JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

FACULTY OF EDUCATION & METHODOLOGY

Faculty Name : JV'n ABHISHEK SEN (Librarian)

Program : B.Lib Ist Semester / Year

Course Name : Information Communication & Technology

Session No. & Name : 1.1   (Name of the Session)

Academic Day starts with –

- Greeting with saying **'Namaste'** by joining Hands together following by 2-3 Minutes Happy session, Celebrating birthday of any student of respective class and **National Anthem**.

Lecture Starts with- Review of previous Session-

Topic to be discussed today- Today We will discuss about

 Generations of Computers – Computer Fundamentals

> ➢ The modern computer took its shape with the arrival of your time. It had been around the 16th century when the evolution of the computer started. The initial computer faced many changes, obviously for the betterment. It continuously improved itself in terms of speed, accuracy, size, and price to urge the form of the fashionable day computer.

Basic Terms Related to Computers

The basic terms related to generations of computers are listed below.

1. **Vacuum Tube :** Vacuum tubes have the functionality of controlling the flow of electronics in a vacuum. Generally, it is used in switches, amplifiers, radios, televisions, etc.

2. **Transistor :** A transistor helps in controlling the flow of electricity in devices, it works as an amplifier or a switch.

3. **Integrated Circuit (IC) :** Integrated circuits are silicon chips that contain their circuit elements like transistors, resistors, etc.

4. **Microprocessors :** Microprocessors are the components that contain the CPU and its circuits and are present in the Integrated Circuit.

5. **Central Processing Unit (CPU) :** The CPU is called the brain of the computer. CPU performs processing and operations work.

6. **Magnetic Drum :** Magnetic Drum is like a cylinder that stores data and cylinder.

7. **Magnetic Core :** Magnetic cores are used to store information. These are arrays of small rings.

8. **Machine Language :** Machine Language is the language that a computer accepts (in the form of binary digits). It is also called low-level programming language.

9. **Memory :** Memory is used to store data, information, and program in a computer.

10. **Artificial Intelligence :** Artificial Intelligence deals with creating intelligent machines and behaviors.

First Generation Computers

The technology behind the primary generation computers was a fragile glass device, which was called a vacuum tube. These computers were very heavy and really large. These weren't very reliable and programming on them was a tedious task as they used low-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 a lot of electricity.

Examples of some main first-generation computers are mentioned below.

- **ENIAC :** Electronic Numerical Integrator and Computer, built by J. Presper Eckert and John V. Mauchly was a general-purpose computer. It had been cumbersome, and 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.

Characteristics of First-Generation Computers

Characteristics	Components
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 (often taking up an entire room).
Examples of the first generation	IBM 650, IBM 701, ENIAC, UNIVAC1, etc.

Second Generation Computers

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.

The 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).

Characteristics of Second-Generation Computers

Characteristics	Components
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, had low power consumption, and generated less heat (in comparison with the first-generation computers).
Examples of the second generation	PDP-8, IBM1400 series, IBM 7090 and 7094, UNIVAC 1107, CDC 3600, etc.

Third Generation Computers

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 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.

Characteristics of Third-Generation Computers

Characteristics	Components
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 the third generation	IBM 360, IBM 370, PDP-11, NCR 395, B6500, UNIVAC 1108, etc.

Fourth Generation Computers

In 1971 First microprocessors were used, the large-scale of integration LSI circuits built on one chip called microprocessors. The 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 even smaller size of computers, with larger capacities. That's not

enough, then Very Large Scale Integrated (VLSI) circuits replaced LSI circuits. The Intel 4004 chip, 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.

Characteristics of Fourth-Generation Computers

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

Fifth Generation Computers

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 medicine, and entertainment. Within the field of game playing also it's shown remarkable performance where computers are capable of beating human competitors.

The speed is the highest, size is 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.

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

Characteristics of Fifth-Generation Computers

Characteristics	Components
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 the 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), touch screen, pen, speech input (recognize voice/speech), light scanner, printer, keyboard, monitor, mouse, etc.
Example of the fifth generation	Desktops, laptops, tablets, smartphones, etc.

Title: The Five Generations of Computers

First generation computers (1940-1956)

- The first computers used vacuum tubes for circuitry and magnetic drums for memory.

- They were often enormous and taking up entire room.

- First generation computers relied on machine language.

- 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.

- The UNIVAC and ENIAC computers are examples of first-generation computing devices.

Second generation computers (1956-1963)

- Transistors replaced vacuum tubes and ushered in the second generation of computers.

- Second-generation computers moved from cryptic binary machine language to symbolic.

- 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.

Third generation computers(1964-1971)

- The development of the integrated circuit was the hallmark of the third generation of computers.

- Transistors were miniaturized and placed on silicon chips, called semiconductors.

- Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an operating system.

- Allowed the device to run many different applications at one time.

Fourth generation computers (1971-present)

- The microprocessor brought the fourth generation of computers, as thousands of integrated circuits were built onto a single silicon chip.

- The Intel 4004 chip, developed in 1971, located all the components of the computer.

- From the central processing unit and memory to input/output controlson a single chip.

- Fourth generation computers also saw the development of GUIs, the mouse and handheld devices.

Fifth generation computers(present and beyond)

- Fifth generation computing devices, based on artificial intelligence.

- Are still in development, though there are some applications, such as voice recognition.

- The use of parallel processing and superconductors is helping to make artificial intelligence a reality.

- The goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.

Input And Output Devices :- https://www.mybigguide.com/2022/03/what-is-input-output-device-in-hindi.html

Storage Devices :- https://infonixelearn.com/storage-devices-in-hindi/