GENERATIONS OF COMPUTER

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What is Generations Computer?

The generation of computer means the gap between the development of the computer in terms of the technologies. Each generation of computer is characterized by a major technologies development that fundamentally changed the way computer operate, resulting in smaller, cheaper, and more powerful, efficient and reliable device.

Nowadays, a computer can be used to type documents, send email, play games, and browse the Web. It can also be used to edit or create spreadsheets, presentations, and even videos. But the evolution of this complex system started around 1940 with the first Generation of Computer and evolving ever since.

There are five generations of computers.

First Generation (1940 – 1956)

- The first computers used vacuum tubes for circuitry and magnetic drums for memory, and were often enormous, taking up entire rooms.
- These computers used thousands of vacuum tubes
- As a result consumed lots of power and generated a large amount of heat which often cause malfunctions.
- They were large in size and very expensive
- First generation of 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 printouts.
- They were the fastest calculating device of their time, and they can calculate a large amount of calculations per second.
- The UNIVAC 1, EDVAC and ENIAC computers are examples of first-generation computing devices. The UNIVAC was the first commercial computer delivered to a business client, the U.S. Census Bureau in 1951.

First Generation Cont.....

Advantage.

I. It made use of vacuum tubes which are the only electronic component available during those days.
II. These computers could calculate in milliseconds.

Disadvantages.

III. These were very big in size, weight was about 30 tones
IV. As the invention of first generation computers involves vacuum tubes, so another disadvantage of these computers was vacuum tubes require a large cooling system.
V. These computers were very costly.
VI. It could store only a small amount of information due to the presence of magnetic drums.
VII. Large amount of energy consumption.
VIII. Not reliable and constant maintenance is required.

Second Generation (1956 – 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 1950s.
- 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.
- 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. EXAMPLES CDC 3600, IBM 7090

Second Generation Cont.....

Advantage.

I. Due to the presence of transistors instead of vacuum tubes, the size of electron component decreased. This resulted in reducing the size of a computer as compared to first generation computers.
II. Low cost than first generation computers.
III. Less energy and not produce as much heat as the first generation.
IV. Better speed, calculate data in microseconds.
V. Better portability as compared to first generation

Second Generation Cont.....

Disadvantage.

I. A cooling system was required.
II. Constant maintenance was required.
III. Only used for specific purposes.

Third Generation (1963 – 1971)

- This generation used the integrated circuit (IC).
- The development of the integrated circuit was the hallmark of the third generation of computers.
- IC was a single component containing number of transistors.
- Transistors were reduced and placed on silicon chips, called semiconductors, which 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.
- Computers for the first time became accessible to a mass audience because they were smaller and cheaper than their predecessors.
- They were made available to large number of people
- EXAMPLES IBM 360, PDP 11

Third Generation Cont.....

Advantage.

I. They were fast and reliable.
II. Use of IC in the computer provides the small size of the computer.
III. IC not only reduce the size of the computer but it also improves the performance of the computer as compared to previous computers.
IV. This generation of computers has big storage capacity.
V. Instead of punch cards, mouse and keyboard are used for input.
VI. They used an operating system for better resource management and used the concept of time-sharing and multiple programming.
VII. These computers reduce the computational time from microseconds to nanoseconds.

Third Generation Cont.....

Disadvantage.

I. IC chips are difficult to maintain.
II. The highly sophisticated technology required for the manufacturing of IC chips.
III. Air conditioning is required.

Fourth Generation (1971 - Present)

- The microprocessor brought the fourth generation of computers.
- Microprocessors in this generation use VLSI (Very large scale integration) Technology
- It contains a thousands of IC on a single silicon chip
- Which made the computer small and portable but more chip and work at high speed with a lot more of accuracy and reliability
- Unlike the first generation computers which filled an entire room could now fit in the palm of the hand.
- The Intel 4004 chip, developed in 1971, located all the components of the computer —from the central processing unit and memory to input/output controls—on a single chip.
- In 1981 IBM introduced its first computer for the home user, and in 1984 Apple introduced the Macintosh.
- Microprocessors also moved out of the realm of desktop computers and into many areas of life as more and more everyday products began to use microprocessors.
- 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, application software and handheld devices.

Fourth Generation Cont.....

Advantage.

I. Heat generated is negligible.
II. Fastest in computation and size get reduced as compared to the previous generation of computer.
III. Less maintenance is required
IV. All types of high-level language can be used in this type of computers.
V. They could be linked together to form networks, which eventually led to the development of the Internet.

Fourth Generation Cont.....

Disadvantage.

I. The Microprocessor design and fabrication are very complex.
II. Air conditioning is required in many cases due to the presence of ICs.
III. Advance technology is required to make the ICs.

Fifth Generation (Present - Future)

- Fifth generation computing devices, based on artificial intelligence.
- The AI use ULSI (ultra large scale integration) which makes it more faster, cheaper and self reliant
- They are still in development, though there are some applications, such as voice recognition, that are being used today.
- They are combined Quantum and nano technology together, which will result in making these computers more intelligent computers
- 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.
- The ULSI(Ultra Large Scale Integration) technology resulting in the production of microprocessor chips having ten million electronic component.

Fifth Generation Cont.....

Advantage

I. It is more reliable and works faster.
II. It is available in different sizes and unique features.
III. It provides computers with more user-friendly interfaces with multimedia features.

Disadvantage

IV. They need very low-level languages.
V. They may make the human brains dull and doomed.

ANY QUESTION?