

# C++ Programming Basics Continued

C++ Lecture 2

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# Lecture Goals

- Today is devoted to more basic building blocks
  - Variables
  - User Input
  - Operators
  - Arrays

# What Are Variables?

- Variables are boxes for information
- 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>)

# Variable Syntax

Declaring a variable → [data type] [name]; (Make an empty box)

```
// declare int variable  
int a;
```

Initialize the variable → [name] = [value]; (Fill the empty box)

```
// initialize int variable  
a = 5;
```

Declare and initialize a variable → [data type] [name] = [value]; (Make and fill a box)

```
// declare AND initialize int variable  
int b = 10;
```

# What's the Point?!

- Once you create a variable, you can use it later in your program!

```
int main() {  
    int a = 10;  
  
    // print variable  
    std::cout << a << std::endl;  
}
```

# Variable Examples

- Declare some variables of different data-types
- Initialize the variables
- Declare and initialize some more variables
- Print them out!

# User Command Line Input

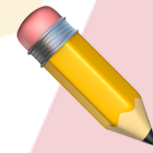
- What if we want user input in our program?
- We use the `cin` object to store user input into a variable

```
// cin
int a;
cout << "Enter a number: "; // prompt user
cin >> a; // get user input and store in a
```

- Program will pause at `cin` and wait for user input



# Mini Task



1. Make a program which asks the user to input a number
2. Store the number in a variable using `cin`
3. Print the number back to the user using `cout`



# Operators

- What if we want to add or multiply values/variables together?
- Arithmetic operators (used on numeric variables)
  - +, -, \*, /, .....
- Comparison operators (used on boolean variables)
  - ==, !=, <, <=, >=
- Logical operators (used on boolean variables)
  - &&, ||, !

# Operator Examples

- Using operators during variable assignment
  - `int a = (some expression using operators)`
- Conditional and Logical operator expressions
  - `<, >, <=, >=, ==, &&, ||`

# Arrays

- Arrays allow us to store multiple variables of the same data-type in a list fashion

```
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;
```

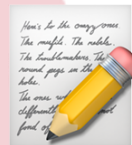
```
The 3rd value in myArray is: 9
Press any key to continue . . .
```

# Array Examples


- Declare an array
- Instantiate each slot of the array individually
- Declare and instantiate an array
- Set a new value in the array
- Access a value in the array and print it out



# Questions?



# Assignment

1. Go to [https://github.com/iastate/VRAC\\_REU\\_Programming](https://github.com/iastate/VRAC_REU_Programming)
2. Under **challenges/** read `timeConversion.md` 
3. Make a new project and code 