

# **C++ Variables**

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# Variables in C++

- Allows storage of data internally for the program
- Allows storage of information from the user
- There are different types of variables which services 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 must first declare it. Think of declaring a variable as creating the variable.
- Model:  
*variable\_type variable\_name ;*
  - variable\_type: The type of the variable, different type stores different type of information.
  - variable\_name: The name of the variable, how they will be referred to 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 allow 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;`
    - space
  - `int 1number;`
    - Begins with number
  - `int discount%;`
    - symbols
  - `double int;`
    - keyword
  - `int string;`
    - keyword

# 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 answer;`
  - `bool reply;`
- Examples of bool (boolean)
  - `answer = true;`
  - `answer = false;`
  - `reply = 0;`
  - `reply = 1;`
- Examples of INVALID bool
  - `answer = "false";`
  - `reply = '0'; //will be true`