Rajshahi Nursing College

ICT Assignment

Subject: Generation of Computers

Group - II

BSc Nursing Course

15th Batch, 1st year

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Generations of Computer

The history of computer development is often referred to in reference to the different 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, more efficient and reliable devices.

There are five generations of computer:

S.no	Time-period	Generations of Computer	Evolving Hardware
1	1940-1950	First-generation	Vacuum-Tube Based
2	1950-1960	Second generation	Transistor Based
3	1960-1970	Third generation	Integrated-Circuit Based
4	1970-Present	Fourth Generation	Microprocessor-Based
5	Present-Future	Fifth Generation	Artificial Intelligence Based

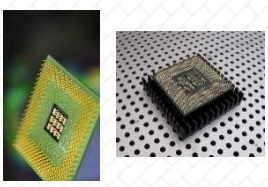
Vacuum-Tube

Transistor

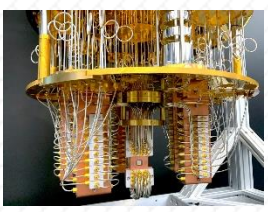
MicroController

[Integrated-Circuit]

Raspberry Pi



Microprocessor



Quantum Computer

First Generation Computers: Vacuum Tubes (1940-1956)

The technology behind the primary generation computers was a fragile glass device, which was called vacuum tubes. These computers were very heavy and really large in size. These weren't very reliable and programming on them was a really tedious task as they used high-level programming language and used no OS. First-generation computers were used for calculation, storage, and control purpose. They were too bulky and large that they needed a full room and consume rot of electricity.

Main first generation computers are:

- **ENIAC:** Electronic Numerical Integrator and Computer, built by J. Presper Eckert and John V. Mauchly was a general-purpose computer. It had been very heavy, large, and contained 18,000 vacuum tubes.
- **EDVAC:** Electronic Discrete Variable Automatic Computer was designed by von Neumann. It could store data also as instruction and thus the speed was enhanced.
- **UNIVAC:** Universal Automatic Computer was developed in 1952 by Eckert and Mauchly.

Figure: IBM 650

Main characteristics of first generation computers are:

Main electronic component	Vacuum tube.
Programming language	Machine language.
Main memory	Magnetic tapes and magnetic drums.
Input/output devices	Paper tape and punched cards.
Speed and size	Very slow and very large in size (often taking up entire room).
Examples of the first generation	IBM 650, IBM 701, ENIAC, UNIVAC1, etc.

Second Generation Computers: Transistors (1956-1963)

Second-generation computers used the technology of transistors rather than bulky vacuum tubes. Another feature was the core storage. A transistor may be a device composed of semiconductor material that amplifies a sign or opens or closes a circuit.

Transistors were invented in Bell Labs. The use of transistors made it possible to perform powerfully and with due speed. It reduced the dimensions and price and thankfully the warmth too, which was generated by vacuum tubes. Central Processing Unit (CPU), memory, programming language and input, and output units also came into the force within the second generation.

Programming language was shifted from high level to programming language and made programming comparatively a simple task for programmers. Languages used for programming during this era were FORTRAN (1956), ALGOL (1958), and COBOL (1959).

Figure: IBM 7094

Main characteristics of second generation computers are:-

Main electronic component	Transistor.
Programming language	Machine language and assembly language.
Memory	Magnetic core and magnetic tape/disk.
Input/output devices	Magnetic tape and punched cards.
Power and size	Smaller in size, low power consumption, and generated less heat (in comparison with the first generation computers).
Examples of second generation	PDP-8, IBM1400 series, IBM 7090 and 7094, UNIVAC 1107, CDC 3600 etc.

Third Generation Computers: Integrated Circuits. (1964-1971)

During the third generation, technology envisaged a shift from huge transistors to integrated circuits, also referred to as IC. Here a variety of transistors were placed on silicon chips, called semiconductors. The most feature of this era's computer was the speed and reliability. IC was made from silicon and also called silicon chips.

A single IC, has many transistors, registers, and capacitors built on one thin slice of silicon. The value size was reduced and memory space and dealing efficiency were increased during this generation. Programming was now wiped out Higher level languages like BASIC (Beginners All-purpose Symbolic Instruction Code). Minicomputers find their shape during this era.

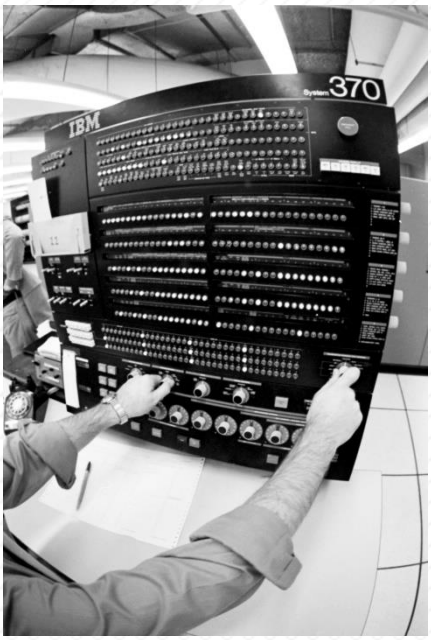


Figure: IBM 370

Main characteristics of third generation computers are:

Main electronic component	Integrated circuits (ICs)
Programming language	High-level language
Memory	Large magnetic core, magnetic tape/disk
Input / output devices	Magnetic tape, monitor, keyboard, printer, etc.
Examples of third generation	IBM 360, IBM 370, PDP-11, NCR 395, B6500, UNIVAC 1108, etc.

Fourth Generation Computers: Micro-processors (1971-1990)

In 1971 First microprocessors were used, the large scale of integration LSI circuits built on one chip called microprocessors. The most advantage of this technology is that one microprocessor can contain all the circuits required to perform arithmetic, logic, and control functions on one chip.

The computers using microchips were called microcomputers. This generation provided the even smaller size of computers, with larger capacities. That's not enough, then Very Large Scale Integrated (VLSI) circuits replaced LSI circuits. The Intel 4004chip, developed in 1971, located all the components of the pc from the central processing unit and memory to input/ output controls on one chip and allowed the dimensions to reduce drastically.

Technologies like multiprocessing, multiprogramming, time-sharing, operating speed, and virtual memory made it a more user-friendly and customary device. The concept of private computers and computer networks came into being within the fourth generation.

Figure: Apple Macintosh

Main characteristics of fourth generation computers are:

Main electronic component	Very large-scale integration (VLSI) and the microprocessor (VLSI has thousands of transistors on a single microchip).
Memory	semiconductor memory (such as RAM, ROM, etc.)
Input/output devices	pointing devices, optical scanning, keyboard, monitor, printer, etc.
Examples of fourth generation	IBM PC, STAR 1000, APPLE II, Apple Macintosh, Alter 8800, etc.

Fifth Generation Computers: Artificial intelligence based

The technology behind the fifth generation of computers is AI. It allows computers to behave like humans. It is often seen in programs like voice recognition, area of medicines, and entertainment. Within the field of games playing also it's shown remarkable performance where computers are capable of beating human competitors.

The speed is highest, size is that the smallest and area of use has remarkably increased within the fifth generation computers. Though not a hundred percent AI has been achieved to date but keeping in sight the present developments, it is often said that this dream also will become a reality very soon.

In order to summarize the features of varied generations of computers, it is often said that a big improvement has been seen as far because the speed and accuracy of functioning care, but if we mention the dimensions, it's being small over the years. The value is additionally diminishing and reliability is in fact increasing.

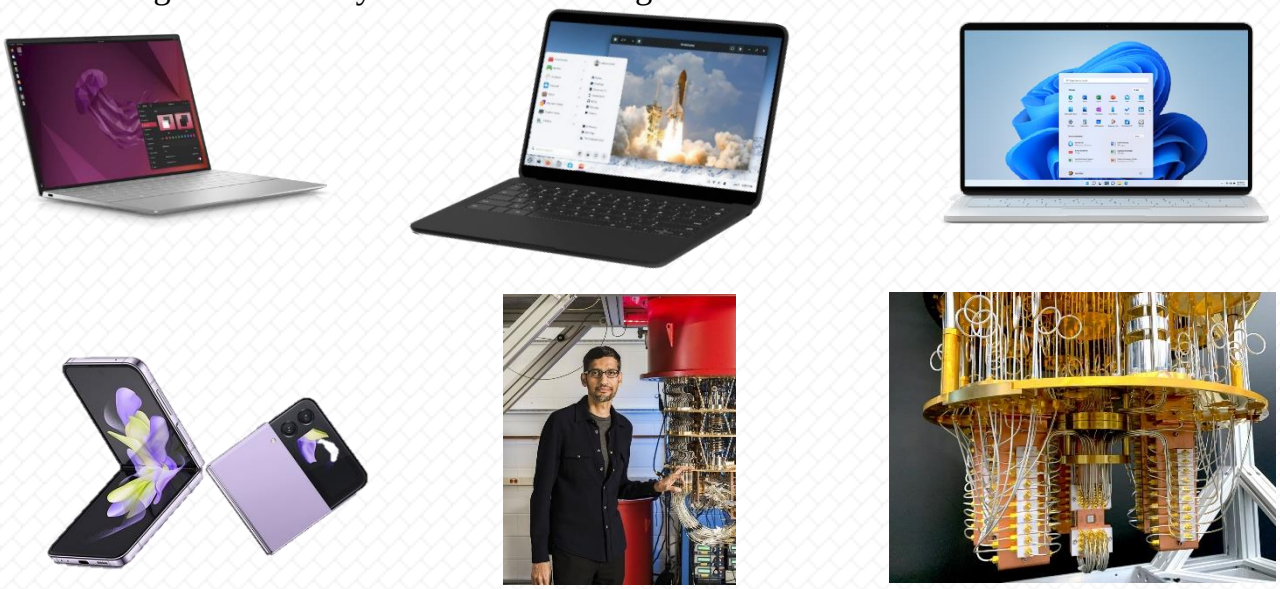


Figure: Fifth Generation Computers

Main characteristics of fifth generation computers are:

Main electronic component	Based on artificial intelligence, uses the Ultra Large-Scale Integration (ULSI) technology and parallel processing method (ULSI has millions of transistors on a single microchip and Parallel processing method use two or more microprocessors to run tasks simultaneously).
Language	Understand natural language (human language).
Size	Portable and small in size.
Input / output device	Trackpad (or touchpad), touchscreen, pen, speech input (recognize voice/speech), light scanner, printer, keyboard, monitor, mouse, etc.
Example of fifth generation	Desktops, laptops, tablets, smartphones, etc.

Excercise

SAQ

1. How many generations of computer are there?
2. What is the definition of computer generation?
3. Write the main characteristics of generation (1st , 2nd, 3rd, 4th, 5th)?
4. What was the 1st computer?
5. Give some examples of each generation.

EQ

1. Briefly describe the generation of computer.
2. Describe the trend and features of fifth generation computer.
3. Write the differences between 4th and 5th Generation.

MCQ

1. **The 4th generation was based on integrated circuits.**
   a. True b. False
2. **The generation based on VLSI microprocessor,**
   a. 1st b. 2nd
   c. 3rd d. 4th
3. **Which is the main memory of 3rd generation?**
   a. Magnetic tapes
   b. Large magnetic core
   c. Magnetic core
   d. Semi Conductor
4. **Select the name of generation in which operating systems were built.**
   a. First b. Third
   c. Second d. Fourth
5. **Influence of artificial intelligence is considered in**
   a. 1st Generation b. 2nd Generation
   c. 3rd Generation d. 5th Generation
6. **A term in computer terminology is a change in technology a computer is/was being used.**
   a. development b. generation
   c. advancement d. growth
7. **ULSI stands for?**
   a. Ultra Large Scale Integration
   b. Under Lower Scale Integration
   c. Ultra Lower Scale Integration
   d. Under Large Scale Integration
8. **HLL stands for?**
   a. High Level Language
   b. High Laymen's Language
   c. High Level Lesson
   d. High Laymen's Lesson

-: The End :-