STD: XI  COMPUTER SCIENCE

L.1. Introduction to computers

2 marks
1. What is a computer?
   Computer:
   ✓ A computer is an electronic machine, capable of performing basic operations like addition, subtraction, multiplication, division, etc.
   ✓ The computer is also capable of storing information, which can be used later.
   ✓ It can process millions of instructions in a few seconds and at the same time with high accuracy.

2. What is Data?
   DATA:
   ✓ Data is a collection of facts from which information may be derived.
   ✓ Data is defined as an un-processed collection of raw facts in a manner suitable for communication, interpretation or processing.
   Hence data are
   _ Stored facts
   _ Inactive
   _ Technology based
   _ Gathered from various sources

3. What is information?
   Information:
   ✓ Information is a collection of facts from which conclusions may be drawn.
   ✓ This information can be represented in textual, numerical, graphic, cartographic, narrative, or audiovisual forms.
   Hence information is
   _ Processed facts
   _ Active
   _ Business based
   _ Transformed from data

4. Define Algorithm.
   Algorithm:
   ✓ Algorithm is defined as a step-by-step procedure or formula for solving a problem i.e. a set of instructions or procedures for solving
A problem.
✓ It is also defined as a mathematical procedure that can **Data Processing Information** usually be explicitly encoded in a set of computer language instructions that manipulate data.

5. What is program?
Program:
✓ A computer **program** (or set of programs) is designed to systematically solve a problem.

6. Define Hardware.
Hardware:
✓ The term hardware refers to all the **physical items associated** with a computer system.

7. What is software:
✓ Software is a **set of instructions**, which enables the hardware to perform a specific task.
✓ Software refers to a **program that makes the computer to do something meaningful**.
✓ Software can be classified into two categories: **System Software** and **Application Software**.

8. Define Input device.
Input device
✓ **Input devices** allows the user to enter the program and data and send it to the processing unit. The common input devices are **keyboard, mouse and scanners**.

9. What is processor?
Processor:
✓ The **Processor**, more formally known as the **central processing unit (CPU)**, has the electronic circuitry that manipulates input data into the information as required. The central processing unit actually **executes computer instructions**.

10. Define Memory.
Memory:
✓ **Memory** from which the CPU fetches the instructions and data is called main memory. It is also called as primary memory and is volatile in nature.
11. What is Output device:

**Output device:**
- **Output devices** show the processed data – information – the result of processing. The devices are normally a **monitor** and **printers**.

12. Define storage:

**Storage:**
- **Storage** usually means **secondary storage**, which stores data and programs. Here the data and programs are permanently stored for future use.

13. What is Peripheral equipment?

**Peripheral equipment:**
- The **hardware devices attached to the computer** are called peripheral equipment.
- Peripheral equipment includes all **input**, **output** and **secondary storage devices**.


**System Software:**
- System software consists of general programs written for a computer.
- These programs **provide the environment to run the application programs**.
- System software comprises programs, which interact with the hardware at a very basic level.
- System software serves as the interface between hardware and the user.
- The **operating system**, **compilers** and **utility programs** are examples of system software.

15. What is operating system?

- An operating system is an **integrated set of specialized programs** that is used to manage the overall operations of a computer.
- It acts like an interface between the user, computer hardware and software.
- **DOS (Disk Operating System)**, **Unix**, **Linux** and **Windows** are some of the common operating systems.

16. Define compiler:

**Compiler:**
- The compiler software translates the source program into an object program.
- Specific compilers are available for computer programming languages like
FORTRAN, COBOL, C, C++ etc.

17. Define Application Software:
Application Software:
- An Application Software consists of programs designed to solve a user problem.
- Application software are in turn, controlled by system software which manages hardware devices.
- Some typical examples are: railway reservation system, game programs, word processing software, weather forecasting programs.

18. What is word processor?
Word processor:
- This software lets you create, edit, format, store and print text and graphics.
- Some of the commonly used word processors are Microsoft Word, WordStar, WordPerfect, etc.

19. Define Spreadsheet.
Spreadsheet:
- Spreadsheet software packages allow the user to manipulate numbers.
- Repetitive numeric calculations, use of related formulae and creation of graphics and charts are some of the basic tools.
- Lotus 1-2-3, Excel, etc. are some of the famous spreadsheet applications.

20. What is Database?
Database:
- A database management system is a collection of programs that enable to store, modify and extract information from a database.
- Computerized banking system, Automated Teller Machine, Airlines and Railway reservation system etc., are some of the database applications.

21. What is Analog computer?
Analog Computer:
- Analog Computer is a computing device that works on continuous range of values.
- The analog computers give approximate results since they deal with quantities that vary continuously.
- It generally deals with physical variables such as voltage, pressure, temperature, speed, etc.

22. What is Digital computer?
Digital Computer:
✓ 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.
✓ Digital Computers can give the results with more accuracy and at a faster rate.

23. What is Hybrid Computer?

Hybrid Computer:
✓ A hybrid computing system is a combination of desirable features of analog and digital computers.
✓ It is mostly used for automatic operations of complicated physical processes and machines.
✓ Hybrid computers are mainly used for specialized tasks.

24. Define Workstations.

Workstations:
✓ Workstations are also desktop machines mainly used for intensive graphical applications.
✓ They have more processor speed than that of personal computers.
✓ Workstations use sophisticated display screens featuring high-resolution colour graphics.
✓ Workstations are used for executing numeric and graphic intensive applications such as Computer Aided Design (CAD).

25. Define Personal computers.

Personal Computers
✓ These desktop computers are also known as home computers.
✓ They are usually easier to use and more affordable than workstations.
✓ Most often used for word processing and small database applications.


Laptop Computer:
✓ Laptop computers are **portable computers** that fit in a briefcase.
✓ **Laptop computers**, also called notebook computers, are wonderfully portable and functional, and popular with travelers who need a computer that can go with them.

27. Define Personal Digital Assistants.

Personal Digital Assistants:
✓ **Pen-based computers** use a pen like stylus and accept handwritten input directly on a screen.


✓ Pen-based computers are also called **Personal Digital Assistants (PDA)**.

**5 Marks:**

1. Discuss the various computer generation along with the key characteristics of the computer of each generation.

**Generation of Computers:**

The evolution of electronic computers over a period of time can be traced effectively by dividing this period into various generations. Each generation is characterized by a major technological development that fundamentally changed the way computers operated.

**First Generation - 1940-1956: Vacuum Tubes**

The first generation of computers used vacuum tubes for circuitry and magnetic drums for memory. They were large in size, occupied a lot of space and produced enormous heat. They were very expensive to operate and consumed large amount of electricity. Sometimes the heat generated caused the computer to malfunction. First generation computers operated only on machine language. Input was based on punched cards and paper tape, and output was displayed on printouts. First generation computers could solve only one problem at a time. The Universal Automatic Computer (UNIVAC) and the Electronic Numerical Integrator And Calculator (ENIAC) are classic examples of first-generation computing devices.

**Second Generation - 1956-1963: Transistors**

The second generation of computers witnessed the vacuum tubes being replaced by transistors. The transistor was far superior to the vacuum tube, allowing computers to become smaller, faster, cheaper, energy-efficient and more reliable than their first-generation counter parts. The transistors also generated considerable heat that sometimes caused the computer to malfunction. But it was a vast improvement over the vacuum tube. Second-generation computers used punched cards for input and printouts for output. Second-generation computers moved from the use of machine language to assembly languages, which allowed programmers to specify instructions in words. High-level programming languages were also being developed at this time, such as early versions of COBOL and FORTRAN. The computers stored their instructions in their memory, which moved from a magnetic drum to magnetic core technology.

The development of the integrated circuit left its mark in the third generation of computers. Transistors were made smaller in size and placed on silicon chips, which dramatically increased the speed and efficiency of computers. In this generation, keyboards and monitors were used instead of punched cards and printouts. The computers were interfaced with an operating system which allowed to solve many problems at a time.

**Fourth Generation - 1971-Present : Microprocessors**
The microprocessor brought forth the fourth generation of computers, as thousands of integrated circuits were built onto a single silicon chip. As these small computers became more powerful, they could be linked together to form networks, which eventually led to the development of the Internet.

**Fifth Generation - Present and Beyond: Artificial Intelligence**
Fifth generation computing devices, based on artificial intelligence, are still in their developmental stage. Fifth generation computers will come close to bridging the gap between computing and thinking.

2. Discuss the important features and uses of micro, mini, mainframe and super computers.

**Classification of Computers based on Configuration**
Based on performance, size, cost and capacity, the digital computers are classified into four different types: Super computers, Mainframe computers, Mini computers and Micro computers.

**Super Computers**
The mightiest computers but at the same time, the most expensive ones are known as super computers. Super computers process billions of instructions per second. In other words, super computers are the computers normally used to solve intensive numerical computations. Examples of such applications are stock analysis, special effects for movies, weather forecasting and even sophisticated artworks.

**Mainframe Computers**
Mainframe computers are capable of processing data at very high speeds - hundreds of million instructions per second. They are large in size. These systems are also expensive. They are used to process large amount of data quickly. Some of the obvious customers are banks, airlines and railway reservation systems, aerospace companies doing complex aircraft design, etc.

**Mini Computers**
The mini computers were developed with the objective of bringing out low cost computers. They are lower to mainframe computers, in terms of speed and storage capacity. Some of the hardware features available in mainframes were not included in the mini computer hardware in order to reduce the cost. Some features which were handled by hardware in mainframe computers were done by software in mini computers. Hence the performance of mini computer is less than that of the mainframe. However, the mini computer market has diminished somewhat as buyers have moved towards less expensive but increasingly powerful personal computers.

**Micro Computers**

The invention of microprocessor (single chip CPU) gave birth to the micro computers. They are several times cheaper than mini computers. The micro computers are further classified into workstation, personal computers, laptop computers and still smaller computers.

3. **Write the detail about computer software and their categories.**

**Computer Software**

Software refers to a program that makes the computer do something meaningful. It is the planned, step-by-step instructions required to turn data into information. Software can be classified into two categories: System Software and Application Software.

**System software:**

System software consists of general programs written for a computer. These programs provide the environment to run the application programs. System software serves as the interface between hardware and the user. The operating system, compilers and utility programs are examples of system software. An operating system is an integrated set of specialized programs that is used to manage the overall operations of a computer. It acts like an interface between the user, computer hardware and software. Every computer must have an operating system to run other programs. DOS (Disk Operating System), Unix, Linux and Windows are some of the common operating systems.

**Compiler**

The compiler software translates the source program (user written program) into an object program (binary form). Specific compilers are available for computer programming languages like FORTRAN, COBOL, C, C++ etc. The
utility programs support the computer for specific tasks like file copying, sorting, linking an object program, etc.

**Application Software**

An Application Software consists of programs designed to solve a user problem. It is used to accomplish specific tasks rather than just managing a computer system. Application software are in turn, controlled by system software which manages hardware devices.

M.GEETHA, M.Sc(IT)
COMPUTER INSTRUCTOR
V.M.G. RAJASEKARAN - RAMANI
SRI SARADA SAKTHI MHSS
VIRUDHUNAGAR