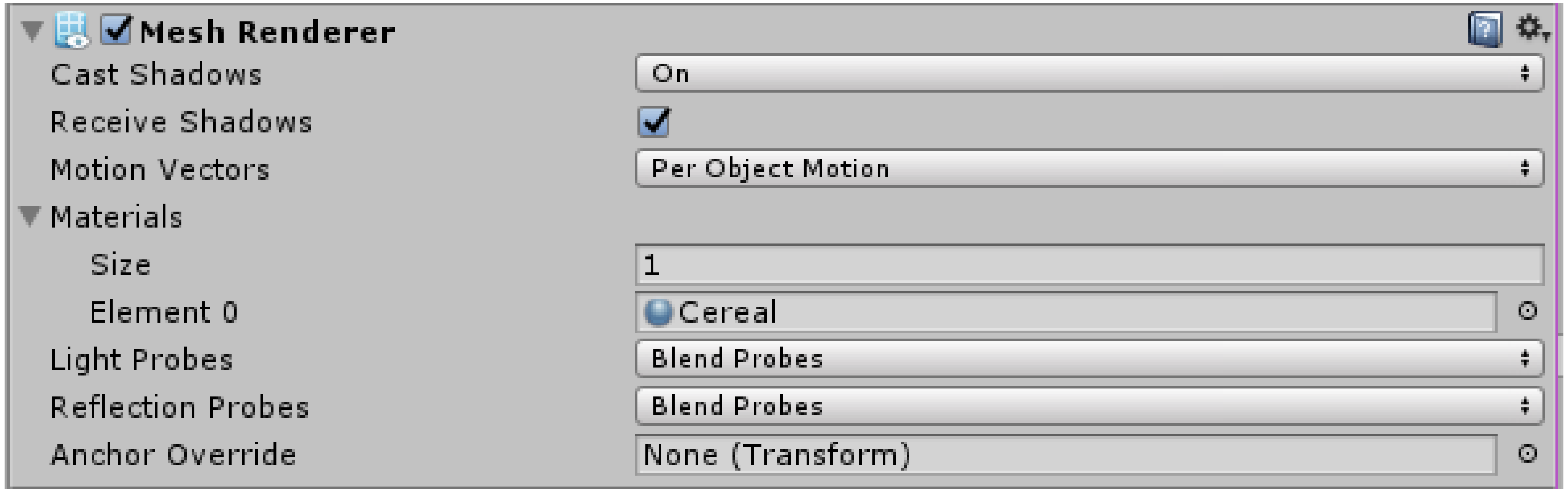
C#

(C Sharp)

MeshRenderer & Material

http://docs.unity3d.com/ScriptReference/MeshRenderer.html
http://docs.unity3d.com/ScriptReference/Material.html


Mesh Renderer

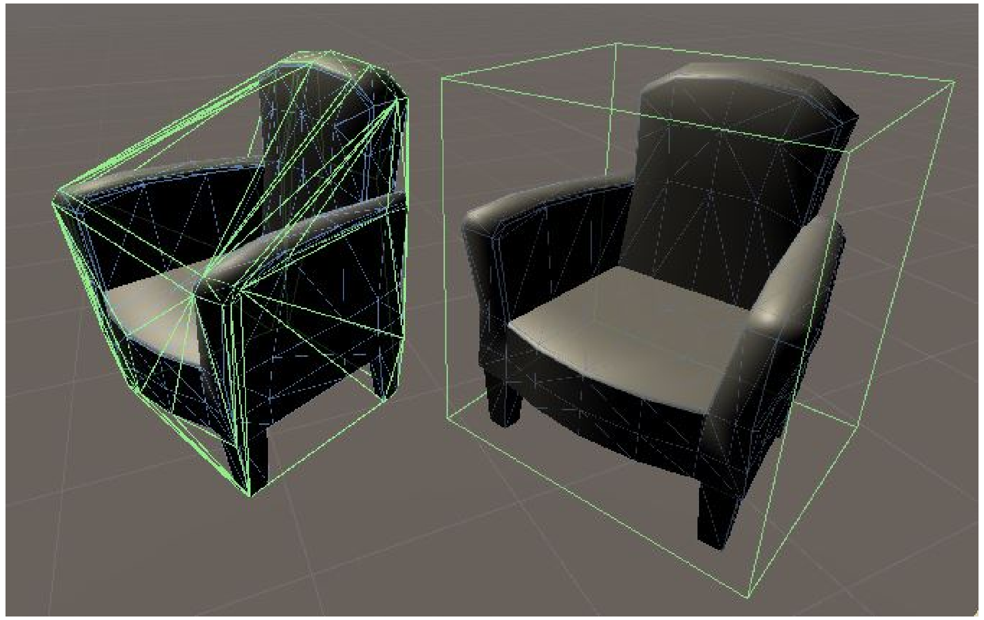
Cast Shadows	On
Receive Shadows	✓
Motion Vectors	Per Object Motion
Materials	
Size	1
Element 0	Cereal
Light Probes	Blend Probes
Reflection Probes	Blend Probes
Anchor Override	None (Transform)

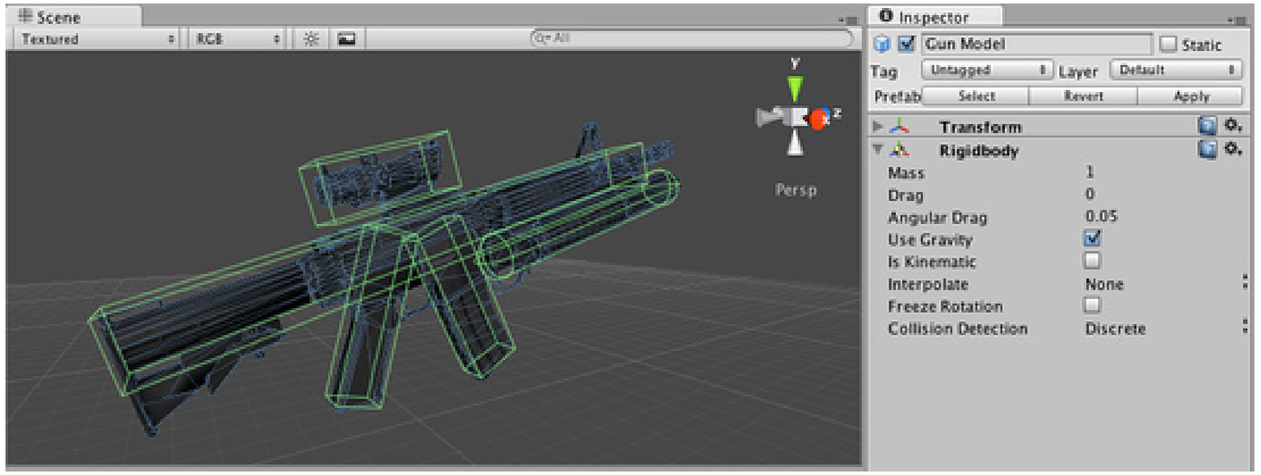
```
private Material Mat;

void Start () {
    // Get a reference to the MeshRenderer component
    MeshRenderer renderer = GetComponent<MeshRenderer>();
    // Store a reference to the (first) material
    Mat = renderer.material;
    // Change the material to red
    Mat.color = new Color(1f, 0f, 0f);
}
```

Physics & 3D Models

Collider

- Invisible shape that defines the physical shape for collisions
- Different shapes: box, capsule, sphere, mesh, etc.
- Default: collider is static (never moves)



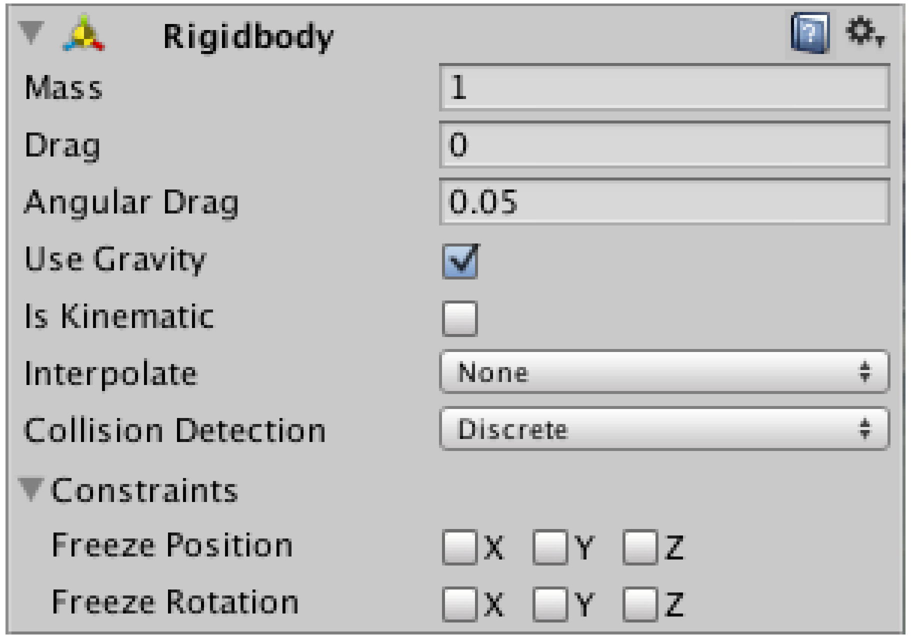


Gun Model ☐ Static
Tag: Untagged | Layer: Default

Mass	1
Drag	0
Angular Drag	0.05
Use Gravity	✓
Is Kinematic	☐
Interpolate	None
Freeze Rotation	☐
Collision Detection	Discrete

Rigidbody

- Physics simulation component
- Adds mass, drag, gravity, etc.
- Requires a collider



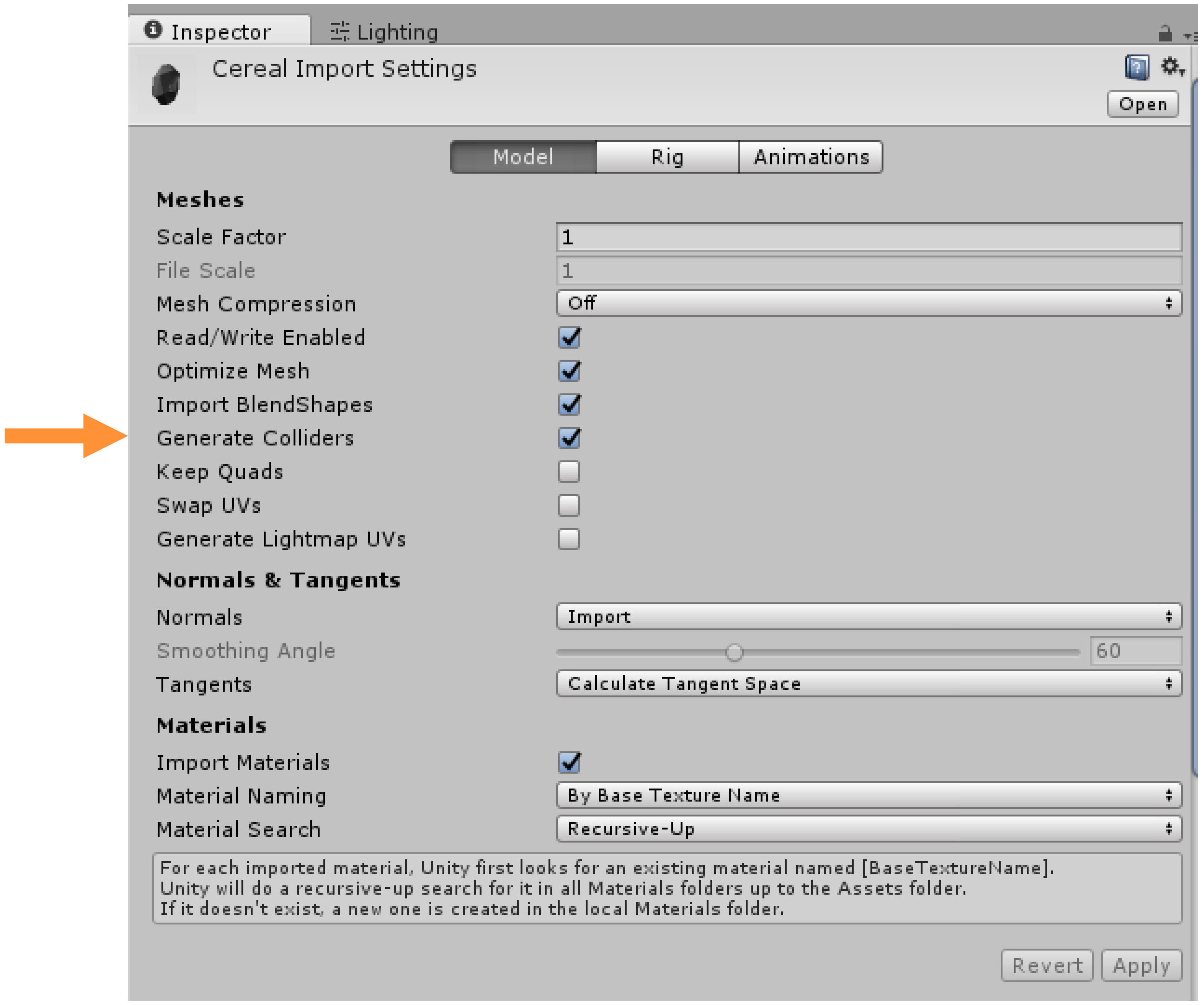
Rigidbody

Mass	1
Drag	0
Angular Drag	0.05
Use Gravity	✓
Is Kinematic	☐
Interpolate	None
Collision Detection	Discrete

Constraints

Freeze Position	☐ X	☐ Y	☐ Z
Freeze Rotation	☐ X	☐ Y	☐ Z

Importing 3D Model for Physics



Cereal Import Settings

Meshes

Scale Factor	1
File Scale	1
Mesh Compression	Off
Read/Write Enabled	✓
Optimize Mesh	✓
Import BlendShapes	✓
Generate Colliders	✓
Keep Quads	☐
Swap UVs	☐
Generate Lightmap UVs	☐

Normals & Tangents

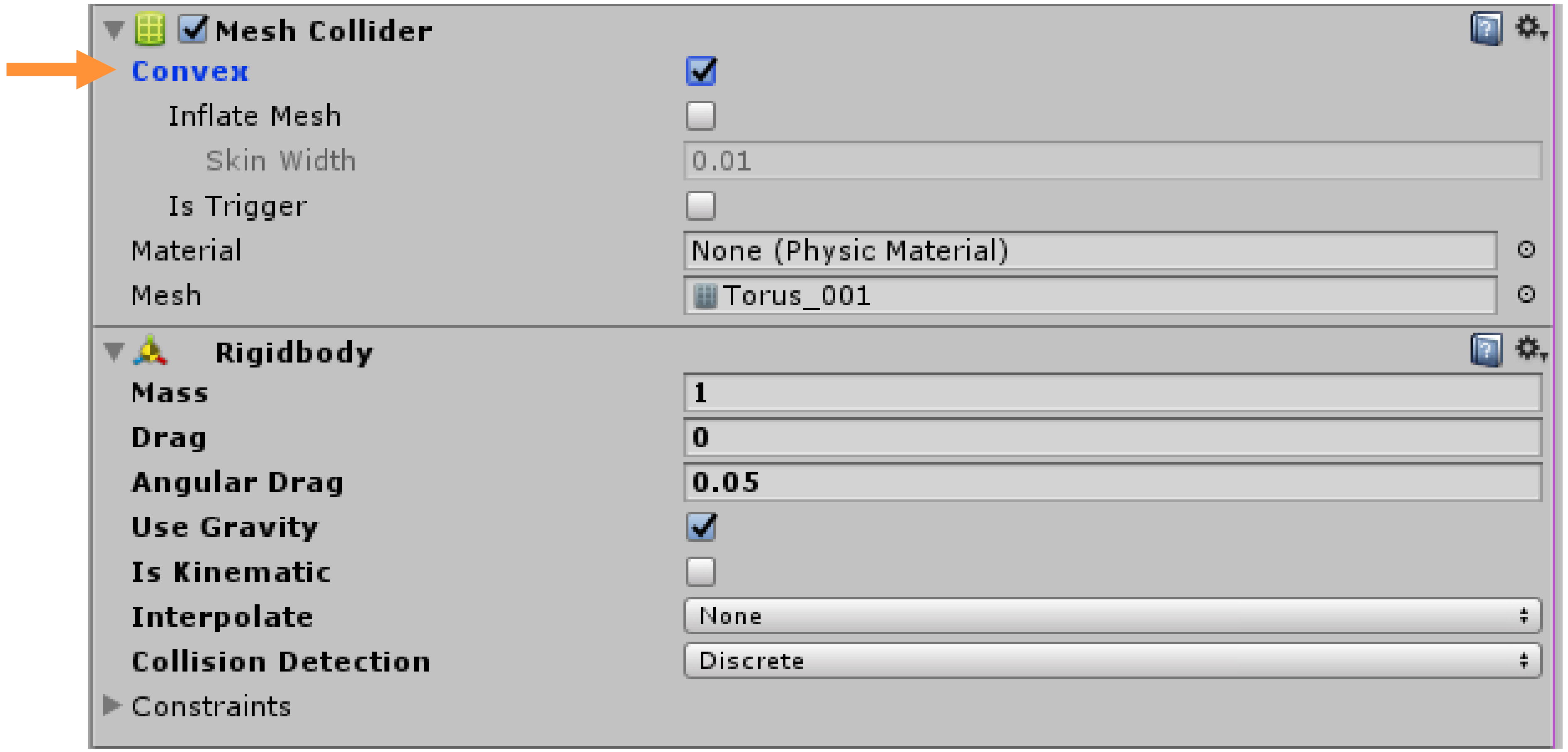
Normals	Import
Smoothing Angle	60
Tangents	Calculate Tangent Space

Materials

Import Materials	✓
Material Naming	By Base Texture Name
Material Search	Recursive-Up

For each imported material, Unity first looks for an existing material named [BaseTextureName].
Unity will do a recursive-up search for it in all Materials folders up to the Assets folder.
If it doesn't exist, a new one is created in the local Materials folder.

Importing 3D Model for Physics



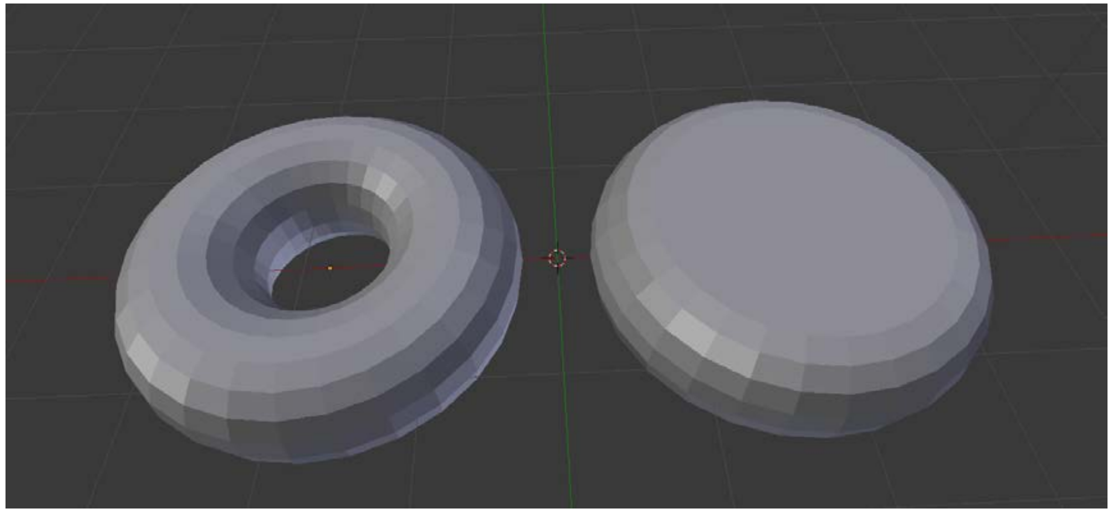
Mesh Collider

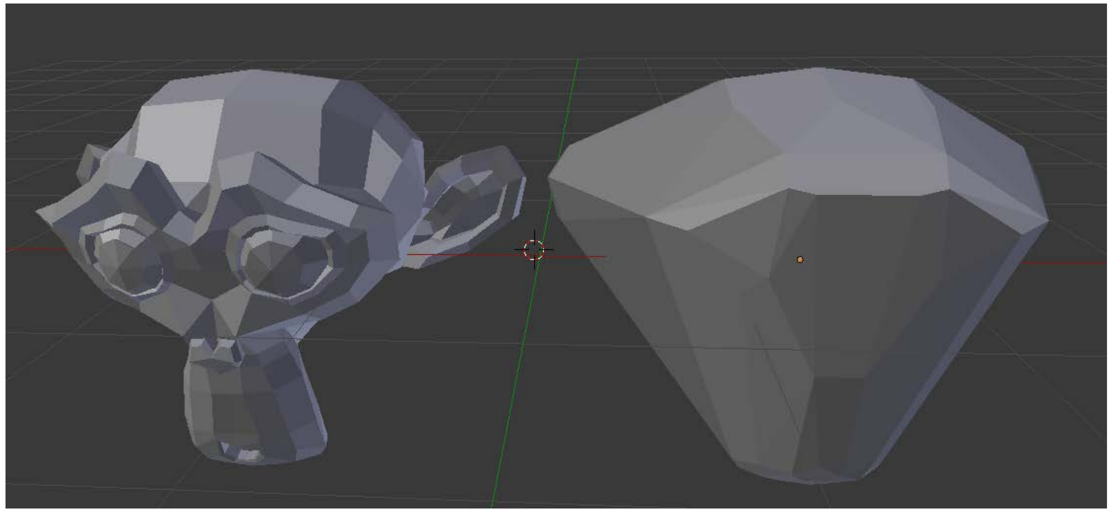
Convex	✓
Inflate Mesh	☐
Skin Width	0.01
Is Trigger	☐
Material	None (Physic Material)
Mesh	Torus_001

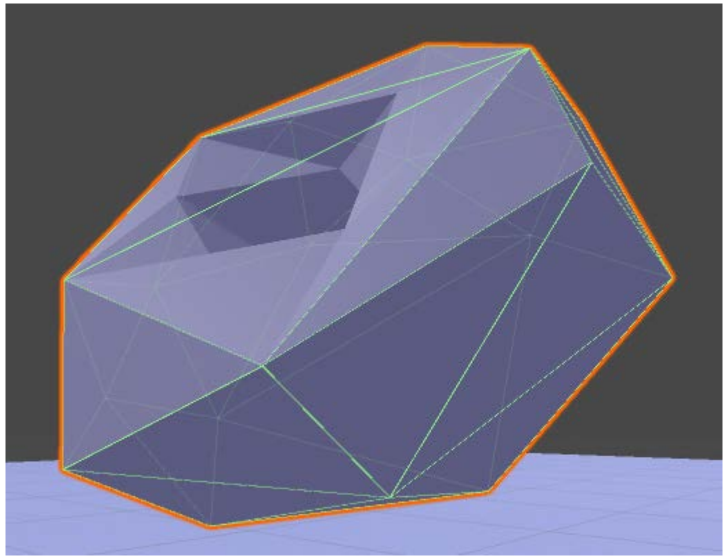
Rigidbody

Mass	1
Drag	0
Angular Drag	0.05
Use Gravity	✓
Is Kinematic	☐
Interpolate	None
Collision Detection	Discrete
Constraints	

Convex Hull

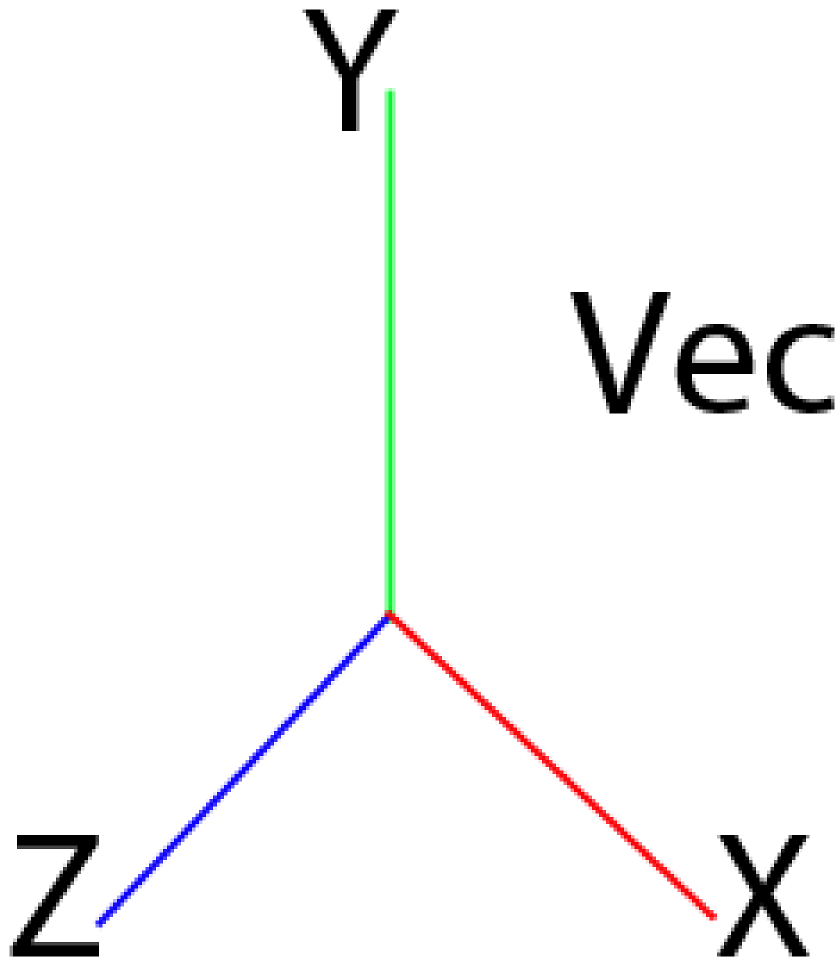






Vector3

http://docs.unity3d.com/ScriptReference/Vector3.html



Vector3

Vector3

struct in UnityEngine

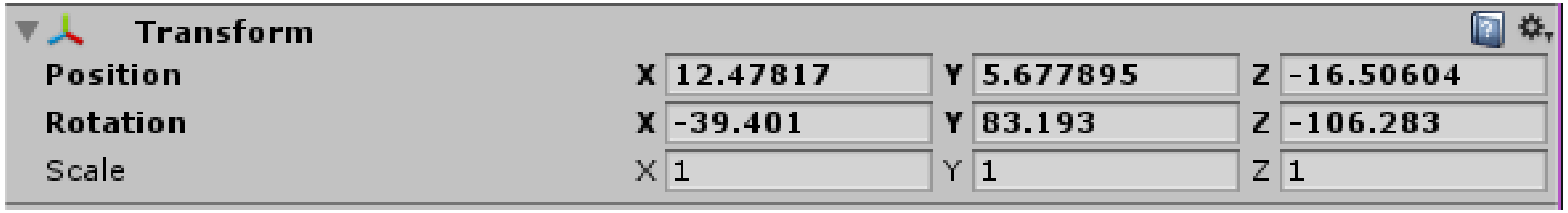
Description

Representation of 3D vectors and points.

This structure is used throughout Unity to pass 3D positions and directions around. It also contains functions for doing common vector operations.

```
Vector3 position = new Vector3(0f, 0f, 1f);
```

Transform



Transform			
Position	X 12.47817	Y 5.677895	Z -16.50604
Rotation	X -39.401	Y 83.193	Z -106.283
Scale	X 1	Y 1	Z 1

Transform.localPosition

SWITCH TO MANUAL

public Vector3 **localPosition**;

Transform.position

SWITCH TO MANUAL

public Vector3 **position**;

Transform.localScale

SWITCH TO MANUAL

public Vector3 **localScale**;

Transform.eulerAngles

SWITCH TO MANUAL

public Vector3 **eulerAngles**;

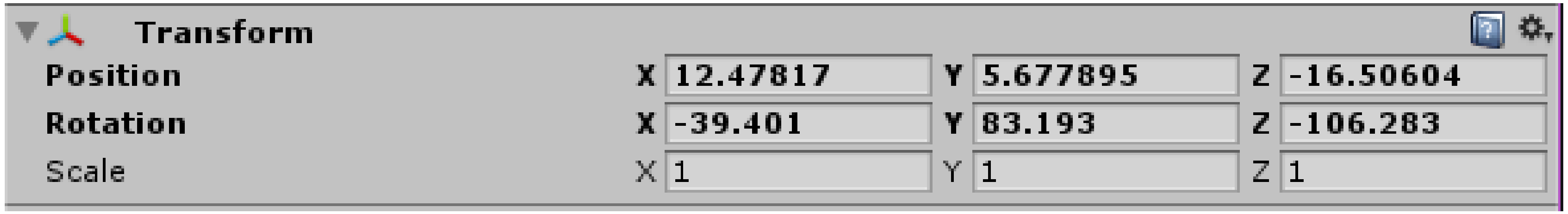
Transform.localEulerAngles

SWITCH TO MANUAL

public Vector3 **localEulerAngles**;

https://docs.unity3d.com/ScriptReference/Transform.html

Transform



Transform			
Position	X 12.47817	Y 5.677895	Z -16.50604
Rotation	X -39.401	Y 83.193	Z -106.283
Scale	X 1	Y 1	Z 1

- Access “Transform” component via: “transform”
- Ref: docs.unity3d.com/ScriptReference/Transform.html

Random

https://docs.unity3d.com/ScriptReference/Random.html

Random.Range

public static float **Range**(float **min**, float **max**);

Parameters

Description

Returns a random float number between and `min` [inclusive] and `max` [inclusive] (Read Only).

Note that `max` is inclusive, so using Random.Range(0.0f, 1.0f) could return 1.0 as a value.

```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour
{
    public GameObject prefab;

    // Instantiate the prefab somewhere between -10.0 and 10.0 on the x-z plane
    void Start()
    {
        Vector3 position = new Vector3(Random.Range(-10.0f, 10.0f), 0, Random.Range(-10.0f, 10.0f));
        Instantiate(prefab, position, Quaternion.identity);
    }
}
```

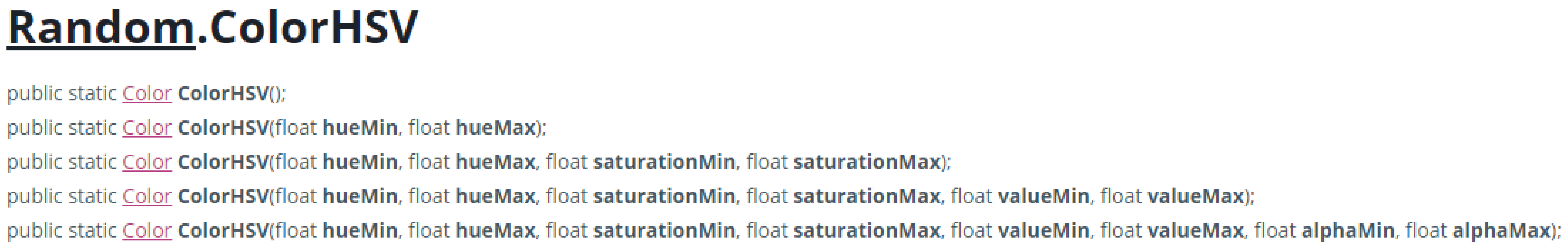
Random.rotationUniform

public static Quaternion **rotationUniform**;

Description

Returns a random rotation with uniform distribution (Read Only).

```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour {
    void Example() {
        transform.rotation = Random.rotationUniform;
    }
}
```



Random.ColorHSV

```
public static Color ColorHSV();
public static Color ColorHSV(float hueMin, float hueMax);
public static Color ColorHSV(float hueMin, float hueMax, float saturationMin, float saturationMax);
public static Color ColorHSV(float hueMin, float hueMax, float saturationMin, float saturationMax, float valueMin, float valueMax);
public static Color ColorHSV(float hueMin, float hueMax, float saturationMin, float saturationMax, float valueMin, float valueMax, float alphaMin, float alphaMax);
```

http://alloyui.com/examples/color-picker/hsv/

Distance

Vector3.Distance

public static float **Distance**(Vector3 **a**, Vector3 **b**);

Parameters

Description

Returns the distance between a and b.

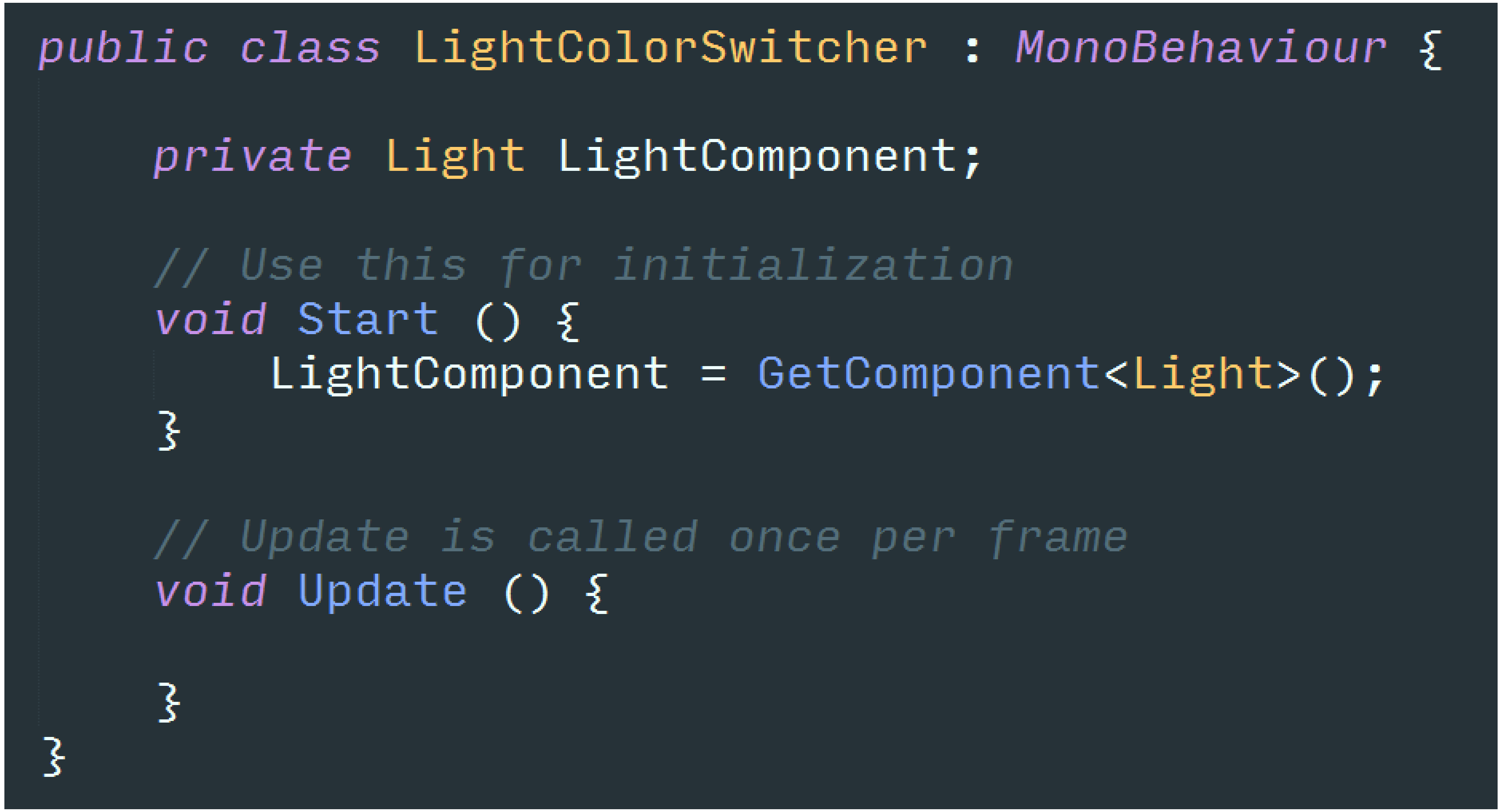
`Vector3.Distance(a,b)` is the same as `(a-b).magnitude`.

```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour {
    public Transform other;
    void Example() {
        if (other) {
            float dist = Vector3.Distance(other.position, transform.position);
            print("Distance to other: " + dist);
        }
    }
}
```

http://docs.unity3d.com/ScriptReference/Vector3.Distance.html

Accessing Components

Components On The Same Object



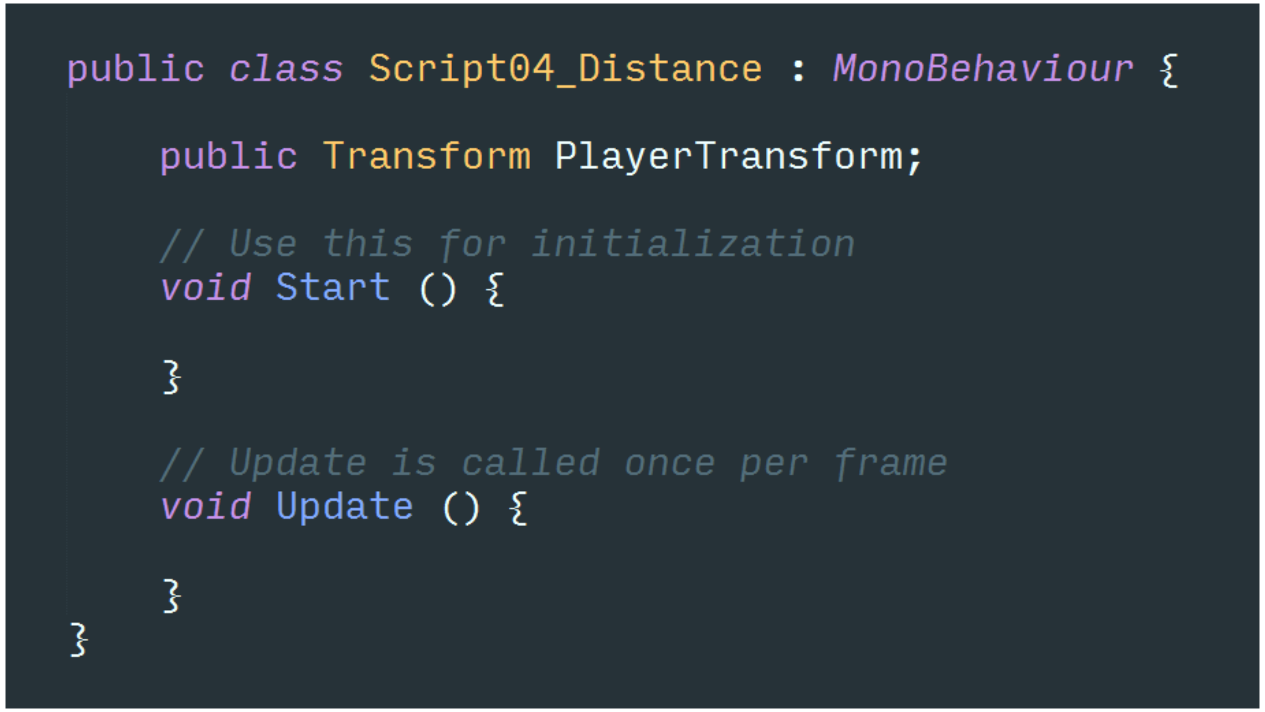
```
public class LightColorSwitcher : MonoBehaviour {

    private Light LightComponent;

    // Use this for initialization
    void Start () {
        LightComponent = GetComponent<Light>();
    }

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

    }
}
```

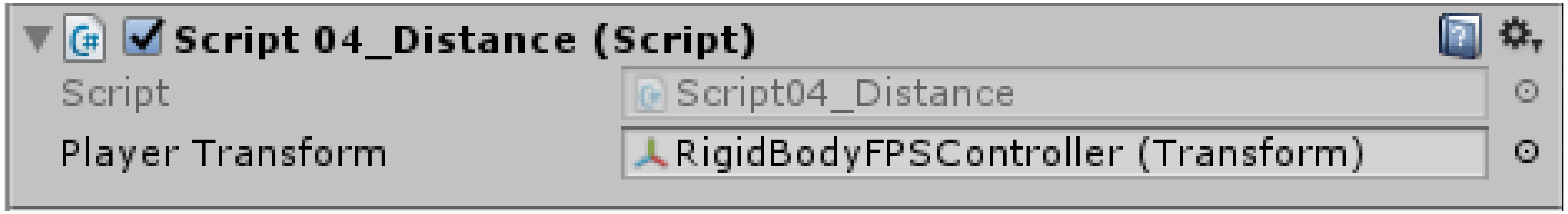
Generic Method

```
LightComponent = GetComponent<Light>();
```

TYPE OF COMPONENT

Components On Other Objects
(Inspector Method)


```
public class Script04_Distance : MonoBehaviour {

    public Transform PlayerTransform;

    // Use this for initialization
    void Start () {

    }

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

    }
}
```

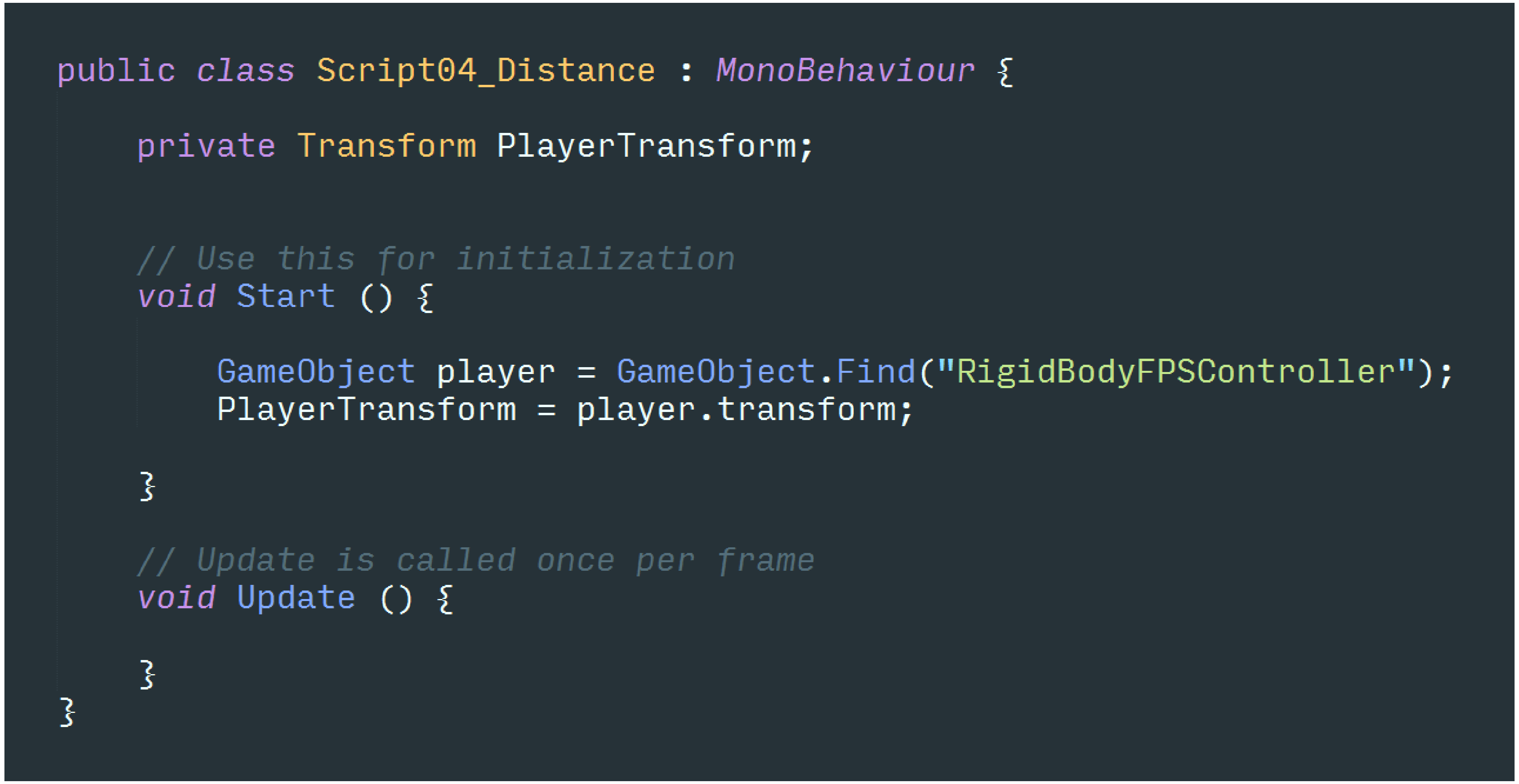

Script 04_Distance (Script)

Script: Script04_Distance

Player Transform: RigidBodyFPSController (Transform)

Components On Other Objects

(Scripting Method)



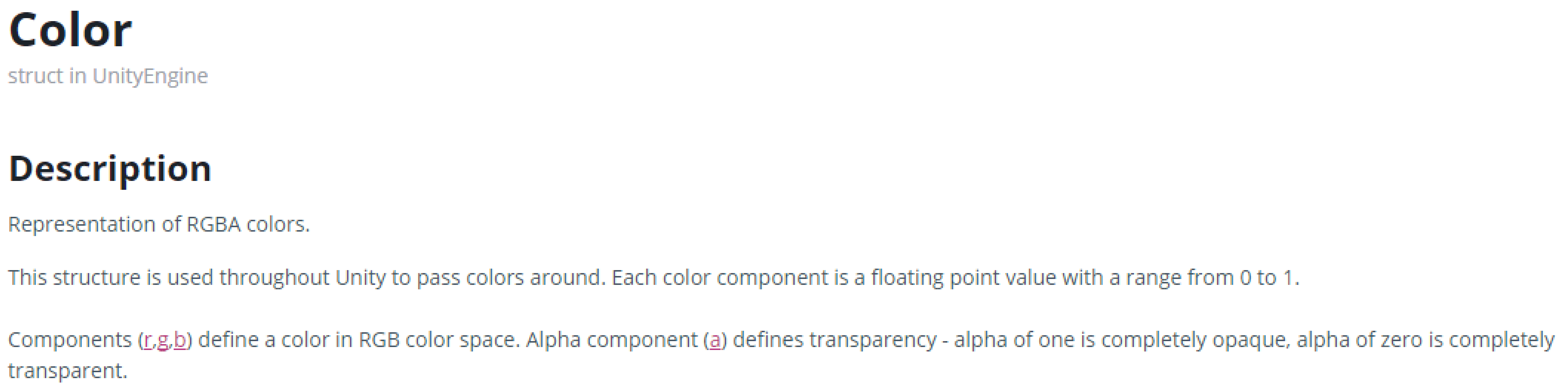
```
public class Script04_Distance : MonoBehaviour {

    private Transform PlayerTransform;


    // Use this for initialization
    void Start () {

        GameObject player = GameObject.Find("RigidBodyFPSController");
        PlayerTransform = player.transform;

    }

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

    }
}
```

https://docs.unity3d.com/ScriptReference/GameObject.Find.html

```csharp
public class DistanceDemo : MonoBehaviour {

    public Transform PlayerTransform;

    void Update () {

        // Find the distance
        float distance = Vector3.Distance(PlayerTransform.position, transform.position);

        // Check how this object is to the player
        if (distance <= 3f) {
            Debug.Log("Player is close!");
        } else {
            Debug.Log("Player is far!");
        }
    }
}
```

Color

http://docs.unity3d.com/ScriptReference/Color.html



Color

struct in UnityEngine

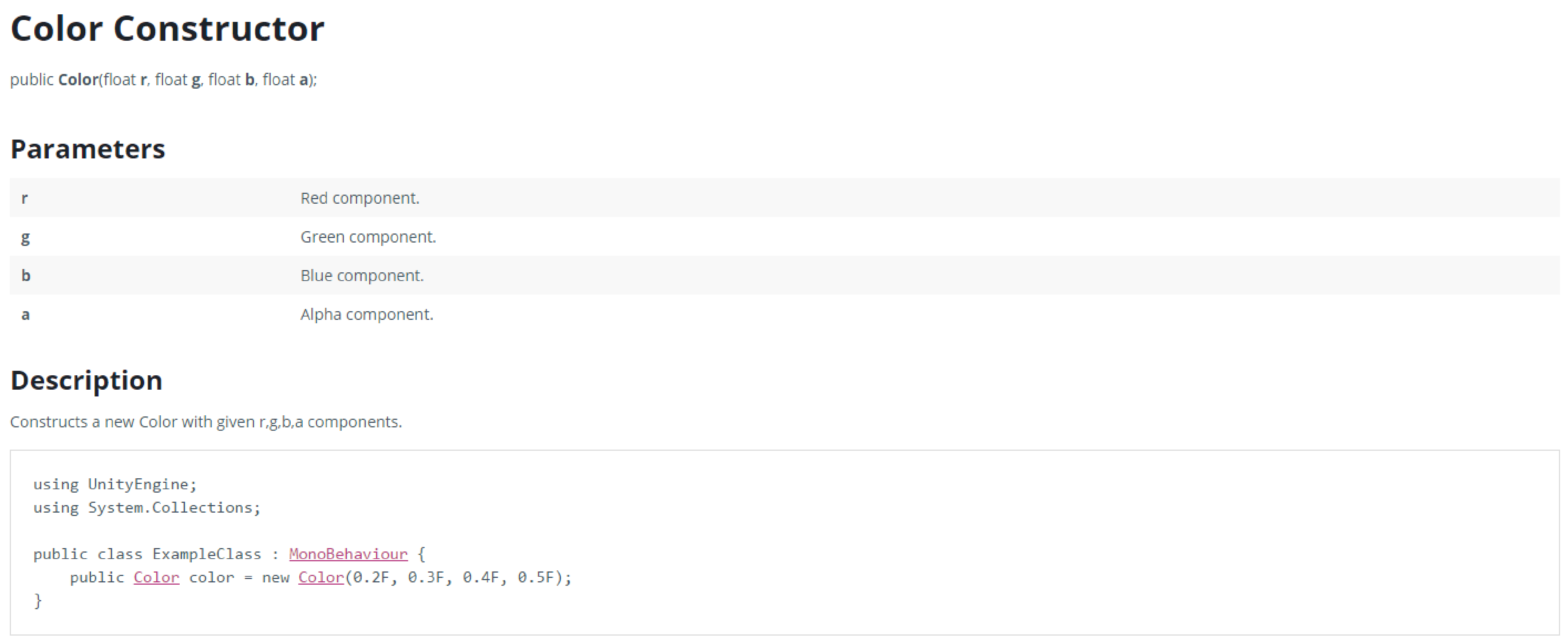
Description

Representation of RGBA colors.

This structure is used throughout Unity to pass colors around. Each color component is a floating point value with a range from 0 to 1.

Components (r,g,b) define a color in RGB color space. Alpha component (a) defines transparency - alpha of one is completely opaque, alpha of zero is completely transparent.

https://docs.unity3d.com/ScriptReference/Color.html



Color Constructor

public **Color**(float **r**, float **g**, float **b**, float **a**);

Parameters

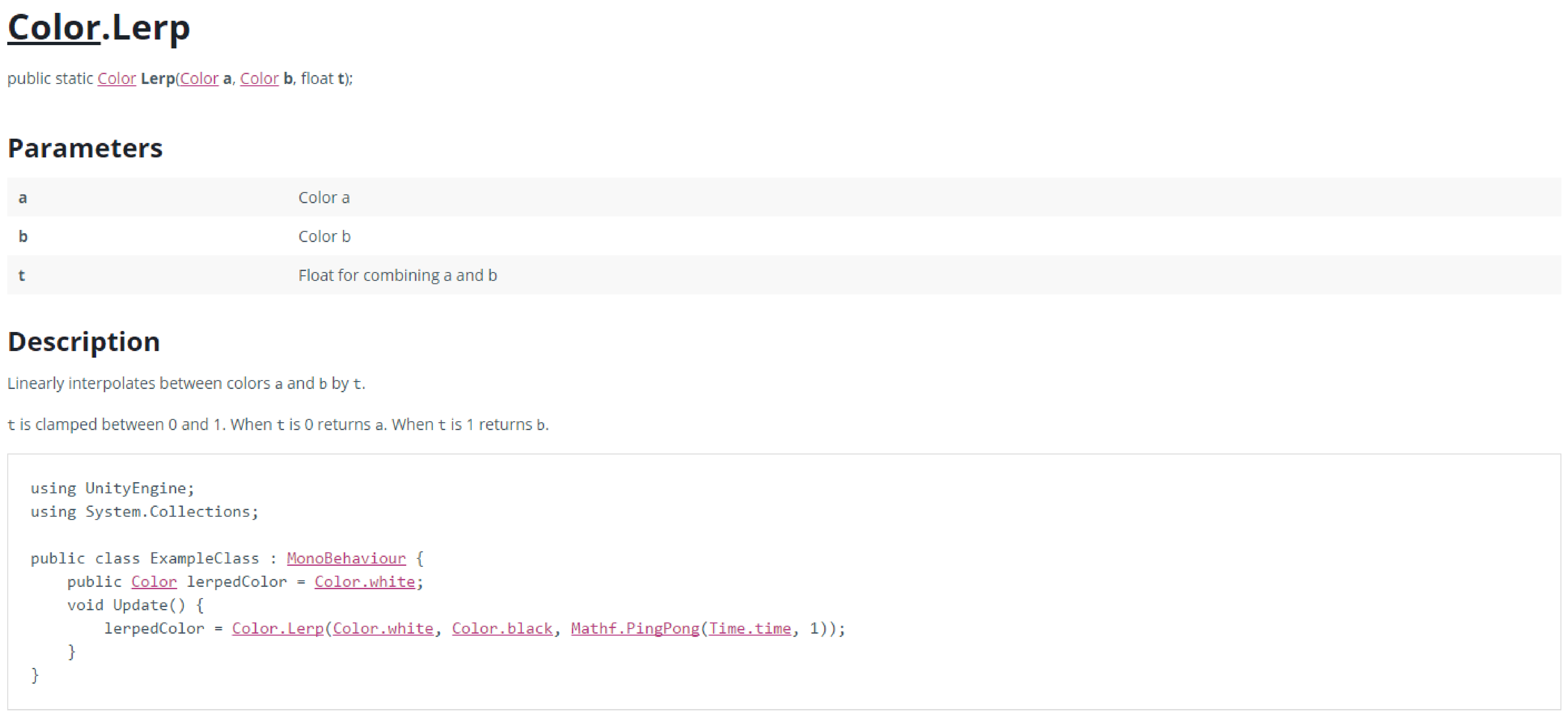
r	Red component.
g	Green component.
b	Blue component.
a	Alpha component.

Description

Constructs a new Color with given r,g,b,a components.

```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour {
    public Color color = new Color(0.2F, 0.3F, 0.4F, 0.5F);
}
```

https://docs.unity3d.com/ScriptReference/Color-ctor.html



Color.Lerp

public static Color **Lerp**(Color **a**, Color **b**, float **t**);

Parameters

a	Color a
b	Color b
t	Float for combining a and b

Description

Linearly interpolates between colors `a` and `b` by `t`.

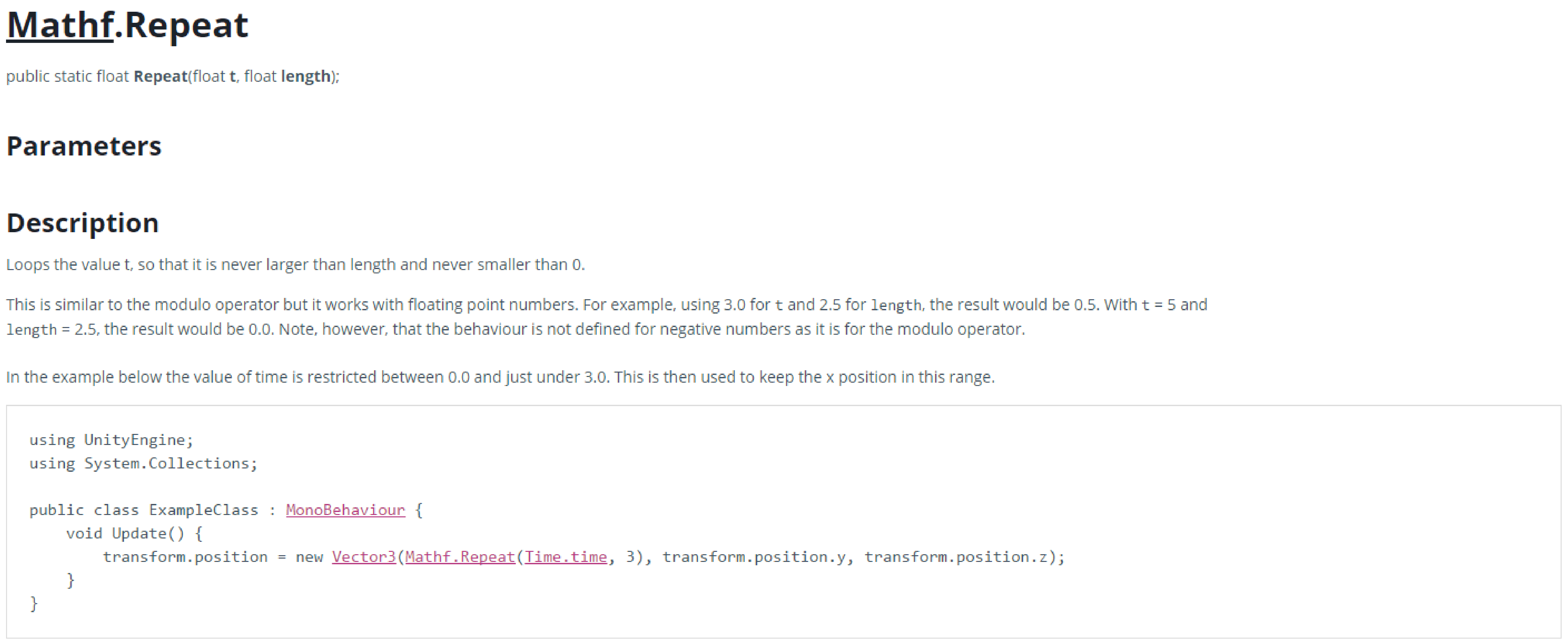
`t` is clamped between 0 and 1. When `t` is 0 returns `a`. When `t` is 1 returns `b`.

```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour {
    public Color lerpedColor = Color.white;
    void Update() {
        lerpedColor = Color.Lerp(Color.white, Color.black, Mathf.PingPong(Time.time, 1));
    }
}
```

http://docs.unity3d.com/ScriptReference/Color.Lerp.html

Mathf

http://docs.unity3d.com/ScriptReference/Mathf.html



Mathf.Repeat

public static float **Repeat**(float **t**, float **length**);

Parameters

Description

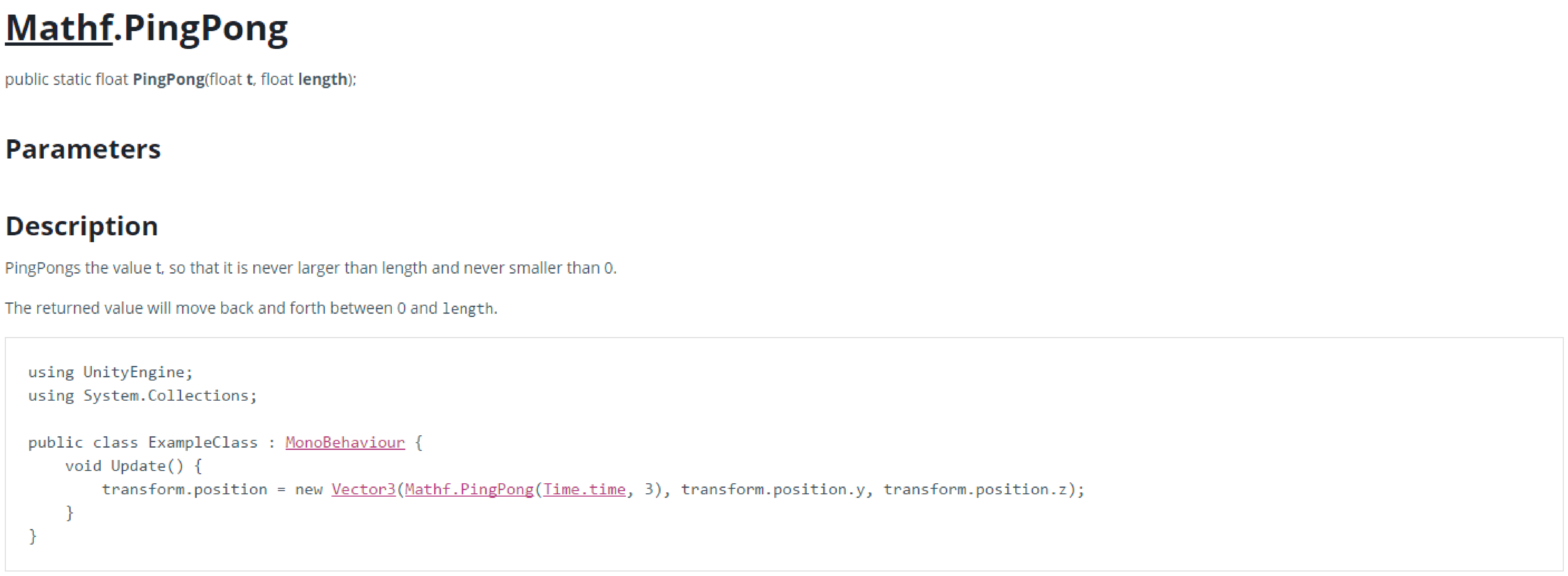
Loops the value t, so that it is never larger than length and never smaller than 0.

This is similar to the modulo operator but it works with floating point numbers. For example, using 3.0 for `t` and 2.5 for `length`, the result would be 0.5. With `t` = 5 and `length` = 2.5, the result would be 0.0. Note, however, that the behaviour is not defined for negative numbers as it is for the modulo operator.

In the example below the value of time is restricted between 0.0 and just under 3.0. This is then used to keep the x position in this range.

```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour {
    void Update() {
        transform.position = new Vector3(Mathf.Repeat(Time.time, 3), transform.position.y, transform.position.z);
    }
}
```

http://docs.unity3d.com/ScriptReference/Mathf.Repeat.html



Mathf.PingPong

public static float **PingPong**(float **t**, float **length**);

Parameters

Description

PingPongs the value t, so that it is never larger than length and never smaller than 0.

The returned value will move back and forth between 0 and `length`.

```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour {
    void Update() {
        transform.position = new Vector3(Mathf.PingPong(Time.time, 3), transform.position.y, transform.position.z);
    }
}
```

http://docs.unity3d.com/ScriptReference/Mathf.PingPong.html