

MODULE 1: INTRODUCTION TO PROGRAMMING

Loops and Arrays



Working with variables

C# Type	.NET Framework Type
bool	System.Boolean
byte	System.Byte
sbyte	System.SByte
char	System.Char
decimal	System.Decimal
double	System.Double
float	System.Single
int	System.Int32
uint	System.UInt32
long	System.Int64
ulong	System.UInt64

<https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/keywords/built-in-types-table>

Wild Animals



What is an array?

- An **array** is a data structure that is a collection of variables of the same type



Declarative syntax

```
string[ ] animals;
```



Element Type



Variable Name

Initialization syntax

```
animals = new string[6];
```



Variable Name



Number of elements

syntax

```
string[ ] animals = new string[6];
```



Element Type



Variable Name



Number of elements

Assigning values to elements

```
string[ ] animals = new string[6];
```

```
animals[0] = "Tiger";
```

```
animals[1] = "Polar Bear";
```

```
animals[2] = "Giraffe";
```

↑
index

```
animals[3] = "Koala";
```

```
animals[4] = "Moose";
```

```
animals[5] = "Panda";
```


Accessing values in an array

- Write the 3rd value from the array to the console:
 - `Console.WriteLine(animals[2]);`

LET'S CODE!



ELEVATE  YOURSELF

What are arrays good for?

- Keeping related data together for processing
 - Names of students in a classroom
 - `string[] students = new string[20];`
 - Par values on a golf score card
 - `int[] parValues = new int[18];`

The gotchas

- Arrays are zero indexed
- Arrays are fixed length
- Arrays must be initialized before used
- Array are reference types

Scope

```
{  
    int length;  
    int width;  
    int area;  
    area = length * width;  
}
```

A variable's **scope** defines where in the program that the variable exists (i.e. can be referenced). When code execution reaches a point where a variable is no longer referenceable, the variable is said to be *out of scope*.

Rules of Scope

- Variables declared inside of a function or block `{..}` are local variables and only available within that block. This includes loops.
- Blocks can be nested within other blocks and therefore if a variable is declared outside of a block, it is accessible within the inner block.

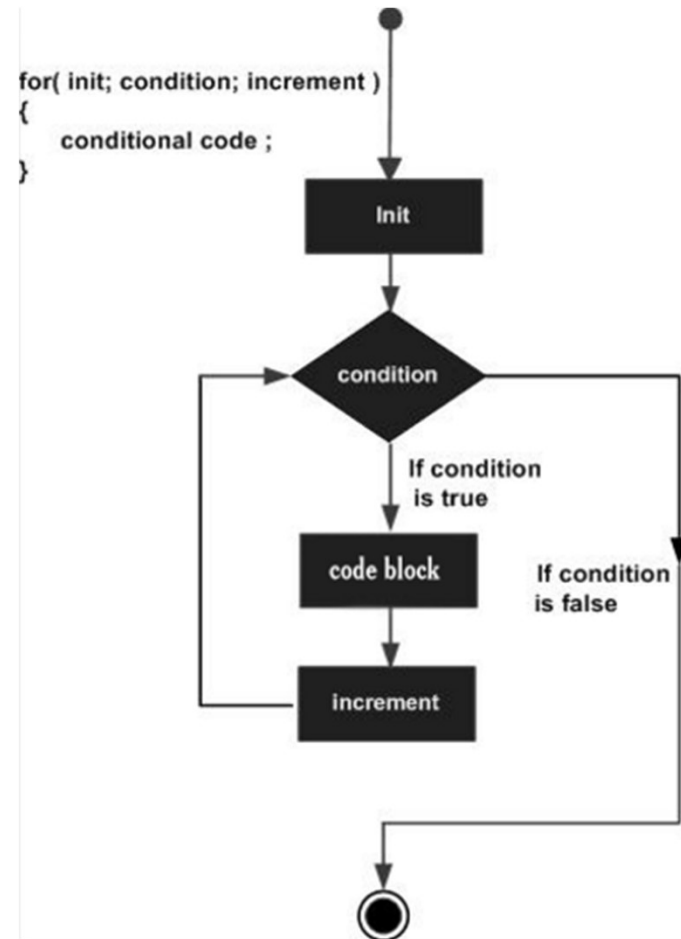
Finding Animals

- How would we find the Moose?



Accessing Elements in an Array

- For loop allows you to check each element in an array.



Memorize this code segment!!

```
for(int i = 0; i < animals.Length; i++) {  
    ...  
}
```

Shorthand Notation

- Increment variable x by 1:
 - $x++$ is the same as $x = x + 1$
- Decrement variable x by 1:
 - $x--$ is the same as $x = x - 1$
- Assignment shortcuts
 - $x += n$ is the same as $x = x + n$
 - $x -= n$ is the same as $x = x - n$

Danger of Shorthand notation

```
{  
    Int x = 0;  
    Int y = 0;  
    Int z = 0;  
    y = x++;  
    z = ++x;  
}
```

LET'S CODE!



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WHAT QUESTIONS DO
YOU HAVE?



Reading for tonight:
**Building Command Line
Programs**

