

**Mr. Giansante**



**C++ Programming**  
**Arrays**

**August 2018**

# Array Basics

An **array** data structure (or simply "array") is a data structure consisting of a collection of elements (values or variables), each identified by one or more integer indices. (Source: Wikipedia.org)

Arrays are used to store similar data types grouped as a single unit.

Arrays must be declared in the same way variables are declared.

Example of declaring an array.

```
int myArray[10];
```

**Note:** This declares a 10 element array (starting at 0 and ending at 9)

0	<input type="text"/>
1	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>
5	<input type="text"/>
...	
9	<input type="text"/>

You can also specify the values of array members when you declare the array.

```
int myArray[4] = {0,1,2,3};
```

You can also leave out the size ...

```
int myArray[] = {0,1,2,3,4,5};
```

... and the array will be created to the size that matches the number of elements specified.

## Accessing an Element in an Array

To access a particular element, do as follows ...

```
cout << myArray[2];  
myArray[3] = myArray[2] + 3;
```

etc.

## Two-Dimensional Arrays

Arrays can have more than one "dimension". A two-dimensional array is similar to a matrix in math.

Example of declaring a two-dimensional array.

```
int myArray[5][3];
```

**Note:** This declares a 24 element array. (ie. 6 by 4)

0,0	0,1	0,2	0,3
1,0	1,1	1,2	1,3
2,0	2,1	2,2	2,3
3,0	3,2	3,2	3,3
4,0	4,1	4,2	4,3
5,0	5,1	5,2	5,3

## Multi-Dimensional Arrays

Arrays can also have more than two dimensions.

# Arrays and Loops

---

Loops (for example: For) are very useful for working with arrays.

The following code example illustrates a program that asks the user to type the name of a province.

The user is then informed if they have typed in a valid name or not.

```
#include <iostream>
using namespace std;

int main(int argc, char** argv)
{
    // Variable Declarations
    string provinces[10];
    string userInput;
    bool valid = false;

    // Initial values placed in Array

    provinces[0] = "british columbia";
    provinces[1] = "alberta";
    provinces[2] = "saskatchewan";
    provinces[3] = "manitoba";
    provinces[4] = "ontario";
    provinces[5] = "quebec";
    provinces[6] = "new brunswick";
    provinces[7] = "nova scotia";
    provinces[8] = "prince edward island";
    provinces[9] = "newfoundland";

    // Get Input from User
    cout << "Enter the name of a province (use all lowercase): ";
    cin >> userInput;

    // Compare User Input to each entry in the Array
    for(int i = 0; i < 10; i++)
    {
        if(userInput == provinces[i]) {valid = true;}
    }

    if(valid == true)
    {
        cout << "Valid Input.";
    }
    else
    {
        cout << "Invalid Input.";
    }

    return 0;
}
```