## A Very Brief History of Computers/Computing

1478 da Vinci designs/builds first analog computer?

1822 - 1871

Babbage: 1822 Difference Engine; next the Analytical Engine could be programmed and included: sequential control, conditionals, branching, loops...

1958

1965

1936

Turing describes a very simple concept that can simulate the logic of any computer that can be constructed, which forms a basis for computability, known as the Turing Machine

1946

ENIAC I designed and built by John Mauchly and J Presper Eckert; contained 17,468 vacuum tubes... 1947

Bardeen, Brattain, Shockley demonstrate first transistor

1948 Von Neumann suggests that switches be added to ENAIC to support code selection

1951 Mauchly and Eckert introduce first commercially available computer, UNIVAC

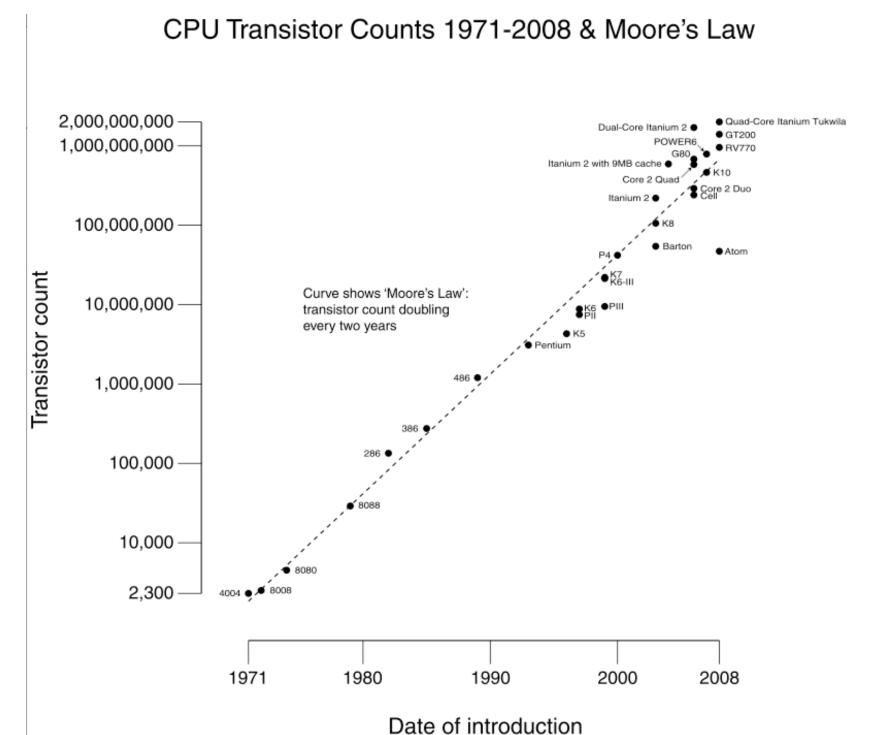
1954 First high-level programming language FORTRAN introduced by Backus and IBM

The Integrated Circuit is invented by Jack Kilby of TI, and Robert Noyce at Fairchild

1964 Douglas Engelbart developed concept of the computer mouse and windows

Moore's Law first expressed; Intel co-founder states: The complexity for minimum component costs has increased at a rate of roughly a factor of two per year ...

Certainly over the short term this rate can be expected to continue, if not to increase. Over the longer term, the rate of increase is a bit more uncertain, although there is no reason to believe it will not remain nearly constant for at least 10 years. That means by 1975 the number of components per integrated circuit for minimum cost will be 65,000. I believe that such a large circuit can be built on a single wafer.



ARPAnet; network from UCLA to Sanford University

Taken from <a href="http://en.wikipedia.org/wiki/Transistor\_count">http://en.wikipedia.org/wiki/Transistor\_count</a>

1970

1971 Intel 4004 -- the first microprocessor

1969

1983

1984

1994

1973

Intel 1103 computer memory

1974 -1975 Altair & others -- pseudo first consumer computers

Xerox Alto -- first computer to use the desktop metaphor and Graphical User Interface (GUI)

1976 -1977 Apple I, TRS-80, and Commodore Pet computers

1978 Visicalc

1979 WordStar

1981 IBM PC; MS-Dos operating system

Apple Computer introduces the Macintosh 1985

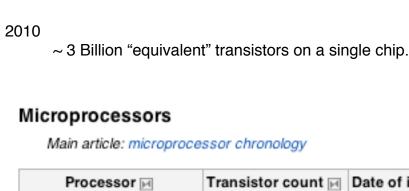
Apple Computer introduces the Lisa

Microsoft introduces Microsoft Windows

Yahoo established 1996

2001 Portable Electronics are taking off...

Google established



Intel 4004

Intel 8008 3,500 4,500 Intel 8080

2,300

11101000	-,				
Intel 8088	29,000	1979	Intel	3 µm	
Intel 80286	134,000	1982	Intel	1.5 μm	
Intel 80386	275,000	1985	Intel	1.5 μm	
Intel 80486	1,180,000	1989	Intel	1 µm	
Pentium	3,100,000	1993	Intel	0.8 μm	
AMD K5	4,300,000	1996	AMD	0.5 μm	
Pentium II	7,500,000	1997	Intel	0.35 μm	
AMD K6	8,800,000	1997	AMD	0.35 μm	
Pentium III	9,500,000	1999	Intel	0.25 μm	
AMD K6-III	21,300,000	1999	AMD	0.25 μm	
AMD K7	22,000,000	1999	AMD	0.25 μm	
Pentium 4	42,000,000	2000	Intel	180 nm	
Atom	47,000,000	2008	Intel	45 nm	
Barton	54,300,000	2003	AMD	130 nm	
AMD K8	105,900,000	2003	AMD	130 nm	
Itanium 2	220,000,000	2003	Intel	130 nm	
Cell	241,000,000	2006	Sony/IBM/Toshiba	90 nm	
Core 2 Duo	291,000,000	2006	Intel	65 nm	
AMD K10	463,000,000 <sup>[1]</sup>	2007	AMD	65 nm	
AMD K10	758,000,000 <sup>[2]</sup>	2008	AMD	45 nm	
tanium 2 with 9MB cache	592,000,000	2004	Intel	130 nm	
Core i7 (Quad)	731,000,000	2008	Intel	45 nm	263 mm
POWER6	789,000,000	2007	IBM	65 nm	341 mm
Six-Core Opteron 2400	904,000,000	2009	AMD	45 nm	
Six-Core Core i7	1,170,000,000	2010	Intel	32 nm	
Dual-Core Itanium 2	1,700,000,000 <sup>[3]</sup>	2006	Intel	90 nm	596 mm <sup>2</sup>
Six-Core Xeon 7400	1,900,000,000	2008	Intel	45 nm	
uad-Core Itanium Tukwila	2,000,000,000 <sup>[4]</sup>	2010	Intel	65 nm	
3-Core Xeon Nehalem-EX	2,300,000,000 <sup>[5]</sup>	2010	Intel	45 nm	

Transistor count ⋈ Date of introduction ⋈ Manufacturer ⋈

1971

1972

1974

Process ⋈

10 μm

10 μm

6 µm

Intel

Intel

Intel

Processor	Transistor count	Date of introduction	Manufacturer	Process	Area
G80	681,000,000	2006	NVIDIA	90 nm	480 mm <sup>2</sup>
RV770	956,000,000 <sup>[6]</sup>	2008	AMD	55 nm	260 mm <sup>2</sup>
RV850	1,040,000,000 <sup>[7]</sup>	2009	AMD	40 nm	170 mm <sup>2</sup>
GT200	1,400,000,000[8]	2008	NVIDIA	55 nm	576 mm²
RV870	2,154,000,000 <sup>[9]</sup>	2009	AMD	40 nm	334 mm <sup>2</sup>
GF100	3,000,000,000 <sup>[10]</sup>	2010	NVIDIA	40 nm	529 mm²