How does a computer monitor work?

(Differences between other types of monitors such as LCD, LED, etc)

Computer monitor

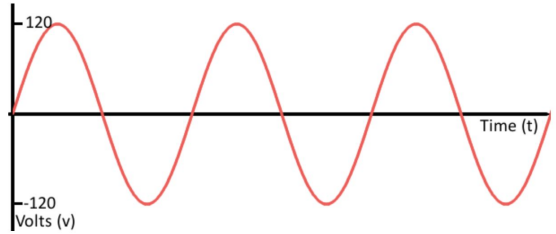
Output device.

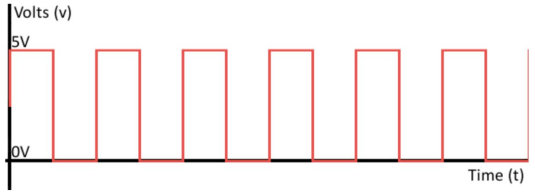
Gives an instant feedback.

To display information on a monitor, your computer sends the monitor a signal. The signal can be in analog or digital format.

- Analog signal is continious - electrical signals of waves
- Digital signal is not continious - carries the data in the form of binary (0 and 1)

CRT monitors can work only with analog signal, other types such as LCD, LED etc work with digital signal





VGA Adapters and connectors

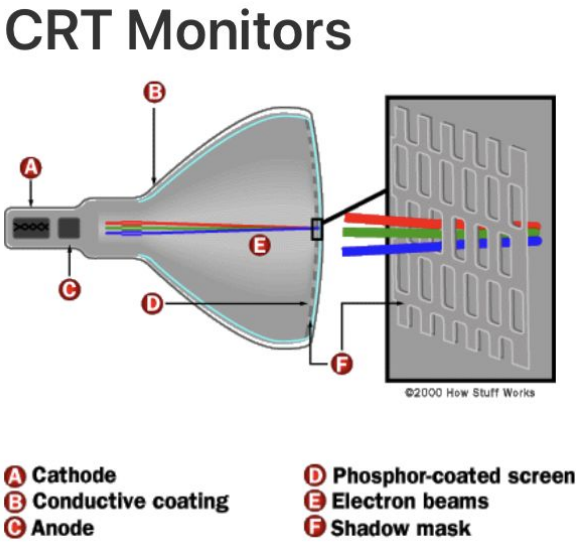
DVI Adapters and connectors

CRT Monitor

Cathode-ray tube monitor

A CRT monitor contains millions of tiny red, green, and blue phosphor dots inside of the glass tube. They glow when they are struck by an electron beam that travels across the screen to create a visible image.

You can get a better image about the technology from video here: https://youtu.be/7Jr0SFMQ4Rs

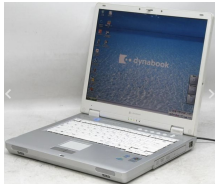


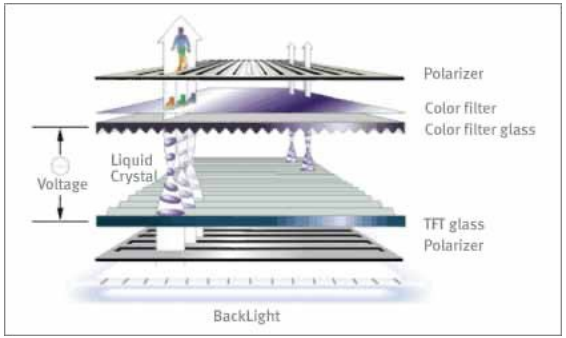
LCD (Liquid Crystal Display)

It is a type of flat panel display technology which uses liquid crystals.

It is used in screens for mobile,laptop and calculator.

The liquid crystals are made up of a part solid, part liquid substance that can be "twisted" by applying electrical voltage to them.





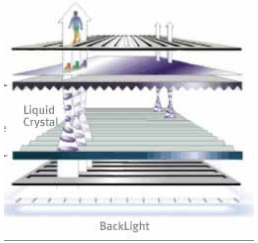
How does it work?

1, The backlight provides light source.
2, Then some filters change original color.
3, We can see the color from screen.

LED(Light Emitting Diode) Display

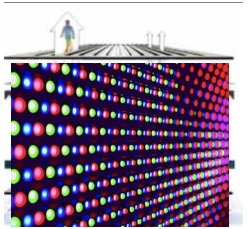
It is a screen display technology that uses a panel of LEDs as the light source.

LED is Energy Efficient + Long-Lasting.



LCD

omit some screen
and use LED as Backlight



LED Display

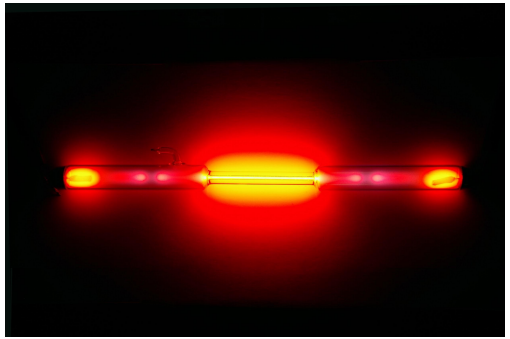
Display become simpler and thinner

Thick

Thin

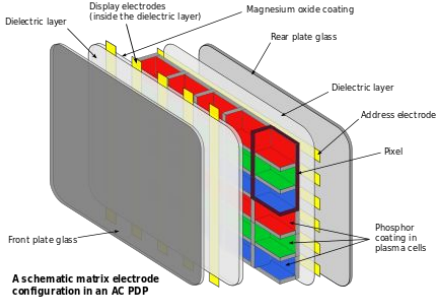
Plasma Display

A plasma is basically a gas made up of free-flowing ions and electrons . A plasma display is a computer video display in which each pixel on the screen is illuminated by a tiny bit of plasma or **charged gas**, somewhat like a tiny neon light.



A plasma screen is made up of many tiny cells containing **noble gases and a tiny amount of mercury.** These cells are between two pieces of glass and electricity is passed through the cells, causing the gases to turn into plasma

It has a excellent **contrast ratio,** wide **viewing angles,** high **refresh rate**



A schematic matrix electrode configuration in an AC PDP

In contrast, it has increase chance of screen **burn in**, **loss of brightness** overtime, h**igher cost of electricity** and usually is on the heavier side compare to other displays.

The main difference is that the cells that make up the pixels in a plasma TV can switch on and off **thousands of times faster** than the **pixels** in an LCD screen, so you get clearer pictures with less blur, especially for moving images during action movies or sports games.

Plasma are power hungry;

- Cathode-ray tube (CRT): 70–150 watts.
- Liquid crystal display (LCD): 50–250 watts.
- **Plasma: 300–700 watts**.
- Organic LED (OLED): 15–60 watts.

Quick Fact

IBM (International Business Machines Corporation) built a **monochrome plasma display** in the 1980s that displayed **orange letters against a black screen.** Today's displays contain a grid of cells in which gas reacts with phosphors in varying degrees in red, green, or blue subpixels, making it possible to produce over **16 million different colors.**

Retina

1) What is Retina display

-> Made by Apple in 2014.

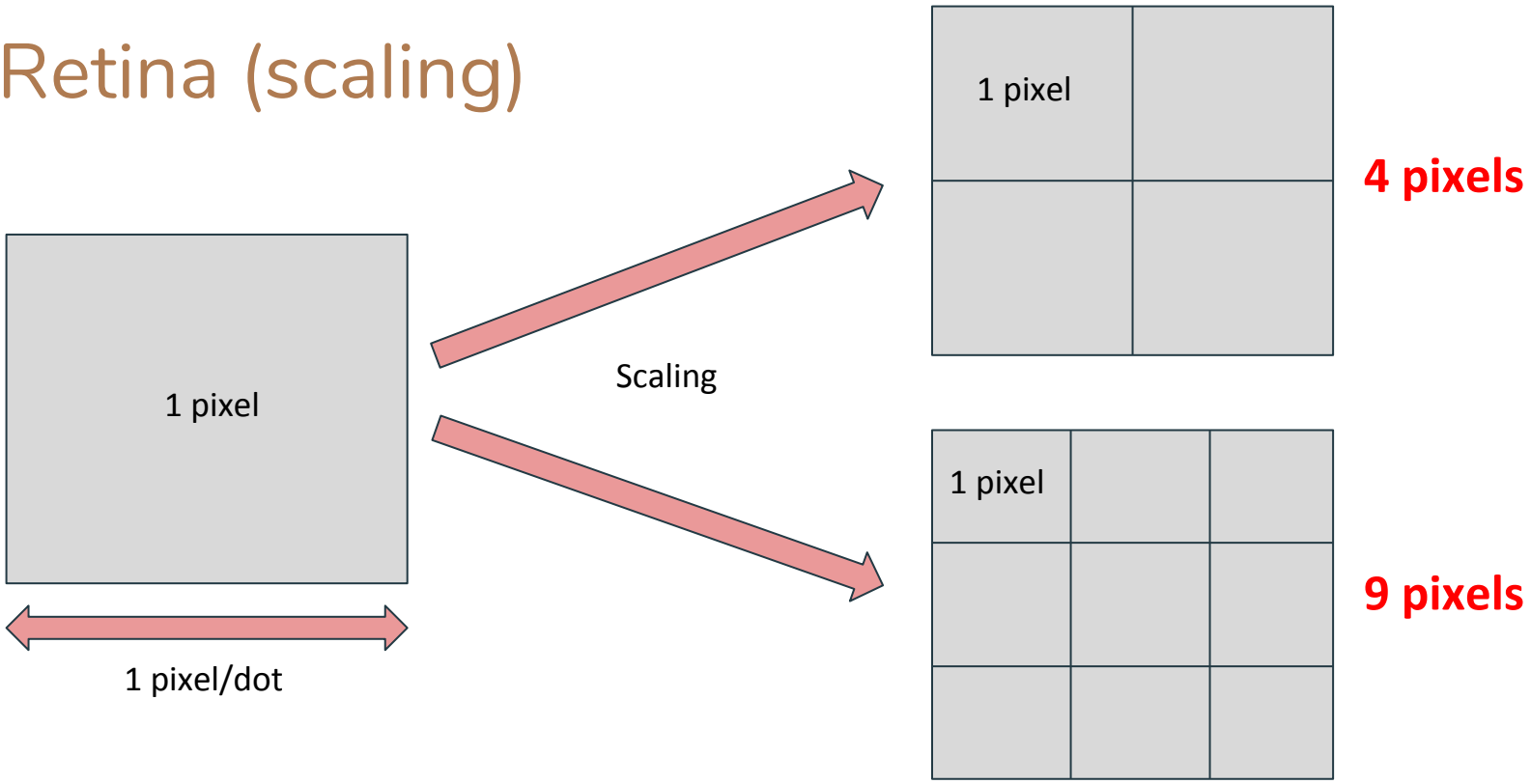
2) Features about pixels

-> Too small pixels.

3) How to get high resolution

-> Put many pixels into One Dot.

Retina (scaling)



OLED

1) What is OLED

-> OLED can produce light by itself.

2) How to produce light

-> Organic substances with electricity.

3) Features about OLED

-> Fast response and Clear black color.

Burn-in (OLED) - iphone X

Cause

Turn on the same display all the time.

Result

Organic Substances don’t work well.

-> Cannot show the clear white color.

※ In case of this picture, continue to display the Home Screen.

Thank you
Time for your questions