% What is information
% Silvestro Di Pietro
% 16/03/2023

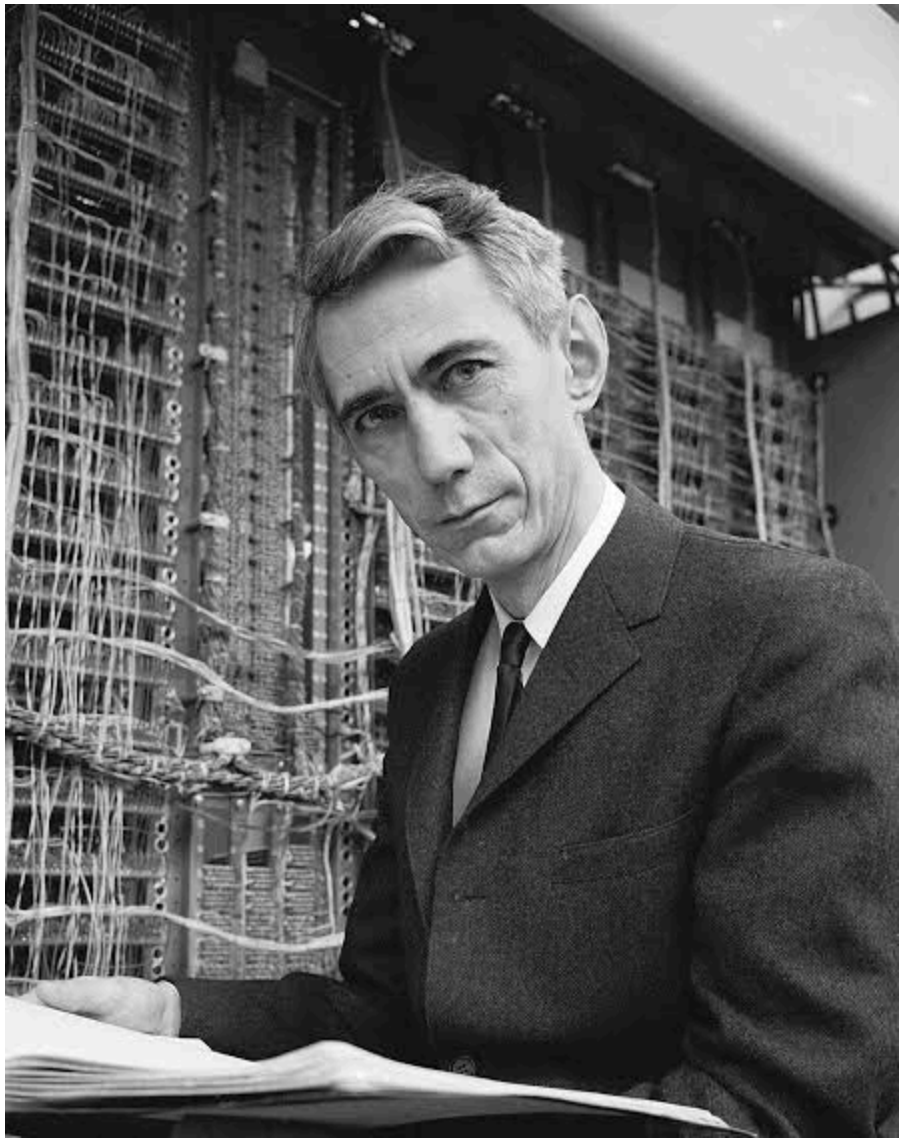
Definition

Information

Any process that is not completely random, and any observable pattern in any medium can be said to convey some amount of information.

Some Science

Shannon

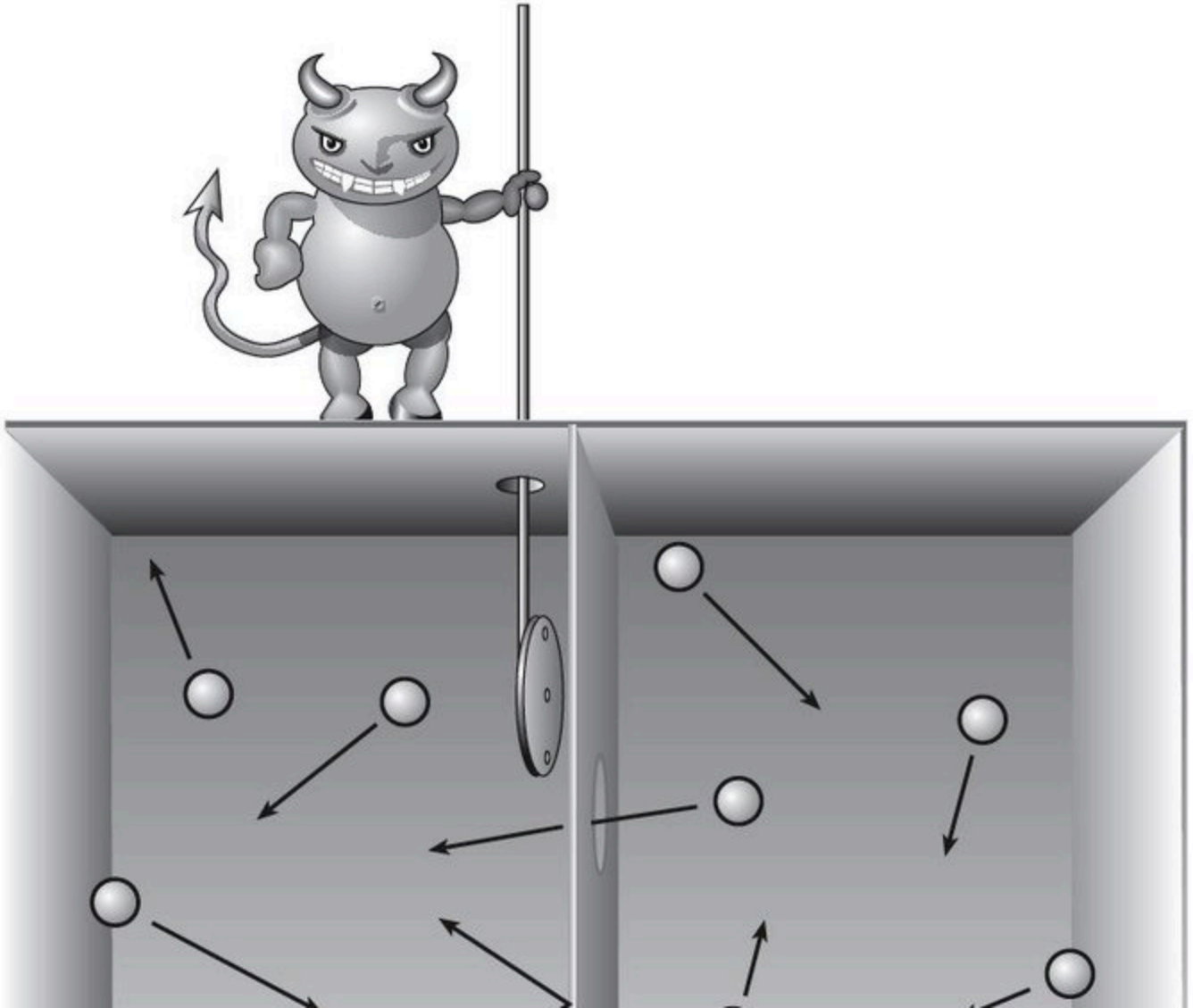


The Surprise

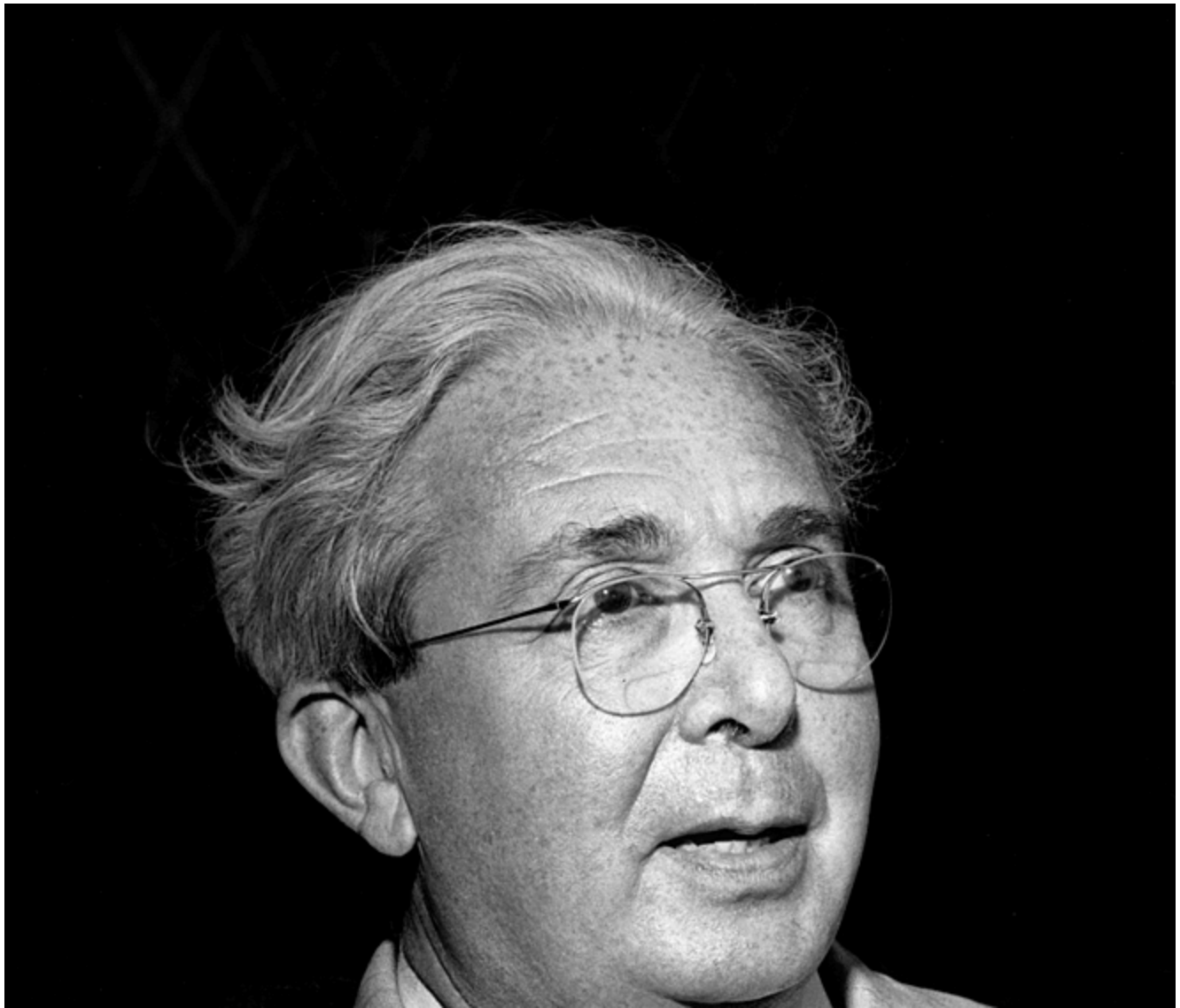
The main idea about the Information theory is the "information value" that depends from the novelty or how much the data is surprising. Shannon introduce the `entropy` (as is in thermodinamics) formulating the theory.

Enalotto

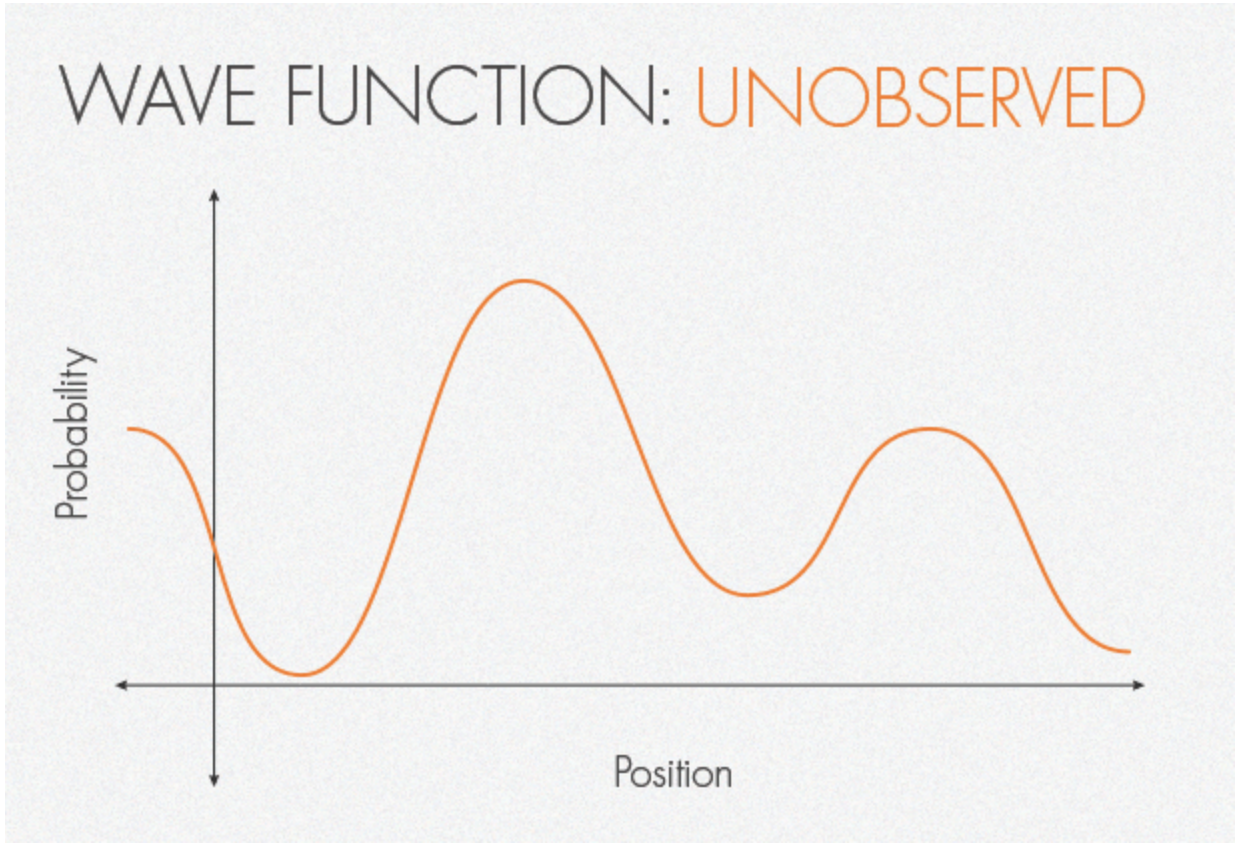
A little demon (1867)



Thermo information



Quantum wave



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Acquiring the information cause the collapsing of the wave function.

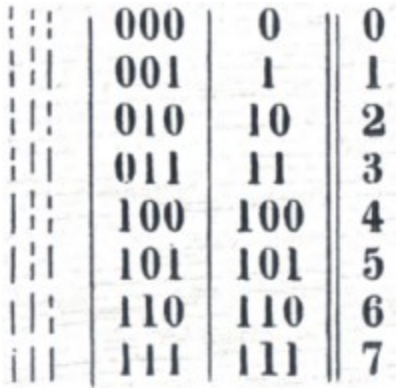
Information need energy

- the information process generate entropy and need energy
- the information is a physical fact.

Binary numbers

Minimal Information

Base 2



000	0	0
001	1	1
010	10	2
011	11	3
100	100	4
101	101	5
110	110	6
111	111	7

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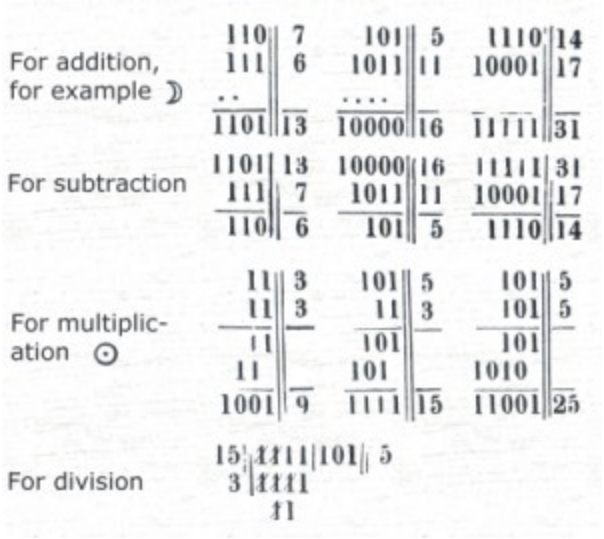
Binary is the minimal way to code information, and for this reason are widely used symbols in informatics.

`https://www.leibniz-translations.com/binary.htm`

Aritmetic



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Binary numbers are just numbers

Base 2 exponential

1 kb =2^10

Value	Metric	Name
1024^1	kB	kilobyte
1024^2	MB	megabyte
1024^3	GB	gigabyte
1024^4	TB	terabyte
1024^5	PB	petabyte
1024^6	EB	exabyte
1024^7	ZB	zettabyte
1024^8	YB	yottabyte
1024^9	RB	ronnabyte

Base 16 exponential

Hexadecimals has 16 symbols

0 1 2 3 4 5 6 7 8 9 A B C D F

`FFFF` = `2^16` = `1111111111111111`

HEX On UNIX

Unix (and related) shells, AT&T assembly language and likewise the C programming language (and its syntactic descendants such as C++, C#, Go, D, Java, JavaScript, Python and Windows PowerShell) use the prefix 0x for numeric constants represented in hex: 0x5A3.

HEX On URIs

in URIs (including URLs), character codes are written as hexadecimal pairs prefixed with `%: http://www.example.com/name%20with%20spaces where %20` is the code for the space (blank) character, `ASCII code point 20 in hex`, 32 in decimal.

HEX On XML

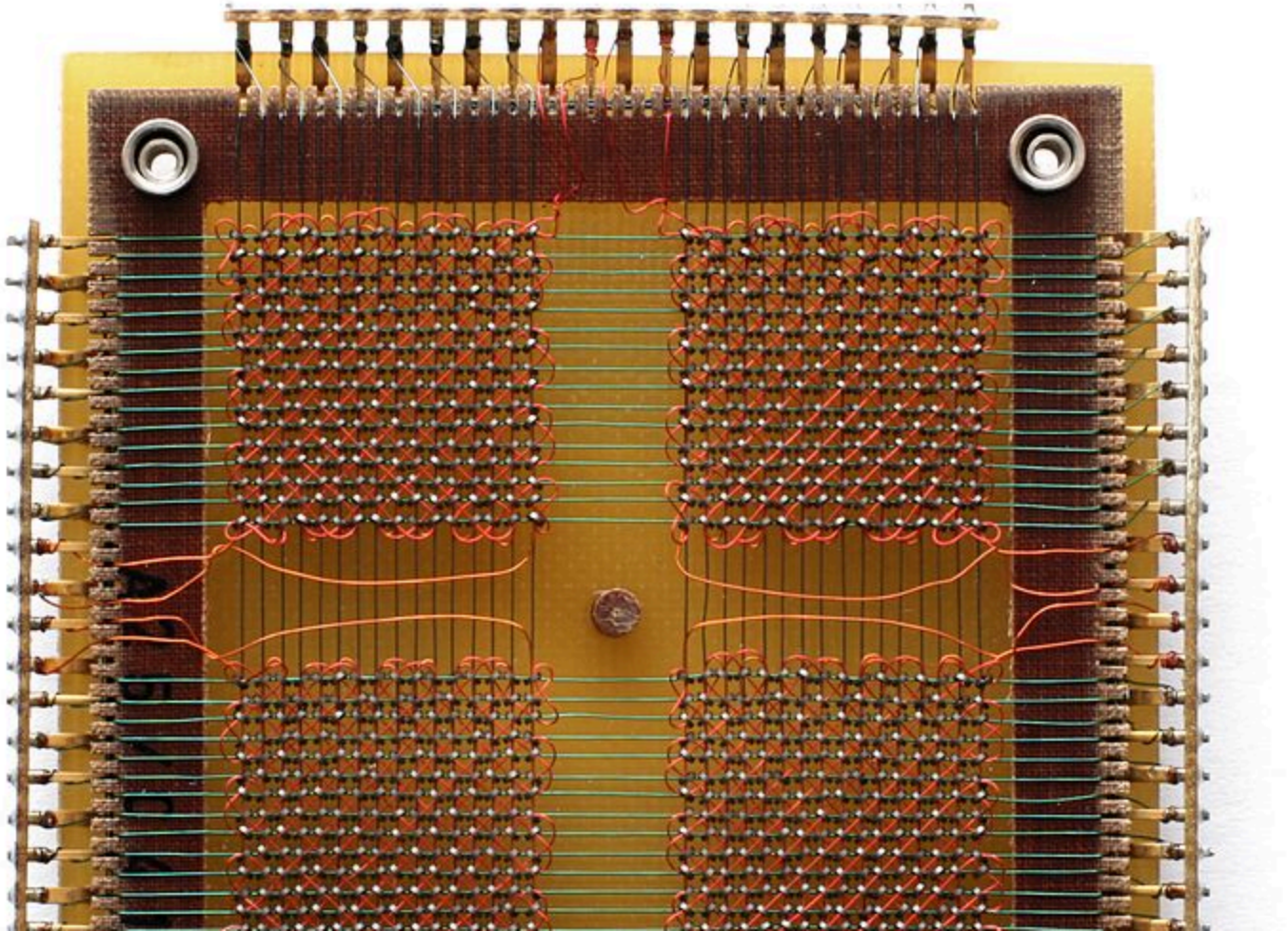
In XML and XHTML, characters can be expressed as hexadecimal numeric character references using the notation &#xcode;, for instance `’` represents the character U+2019 (the right single quotation mark). If there is no x the number is decimal (thus `’` is the same character)

On CSS (html)

Color references in HTML, CSS and X Window can be expressed with six hexadecimal digits (two each for the red, green and blue components, in that order) prefixed with #: white, for example, is represented as `#FFFFFF`. [5] CSS also allows 3-hexdigit abbreviations with one hexdigit per component: `#FA3` abbreviates `#FFAA33` (a golden orange:).

storage

R A M



R O M

LOL ROM

Hard Drive

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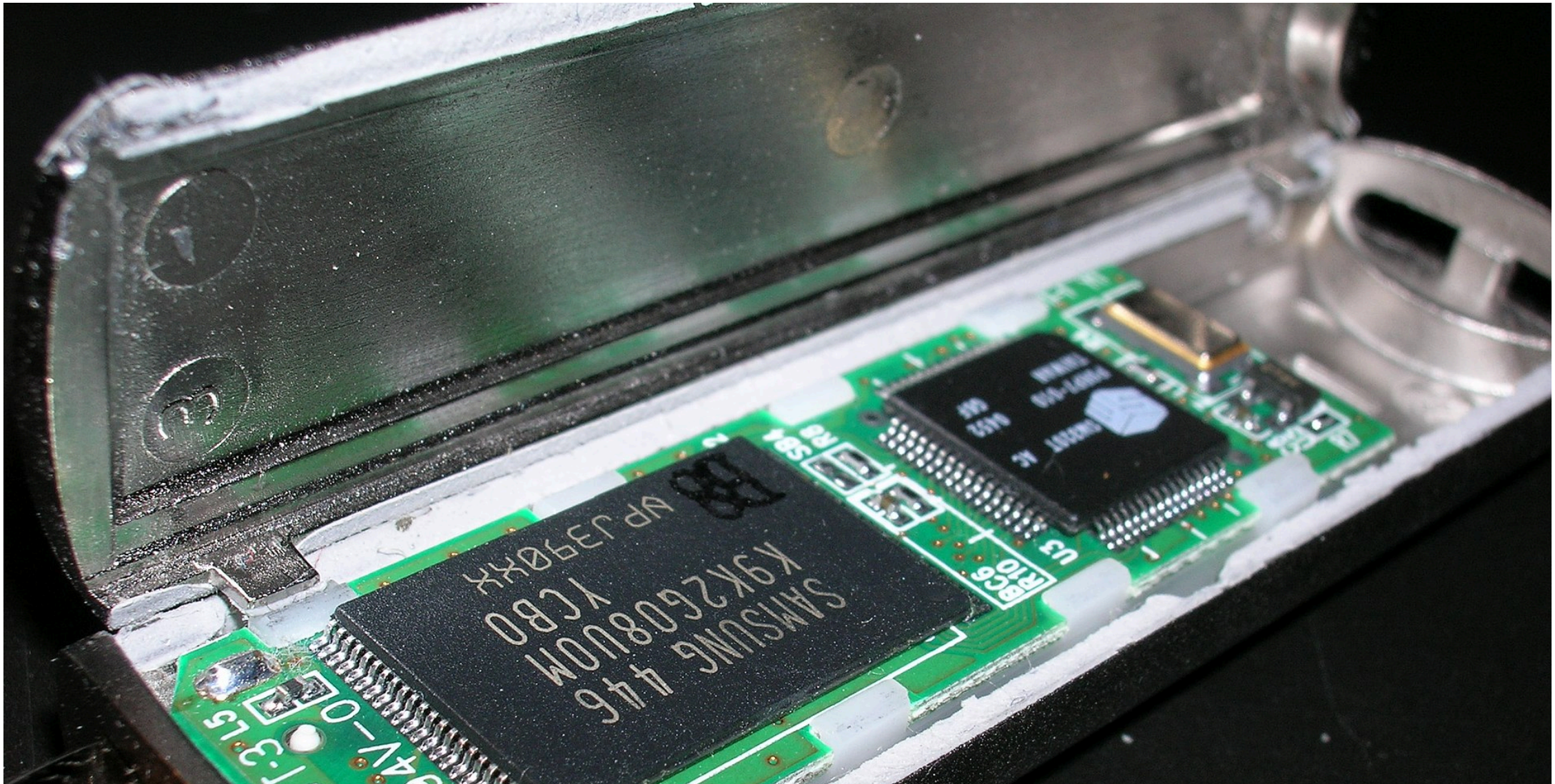
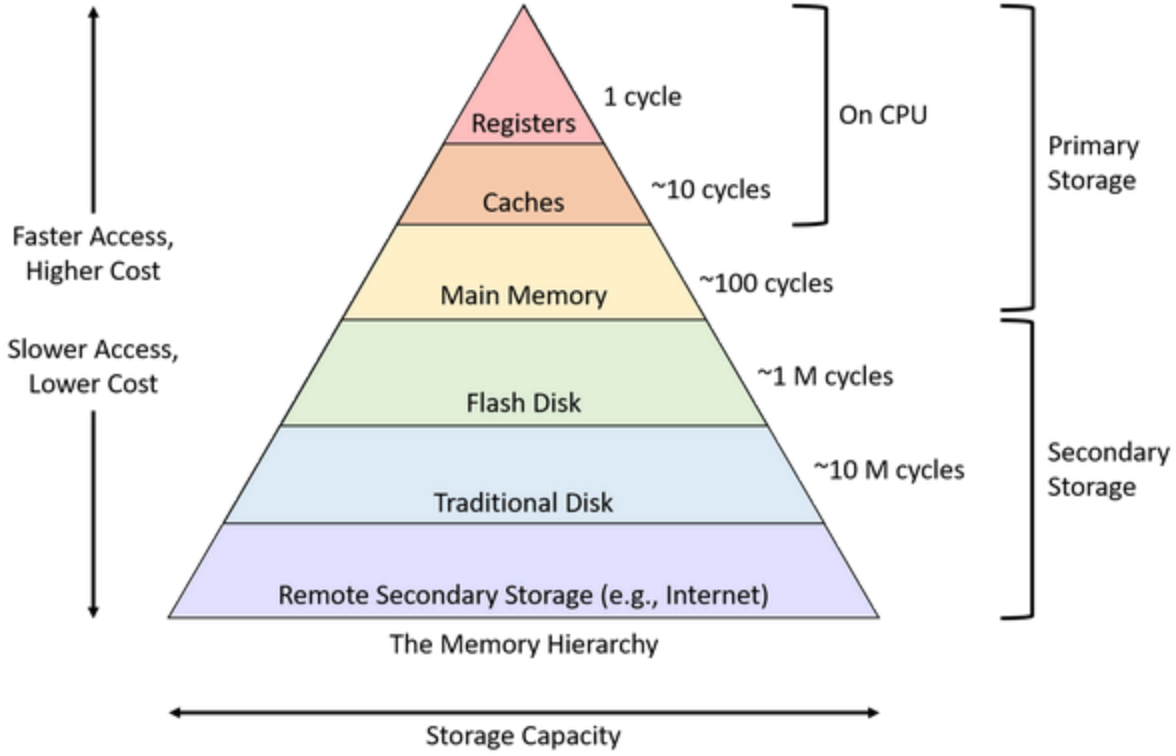
A magnetic disk partitioned with sectors and block of data with a movable head reading and writing capable.

Flash Memory



Memory hiearchy



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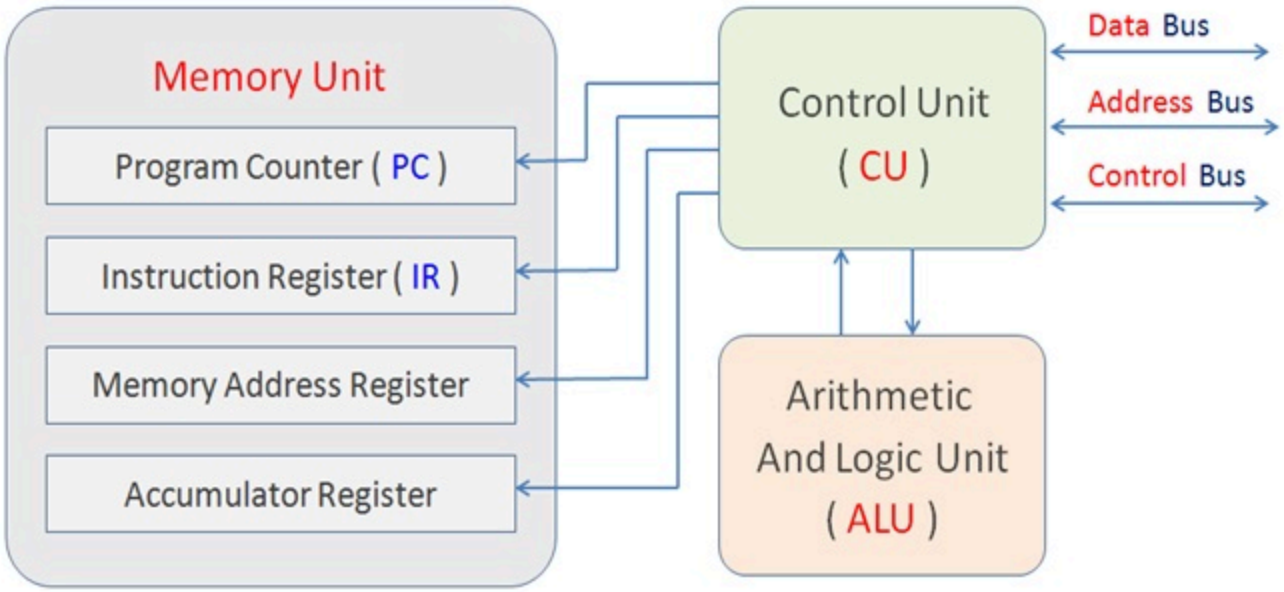
A Computer

CPU



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ComputerSchema

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