Early pseudo computer, 1937 'mechanical mind' (developed at MIT)

1946 ENIAC – The first
- Immobilized by lightning in 1955
- Hydrogen bomb and other military projects.
- During the 80,223 hours ENIAC operated, it might have crunched more calculations than had been performed by all humanity since time began.

1946 – Selectron tube
Selectron tube 256 to 4096 bits, 4096-bit was 10 inches long and 3 inches wide

1951 - Magnetic (Metal) Tape, disk 1200ft long and heavy
1954 UNIVAC – The second

- Faster than ENIAC
- Used binary code instead of base-ten
- Used by CBS to predict the 1952 Election.


1952 - IBM Model 350 Disk File
IBM 305 RAMAC computer, 50 24-inch disc – 6 Mb!!!

1956 RAMAC – the first hard drive

- hard drive of the IBM System 305, built in San Jose, CA
- 50 24-inch diameter platters coated with iron oxide paint mounted on a rotating spindle to store 5MB

1962 UNIVAC 1206

"The 1206 will assist radar stations along the 5,000 mile Atlantic missile range ... tracking space-borne vehicles."
1960s LA (Data Center)
- magnetic "reel-to-reel" tape memory

Univac 494

Univac II. Says the 1969 headline: "Modern computers are replacing the Univac II – but they don’t have character."
1970 - Compact Cassette, used to store data, 660kb on 90 minute tape

1970 - Punch Cards - were used in 1725 to program looms

1971 Intel 4004

- Microprocessors (Intel) replace arrays of circuit boards, physical magnetic storage first developed (Merlin)
- World’s first (commercially available) microprocessor, Intel 4004
  - 740 kHz
  - 2,300 Transistors
- Read-write magnetic head technology for magnetically encoding bits

Hard drives (1975, source unknown)
1971 - Floppy Disk, 5.25”

1978 – Laserdisc
- called Laser Videodisc, funkily branded DiscoVision, 11.81”, 60 minutes of audio-video on each side

1982 IBM – The first desktop PC

Commodore, Apple and others had PCs on the market first, but IBM got them on top of desks in corporate America.

My 1st Computer!
Mac Classic (1990)
- 8 Mhz, 1 Mb RAM
- 40 Mb hard drive

Hitachi 1982
- 1Gb H-8598
- 10” high, 14” wide platters
- 2 read-write heads
- 121kg (267 pounds!!!)

- Next one is May 13th Wall Township, NJ
- http://www.vintage.org/
1989 Intel 486  
33 mHz  
1.2 million transistors

1993 Intel Pentium I  
60 - 200 mHz  
7.5 million transistors

1997 Intel Pentium II  
233 - 300 mHz  
9.5 million transistors

1999 Intel Pentium III  
450 mHz – 1.300 GHz  
9.5 million transistors

2000 Intel Celeron  
500 mHz - 1.4 GHz  
28.1 million transistors


2000 Intel Pentium 4  
1.4 – 2.6 GHz  
42 million transistors

2002 Intel Pentium 4-M  
“Centrino” (Banias 2003, Dothan 2004)  
1.2-2.26 GHz  
77 million transistors

2002 Intel Pentium 4  
(Northwood A-B-C)  
1.7-3.4 GHz  
55 million transistors

2004 Intel Pentium 4  
(Prescott, P4F)  
2.4 – 3.6 GHz  
55 million transistors

as of 2-06

- Seagate-Maxtor/Hitachi 500 Gb 3.5” internal ~$250 (as of 2-06)

• Intel 3.8Ghz P4 ~$700 (only in Japan, for now)
Parallel Supercomputer
288 AMD 1.8 Ghz cpus, 144 Gb RAM, and 11.5 TB of disk space - produces about 45 kW of heat… 45 electric hair dryers operating continuously!

Source: http://krone.physik.unizh.ch/~stadel/zBox/

Industrial Air Conditioners
Connected Motherboards
Blue Gene/L, 2.5 TB RAM
• 1.7 trillion calculations/second, the world's fastest computer.


1965 Gordon Moore, co-founder of Intel, observed that the number of transistors per sq. in. of silicon circuit doubled every year. (revised) Moore's Law: data density doubles about every 18 months

Often misused, "computing power doubles every year-and-a-half" not true because computing power is limited by other components besides the CPU now

PC display capabilities vastly exceed game consoles, future VR depends on High-end PC Video Cards more than CPU

Now 'old' ATI Radeon 9700 Pro
• 2.6 billion pixels per second
• 325 million polygons per second

X-Box
• 150 million pixels per second
• 125 million polygons per second
A Moore’s law for razor blades?

<table>
<thead>
<tr>
<th>Blade running</th>
<th>Number of blades per razor system</th>
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<tr>
<td>1900</td>
<td>0</td>
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<tr>
<td>2000</td>
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<td>5</td>
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<td>2002</td>
<td>10</td>
</tr>
<tr>
<td>2003</td>
<td>15</td>
</tr>
</tbody>
</table>

- Hypothetical curve
- Linear increase
- Power-law increase

Source: Professor

- Schick 4-bladed Quattro (2000)
- Gillette’s 5-bladed “Fusion” razor (2006)