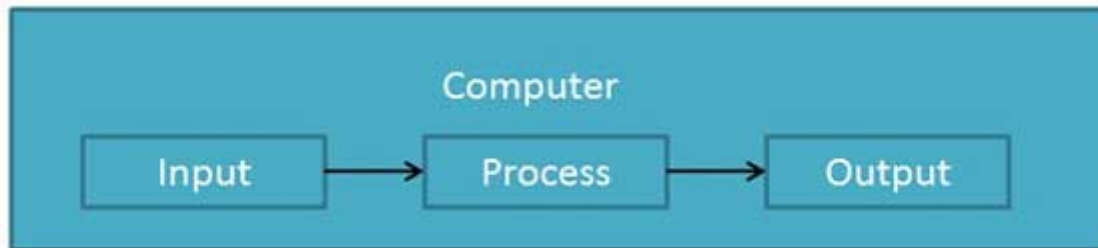**Question No. 1**

What do you mean by Computer? Write different types of computers?

Answer

Computer is an advanced electronic device that takes raw data as an input from the user and processes it under the control of a set of instructions (called program), produces a result (output), and saves it for future use.

The four basic types of computers are as under:

1. Supercomputer
2. Mainframe Computer
3. Minicomputer
4. Microcomputer

1. Supercomputer

The most powerful computers in terms of performance and data processing are the Supercomputers. These are specialized and task specific computers used by large organizations. These computers are used for research and exploration purposes, like NASA uses supercomputers for launching space shuttles, controlling them and for space exploration purpose.

Popular Supercomputers
- IBM's Sequoia, in United States
- Fujitsu's K Computer in Japan
- IBM's Mira in United States
- IBM's SuperMUC in Germany
- NUDT Tianhe-1A in China

2. Mainframe computer

Although Mainframes are not as powerful as supercomputers, but certainly they are quite expensive nonetheless, and many large firms & government organizations uses Mainframes to run their business operations. The Mainframe computers can be accommodated in large air-conditioned rooms because of its size. Super-computers are the fastest computers with large data storage capacity, Mainframes can also process & store large amount of data. Banks

educational institutions & insurance companies use mainframe computers to store data about their customers, students & insurance policy holders.

Popular Mainframe computers

- Fujitsu's ICL VME
- Hitachi's Z800

3. Minicomputer

Minicomputers are used by small businesses & firms. Minicomputers are also called as "Midrange Computers". These are small machines and can be accommodated on a disk with not as processing and data storage capabilities as super-computers & Mainframes**.** These computers are not designed for a single user. Individual departments of a large company or organizations use Mini-computers for specific purposes. For example, a production department can use Mini-computers for monitoring certain production process.

Popular Minicomputers

- K-202
- Texas Instrument TI-990
- SDS-92
- IBM Midrange computers

4. Microcomputer

Desktop computers, laptops, personal digital assistant (PDA), tablets & smart phones are all types of microcomputers. The micro-computers are widely used & the fastest growing computers. These computers are the cheapest among the other three types of computers. The Micro-computers are specially designed for general usage like entertainment, education and work purposes. Well known manufacturers of Micro-computer are Dell, Apple, Samsung, and Sony.

Desktop computers, Gaming consoles, Sound & Navigation system of a car, Netbooks, Notebooks, PDA's, Tablet PC's, Smartphone's, Calculators are all type of Microcomputers.

Question No.2

The development of electronic computers can be divided into five generations depending upon the technologies used. The following are the five generations of computers.

First Generation of Computers (1942-1955)

The beginning of commercial computer age is from UNIVAC (Universal Automatic Computer). It was developed by two scientists Mauchly and Echert at the Census Department of United States in 1947. They were based on **vacuum tubes.**

Examples of first generation computers are **ENIVAC** and **UNIVAC-1**.

Advantages

- Vacuum tubes were the only electronic component available during those days.
- Vacuum tube technology made possible to make electronic digital computers.
- These computers could calculate data in millisecond.

Disadvantages

- The computers were very large in size.
- They consumed a large amount of energy.
- They heated very soon due to thousands of vacuum tubes.
- They were not very reliable.
- Air conditioning was required.
- Constant maintenance was required.
- Non-portable.
- Costly commercial production.
- Limited commercial use.
- Very slow speed.
- Limited programming capabilities.
- Used machine language only.
- Used magnetic drums which provide very less data storage.
- Used punch cards for input.

Second Generation Computers (1955-1964)

The second generation computers used **transistors.** The scientists at Bell laboratories developed transistor in 1947. These scientists include John Barden, William Brattain and William Shockley. The size of the computers was decreased by replacing vacuum tubes with transistors.

The examples of second generation computers are **IBM 7094 series**, **IBM 1400 series** and **CDC 164** etc.

Advantages

- Smaller in size as compared to the first generation computers.
- The 2nd generation Computers were more reliable
- Used less energy and were not heated.
- Wider commercial use
- Better portability as compared to the first generation computers.
- Better speed and could calculate data in microseconds
- Used faster peripherals like tape drives, magnetic disks, printer etc.
- Used Assembly language instead of Machine language.
- Accuracy improved.

Disadvantages

- Cooling system was required
- Constant maintenance was required
- Commercial production was difficult

- Only used for specific purposes
- Costly and not versatile
- Puch cards were used for input.

Third Generation Computers (1964-1975)

The Third generation computers used the **integrated circuits (IC).** Jack Kilby developed the concept of integrated circuit in 1958. It was an important invention in the computer field. The first IC was invented and used in 1961. The size of an IC is about ¼ square inch. A single IC chip may contain thousands of transistors. The computer became smaller in size, faster, more reliable and less expensive.

 The examples of third generation computers are **IBM 370**, **IBM System/360**, **UNIVAC 1108** and **UNIVAC AC 9000** etc.

Advantages

- Smaller in size as compared to previous generations.
- More reliable.
- Used less energy
- Produced less heat as compared to the previous two generations of computers.
- Better speed and could calculate data in nanoseconds.
- Used fan for heat discharge to prevent damage.
- Maintenance cost was low because hardware failure is reare.
- Totally general purpose
- Could be used for high-level languages.
- Good storage
- Versatile to an extent
- Less expensive
- Better accuracy
- Commercial production increased.
- Used mouse and keyboard for input.

Disadvantages

- Air conditioning was required.
- Highly sophisticated technology required for the manufacturing of IC chips.

Fourth Generation Computers (1975-Present)

The fourth generation computers started with the invention of **Microprocessor**. The Microprocessor contains thousands of ICs. **Ted Hoff** produced the first microprocessor in 1971 for **Intel.** It was known as Intel 4004. The technology of integrated circuits improved rapidly. The LSI (Large Scale Integration) circuit and VLSI (Very Large Scale Integration) circuit was designed. It greatly reduced the size of computer. The size of modern Microprocessors is usually one square inch. It can contain millions of electronic circuits.

The examples of fourth generation computers are **Apple Macintosh & IBM PC.**

Advantages

- More powerful and reliable than previous generations.
- Small in size
- Fast processing power with less power consumption
- Fan for heat discharging and thus to keep cold.
- No air conditioning required.
- Totally general purpose
- Commercial production
- Less need of repair.
- Cheapest among all generations
- All types of High level languages can be used in this type of computers

Disadvantages

- The latest technology is required for manufacturing of Microprocessors.

Fifth Generation Computers (Present & Beyond)

Scientists are working hard on the 5th generation computers with quite a few breakthroughs. It is based on the technique of **Artificial Intelligence (AI).** Computers can understand spoken words & imitate human reasoning. Can respond to its surroundings using different types of sensors. Scientists are constantly working to increase the processing power of computers. They 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 future.

Question 3.

Convert the Following

(i) $(142.39)_{10}$ = (?)$_{16}$ **(ii) $(526.137)_8$ =(?)$_2$**   **(iii) $(6D.3A)_{16}$ ==(?)$_2$**

Answer

(i) $(142.39)_{10}$ = (?)$_{16}$

First We Calculating Hexadecimal of Integer part Equivalent −

Step	Operation	Result	Remainder	Remark
Step 1	142 / 16	8	E	(E is equivalent to 14 in decimals)
Step 2	8/ 16	0	8	Most Significant bit

 So $(142)_{10}$ = $(8E)_{16}$

  Now we calculating hexadecimal of fractional part equivalent −

Step	Operation	Result	Integer part to be taken	Remark
Step 1	.39x16	6.24	6	Most Significant bit
Step 2	0.24 x16	3.84	3	
Step 3	0.84 x 16	13.44	D	(D is equivalent to 13 in decimals)
Step 4	0.44 x 16	7.04	7	

So $(.39)_{10}$ = $(63D7)_{16}$.

Hence the Hexadecimal number of Decimal Number $(142.39)_{10}$ is $(8E.63D7)_{16}$.

(ii) $(526.137)_8$ = (?)$_2$

Equivalent binary number is calculated by each digit with three digit representation

5	**2**	**6**	**1**	**3**	**7**
101	**010**	**110**	**001**	**011**	**111**

So binary number of octal number **$(526.137)_8$ is (101010 110. 001 011111)$_2$**

(iii) $(6D.3A)_{16}$ ==(?)$_2$

Equivalent binary number is calculated by each digit with four digit representation

6	**D**	**3**	**A**
0110	**1101**	**0011**	**1010**

So binary number of hexadecimal number **$(6D.3A)_{16}$** is **(01101101.00111010)$_2$.**

The End