C++ Programming Fundamentals: Variables and Data Types

A variable in C++ is a container for storing data values. Each variable has a specific data type, which determines the size and layout of the variables memory.

Common Data Types in C++:

1. int stores integers (e.g., 1, -5, 100)

   Example: int age = 21;

2. float stores floating-point numbers (e.g., 3.14, -0.001)

   Example: float weight = 65.5;

3. double stores double-precision floating-point numbers

   Example: double pi = 3.14159;

4. char stores a single character (e.g., 'A', 'b')

   Example: char grade = 'A';

5. bool stores true or false values

   Example: bool passed = true;

6. string stores a sequence of characters (requires #include <string>)

   Example: string name = "John";

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Declaring Variables:

To declare a variable, use the data type followed by the variable name:

int number;

float temperature;

Initializing Variables:

You can assign a value at the time of declaration:

int number = 10;

char letter = 'B';

Multiple Declarations:

You can declare multiple variables of the same type in one line:

int x = 5, y = 10, z = 15;

Constants:

Use the `const` keyword to declare constant variables that cannot be modified:

const float PI = 3.14;

Example Code:

#include <iostream>

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```
using namespace std;


int main() {
    int age = 20;
    float height = 5.9;
    char grade = 'A';
    bool isStudent = true;


    cout << "Age: " << age << endl;
    cout << "Height: " << height << endl;
    cout << "Grade: " << grade << endl;
    cout << "Is Student? " << isStudent << endl;


    return 0;
}
```

Note:

- C++ is statically typed, so you must declare a variable before using it.
- Each type has a specific size depending on the system architecture.