

IT Job Preparation All important Questions and Answers

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Computer Organization and Architecture

What is Computer

A computer is an electronic device that can process and store information. It can perform calculations, manipulate data, and execute instructions to accomplish specific tasks. The basic components of a computer include the central processing unit (CPU), memory (RAM), storage (hard drive or solid-state drive), input devices (keyboard, mouse, etc.), output devices (monitor, printer, etc.), and various peripheral devices (such as [USB](#) drives or external hard drives).

What is CPU?

The [CPU](#) is often considered the brain of the computer, as it performs most of the processing and calculations required for a computer to function. RAM is the temporary memory that stores data and instructions while the computer is running, while storage is the long-term memory where data is stored even when the computer is turned off.

Input devices allow users to input data or commands into the computer, while output devices display the results of the computer's processing. Peripheral devices are additional components that can be added to a computer to enhance its functionality. We humans understand language that is composed of words which further is composed of letters. But, the computers don't understand our language nor the words like "hello, good morning, discipline, etc". They only understand binary language whose vocabulary contains only two letters or states or symbols i.e. 0 and 1, True and False, On and Off. To maintain the state **transistors** are used.

- Transistors are tiny devices that are used to store 2 values 1 and 0 or on and off.
- If the transistor is on we say that it has a value of 1, and if it is off the value is 0.

What is software?

Software is a set of instructions that tells the computer what to do, when to do, and how to do it. Examples are, the paint that we use in Microsoft, WhatsApp, and games, all are types of different software. Suppose we want to add 2 numbers and want to know what $2 + 2$ is 4. Then we must give the computer instructions,

- **Step-1:** take 2 values.
- **Step-2:** a store that 2 value

- **Step-3:** add 2 value by using + operator
- **Step-4:** save the answer

Types of simple understanding of Computers

- **Personal computers (PCs):** These are the most common type of computer and are designed for personal use. PCs include desktops, laptops, and tablets.
- **Servers:** Servers are designed to manage and distribute resources and data to multiple users or devices. They are often used in businesses or organizations to store and share data and run applications.
- **Mainframes:** Mainframe computers are large, powerful machines that are designed to handle massive amounts of data and perform complex operations. They are often used in large corporations or government agencies.
- **Supercomputers:** Supercomputers are extremely powerful computers that are designed to process data at extremely high speeds. They are often used for scientific research and other specialized applications.
- **Embedded systems:** Embedded systems are small computers that are built into other devices, such as appliances, cars, and medical devices. They are designed to perform specific functions and operate without human intervention.
- **Wearable computers:** Wearable computers are small, portable devices that are worn on the body, such as smartwatches or fitness trackers. They are designed to track data and provide information on the go.

Features of a computer include

- **Processor:** The processor is the brain of the computer, and it carries out all the instructions and calculations required by the system.
- **Memory:** The memory or [RAM \(Random Access Memory\)](#) stores data temporarily for the processor to access quickly.
- **Storage:** Storage devices like hard disks, solid-state drives, or external drives provide long-term storage for data and files.
- **Input devices:** Input devices like keyboards, mice, scanners, and cameras enable the user to provide data and instructions to the computer.
- **Output devices:** Output devices like monitors, printers, and speakers display the results of the computer's processing.
- **Operating System:** The [operating system](#) manages the computer's resources, controls the hardware, and runs application programs.
- **Networking:** Networking capabilities allow computers to communicate and share resources with other computers and devices.
- **Software:** Software is the set of instructions that tell the computer what to do, and it can range from simple applications to complex programs.
- **Graphics and Sound:** Graphics and sound capabilities enable the computer to display and manipulate images and play sounds and videos.
- **Connectivity:** Connectivity features like [USB](#), Wi-Fi, [Bluetooth](#), and Ethernet enable the computer to connect to other devices and the internet.

Advantages of computers

- **Increased efficiency and productivity:** Computers can perform tasks much faster and more accurately than humans, allowing for increased efficiency and productivity in various industries.
- **Storage and organization of information:** Computers can store large amounts of data and organize it in a way that is easily accessible and searchable.
- **Improved communication:** Computers enable people to communicate easily and instantly with others, regardless of their location.
- **Access to information and resources:** The internet provides access to a vast amount of information and resources that would otherwise be difficult or impossible to obtain.
- **Automation of repetitive tasks:** Computers can automate repetitive and mundane tasks, freeing up time and resources for more important work.

Disadvantages of computers

- **Dependence on technology:** Over-reliance on computers can lead to problems if they break down or malfunction, leading to loss of productivity and data.
- **Security risks:** Computers can be vulnerable to viruses, malware, and hacking, leading to data breaches and other security risks.
- **Social isolation:** The overuse of computers can lead to social isolation and reduced face-to-face interaction, leading to social and emotional problems.
- **Environmental impact:** The production and disposal of computers can have a negative impact on the environment due to the use of resources and the creation of electronic waste.
- **Job displacement:** Automation and the use of computers can lead to job displacement in certain industries, requiring workers to adapt to new skill sets or find new employment.

Frequently Asked Questions

Q.1: What is a computer?

Answer:

A computer is an electronic device that can perform various operations and tasks based on a set of instructions, known as programs. It is capable of processing, storing, and retrieving data, as well as executing complex calculations and logical operations. Computers consist of hardware components, such as the central processing unit (CPU), memory, storage devices, input/output devices, and software that controls and manages their operations.

Q.2: What are the primary components of a computer?

Answer:

The primary components of a computer include:

Central Processing Unit (CPU): It is the “brain” of the computer responsible for executing instructions and performing calculations.

Memory: It stores data and instructions that the CPU can quickly access during processing. This includes Random Access Memory (RAM) for temporary storage and cache memory for faster access to frequently used data.

Storage Devices: These devices provide long-term storage for data, programs, and files. Examples include hard disk drives (HDD), solid-state drives (SSD), and optical drives.

Input Devices: These devices allow users to input data or commands into the computer, such as keyboards, mice, touchscreens, scanners, and microphones.

Output Devices: These devices display or provide output from the computer, including monitors, printers, speakers, and headphones.

Motherboard: It is the main circuit board that connects and allows communication between various components of the computer.

Q.3: What are the different types of computers?

Answer:

There are various types of computers, including:

Personal Computers (PCs): *These are general-purpose computers designed for individual users. They include desktop computers, laptops, and tablets.*

Servers: *Servers are computers designed to provide resources and services to other computers or devices on a network. They often handle tasks such as data storage, file sharing, or running web applications.*

Mainframes: *Mainframe computers are powerful systems capable of handling large-scale processing and data storage. They are commonly used by large organizations for critical business applications.*

Supercomputers: *Supercomputers are highly advanced and powerful computers designed to handle complex scientific calculations, simulations, and data analysis.*

Embedded Systems: *Embedded systems are specialized computers integrated into other devices or systems to perform specific functions. They can be found in appliances, vehicles, medical devices, and industrial equipment.*

Q.4: What is the role of software in a computer?

Answer:

Software refers to the programs, applications, and operating systems that run on a computer. It provides instructions and enables the computer hardware to perform specific tasks and operations. Software can be classified into two main types:

System Software: This includes the operating system, device drivers, and utility programs that manage and control the computer's hardware, memory, and other system resources.

Application Software: Application software consists of programs designed to perform specific tasks or applications for users. Examples include word processors, web browsers, graphics editors, and database management systems.

Q.5: How does a computer process data?

Answer:

Computers process data through a series of steps:

Input: Data is entered into the computer using input devices such as keyboards, mice, or sensors. It can be in the form of text, numbers, images, or any other digital format.

Processing: The computer's CPU performs calculations, manipulates data, and executes instructions based on the input received. It follows the instructions provided by software programs.

Storage: Data that needs to be retained for future use is stored in memory or secondary storage devices, such as hard drives or solid-state drives. Memory holds temporary data during processing, while storage devices provide long-term storage.

Output: The processed data is presented to the user through output devices, such as monitors, printers, or speakers. It can be in the form of text, images, sound, or any other format based on the nature of the output device.

Q.6: Can a computer work without the Internet?

Answer:

Yes, computers can work without an internet connection. The Internet is a global network that connects computers and enables communication and access to online resources. However, computers can perform a wide range of tasks offline, such as running software applications, playing media, processing data, and performing calculations. The internet is not a mandatory requirement for the basic functioning of a computer, although it provides additional functionality and access to online services.

1. Assembly level language :

It is a low-level language that allows users to write a program using alphanumeric mnemonic codes, instead of numeric code for a set of instructions. Examples of large assembly language programs from this time are IBM PC DOS.

2. High-level language :

It is a machine-independent language. It enables a user to write a program in a language that resembles English words and familiar mathematical symbols, COBOL was the first high-level language. Examples of high-level language are python, c#, etc.

Difference between assembly language and high-level language :

ASSEMBLY LEVEL LANGUAGE	HIGH-LEVEL LANGUAGE
• It needs an assembler for conversion	• It needs a compiler/interpreter for conversion