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| **Variables and Data Types** |
| 1.What is the difference between a variable and a data type in C programming? Provide examples to illustrate. |
| A: A variable is an identifier which is used to store some value. Variables can change during the execution of a program and update the value stored inside it whereas data type defines what type of data should be stored in the variable  Ex: int x;  x=100;  Here int is the datatype i.e. integer and x is the variable. |
| 2. Explain the concept of datatypes in c programming. Discuss the different types of data types available in c. |
| A: Each variable in C has an associated data type. It specifies the type of data that the variable can store like integer, character, floating, double, etc. Each data type requires different amounts of memory and has some specific operations which can be performed over it. The data type is a collection of data with values having fixed values, meaning as well as its characteristics.  Primitive Data Types:Primitive data types are the most basic data types that are used for representing simple values such as integers, float, characters, etc.  User Defined Data Types:The user-defined data types are defined by the user himself.  Derived Types :The data types that are derived from the primitive or built-in datatypes are referred to as Derived Data Types. |
| 3.How are variables declared and initialized in c programming?Provide examples of variable declarations with different datatypes. |
| A: Declaration of a variable in a computer programming language is a statement used to specify the variable name and its data type.Initialization is the process of assigning a value to the Variable.  datatype variable\_name = value;  Integer:  int num1;  Floating-point number:  float num2;  double:  double num3;  Character:  char letter;  Array of integers:  int arr[10]; |
| 4. Discuss the scope and lifetime of variables in c programming. What are global and local variables? |
| A: The scope of a variable is the area in which a variable is accessible. You cannot use a variable beyond its scope. In C programming, the scope of variables is local and global. A lifetime of a variable is the working time of a variable; till its lifetime a variable holds a memory place.  A global variable is one that is “declared” outside of the functions in a program and can, therefore, be accessed by any of the functions.  A local variable is declared inside a specific function and can only be accessed by the function in which it is declared. |
| 5.Explain the concept of type casting in c programming. When is type casting necessary, and how is it performed? |
| A: Type Casting in C- Type. casting refers to changing an variable of one data type into another. The compiler will automatically change one type of data into another if it makes sense. For instance, if you assign an integer value to a floating-point variable, the compiler will convert the int to a float.  This can be useful in situations where you need to perform operations with different types of data or when you want to store a value of one type into a variable of another type.  Syntax:  int x;  float y;  y = (float) x; |