How Computers Work

take-aways

- ***CIRCUITS / SWITCHES***
- ***CODING SCHEMES***
- ***BINARY DIGITS***
- **2^n**
- ***5 generations of computers***
- ***Moore's Law***
- ***Bits***
- ***Bits, Bytes, KB, MB, GB, TB***
- ***Machine Language***

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Coding schemes

on on	let’s party
on off	movie night
off on	study night
off off	sleeping

Todd's Coding Scheme

0 0 0	A
0 0 1	B
0 1 0	C
1 0 0	D
1 1 0	E
1 0 1	F
0 1 1	G
1 1 1	H

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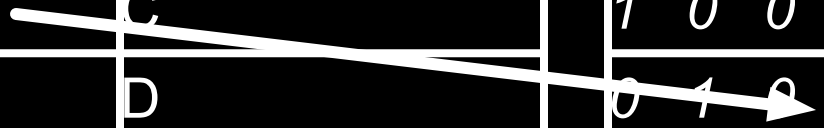

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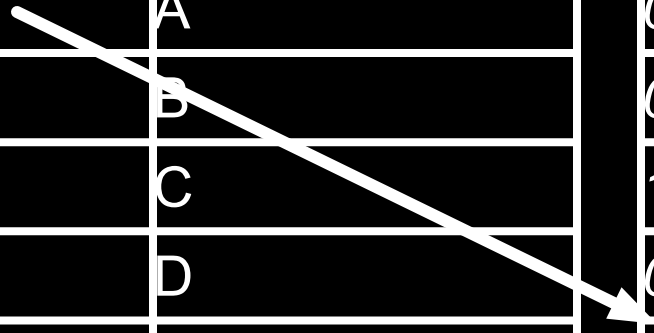

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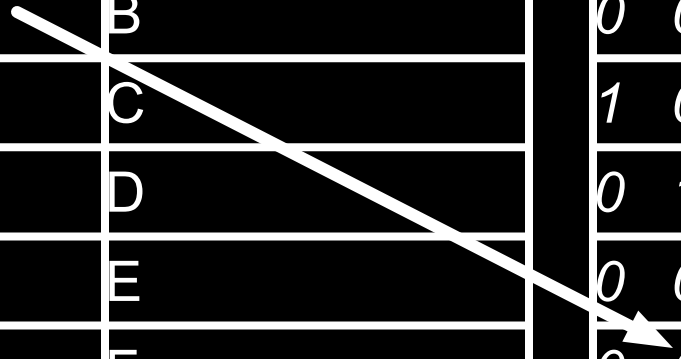

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Binary Digits

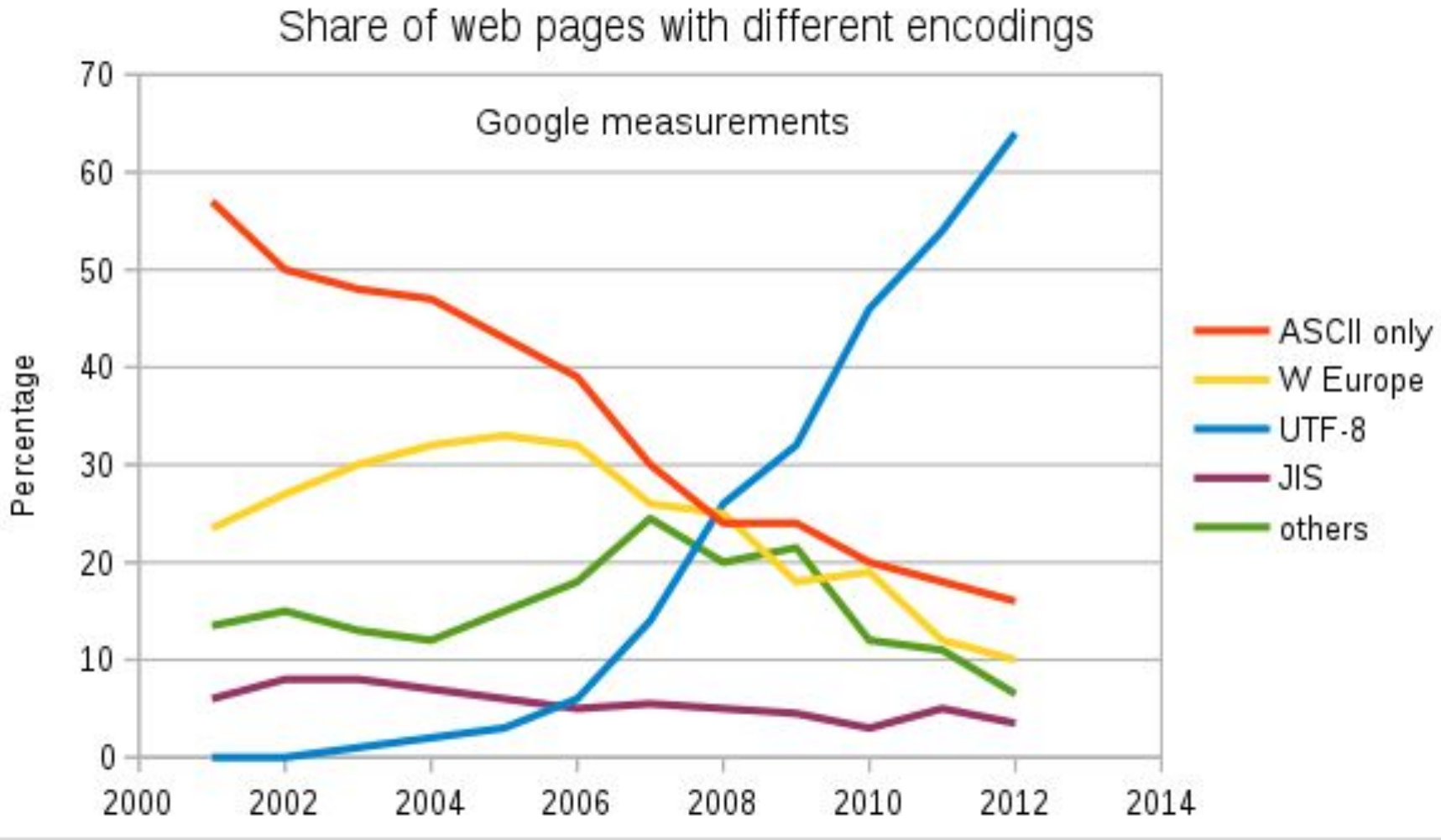
Bits

ON & OFF, 1 & 0, Binary Digits, Bits, and Machine Language are all words used to refer to this idea that, within a computer, it's all nothing but a bunch of ZERO's and ONE's, or switches that are ON or OFF, it's all just a bunch of Binary Digits, or Bits, that's the language which computers speak, it's machine language.

circuits, switches, transistors, and even "gates" are all words used to refer to this thing within a computer that can either be ON or OFF. It's a circuit, it's a switch, it's a gate that can either be OPENED or CLOSED, it's a transistor - you will learn that people use all of those words to talk about this same thing, this ability of computers to store ON / OFF states.

ascii

UTF-8


Share of web pages with different encodings
Google measurements
Percentage
70
60
50
40
30
20
10
0
2000
2002
2004
2006
2008
2010
2012
2014
ASCII only
W Europe
UTF-8
JIS
others

Measuring Bits

1 bit

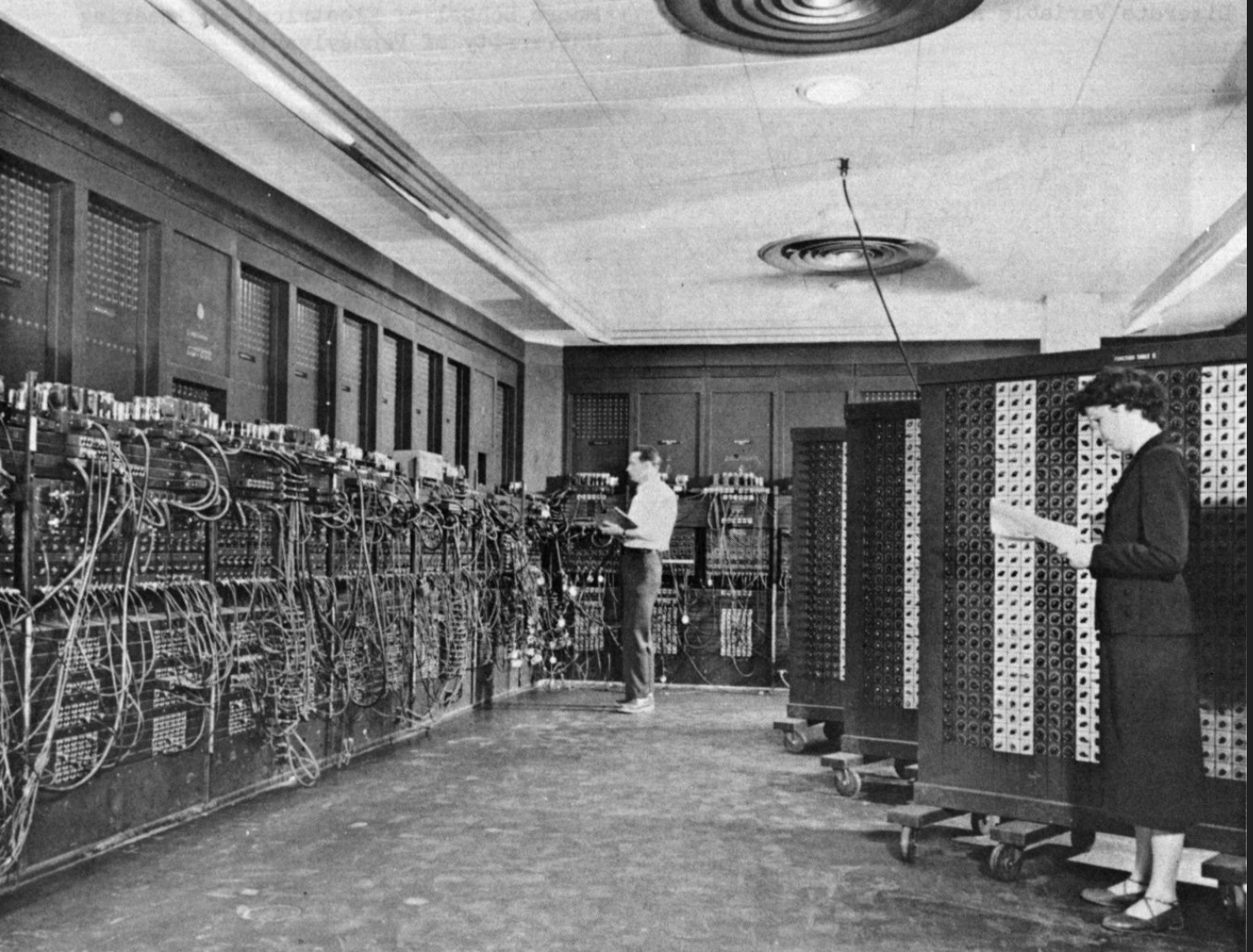
8 bits = byte

1000 bytes = kb

1000 kb = mb

1000 mb = gb

1000 gb = tb



16,000 circuits
(vacuum tubes)

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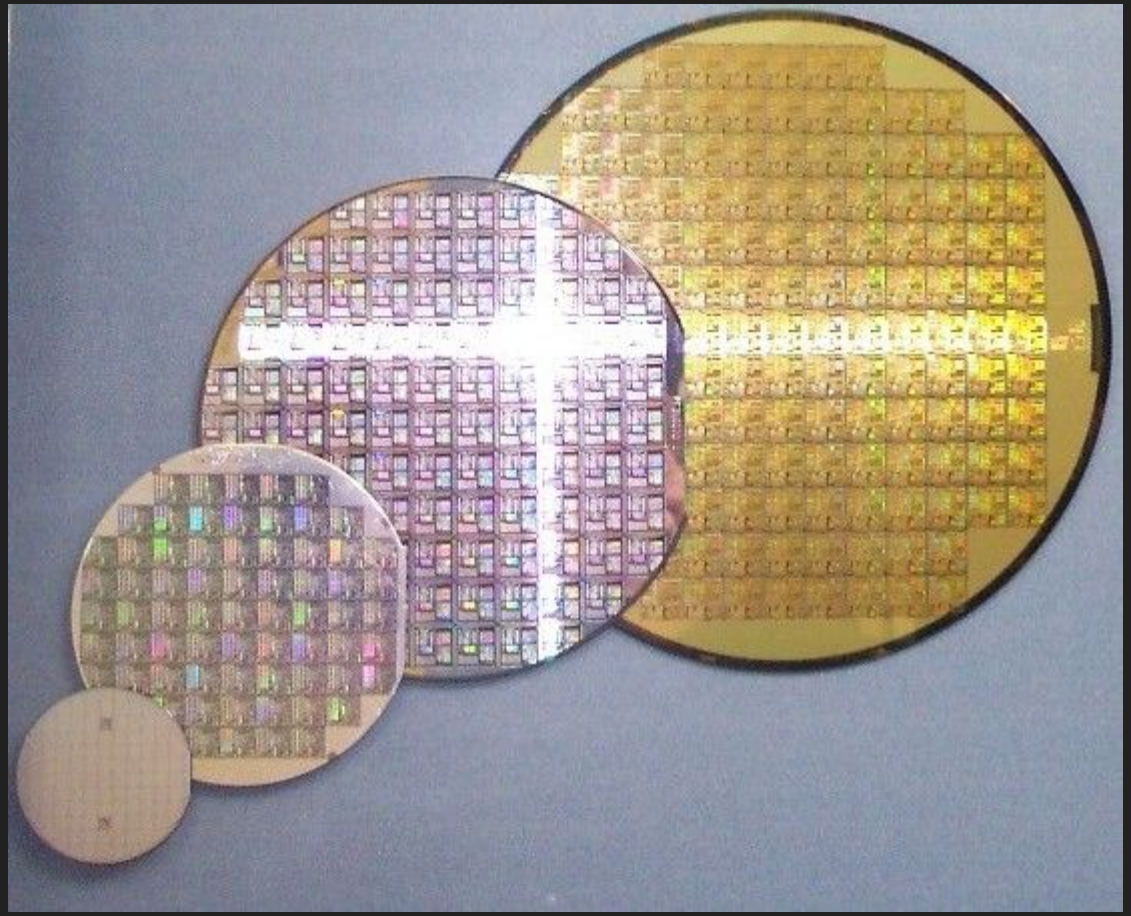

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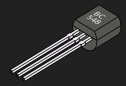
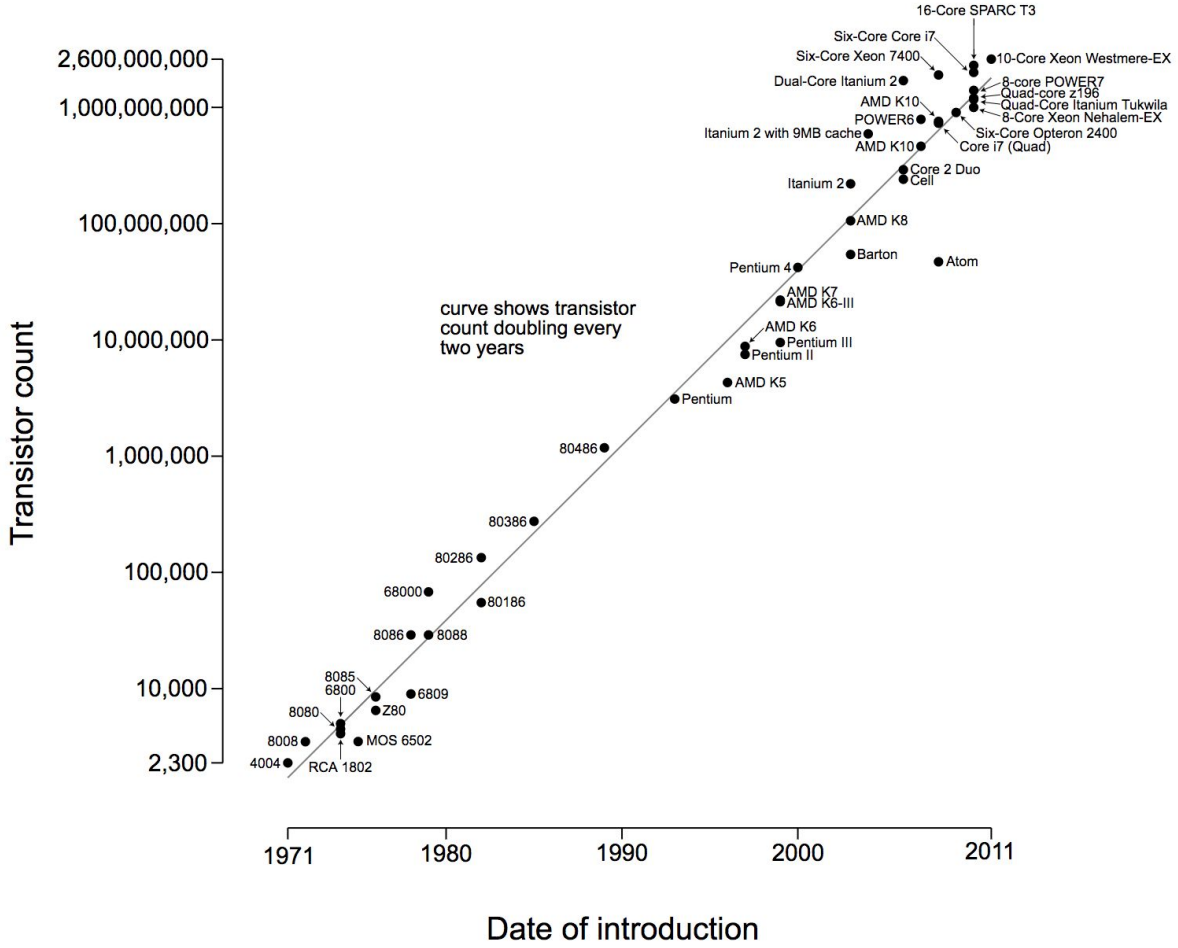


Microprocessor Transistor Counts 1971-2011 & Moore's Law



Moore's Law

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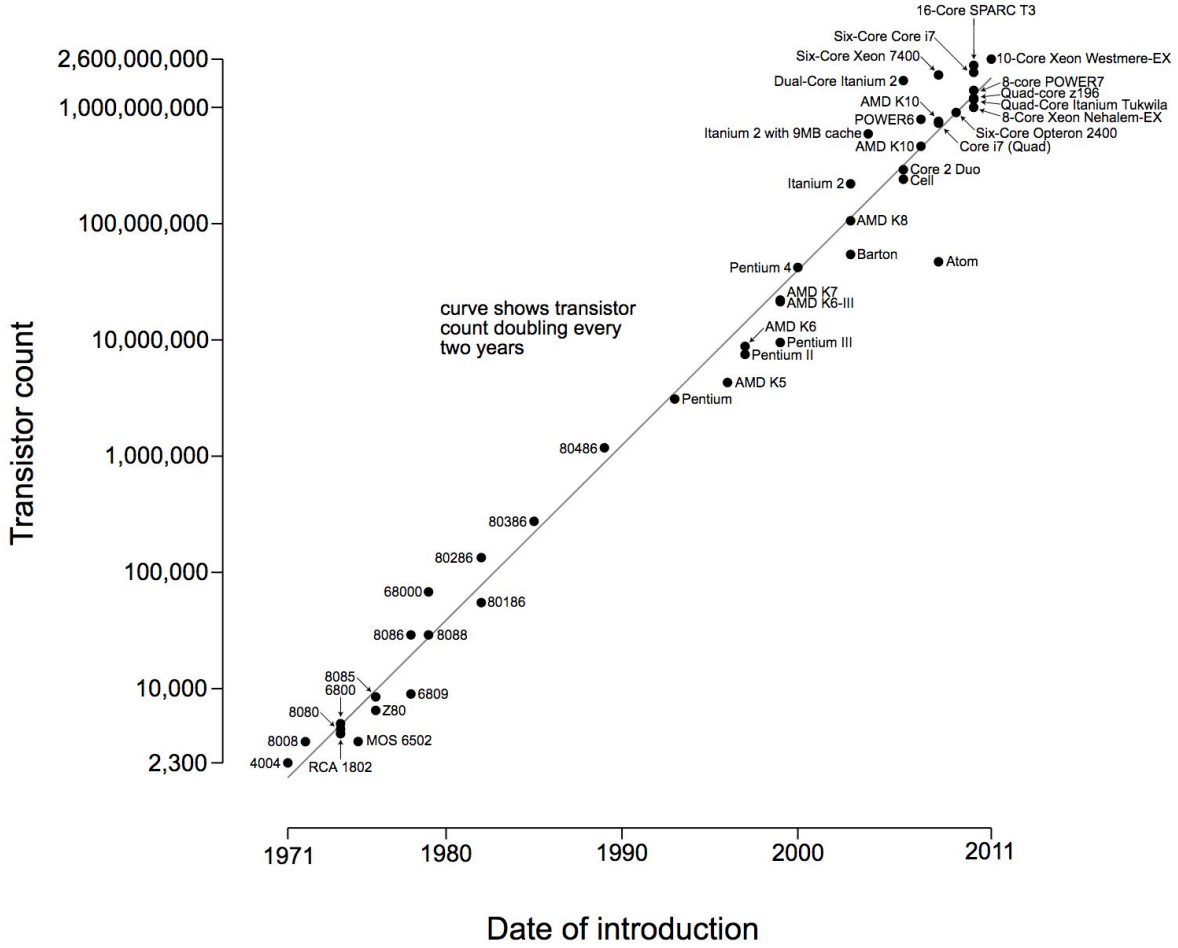

Generations of Computers

1. ***Vacuum tubes***
2. ***Transistors***
3. ***Integrated circuits (chips)***
4. ***Microprocessors (cpu's)***

numeral systems

word