Introduction to Unity

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Unity

- Largest community
- 2D / 3D
- C#

Unity is a cross-platform game engine developed by Unity Technologies.

First released in 2005.

20+ platforms including: Windows, Mac, Linux, Android, Iphone, WebGL, Consoles…

53% of top 1000 grossing mobile games globally

Architecture

- Components
- Scriptable objects
- Unity and C# events
- Assembly files
- Coroutines
- Execution order

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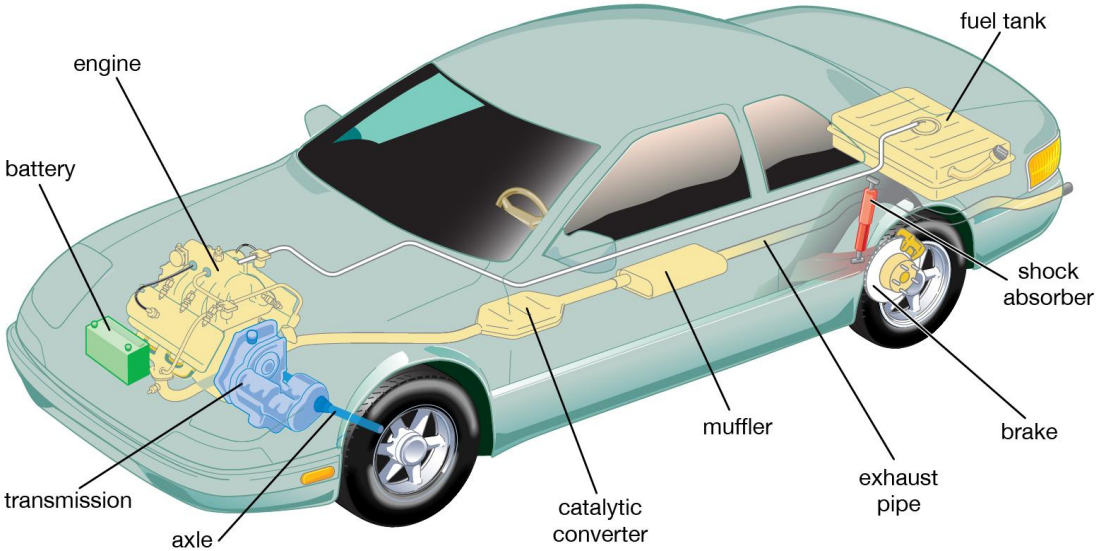
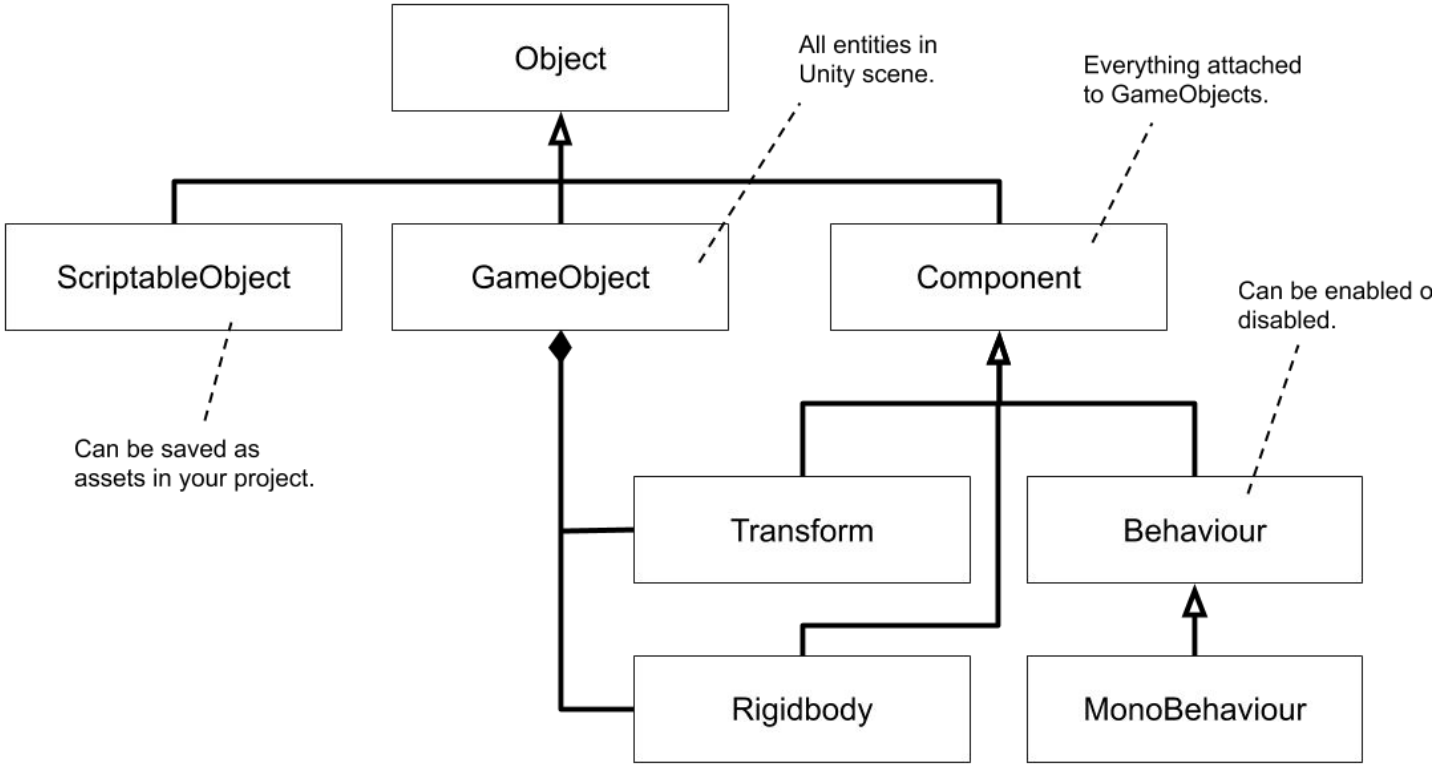
Components

Project is made of **scenes**, scenes are made of **game objects**, game objects are made of **components**.



Engine classes



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Scriptable objects

Scriptable objects are the data containers that can be saved as assets in the project.

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Unity and C# events

Unity events

- Connectable in inspector
- Can only have certain types
- Slower

```
import UnityEngine.Events

[Serializable]

public class SomeEvent : UnityEvent<float> { }
```

C# events

- Can be invoked in the same class
- Can have a return value with Func
- Faster

```
public event Action<float> OnSet;

public event Func<float, float> OnRequest;

OnSet?.Invoke(value);
```

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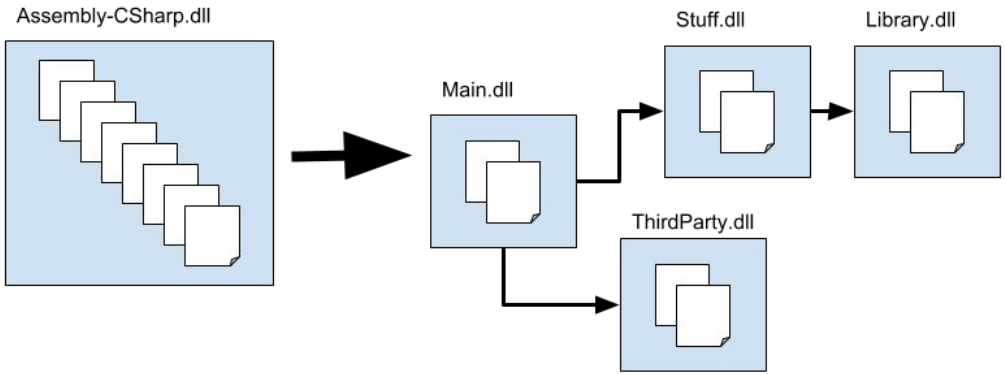
Assembly files

For compiling code in separate dll files.

- Faster compile times
- Guarantees decoupling



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Coroutines

Like a function that has the ability to pause execution and return control to Unity.

They are not using multithreading!

```
void Update()
{
    if (Input.GetKeyDown("f"))
    {
        StartCoroutine("Fade");
    }
}
```

```
IEnumerator Fade()
{
    for (float ft = 1f; ft >= 0; ft -= 0.1f)
    {
        Color c = renderer.material.color;
        c.a = ft;
        renderer.material.color = c;
        yield return new WaitForSeconds(.1f);
    }
}
```

https://docs.unity3d.com/Manual/Coroutines.html

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Execution order

Script lifecycle (ordered in first to last):

1. Awake
2. OnEnable
3. Start
4. FixedUpdate
5. Update
6. LateUpdate
7. OnRender(...)
8. OnGUI
9. OnDisable
10. OnDestroy

More info: https://docs.unity3d.com/Manual/ExecutionOrder.html

Execution order

Execution order of scripts: **Edit > Project Settings**