Chapter 01: Overview of Computers

Answer the following questions (each carrying 1mark):

1. What is computer?
   Computer is an electronic machine that can store, recall and process data.
2. Who is called as Father of Computer?
   Charles Babbage
3. Who introduced Pascaline?
   Blasie Pascal
4. Who is the first female programmer?
   Lady Ada Lovelace
5. Define input.
   The process of giving values or data to the system.
6. Define output.
   The results obtained after computation is called output.
7. How the speed of computer is measured?
   MIPS (Million Instructions Per Second) or BIPS (Billion Instructions Per Second).
8. Define byte.
   Group of 8 bits is called byte.
9. What is a BIT?
   BIT stands for Binary digit.
10. Define hardware.
    The physical components of the computer that can be touched are called as hardware.
11. Define software.
    Set of programs that tell the hardware what to do is called software.
12. Define data.
    Data is a collection of raw facts and figures.
13. Define information
    The processed form of data is called information.
14. Give examples for hardware.
    Keyboard, mouse, monitor.
15. Give examples for software.
    Anti-virus, media players, MS Office etc.
16. Expand CPU.
    Central Processing Unit
17. What are the parts of CPU?
    ALU(Arithmetic and Logic Unit), MU(Memory Unit), Registers
18. What is the function of ALU?
    ALU is used to perform all the Arithmetic and Logical operations on the data.
19. What is the use of ABACUS?

ABACUS is used for counting and calculating.

20. Write any one feature of 1st Generation of computer?
    Vacuum tubes were used for internal operations.
21. Write any one feature of 2nd Generation of computer?
    Transistors were used for internal operations.
22. Write any one feature of 3rd Generation of computer?
    Integrated Circuits were used for operations.
23. Write any one feature of 4th Generation of computer?
    Micro-processors were used for internal operations.
24. Write any one feature of 5th Generation of computer?
    Introduction of Artificial Intelligence in computing streams.
25. Expand ENIAC.
    Electrical Numerical Integrator and Computer
26. Expand UNIVAC
    Universal Automatic Computer.
27. Expand EDVAC.
    Electronic Discrete Variable Automatic Computer
28. What is analog computer?
    The computer that works on the basis of measurements is called analog.
29. What is digital computer?
    The computer that works with values digits is called digital.
30. Write any one feature of super computer?
    These are the fastest computer.
31. Write any one application of computer?
    Scientific and research

Answer the following questions (each carrying 2mark):

1. Distinguish between hardware and software.

Hardware	Software
1. Physical components of computer are called hardware. 2. We can touch and feel.	1. Set of programs are called software. 2. Software cannot be touched and felt.

2. Write about the history of computers?

   The computer as we know it today had its beginning with a 19th century English mathematics professor name Charles Babbage.

   He designed the Analytical Engine and it was this design that the basic framework of the computers of today are based on.

3. Write a note on Abacus?

   Chinese invented Abacus about 4000years back. It was the first machine used for counting and calculating. It is made of a wooden frame, metal rods, and wooden beads Abacus was mainly used for addition, subtraction and later for division and multiplication. The abacus is still used widely in China and other Asian countries to count and calculate, just as we use calculators.

4. Write a note on Input Unit?

   Computers need to receive data and instructions in order to solve a problem. The Input unit performs this operation. The Input Unit basically links the external world or environment to the computer system. The input unit may consist of one or more input devices. The Keyboard and mouse of a computer are the most commonly used input devices.

5. Write a note on Output Unit?

   It is used to print or display the results, which are stored in the memory unit. The actual function of the output unit is just the reverse of the input unit. Thus, the output unit links the computer to the outside world. The Monitor and Printer are the most commonly used output devices.

6. Write about the functions of the ALU?

   Arithmetic and Logic Unit performs arithmetic and logical operations and controls the speed of these operations. Arithmetic operations like addition, subtraction, multiplication and division (+,-,*, /) and logical operations like AND, OR, NOT and relational operations like (<,>, <=,>=) are being carried out in this unit.

7. Compare data with information.

data	information
1. Collection of raw facts. 2. Meaningless.	1. Processed form of data. 2. Meaningful.

8. Write any two applications of computers?
   a. Schools and colleges
   b. Hospitals

9. Distinguish between analog and digital computers.

Analog	Digital
1. Analog computers	1. Digital computer

work on continuous data. 2. They operate by measuring rather than counting.	works upon discontinuous data. 2. Digital computer operates on digital data such as numbers.

10. Why Charles Babbage is called as Father of modern computers?

In the early 1820s, an English mathematician by the name **Charles Babbage** designed a computing machine called the Difference Engine. This machine was to be used in the calculating and printing of simple math tables. In the 1830s, he designed a second computing machine called the Analytical Engine. This machine consist five units, which became the basic principle for the development of modern computer. Hence Charles Babbage is known as the "Father of Computers".

11. Write a note on memory unit?

The data and the instructions required for processing have to be stored in the memory unit before the actual processing starts. In a similar manner, the results generated from processing have to be preserved before it is displayed. The memory units thus provide space to store input data, intermediate results and the final output generated. Secondary storage devices are additional memory (storage) devices such as floppy disks, magnetic tapes, Hard Disk Drive (HDD), Compact Disk (CD), Digital Versatile Disk (DVD) etc., which are used to store huge information for future use.

12. What are the classifications of software?

The software is broadly classified into two types. They are

a. **System Software**: It is a type of computer program that is designed to control and work with computer hardware, to run a computer's hardware and application programs.
   Example: Microsoft Windows, Linux, DOS etc.
b. **Application software:** It is a type of Software written by the user to perform a particular task like drawing a picture, playing computer games.
   Example: Paint, Nudi and Office Package etc.

Answer the following questions (each carrying 5marks):

1. Explain the functional components of a computer.

A computer is designed using four basic units. They are:

a. Input unit
b. CPU
c. Memory Unit
d. Output Unit

- **Input Unit**

Computers need to receive data and instructions in order to solve a problem. The Input unit performs this operation. The Input Unit basically links the external world or environment to the computer system. The input unit may consist of one or more input devices. The Keyboard and mouse of a computer are the most commonly used input devices.

- **Central Processing Unit (CPU)**

It is the main part of a computer system like the heart of a human being. Most computers are identified by the type of CPU that is present in them. The function of the CPU is to interpret the instructions in the program and execute them one by one. It consists of two major units.

1. Control Unit: It controls and directs the transfer of program instructions and data between various units. The main activity is to maintain order and direct the operations of the entire system.

2. Arithmetic and Logic Unit (ALU): Arithmetic and Logic Unit performs arithmetic and logical operations and controls the speed of these operations. Arithmetic operations like addition, subtraction, multiplication and division (+,-,*, /) and logical operations like AND, OR, NOT and relational operations like (<,>, <=,>=) are being carried out in this unit.

- **Memory Unit**

The data and the instructions required for processing have to be stored in the memory unit before the actual processing starts. In a similar manner, the results generated from processing have to be preserved before it is displayed. The memory units thus provide space to store input data, intermediate results and the final output generated.

Secondary storage devices are additional memory (storage) devices such as floppy disks, magnetic tapes, Hard Disk Drive (HDD), Compact Disk (CD), Digital Versatile Disk (DVD) etc., which are used to store huge information for future use.

Note: The input unit, an output unit, and secondary storage devices are together known as Peripheral Devices.

- **Output Unit**

  It is used to print or display the results, which are stored in the memory unit. The actual function of the output unit is just the reverse of the input unit. Thus, the output unit links the computer to the outside world. The Monitor and Printer are the most commonly used output devices.

2. Explain the Generation of Computers.

First Generation of Computer (1940-1956)

- The first generation of computers is started with using vacuum tubes as the basic components.
- The speed of these computers was very slow, storage capacity was very less and these computers are large in size.
- This generation computers operated only on machine language.
- Input was based on punched card, paper tapes an output was obtained as printout.
- Some computers of this generation were ENIAC, UNIVAC.

Second Generation of Computer (1956-1963)

In this generation **transistors** were used in place of vacuum tubes.

- These machines were much faster, more reliable than their earlier machines.
- It generates less heat and consumed less electricity as compared to first generation computers.
- Second Generation computers used punched cards for input and printout for output.
- This computer moved from the use of machine language to assembly languages.
- The computer stored their instructions in their memory, which moved from magnetic drum to magnetic core technology.
- Some computers of this generation were IBM 1620, IBM 7094, CDC (Control Data Corporation) 1604 and 3600, and UNIVAC 1108.

Third Generation of Computer (1964-1971)

- In the third generation of computer **Integrated Circuits (IC's)** were used in place of transistors.
- In this generation, Keyboard and monitors were used instead of punched cards and printout.
- These IC’s were increased the speed of processing and storage capacity.
- These computers were more reliable, smaller in size and faster.

- Maintenance cost was low comparing to the previous generation and consumed less electricity.
- Some computers of this generation were IBM-360 series, Honeywell-6000 series, PDP (Personal Data Processor), IBM-370/168.

Fourth Generation of Computer (1971-1980)

- In the fourth generation of computer, **microprocessors** were used in place of Integrated Circuits(IC's).
- The fourth generation of com puters is marked by the use of Very Large Scale Integrated (VLSI) circuits.
- This made computers smaller i n size became more powerful, they could bi linked to form network.
- Some computers of this generation were Mini Computer and Mainframe computer, Personal computers.

Fifth Generation of Compu ter (1980-till date)

- Fifth generation computer inv olves the concept of **Artificial Intelligence (AI)** which made the computer think like human beings.
- This generation uses VLSI (Very Large Scale integration) and UL SI (Ultra Large Scale Integration) technology.
- These computers are more inte lligent and faster comparing to other generation computers.
- Types of this generation comp uters are Desktop, Laptop, Notebook, and Robot. etc.

3. Explain the features of super computers.

- Supercomputers were introduced in 1980. Super computer is the fastest computer.
- Supercomputer is the biggest in size and the most expensive in price than any other computers.
- Supercomputer is the most sophisticated, complex and advance computer.
- It has a very large storage capacity.
- It can process trillions of instructions in one second.
- Supercomputers are used for highly calculations intensive task.
- Supercomputers are designed for ultra-high performance tasks such as weather analysis, encryption cracking, and the creation of animation.

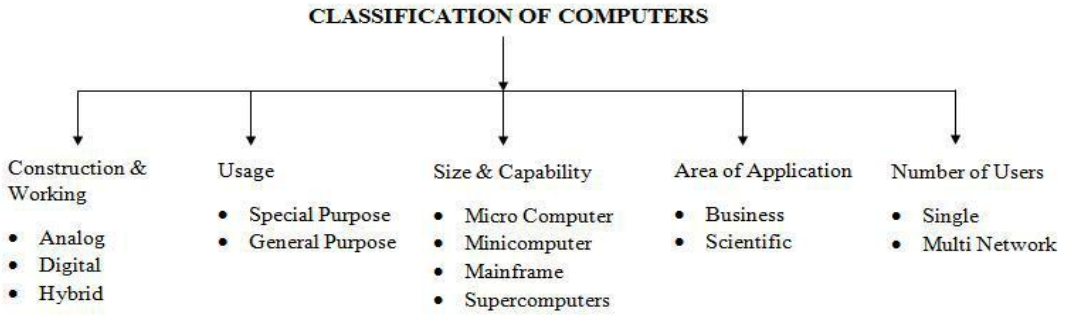
Example: IBM Roadrunner, IBM Blue Gene, PARAM Padma, etc.

Uses of Supercomputers

- Weather Forecasting
- Animated Graphics like Hollywood Movies

- Nuclear energy research
- Space Science
- Weapons and Missile design
- Petroleum Exploration

4. Explain the classification of computers.



Classification based on Purpose

According to purpose, computers are classified into general purpose and specific purpose. **General purpose computers** are designed to perform a range of tasks. They have an ability to store numerous programs but lack in speed and efficiency. **Specific purpose computers** are designed to handle a specific problem or to perform a specific task.

Classification based on Principles of Operation

According to principles of data handling, computers are classified into three types

Analog Computers

Analog computers work upon continuous data. Analog computer operates by measuring ratherthan counting. The analog computers are that all calculation take place in parallel, hence faster. Modern analog computers usually employ electrical parameters, such as voltages, resistances or currents, to represent the quantities being manipulated. Computations are carried out with the physical quantities, such as voltages, length, current, temperature etc. The device that measures such quantities are analog devices.

Digital Computer

The digital computer works upon discontinuous data. A digital computer operates on digital data such as numbers. It uses binary number system in which there are only two digits 0 and 1. Each one is called a bit. They convert the data into digits (Binary Digit 0 and 1) and all operations carried out on these digits at extremely fast rates. A digital computer basically knows how to count the digits and add the digit. Digital Computers are much faster than an analog computer and

far more accurate. Computers used for business and scientific applications are digital computers.

Hybrid Computers

Hybrid computer are the combination of both analog and digital computer. They accept both the analog and digital data for processing. Hybrid computers incorporate the measuring feature of an analog computer and counting feature of a digital computer. For computational purposes, these computers use analog components and for storage, digital memories are used. Hybrid computers are best used in hospitals and weather forcasting.

5. Explain the applications of computers.

- Schools and colleges
- Banks
- Office
- Stock control in business firms
- Stock exchange
- Research and developments
- Entertainment and news
- Government office
- Satellite communication
- Publishing
- Travel
- Computer-aided manufacturing (CAM)
- Hospital.

Assignment :

Explain in general how computers are used in different areas as mentioned in the above answer