KAMSC Sophomore Computer Science Semester 1 Practice Test (Sample)

Study Guide

Everything you need from our exam experts!

Questions

1. What does the term 'Bit' refer to in computer science?

A. Binary digit

B. Decimal digit

C. Hexadecimal digit

D. Octal digit

2. What role does a system clock play in a computer?

A. It processes input commands

B. It controls the speed of operations of the CPU

C. It manages memory allocation

D. It provides power to the internal components

3. What type of file contains pre-made code that declares certain functions in C++?

A. Source file

B. Executable file

C. Header file

D. Library file

4. What invention allowed computers to become smaller and more powerful by replacing vacuum tubes?

A. Microprocessors

B. Transistors

C. Integrated circuits

D. Relays

5. Which of the following is a PC operating system?

A. Android

B. Ubuntu

C. Mac OS

D. DOS

6. What is a key feature of a microprocessor?

A. It is only used for data storage

B. It performs computations and processing tasks

C. It cannot run software programs

D. It requires multiple power sources

7. Approximately how many bytes are in a terabyte (TB)?

A. 1 billion

B. 1 trillion

C. 1 million

D. 1024

8. Which tables were developed to help gunners aim their weapons accurately?

A. Trajectory tables

B. Range tables

C. Firing tables

D. Calibration tables

9. Which of the following is NOT a type of loop structure in C++?

A. for loop

B. while loop

C. do-while loop

D. until loop

10. Which data type typically represents a floating-point number?

A. int

B. char

C. float

D. bool

Answers

1. A
2. B
3. C
4. B
5. D
6. B
7. B
8. C
9. D
10. C

Explanations

1. What does the term 'Bit' refer to in computer science?

A. Binary digit

B. Decimal digit

C. Hexadecimal digit

D. Octal digit

The term 'Bit' in computer science refers to a binary digit, which is the fundamental unit of data in computing and digital communications. A bit can hold one of two possible values: 0 or 1. This binary system is foundational for all computer processes and represents the most basic level of information storage and manipulation in electronic circuitry. Each bit is essential for forming larger data units, such as bytes, which consist of eight bits. By combining multiple bits, computers can represent more complex data types, including numbers, letters, and other symbols. Using bits enables efficient data processing and communication, as all computational tasks ultimately break down to binary operations. Thus, understanding the significance of a bit is crucial for grasping how computers function at a fundamental level.

2. What role does a system clock play in a computer?

A. It processes input commands

B. It controls the speed of operations of the CPU

C. It manages memory allocation

D. It provides power to the internal components

The system clock is a fundamental component of a computer that determines the timing of all operations within the CPU, effectively controlling the speed of these operations. It generates a series of pulses at a constant rate, which helps synchronize the actions of the hardware within the computer. Each pulse can signal the CPU to perform a task, move data, or execute instructions, thereby regulating how fast the processor can perform calculations and manage tasks. By defining a clock rate (measured in hertz), the system clock ensures that all components are working in harmony, processing information in a timely manner. If the clock speed is higher, the CPU can execute more instructions per second, leading to better overall performance. This is why understanding the role of the system clock is crucial when considering the efficiency and speed of computer operations. The other options do not accurately describe the function of the system clock; for example, processing input commands, managing memory allocation, and providing power are performed by different components within the computer system.

3. What type of file contains pre-made code that declares certain functions in C++?

A. Source file

B. Executable file

C. Header file

D. Library file

A header file in C++ is a type of file that typically contains declarations of functions, classes, variables, and other constructs that can be shared across multiple source files. By including a header file in a source file using the `#include` directive, the compiler gains access to the declarations contained within that header, allowing the programmer to use the declared functions or classes without having to rewrite their definitions in every source file. Header files are essential for code organization, as they help manage dependencies in a modular way. They usually have the extension `.h` or `.hpp` and are a key part of the C++ programming model, especially when working with large applications where multiple source files are compiled together. The other options include source files, which contain the actual implementation of functions; executable files, which are the compiled result of C++ code that can be run on a machine; and library files, which might contain compiled code that can be linked to other programs at compile time or run time. While library files can contain a collection of functions, header files specifically serve the purpose of declaring functions and facilitating the interaction between different source files.

4. What invention allowed computers to become smaller and more powerful by replacing vacuum tubes?

A. Microprocessors

B. Transistors

C. Integrated circuits

D. Relays

Transistors played a crucial role in the evolution of computers by significantly reducing their size and enhancing their power and efficiency. Vacuum tubes, which were large, consumed a lot of power, and generated significant heat, were the primary components in early computers for processing and controlling signals. When transistors were introduced, they provided a much smaller, more reliable, and energy-efficient alternative. Transistors function as electronic switches or amplifiers and allow for the development of smaller circuit designs. This transition from vacuum tubes to transistors directly facilitated the miniaturization of electronic components and paved the way for the development of more advanced technologies. Over time, the integration of transistors into larger systems, such as integrated circuits, further multiplied their effectiveness, leading to the powerful, compact computers we use today. While microprocessors, integrated circuits, and relays all have significant roles in the history of computing, it is the invention of transistors that was essential in moving away from the bulky and inefficient vacuum tubes, marking a major technological advancement in computer engineering.

5. Which of the following is a PC operating system?

A. Android

B. Ubuntu

C. Mac OS

D. DOS

The correct answer is DOS. DOS, which stands for Disk Operating System, is a command-line based operating system used primarily in personal computers. It was among the earliest operating systems that allowed users to manage files and run software on IBM-compatible PCs. Its simplicity and direct interaction with the hardware made it a foundational OS for early computing on personal computers. While other operating systems like Android, Ubuntu, and Mac OS have their own functionalities and user environments, they do not all qualify as traditional "PC operating systems" in the same sense as DOS. Android is primarily designed for mobile devices, Ubuntu is often categorized under Linux-based systems and might not traditionally be referred to simply as a "PC operating system" without context, and Mac OS is tailored specifically for Apple hardware. Each of these systems has its own distinct use cases and environments that set them apart from DOS in the traditional realm of PCs.

6. What is a key feature of a microprocessor?

A. It is only used for data storage

B. It performs computations and processing tasks

C. It cannot run software programs

D. It requires multiple power sources

A key feature of a microprocessor is its ability to perform computations and processing tasks, making it central to the functionality of computers and many electronic devices. Microprocessors execute instructions from software, which involves carrying out arithmetic calculations, logical operations, and data manipulation. This capability allows them to support a wide range of applications, from simple calculations to complex processing required in graphical systems, data analysis, and multitasking. The correct understanding of this function highlights why this option is the most accurate representation of what a microprocessor does. In contrast, other choices misrepresent the core functionalities of microprocessors. For instance, data storage is not the primary function of a microprocessor; instead, it often works in tandem with memory components that handle storage. Furthermore, microprocessors definitely run software programs, as they are designed for executing instructions specified in those programs. Lastly, while power needs can vary among different microprocessor designs, the requirement for multiple power sources is not a defining characteristic of microprocessors themselves, as many can operate efficiently on a single power source.

7. Approximately how many bytes are in a terabyte (TB)?

A. 1 billion

B. 1 trillion

C. 1 million

D. 1024

A terabyte (TB) is a measure of digital information storage that is equivalent to approximately 1 trillion bytes. This measurement is based on the decimal system commonly used in storage devices; 1 terabyte is equal to \(10^{12} \) bytes, which is 1,000 gigabytes or 1,000,000 megabytes. In binary terms, however, a terabyte is also sometimes considered to be \(1024^4 \) bytes (or 1,099,511,627,776 bytes), but in the context of most consumer storage devices and general usage, it is referred to as 1 trillion bytes. This distinction makes it clear why the answer indicating 1 trillion is correct, as it aligns with the common interpretation of a terabyte in a decimal system. The other choices reflect incorrect quantities associated with different units of storage. 1 billion bytes refers to a gigabyte, 1 million bytes represents a megabyte, and 1024 is not a byte count but rather a binary prefix associated with powers of 2. Thus, recognizing that a terabyte is understood as approximately 1 trillion bytes is essential in understanding digital storage capacities.

8. Which tables were developed to help gunners aim their weapons accurately?

A. Trajectory tables

B. Range tables

C. Firing tables

D. Calibration tables

Firing tables are specifically designed to assist gunners in accurately aiming their weapons by providing critical data related to ammunition type, elevation, range, wind conditions, and other factors that influence projectile trajectory. These tables serve as reference materials that enable gunners to make precise adjustments to their aim in various firing conditions, improving accuracy during operations. Firing tables systematically compile the calculations and empirical data necessary for effective targeting, ensuring that users can quickly find the information they need based on the current circumstances of their firing scenario. This vital resource is essential for military operations, where precision is paramount. While trajectory tables and range tables deal with aspects of projectile motion and distance, firing tables consolidate that information into a practical format specifically tailored for gunners' needs in the field. Calibration tables, on the other hand, refer more to the process of adjusting instruments and settings to ensure accurate measurements, which is not the primary function suited to gunners aiming their weapons.

9. Which of the following is NOT a type of loop structure in C++?

A. for loop

B. while loop

C. do-while loop

D. until loop

In C++, the typical loop structures for controlling the flow of execution based on conditions are the for loop, while loop, and do-while loop. The for loop is primarily used for iterating a specific number of times, often with a counter, making it suitable for scenarios where the number of iterations is known in advance. The while loop checks its condition before each iteration, which means that if the condition is false from the start, the block of code inside the loop will not execute at all. The do-while loop, in contrast, guarantees that the code block will execute at least once, since its condition is checked after the block has run. The term "until loop" is not recognized as a standard loop structure in C++. While some programming languages might use a similar construct, C++ does not include an until loop as part of its syntax. This makes the until loop the option that does not belong to the standard set of loops in C++. Understanding these differences is crucial for effective programming in C++, as selecting the appropriate loop structure based on the requirements is key to writing efficient and correct code.

10. Which data type typically represents a floating-point number?

A. int

B. char

C. float

D. bool

The data type that typically represents a floating-point number is the float. Float, short for floating-point, is specifically designed to handle numbers that are not whole, meaning they can contain decimal points. This data type allows for a wide range of values, supporting both very small and very large numbers, which makes it ideal for representing real numbers in programming. In contrast, the other data types serve different purposes. The int data type is used for whole numbers without any fractional component. The char data type represents single characters, such as letters or symbols. Finally, the bool data type is used for representing boolean values, which can only be true or false. Thus, float is the appropriate choice for functioning with decimal numbers and performing calculations that require precision with fractional values.