

# **C++ Variables**

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# Variables in C++

- Allow storage of data internally for the program
- Allow storage of information from the user
- There are different types of variables which service different needs
- Examples:
  - Variables that store texts
  - Variables that store integers (positive & negative numbers)
  - Variables that store decimals (floating point numbers)

# Declare/Create variables

- In order to use a variable in C++, we have to first declare i.e., create it
- Model:  

```
variable_type variable_name;
```
- `variable_type`: The type of a variable, depends on the type of data we want to store.
- `variable_name`: The name of a variable, how we want to refer to it in the rest of the program.

# Legal Variable Names

- C++ rules for legal variable names
  - 1. Must start with a letter, can end with numbers
  - 2. Must not have a space in the name
  - 3. Can not have special characters
    - Only allowed character is "\_" (underscore)
  - 4. Must not be a C++ keyword
- Suggestions for variable names
  - Variable names should be meaningful
  - Variable names should be easy to read

# Illegal Variable Names

- Example of illegal variable names
  - `int number of cakes;`
    - Has spaces
  - `int 1number;`
    - Begins with a number
  - `int discount%;`
    - Contains a symbol
  - `double int;`
    - Contains a keyword, `int`
  - `int string;`
    - Although not a keyword, it will not allow us to declare and use string variables.

# Important Note

- C++ is case sensitive!!
- Examples:
  - `int hello; //declares a variable hello`
  - `int Hello; //declares another variable Hello`
  - `Int hello; //error, Int is not a C++ type`
  - `Double amount; //error, Double is not a type`

# **Types of variables**

# String

- Variable declaration
  - string name;
  - string address;
  - string day;
- Examples of strings
  - name = "Vincent";
  - address = "65-30 Kissena Blvd.";
  - day = "2";
- Examples of INVALID strings
  - name = ' Vincent ';
  - address = 65-30 Kissena Blvd.;
  - day = 2;



# int (integers)

- Variable declaration
  - int number;
  - int year;
  - int age;
- Examples of integers
  - number = 14;
  - year = 2011;
  - age = 30;
- Examples of INVALID int
  - number = "14";
  - year = '2011';
  - age = "thirty";
  - age = 34.5

# double (decimals, high precision)

- Variable declaration
  - double pi;
  - double e;
- Examples of double (decimals)
  - pi = 3.1415926535;
  - e = 2.71828;
- Examples of INVALID double
  - pi = "3.141";
  - pi = ' 3.141 ';

# char (characters)

- Variable declaration
  - char c;
  - char newline;
  - char code;
- Examples of char (characters)
  - c = 'c';
  - newline = '\n';
  - code = 65; //max number is 127
- Example of INVALID char
  - code = 456;
  - newline = "\n";

# bool(boolean: true or false)

- Variable declaration
  - `bool reply;`
  - `bool answer;`
- Examples of bool(boolean)
  - `answer = true;`
  - `answer = false;`
  - `reply = 0;`
  - `reply = 1;`
- Examples of INVALID bool
  - `answer = "true";`
  - `reply = '0'; //value becomes true`