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Engineering • Technology • Creativity

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Chapter 3: Variables and constants

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Objectives

- In this chapter, you will learn about:

    1) Definition of variables and constants

    2) Variables & constants declarations

Variable

- A variable is a memory address where data can be stored and changed.

- When you declare a variable, it means you need to specify both its name and data type.

Variable Declaration

- When a variable is declared, it tells the compiler to allocate memory to hold/store the value of this data type.

- `int ageOfDog;`→

- `char middleInitial;` →

- `float taxRate;`→

Variable Declaration

- All variables must declared **before** use.
  - At the top of the program
  - Just before use.
- Commas are used to separate identifiers of the same type.

```
int count, age;
```

- Variables can be initialized to a starting value when they are declared

```
int count = 0;
int age, count = 0;
```

Constants

- Constants in C++ are declared just like variables, but with additional of the word *const.* Example of constant declaration: `const double g = 9.81;`

- A constant can be used like a variable but cannot be changed/modified once they are declared.

- A constant cannot appear on the left side of any assignment (=), other than its declaration statement. Example:

    `g = 10.01;`

Constants (cont.)

- All constants must be initialized (given value) where they are declared!

```cpp
#include <iostream>
using namespace std;
int main()
{
    const double PI = 3.142;
    cout << "Pi is = " << PI << endl;
}
```

- Generally expressed in capital letters

- Clarity: Tells the user the significance of the number
- Maintainability: Allows the program to be modified easily.
  - Ex: Program tax compute has

    ```
    const double TAXRATE=0.0725;
    ```

  If taxes rise to 8%, programmer only has to change the one line to `const double TAXRATE=0.08`
- Safety: Cannot be altered during program execution