**C Programming Complete Answers - Short Notes**

1. **Why do computers understand only binary language?** Computers are built with electronic circuits that have two states: ON and OFF. These states are easy to represent using 1s and 0s, which is the binary number system. Each transistor in the computer acts as a switch that can either allow or block the flow of electricity, corresponding to 1 or 0. Using binary simplifies the design of circuits, reduces errors, and ensures reliability. Other number systems would increase complexity and make it difficult for the hardware to distinguish different voltage levels consistently. Therefore, all instructions and data in a computer are ultimately converted into binary for processing.

2. **Full form of IDE** The full form of IDE is Integrated Development Environment. It is a software application that provides comprehensive facilities to programmers for software development. An IDE typically includes a source code editor to write and edit code, a compiler or interpreter to translate the code into executable form, and a debugger to test and fix errors. Many IDEs also offer features such as code completion, syntax highlighting, version control integration, and build automation tools. IDEs help increase productivity, reduce errors, and simplify the development process, making programming more efficient, especially for languages like C, Java, and Python.

3. **Difference between a text editor and a code editor** A text editor is a basic software tool that allows users to create and edit plain text files without any additional features. Examples include Notepad and TextEdit. On the other hand, a code editor is designed specifically for writing and editing programming code. It provides features such as syntax highlighting, auto-completion, error detection, and code formatting to help programmers write code more efficiently. Code editors often integrate with compilers or interpreters and sometimes provide debugging capabilities. While a text editor is general-purpose, a code editor is specialized for software development, making coding faster and less error-prone.

4. **Steps to develop software using the C language** Developing software in C involves several systematic steps. First, the programmer writes the source code using a code editor or IDE. Next, preprocessing occurs where directives like #include and #define are handled. Then the compiler converts the human-readable C code into object code. Linking combines the object code with required libraries to generate an executable file. Finally, the program is executed on the computer. Throughout this process, debugging may be performed to correct logical and syntax errors. This structured approach ensures that the program functions as intended and efficiently utilizes system resources.

5a. **Latest version of C language** The latest official standard of the C programming language is C17, formally known as ISO/IEC 9899:2018. It is an update to the previous C11 standard and includes bug fixes and minor improvements but does not introduce significant new features. Work is ongoing for C23, which is expected to bring more modern features, improved security, and additional functionality. Developers are advised to follow these standards to ensure portability, maintainability, and compatibility of their C programs across different compilers and systems.

5b. **Who developed C language** The C programming language was developed by Dennis Ritchie at Bell Labs in 1972. It was designed to be a general-purpose, high-level language that could also perform low-level operations. C became widely popular due to its efficiency, portability, and ability to manipulate

hardware resources directly. It laid the foundation for many other languages, including C++, C#, and Java. Ritchie's work on C, along with his contributions to UNIX, has had a lasting impact on modern computing, making C one of the most influential and widely used programming languages in history.

5c. **Difference between System and Application Software** System software is designed to manage and control computer hardware, providing a platform for running application software. Examples include operating systems, device drivers, and utility programs. Application software, on the other hand, is designed to help users perform specific tasks, such as word processing, browsing, or gaming. System software operates at a lower level and is essential for the computer to function, while application software operates at a higher level and depends on system software to run. Both types of software are crucial, but they serve different purposes in the computing environment.

5d. **How to convert a number from decimal to binary** To convert a decimal number to binary, divide the number by 2 and record the remainder. Update the number as the quotient of the division. Repeat this process until the quotient becomes zero. The binary representation of the number is obtained by reading the remainders from bottom to top. For example, converting the decimal number 13 to binary: 13 ÷ 2 = 6 remainder 1, 6 ÷ 2 = 3 remainder 0, 3 ÷ 2 = 1 remainder 1, 1 ÷ 2 = 0 remainder 1. Reading remainders bottom-to-top gives the binary number 1101. This method ensures an accurate representation of decimal numbers in binary format suitable for computer processing.