

Foundation of Information Technology (FIT)

Chapter-1

Introduction to Computer

A computer is an electronic programmable device that takes raw data as input, process it and convert into a meaningful information as output. Computers perform complex calculations in a fraction of seconds.

Characteristics of Computer

- Speed
- Storage
- Diligence
- Versatile
- Accuracy
- Automatic
- Word Length

History of Computer

- Abacus (Invented by Chinese)
- Napier's Bone (John Napier)
- Pascaline (Blaise Pascal)
- Difference Engine (Charles Babbage)
- Analytical Engine (Charles Babbage)
- Tabulating Machine (Herman Hollerith)
- Mark-I (Howard Aiken)
- ENIAC (Electronic Numerator Integrator and Computer)
- EDSAC (Electronic Delay storage Automatic calculator)
- EDVAC (Electronic Discrete variable Automatic Computer)
- UNIVAC (Universal Automatic Computer)

Generation of Computers

1st Generation

- **Time Period**: 1946 to 1956
- **Main Components**: Vacuum tubes
- **Language**: Machine Level Language
- **Size**: Large. Size was equivalent to a room.
- **Speed**: Slow speed, hundred instructions per second.
- **Storage Capacity**: Low
- **Portability**: Low
- **Power**: High electricity consumption and heat production.
- **Example**: ENIAC, UNIVAC, Mark-I etc.

2nd Generation

- **Time Period**: 1957 to 1964
- **Main Components**: Transistor
- **Language**: Assembly level language
- **Size**: smaller than first generation computers.
- **Speed**: faster than first generation computers.
- **Storage capacity**: higher than first generation computers.
- **Power**: low electricity consumption and low heat production than first generation computers.
- **Example**: IBM-3600 series

• 3rd Generation

- **Time Period**: 1965 to 1971
- **Main Components**: Integrated Circuits (IC)
- **Language**: High Level Language (Procedural Language)
- **Example**: IBM 3600 series.

• 4th Generation

- **Time Period**: 1972 to present
- **Main Components**: Large Scale Integrated (LSI) semiconductor circuits called MICRO PROCESSOR, or chip and very Large Scale Integrated (VLSI).
- **Language**: High Level Language (Problem Oriented Language, Object oriented Language)
- **Example**: Desktop, Laptops.

• 5th Generation

- **Status**: still in development process
- **Main Components**: Ultra Large Scale Integrated (ULSI) circuit.
- **Language**: High Level Language (Natural Language)

Classification of Computer

On the basis of function

- 1) Analog Computer (Example: slide rule)
- 2) Digital Computer (Example: Personal Desktop Computers)
- 3) Hybrid Computer (Example: ultrasound machine)

On the basis of size

- Super
- Mainframe
- Mini
- Micro

On the basis of Brand

- IBM
- IBM compatible
- Apple / Macintosh

On the basis of technology

- AT
- XT
- PS2

On the basis of purpose

- General purpose
- Special Purpose

Q.N) Differentiate between digital computer and analog computer.

→ The differences between digital computer and analog computer are:

Digital Computer	Analog Computer
1) These computers work on digits.	1) These computers work on physical values.
2) They work on discrete data.	2) They work on continuous data.
3) They operate by counting and adding.	3) They operate by comparing and measuring.
4) They can be reprogrammed.	4) They cannot be reprogrammed usually.
5) They are general purpose computers.	5) They are special purpose computers.
6) They have high accuracy.	6) They have lower accuracy.
7) They have higher storage capacity.	7) They have lower storage capacity.
8) They are expensive.	8) They are cheaper.
9) They work on digital signal.	9) They work on analog signal.
10) Example: Microcomputers, Supercomputers.	10) Example: Seismograph, voltmeter, pressure gauge, Prostag etc.

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Assignment

1) Differentiate between 1st and 2nd generation of computer.

⇒ The terms "1st generation" and "2nd generation" in the context of computing generally refer to different eras or stages in the development of computer technology. 1st and 2nd generation of computer are differentiated as below:

1 st Generation Computers	2 nd Generation Computers
1) Vacuum tubes were used as main component.	1) Transistors were used as main component.
2) Machine level language was used as programming language.	2) Assembly language was used as programming language.
3) The processing speed of first generation computers was relatively slow compared to second generation computers.	3) The processing speed was faster than that of first generation computers.
4) Computers produced high heat.	4) Computers produced less heat compared to first generation computer.
5) The size of computers was too large.	5) Size of computer was smaller than first generation computers.
6) Magnetic drums were used for storage.	6) RAM and ROM were used for storage.
7) They are expensive.	7) They are cheaper compared to first generation computers.

2) Explain about AI along with its features.

⇒ Artificial Intelligence (AI) is the machine-displayed intelligence that stimulates human behaviour or thinking and can be trained to solve specific problems. It is the ability of machines to replicate or enhance human intellect, such as reasoning and learning from experience.

Some of the features of AI are:

1) Learning and adaptation: One of the fundamental features of AI is its capacity to learn and adapt. AI systems have the capability to examine extensive datasets, identify recurring trends, and formulate forecasts or choices grounded in data.

AI models can better identify objects or faces with each exposure to new data.

2) Automation: Automation is a main feature of AI, as it can perform tasks with minimal human intervention. This is transforming industries by streamlining operations and increasing efficiency.

3) Human-machine interaction: AI systems are becoming more interactive and capable of understanding and responding to human emotions and intentions. This feature enhances user experiences in various applications such as Virtual Reality (VR), Gaming and customer service.

4) Problem solving: AI excels at solving complex problems that involve large amounts of data and decision-making. Unlike traditional programming, where explicit rules are coded, systems can find solutions by analysing data and adjusting their internal parameters.

3) Differentiate between super computers and microcomputers.

⇒ Supercomputers and Microcomputers are two distinct categories of computing devices designed to serve different purposes and meet varied computational needs.

The differences between them are as follows:

Supercomputers	Micro Computers
1) They are special purpose computers that are able to perform at or near the highest operational rate.	1) they are general purpose computers mostly used for day to day work.
2) They are larger and expensive computers.	2) They are smaller and inexpensive computers.
3) Supercomputers generate high heat.	3) Microcomputers generate low heat.
4) They are faster in data processing.	4) they are slower in data processing.
5) Supercomputers are kept in a special room with a special cooling system.	5) Microcomputers does not have to be kept in a special room.
6) They have high storage capacity.	6) They have low storage capacity.

4) Explain some applications of AI.

⇒ Artificial Intelligence (AI) is the ability for a computer to think and learn. In AI technology, computers behave like human and have learning capabilities. ~~Nowada~~ AI can be used in different fields like Education, E-commerce, Robotics, Healthcare, Agriculture, Gaming, Automobiles, social media, Marketing, chatbots, Finance etc. Some of them are explained below:

1) Education: Although the education sector is the one most influenced by humans. AI has slowly begun to seep its roots in the education sector as well. Even in the education sector, this slow transition of AI has helped increase productivity among faculties and helped them concentrate more on students than office or administration work.

2) Healthcare: AI is widely used in healthcare for tasks such as medical diagnosis, personalized treatment plans, and drug discovery. Machine learning algorithms analyze patient data to identify patterns and make predictions, helping healthcare professionals make more informed decisions.

3) Finance: In the financial sector, AI is applied for fraud detection, algorithmic trading and customer service. Machine learning models can analyze vast amounts of financial data in real-time to detect unusual patterns or potential fraudulent activities.

4) Agriculture: AI is used to identify defects and nutrient deficiencies in the soil. This is done using computer vision, robotics and machine learning applications. AI bots can help to harvest crops at a higher volume and faster pace than the human laborers.

5) Gaming: Another sector where AI applications have found prominence is the gaming sector. AI can be used to create smart, human-like NPCs to interact with the the players.
