Intro To Binary

Binary Number System

Get the joke ?!?

There are 10 types of people in the world … people who understand binary and those who don’t!

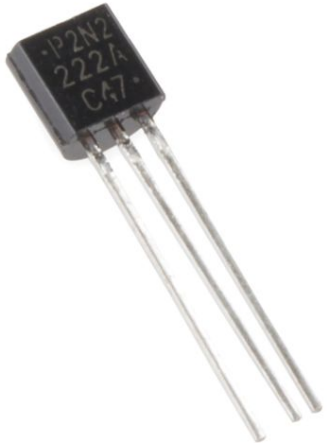
Intro

- binary number system plays a central role in how information of all kinds is stored on computers.

- number system is made up of 0s and 1s

- ideal for computers because they are composed of digital electronics ; that means that their electronic circuits can exist in only one of two states: on or off.

Transistors



- Invented in 1947
- A device composed of semiconductor material that amplifies a signal or acts as a switch (opens or closes a circuit)
- Can be used as a switch or an amplifier
- Initially was used in hearing aids
- Electric currents can switch these transistors on/off
- Voltage threshold (5V ON) (< 5V OFF)

Question

What computer hardware can you think of that stores information?

CD ROMS

- microscopic dark spots on the surface of the disk represent 0 (or OFF)
- shiny surface represents 1 (or ON)

Main Memory

- an array of "cells"
- row of 32 cells stores a "word" (has to do with the computer architecture)
- Each word can be accessed by its own unique "memory address."
- Each cell holds one binary data bit, either 0 or 1. Because a computer needs millions of memory cells in order to operate efficiently, the cells have to be cheap. The cheapest memory cell of all is a very tiny capacitor.
- A "0" value would be represented by an absence of electric charge stored in the capacitor. A "1" is represented by an electric charge being stored in the cell.
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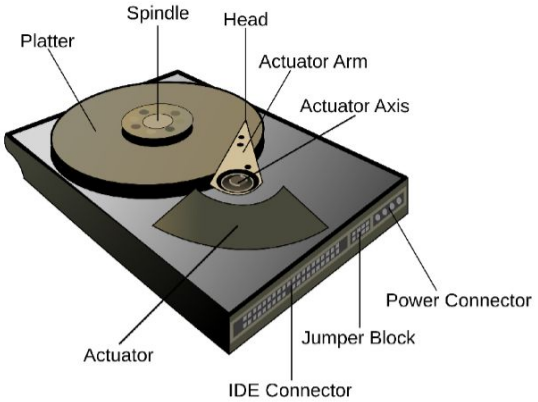
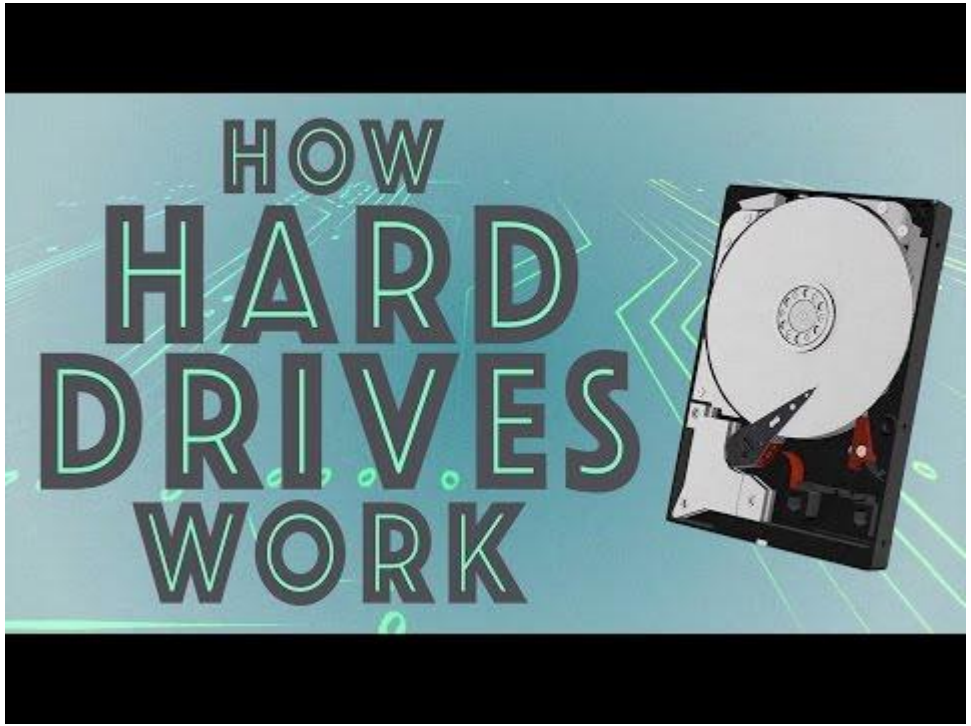
Hard Drive



- inside there’s a circular "plate" of magnetic material called a platter divided into many tiny areas.
- Each area can be independently magnetized (to store a 1) or demagnetized (to store a 0).
- Bits of data are arranged in circular paths called tracks
- Each track is broken up into smaller areas called sectors.
- Part of the hard drive stores a map of sectors that have already been used up and others that are still free.

How hard drives work?



How SSD's work?

Numbering System

Which numbering system do we use today?

Why is the number 10 so important?

10

https://youtu.be/USCBCmwMCDA?list=PLzdnOPI1iJNcsRwJhvksEo1tJqjIqWbN-