



computer science

CLASS XI

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CHAPTER -1

Computer System

2MARK QUESTIONS

Q1: Define Computer System.

Answer:

A computer system is an integrated set of hardware and software components that work together to process data and perform tasks. It consists of the central processing unit (CPU), memory, storage devices, input devices, output devices, and system software.

Q2: Differentiate between hardware and software.

Answer:

Hardware refers to the physical components of a computer system, such as the CPU, memory, and peripherals. Software, on the other hand, consists of programs and instructions that tell the hardware how to perform tasks. In summary, hardware is tangible, while software is intangible.

Q3: Explain the role of the CPU in a computer system.

Answer:

The Central Processing Unit (CPU) is the brain of a computer system. It executes instructions stored in memory, performs calculations, and manages the flow of data within the system. It consists of the control unit, arithmetic logic unit (ALU), and registers.

Q4: Describe the primary function of RAM in a computer.

Answer:

RAM (Random Access Memory) is volatile memory that stores data and machine code currently being used and processed by the CPU. It allows for quick read and write access, providing fast data retrieval compared to other types of storage. However, it loses its content when the computer is powered off.

Q5: What is the purpose of an operating system?

Answer:

An operating system (OS) acts as an intermediary between the user and the computer hardware. It manages system resources, provides a user interface, facilitates communication between hardware and software components, and ensures the smooth execution of programs.

Q6: Differentiate between input and output devices.

Answer:

Input devices are used to enter data into a computer system, such as keyboards and mice. Output devices, on the other hand, display or present processed information from the computer, like monitors and printers.

Q7: Explain the concept of binary system in computing.

Answer:

The binary system is a base-2 number system used in computing, where each digit (bit) can be either 0 or 1. It is the fundamental language of computers, allowing them to represent and process data in the form of binary code.

Q8: Define the term 'Peripheral' in the context of computer systems.

Answer:

A peripheral is an external device connected to a computer system to provide additional functionality. Examples include printers, scanners, and external storage devices.

Q9: What is the purpose of secondary storage in a computer system?

Answer:

Secondary storage is used to store data permanently, even when the computer is turned off. It includes devices like hard drives and solid-state drives, providing non-volatile storage for the long-term retention of data.

Q10: Briefly explain the difference between ROM and RAM.

Answer:

ROM (Read-Only Memory) is non-volatile memory that stores firmware and is not easily modified. It retains data even when the power is off. RAM (Random Access Memory) is volatile memory used for temporary data storage during active processing, and its content is lost when the power is turned off.

4MARK QUESTIONS

Q1: Discuss the components of the Central Processing Unit (CPU) in detail.

Answer:

The CPU comprises the Control Unit (CU), Arithmetic Logic Unit (ALU), and registers. The Control Unit manages the flow of data within the CPU and controls the execution of instructions. The ALU performs arithmetic and logical operations. Registers are small, high-speed storage locations within the CPU used for temporary data storage during processing.

Q2: Compare and contrast primary and secondary storage devices, highlighting their respective roles in a computer system.

Answer:

Primary storage (e.g., RAM) is volatile and used for temporary data storage during active processing. Secondary storage (e.g., hard drives) is non-volatile and used for long-term data retention. While primary storage provides fast access to data, secondary storage offers larger storage capacities and retains data even when the computer is powered off.

Q3: Elaborate on the functions of an operating system and discuss its significance in managing computer resources.

Answer:

An operating system (OS) manages hardware resources, provides user interfaces, facilitates communication between hardware and software, and ensures the orderly execution of programs. It allocates memory, schedules tasks, manages file systems, and handles input and output operations. The OS is crucial for efficient resource utilization and user interaction.

Q4: Explain the concept of binary representation and its importance in computer systems. Provide examples to illustrate binary conversion.

Answer:

Binary representation is a base-2 numbering system used in computers. Each digit (bit) is either 0 or 1. It is fundamental for digital data representation and processing. For example, the binary representation of the decimal number 13 is

1101. Binary conversions involve expressing data in binary form, facilitating digital communication and computation.

Q5: Describe the role of input devices in a computer system. Provide examples and discuss their significance in data entry.

Answer:

Input devices, such as keyboards and mice, enable users to enter data into a computer system. They convert human-readable information into a format the computer can process. Examples include scanners and microphones. Input devices are crucial for data entry, communication, and interaction with the computer.

Q6: Explore the distinction between system software and application software. Provide examples of each and discuss their specific functions.

Answer:

System software, like operating systems and device drivers, manages computer hardware and provides essential services. Application software, such as word processors and web browsers, allows users to perform specific tasks. While system software facilitates overall system operation, application software serves user needs and preferences.

Q7: Discuss the characteristics of Random Access Memory (RAM) and explain its role in a computer system.

Answer:

RAM is volatile memory that provides fast read and write access. It stores data and machine code currently in use by the CPU. RAM facilitates quick data retrieval but loses its content when the computer is powered off. Its characteristics include speed, volatility, and temporary data storage during active processing.

Q8: Explain the boot process of a computer system. Outline the key steps involved from powering on to loading the operating system.

Answer:

The boot process involves powering on the computer, initializing hardware components, loading the BIOS or UEFI firmware, conducting a Power-On Self-Test (POST), and initiating the bootloader. The bootloader loads the operating system into memory, allowing the system to transition from a powered-off state to a fully operational state.

Q9: Compare and contrast sequential access and random access storage devices. Provide examples of each and discuss their applications.

Answer:

Sequential access storage devices, like magnetic tapes, read data sequentially, limiting access to specific points. Random access storage devices, such as hard drives and SSDs, allow direct access to any location. While sequential access is suitable for large-scale data storage, random access devices offer quicker data retrieval, making them ideal for everyday computing tasks.

Q10: Elaborate on the concept of cache memory in a computer system. Discuss its purpose, types, and how it enhances system performance.

Answer:

Cache memory is a small-sized, high-speed type of volatile computer memory that provides high-speed data access to the CPU and stores frequently used instructions and data. It reduces the average time to access data, enhancing system performance. There are different levels of cache (L1, L2, and L3) with varying proximity to the CPU, and each level serves to speed up data retrieval by storing copies of frequently accessed information.

7MARK QUESTIONS

Q1: Describe the architecture of a computer system, highlighting the roles of the CPU, memory, and input/output devices. Discuss how data flows between these components during the execution of a program.

Answer:

The architecture of a computer system involves the Central Processing Unit (CPU), memory (RAM), and input/output devices. The CPU executes instructions stored in memory, utilizing the control unit, arithmetic logic unit (ALU), and registers. Input devices facilitate data entry, while output devices present processed information. Data flows from input devices to memory for processing by the CPU, and the results are then stored or sent to output devices.

Q2: Compare and contrast primary and secondary storage devices, considering factors such as speed, volatility, and capacity. Provide examples and discuss their significance in the overall storage hierarchy of a computer system.

Answer:

Primary storage (e.g., RAM) is volatile, fast, and used for active data processing, but loses data when the power is off. Secondary storage (e.g., hard drives) is non-volatile, slower, and provides larger storage capacities for long-term data retention. The storage hierarchy involves using primary storage for quick access and secondary storage for permanent storage, balancing speed and capacity.

Q3: Explore the functions of an operating system (OS) in detail. Discuss its role in managing hardware resources, providing user interfaces, and ensuring the smooth execution of programs. Provide examples of popular operating systems and their applications.

Answer:

An operating system manages hardware resources, allocates memory, schedules tasks, handles input/output operations, and provides user interfaces. Examples include Windows, macOS, and Linux. The OS is crucial for efficient resource utilization, facilitating communication between software and hardware, and enhancing user experience.

Q4: Elaborate on the binary system in computing. Discuss its importance in representing data and executing operations in computer systems. Provide examples of binary representation and conversion.

Answer:

The binary system is a base-2 numbering system crucial in computing. It uses 0s and 1s to represent data. Binary is fundamental for digital data representation and processing in computers. Examples of binary representation and conversion involve expressing numbers, characters, and instructions in binary form to enable computer operations.

Q5: Discuss the significance of input devices in a computer system. Provide a detailed analysis of different types of input devices, their working principles, and applications.

Answer:

Input devices enable users to interact with a computer system. Types include keyboards, mice, scanners, and microphones. They convert human-readable information into a format the computer can process. Each type has specific working principles and applications, contributing to efficient data entry and communication with the computer.

Q6: Differentiate between system software and application software. Provide examples of each category and discuss how they contribute to the functionality of a computer system.

Answer:

System software, like operating systems and device drivers, manages hardware and provides essential services. Application software, such as word processors and web browsers, allows users to perform specific tasks. System software facilitates overall system operation, while application software serves user needs and preferences, enhancing the computer's functionality.

Q7: Analyze the characteristics and functions of Random Access Memory (RAM) in a computer system. Discuss how RAM contributes to system performance and why it is considered volatile memory.

Answer:

RAM is volatile, high-speed memory used for temporary data storage during active processing. It facilitates quick access to data, contributing to system performance. RAM characteristics include speed, volatility, and its role in

providing the CPU with fast read and write access to data during program execution.

Q8: Explain the boot process of a computer system in detail. Outline the key steps involved, from powering on to loading the operating system. Discuss the role of firmware, POST, and bootloader in the boot sequence.

Answer:

The boot process involves powering on the computer, initializing hardware, loading firmware (BIOS or UEFI), conducting a Power-On Self-Test (POST), and initiating the bootloader. The bootloader loads the operating system into memory, transitioning the system from a powered-off state to a fully operational state. Firmware, POST, and the bootloader are critical components in ensuring a successful boot sequence.

Q9: Compare and contrast sequential access and random access storage devices. Provide examples of each and discuss their specific characteristics and applications.

Answer:

Sequential access storage devices (e.g., magnetic tapes) read data sequentially, suitable for large-scale storage. Random access storage devices (e.g., hard drives, SSDs) allow direct access to any location, providing quick data retrieval for everyday computing tasks. Their characteristics and applications differ based on their access methods and usage scenarios.

Q10: Explore the concept of cache memory in a computer system. Discuss its purpose, types, and how it enhances system performance. Provide examples of real-world applications where cache memory plays a crucial role.

Answer:

Cache memory is high-speed, small-sized volatile memory that stores frequently used instructions and data, reducing average data access time and enhancing system performance. Types include L1, L2, and L3 caches. Examples of real-world applications include web browsers, where caching helps in faster webpage loading, demonstrating the importance of cache memory in optimizing system responsiveness.

Multiple-Choice Questions (MCQs):

Q 1: What is the primary function of the CPU in a computer system?

- a) Long-term data storage**
- b) Input device management**
- c) Data processing and execution of instructions**
- d) Output device control**

Answer: c) Data processing and execution of instructions

Q 2: Which of the following is a volatile storage device?

- a) Hard disk drive (HDD)**
- b) Solid State Drive (SSD)**
- c) Random Access Memory (RAM)**
- d) USB flash drive**

Answer: c) Random Access Memory (RAM)

Q 3: What does the binary system in computing use for representation?

- a) Base-8**
- b) Base-10**
- c) Base-16**
- d) Base-2**

Answer: d) Base-2

Q 4: Which component of a computer system provides permanent storage for data even when the power is off?

- a) RAM**
- b) CPU**
- c) Secondary storage**
- d) Cache memory**

Answer: c) Secondary storage

Q 5: What is the main purpose of an operating system (OS)?

- a) Data processing**
- b) Hardware management**
- c) User interface design**
- d) Output device control**

Answer: b) Hardware management

Q 6: Which input device is commonly used for capturing printed or handwritten documents and converting them into digital form?

- a) Mouse**
- b) Keyboard**
- c) Scanner**
- d) Microphone**

Answer: c) Scanner

Q 7: What type of software manages and controls the basic functions of a computer system, such as memory and peripheral devices?

- a) Application software**
- b) System software**
- c) Utility software**
- d) Firmware**

Answer: b) System software

Q 8: What is the primary role of cache memory in a computer system?

- a) Long-term data storage**
- b) Speeding up data access by storing frequently used instructions and data**
- c) Managing input devices**
- d) Providing a user interface**

Answer: b) Speeding up data access by storing frequently used instructions and data

Q 9: Which of the following storage devices uses sequential access for reading and writing data?

- a) Hard disk drive (HDD)**
- b) Solid State Drive (SSD)**
- c) Magnetic tape**
- d) USB flash drive**

Answer: c) Magnetic tape

Q 10: What is the main characteristic of Random Access Memory (RAM)?

- a) Volatility**
- b) Long-term data storage**
- c) Sequential data access**
- d) Slow data retrieval speed**

Answer: a) Volatility

Fill in the Blanks:

Q1. in the Blank 1: The CPU consists of the _____, _____, and registers.

Answer: Control Unit, Arithmetic Logic Unit (ALU)

Q2: Secondary storage devices provide _____ storage for data.

Answer: Permanent

Q3: The binary system uses _____ as its base for data representation.

Answer: 2

Q4: An operating system manages hardware resources, provides user interfaces, and ensures the _____ execution of programs.

Answer: Smooth

Q5: Input devices, such as keyboards and mice, enable users to _____ data into a computer system.

Answer: Enter

Q6: _____ software manages computer hardware and provides essential services.

Answer: System

Q7: Cache memory is a high-speed, small-sized volatile memory that stores frequently used instructions and data, reducing average data _____ time.

Answer: Access

Q 8: Sequential access storage devices, like _____, read data sequentially.

Answer: Magnetic tapes

Q9: RAM is volatile memory used for _____ data storage during active processing.

Answer: Temporary

Q 10: The bootloader loads the _____ into memory during the computer boot process.

Answer: Operating system