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Q1. What is the purpose of the main() function in a C program? Explain its significance.

Ans: The main() function is the starting point of the program. When a C program is run, the execution begins from the main() function so it is the entry point of the program. It typically contains the core logic or sequence of operations that the program is intended to perform.

Without the main() function, the program would not have a defined starting point.

Q2. Explain the difference between a variable declaration and a variable initialization in C.

Ans: In C programming, a declaration is a statement that tells the compiler about the name and type of an identifier, such as a variable or function. It specifies what kind of data the identifier will hold, like int, float, or char, and may also assign an initial value. Initialization, on the other hand, is the process of assigning a starting value to a variable at the time of its declaration. For example, `int age = 25;` is both a declaration and an initialization—age is declared as an integer and initialized with the value 25. If a variable is declared without initialization, it contains an undefined value until one is assigned.

Q4. What are the different data types available in C? Provide examples of each data type.

Ans: In C, a data type specifies the kind of data a variable can hold and how much memory it uses. Common data types include `int` for whole numbers, `float` for decimal numbers, `double` for more precise decimals, `char` for single characters, and `_Bool` (or `bool` with `<stdbool.h>`) for true/false values. For example, `int number = 4`, `float = 19.99`, `double= 3.141592`, `char= 'A'`, and `bool= true`. These types help the program store and manipulate different kinds of information efficiently.

Q5. Explain the concept of type conversions in C. Provide examples of implicit and explicit type conversions.

Ans: Type conversion in C is the process of changing a variable's data type to another. It can be implicit, where the compiler automatically converts a value to a compatible type (e.g., assigning int to float), or explicit, where the programmer manually converts a value using a cast operator.

For example, in implicit conversion, `int num = 10; float result = num;` automatically converts num to float. In explicit conversion, `float num = 15.75; int result = (int)num;` forces the conversion, truncating the decimal part to produce 15.

Q7. What is the role of the scanf() function in C? Provide an example of its usage.

Ans: The `scanf()` function in C is used to read input from the user and store it in variables. It uses format specifiers like `%d` for integers, `%f` for floats, `%c` for characters, and `%s` for strings to determine the type of input. The `&` operator provides the memory address of the variable to store the value. For example, `scanf("%d", &age);` reads an integer and stores it in age, while `scanf("%s %d %f", name, &age, &height)` can read a string, an integer, and a float in a single line.