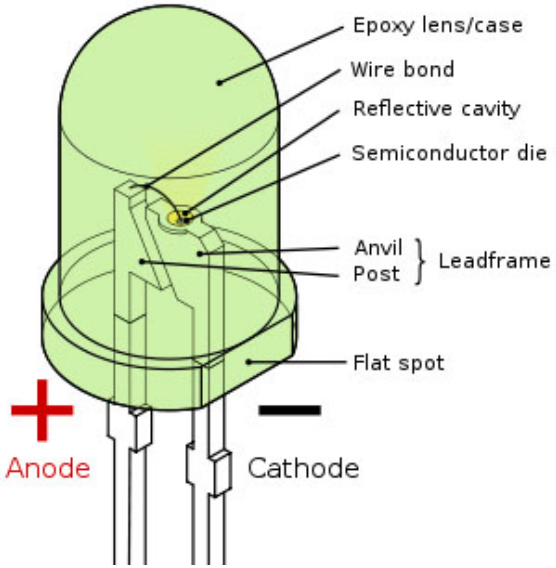
Plasma

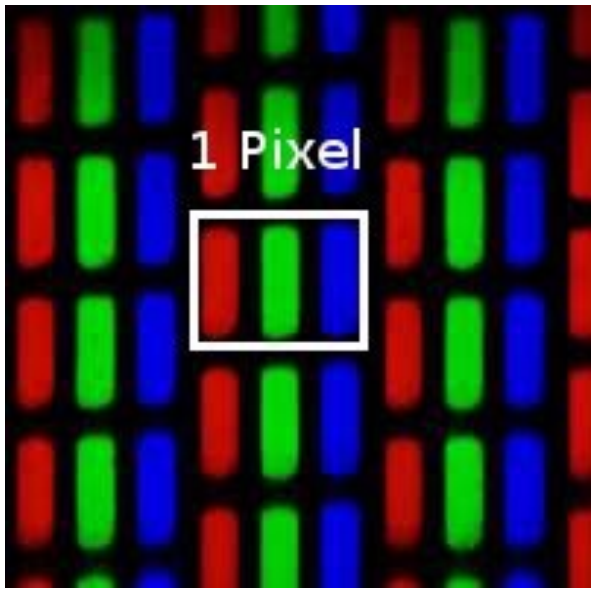

Front Plate Glass
Electrode
Surface Discharge
UV Light
Phosphor Coating
Electrode
Rear Plate Glass

Liquid-Crystal Display (LCD)

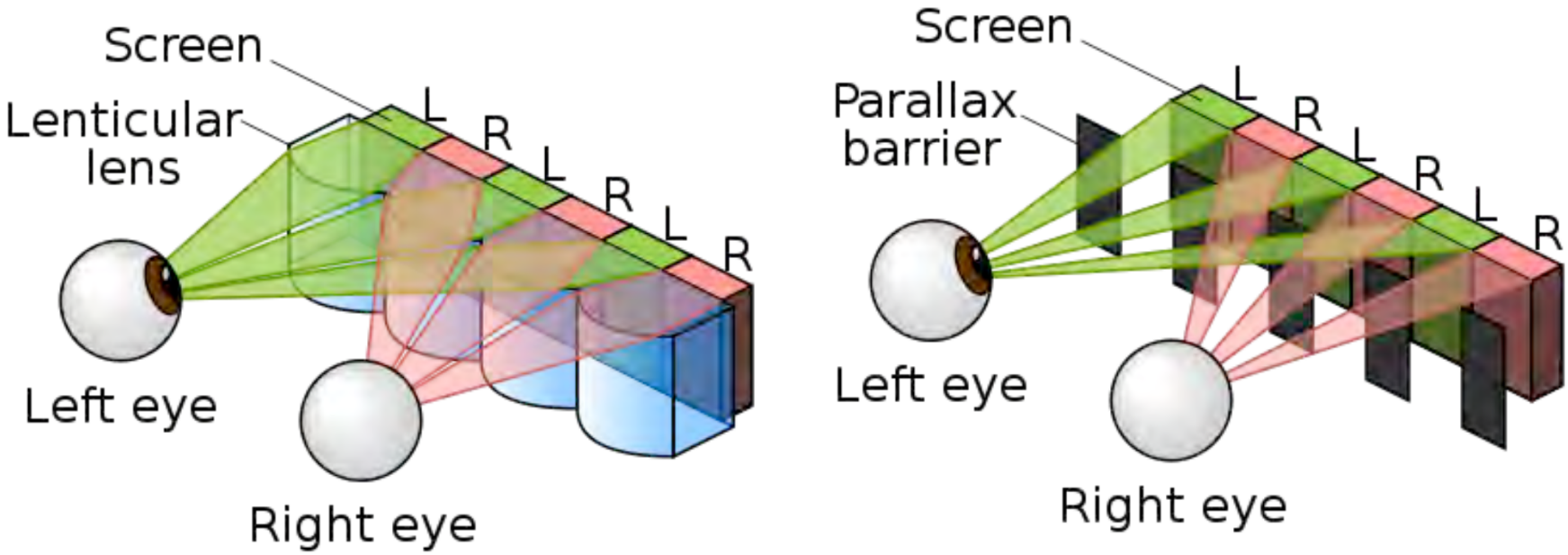


Light-Emitting Diode (LED)

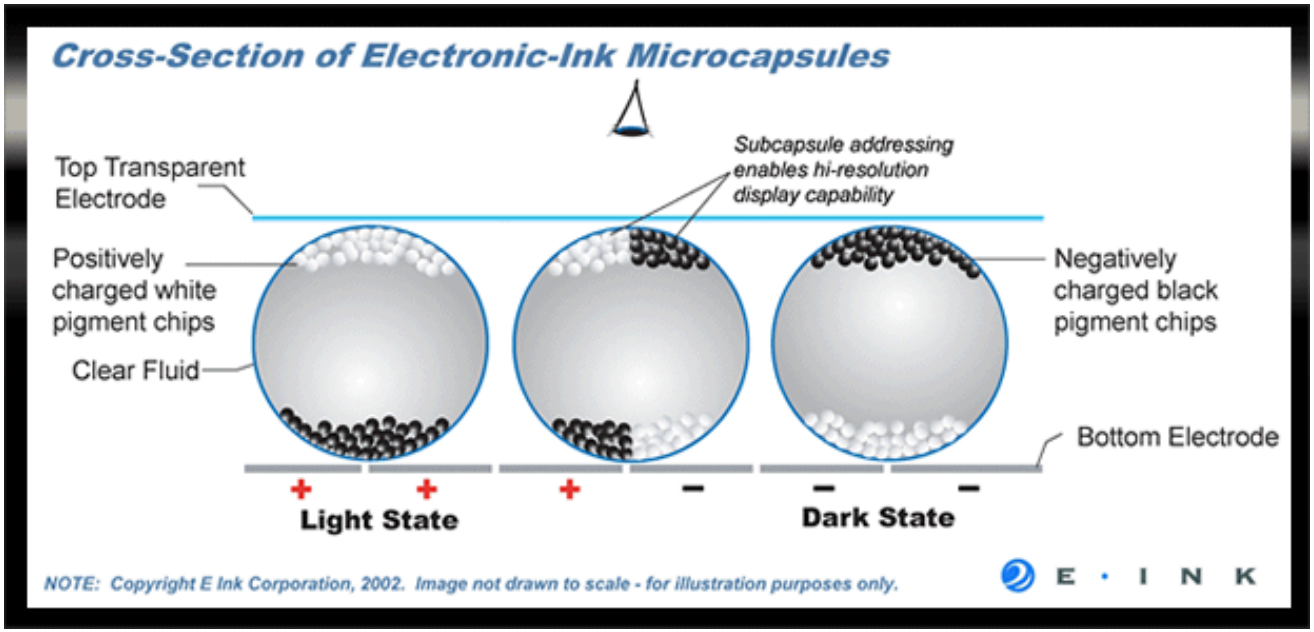


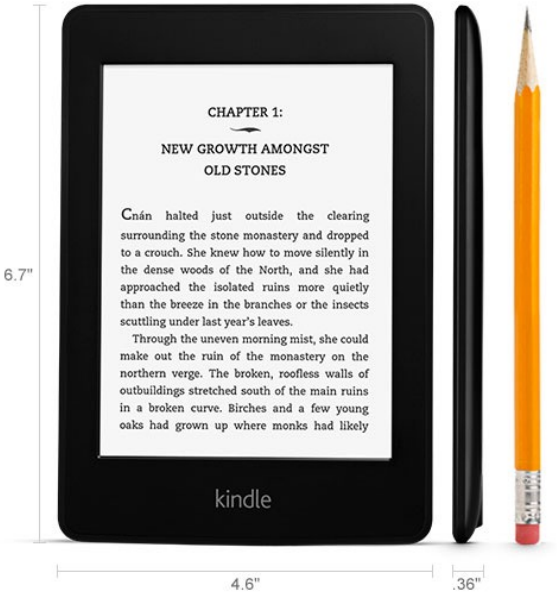


3D Display


Screen
Lenticular lens
L
R
L
R
L
R
Left eye
Right eye
Screen
Parallax barrier
L
R
L
R
L
R
Left eye
Right eye

E-Ink


Cross-Section of Electronic-Ink Microcapsules
Top Transparent Electrode
Subcapsule addressing enables hi-resolution display capability
Positively charged white pigment chips
Clear Fluid
Negatively charged black pigment chips
Bottom Electrode
+ + + − − −
Light State
Dark State
NOTE: Copyright E Ink Corporation, 2002. Image not drawn to scale - for illustration purposes only.
E · I N K

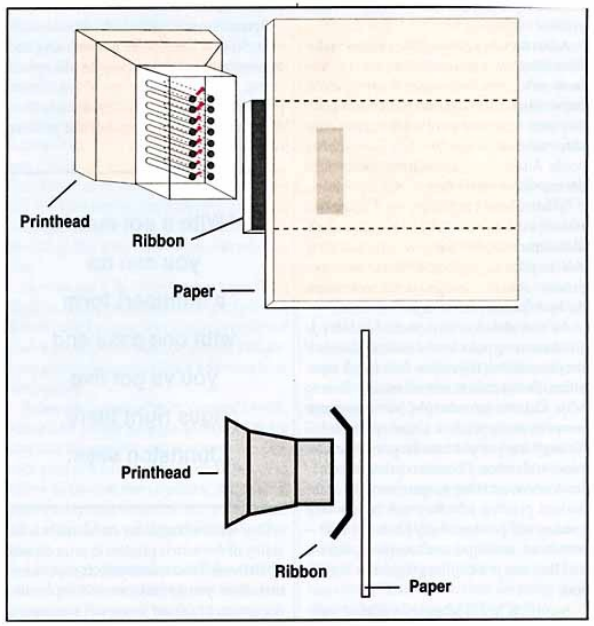

6.7"
CHAPTER 1:
NEW GROWTH AMONGST OLD STONES
Cnán halted just outside the clearing surrounding the stone monastery and dropped to a crouch. She knew how to move silently in the dense woods of the North, and she had approached the isolated ruins more quietly than the breeze in the branches or the insects scuttling under last year's leaves.
Through the uneven morning mist, she could make out the ruin of the monastery on the northern verge. The broken, roofless walls of outbuildings stretched south of the main ruins in a broken curve. Birches and a few young oaks had grown up where monks had likely
kindle
4.6"
.36"

Printers

Three types of printer

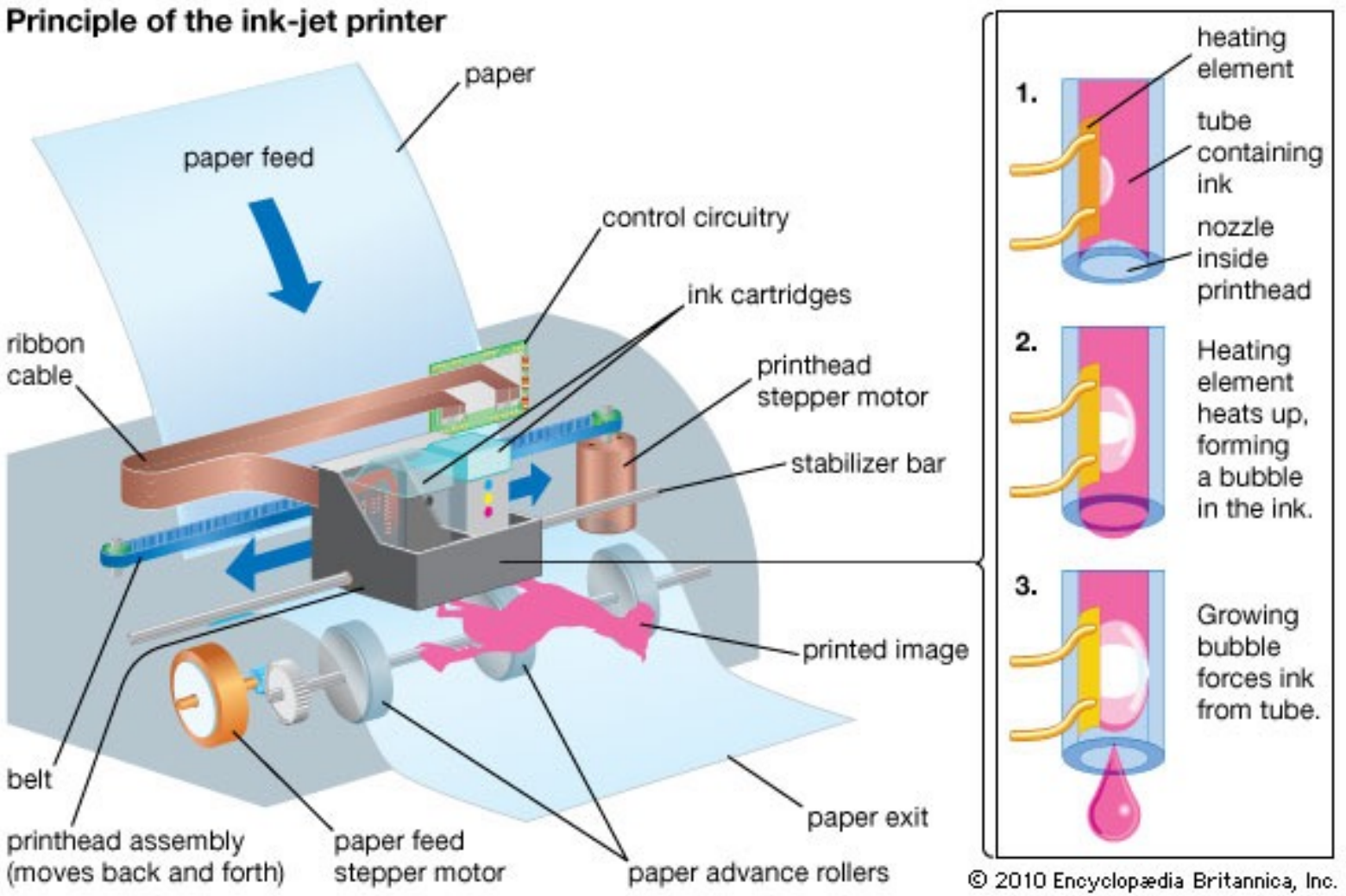
- Dot-Matrix (Mono)
- Inkjet (Color)
- Laser (Mono/Color)

How printer works ? (1)



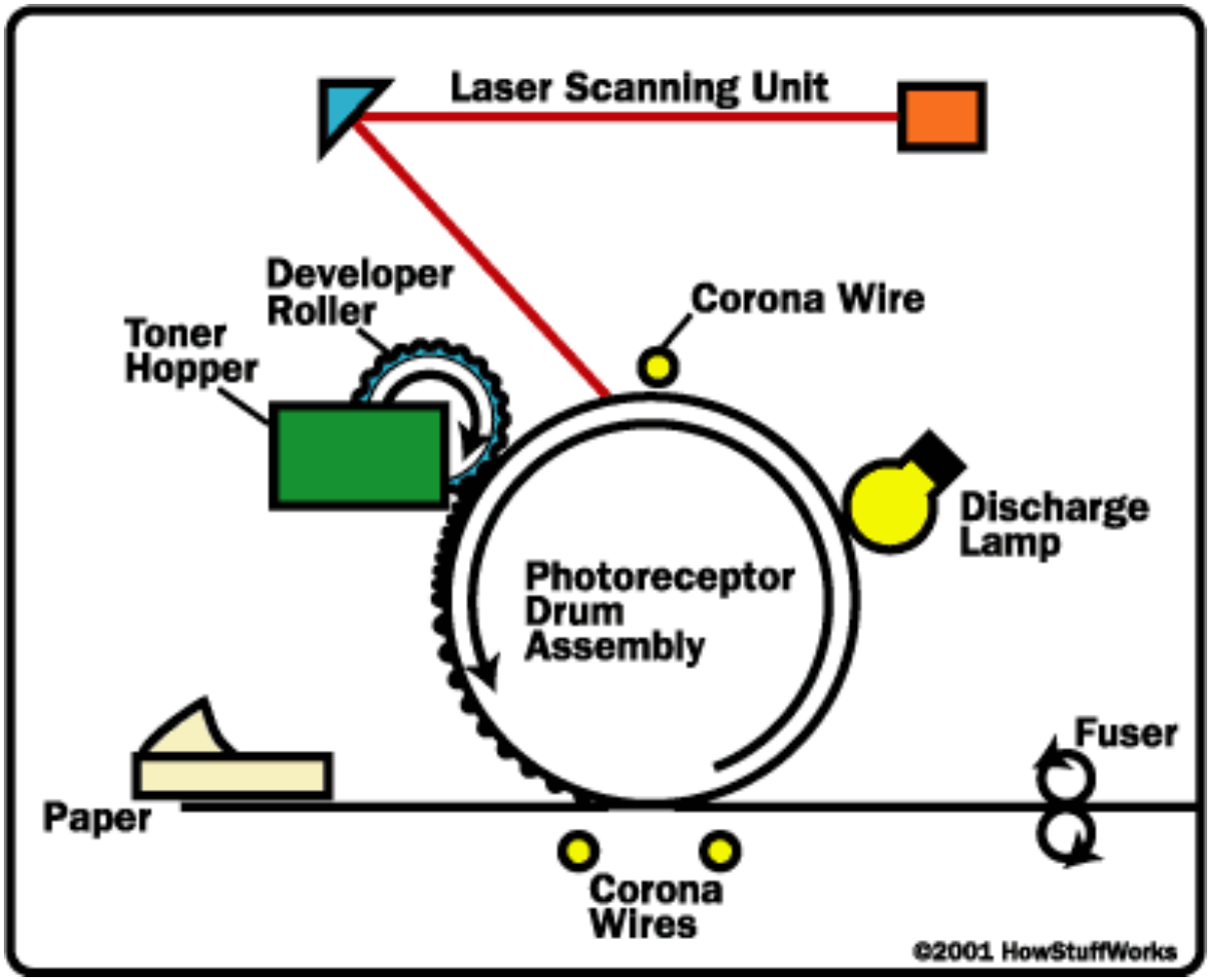
Dot-Matrix

How printer works ? (2)



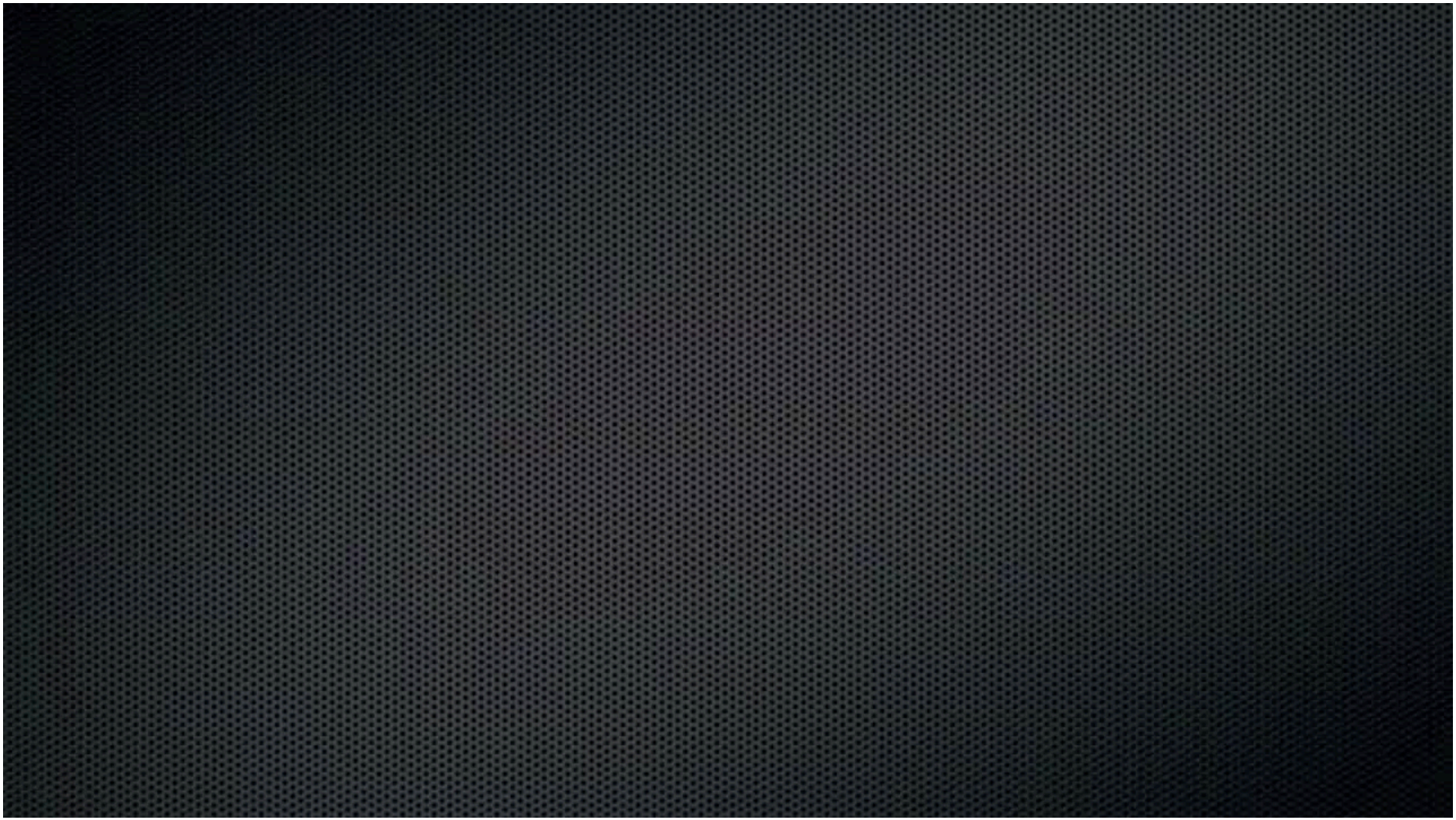
Inkjet

How printer works ? (3)



Laser

3D Printing



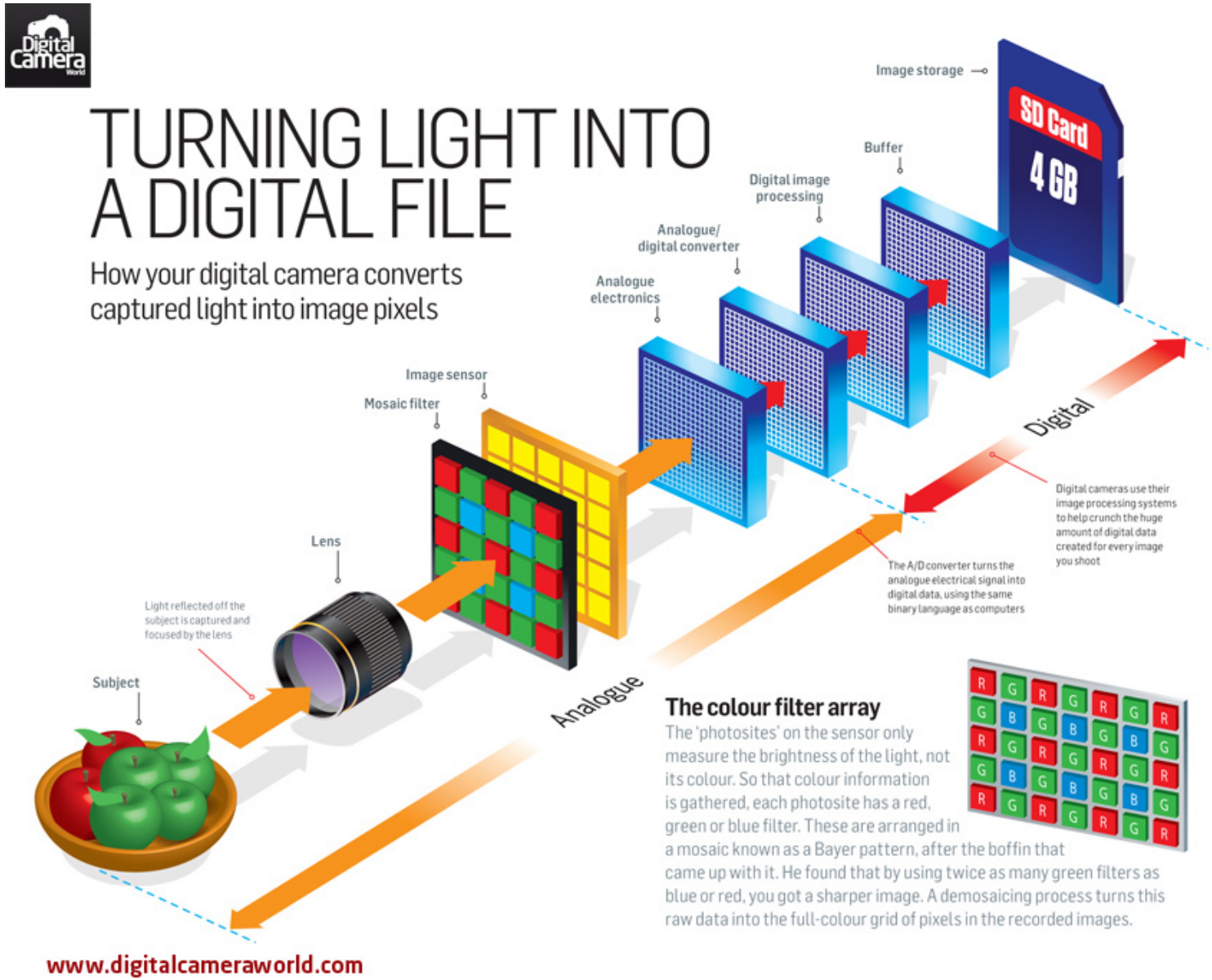
Input Devices
(Data In)

Camera (1)

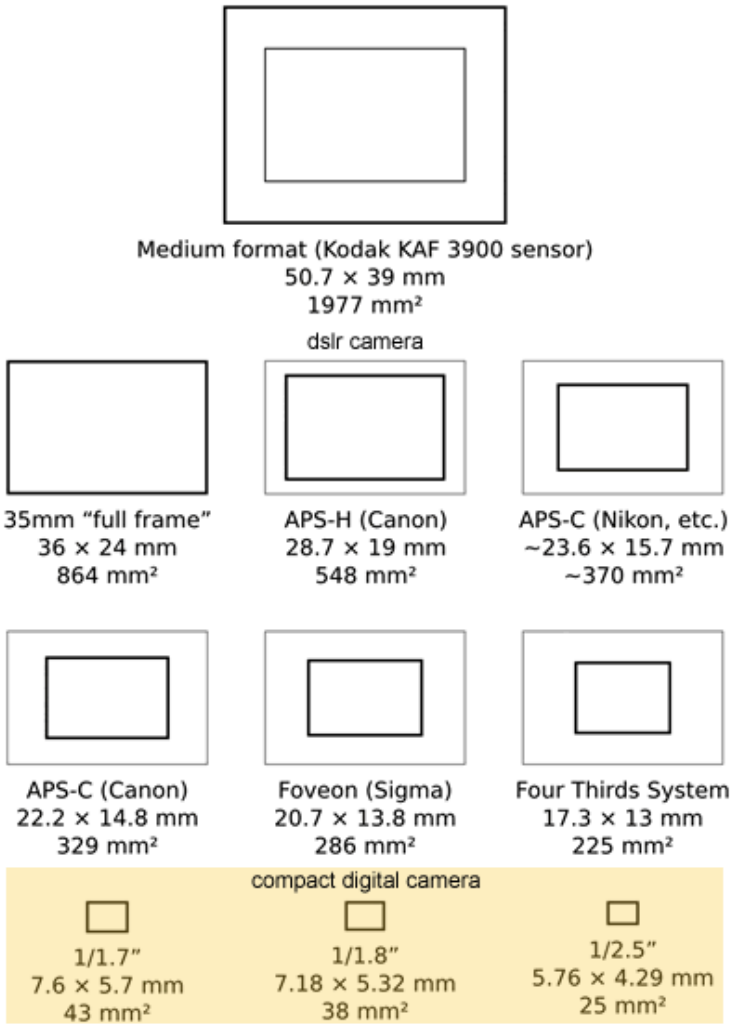
There are many types of camera

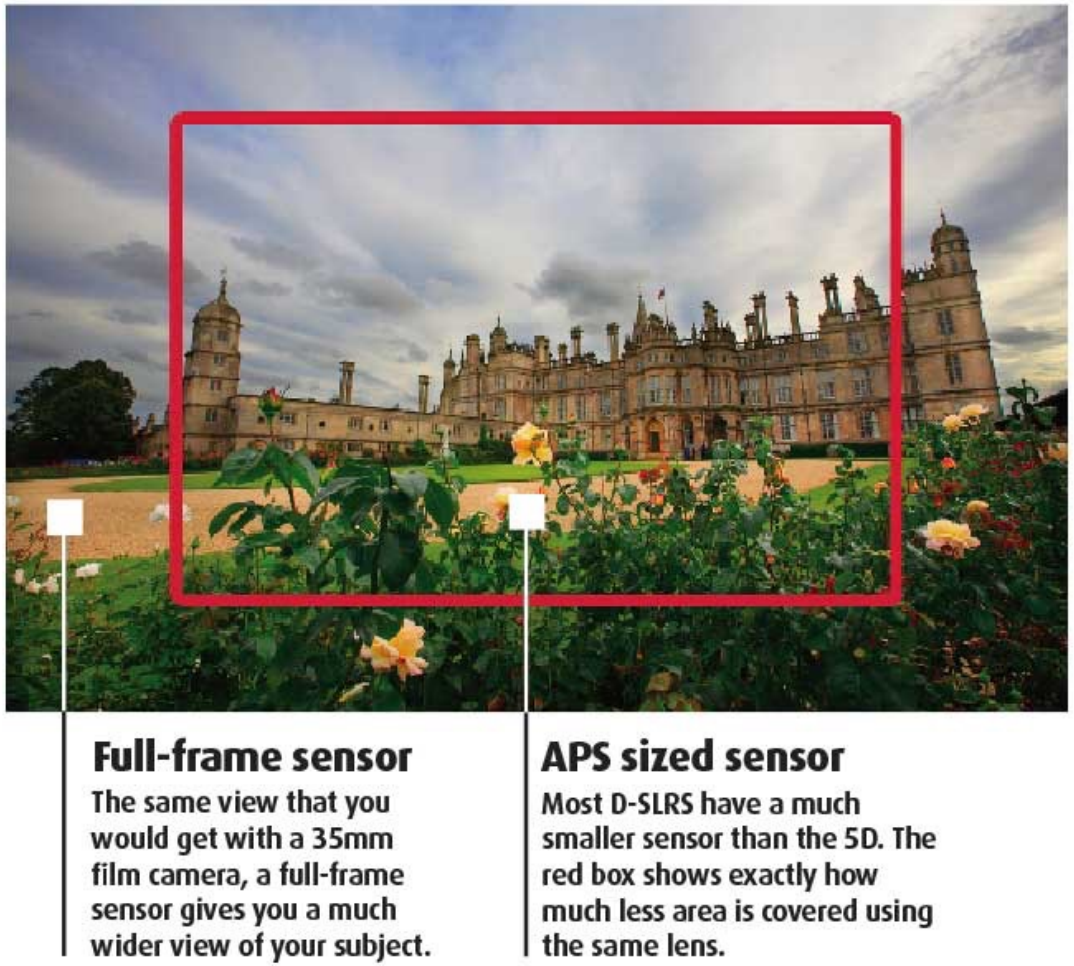
- Digital Camera (Still Camera)
  - DSLR (Digital Single-Lens Reflex)
  - Digital Compact Camera
- Video Camera
  - CCTV (Closed-Circuit Television)
  - Web Camera
  - Spy Camera
- Phone Camera, and etc.

Camera (2)


Digital Camera World
TURNING LIGHT INTO A DIGITAL FILE
How your digital camera converts captured light into image pixels
Image storage
SD Card
4 GB
Buffer
Digital image processing
Analogue/ digital converter
Analogue electronics
Image sensor
Mosaic filter
Lens
Light reflected off the subject is captured and focused by the lens
Subject
Analogue
Digital
Digital cameras use their image processing systems to help crunch the huge amount of digital data created for every image you shoot
The A/D converter turns the analogue electrical signal into digital data, using the same binary language as computers
The colour filter array
The 'photosites' on the sensor only measure the brightness of the light, not its colour. So that colour information is gathered, each photosite has a red, green or blue filter. These are arranged in a mosaic known as a Bayer pattern, after the boffin that came up with it. He found that by using twice as many green filters as blue or red, you got a sharper image. A demosaicing process turns this raw data into the full-colour grid of pixels in the recorded images.
www.digitalcameraworld.com

Camera (3)


Medium format (Kodak KAF 3900 sensor)
50.7 × 39 mm
1977 mm²
dslr camera
35mm "full frame"
36 × 24 mm
864 mm²
APS-H (Canon)
28.7 × 19 mm
548 mm²
APS-C (Nikon, etc.)
~23.6 × 15.7 mm
~370 mm²
APS-C (Canon)
22.2 × 14.8 mm
329 mm²
Foveon (Sigma)
20.7 × 13.8 mm
286 mm²
Four Thirds System
17.3 × 13 mm
225 mm²
compact digital camera
1/1.7"
7.6 × 5.7 mm
43 mm²
1/1.8"
7.18 × 5.32 mm
38 mm²
1/2.5"
5.76 × 4.29 mm
25 mm²


Full-frame sensor
The same view that you would get with a 35mm film camera, a full-frame sensor gives you a much wider view of your subject.
APS sized sensor
Most D-SLRS have a much smaller sensor than the 5D. The red box shows exactly how much less area is covered using the same lens.

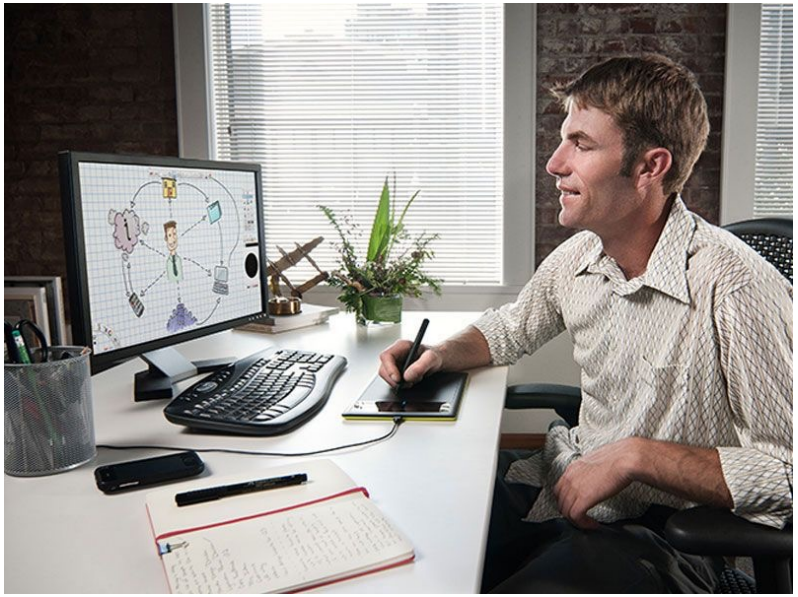
The First Mouse

Doug Engelbart invented the computer mouse in the early 1960s in his research lab at Stanford Research Institute (now SRI International). The first prototype was built in 1964

Trackball

- A trackball is a pointing device consisting of a ball held by a socket containing sensors to detect a rotation of the ball about two axes — like an upside-down mouse with an exposed protruding ball.
- The user rolls the ball with the thumb, fingers, or the palm of the hand to move a pointer.

Graphic Tablets



Touch Screen

Detail History:

- http://billbuxton.com/multitouchOverview.html

Two type of touch screen

- Resistive
  - Pressing down creates short circuit/change in resistance.
  - Not quite responsive.
  - Cheap.
- Capacitive
  - iPhone screen
  - Use change in capacitance.

Scanner

Barcode and QR Code

Traditional Barcode

VS

QR Code

QR-Code

DataMatrix

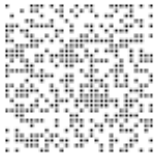
Cool-Data-Matrix

Aztec

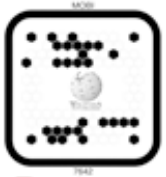
Trillcode

Quickmark

Shotcode

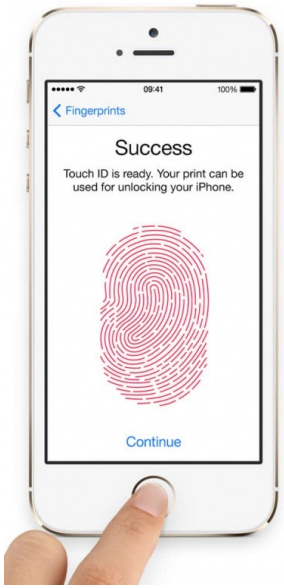


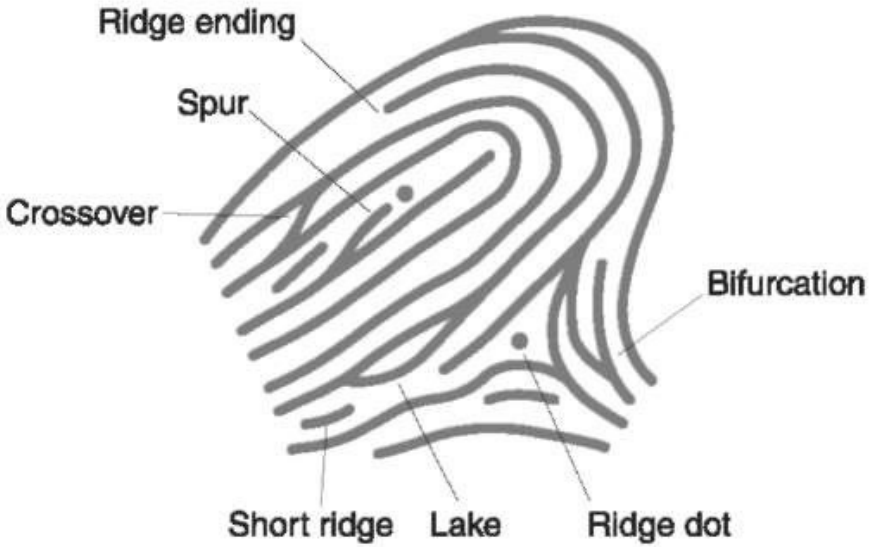
mCode



Beetagg

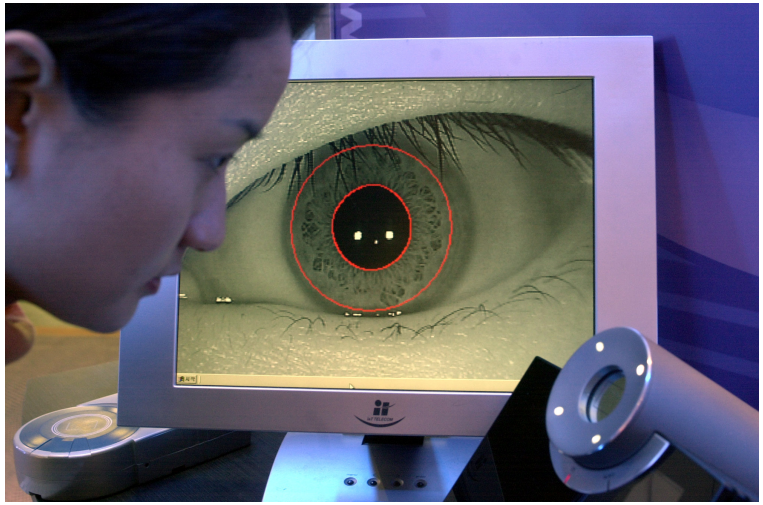
Biometrics Scanner (1)

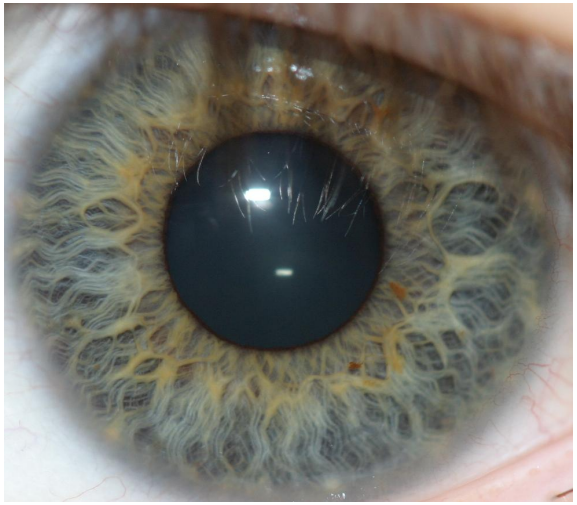




Fingerprint Scanner

Biometrics Scanner (2)

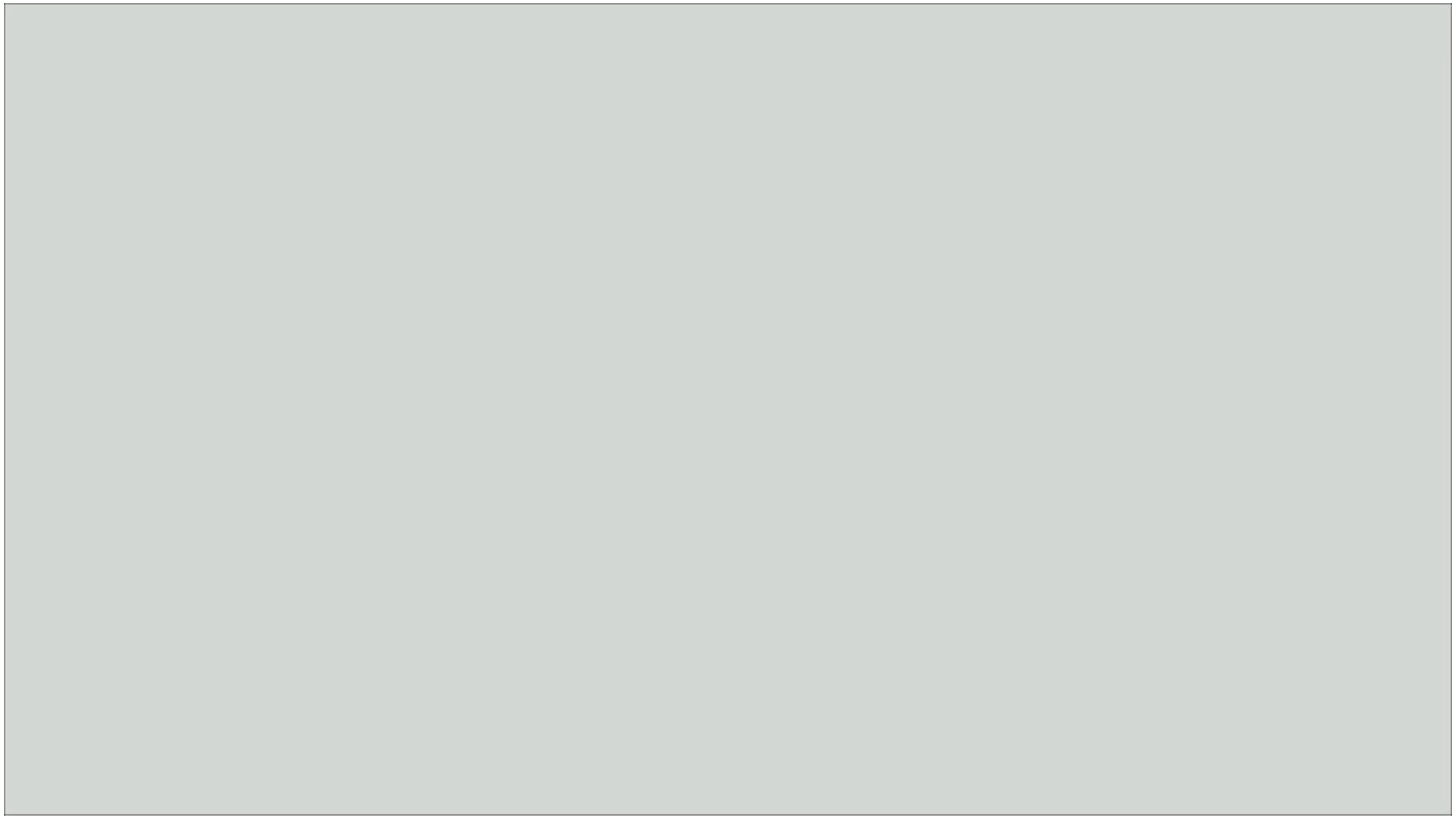




Retina (Eye) Scanner

The Cutting Edge

LeapMotion



Microsoft Kinect

Myo

Assignment 2

- คุณได้เห็นแล้วว่า LeapMotion, Microsoft Kinect, Myo และ 3D Printer สามารถทำอะไรได้บ้าง
- ให้แต่ละกลุ่มกลับไปลองหาแนวคิดว่าจะเอาอุปกรณ์ต่างๆ เหล่านี้ไปใช้ทำอะไรได้บ้าง
- แนวคิด (Idea) ของแต่ละกลุ่มควร “ไม่ซ้ำ” กัน
- เขียนตอบในเว็บไซต์ของวิชานี้

Holograms