



# unity C# Overview

## Variables and Data Types

```
int i = 5;
float x = 0.1f;
bool isDone = false;
string name = "Brian" ;
string[] family = new string[] { "Mario", "Luigi", "Peach" };
List<string> family = new List<string>();
family.add("Mario");
Vector3 loc = new Vector3(0,0,0);
Transform target; // or any other component type
GameObject projectile; // can be set to a gameObject or Prefab
```

## Variables and Scope

```
int p; // private member variable
private int p; // also private member variable
public int p; // public member variable
public static int p; // global member variable
```

## Assignment

Expression	Shortcut
x=x+1	x++
y=y+1	y--
x=x+y	x+=y
x=x-y	x-=y

## Logic

Logic	Symbol
Equal	==
Not Equal	!=
Greater Than	>
Greater Than or Equal To	>=
Less Than	<
Less Than or Equal To	<=
And	&&
Or	

## Arrays

```
string[] family;
family = new string[] { "Homer", "Marge", "Bart", "Lisa", "Maggie" };
Debug.Log("Family members="+family.Length);
Debug.Log("First members="+family[0]);
foreach (string name in family) {
    Debug.Log(name);
}
```

## Classes

```
public class ClassName : ClassNameExtends {
}
```

## Functions

```
int functionName(int x, int y) {
    // local variable
    int result;
    // actions
    result = x + y;
    // return from function
    return result;
}
```

## Conditionals

```
if (condition1) {
    // do this
} else if (condition2) {
    // do that
} else {
    // do default
}
```

```
switch(name) {
    case "brian":
        Debug.Log("Welcome Brian");
        break;
    case "will":
        Debug.Log("Welcome Will");
        break;
    default:
        Debug.Log("I don't know you");
        break;
}
```

## Loops

```
for (initialization; condition; increment) {
    // actions
}

while (condition) {
    // actions
}
```



# unity C# and Unity API

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## Typical C# Script Template

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class BasicTargetMover : MonoBehaviour {

    // Use this for initialization
    void Start () {

    }

    // Update is called once per frame
    void Update () {

    }

}
```

## Important concepts in Unity

- MonoBehaviour is the base class that all Unity GameObject scripts are derived from.
- Public variables are exposed in the editor
- Public variables and functions can be accessed when you have a reference to the component
- You can make an Object global by creating a public static variable

## Referencing GameObjects

You can reference a gameObject in code in the following ways:

If the script is attached to the gameObject, you can reference the gameObject as:

```
this.gameObject or simply gameObject
```

If we want to reference a gameObject that the script is NOT attached to, we can do this in a number of ways:

We can have a public variable of type GameObject that we attach to another gameObject or prefab in the Unity Editor.

```
public GameObject target;
```

We can search for the game Object using GameObject.Find to search for a GameObject by name:

```
GameObject target = GameObject.Find("Enemy");
```

We can search for the game Object using GameObject.FindWithTag to search for a GameObject with a particular tag:

```
GameObject target = GameObject.FindWithTag("Player");
```

## Referencing Components

You can get a reference to a component in the following ways:

Setup a public variable that holds the reference that you set in the Editor, such as:

```
public AudioSource backgroundMusic;
```

Get the component through a reference to a gameObject, such as:

```
gameObject.GetComponent<AudioSource>();
```

The Transform component has a shortcut.

```
gameObject.transform
```

## Instantiating Prefabs

You can dynamically create, or instantiate gameObjects in a scene from other gameObjects or Prefabs:

```
GameObject spawnedObject = Instantiate
(prefabObject, spawnPosition, spawnRotation) as
GameObject;
```

## Common Game Events

Awake & Start - called once. This is where you can set things up.

Update - is called every game cycle before rendering a frame. This is where most game behaviour code goes, except physics code.

FixedUpdate - is called once every physics time step. This is the place to do physics-based game behaviour.

OnCollisionEnter is called when this collider/rigidbody has begun touching another rigidbody/collider.

OnTriggerEnter is called when this collider has touched another collider that is tagged as a trigger.

## Useful API Classes

GameObject, Time, Transform, Rigidbody, AudioSource  
(look in documentation for details and other UnityEngine classes)