A generation refers to the state of improvement in the development of a product. This term is also used in the different advancements of computer technology. With each new generation, the circuitry has gotten smaller and more advanced than the previous generation before it. As a result of the miniaturization, speed, power, and memory of computers has proportionally increased.

There are four computer generations known to the present and five generation with artificial intelligent in the future..

**The First Generation: 1946-1955 (The Vacuum Tube Years)**

The first generation computers were huge, slow, expensive, and often unreliable. In 1946 two Americans, Presper Eckert, and John Mauchly built the ENIAC(Electronic Numerical Integrator And Computer) which used vacuum tubes instead of the mechanical switches of the Mark I. The ENIAC used thousands of vacuum tubes, which took up a lot of space and gave off a great deal of heat just like light bulbs do. The ENIAC led to other vacuum tube type computers like the EDVAC (Electronic Discrete Variable Automatic Computer) and the UNIVAC (UNIVersal Automatic Computer). The UNIVAC was the first commercial computer delivered to a business client in 1951.

These first generation computers relied on ‘machine language’ (which is the most basic programming language that can be understood by computers). These computers were limited to solving one problem at a time. Input was based on punched cards and paper tape. Output came out on print-outs.

The ENIAC gave off so much heat that they had to be cooled by gigantic air conditioners. However even with these huge coolers, vacuum tubes still overheated regularly. It was time for something new.

**FEATURES OF FIRST GENERATION**

* Vacuum tube technology
* Unreliable
* Supported Machine language only
* Very costly
* Generate lot of heat
* Slow Input/Output device
* Huge size
* Non-portable
* Consumed lot of electricity
* Larger AC were needed

**The Second Generation: (1956-1964)**

In 1947 three scientists, John Bardeen,William Shockley, and Walter Brattain working at AT&T's Bell Labs invented the transistor which functions like a vacuum tube in that it can be used to relay and switch electronic signals.

There were obvious differences between the transisitor and the vacuum tube. The transistor was faster, more reliable, smaller, and much cheaper to build than a vacuum tube. One transistor replaced the equivalent of 40 vacuum tubes. These transistors were made generally of silicon, an abundant element (second only to oxygen) found in beach sand and glass. Therefore they were very cheap to produce. Transistors were found to conduct electricity faster and better than vacuum tubes. They were also much smaller and gave off virtually no heat compared to vacuum tubes. Their use marked a new beginning for the computer. Without this invention, space travel in the 1960's would not have been possible. However, a new invention would even further advance our ability to use computers.

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 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. These were also the first computers that stored their instructions in their memory, which moved from a magnetic drum to magnetic core technology.

The first computers of this generation were developed for the atomic energy industry.

The period of second generation was 1959-1965. 1959-1964 (The Era of the Transistor)

* Use of transistors
* Reliable as compared to First generation computers
* Smaller size as compared to First generation computers
* Generate less heat as compared to First generation computers
* Consumed less electricity as compared to First generation computers
* Faster than first generation computers
* Still very costly
* A.C. needed
* Programming was in Machine Language & Aseembly Language
* Magnetic tapes & discs were used
* First Operating System was developed
* Core Memory was developed

Some computers of this generation were:

* IBM 1620; IBM 7094; CDC 1604; CDC 3600; UNIVAC 1108

**The Third Generation**: 1965-1970 (Integrated Circuits - Miniaturizing the Computer)

Transistors were a tremendous breakthrough in advancing the computer. However no one could predict that thousands even now millions of transistors (circuits) could be compacted in such a small space. The integrated circuit packs a huge number of transistors onto a single wafer of silicon. Robert Noyce Jack Kilby

Since the invention of integrated circuits, the number of transistors that can be placed on a single chip has doubled every two years, shrinking both the size and cost of computers even further and further enhancing its power.

High-level language (FORTRAN-II TO IV, COBOL, PASCAL PL/1, BASIC, ALGOL-68, etc.) were used during this generation.

These third generation computers could carry out instructions in billionths of a second. The size of these machines dropped to the size of small file cabinets. Yet, the single biggest advancement in the computer era was yet to be discovered.

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. Computers for the first time became accessible to a mass audience because they were smaller and cheaper than their predecessors.

**THIRD GENERATION FEATURES**

* Integrated circuits developed
* More reliable
* Smaller size
* Generate less heat
* Faster
* Still costly
* Power consumption was low
* Lesser maintenance
* High level languages were used

Some computers of this generation were:

IBM-360 series; Honeywell-6000 series; PDP(Personal Data Processor); IBM-370/168; TDC-316

**FOURTH GENERATION COMPUTERS** 1971-Today (Microprocessors)

This generation can be characterized by both the jump to monolithic integrated circuits(millions of transistors put onto one integrated circuit chip) and the invention of the microprocessor (a single chip that could do all the processing of a full-scale computer). By putting millions of transistors onto one single chip more calculation and faster speeds could be reached by computers.

This revolution can be summed in one word: Intel. The chip-maker developed the Intel 4004 chip in 1971, invented by Tedd hoff, which positioned all computer components (CPU, memory, input/output controls) onto a single chip. What filled a room in the 1940s now fit in the palm of the hand. The Intel chip housed thousands of integrated circuits.

One of the earliest personal computers was the Altair 8800 computer kit. In 1975 you could purchase this kit and put it together to make your own personal computer. In 1977 the Apple II was sold to the public and in 1981 IBM entered the PC (personal computer) market 1984 saw the MacIntosh introduced by Apple.

In this generation, Time sharing, Real time, Networks, Distributed Operating System were used.

All the higher level languages like C and C++, DBASE, etc., were used in this generation.

Microprocessors even moved beyond the realm of computers and into an increasing number of everyday products.

The increased power of these small computers meant they could be linked, creating networks. Which ultimately led to the development, birth and rapid evolution of the Internet. Other major advances during this period have been the Graphical user interface (GUI), the mouse and more recently the astounding advances in lap-top capability and hand-held devices. .

**The main features of Fourth Generation are:**

* Very-large-scale integration of ICs
* Very small size
* Very cheap
* Portable and reliable
* No A.C. needed
* Development of Personal Computers
* Computers became easily available
* Different types of memories with very high accessing speed & storage capacity
* Computers started in use for Data Communication with technology of internet
* Great developments in the fields of networks
* Used in virtual reality, multimedia, simulation

Some computers of this generation were:

* DEC 10; STAR 1000; PDP 11; CRAY-1 (Super Computer); CRAY-X-MP (Super Computer)

**Fifth Generation (Present and Beyond) Artificial Intelligence**

Fifth generation computing devices, based on artificial intelligence, are still in development, though there are some applications, such as voice recognition, that are being used today. The use of parallel processing and superconductors is helping to make artificial intelligence a reality. Quantum computation and molecular and nanotechnology will radically change the face of computers in years to come. The goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.

To conclude, technology of computer were changing and developing to increase the power of computers and to less it cost. Now scientists are trying to create a computer with real IQ with the help of advanced programming and technologies. The advancement in modern technologies will revolutionize the computer in particular and our life in general in future.