

C++ Programming Basics

Continued

C++ Lecture 2

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Motivation

- Much more to programming than printing out to the command line
- What about if we want to
 - Do math?
 - Save text for later?
 - Organize data into a container?
 - Take in values from the user?
- Today is devoted to more basic building blocks
 - Assigning Variables
 - User Input
 - Assigning and Using Arrays
 - Understanding and Using Operators

What Are Variables?

- Variables are containers for information
- C++ variable definitions are case sensitive
- Different types of variables store different types of information
 - bool – a variable type that is either true or false
 - char – a variable type that can hold a single character (e.g., 'x', 'y', 'z')
 - int – a variable type that can hold an integer value (e.g., 1, 2, -3)
 - float - a variable type that can hold a decimal value up to around 7 digits
 - double – a variable type that can hold a decimal value up to 15 digits
 - strings – a variable type that can hold text (requires `#include <string>`)

Assigning Variables

- Variables are created using the <data-type> <name> format;
- Assign the variable a value using <name> = <value>;

```
22  
23 // Programming Basics Cont.  
24 bool aBoolVar;  
25  
26 aBoolVar = true;  
27  
28 bool anotherBoolVar = false;  
29
```

Checkpoint

- Try printing out the bool variable to the command line
- What is the difference between the value printed out for a true vs a false assignment?

```
23 // Programming Basics Cont.  
24 bool aBoolVar;  
25  
26 aBoolVar = true;  
27  
28 std::cout << aBoolVar << std::endl;
```

Assigning Float Variables

- What happens when you change the type to int or bool?
- Try printing out the variable to the command line.

```
31  
32 // A float assignment |  
33 float aFloat = 5.3;
```

Checkpoint

- Create variables that have the following data types and assign values

- char
- int
- double

```
C:\Windows\system32\cmd.exe
Hello World!
bool: 1
Press any key to continue . . .
```

- Print the variables out to the command line with a type label

User Command Line Input

- What if the user wants to assign a variable value?
- We use the cin stream

```
// Reading in a user defined value
float aFloat; // Create a variable that holds type float

std::cout << "Enter a float value: " << std::endl; // Prompt the user to enter a value

std::cin >> aFloat; // Use cin to read in the value and assign it to the variable aFloat

std::cout << "The float entered is: " << aFloat << std::endl; // Print the value back out to the user
```

```
Enter a float value:
3.5
The float entered is: 3.5
Press any key to continue . . .
```


Checkpoint

- What happens when you enter a int?
- What happens when you expect an int and get a float?
- Try it.....
- Ask the user for a string and print it back to them

Arrays

- Arrays are just a fancy way to store and organize variables
- Arrays have a length that is indexed from 0

```
int myArray[4]; // Want an array with 4 slots to fill with ints

myArray[0] = 2; // Indexing starts at 0!
myArray[1] = 5; // Assign the second array slot to 5
myArray[2] = 9;
myArray[3] = 3; // This is the 4th slot at index 3

std::cout << "The 3rd value in myArray is: " << myArray[2] << std::endl;
```

```
The 3rd value in myArray is: 9
Press any key to continue . . .
```

Checkpoint

- Create an array of three user specified strings
- Print strings out to user

```
Enter a string:  
first  
Enter a string:  
second  
Enter a string:  
last!  
myStrings[0]: first, myStrings[1]: second, myStrings[2]: last!  
Press any key to continue . . .
```

Operators

- What if we want to add or multiply values together?
- Use standard math operators
 - +, -, *, /,
- Equality operators
 - ==, !=, <, <=, >=
- Logical operators
 - &&, ||, !

Using Addition Operators

```
// Using Addition Operators
int myInt1;
int myInt2;

std::cout << "Enter a int: " << std::endl;
std::cin >> myInt1;

std::cout << "Enter a int: " << std::endl;
std::cin >> myInt2;

std::cout << myInt1 << "+" << myInt2 << "=" << (myInt1 + myInt2) << std::endl;
```

```
Enter a int:
2
Enter a int:
9
2+9=11
Press any key to continue . . .
```

Questions?

Assignment

- Create a program that takes in four user specified values and multiplies the first two values together and divides by the sum of the last two
- Display result to the user
- Challenge: use one array to store all the values