

VICTORIA UNIVERSITY OF BANGLADESH

MID TERM ASSESSMENT

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Programming Techniques.

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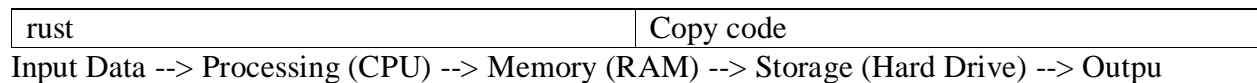
Question no 01(a)

Define Computer and draw the data processing diagram.

Answer to the question no 01(a)

A computer is a programmable electronic device designed to perform a variety of tasks by executing instructions stored in its memory. It consists of hardware components such as a central processing unit (CPU), memory, storage devices, input/output devices, and a motherboard that connects everything together. Software, including operating systems and applications, enables users to interact with the computer and utilize its capabilities.

Here's a simplified data processing diagram illustrating the basic components and flow of data within a computer system:



Input Data: This represents any information or commands entered into the computer system through input devices such as keyboards, mice, touchscreens, or other sensors.

Processing (CPU): The central processing unit (CPU) is the brain of the computer. It executes instructions and performs calculations on the input data according to the program or software being run.

Memory (RAM): Random-access memory (RAM) is a volatile form of memory where data and instructions are temporarily stored while the CPU processes them. RAM allows for quick access to data, speeding up processing.

Storage (Hard Drive): Data that needs to be retained beyond the current session is stored on non-volatile storage devices such as hard disk drives (HDDs) or solid-state drives (SSDs). These devices provide long-term storage for files, programs, and operating systems.

Output: Processed data or results are sent to output devices such as monitors, printers, speakers, or other display devices, where users can perceive or utilize the information generated by the computer.

This diagram represents the fundamental flow of data within a computer system, from input to processing to output, highlighting the key components involved in data processing.

Question no 01(b)

List the characteristics of modern computer.

Answer to the question no 01(b)

Modern computers exhibit several key characteristics that distinguish them from earlier models. Here are some of the prominent features:

High Speed: Modern computers are capable of executing billions of instructions per second (gigahertz speed), enabling rapid processing of tasks and calculations.

Vast Storage Capacity: They offer large storage capacities, ranging from gigabytes to terabytes and beyond, allowing users to store vast amounts of data including documents, media files, and applications.

Multitasking: Modern computers support multitasking, enabling users to run multiple programs simultaneously without significant performance degradation. This is facilitated by powerful processors and sufficient memory (RAM).

Connectivity: They are equipped with various connectivity options such as Ethernet, Wi-Fi, Bluetooth, and USB, enabling seamless communication and data transfer between devices and networks.

User Interface: Modern computers feature user-friendly graphical user interfaces (GUIs) that allow users to interact with the system using visual elements such as icons, windows, and menus. This simplifies navigation and enhances usability.

Portability: While traditional desktop computers remain prevalent, modern computing devices also include laptops, tablets, and smartphones, offering portability and flexibility for users to work and access information from anywhere.

Power Efficiency: There's a growing emphasis on power efficiency in modern computers, with advancements in processor architectures and energy-saving features aimed at reducing power consumption and extending battery life in portable devices.

Scalability: Modern computers are often modular and scalable, allowing users to upgrade components such as processors, memory, and storage to meet evolving performance requirements and technological advancements.

Security Features: With increasing concerns about cybersecurity, modern computers incorporate advanced security features such as encryption, biometric authentication, firewalls, and antivirus software to protect against malware, data breaches, and unauthorized access.

Cloud Integration: Many modern computing platforms integrate with cloud services, enabling users to store data remotely, access applications and resources over the internet, and collaborate with others in real-time.

These characteristics collectively contribute to the efficiency, versatility, and connectivity of modern computers, empowering users with powerful tools for communication, productivity, entertainment, and creativity.

Question no 02(a)

What are the difference between 3rd and 4th generation of computer?

Answer to the question no 02(a)

The transition from the third generation to the fourth generation of computers represents a significant evolution in computer technology, marked by several key differences:

Integrated Circuits vs. Microprocessors:

Third-generation computers primarily utilized integrated circuits (ICs), which were small silicon chips containing multiple transistors and other electronic components.

Fourth-generation computers introduced microprocessors, which integrated the CPU (Central Processing Unit) onto a single chip. This consolidation of components greatly improved performance and reduced the size and cost of computers.

Miniaturization and Portability:

Fourth-generation computers were characterized by significant miniaturization and portability compared to their predecessors. Microprocessors enabled the development of smaller and more lightweight computers, leading to the emergence of personal computers (PCs), laptops, and other portable devices.

Increased Processing Power:

Fourth-generation computers exhibited much higher processing power compared to third-generation systems. Microprocessors were capable of executing instructions at faster speeds, enabling quicker data processing and improved performance for a wide range of applications.

Operating Systems and Software:

Fourth-generation computers saw the development of more advanced operating systems and software applications tailored to the capabilities of microprocessor-based systems. Graphical user interfaces (GUIs) became more prevalent, enhancing user interaction and ease of use.

Memory and Storage:

Fourth-generation computers featured advancements in memory and storage technology, including the introduction of dynamic random-access memory (DRAM) for faster and more efficient memory access.

Storage capacities also increased significantly with the adoption of magnetic disk drives and later solid-state drives (SSDs), allowing for larger storage capacities and faster data retrieval.

Networking and Connectivity:

Fourth-generation computers facilitated greater networking and connectivity capabilities compared to third-generation systems. The proliferation of microprocessor-based computers led to the development of local area networks (LANs) and eventually the internet, enabling seamless communication and data sharing between computers.

Specialized Applications:

Fourth-generation computers enabled the development of specialized applications and technologies in various fields, including multimedia, gaming, telecommunications, and scientific research. The increased processing power and capabilities of microprocessor-based systems drove innovation across multiple industries.

Overall, the transition from the third generation to the fourth generation of computers represented a paradigm shift in computing technology, ushering in an era of smaller, more powerful, and more versatile machines that revolutionized the way we work, communicate, and interact with technology.

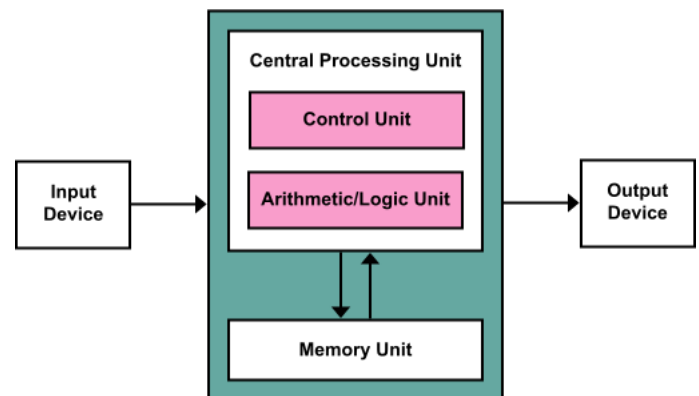
Question no 02(b)

Draw and explain the CPU basic architecture.

Answer to the question no 02(b)

Certainly! The Central Processing Unit (CPU) is the primary component of a computer responsible for executing instructions and performing calculations.

Here's a simplified diagram and explanation of the basic architecture of a CPU:



Control Unit:

The Control Unit (CU) directs the operation of the CPU by fetching instructions from memory, decoding them, and executing them. It coordinates the activities of other components within the CPU.

Arithmetic Logic Unit (ALU):

The Arithmetic Logic Unit (ALU) performs arithmetic and logical operations on data. It can perform basic operations such as addition, subtraction, AND, OR, and NOT operations.

Registers:

Registers are small, high-speed storage units located within the CPU. They hold data, instructions, and intermediate results during processing. Common types of registers include:

Program Counter (PC): Stores the memory address of the next instruction to be fetched.

Instruction Register (IR): Holds the current instruction being executed.

Memory Address Register (MAR): Stores the memory address from which data is to be fetched or to which data is to be written.

Memory Data Register (MDR): Contains the data being fetched or written to memory.

Accumulator: Stores the result of arithmetic and logical operations performed by the ALU.

Control and Data Bus:

The Control Bus carries control signals between the CPU and other components, indicating the type of operation to be performed (read, write, etc.).

The Data Bus carries data between the CPU, memory, and input/output devices. It transfers both instructions and data during processing.

The basic operation of the CPU involves the Control Unit fetching instructions from memory, decoding them, and then executing them using the ALU. Registers are used to store data and intermediate results during processing. The Control and Data Bus facilitate communication between the CPU and other components of the computer system, enabling the transfer of instructions and data. This architecture forms the foundation of modern CPUs, which vary in complexity and capabilities based on factors such as architecture, instruction set, and clock speed.

Question no 02(c)

Write down the differences between primary and secondary storage.

Answer to the question no 02(c)

Primary storage and secondary storage are two types of storage devices used in computer systems, each serving different purposes and possessing distinct characteristics. Here are the key differences between primary and secondary storage:

Nature:

Primary storage, also known as main memory or RAM (Random Access Memory), is volatile memory that temporarily stores data and instructions that are actively being used by the CPU. It is directly accessible by the CPU for fast read and write operations.

Secondary storage, such as hard disk drives (HDDs), solid-state drives (SSDs), optical disks, and magnetic tapes, is non-volatile memory used for long-term storage of data and programs. It retains data even when the power is turned off and is not directly accessed by the CPU for processing.

Speed:

Primary storage is much faster than secondary storage. Access to data in primary storage is nearly instantaneous, allowing for quick retrieval and manipulation of data by the CPU.

Secondary storage is slower compared to primary storage. Retrieving data from secondary storage involves mechanical processes (in the case of HDDs) or electronic processes (in the case of SSDs), which are significantly slower than accessing data from primary storage.

Capacity:

Primary storage has a smaller capacity compared to secondary storage. It is typically limited by the amount of physical memory installed on the computer system, ranging from gigabytes (GB) to terabytes (TB).

Secondary storage offers much larger storage capacities compared to primary storage. HDDs and SSDs can store multiple terabytes of data, while optical disks and magnetic tapes can store even more, making them suitable for storing large volumes of data and media files.

Volatility:

Primary storage is volatile memory, meaning that it loses its contents when the power is turned off. Data stored in primary storage is only retained temporarily while the computer is powered on.

Secondary storage is non-volatile memory, meaning that it retains its contents even when the power is turned off. Data stored in secondary storage remains intact for long periods, making it suitable for permanent storage and data backup.

Cost:

Primary storage is more expensive on a per-unit basis compared to secondary storage. The cost per gigabyte of primary storage is higher due to its faster speed and more advanced technology.

Secondary storage is more cost-effective for storing large amounts of data over extended periods. The cost per gigabyte of secondary storage is lower, making it suitable for bulk data storage and archival purposes.

Overall, primary storage and secondary storage serve complementary roles in computer systems, with primary storage providing fast, temporary storage for active data and secondary storage offering larger, long-term storage for persistent data.

Question no 03

Convert the number:

[Answer to the question no 03\(a\)](#)

275.125 in decimal is equal to 423.1 in octal.

[Answer to the question no 03\(b\)](#)

AC0.1ECF in hexadecimal is equal to approximately 44033.1195 in decimal.

[Answer to the question no 03\(c\)](#)

100111.1011 in binary is equal to 39.6875 in decimal.

[Answer to the question no 03\(d\)](#)

15435.063 in octal is equal to approximately 6941.099609375 in decimal.