

The five generations of computing essay sample

[Technology](#), [Computer](#)



The history of computer development is often referred to in terms of five distinct eras, or “generations” of computing devices. Each generation of computer is characterized by a major technological development that fundamentally changed the way computers operate, resulting in increasingly smaller, cheaper, more powerful and more efficient and reliable devices.

First Generation: 1946 to 1955 The first computers used vacuum tubes for circuitry, magnetic drums and magnetic cores for memory, and were often enormous, taking up entire rooms. They were very expensive to operate and in addition to using a great deal of electricity, generated a lot of heat, which was often the cause of malfunctions. First generation computers relied on machine language, the lowest-level programming language understood by computers, to perform operations, and they could only solve one problem at a time. Input was based on punched cards and paper tape, and output was displayed on teletype printers.

The UNIVAC is the most famous first generation computer. Manufactured by Sperry-Rand Corporation, the first UNIVAC was delivered to the U. S. Census Bureau in 1951 - becoming the first computer that was not used for military or scientific purposes.

Vacuum tube processing unit in a first-generation computer.

The Second Generation: 1956 to 1963 Transistors replaced vacuum tubes and ushered in the second generation of computers. The transistor was invented in 1947 but did not see widespread use in computers until the late 50s. The transistor was far superior to the vacuum tube, allowing computers to become smaller, faster, cheaper, more energy-efficient and more reliable than their first-generation predecessors. Though the transistor still generated a great deal of heat that subjected the

computer to damage, it was a vast improvement over the vacuum tube. Second-generation computers still relied on punched cards for input and printouts for output. Second-generation computers moved from cryptic binary machine language to symbolic, or assembly, languages, which allowed programmers to specify instructions in words. High-level programming languages were also being developed at this time, such as early versions of COBOL and FORTRAN.

It was during this era that IBM became the world-wide leader in computer manufacturing. IBM also developed the first hard disk in this period - a massive device that was comprised of 50 platters, each with a 2-foot diameter. The entire hard disk could store a whopping 5MB. | Transistor-based processing unit in a second-generation computer | The Third Generation: 1964 to 1970 The third generation is characterized by the development of the integrated circuit - a complete electrical circuit whose components (transistors, capacitors, etc.) are fabricated onto a small "chip" made of silicon ... otherwise known as an integrated circuit chip, or IC chip. IC chips drastically increased the speed and efficiency of computers. Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an operating system, which allowed the device to run many different applications at one time with a central program that monitored the memory. Although still large by today's standards, third-generation computers were smaller and cheaper than their predecessors, and were now being mass-produced (primarily by IBM) for commercial use around the world. | An early IC chip, containing 3 transistors (silver)

The Fourth Generation: 1971 to 1991 The fourth generation is distinguished primarily as the generation in which the personal computer first appeared. This was made possible by the development of the microprocessor by Intel Corp. A microprocessor is a single IC chip that contains an entire computer processor - essentially, an entire first-generation computer that can fit in the palm of your hand. The second breakthrough was a series of improvements in IC design and manufacturing methods which allowed engineers to create IC chips with tens of thousands of transistors, a process now known as large scale integration (LSI). This allowed more complex systems to be produced using smaller circuit boards, and at a reduced cost. Solid-state electronics began to make their way into everyday life ... home appliances, radios, TVs, games, and more. In 1981 IBM introduced its first computer for the home user, and in 1984 Apple introduced the Macintosh. As these small computers became more powerful, they could be linked together to form networks, which eventually led to the development of the Internet. Fourth generation computers also saw the development of GUIs, the mouse and handheld devices.

The original IBM PC

The Fifth Generation: 1992 to present In the computing world, there is no real consensus on the timeline (or even the existence of) a fifth generation of computers. It can be argued that while microprocessors have become more powerful, and integrated circuits have become smaller, the underlying technology has not really changed since the fourth generation. If we wish to recognize a " fifth generation" at all, then perhaps it reflects a shift in

computer use, rather than computer technology. The emergence of the Internet, and particular, the World Wide Web has forever changed the way computers are used in society. Artificial intelligence - a field of study that predates the first generation - is now a reality, with devices that are capable of learning, self-organization, and natural language input. If a " true" fifth generation (based on technology only) emerges, it will probably be based upon quantum computation, molecular / nanotechnology, or some other innovation that will enhance (or replace) the integrated circuit, and once again radically change the face of computers.