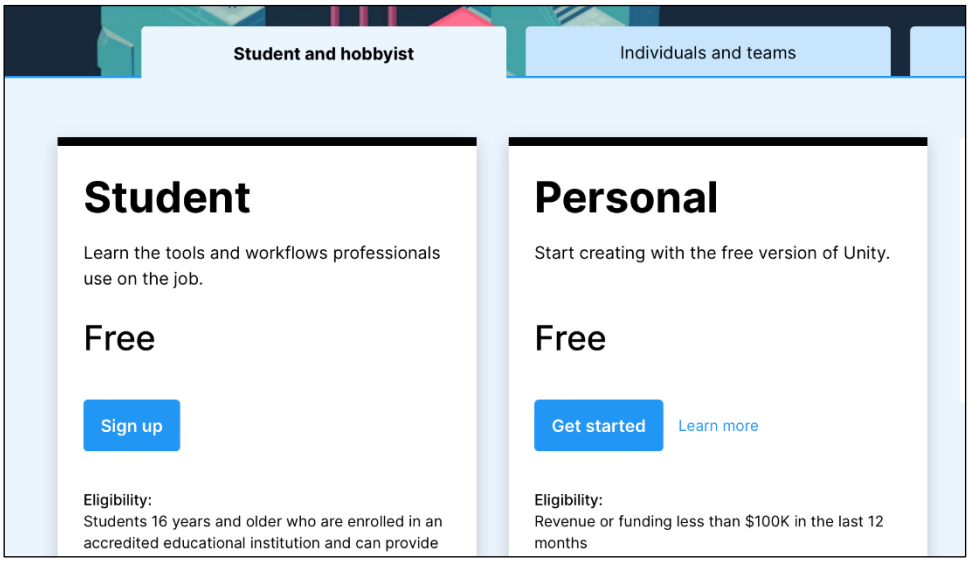
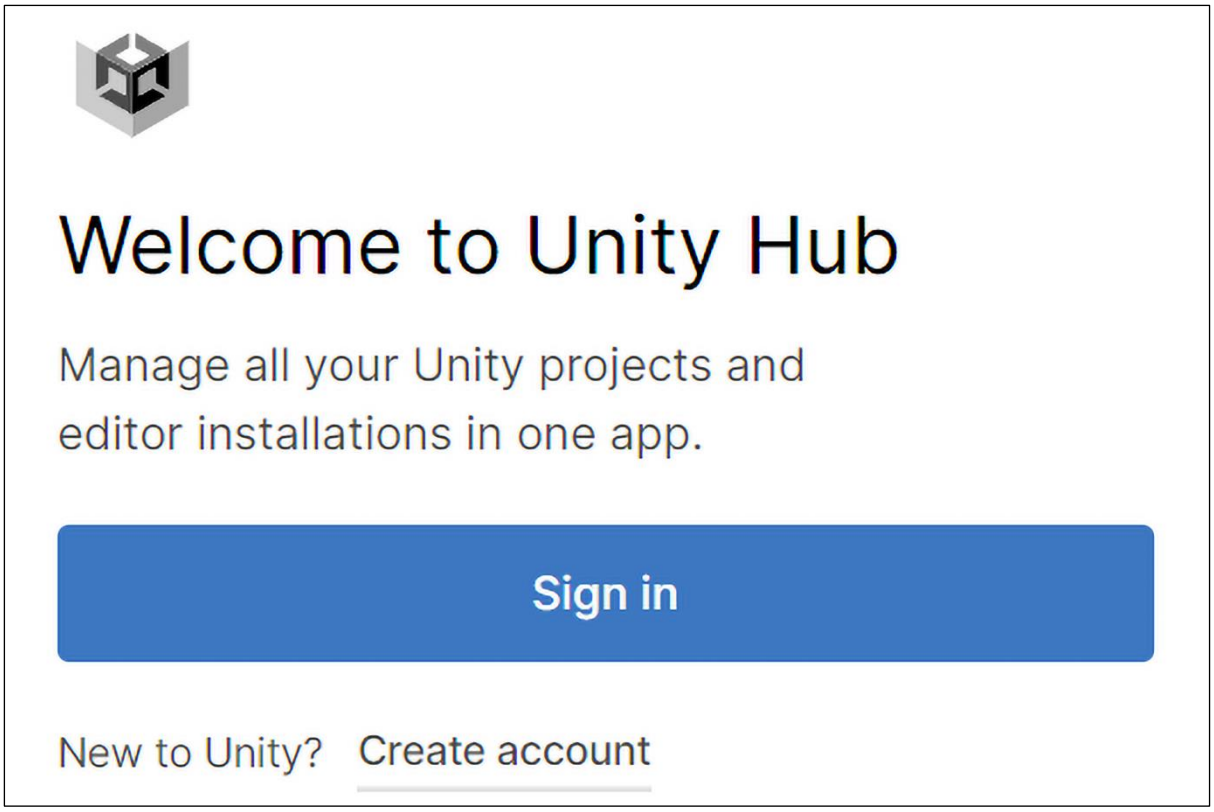
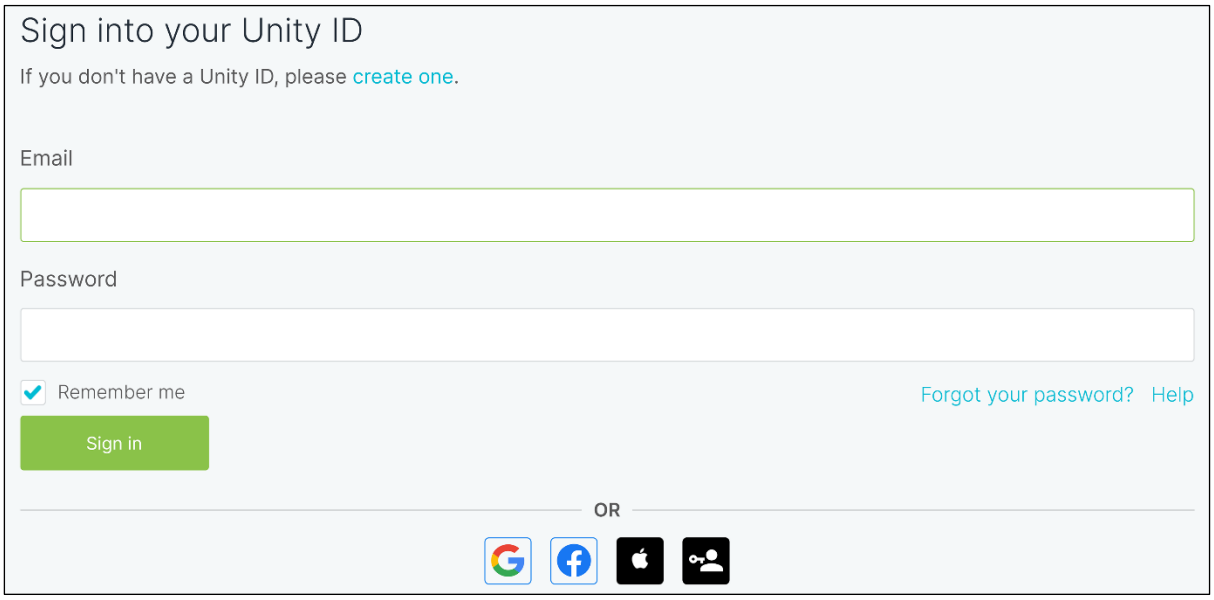
Chapter 1: Embark on Your Unity Journey

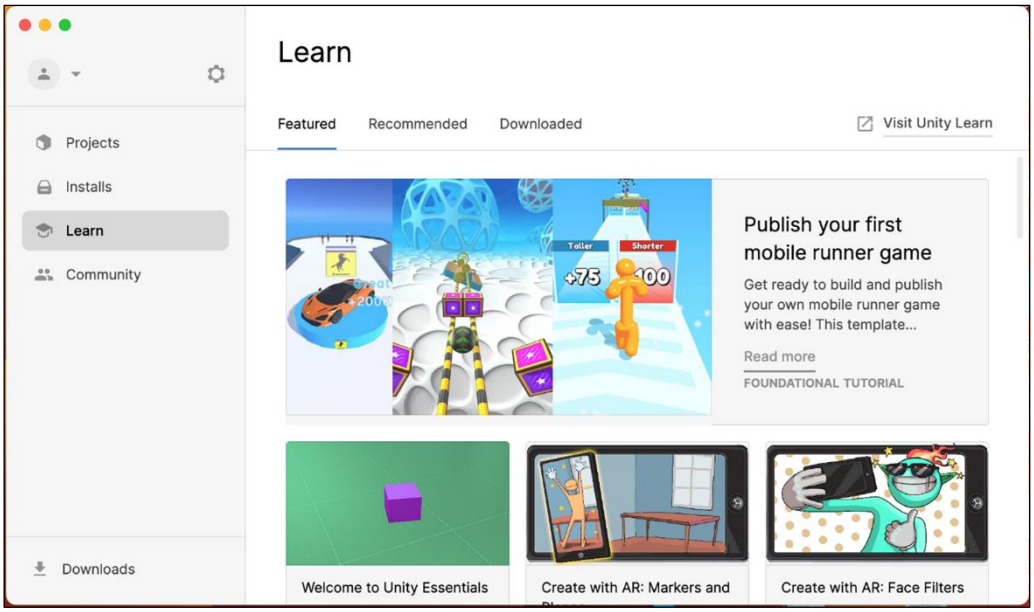




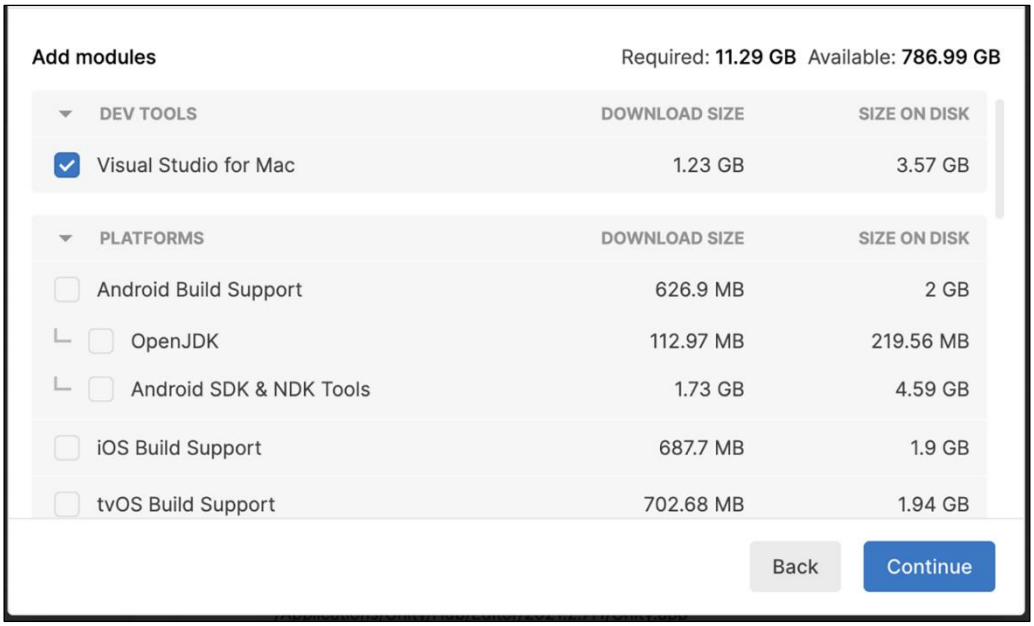


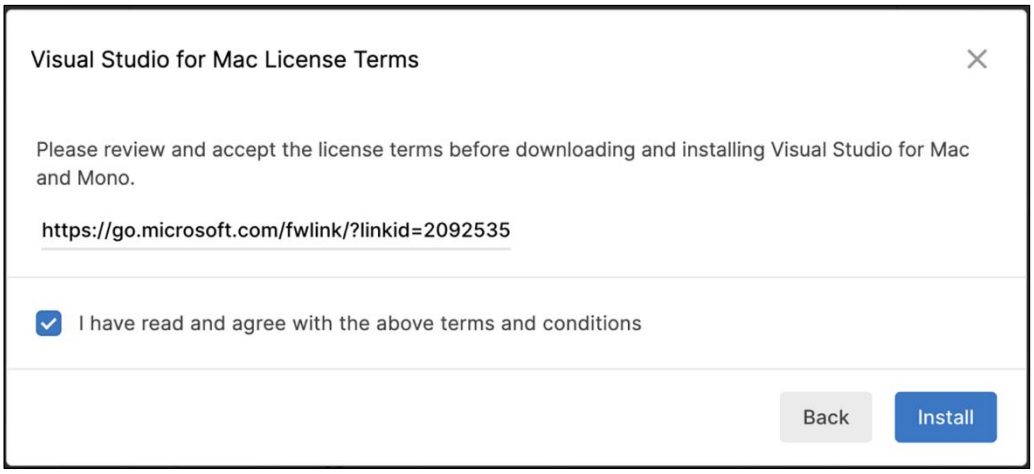

Welcome to Unity Hub
Manage all your Unity projects and editor installations in one app.
Sign in
New to Unity? Create account

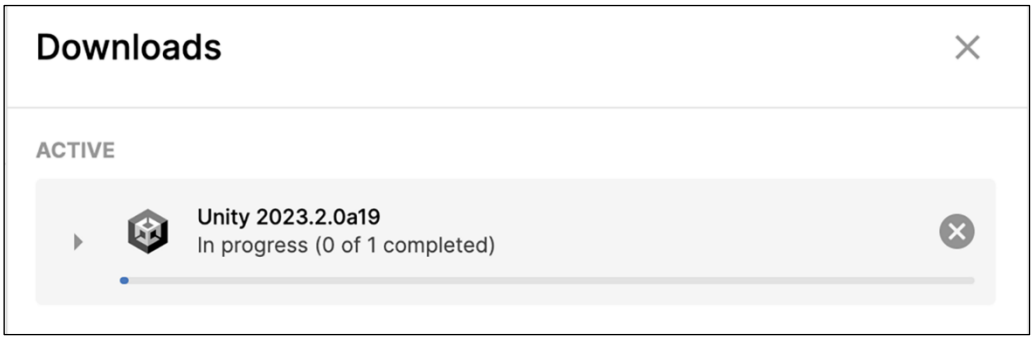

Sign into your Unity ID
If you don't have a Unity ID, please create one.
Email
Password
Remember me
Forgot your password? Help
Sign in
OR

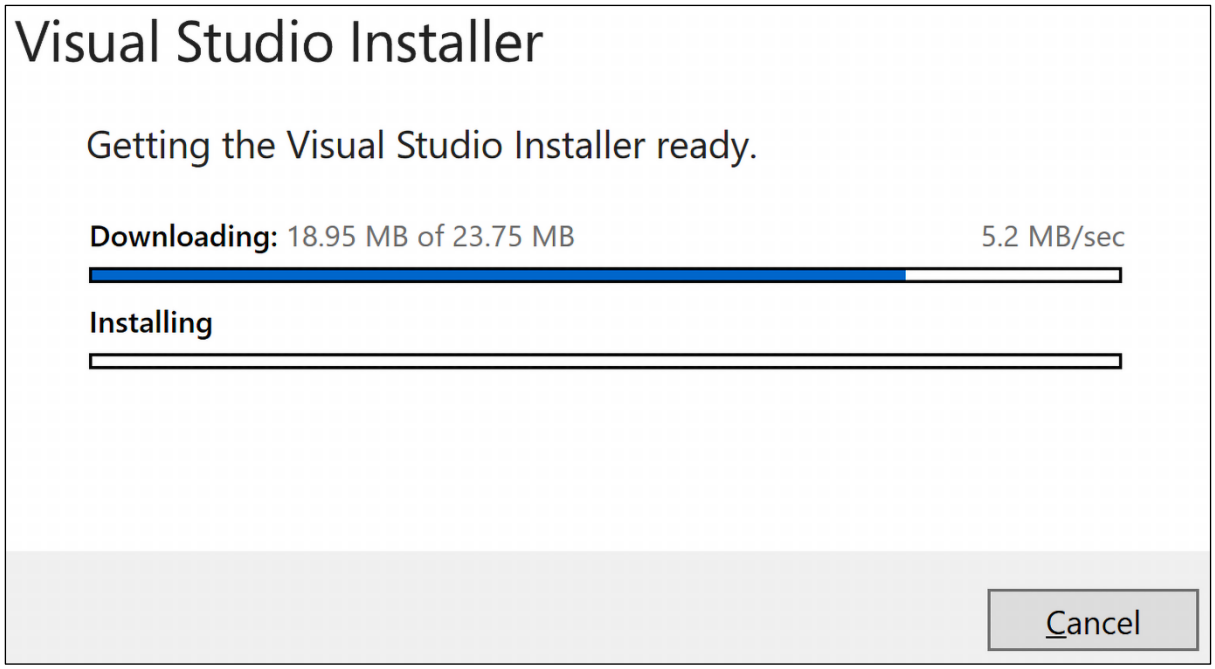

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Publish your first mobile runner game
Get ready to build and publish your own mobile runner game with ease! This template...
Read more
FOUNDATIONAL TUTORIAL
Welcome to Unity Essentials
Create with AR: Markers and
Create with AR: Face Filters

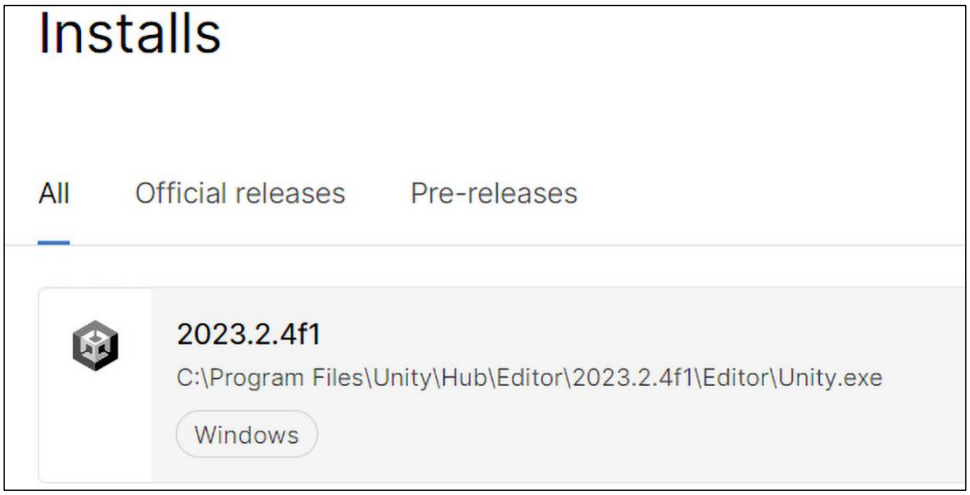

Install Unity Editor
Official releases
Pre-releases
Archive
LONG TERM SUPPORT (LTS)
2022.3.16f1 LTS
Recommended version
Install
2021.3.33f1 LTS
Install
OTHER VERSIONS
2023.2.4f1
Installed
Install

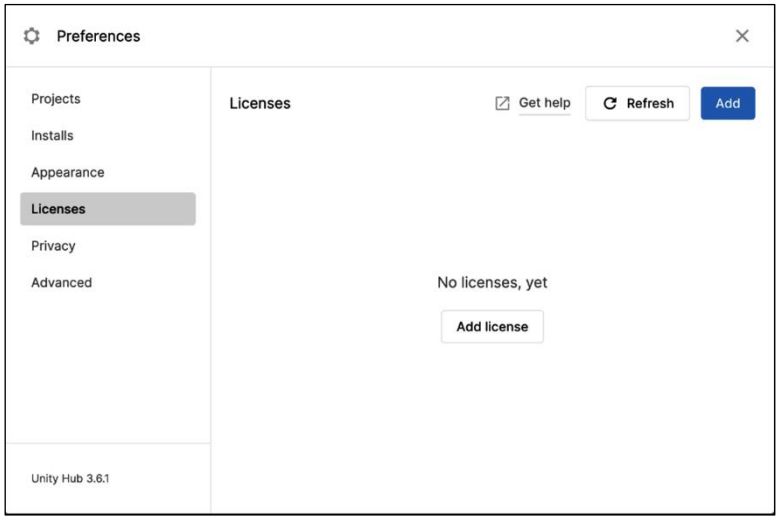

Add modules
Required: 11.29 GB Available: 786.99 GB
DEV TOOLS
DOWNLOAD SIZE
SIZE ON DISK
Visual Studio for Mac
1.23 GB
3.57 GB
PLATFORMS
DOWNLOAD SIZE
SIZE ON DISK
Android Build Support
626.9 MB
2 GB
OpenJDK
112.97 MB
219.56 MB
Android SDK & NDK Tools
1.73 GB
4.59 GB
iOS Build Support
687.7 MB
1.9 GB
tvOS Build Support
702.68 MB
1.94 GB
Back
Continue

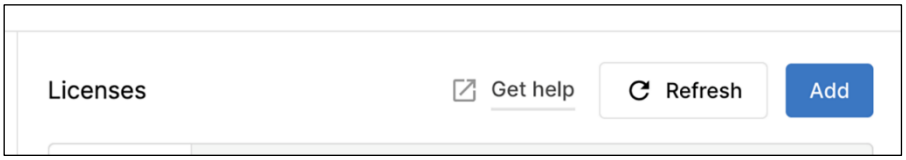

Visual Studio for Mac License Terms
Please review and accept the license terms before downloading and installing Visual Studio for Mac and Mono.
https://go.microsoft.com/fwlink/?linkid=2092535
I have read and agree with the above terms and conditions
Back
Install

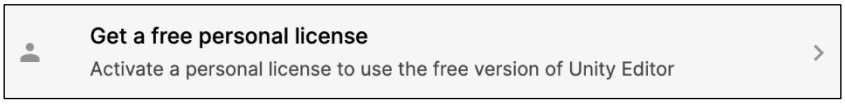

Downloads
ACTIVE
Unity 2023.2.0a19
In progress (0 of 1 completed)


Visual Studio Installer
Getting the Visual Studio Installer ready.
Downloading: 18.95 MB of 23.75 MB
5.2 MB/sec
Installing
Cancel

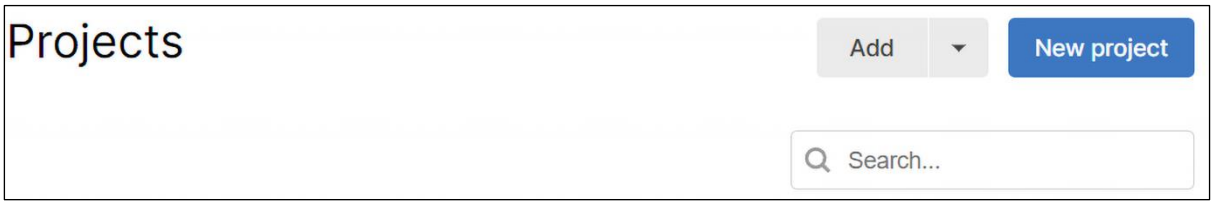

Installs
All
Official releases
Pre-releases
2023.2.4f1
C:\Program Files\Unity\Hub\Editor\2023.2.4f1\Editor\Unity.exe
Windows

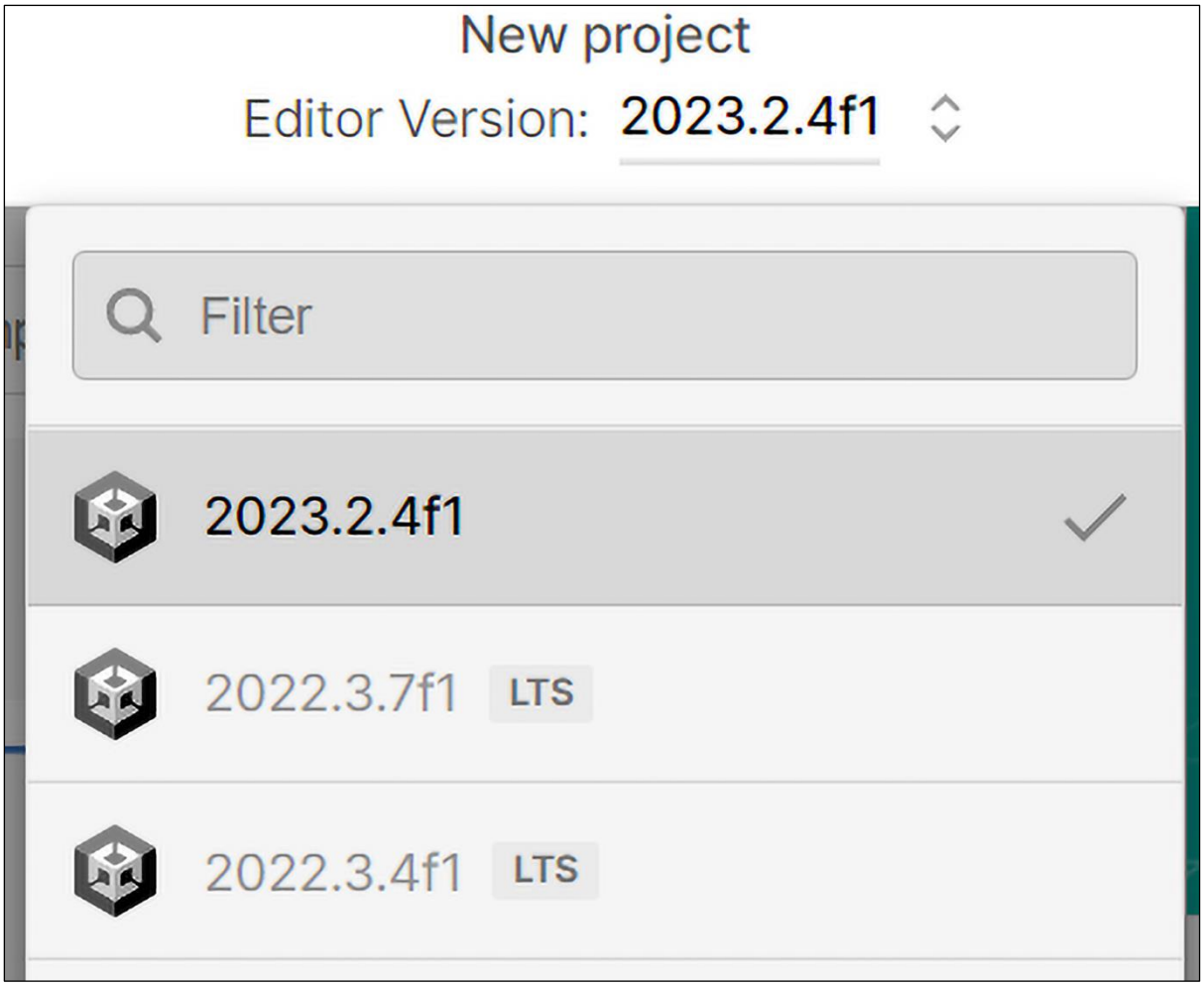

Preferences
Projects
Installs
Appearance
Licenses
Privacy
Advanced
Unity Hub 3.6.1
Licenses
Get help
Refresh
Add
No licenses, yet
Add license

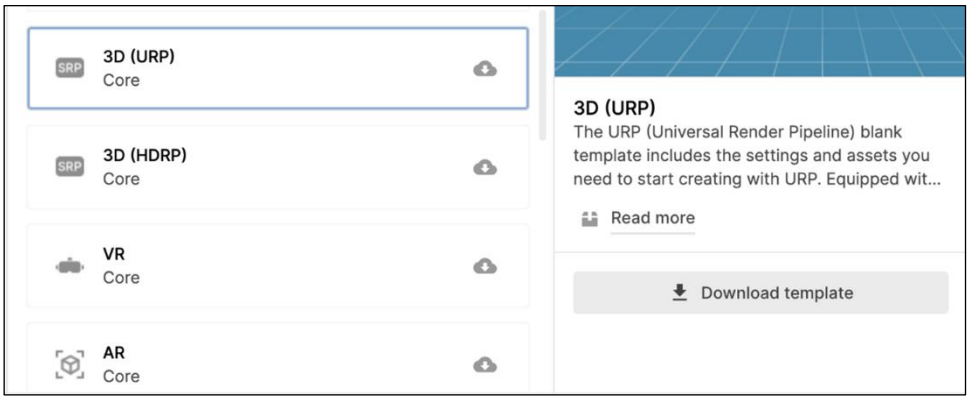

Licenses
Get help
Refresh
Add

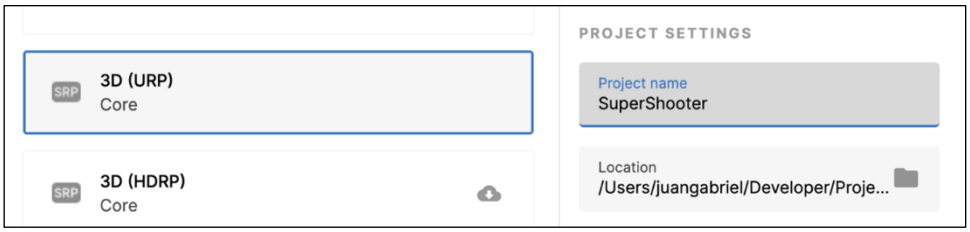

Get a free personal license
Activate a personal license to use the free version of Unity Editor

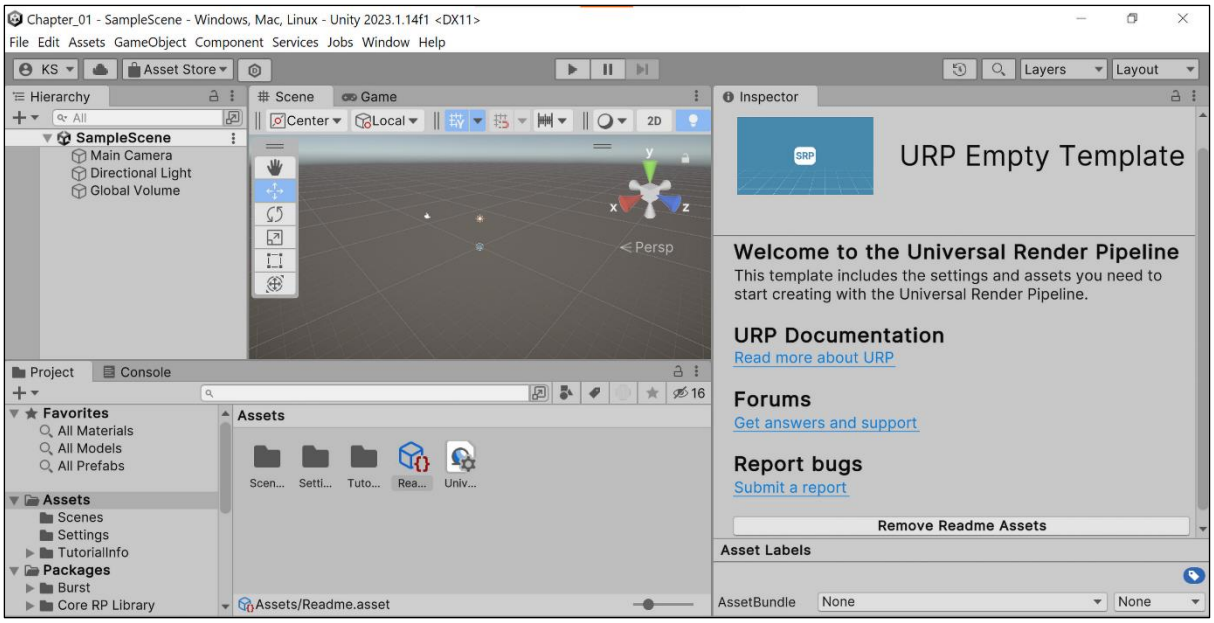

Agree and get personal edition license

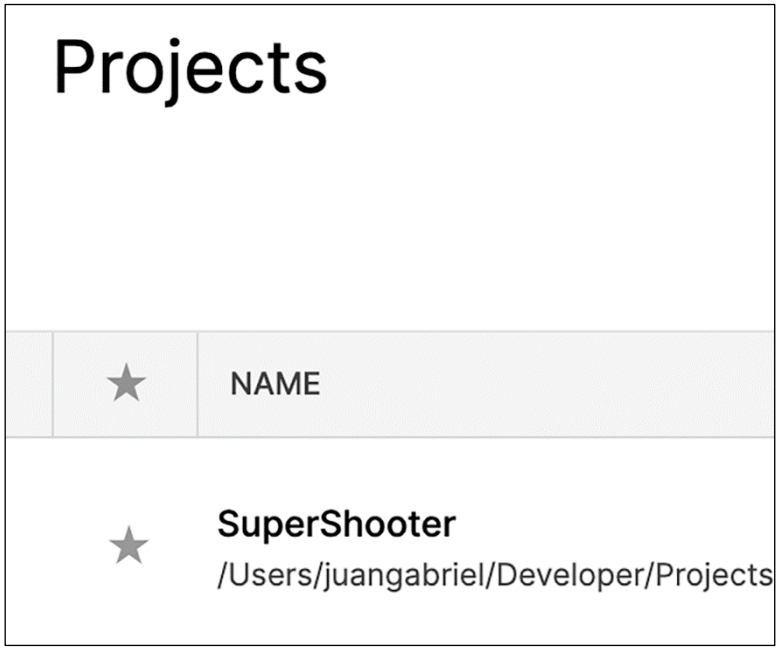

Projects
Add
New project
Search...

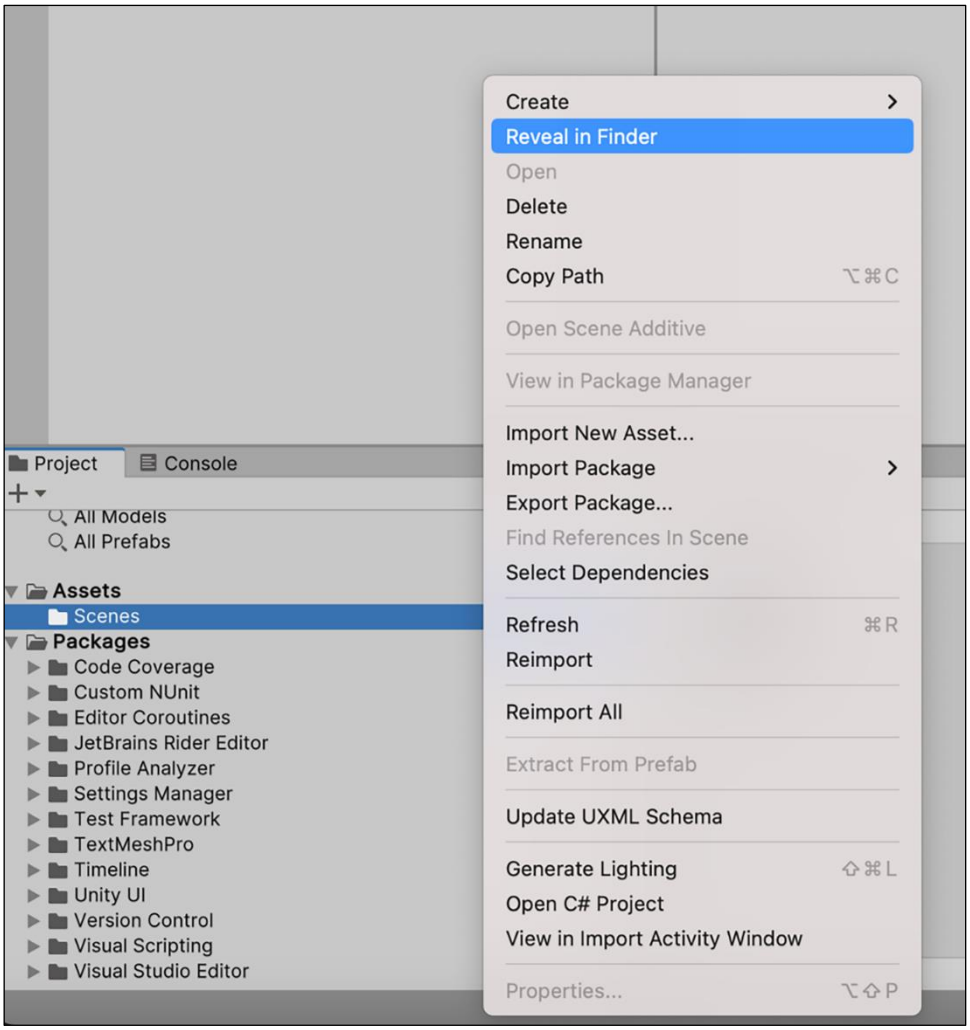

New project
Editor Version: 2023.2.4f1
Filter
2023.2.4f1
2022.3.7f1 LTS
2022.3.4f1 LTS

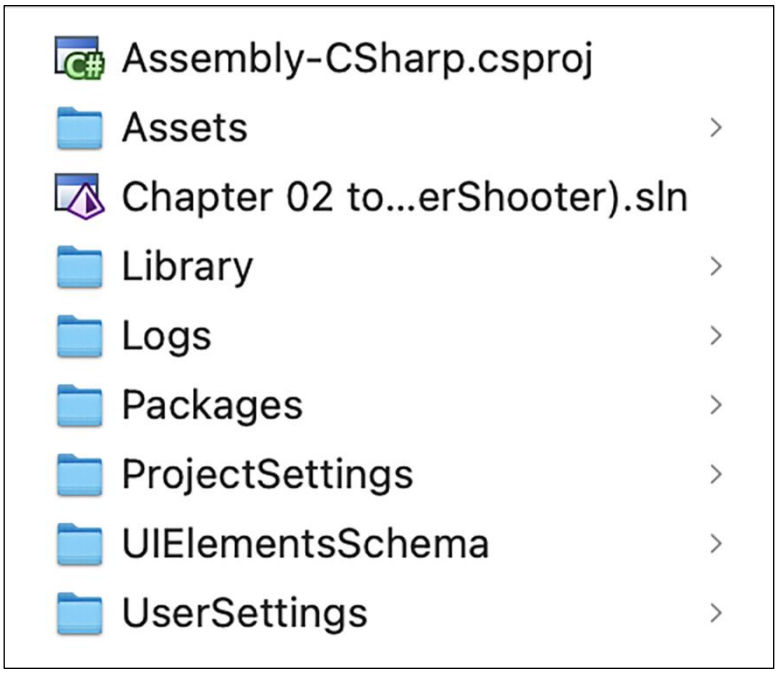

3D (URP)
Core
3D (HDRP)
Core
VR
Core
AR
Core
3D (URP)
The URP (Universal Render Pipeline) blank template includes the settings and assets you need to start creating with URP. Equipped wit...
Read more
Download template


3D (URP)
Core
3D (HDRP)
Core
PROJECT SETTINGS
Project name
SuperShooter
Location
/Users/juangabriel/Developer/Proje...

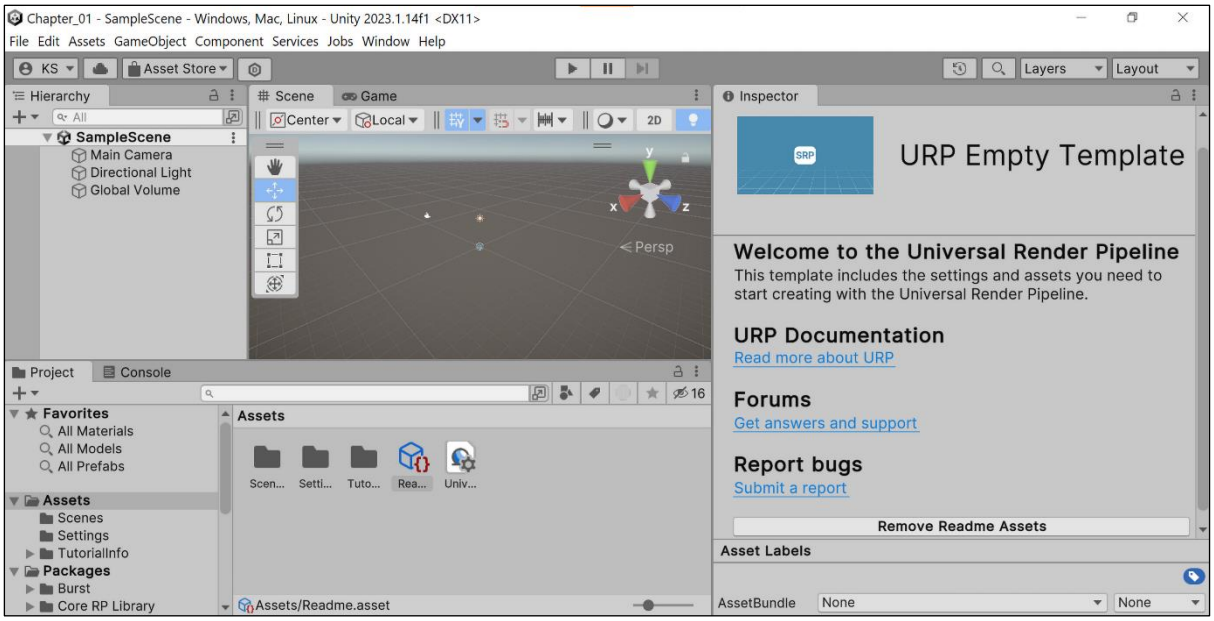

Chapter_01 - SampleScene - Windows, Mac, Linux - Unity 2023.1.14f1 <DX11>
File Edit Assets GameObject Component Services Jobs Window Help
KS
Asset Store
Layers
Layout
Hierarchy
SampleScene
Main Camera
Directional Light
Global Volume
Scene
Game
Center
Local
2D
Persp
Inspector
URP Empty Template
Welcome to the Universal Render Pipeline
This template includes the settings and assets you need to start creating with the Universal Render Pipeline.
URP Documentation
Read more about URP
Forums
Get answers and support
Report bugs
Submit a report
Remove Readme Assets
Asset Labels
AssetBundle
None
None
Project
Console
Favorites
All Materials
All Models
All Prefabs
Assets
Scenes
Settings
TutorialInfo
Packages
Burst
Core RP Library
Assets
Scen...
Setti...
Tuto...
Rea...
Univ...
Assets/Readme.asset

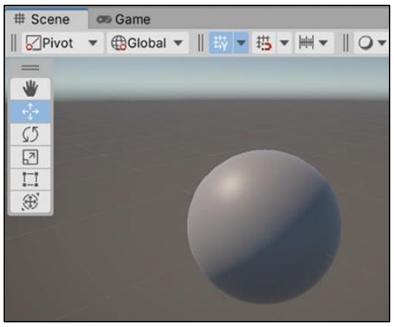

Projects
NAME
SuperShooter
/Users/juangabriel/Developer/Projects

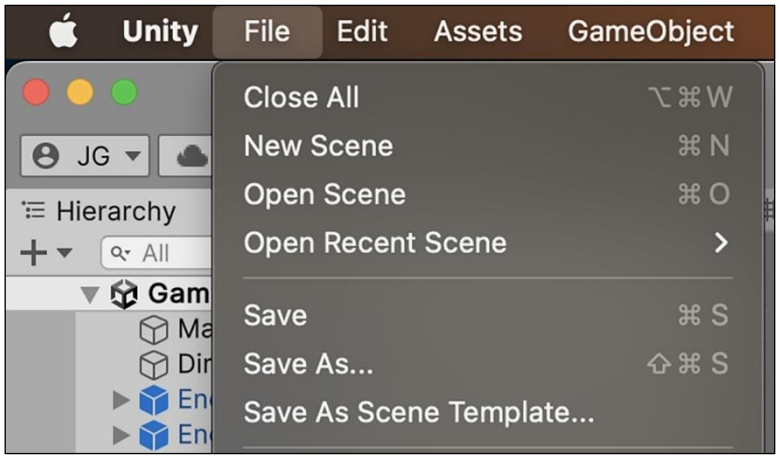

Create
Reveal in Finder
Open
Delete
Rename
Copy Path ⌥⌘C
Open Scene Additive
View in Package Manager
Import New Asset...
Import Package
Export Package...
Find References In Scene
Select Dependencies
Refresh ⌘R
Reimport
Reimport All
Extract From Prefab
Update UXML Schema
Generate Lighting ⇧⌘L
Open C# Project
View in Import Activity Window
Properties... ⌥⇧P
Project
Console
All Models
All Prefabs
Assets
Scenes
Packages
Code Coverage
Custom NUnit
Editor Coroutines
JetBrains Rider Editor
Profile Analyzer
Settings Manager
Test Framework
TextMeshPro
Timeline
Unity UI
Version Control
Visual Scripting
Visual Studio Editor

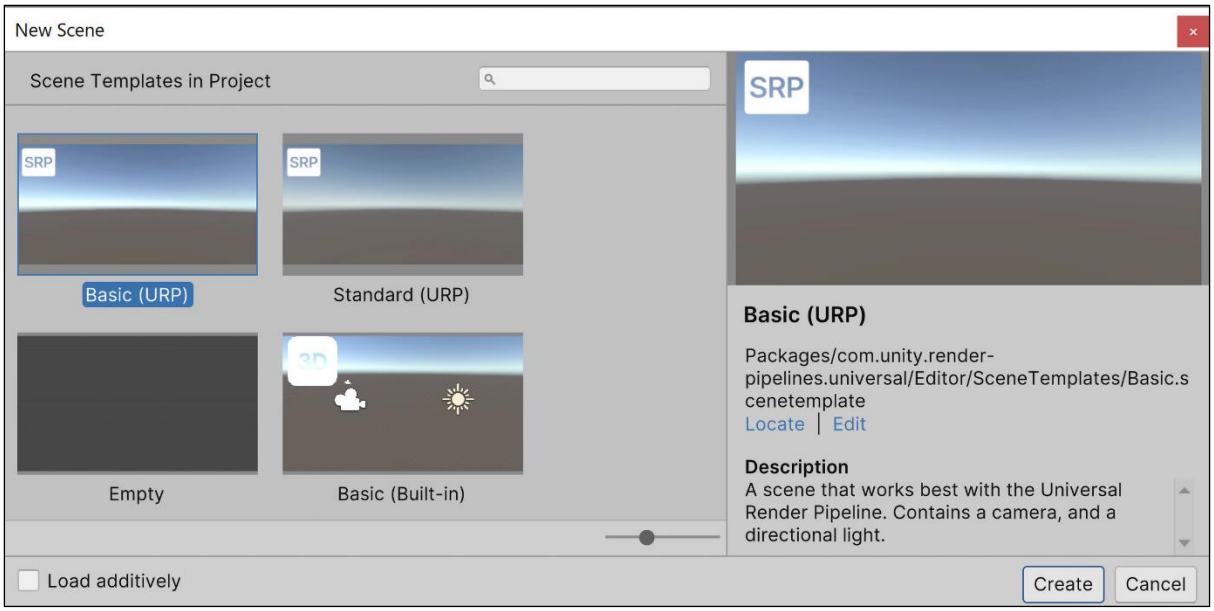

Assembly-CSharp.csproj
Assets
Chapter 02 to...erShooter).sln
Library
Logs
Packages
ProjectSettings
UIElementsSchema
UserSettings

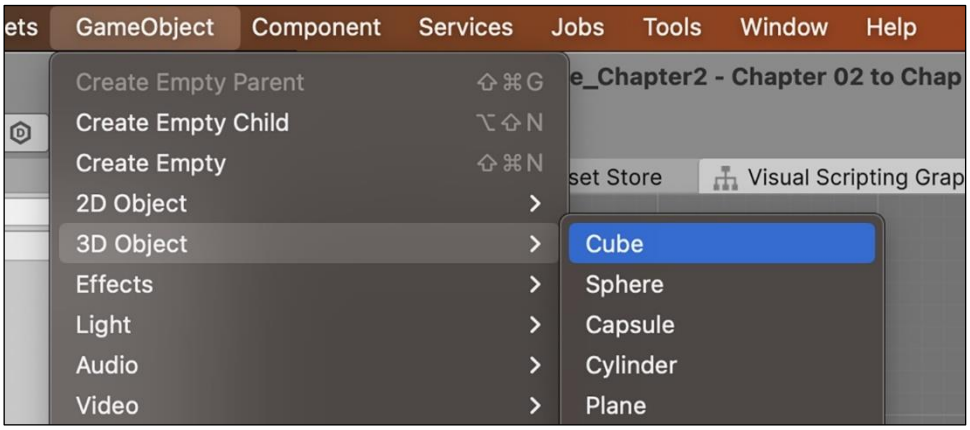
Chapter 2: Crafting Scenes and Game Elements

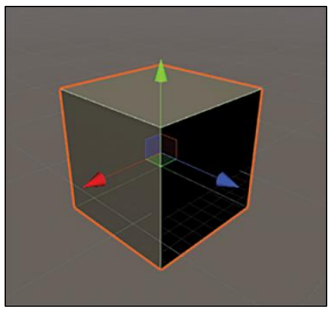




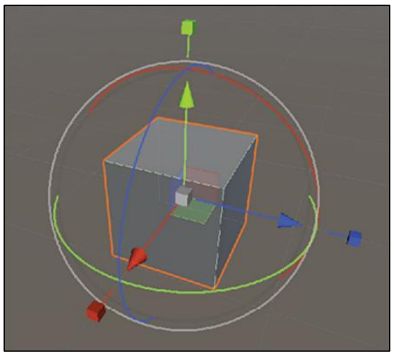


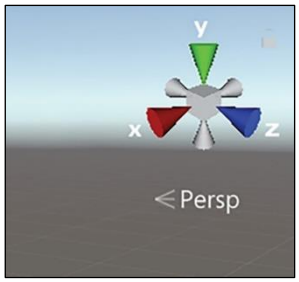

New Scene
Scene Templates in Project
SRP
Basic (URP)
Standard (URP)
Empty
Basic (Built-in)
Basic (URP)
Packages/com.unity.render-pipelines.universal/Editor/SceneTemplates/Basic.scenetemplate
Locate | Edit
Description
A scene that works best with the Universal Render Pipeline. Contains a camera, and a directional light.
Load additively
Create
Cancel


GameObject
Component
Services
Jobs
Tools
Window
Help
Create Empty Parent
Create Empty Child
Create Empty
2D Object
3D Object
Effects
Light
Audio
Video
Cube
Sphere
Capsule
Cylinder
Plane
Visual Scripting Grap

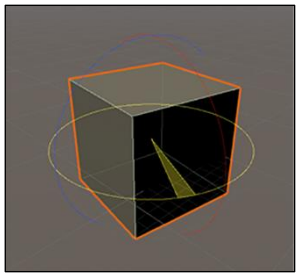


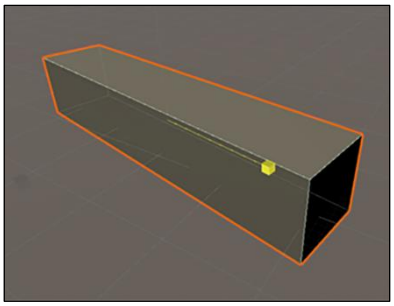

Scene
Pivot

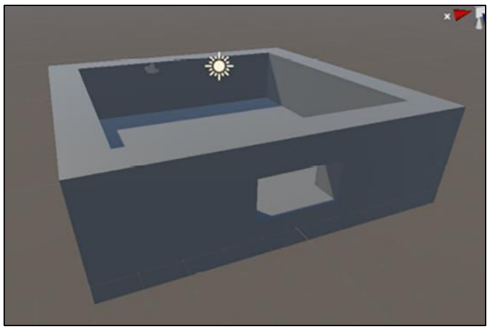


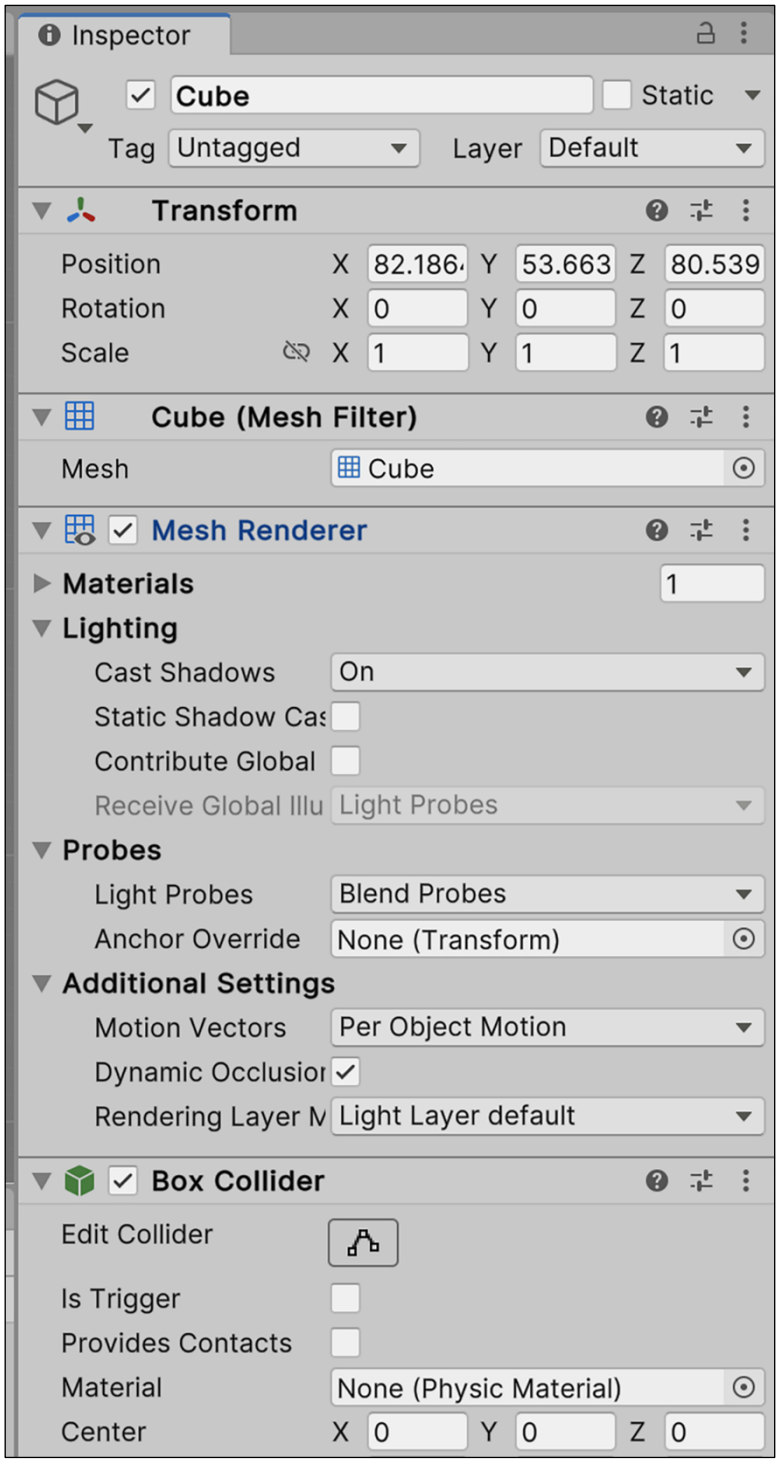

y
x
z
Persp

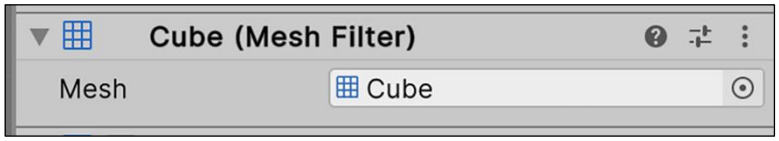

Scene
Game
Pivot
Local
Global
✓ Local

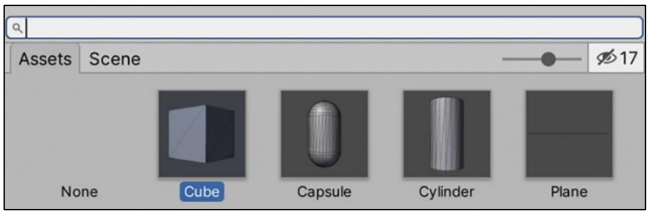


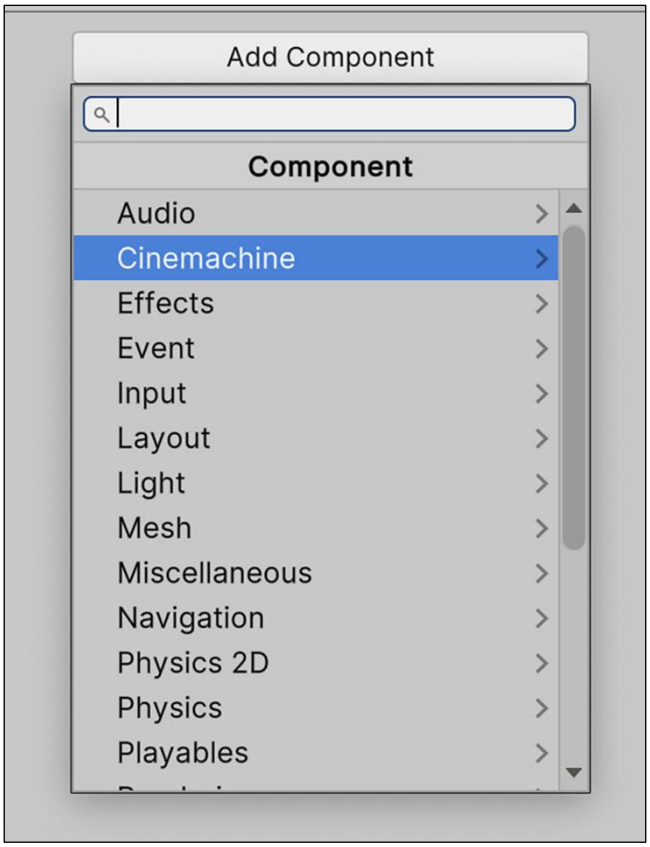


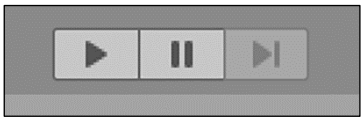


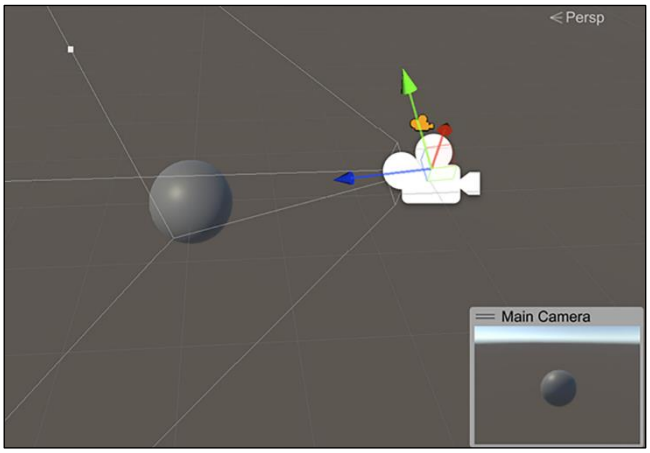

Inspector
Cube
Static
Tag
Untagged
Layer
Default
Transform
Position
X 82.186
Y 53.663
Z 80.539
Rotation
X 0
Y 0
Z 0
Scale
X 1
Y 1
Z 1
Cube (Mesh Filter)
Mesh
Cube
Mesh Renderer
Materials
1
Lighting
Cast Shadows
On
Static Shadow Cas
Contribute Global
Receive Global Illu
Light Probes
Probes
Light Probes
Blend Probes
Anchor Override
None (Transform)
Additional Settings
Motion Vectors
Per Object Motion
Dynamic Occlusior
Rendering Layer M
Light Layer default
Box Collider
Edit Collider
Is Trigger
Provides Contacts
Material
None (Physic Material)
Center
X 0
Y 0
Z 0

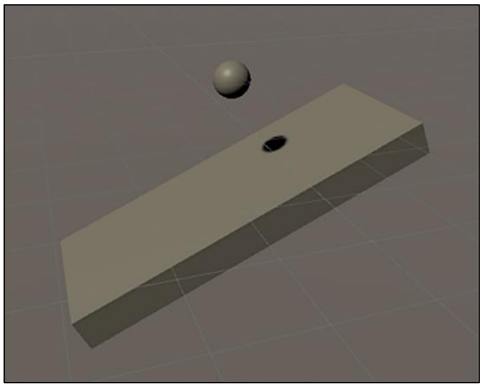

Cube (Mesh Filter)
Mesh
Cube

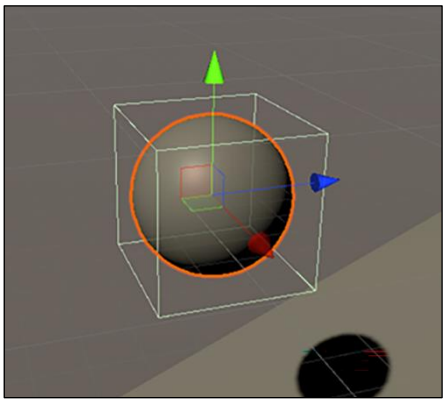

Assets
Scene
17
None
Cube
Capsule
Cylinder
Plane


Add Component
Component
Audio
Cinemachine
Effects
Event
Input
Layout
Light
Mesh
Miscellaneous
Navigation
Physics 2D
Physics
Playables

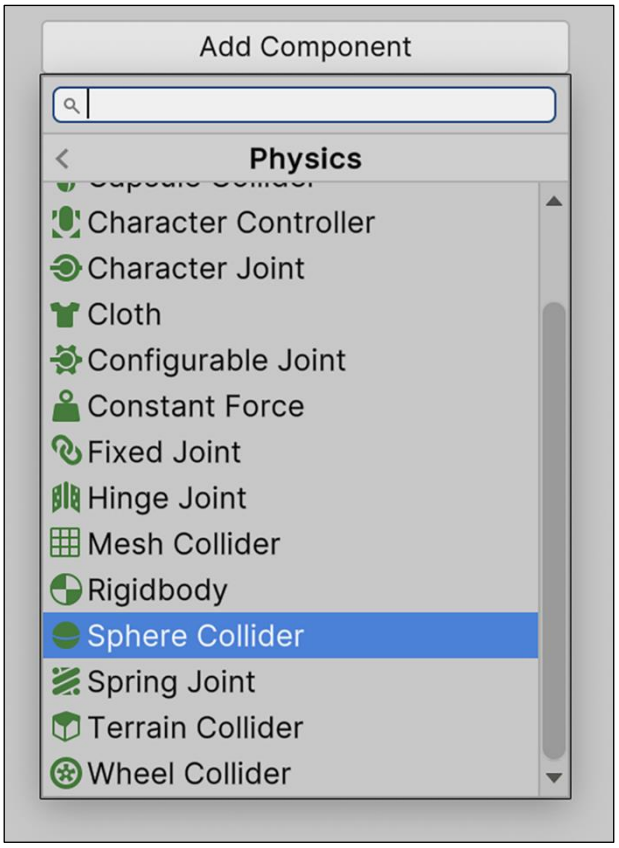


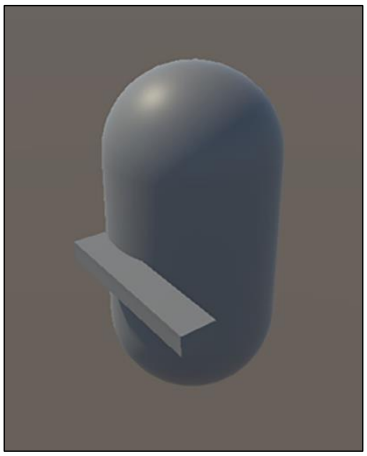

Persp
Main Camera

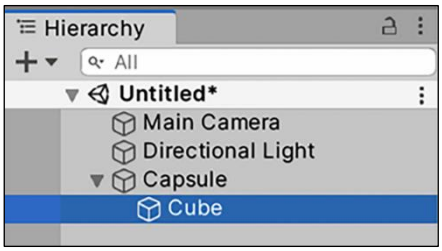


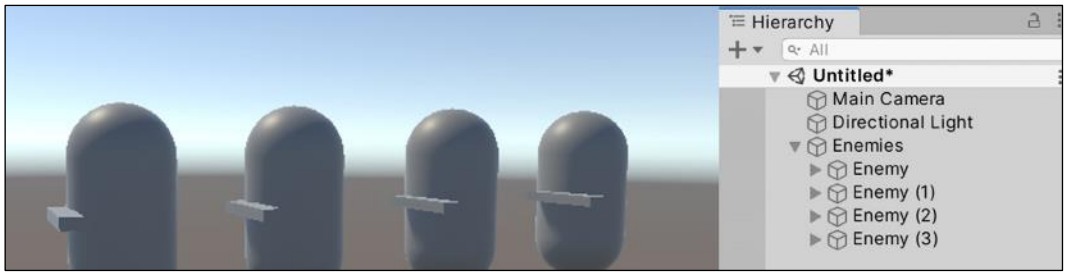


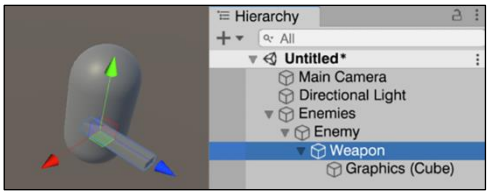

Box Collider
Edit Collider
Is Trigger
Provides Contacts
Material
None
Center
X 0
Size
X 1
Layer Overrides
Reset
Remove Component
Move Up
Move Down
Copy Component
Paste Component As New
Paste Component Values

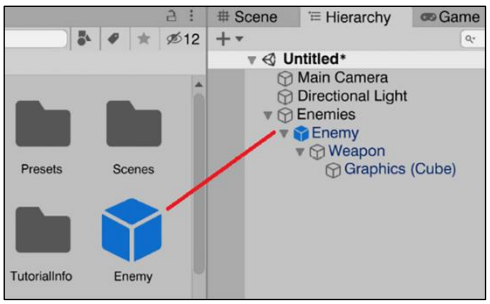

Add Component
Physics
Character Controller
Character Joint
Cloth
Configurable Joint
Constant Force
Fixed Joint
Hinge Joint
Mesh Collider
Rigidbody
Sphere Collider
Spring Joint
Terrain Collider
Wheel Collider

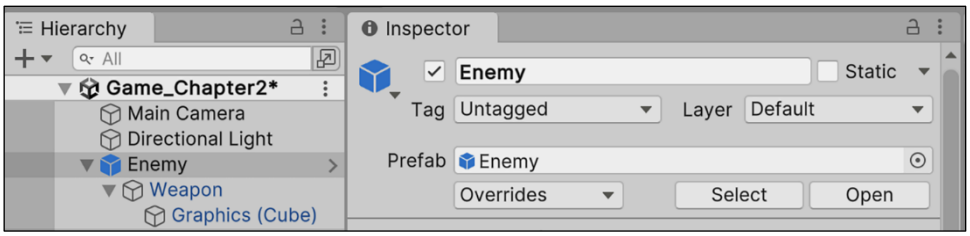



Hierarchy
All
Untitled*
Main Camera
Directional Light
Capsule
Cube

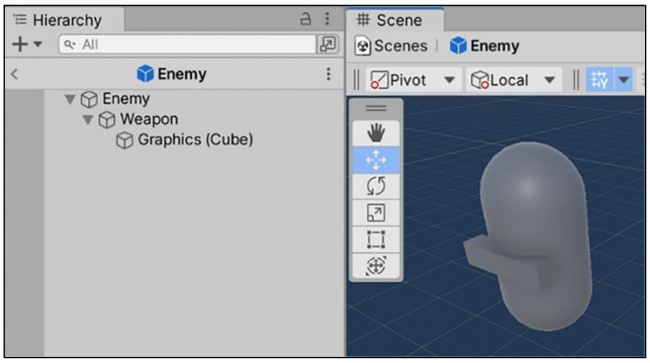

Hierarchy
All
Untitled*
Main Camera
Directional Light
Enemies
Enemy
Enemy (1)
Enemy (2)
Enemy (3)

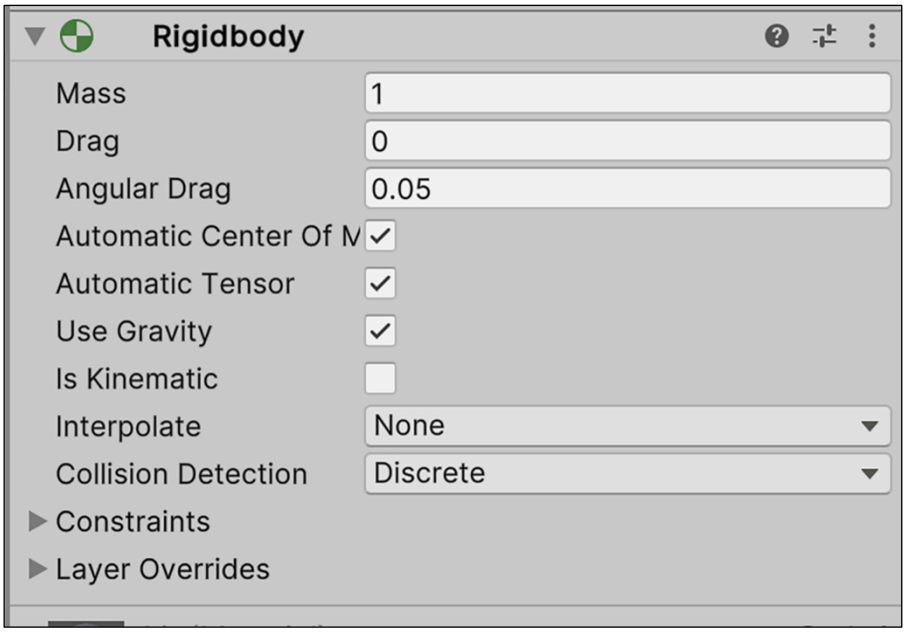

Hierarchy
All
Untitled*
Main Camera
Directional Light
Enemies
Enemy
Weapon
Graphics (Cube)

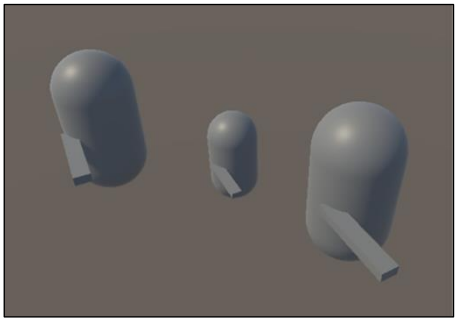

Scene
Hierarchy
Game
Untitled*
Main Camera
Directional Light
Enemies
Enemy
Weapon
Graphics (Cube)
Presets
Scenes
TutorialInfo
Enemy

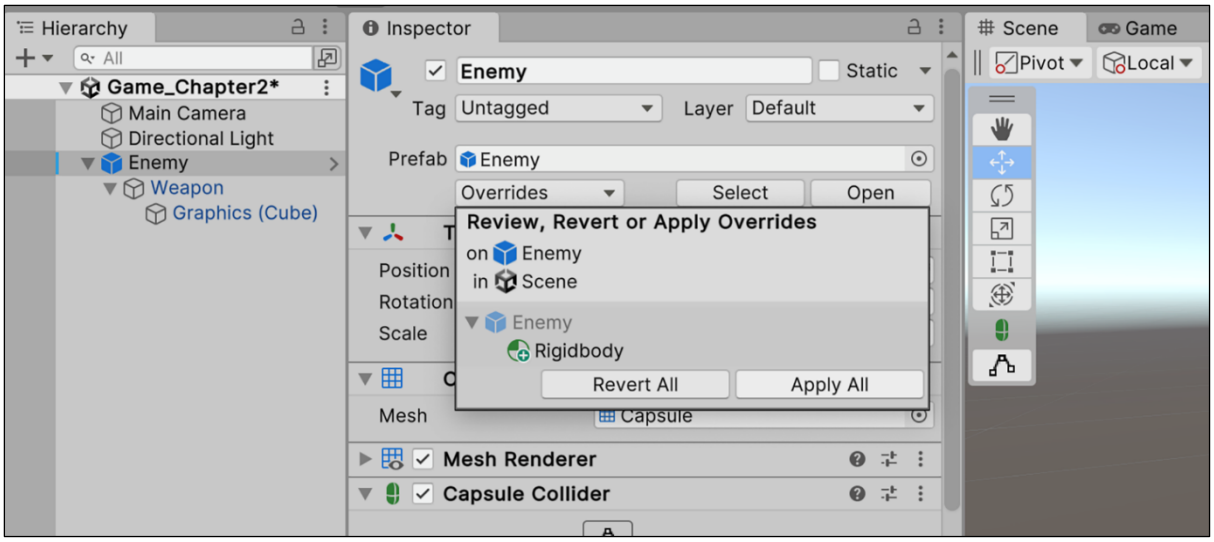

Hierarchy
All
Game_Chapter2*
Main Camera
Directional Light
Enemy
Weapon
Graphics (Cube)
Inspector
Enemy
Static
Tag
Untagged
Layer
Default
Prefab
Enemy
Overrides
Select
Open

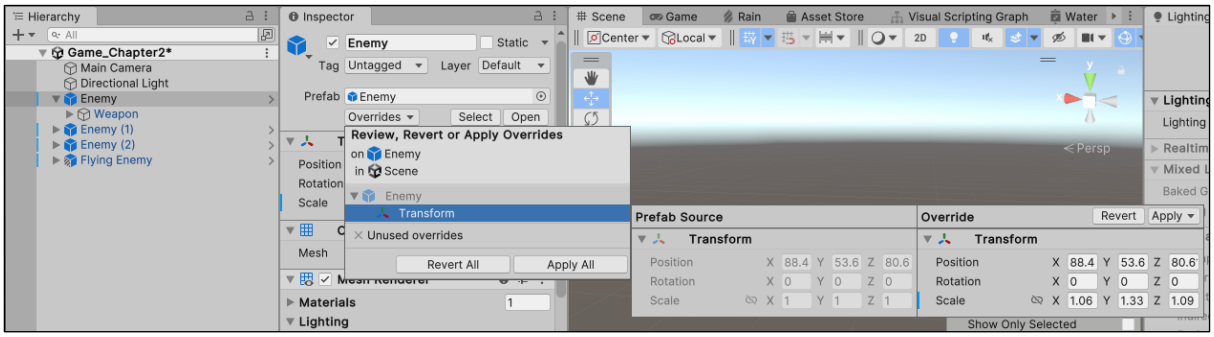

Prefab
Create Empty
Create Empty Parent
Select Root
Replace...
Replace and Keep Overrides...

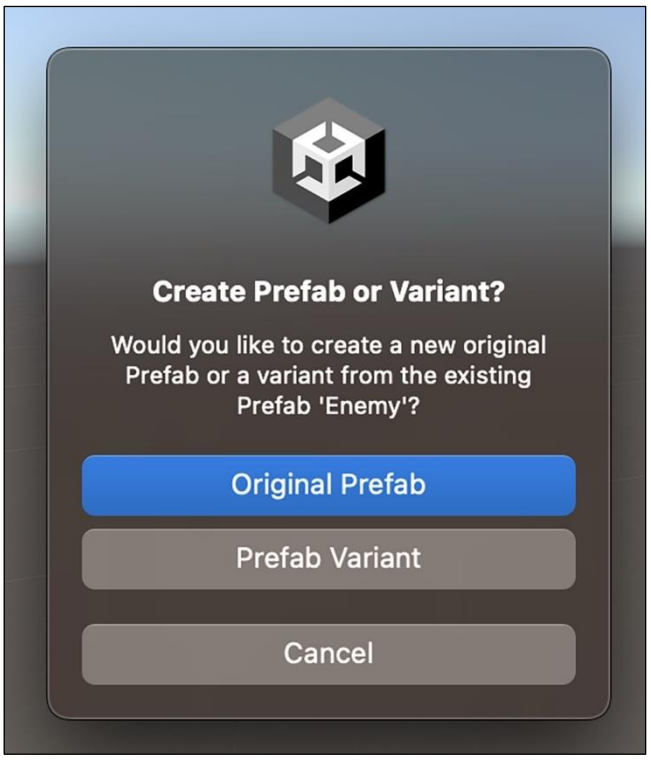

Hierarchy
All
Enemy
Enemy
Weapon
Graphics (Cube)
Scene
Scenes
Enemy
Pivot
Local

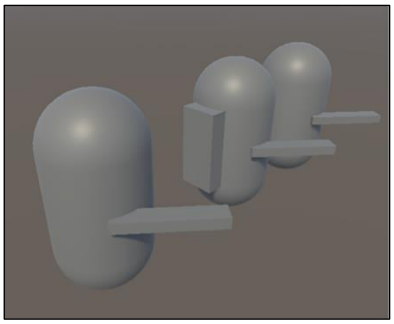

Rigidbody
Mass
1
Drag
0
Angular Drag
0.05
Automatic Center Of M
Automatic Tensor
Use Gravity
Is Kinematic
Interpolate
None
Collision Detection
Discrete
Constraints
Layer Overrides

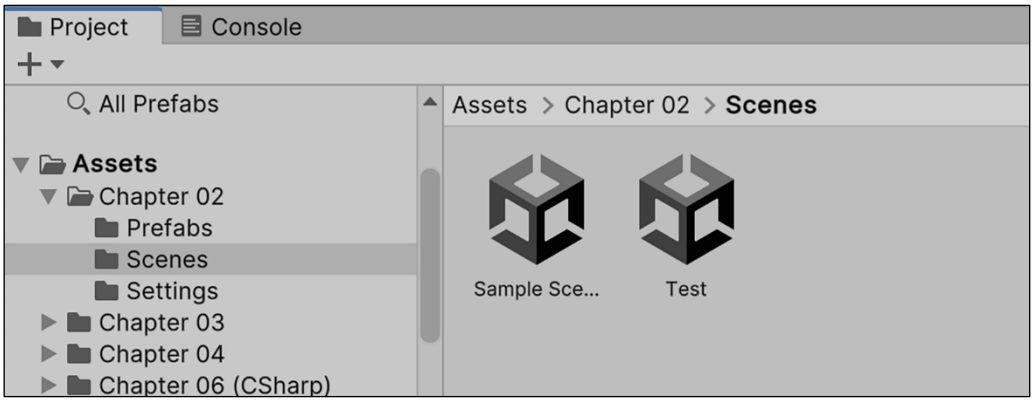



Hierarchy
Game_Chapter2*
Main Camera
Directional Light
Enemy
Weapon
Graphics (Cube)
Inspector
Enemy
Static
Tag
Untagged
Layer
Default
Prefab
Enemy
Overrides
Select
Open
Review, Revert or Apply Overrides
on Enemy
in Scene
Enemy
Rigidbody
Revert All
Apply All
Position
Rotation
Scale
Mesh
Capsule
Mesh Renderer
Capsule Collider
Scene
Game
Pivot
Local


Hierarchy
Inspector
Scene
Game
Rain
Asset Store
Visual Scripting Graph
Water
Enemy
Static
Tag
Untagged
Layer
Default
Prefab
Overrides
Select
Open
Review, Revert or Apply Overrides
on Enemy
in Scene
Transform
Unused overrides
Revert All
Apply All
Prefab Source
Override
Revert
Apply
Transform
Position
Rotation
Scale
Show Only Selected

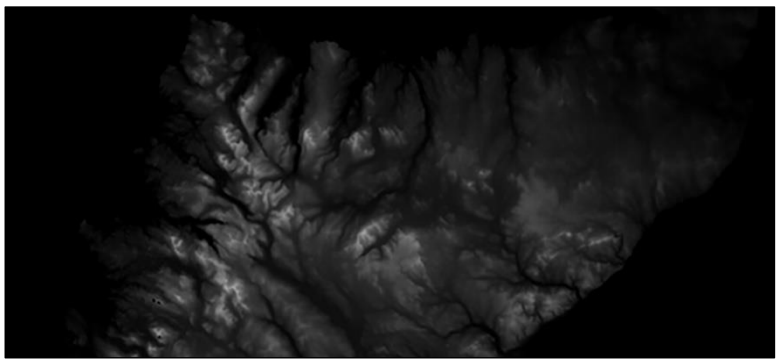

Create Prefab or Variant?
Would you like to create a new original Prefab or a variant from the existing Prefab 'Enemy'?
Original Prefab
Prefab Variant
Cancel

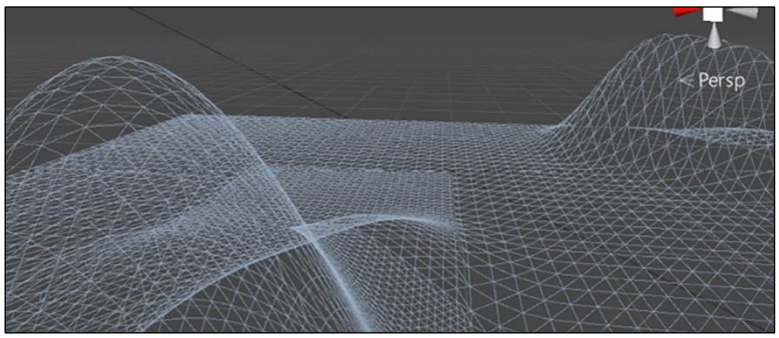


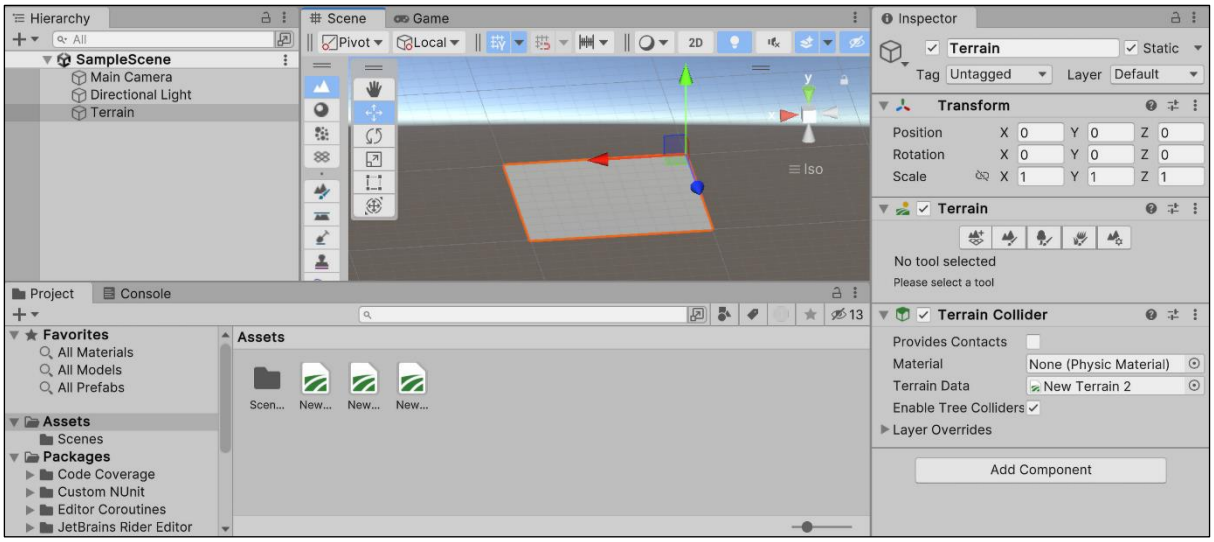

Project
Console
All Prefabs
Assets
Chapter 02
Prefabs
Scenes
Settings
Chapter 03
Chapter 04
Chapter 06 (CSharp)
Assets > Chapter 02 > Scenes
Sample Sce...
Test

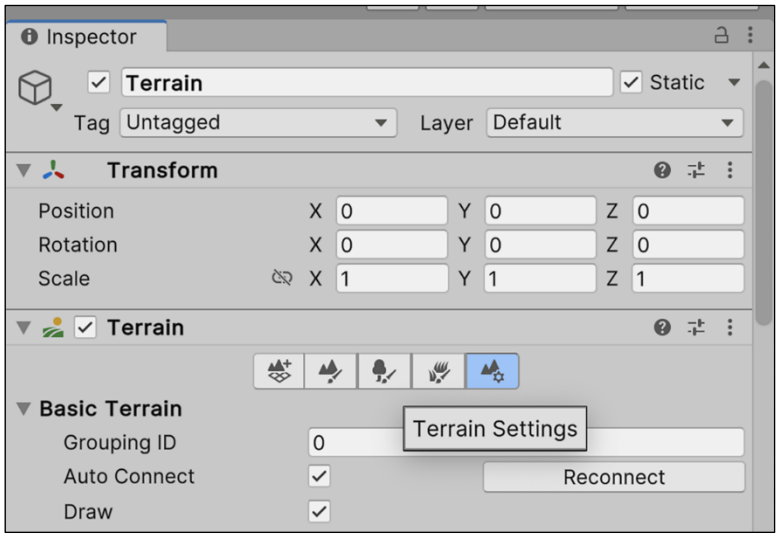
Chapter 3: From Blueprint to Reality: Building with Terrain and ProBuilder

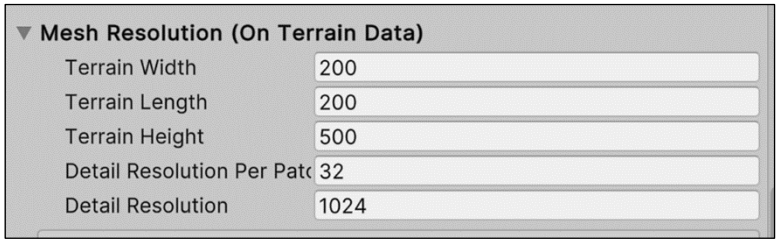


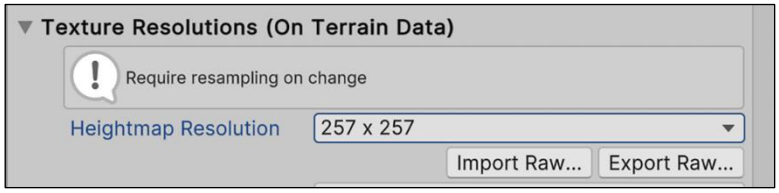




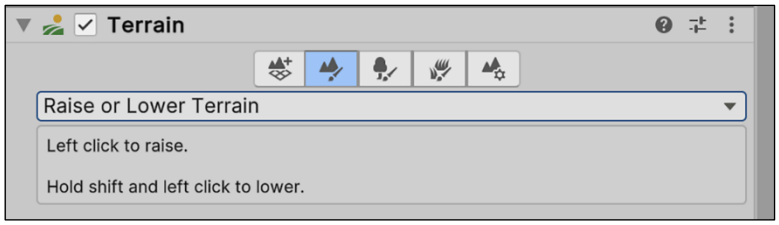

Hierarchy
SampleScene
Main Camera
Directional Light
Terrain
Scene
Game
Pivot
Local
2D
Iso
Inspector
Terrain
Static
Tag
Untagged
Layer
Default
Transform
Position
Rotation
Scale
No tool selected
Please select a tool
Terrain Collider
Provides Contacts
Material
None (Physic Material)
Terrain Data
New Terrain 2
Enable Tree Colliders
Layer Overrides
Add Component
Project
Console
Favorites
All Materials
All Models
All Prefabs
Assets
Scenes
Packages
Code Coverage
Custom NUnit
Editor Coroutines
JetBrains Rider Editor

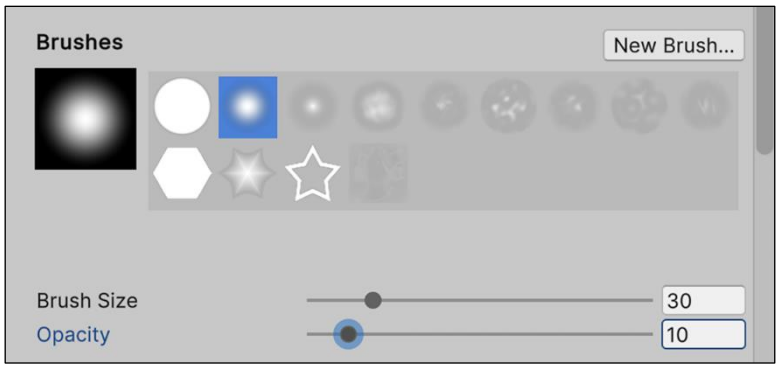

Inspector
Terrain
Static
Tag
Untagged
Layer
Default
Transform
Position
Rotation
Scale
Terrain
Basic Terrain
Terrain Settings
Grouping ID
Auto Connect
Reconnect
Draw

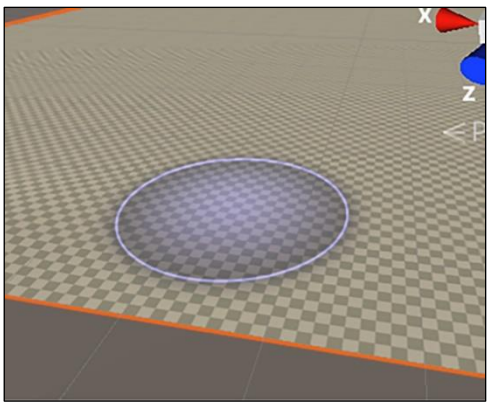

Mesh Resolution (On Terrain Data)
Terrain Width
200
Terrain Length
200
Terrain Height
500
Detail Resolution Per Patc
32
Detail Resolution
1024

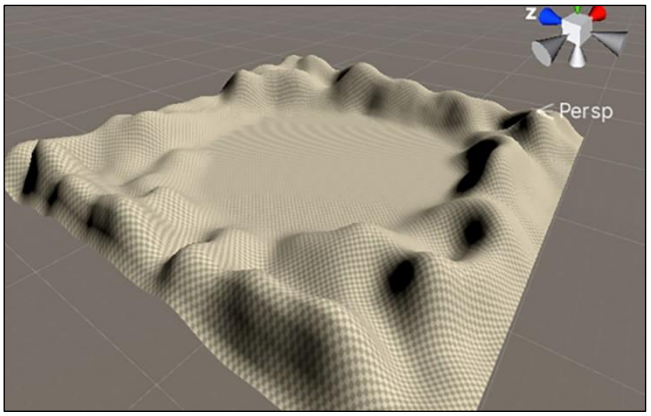

Texture Resolutions (On Terrain Data)
Require resampling on change
Heightmap Resolution
257 x 257
Import Raw...
Export Raw...

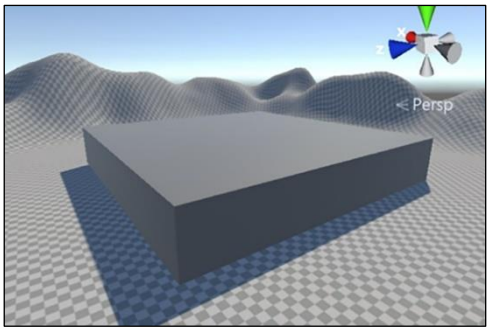

Terrain
Set Height
Left click to set the height.
Hold shift and left click to sample the target height.
Space
World
Height
50
Flatten Tile
Flatten All

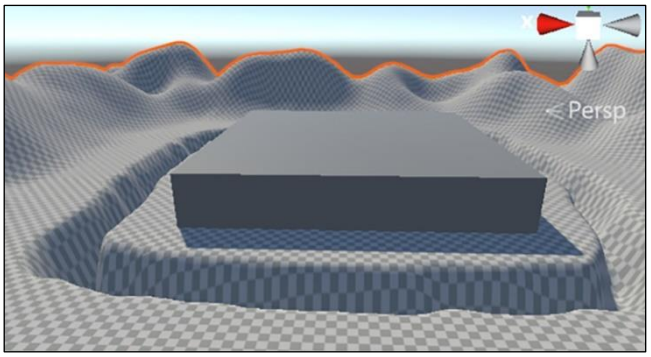

Terrain
Raise or Lower Terrain
Left click to raise.
Hold shift and left click to lower.

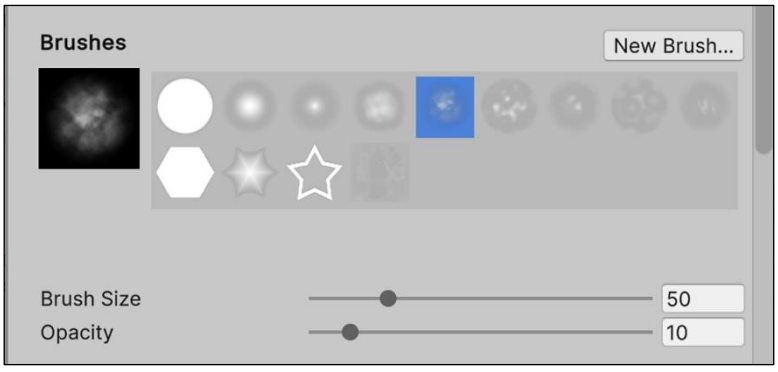

Brushes
New Brush...
Brush Size
30
Opacity
10

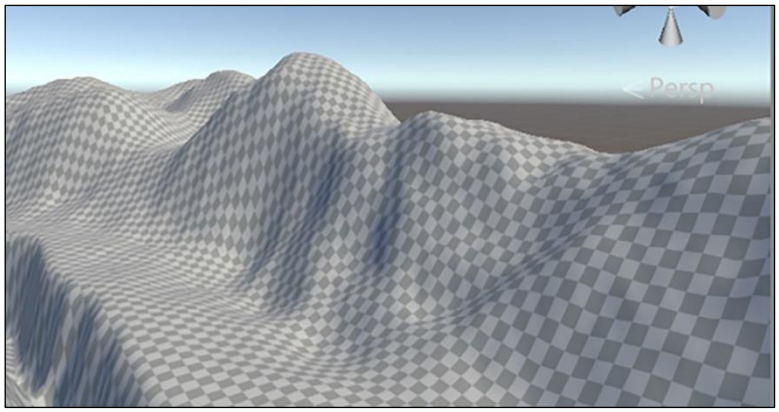

X
Z

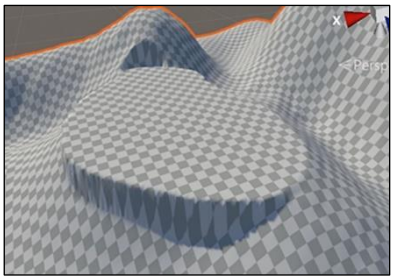

Persp

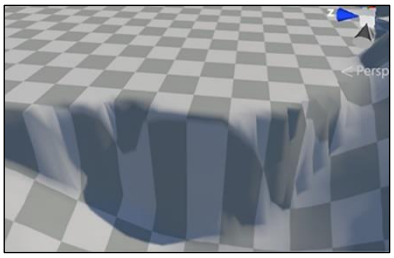

Persp

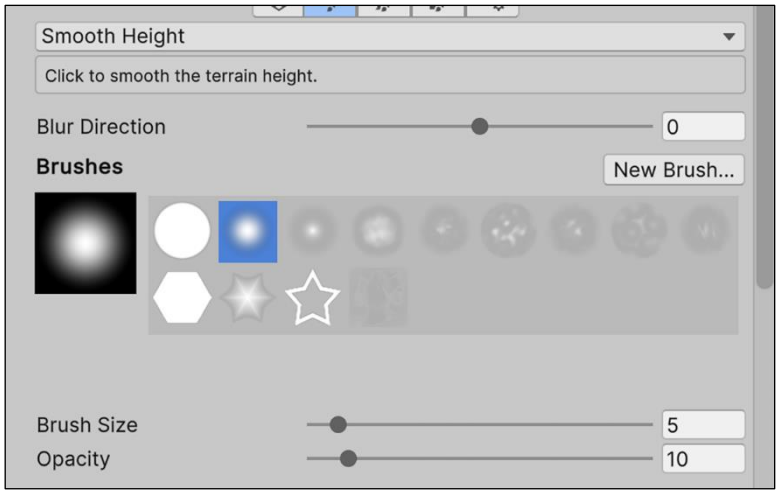

Persp

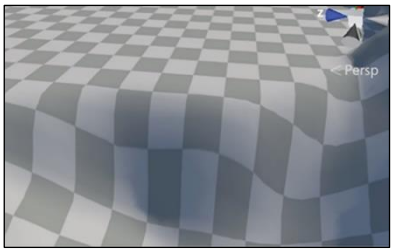

Brushes
New Brush...
Brush Size
50
Opacity
10

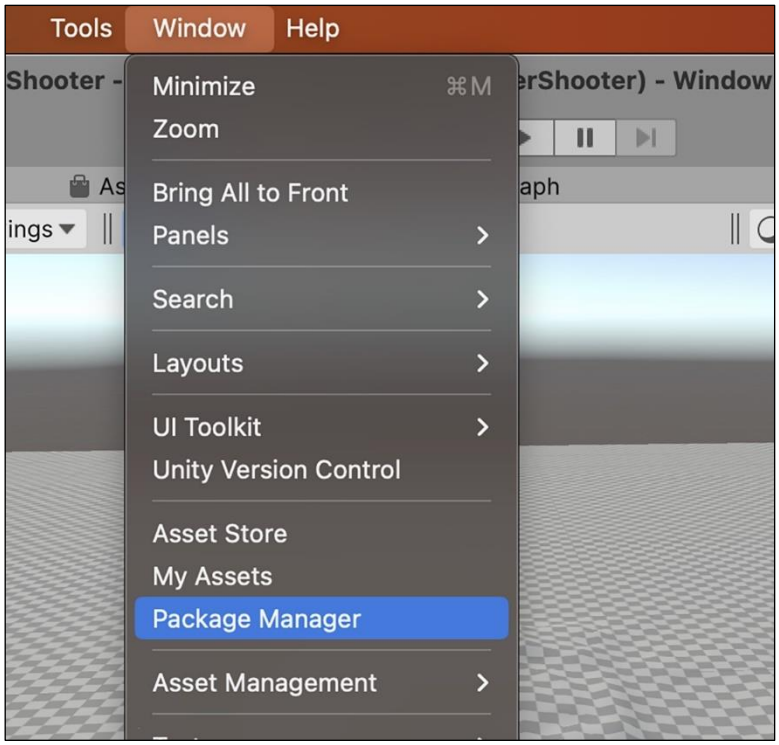

Persp

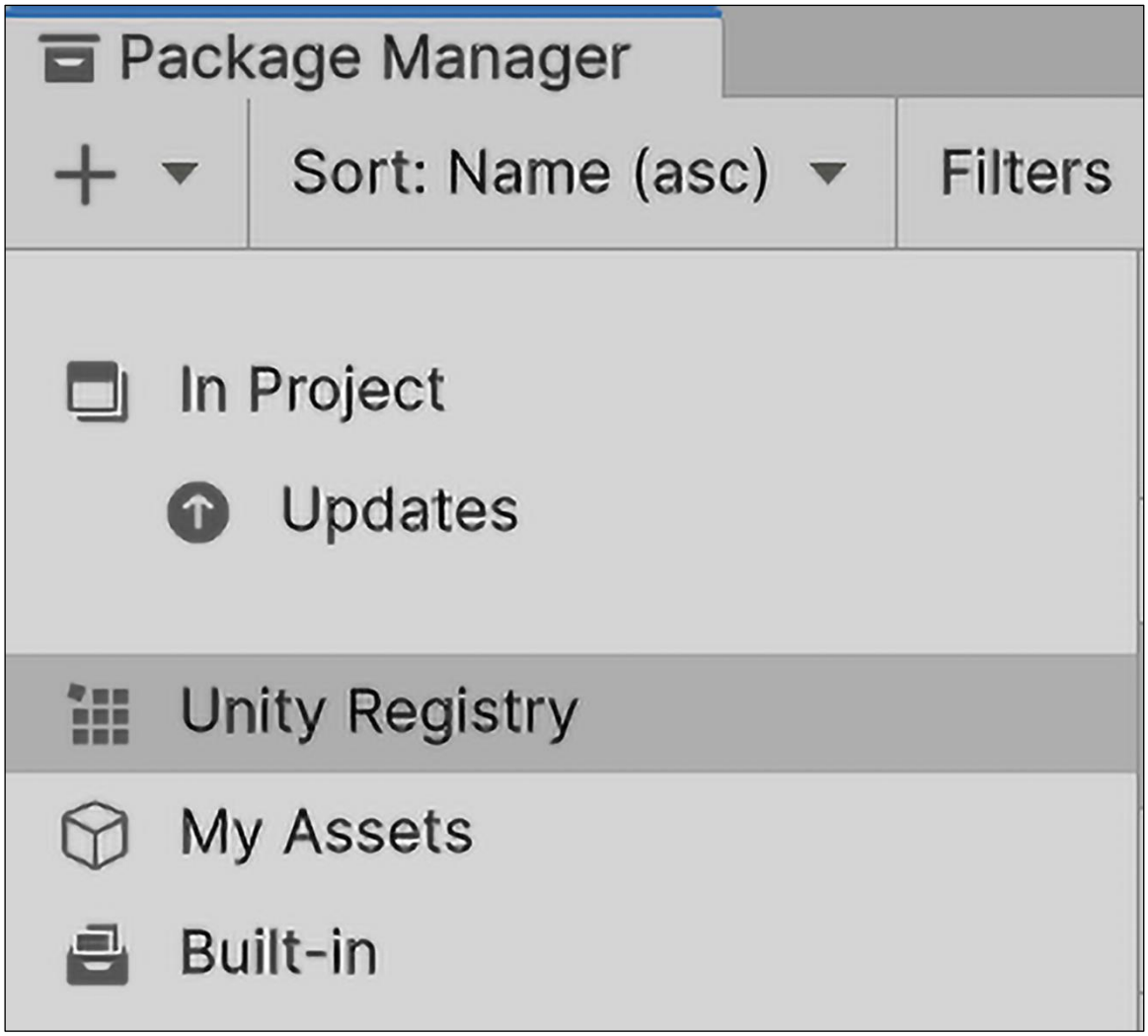

Persp

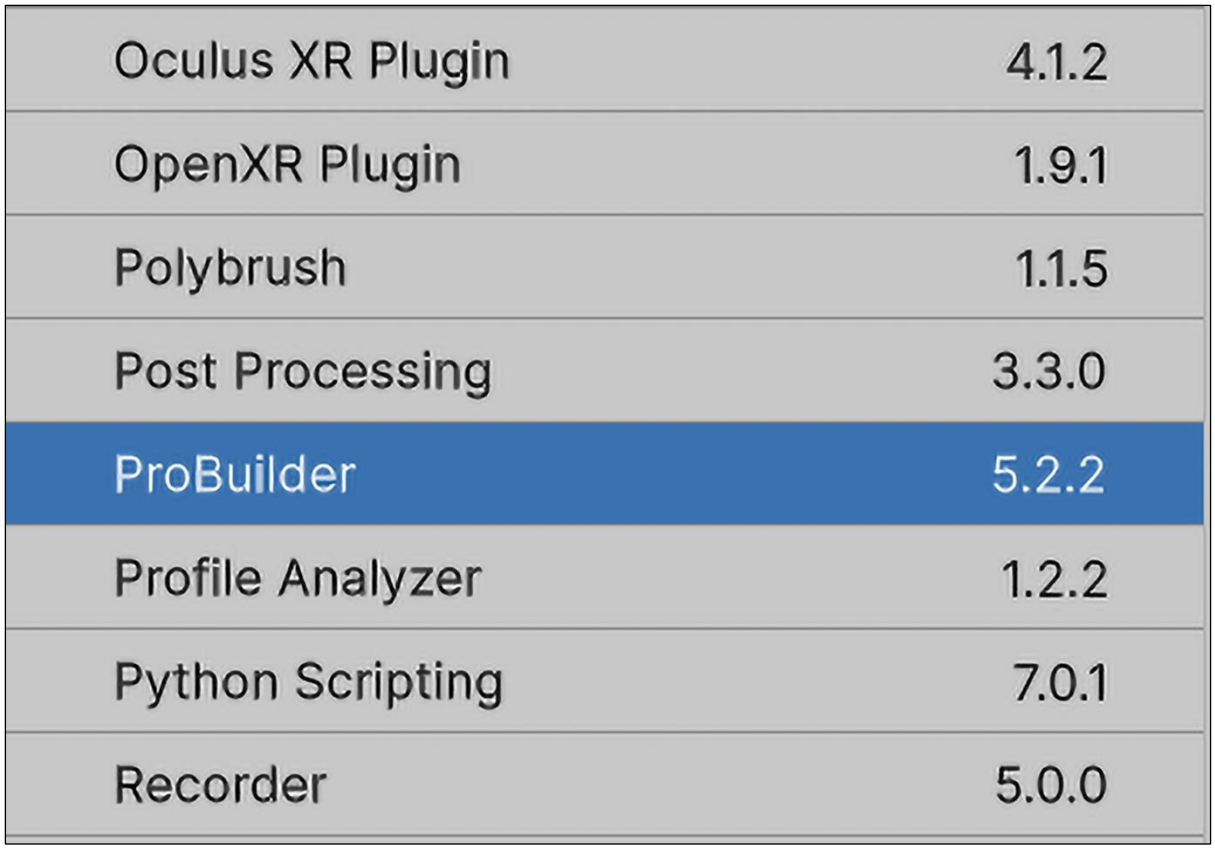

Persp


Smooth Height
Click to smooth the terrain height.
Blur Direction
0
Brushes
New Brush...
Brush Size
5
Opacity
10

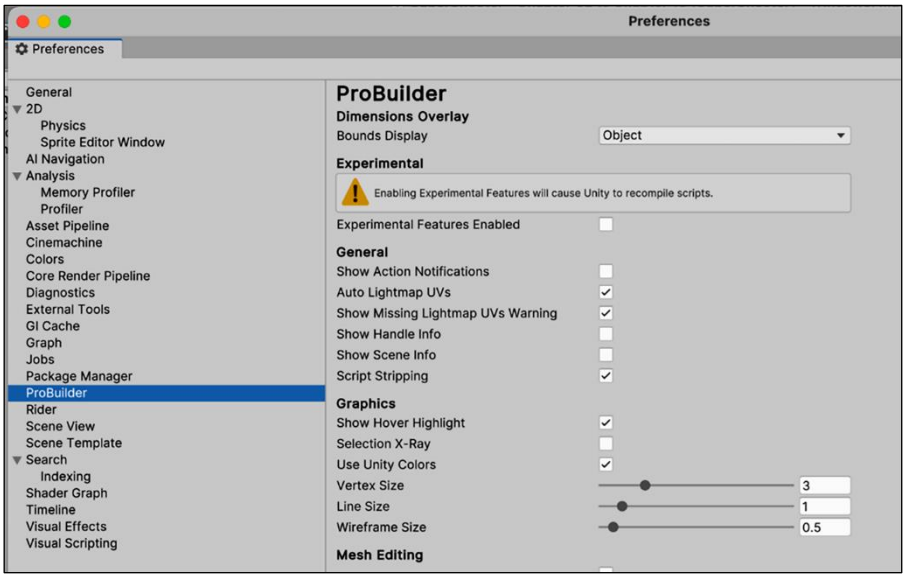

Persp

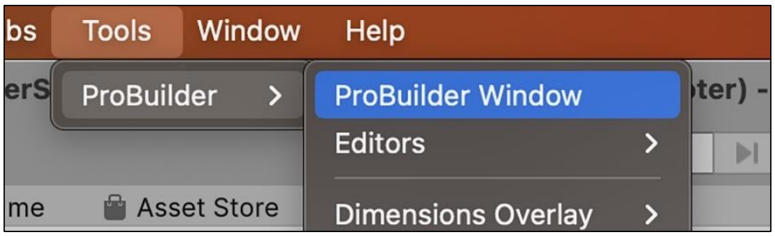

Tools
Window
Help
Minimize ⌘M
Zoom
Bring All to Front
Panels
Search
Layouts
UI Toolkit
Unity Version Control
Asset Store
My Assets
Package Manager
Asset Management

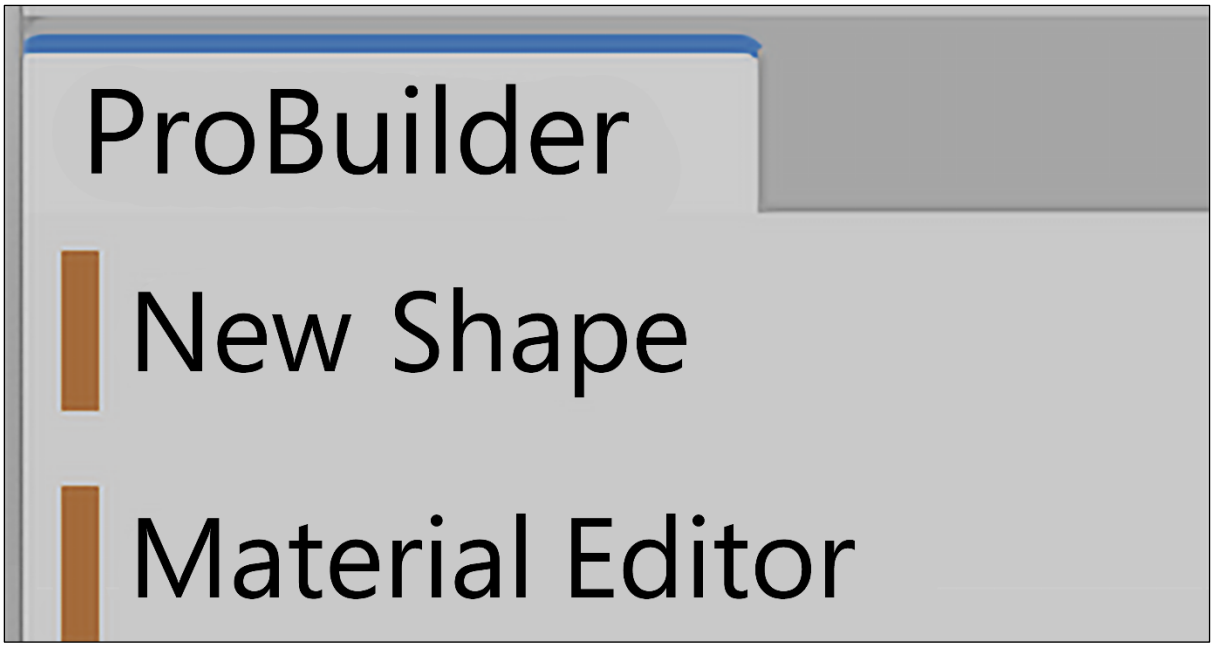

Package Manager
Sort: Name (asc)
Filters
In Project
Updates
Unity Registry
My Assets
Built-in

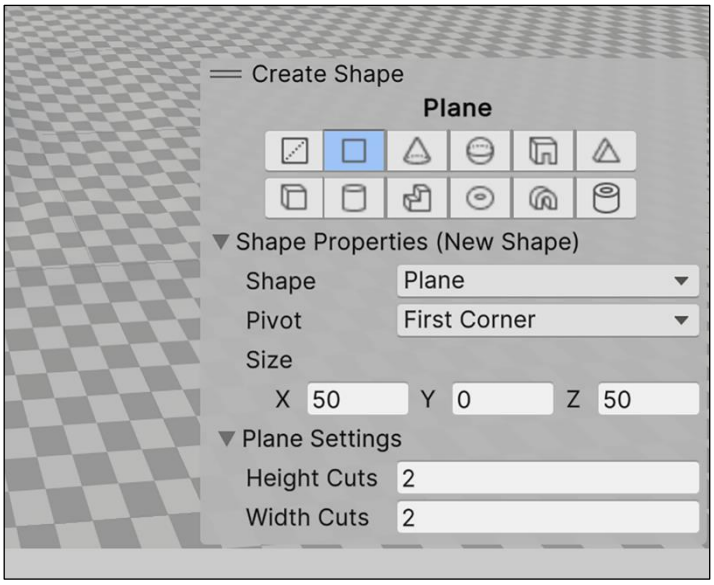

Oculus XR Plugin 4.1.2
OpenXR Plugin 1.9.1
Polybrush 1.1.5
Post Processing 3.3.0
ProBuilder 5.2.2
Profile Analyzer 1.2.2
Python Scripting 7.0.1
Recorder 5.0.0


Install
Inc.

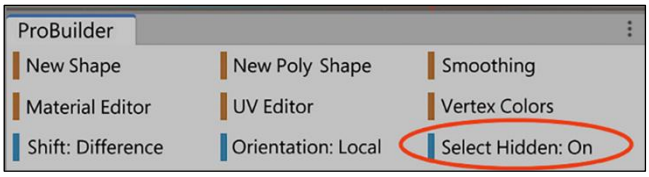

Preferences
Preferences
General
2D
Physics
Sprite Editor Window
AI Navigation
Analysis
Memory Profiler
Profiler
Asset Pipeline
Cinemachine
Colors
Core Render Pipeline
Diagnostics
External Tools
GI Cache
Graph
Jobs
Package Manager
ProBuilder
Rider
Scene View
Scene Template
Search
Indexing
Shader Graph
Timeline
Visual Effects
Visual Scripting
ProBuilder
Dimensions Overlay
Bounds Display
Object
Experimental
Enabling Experimental Features will cause Unity to recompile scripts.
Experimental Features Enabled
General
Show Action Notifications
Auto Lightmap UVs
Show Missing Lightmap UVs Warning
Show Handle Info
Show Scene Info
Script Stripping
Graphics
Show Hover Highlight
Selection X-Ray
Use Unity Colors
Vertex Size
Line Size
Wireframe Size
3
1
0.5
Mesh Editing

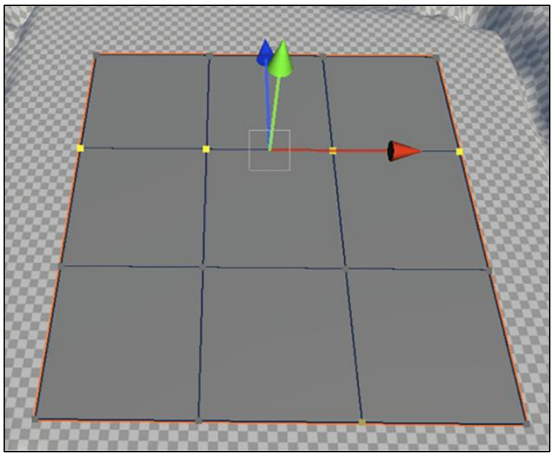

bs
Tools
Window
Help
ProBuilder
ProBuilder Window
Editors
Dimensions Overlay
me
Asset Store

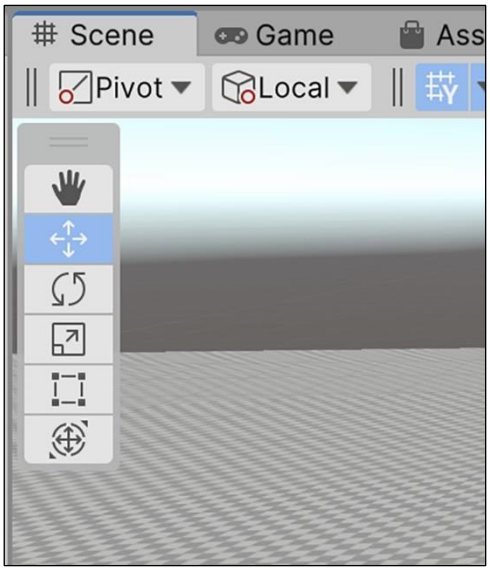

ProBuilder
New Shape
Material Editor

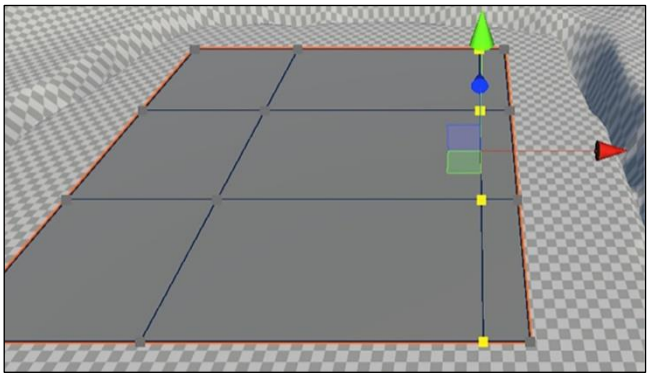

Create Shape
Plane
Shape Properties (New Shape)
Shape
Plane
Pivot
First Corner
Size
X 50 Y 0 Z 50
Plane Settings
Height Cuts 2
Width Cuts 2

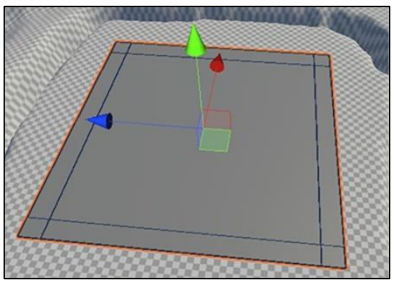



ProBuilder
New Shape
New Poly Shape
Smoothing
Material Editor
UV Editor
Vertex Colors
Shift: Difference
Orientation: Local
Select Hidden: On

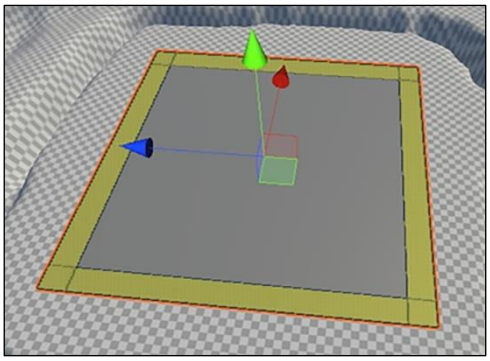



Scene
Game
Ass
Pivot
Local

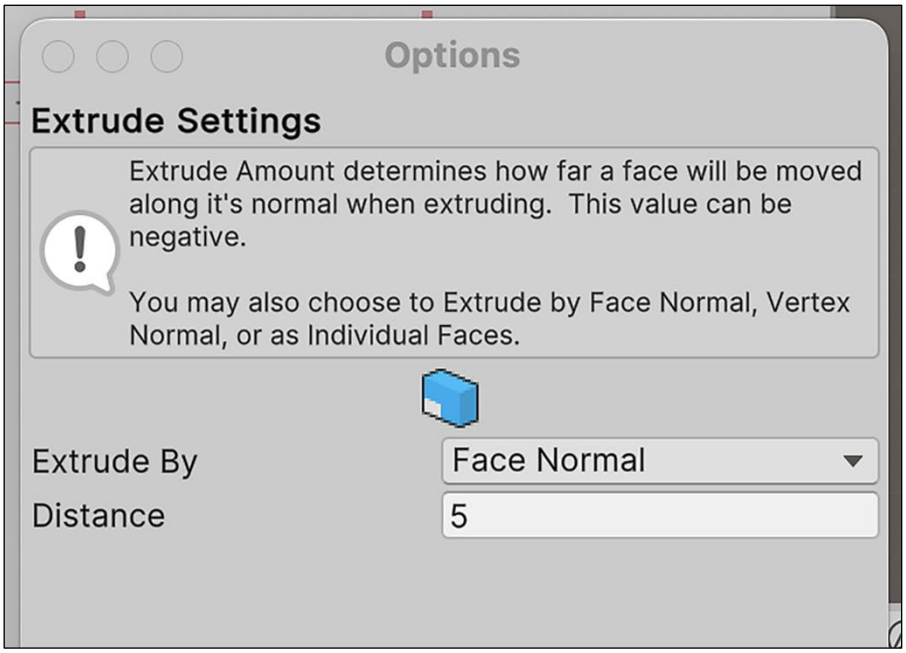


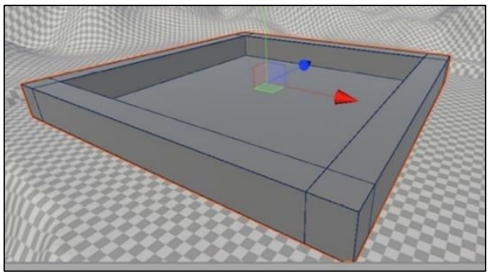


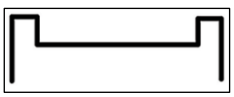




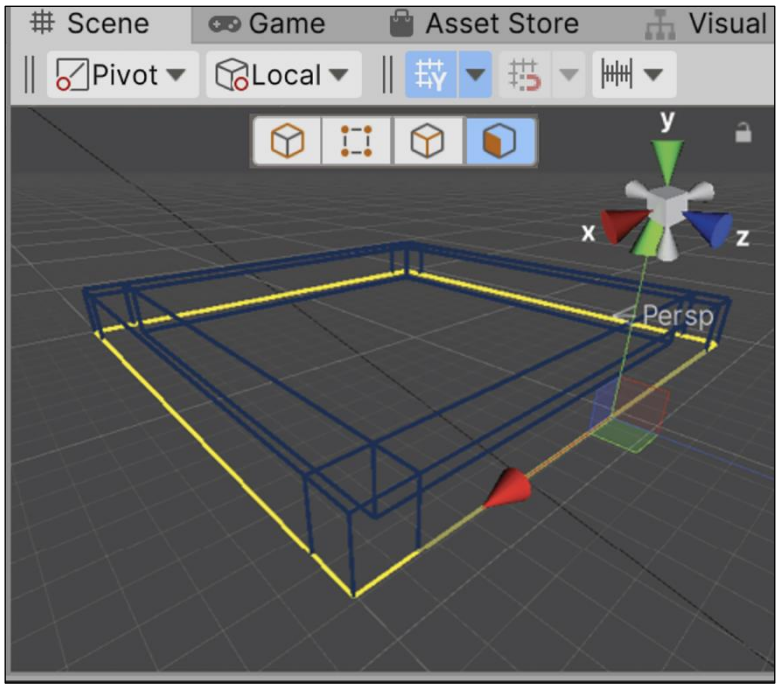

Merge Faces
C
Extrude Faces
+
D

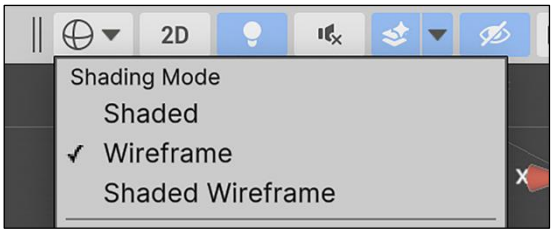

Options
Extrude Settings
Extrude Amount determines how far a face will be moved along it's normal when extruding. This value can be negative.
You may also choose to Extrude by Face Normal, Vertex Normal, or as Individual Faces.
Extrude By
Face Normal
Distance
5

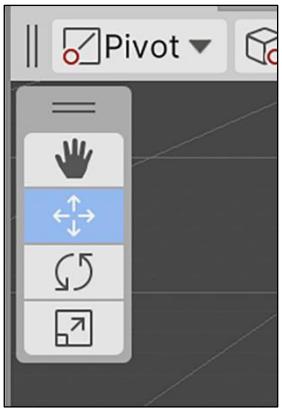


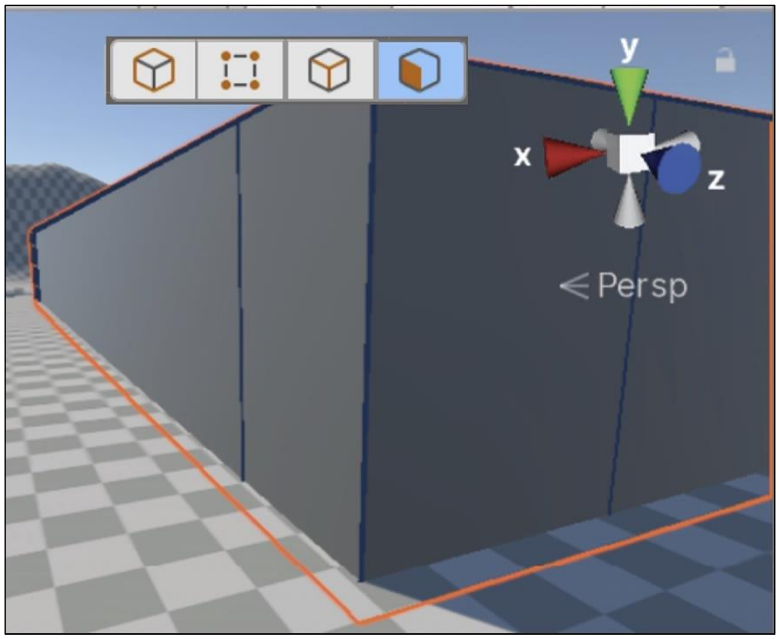


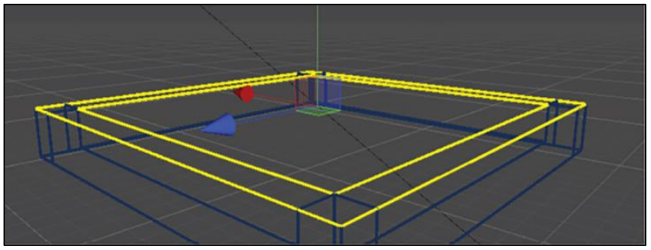


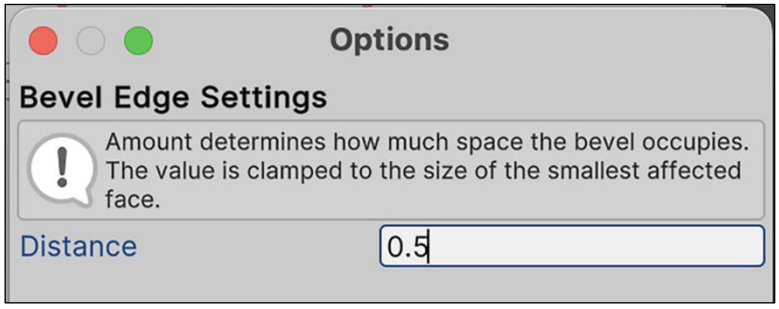

Scene
Game
Asset Store
Visual
Pivot
Local
y
x
z
Persp

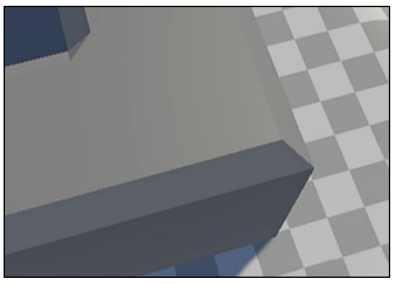

2D
Shading Mode
Shaded
Wireframe
Shaded Wireframe
x

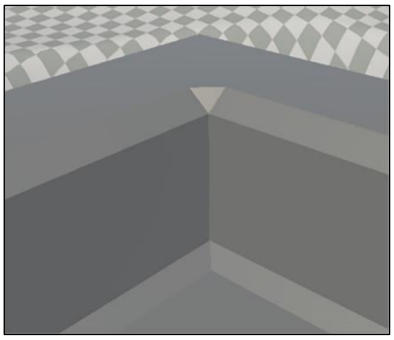

Pivot

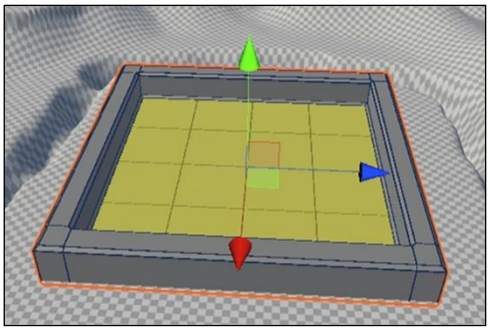

y
x
z
Persp

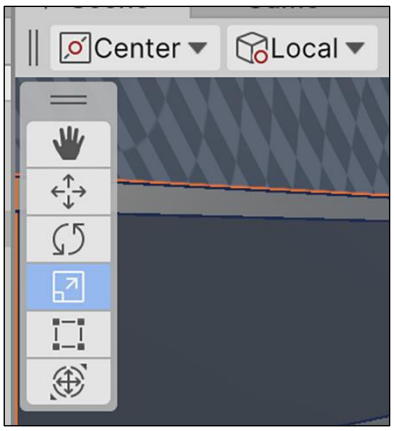


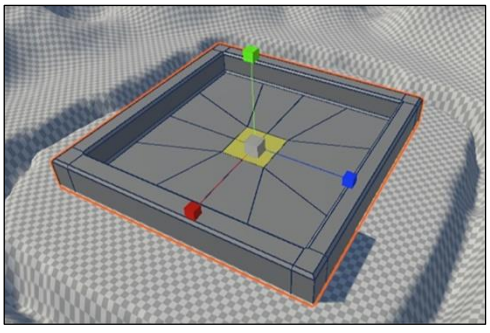

Options
Bevel Edge Settings
Amount determines how much space the bevel occupies. The value is clamped to the size of the smallest affected face.
Distance
0.5

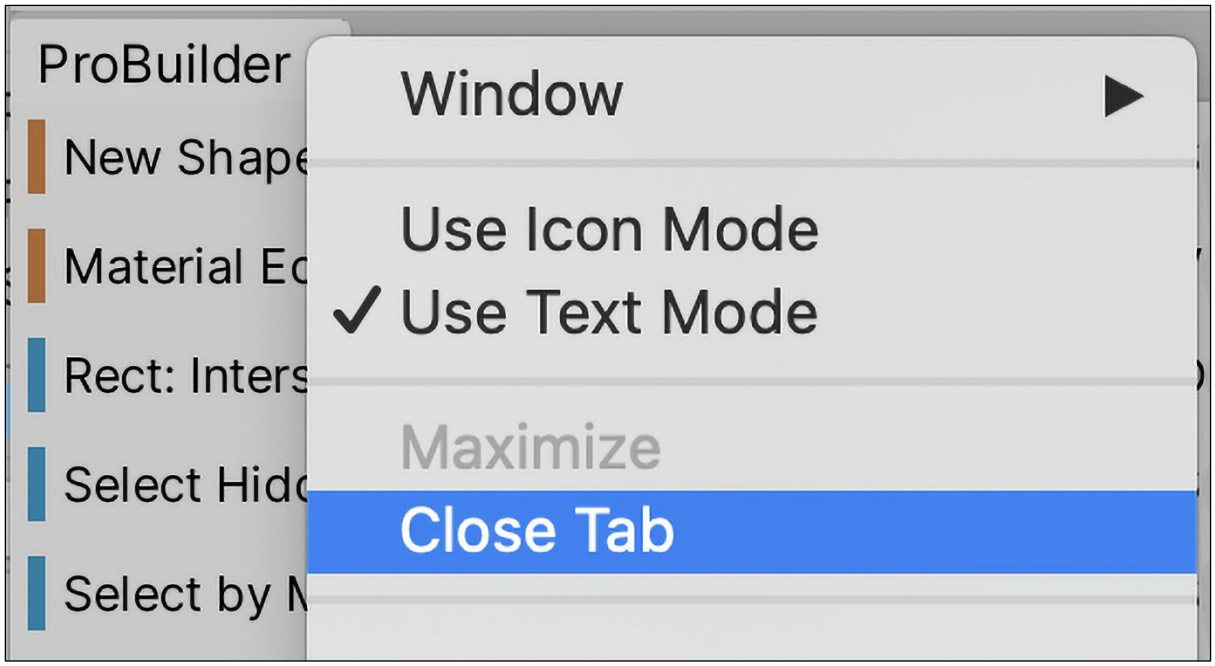


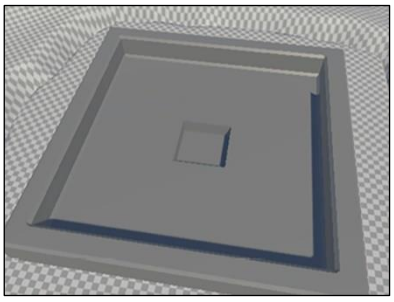





Center
Local

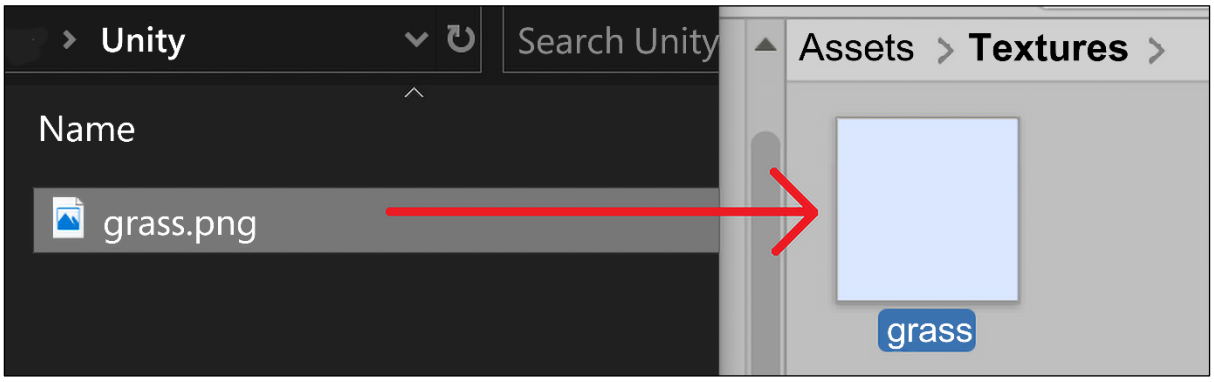



ProBuilder
New Shape
Material Ec
Rect: Inters
Select Hidc
Select by M
Window
Use Icon Mode
Use Text Mode
Maximize
Close Tab

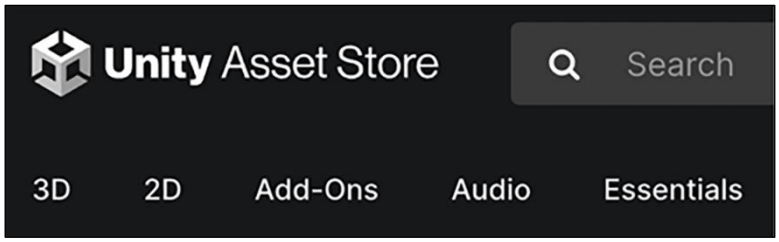


Chapter 4: Seamless Integration: Importing and Incorporating Assets









All Categories

- [x] 3D (37191)
  - [ ] Animations (723)
  - [ ] Characters (10524)
  - [ ] Environments (7576)
    - [ ] Dungeons (319)
    - [ ] Fantasy (1128)

Pricing

- [x] Free Assets (5)



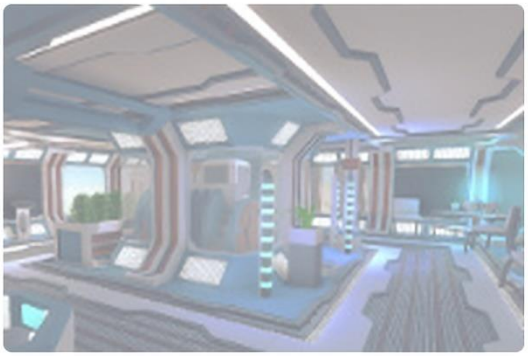
New

ASSET STORE ORIGINALS

Snaps Prototype | Sci-Fi / In...

★★★★★ (13)

FREE



Purchased

KARBOOSX

Sci-Fi Styled Modular Pack

★★★★★ (92)

FREE



Sci-Fi Styled Modular Pack

karboosx ★★★★★ 5 | 89 Reviews

FREE

Open in Unity

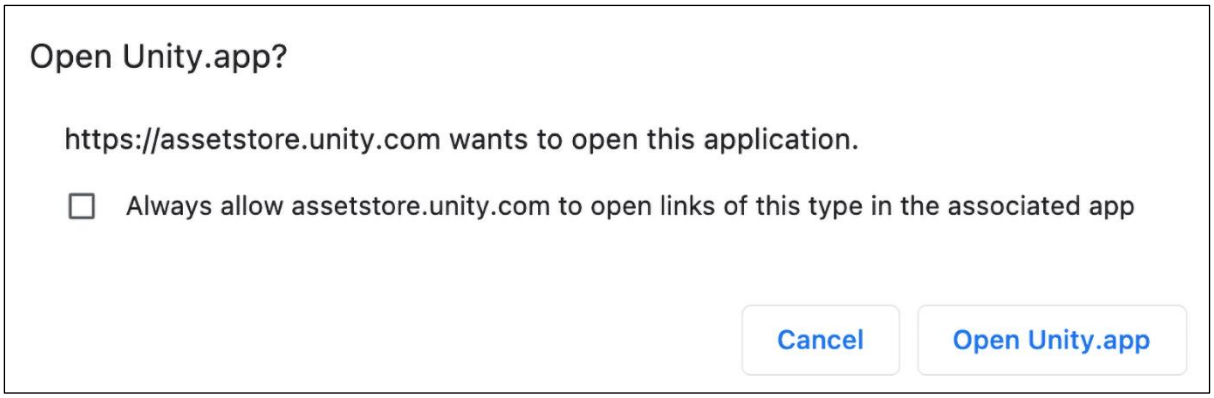
P Pinky321

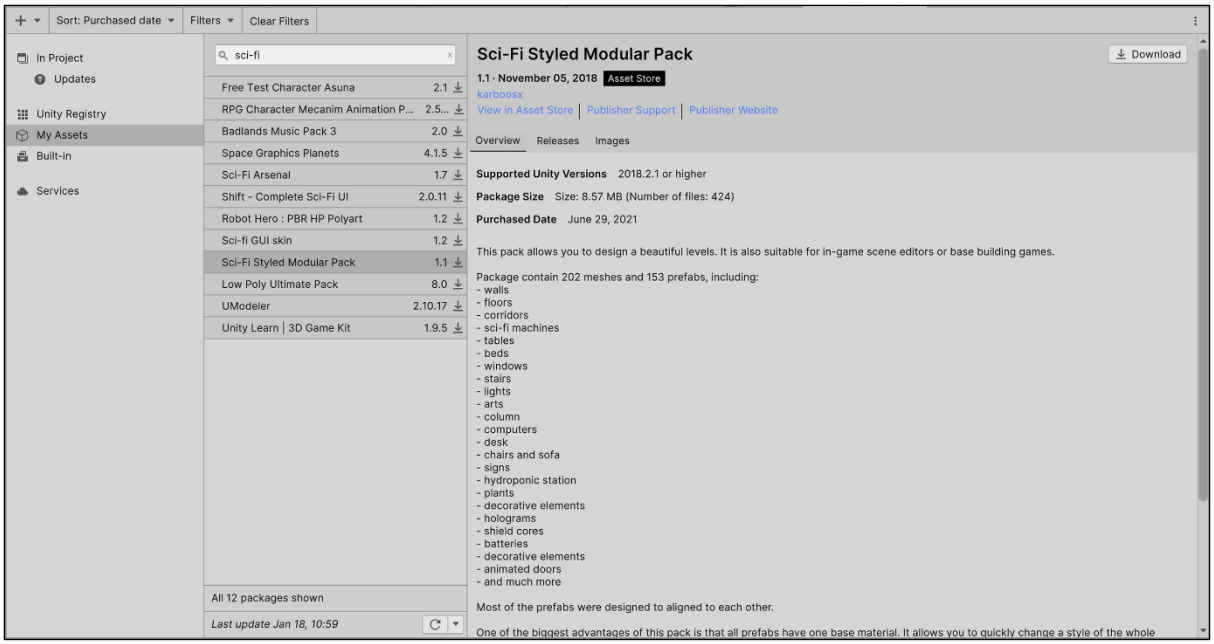
★★★★★ 5 days ago

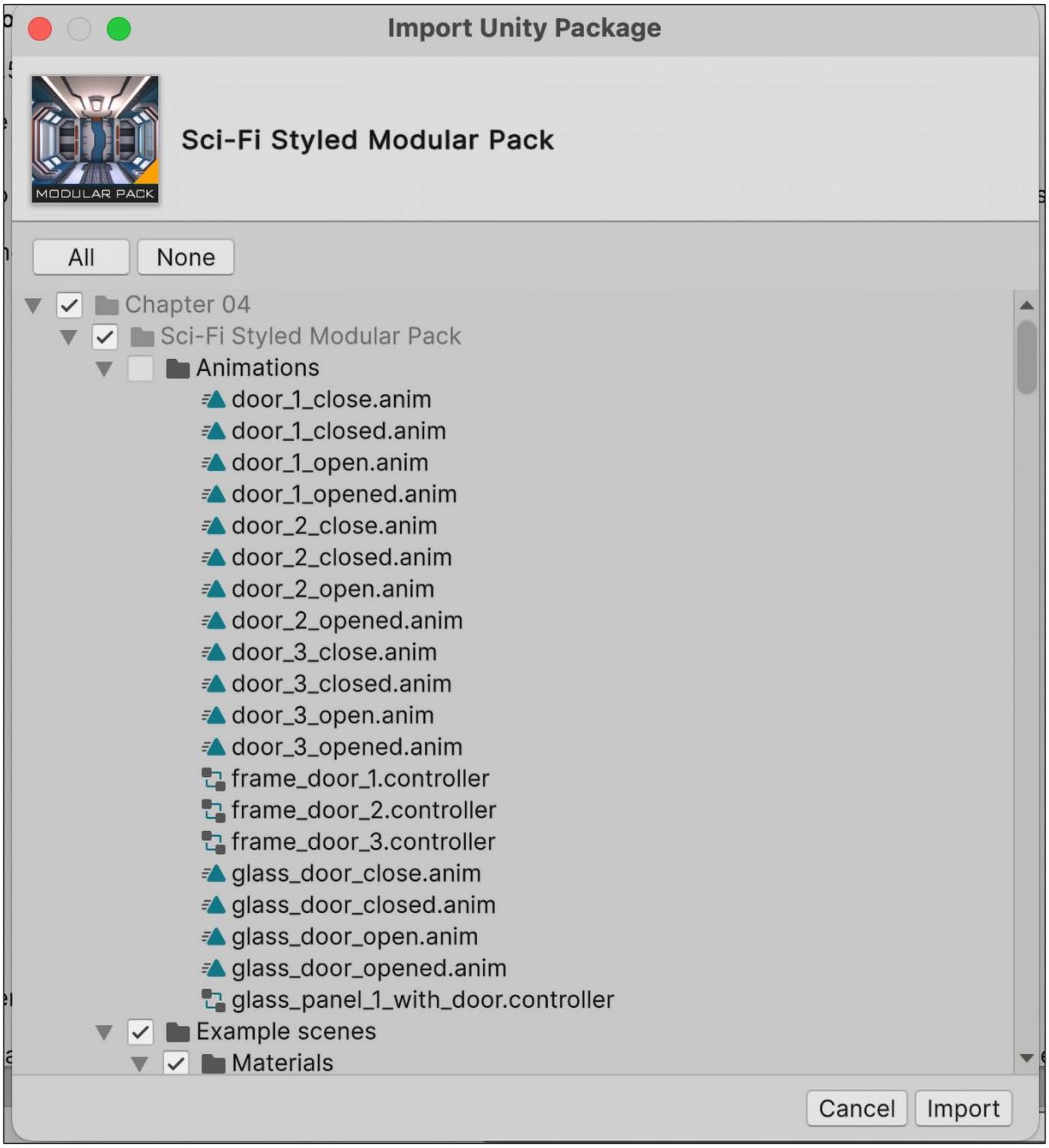
Lots of models

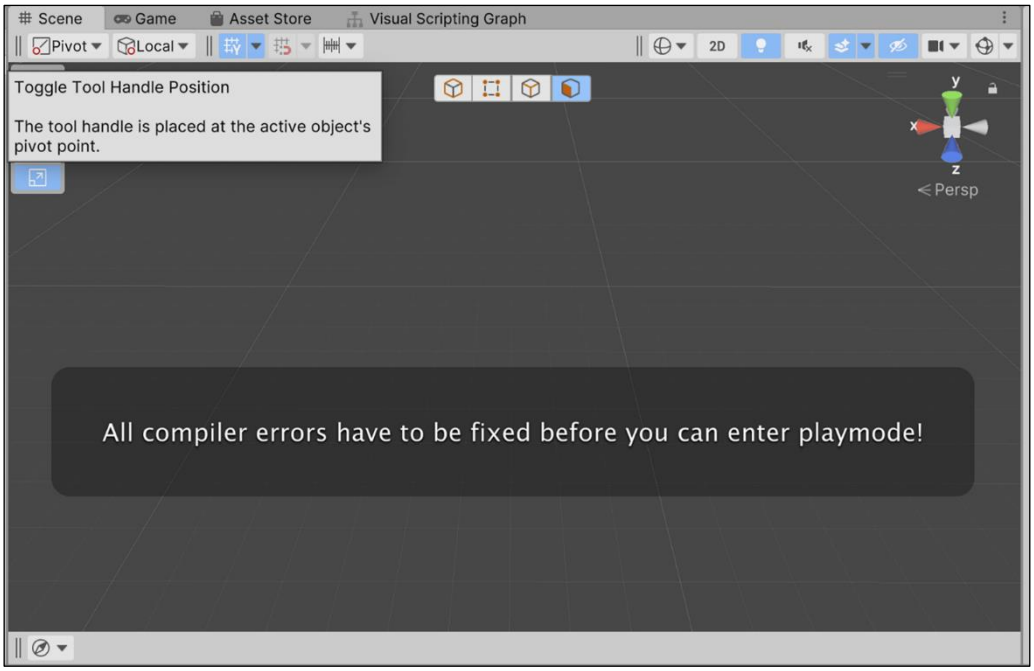
A nice asset to play with and start off your Sci-Fi level.

Read more reviews


Open Unity.app?
https://assetstore.unity.com wants to open this application.
Always allow assetstore.unity.com to open links of this type in the associated app
Cancel
Open Unity.app


Sort: Purchased date
Filters
Clear Filters
In Project
Updates
Unity Registry
My Assets
Built-in
Services
sci-fi
Free Test Character Asuna 2.1
RPG Character Mecanim Animation P... 2.5...
Badlands Music Pack 3 2.0
Space Graphics Planets 4.1.5
Sci-Fi Arsenal 1.7
Shift - Complete Sci-Fi UI 2.0.11
Robot Hero : PBR HP Polyart 1.2
Sci-fi GUI skin 1.2
Sci-Fi Styled Modular Pack 1.1
Low Poly Ultimate Pack 8.0
UModeler 2.10.17
Unity Learn | 3D Game Kit 1.9.5
All 12 packages shown
Last update Jan 18, 10:59
Sci-Fi Styled Modular Pack
Download
1.1 · November 05, 2018 Asset Store
karboosx
View in Asset Store | Publisher Support | Publisher Website
Overview Releases Images
Supported Unity Versions 2018.2.1 or higher
Package Size Size: 8.57 MB (Number of files: 424)
Purchased Date June 29, 2021
This pack allows you to design a beautiful levels. It is also suitable for in-game scene editors or base building games.
Package contain 202 meshes and 153 prefabs, including:
- walls
- floors
- corridors
- sci-fi machines
- tables
- beds
- windows
- stairs
- lights
- arts
- column
- computers
- desk
- chairs and sofa
- signs
- hydroponic station
- plants
- decorative elements
- holograms
- shield cores
- batteries
- decorative elements
- animated doors
- and much more
Most of the prefabs were designed to aligned to each other.
One of the biggest advantages of this pack is that all prefabs have one base material. It allows you to quickly change a style of the whole


Import Unity Package
Sci-Fi Styled Modular Pack
MODULAR PACK
All
None
Chapter 04
Sci-Fi Styled Modular Pack
Animations
door_1_close.anim
door_1_closed.anim
door_1_open.anim
door_1_opened.anim
door_2_close.anim
door_2_closed.anim
door_2_open.anim
door_2_opened.anim
door_3_close.anim
door_3_closed.anim
door_3_open.anim
door_3_opened.anim
frame_door_1.controller
frame_door_2.controller
frame_door_3.controller
glass_door_close.anim
glass_door_closed.anim
glass_door_open.anim
glass_door_opened.anim
glass_panel_1_with_door.controller
Example scenes
Materials
Cancel
Import


Scene
Game
Asset Store
Visual Scripting Graph
Pivot
Local
2D
Toggle Tool Handle Position
The tool handle is placed at the active object's pivot point.
y
x
z
Persp
All compiler errors have to be fixed before you can enter playmode!



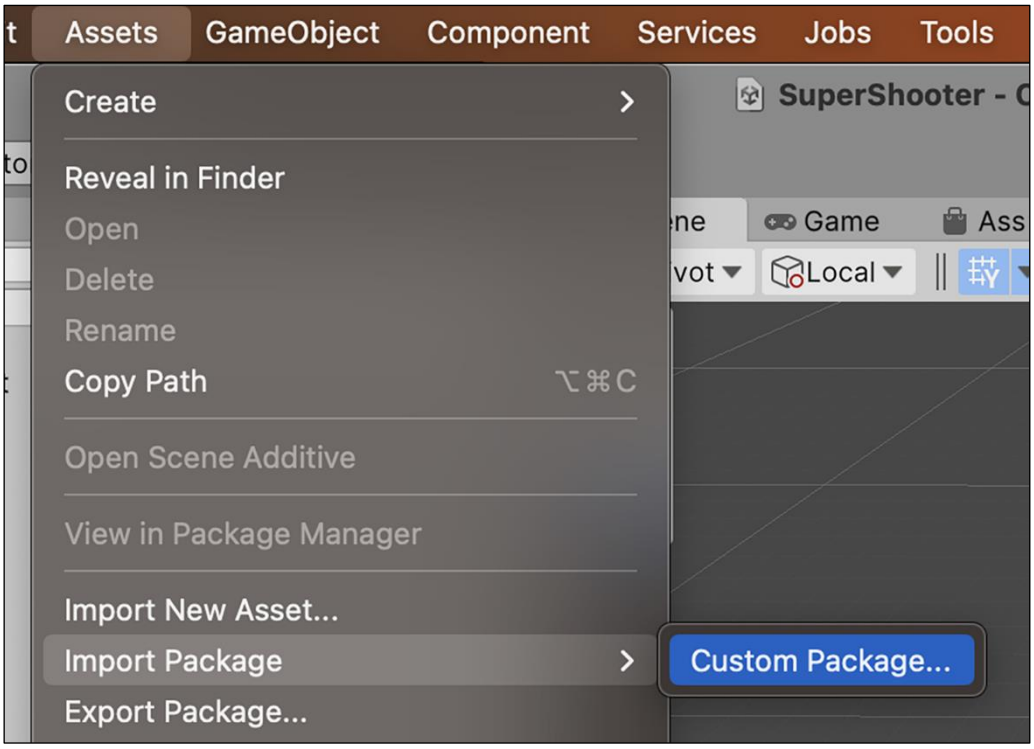
DUNGEON MASON

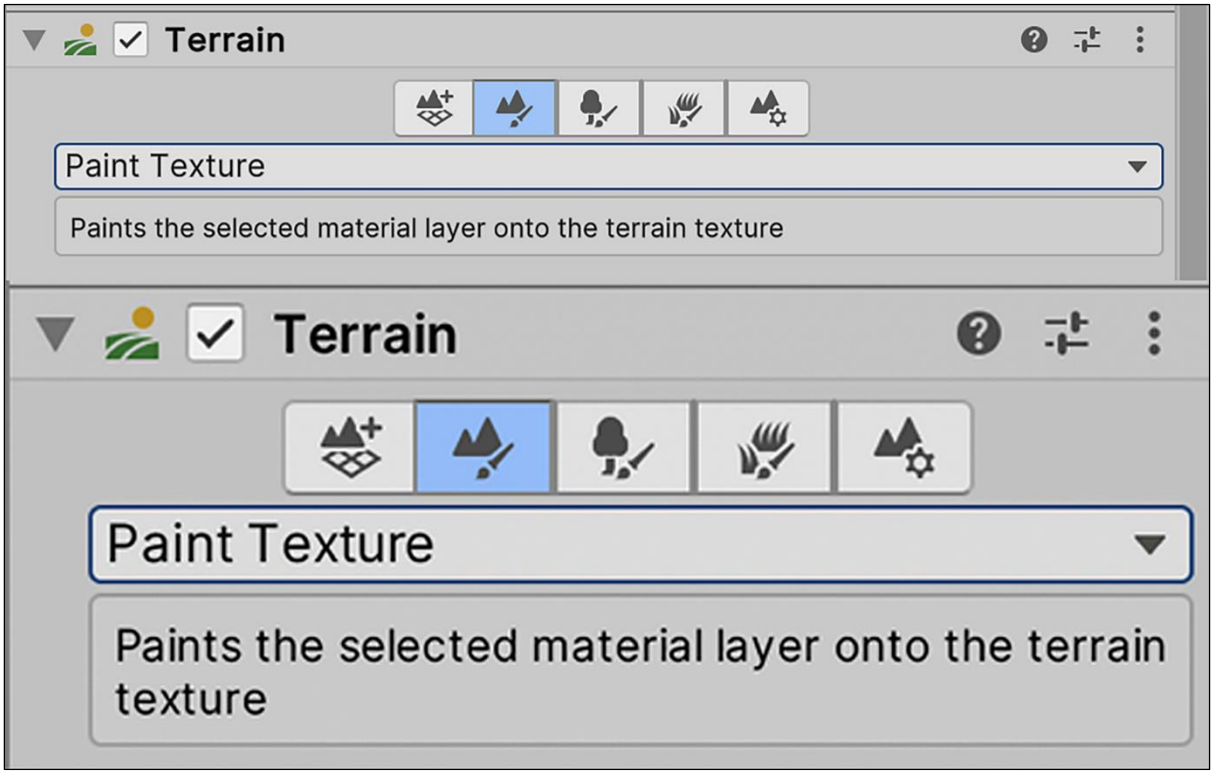
Robot Hero : PBR HP Poly...

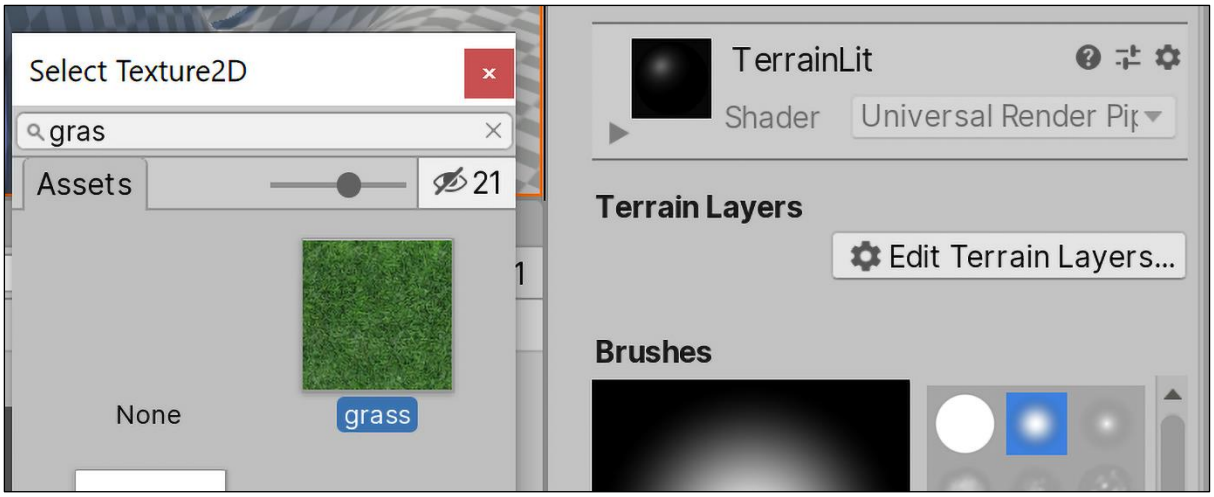
★★★★★ (43) | ♥ (2664)

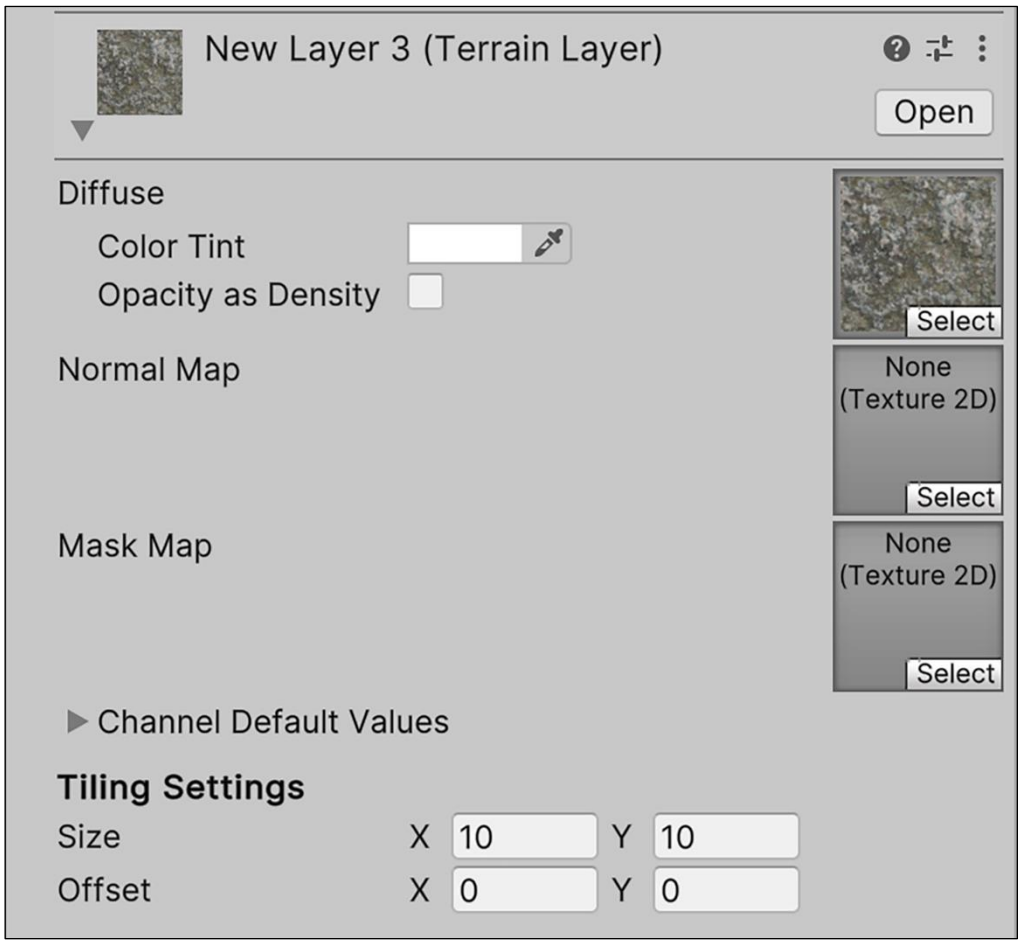
FREE

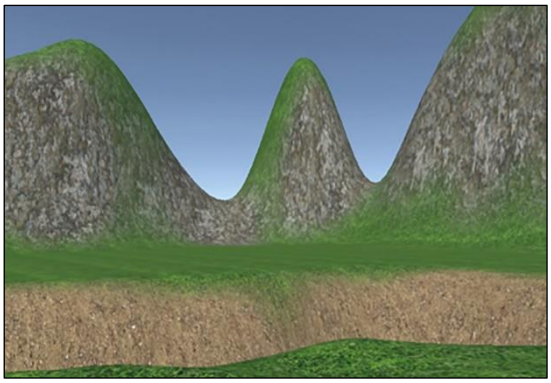
Add to My Assets

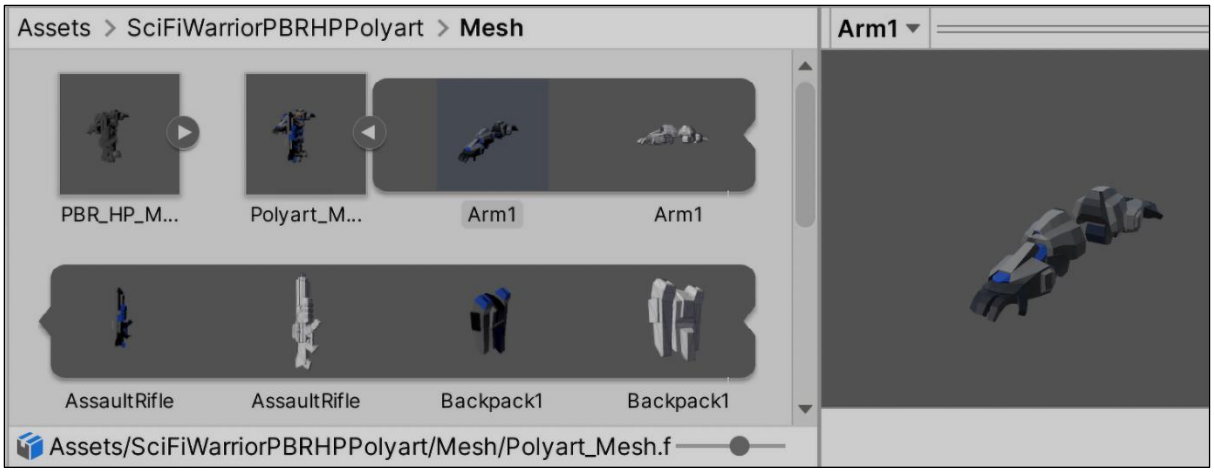

Assets
GameObject
Component
Services
Jobs
Tools
Create
Reveal in Finder
Open
Delete
Rename
Copy Path
⌥⌘C
Open Scene Additive
View in Package Manager
Import New Asset...
Import Package
Export Package...
Custom Package...
SuperShooter - C
Game
Local


Terrain
Paint Texture
Paints the selected material layer onto the terrain texture
Terrain
Paint Texture
Paints the selected material layer onto the terrain texture

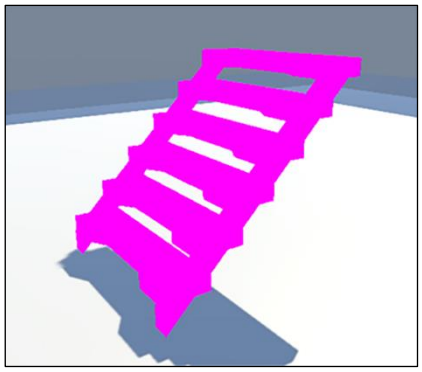

Select Texture2D
gras
Assets
21
None
grass
TerrainLit
Shader
Universal Render Pip
Terrain Layers
Edit Terrain Layers...
Brushes

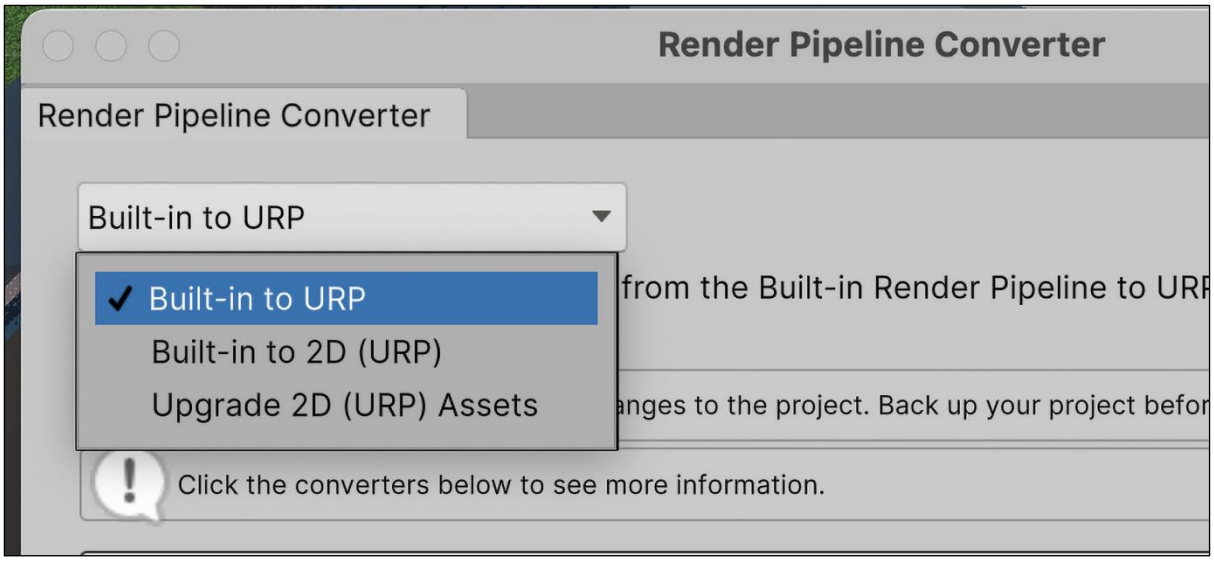

New Layer 3 (Terrain Layer)
Open
Diffuse
Color Tint
Opacity as Density
Select
Normal Map
None
(Texture 2D)
Select
Mask Map
None
(Texture 2D)
Select
Channel Default Values
Tiling Settings
Size
X 10
Y 10
Offset
X 0
Y 0

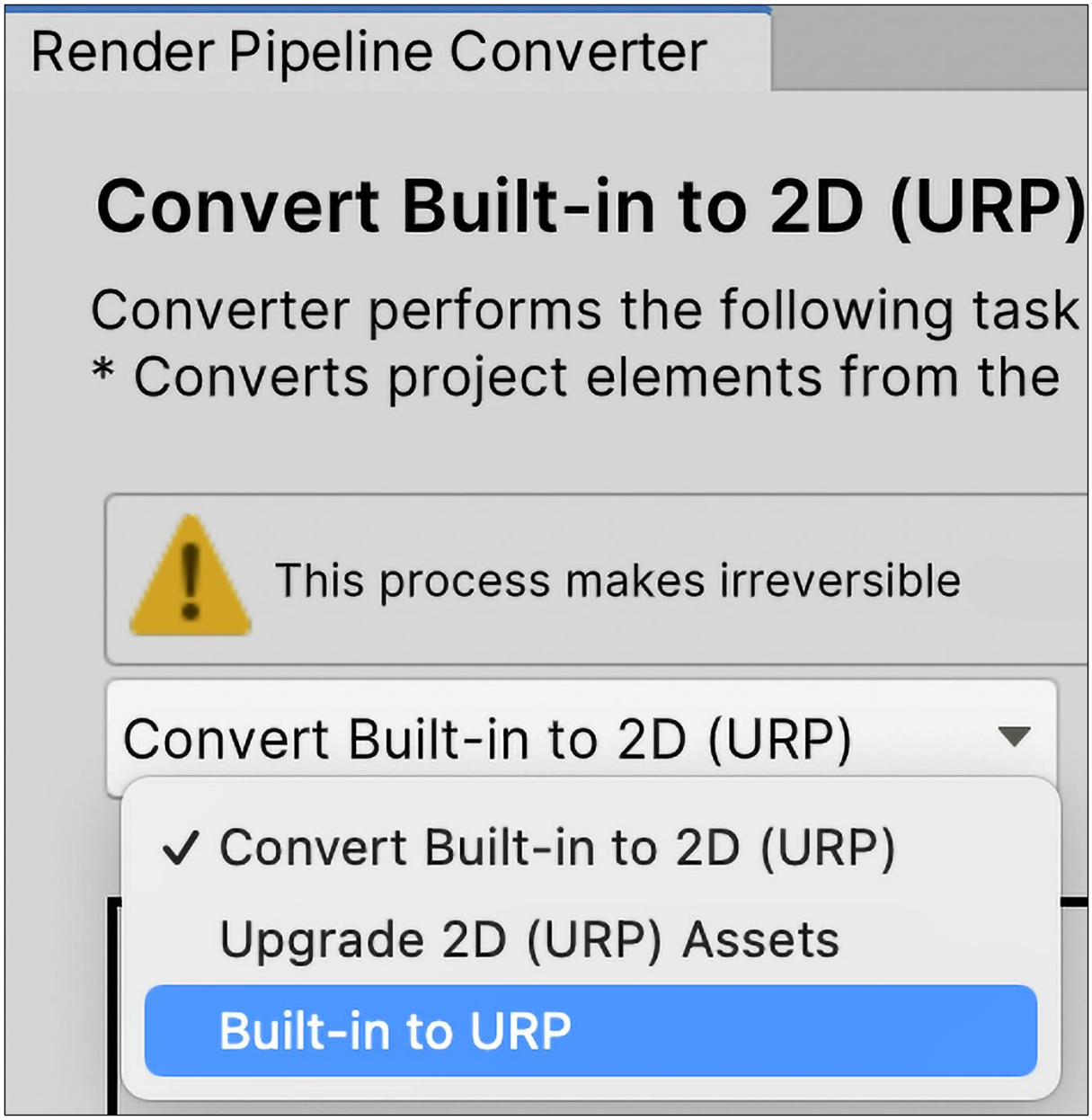


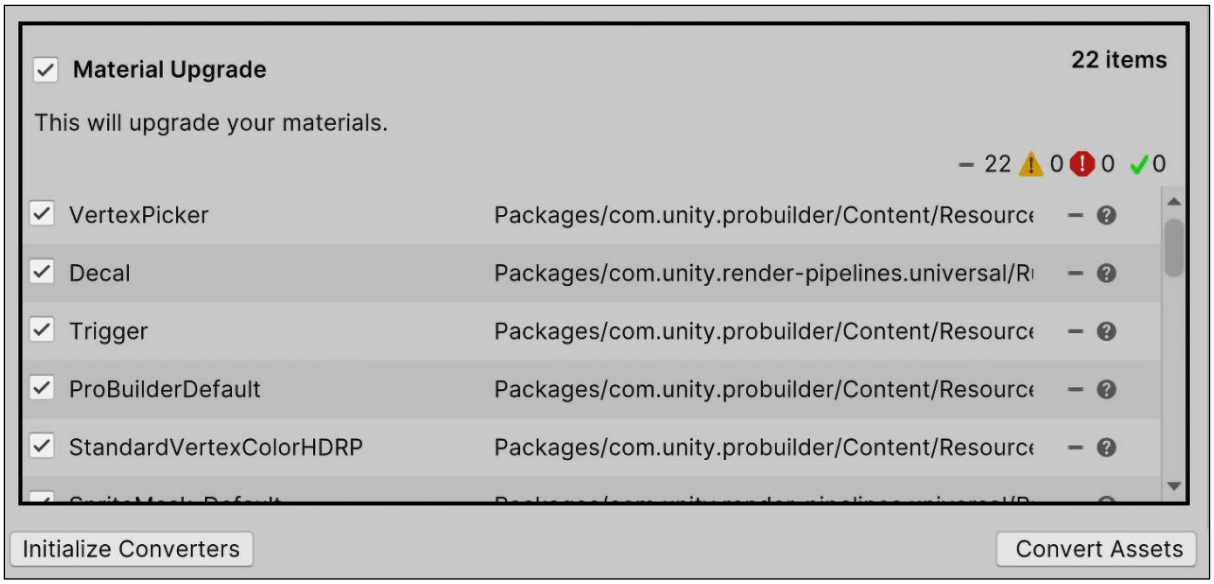

Assets > SciFiWarriorPBRHPPolyart > Mesh
PBR_HP_M...
Polyart_M...
Arm1
Arm1
AssaultRifle
AssaultRifle
Backpack1
Backpack1
Arm1
Assets/SciFiWarriorPBRHPPolyart/Mesh/Polyart_Mesh.f

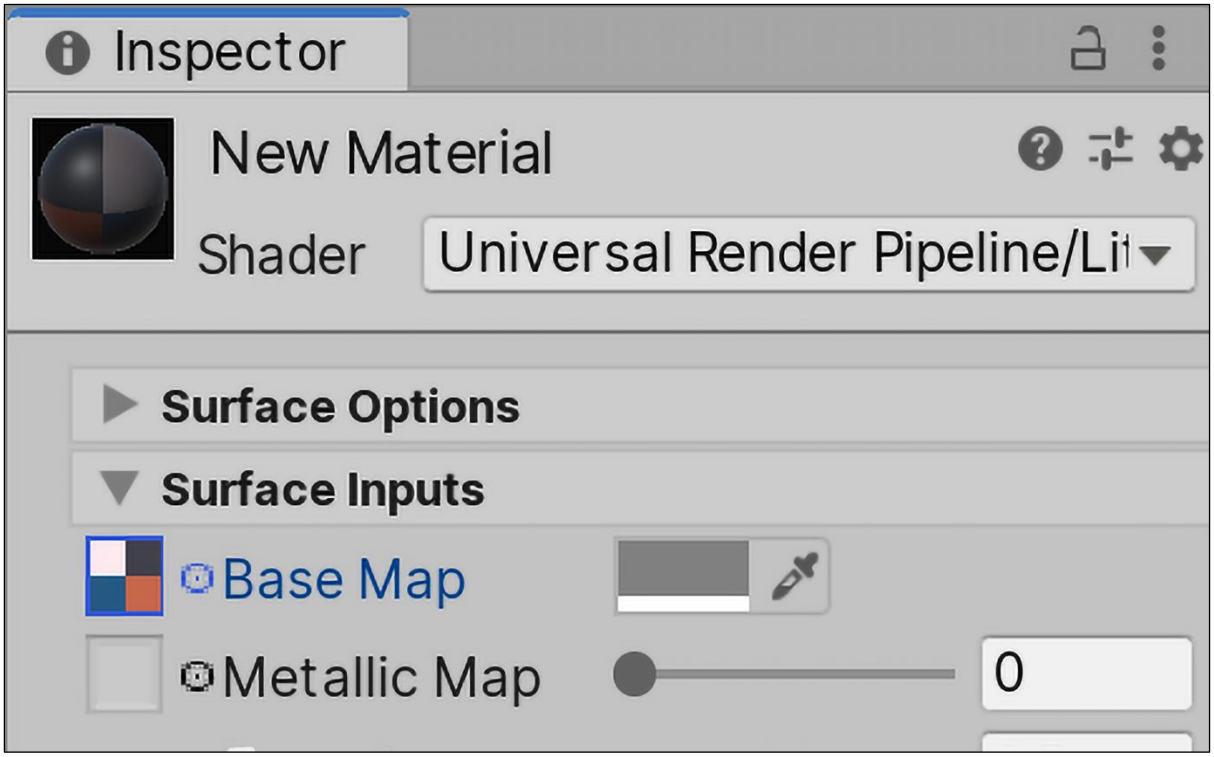

Main Camera
Polyart_Mesh
Arm1
AssaultRifle
Backpack1
Body1
head1
Hips
Leg1

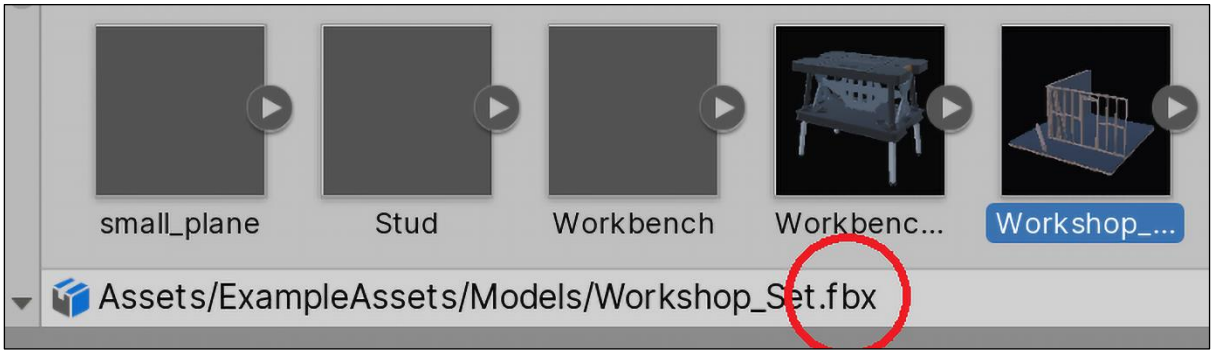


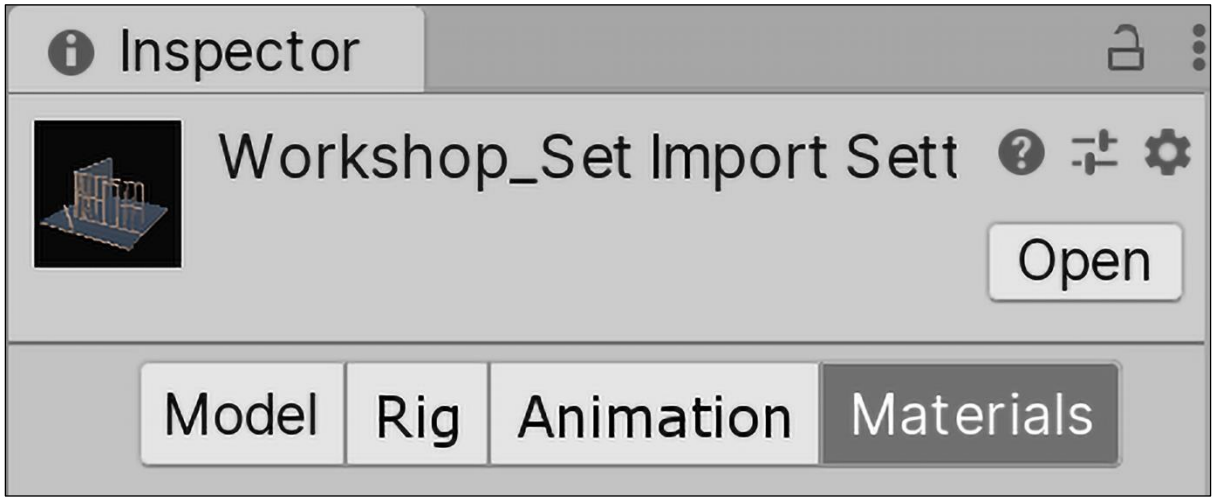

Render Pipeline Converter
Render Pipeline Converter
Built-in to URP
Built-in to URP
Built-in to 2D (URP)
Upgrade 2D (URP) Assets
from the Built-in Render Pipeline to URP
anges to the project. Back up your project befor
Click the converters below to see more information.


Render Pipeline Converter
Convert Built-in to 2D (URP)
Converter performs the following task
* Converts project elements from the
This process makes irreversible
Convert Built-in to 2D (URP)
✓ Convert Built-in to 2D (URP)
Upgrade 2D (URP) Assets
Built-in to URP

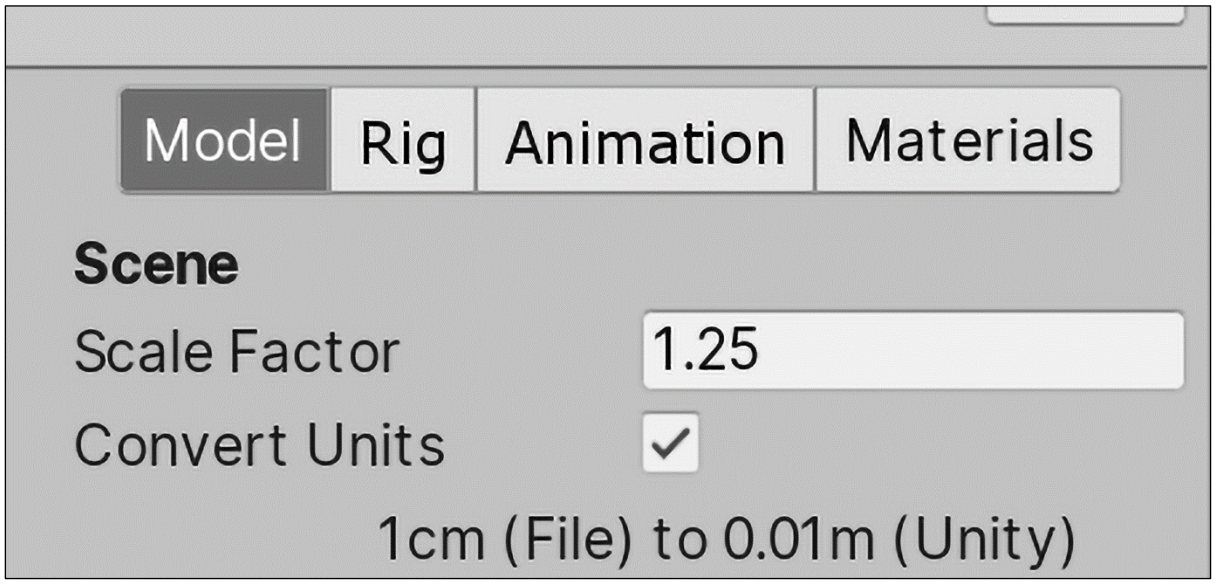

Material Upgrade
22 items
This will upgrade your materials.
22 0 0 0
VertexPicker Packages/com.unity.probuilder/Content/Resource
Decal Packages/com.unity.render-pipelines.universal/R
Trigger Packages/com.unity.probuilder/Content/Resource
ProBuilderDefault Packages/com.unity.probuilder/Content/Resource
StandardVertexColorHDRP Packages/com.unity.probuilder/Content/Resource
Initialize Converters
Convert Assets


Inspector
New Material
Shader
Universal Render Pipeline/Lit
Surface Options
Surface Inputs
Base Map
Metallic Map
0


small_plane
Stud
Workbench
Workbenc...
Workshop_...
Assets/ExampleAssets/Models/Workshop_Set.fbx

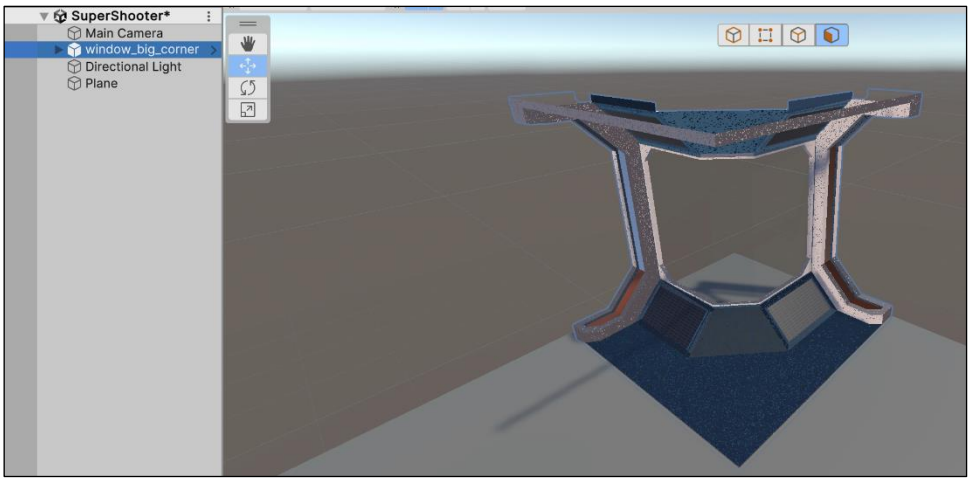

Inspector
Workshop_Set Import Sett
Open
Model
Rig
Animation
Materials

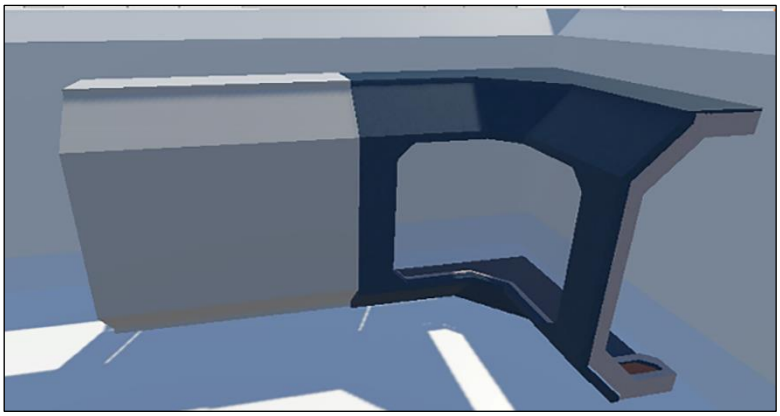


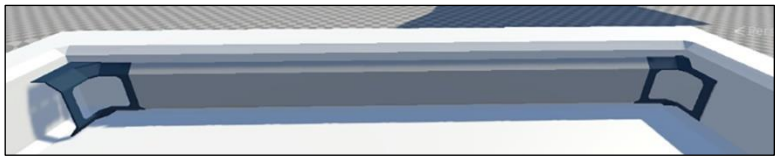

Model
Rig
Animation
Materials
Scene
Scale Factor
1.25
Convert Units
1cm (File) to 0.01m (Unity)

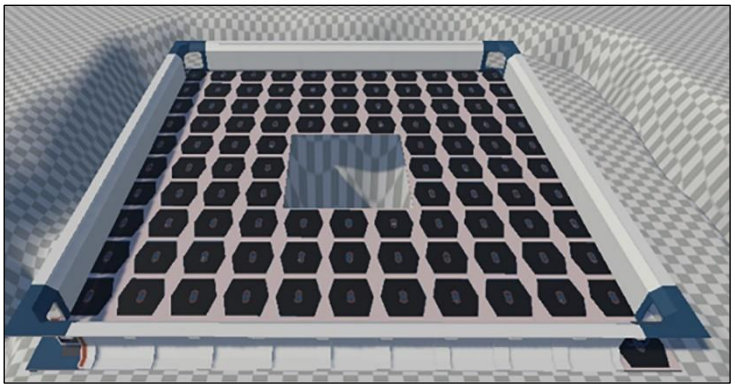


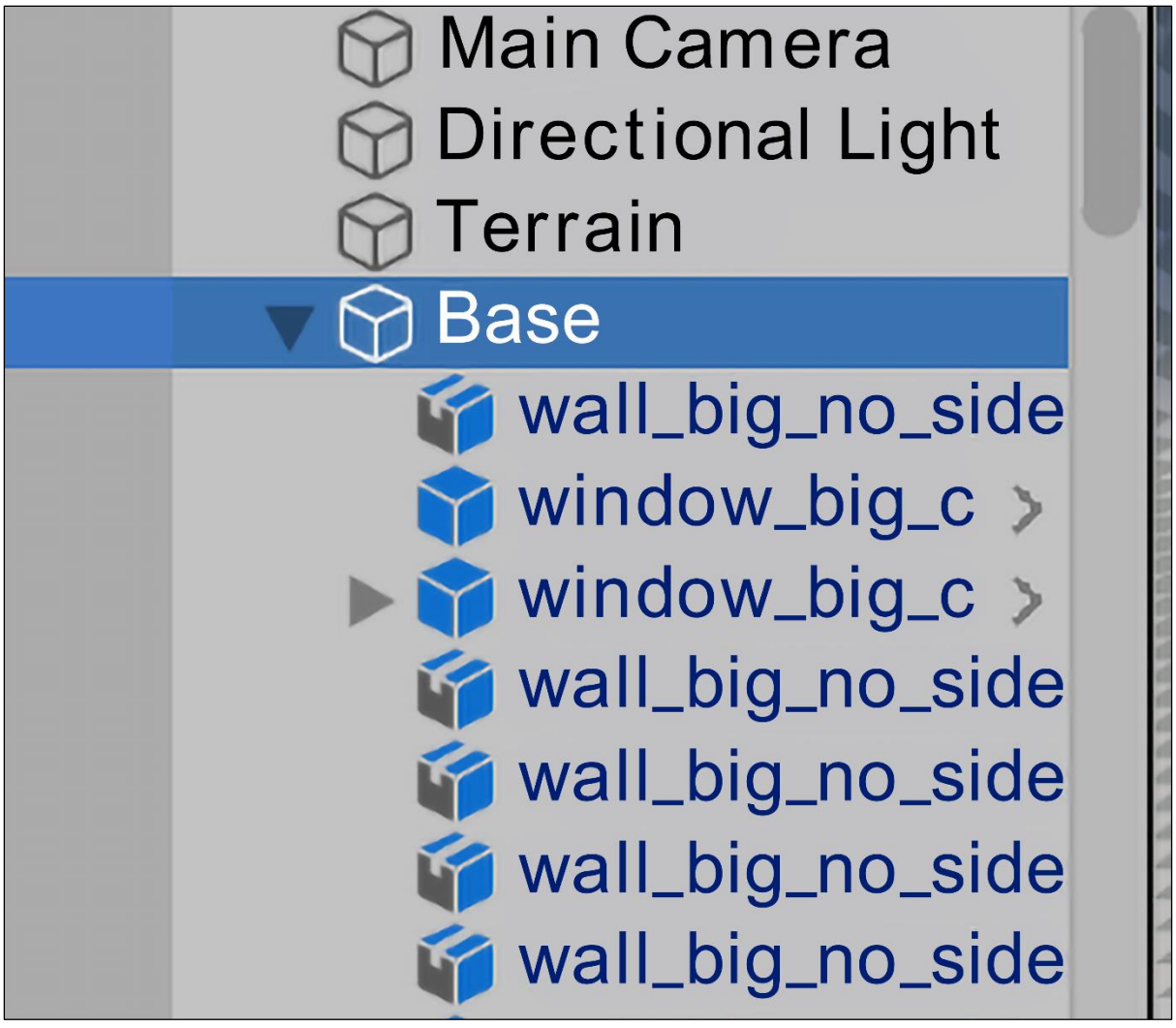

corner
21
Asset Store: 143/999+
window_bi...
window_bi...
window_bi...
window_bi...
window_bi...
window_bi...
window_bi...
window_bi...
window_big_corner_plug


SuperShooter*
Main Camera
window_big_corner
Directional Light
Plane

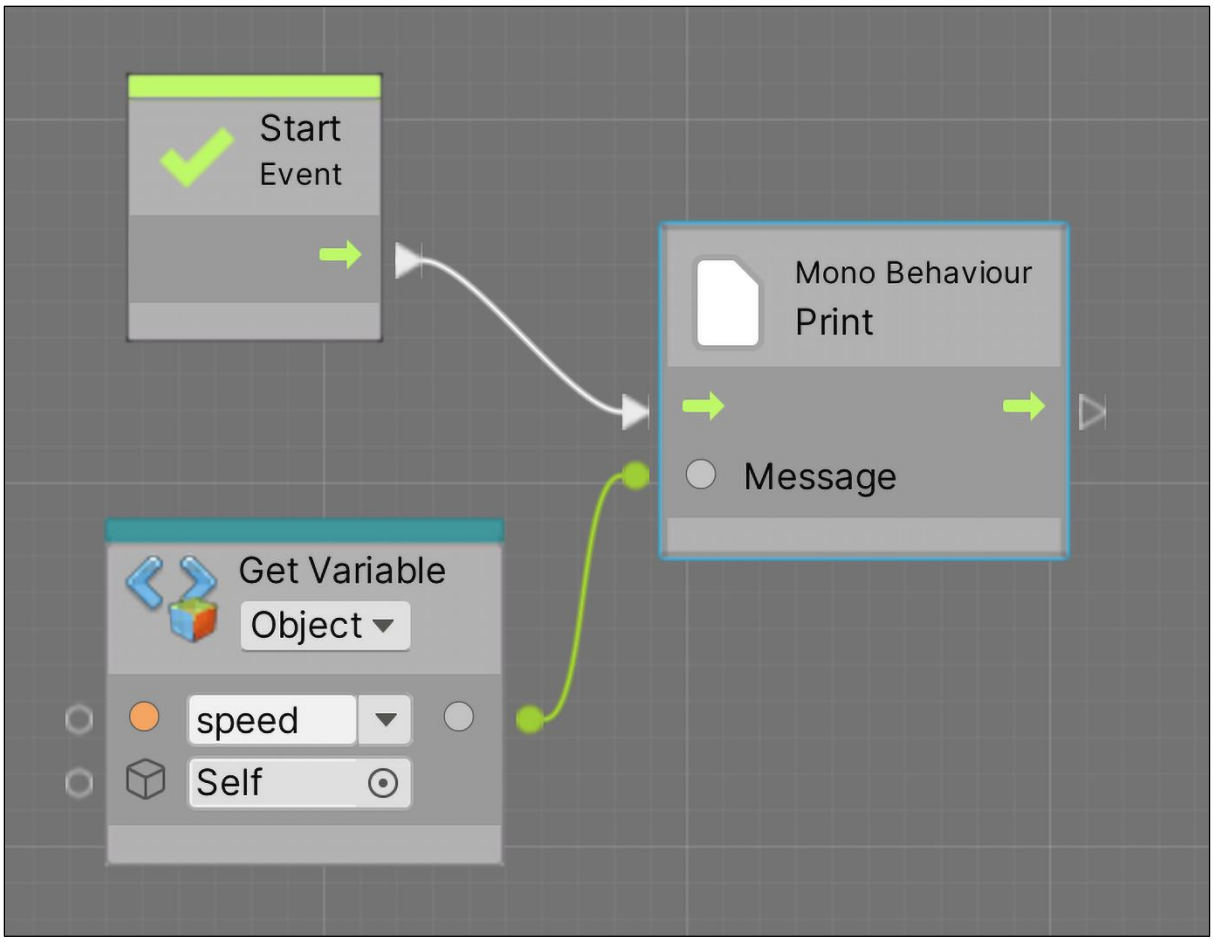




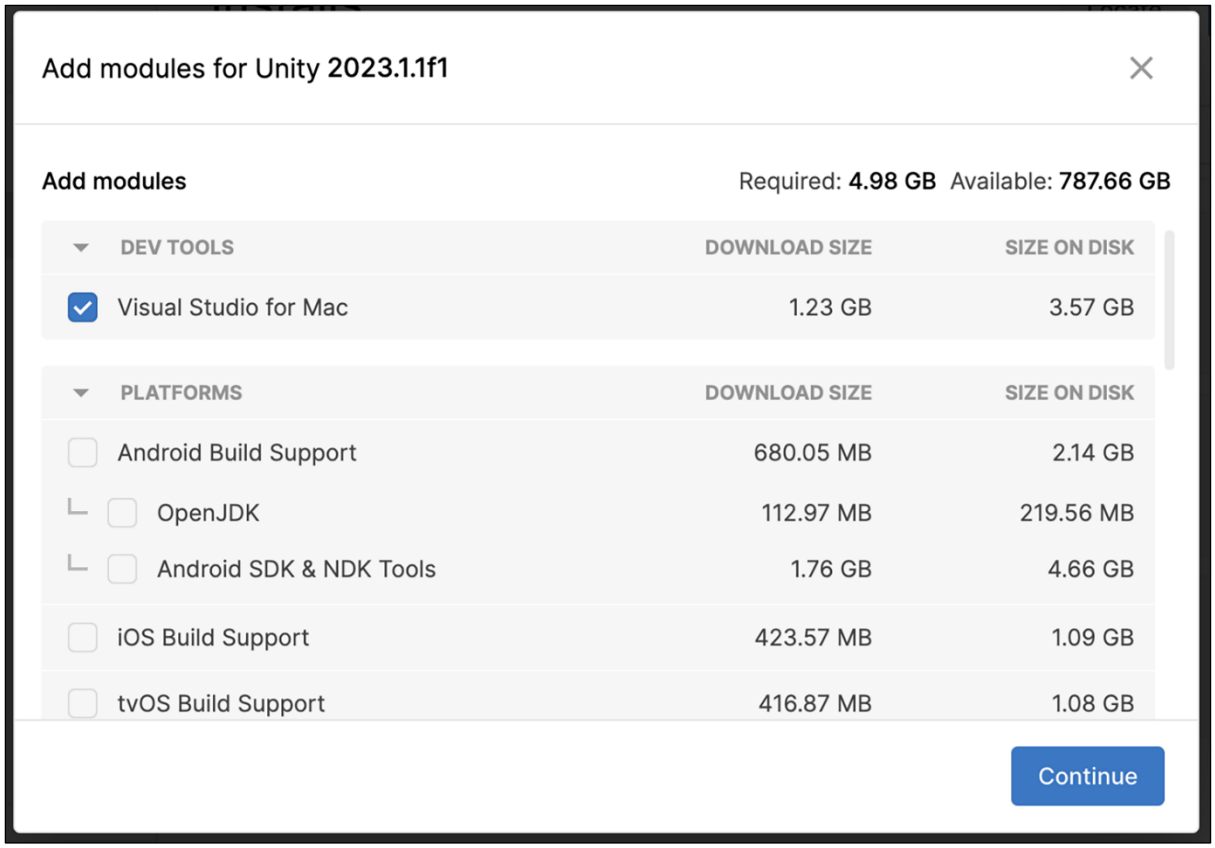


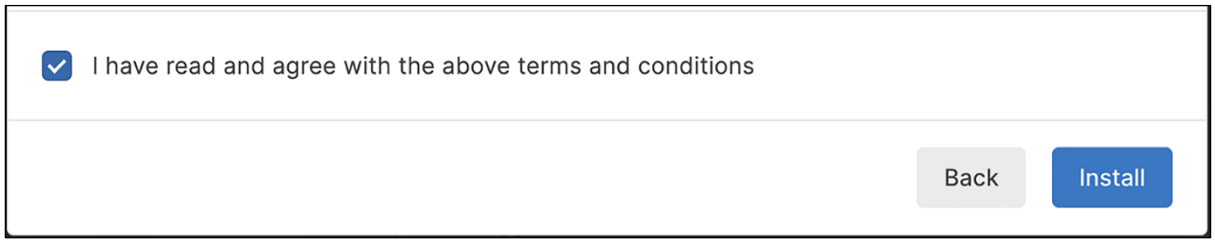

Main Camera
Directional Light
Terrain
Base
wall_big_no_side
window_big_c
window_big_c
wall_big_no_side
wall_big_no_side
wall_big_no_side
wall_big_no_side

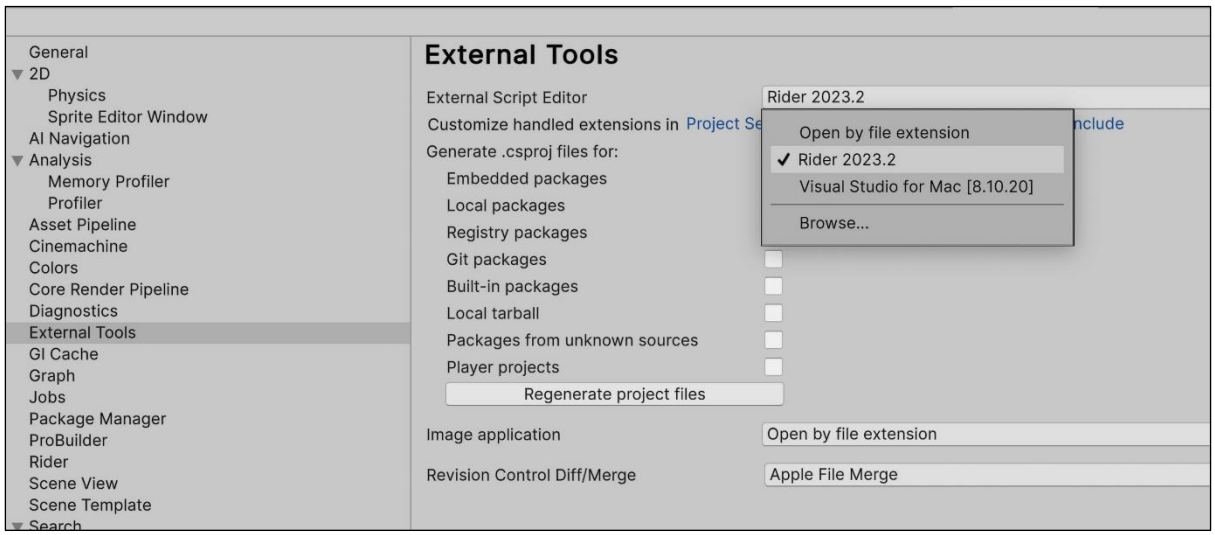
Chapter 5: Unleashing the Power of C# and Visual Scripting

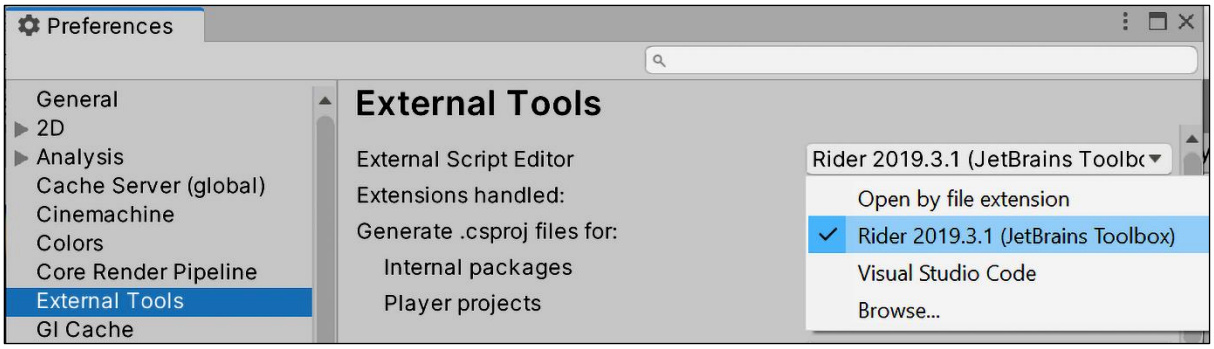


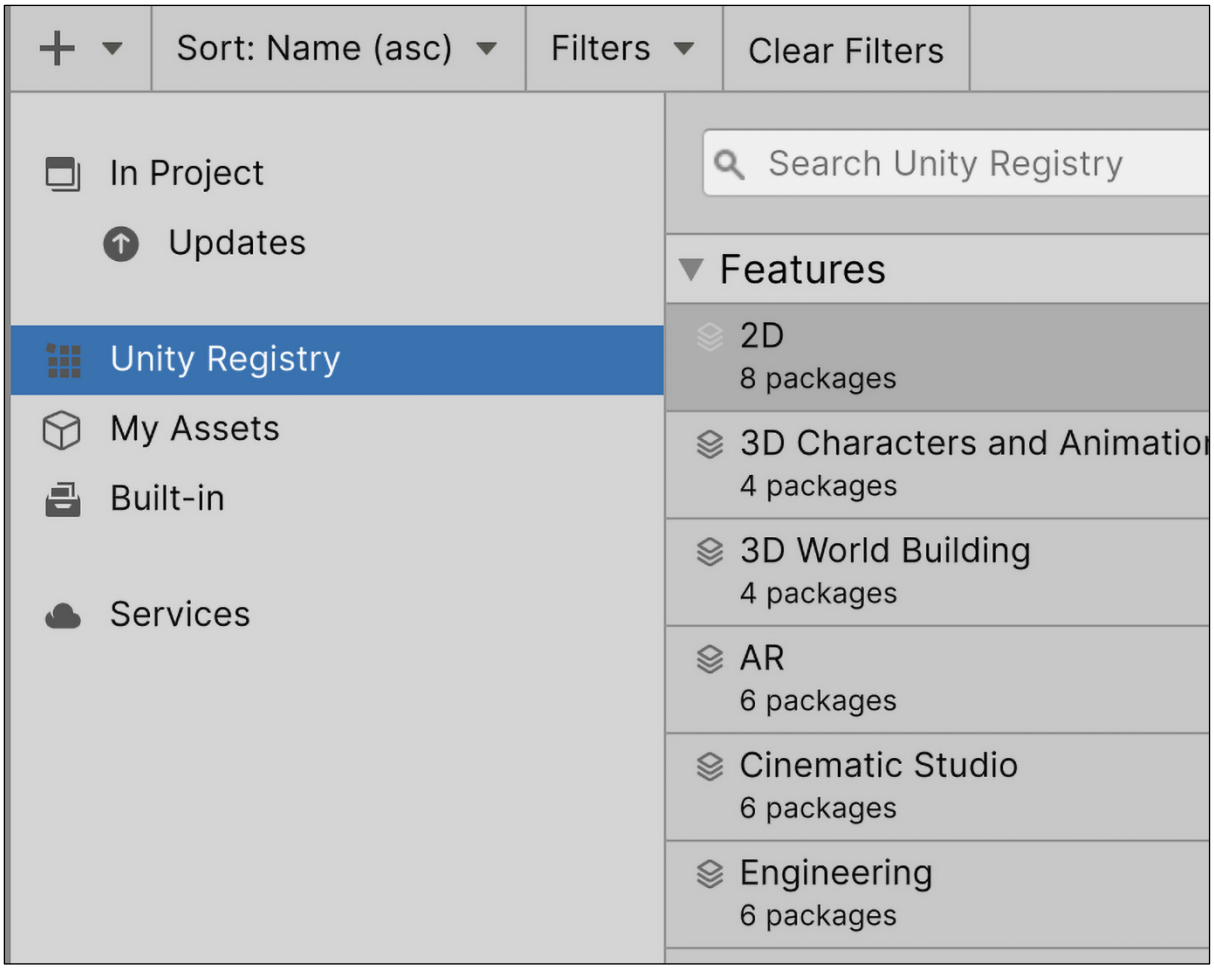


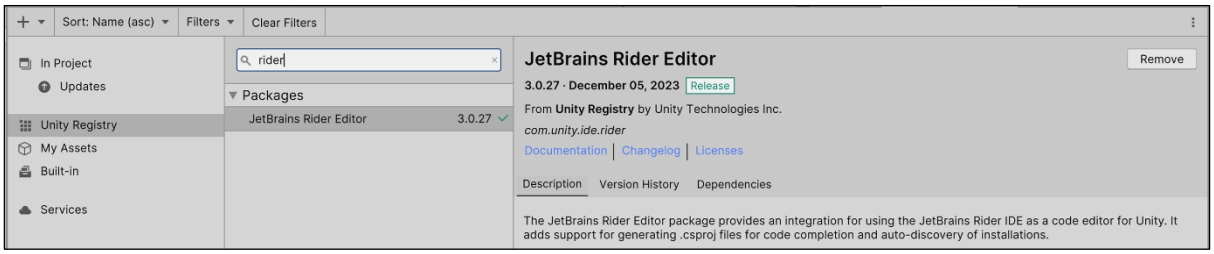

Add modules for Unity 2023.1.1f1
Add modules
Required: 4.98 GB Available: 787.66 GB
DEV TOOLS
DOWNLOAD SIZE
SIZE ON DISK
Visual Studio for Mac
1.23 GB
3.57 GB
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SIZE ON DISK
Android Build Support
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2.14 GB
OpenJDK
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219.56 MB
Android SDK & NDK Tools
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4.66 GB
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423.57 MB
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1.08 GB
Continue

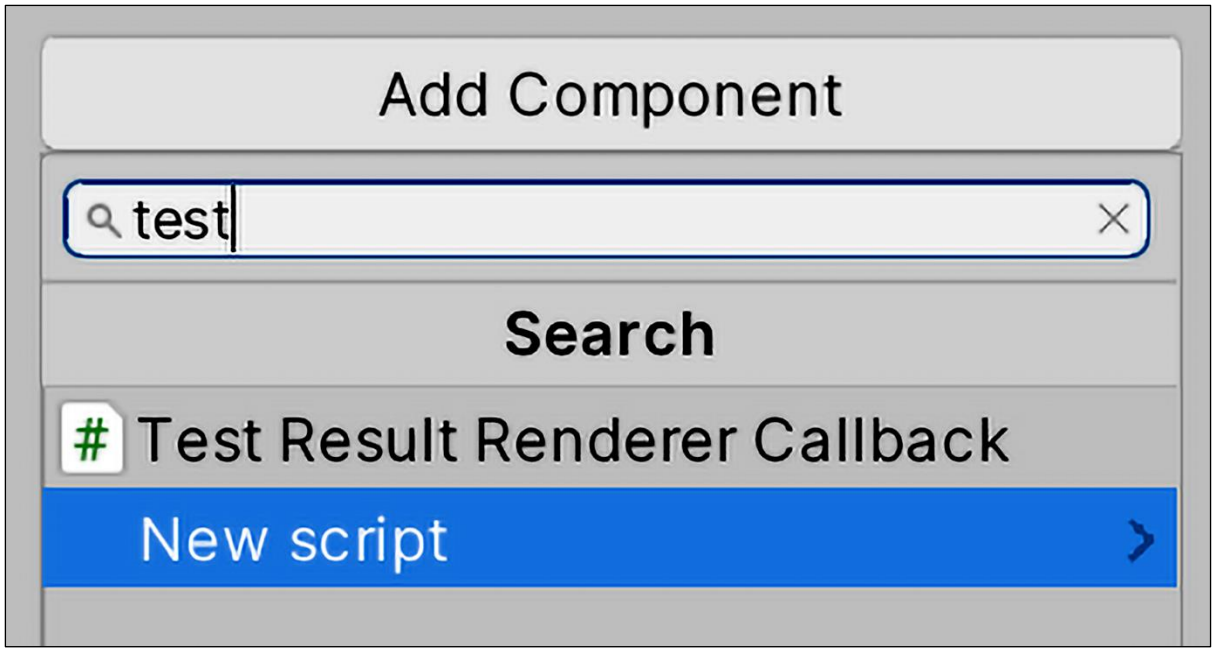

I have read and agree with the above terms and conditions
Back
Install


General
2D
Physics
Sprite Editor Window
AI Navigation
Analysis
Memory Profiler
Profiler
Asset Pipeline
Cinemachine
Colors
Core Render Pipeline
Diagnostics
External Tools
GI Cache
Graph
Jobs
Package Manager
ProBuilder
Rider
Scene View
Scene Template
Search
External Tools
External Script Editor
Rider 2023.2
Customize handled extensions in Project Se
nclude
Generate .csproj files for:
Embedded packages
Local packages
Registry packages
Git packages
Built-in packages
Local tarball
Packages from unknown sources
Player projects
Regenerate project files
Open by file extension
Rider 2023.2
Visual Studio for Mac [8.10.20]
Browse...
Image application
Open by file extension
Revision Control Diff/Merge
Apple File Merge


Preferences
General
2D
Analysis
Cache Server (global)
Cinemachine
Colors
Core Render Pipeline
External Tools
GI Cache
External Tools
External Script Editor
Extensions handled:
Generate .csproj files for:
Internal packages
Player projects
Rider 2019.3.1 (JetBrains Toolbc
Open by file extension
Rider 2019.3.1 (JetBrains Toolbox)
Visual Studio Code
Browse...

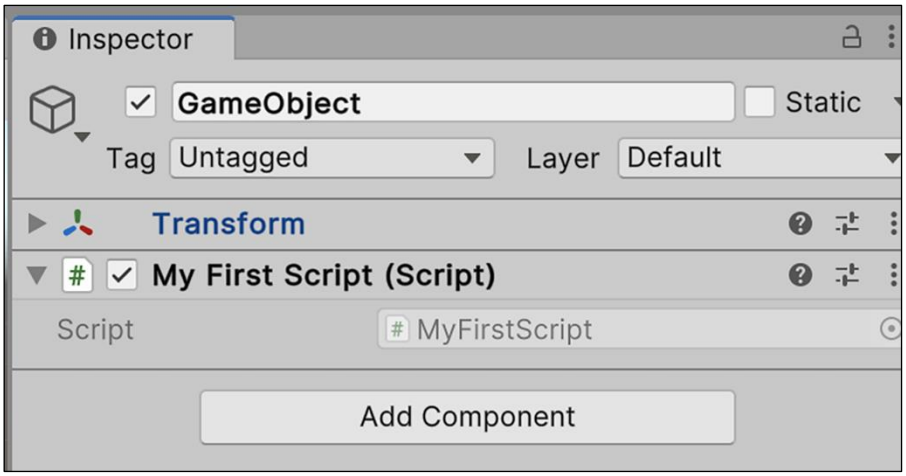

Sort: Name (asc)
Filters
Clear Filters
In Project
Updates
Unity Registry
My Assets
Built-in
Services
Search Unity Registry
Features
2D
8 packages
3D Characters and Animatio
4 packages
3D World Building
4 packages
AR
6 packages
Cinematic Studio
6 packages
Engineering
6 packages

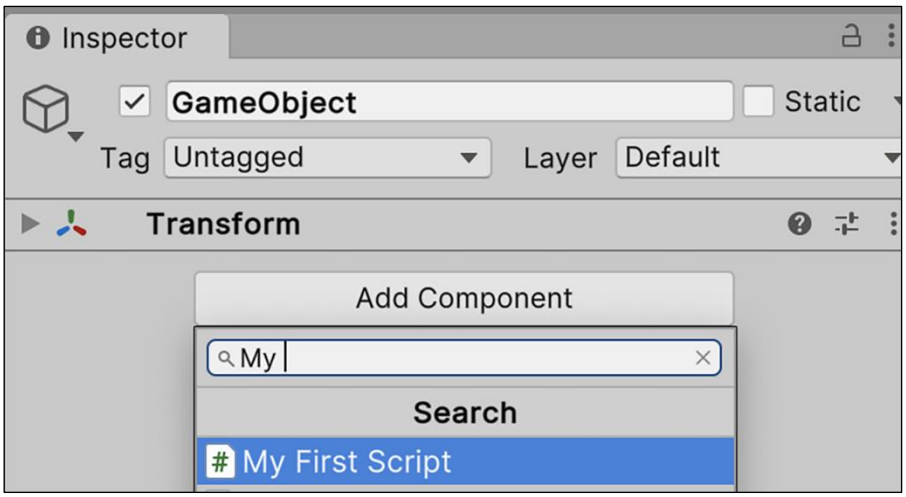

Sort: Name (asc)
Filters
Clear Filters
In Project
Updates
Unity Registry
My Assets
Built-in
Services
rider
Packages
JetBrains Rider Editor
3.0.27
JetBrains Rider Editor
Remove
3.0.27 · December 05, 2023
Release
From Unity Registry by Unity Technologies Inc.
com.unity.ide.rider
Documentation | Changelog | Licenses
Description
Version History
Dependencies
The JetBrains Rider Editor package provides an integration for using the JetBrains Rider IDE as a code editor for Unity. It adds support for generating .csproj files for code completion and auto-discovery of installations.


Add Component
test
Search
Test Result Renderer Callback
New script


New script
Name
MyFirstScript
Create and Add


Scripts
MyFirstScript


Inspector
GameObject
Static
Tag
Untagged
Layer
Default
Transform
My First Script (Script)
Script
MyFirstScript
Add Component


Inspector
GameObject
Static
Tag
Untagged
Layer
Default
Transform
Add Component
My
Search
My First Script

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

public class MyFirstScript : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

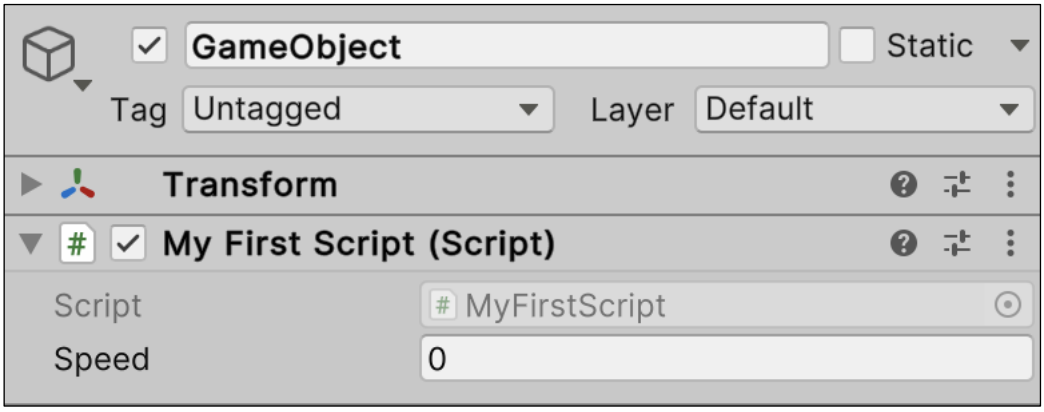
    }
```

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

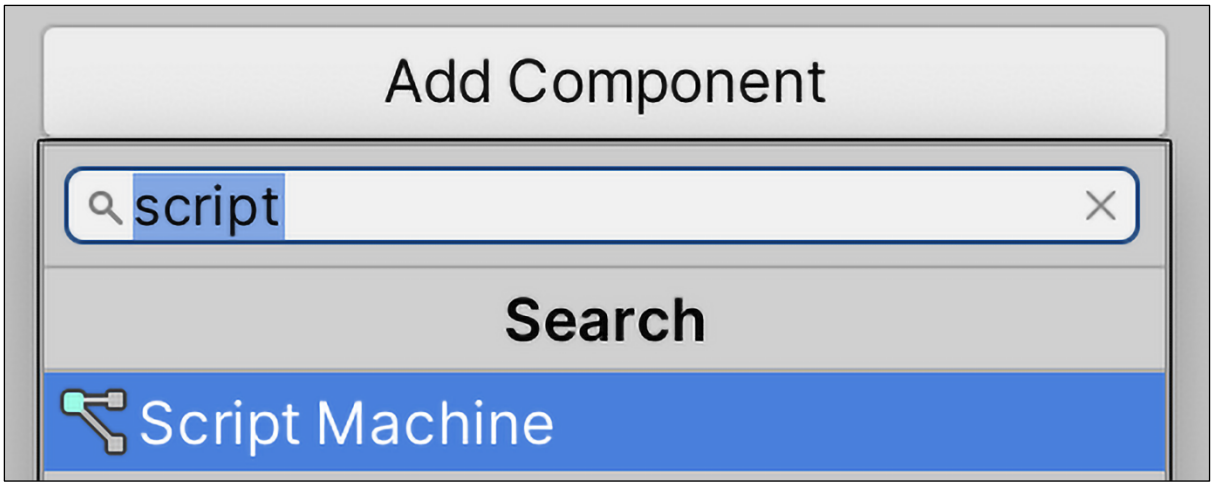
```
public class MyFirstScript : MonoBehaviour
```

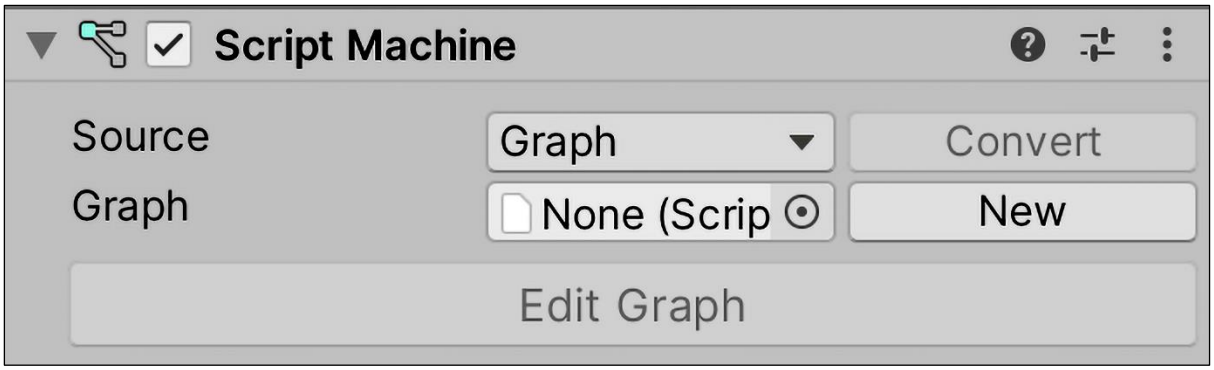
```
public class MyFirstScript : MonoBehaviour
{
    public float speed;
```

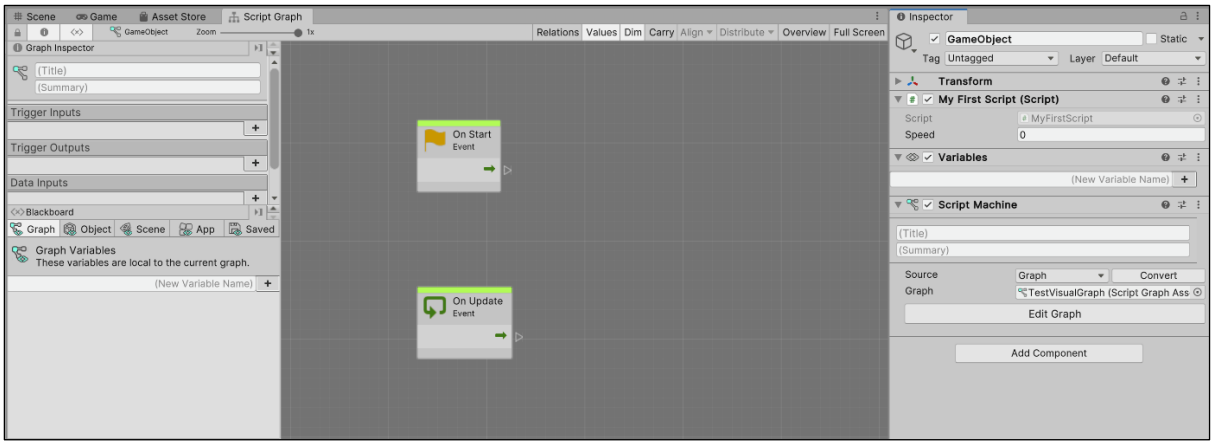


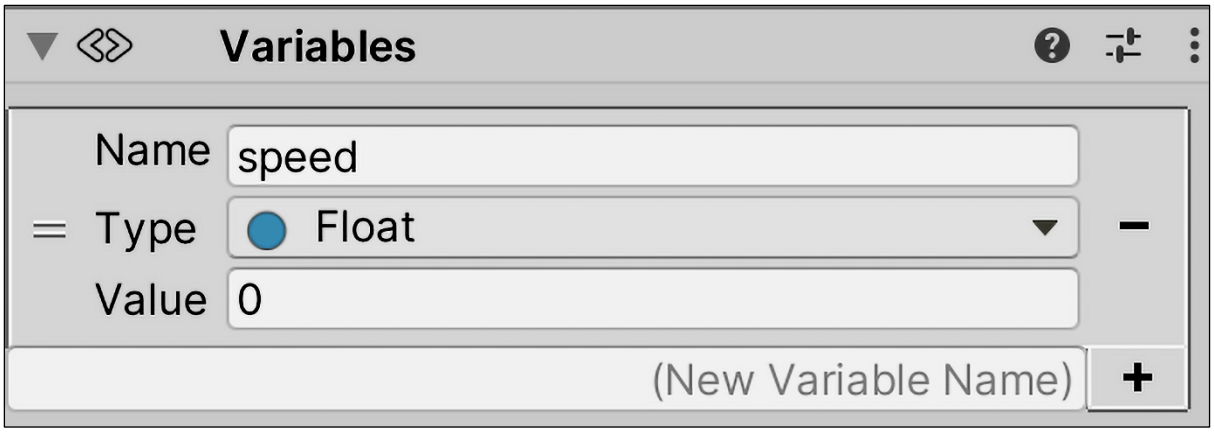



```
[SerializeField]
private float speed;
```


Add Component
script
Search
Script Machine


Script Machine
Source
Graph
Convert
Graph
None (Scrip
New
Edit Graph


Scene
Game
Asset Store
Script Graph
Graph Inspector
(Title)
(Summary)
Trigger Inputs
Trigger Outputs
Data Inputs
Blackboard
Graph
Object
Scene
App
Saved
Graph Variables
These variables are local to the current graph.
(New Variable Name)
Relations
Values
Dim
Carry
Align
Distribute
Overview
Full Screen
On Start
Event
On Update
Event
Inspector
GameObject
Static
Tag
Untagged
Layer
Default
Transform
My First Script (Script)
Script
MyFirstScript
Speed
0
Variables
(New Variable Name)
Script Machine
(Title)
(Summary)
Source
Graph
Convert
Graph
TestVisualGraph (Script Graph Ass
Edit Graph
Add Component




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

}
```

```
void Update()
{
    print("test");
}
```

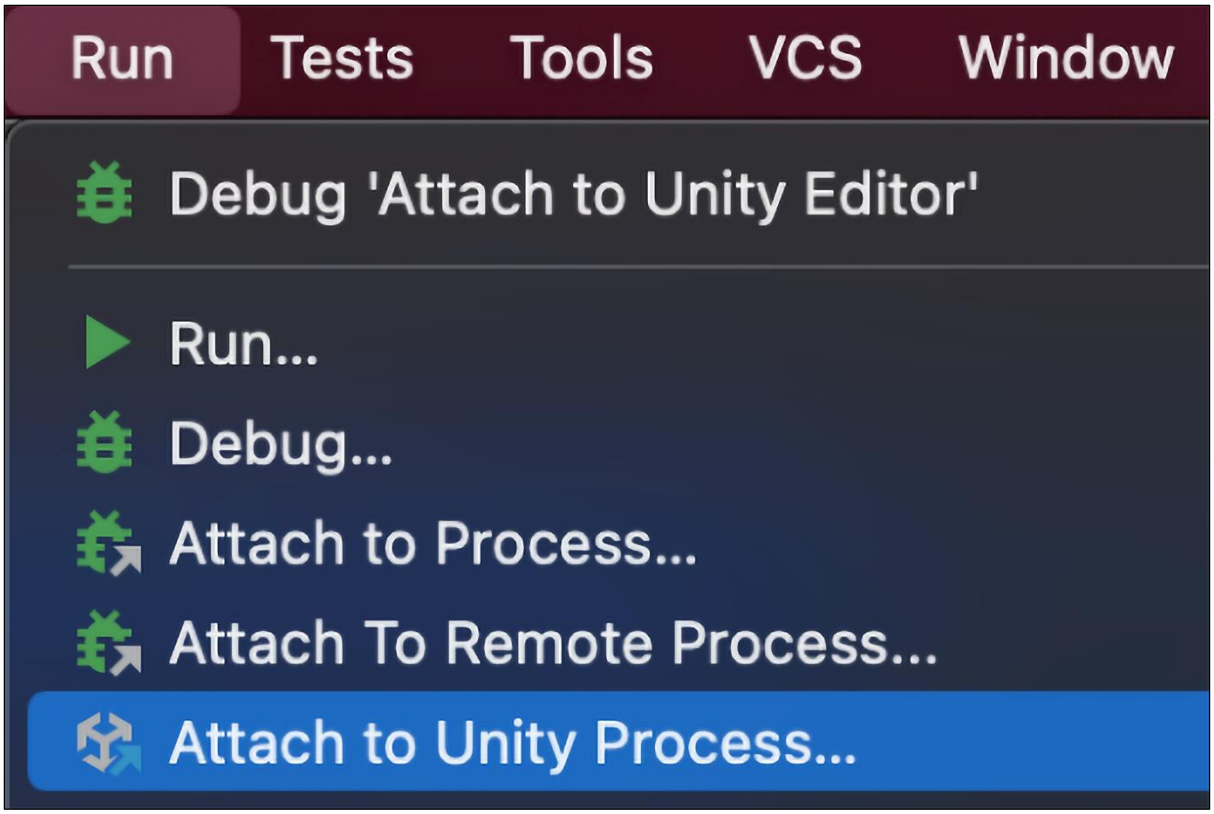
```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

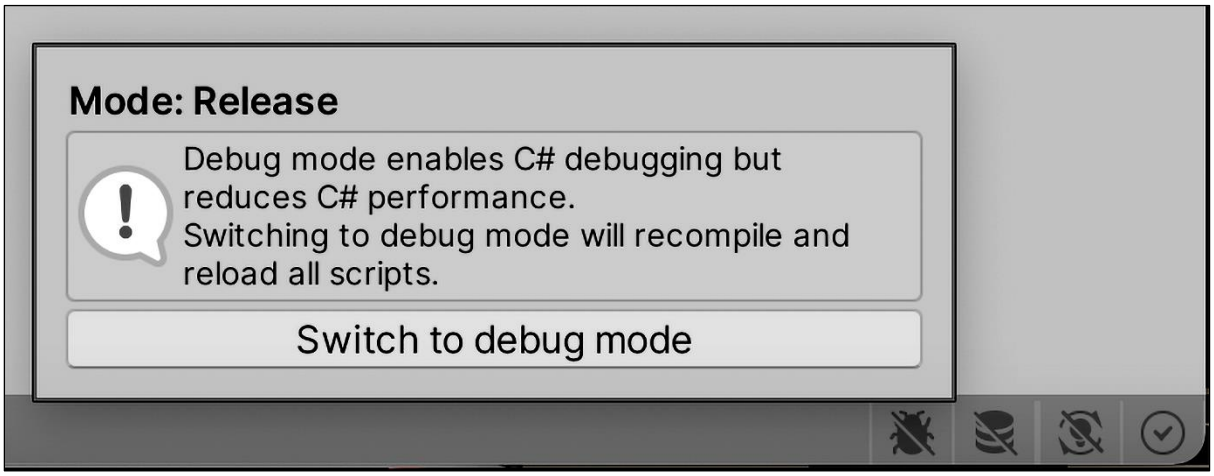
public class MyFirstScript : MonoBehaviour
{
    [SerializeField]
    private float speed;

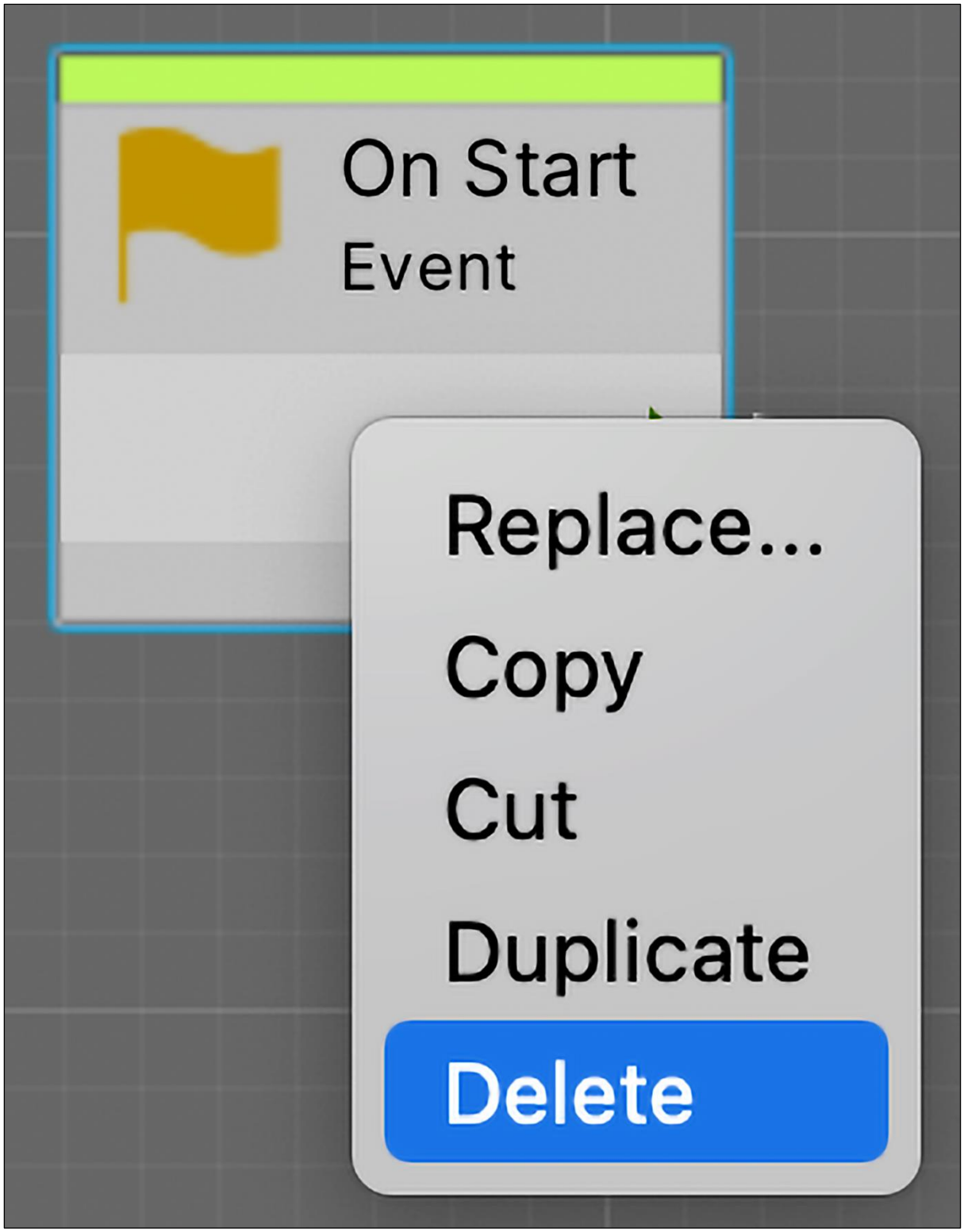
    void Start()
    {
        print("test Start");
    }

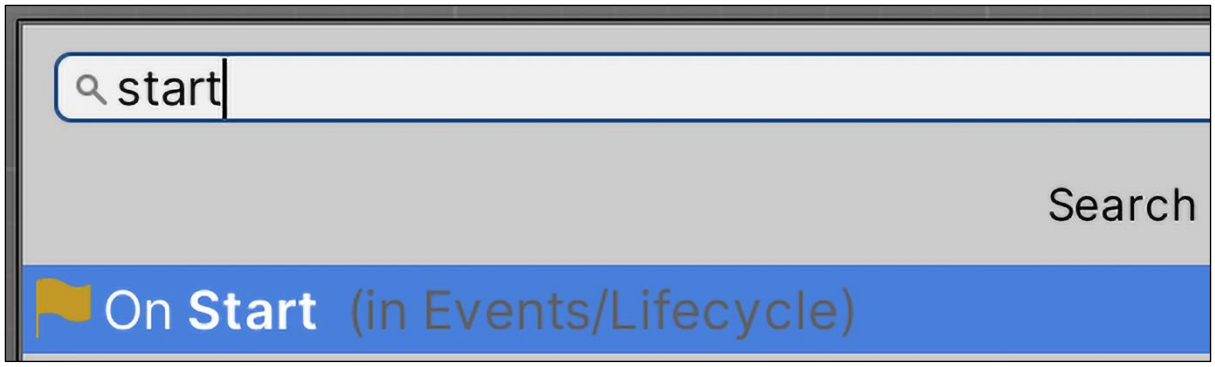
    void Update()
    {
        print("test");
    }
}
```

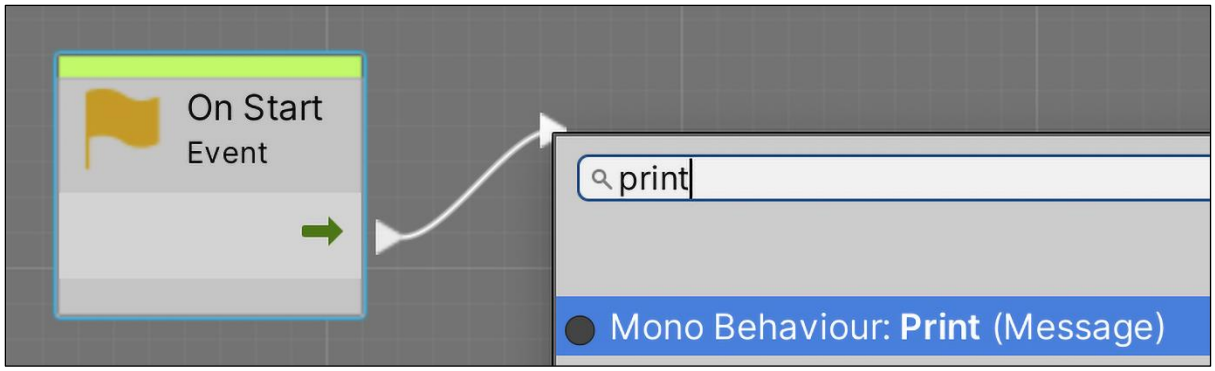
```
void Start()
{
    print( message: "test Start");
}
```

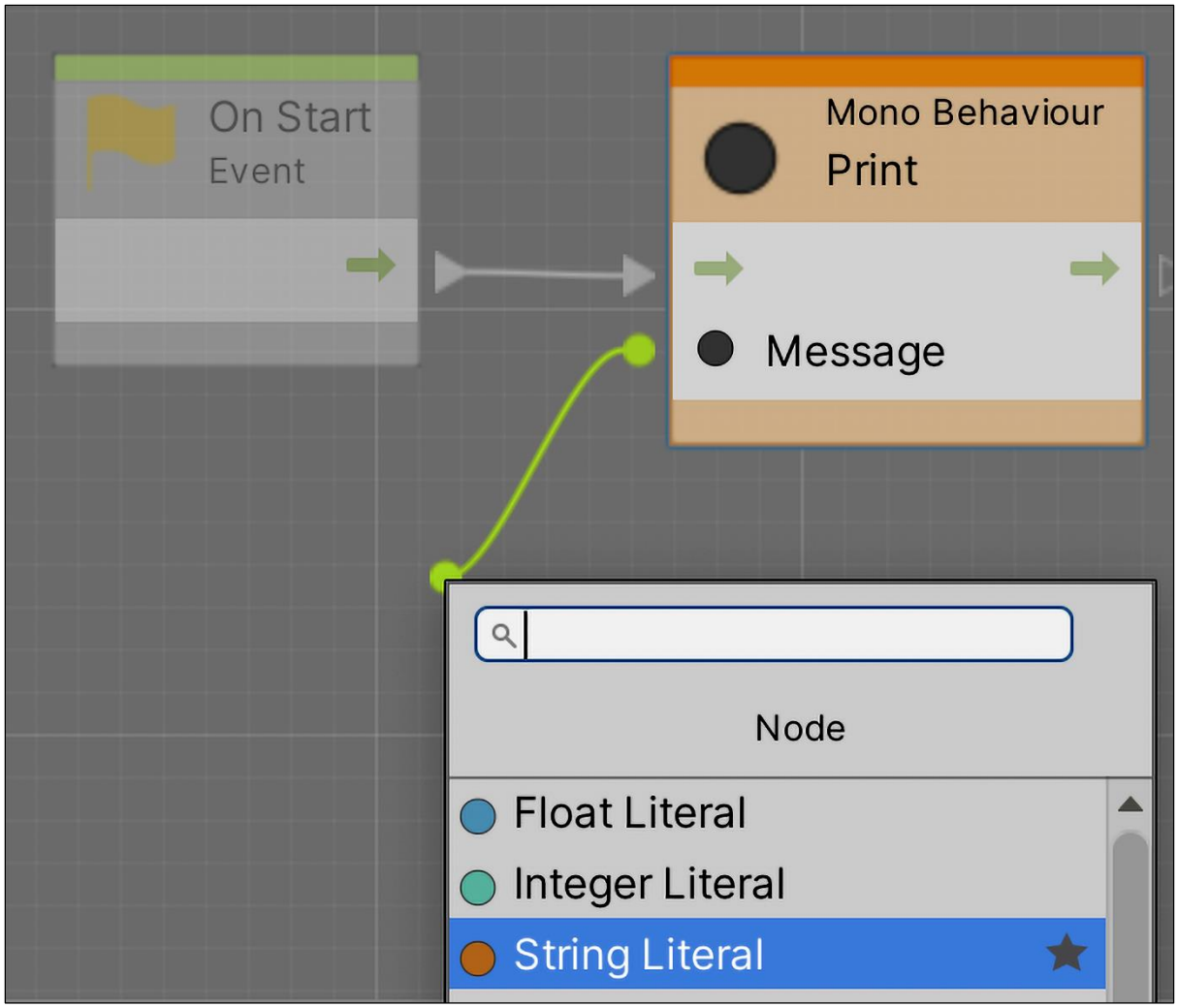


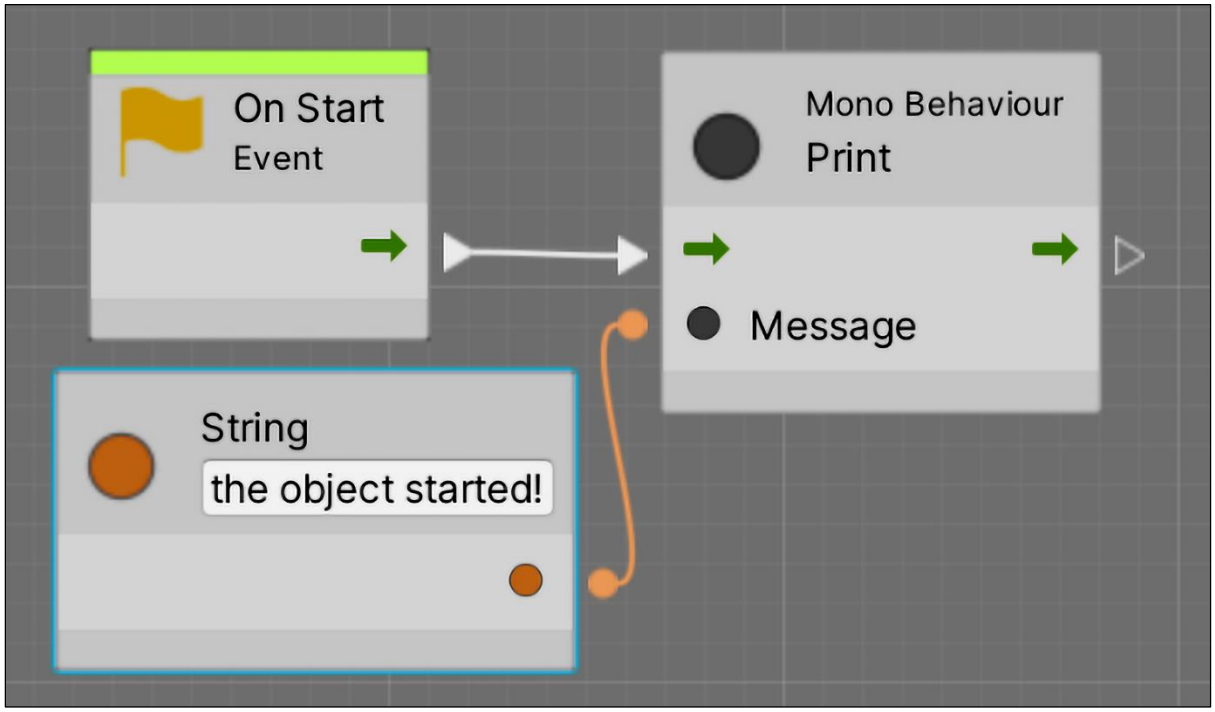



On Start
Event
Replace...
Copy
Cut
Duplicate
Delete


start
Search
On Start (in Events/Lifecycle)

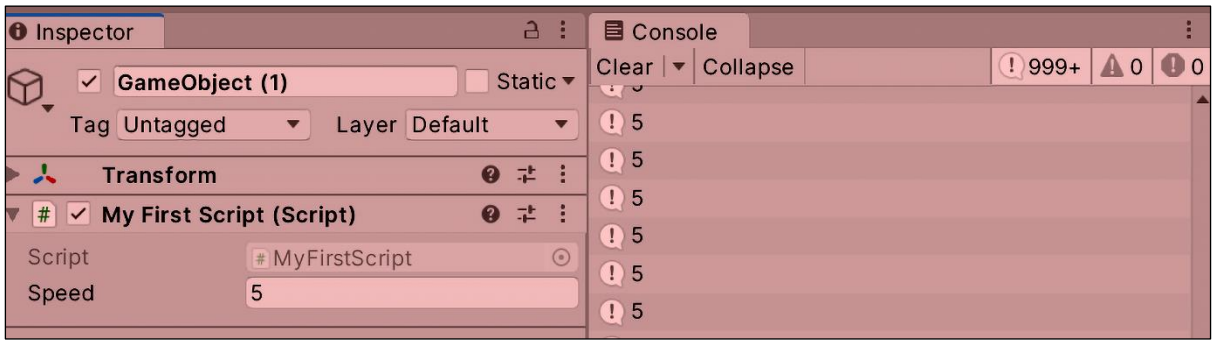

On Start
Event
print
Mono Behaviour: Print (Message)

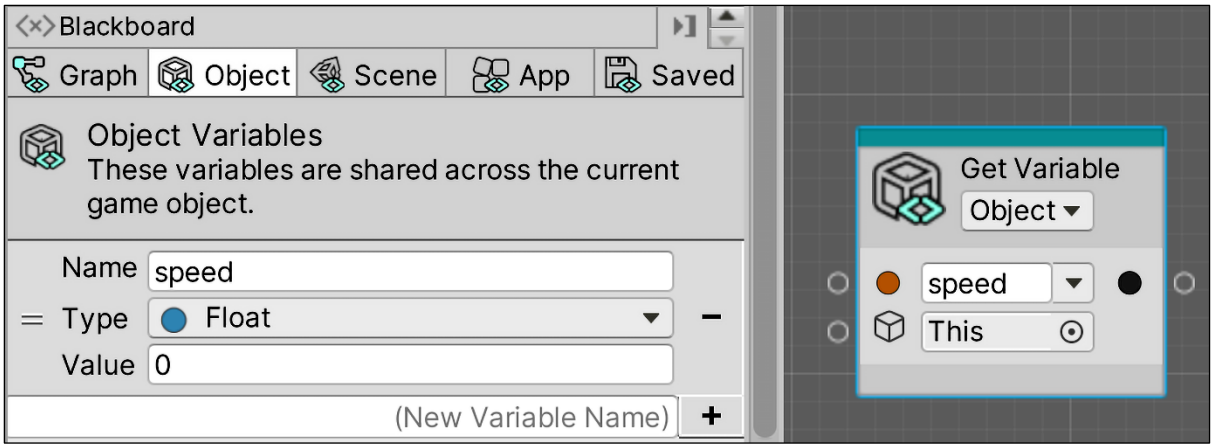

On Start
Event
Mono Behaviour
Print
Message
Node
Float Literal
Integer Literal
String Literal

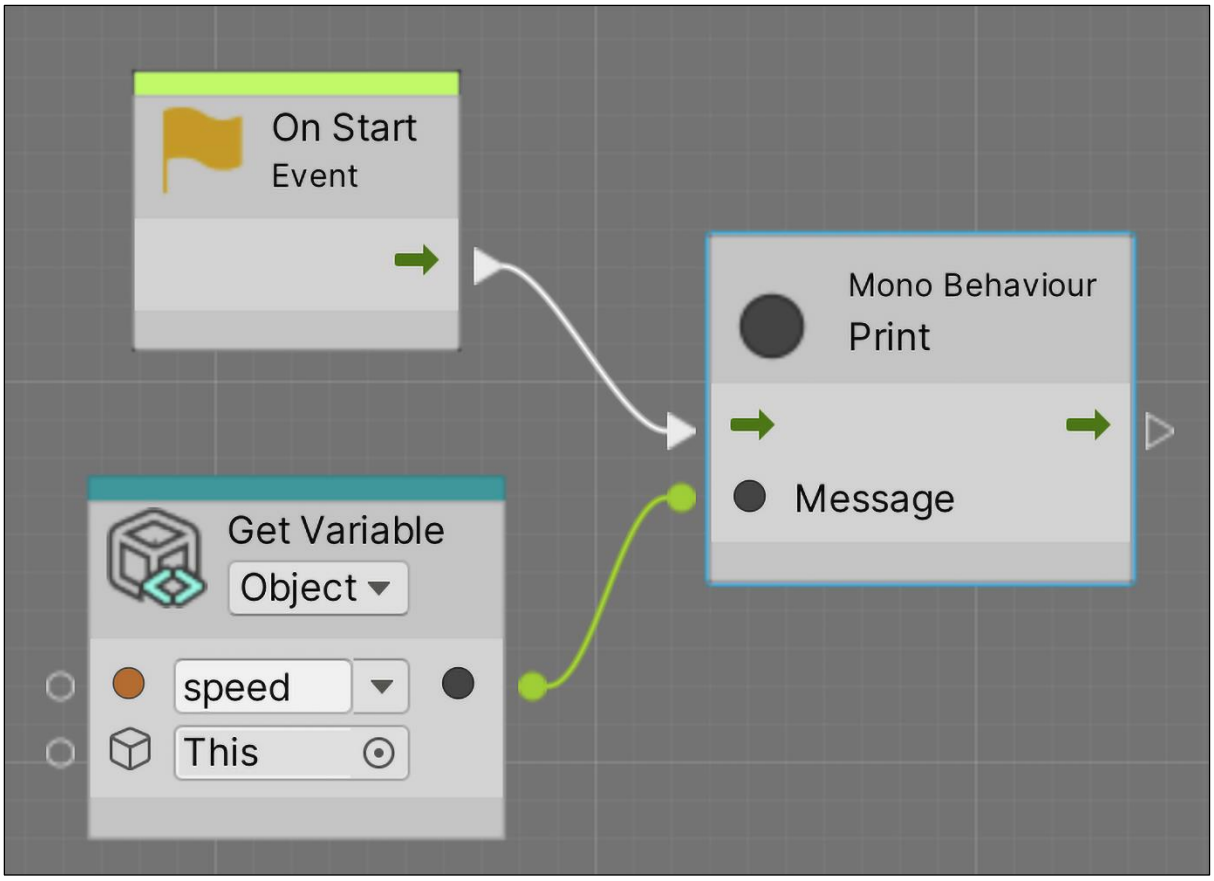

On Start
Event
Mono Behaviour
Print
Message
String
the object started!

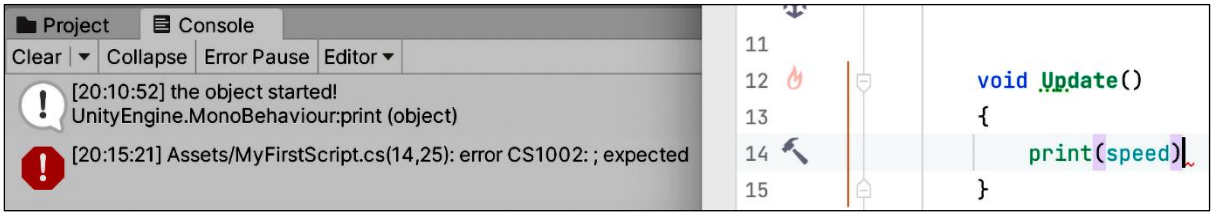
```
[SerializeField]
private float speed;

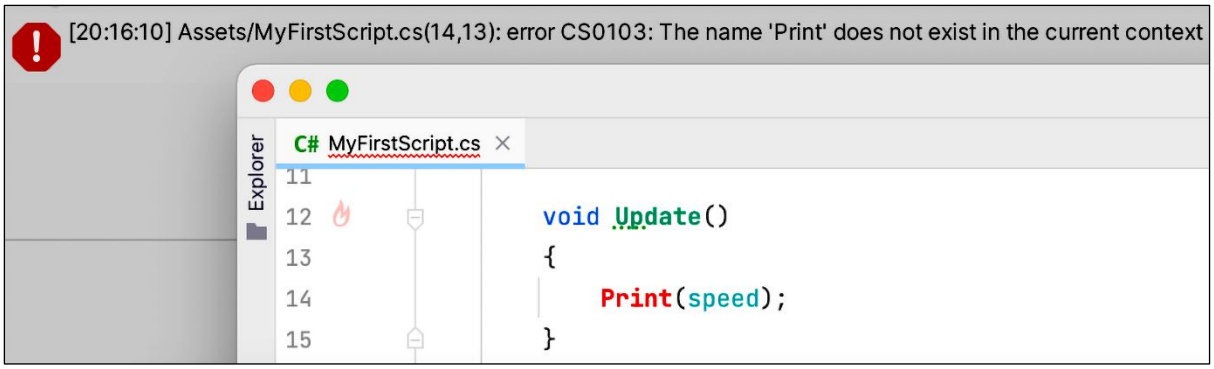

void Update()
{
    print(speed);
}
```

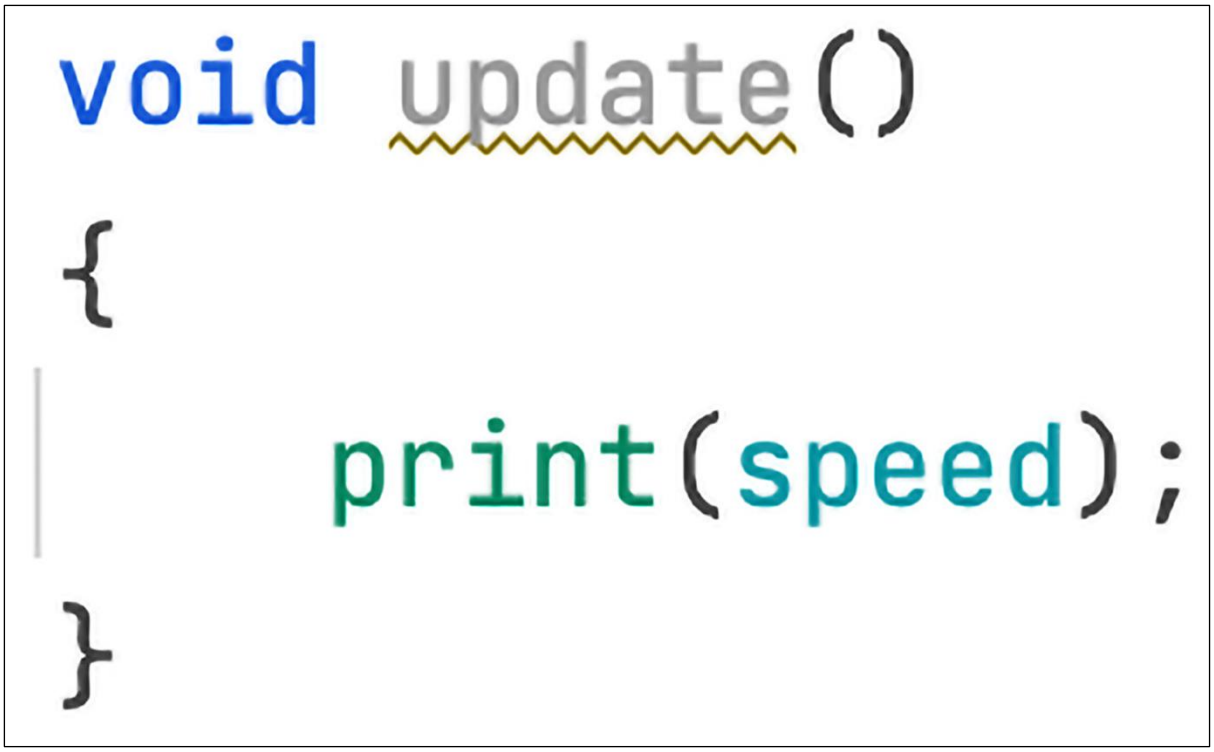


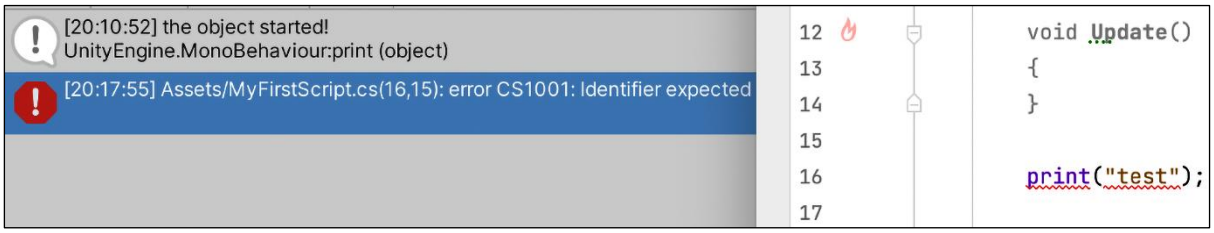

Blackboard
Graph
Object
Scene
App
Saved
Object Variables
These variables are shared across the current game object.
Name
speed
Type
Float
Value
0
(New Variable Name)
Get Variable
Object
speed
This

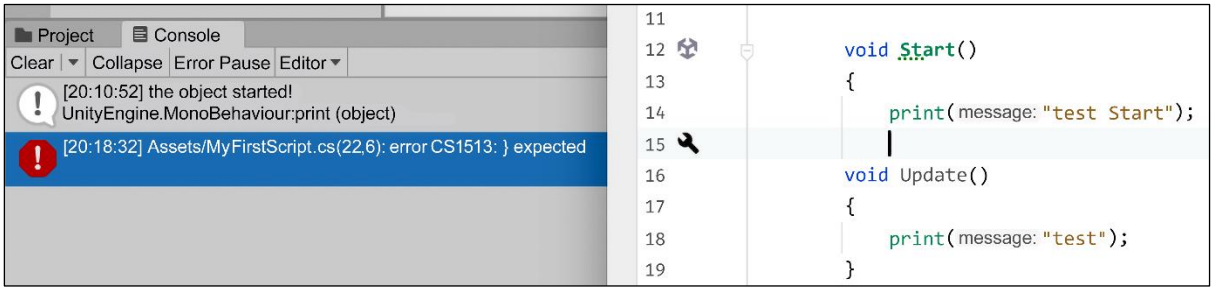

On Start
Event
Mono Behaviour
Print
Message
Get Variable
Object
speed
This


Project
Console
Clear
Collapse
Error Pause
Editor
[20:10:52] the object started!
UnityEngine.MonoBehaviour:print (object)
[20:15:21] Assets/MyFirstScript.cs(14,25): error CS1002: ; expected
11
12
13
14
15
void Update()
{
print(speed)
}

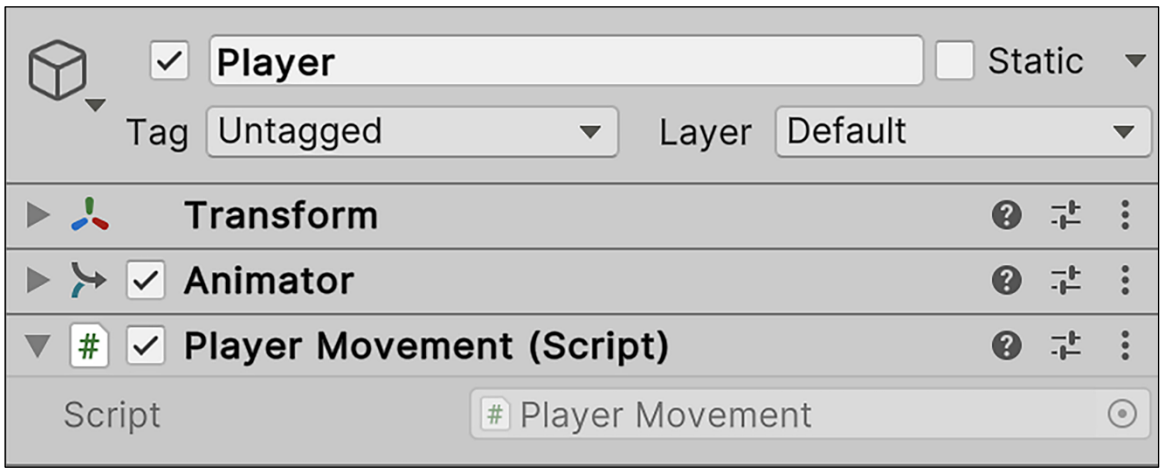

[20:16:10] Assets/MyFirstScript.cs(14,13): error CS0103: The name 'Print' does not exist in the current context
Explorer
C# MyFirstScript.cs
11
12 void Update()
13 {
14 Print(speed);
15 }


void update()
{
print(speed);
}


[20:10:52] the object started!
UnityEngine.MonoBehaviour:print (object)
[20:17:55] Assets/MyFirstScript.cs(16,15): error CS1001: Identifier expected
12 void Update()
13 {
14 }
15
16 print("test");
17


Project
Console
Clear
Collapse
Error Pause
Editor
[20:10:52] the object started!
UnityEngine.MonoBehaviour:print (object)
[20:18:32] Assets/MyFirstScript.cs(22,6): error CS1513: } expected
11
12 void Start()
13 {
14 print(message: "test Start");
15
16 void Update()
17 {
18 print(message: "test");
19 }

Chapter 6: Dynamic Motion: Implementing Object Movement and Spawning




```
using UnityEngine;


public class PlayerMovement : MonoBehaviour
{
    void Update()
    {

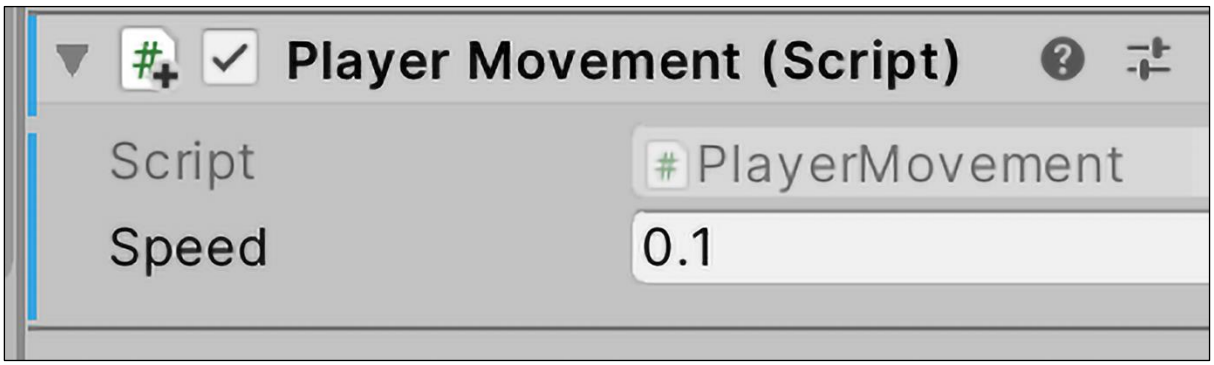
    }
}
```

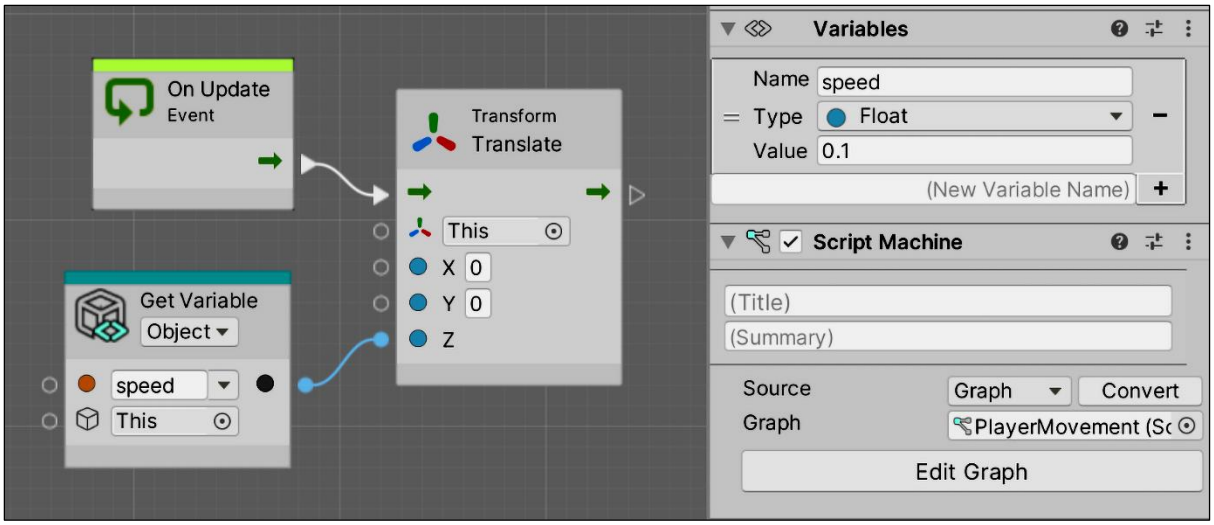
```
using UnityEngine;

public class PlayerMovement : MonoBehaviour
{
    void Update()
    {
        transform.Translate(0, 0, 1);
    }
}
```

```
public float speed;

void Update()
{
    transform.Translate(0, 0, speed);
}
```

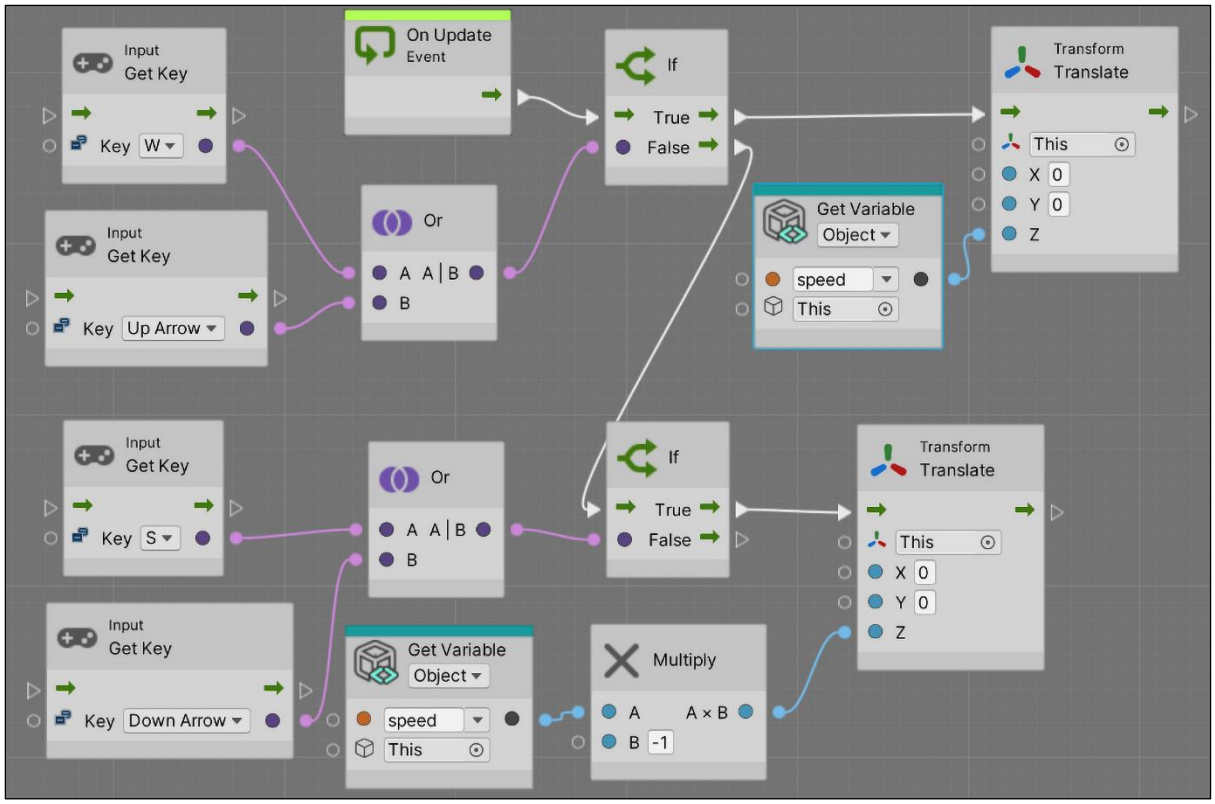


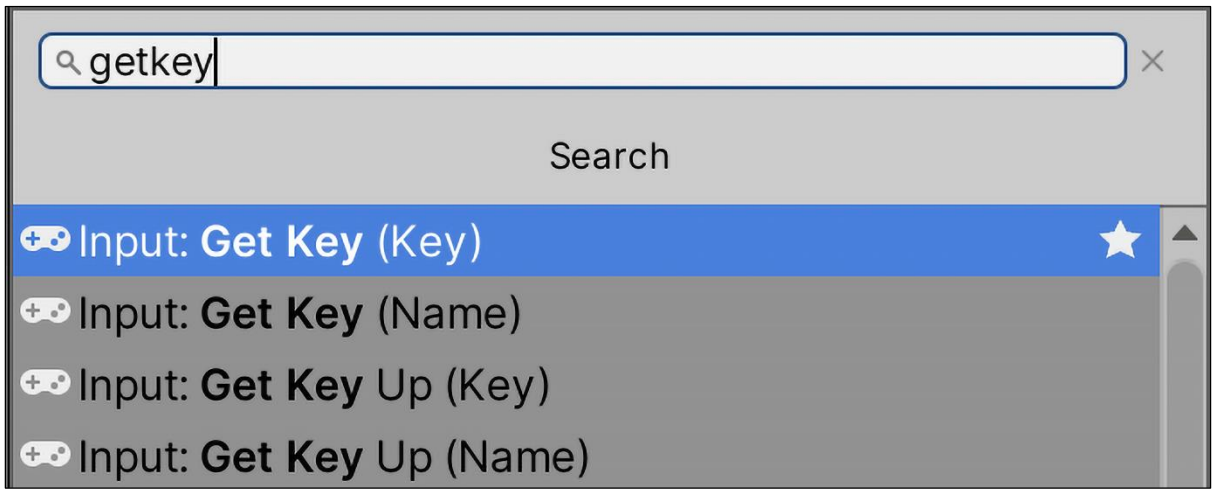


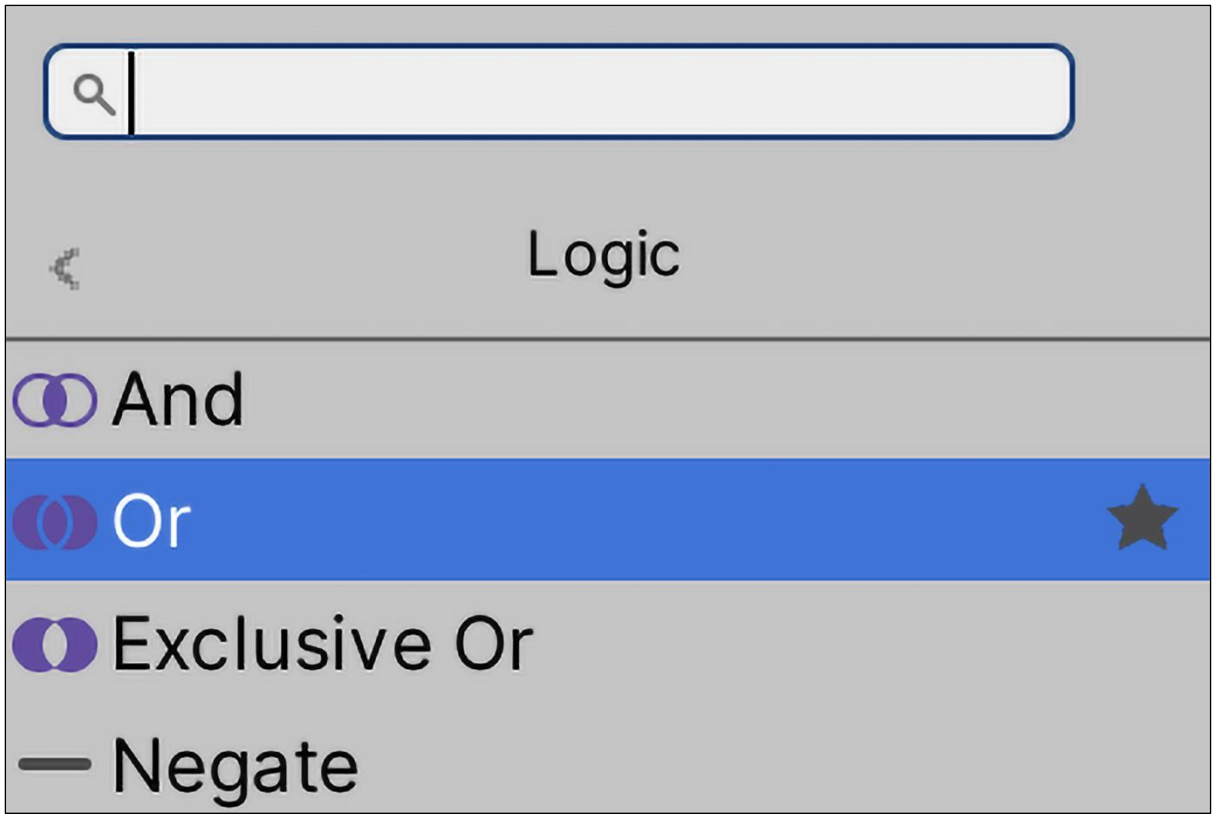

```
void Update()
{
    if (Input.GetKey(KeyCode.W))
    {
        transform.Translate(0, 0, speed);
    }
}
```

```
if (Input.GetKey(KeyCode.W)) { transform.Translate(0, 0, speed); }
if (Input.GetKey(KeyCode.S)) { transform.Translate(0, 0, -speed); }
if (Input.GetKey(KeyCode.A)) { transform.Translate(-speed, 0, 0); }
if (Input.GetKey(KeyCode.D)) { transform.Translate(speed, 0, 0); }
```

```
if (Input.GetKey(KeyCode.W) || Input.GetKey(KeyCode.UpArrow)) { transform.Tra
if (Input.GetKey(KeyCode.S) || Input.GetKey(KeyCode.DownArrow)) { transform.T
if (Input.GetKey(KeyCode.A) || Input.GetKey(KeyCode.LeftArrow)) { transform.T
if (Input.GetKey(KeyCode.D) || Input.GetKey(KeyCode.RightArrow)) { transform.
```


Input
Get Key
Key W
On Update
Event
If
True
False
Transform
Translate
This
X 0
Y 0
Z
Input
Get Key
Key Up Arrow
Or
A A | B
B
Get Variable
Object
speed
This
Input
Get Key
Key S
Or
A A | B
B
If
True
False
Transform
Translate
This
X 0
Y 0
Z
Input
Get Key
Key Down Arrow
Get Variable
Object
speed
This
Multiply
A
A × B
B -1


getkey
Search
Input: Get Key (Key)
Input: Get Key (Name)
Input: Get Key Up (Key)
Input: Get Key Up (Name)

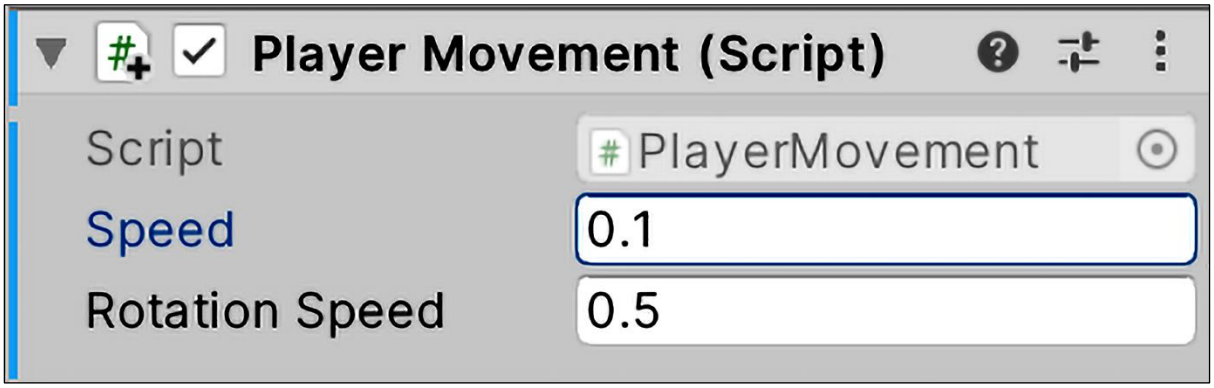


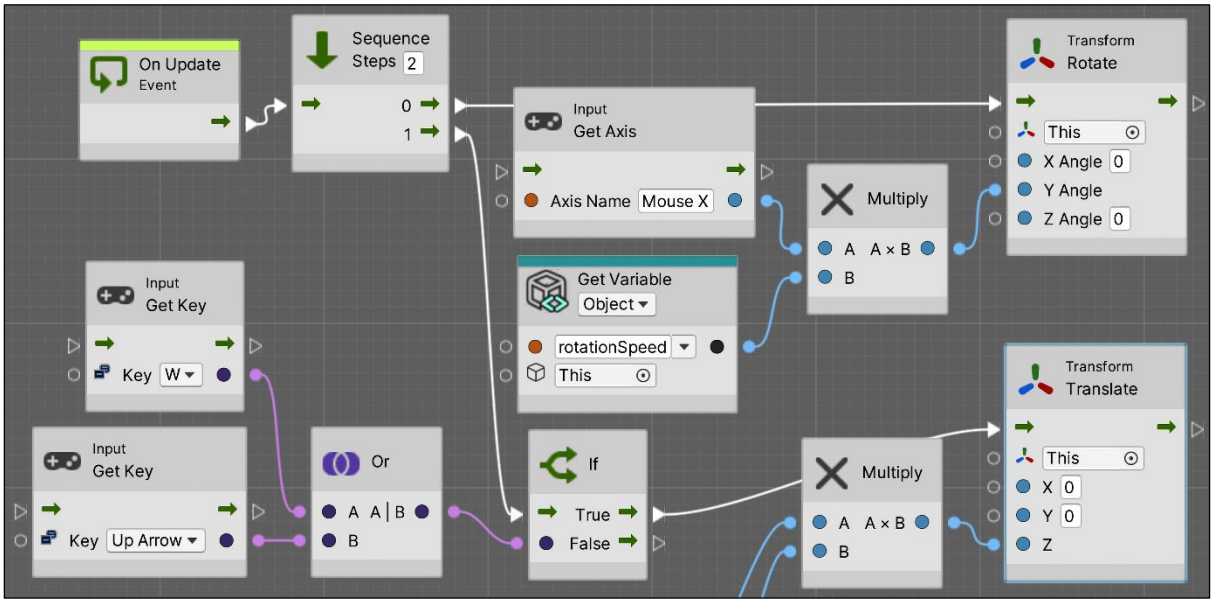

```
float mouseX = Input.GetAxis("Mouse X");
```

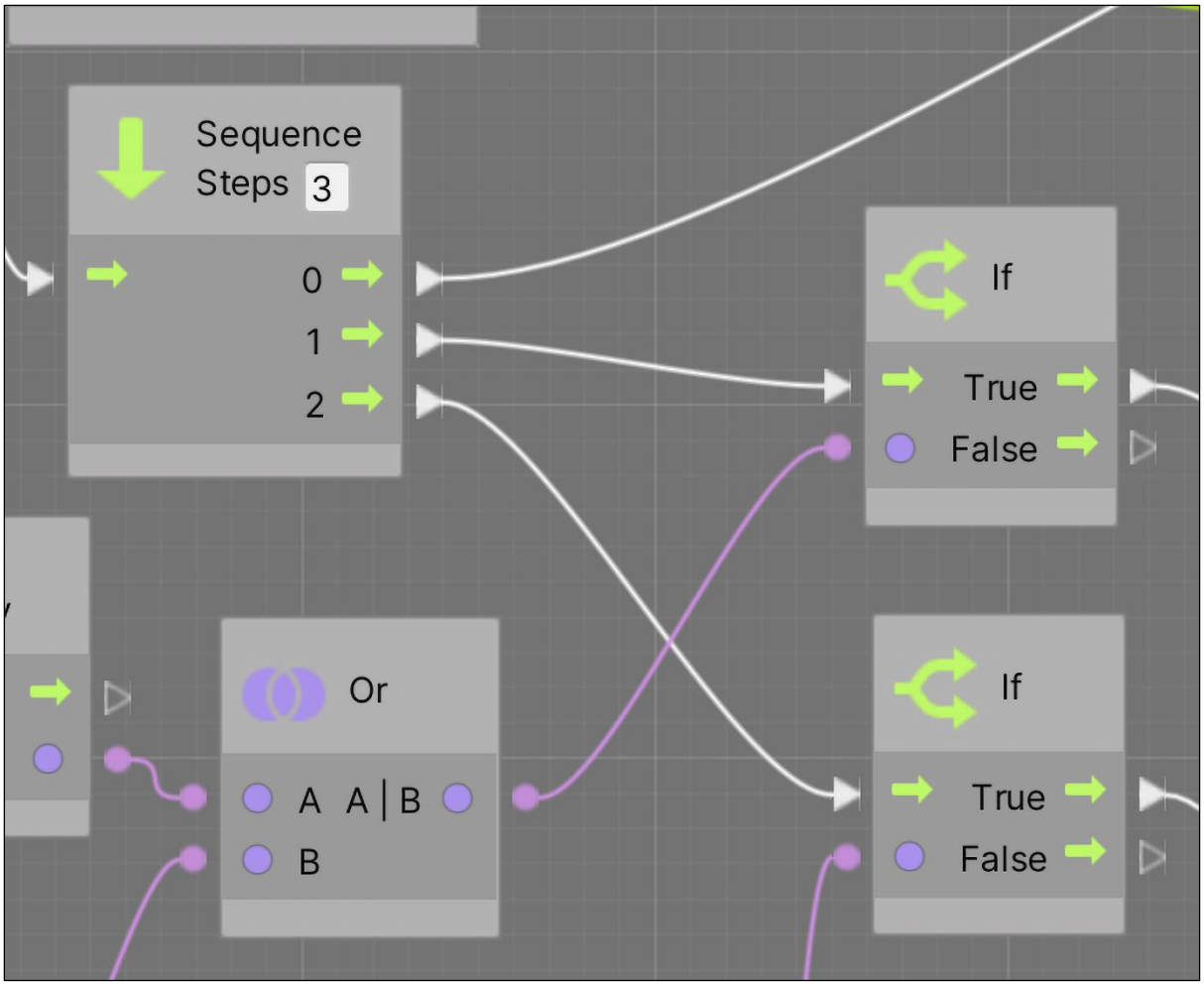
```
float mouseX = Input.GetAxis("Mouse X");
transform.Rotate(0, mouseX, 0);
```

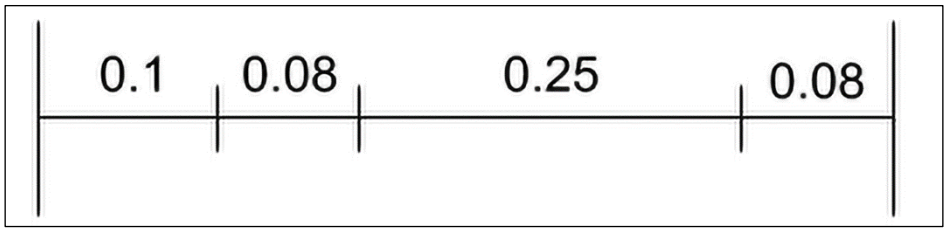
```
public float speed;
public float rotationSpeed;
```

```
float mouseX = Input.GetAxis("Mouse X");
transform.Rotate(0, mouseX * rotationSpeed, 0);
```


Player Movement (Script)
Script
PlayerMovement
Speed
0.1
Rotation Speed
0.5


On Update
Event
Sequence
Steps 2
0
1
Input
Get Axis
Axis Name Mouse X
Transform
Rotate
This
X Angle 0
Y Angle
Z Angle 0
Multiply
A A × B
B
Get Variable
Object
rotationSpeed
This
Input
Get Key
Key W
Input
Get Key
Key Up Arrow
Or
A A | B
B
If
True
False
Multiply
A A × B
B
Transform
Translate
This
X 0
Y 0
Z


Sequence
Steps 3
0
1
2
If
True
False
Or
A
A | B
B
If
True
False


0.1
0.08
0.25
0.08

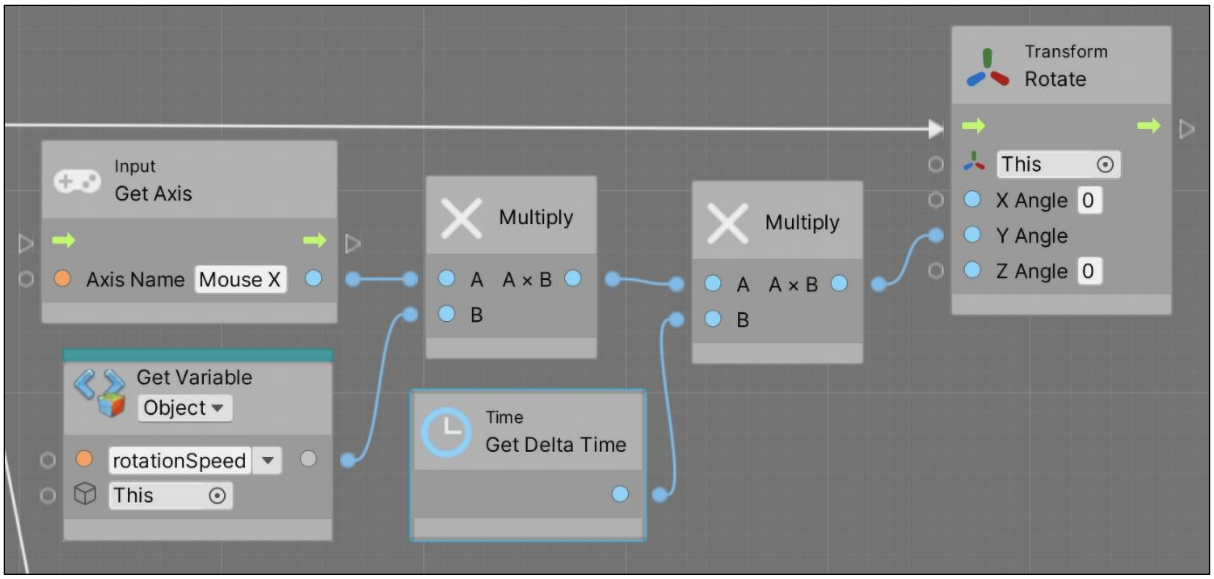
```
if (Input.GetKey(KeyCode.W) || Input.GetKey(KeyCode.UpArrow))
{ transform.Translate(0, 0, speed * Time.deltaTime); }

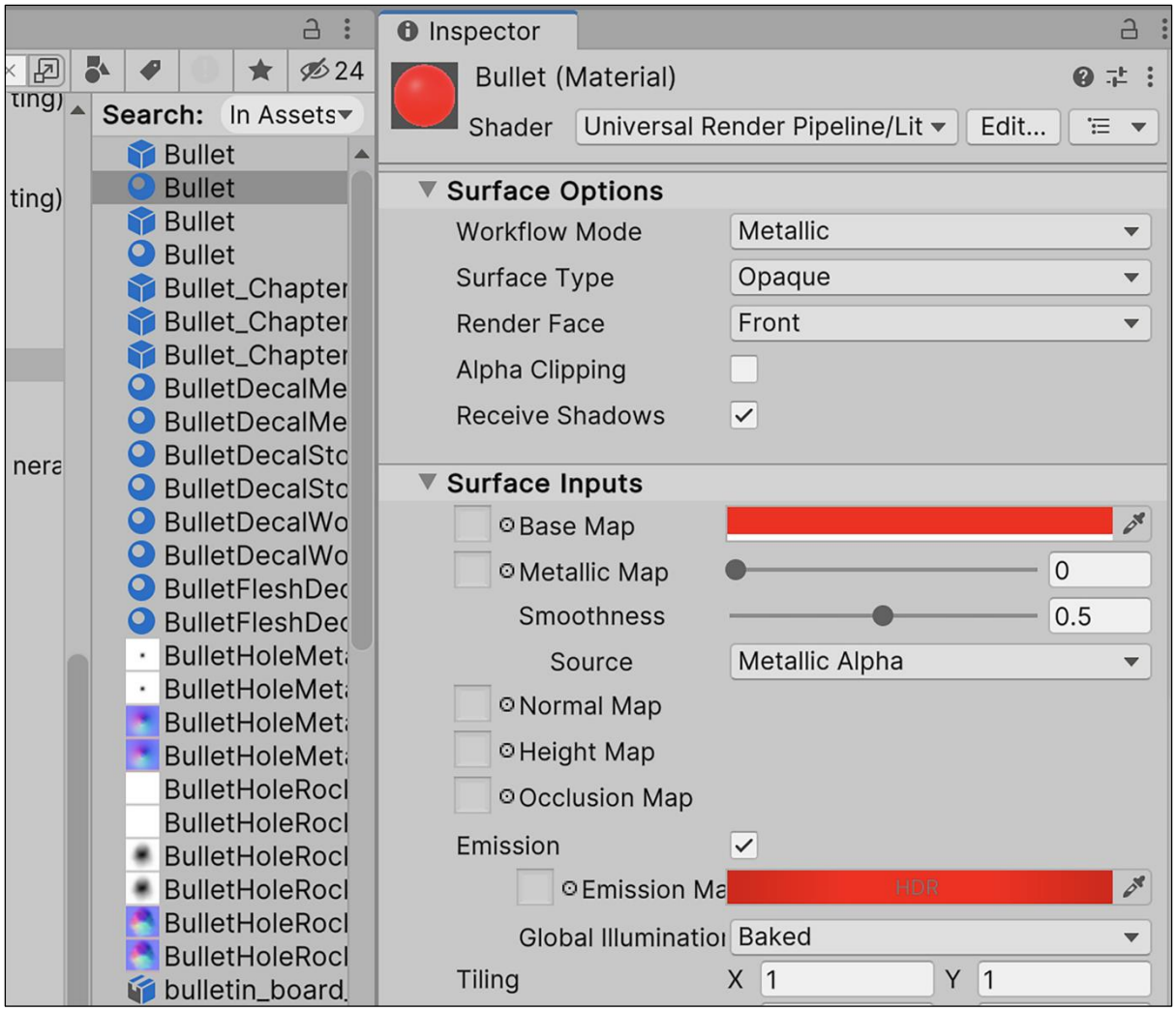
if (Input.GetKey(KeyCode.S) || Input.GetKey(KeyCode.DownArrow))
{ transform.Translate(0, 0, -speed * Time.deltaTime); }

if (Input.GetKey(KeyCode.A) || Input.GetKey(KeyCode.LeftArrow))
{ transform.Translate(-speed * Time.deltaTime, 0, 0); }

if (Input.GetKey(KeyCode.D) || Input.GetKey(KeyCode.RightArrow))
{ transform.Translate(speed * Time.deltaTime, 0, 0); }
```

```
float mouseX = Input.GetAxis("Mouse X");
transform.Rotate(0, mouseX * rotationSpeed * Time.deltaTime, 0);
```

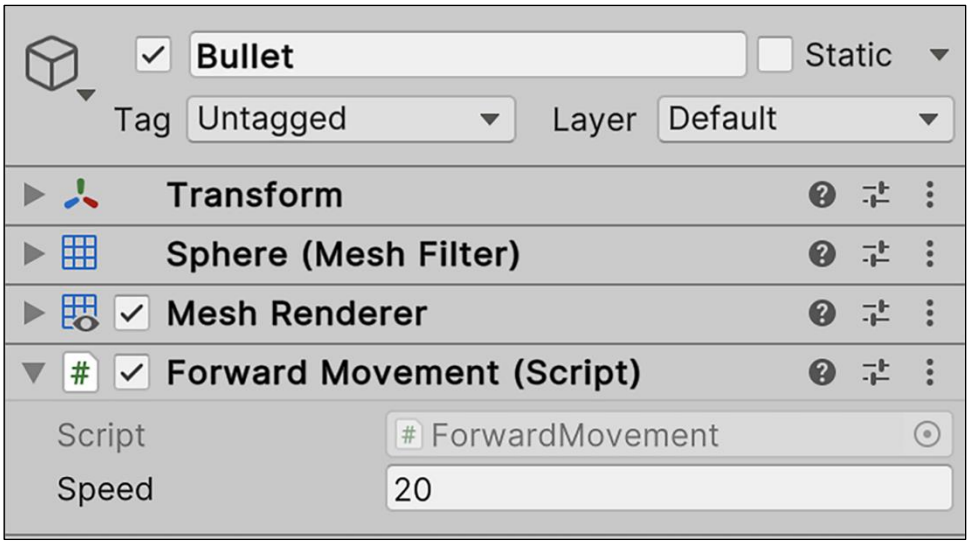


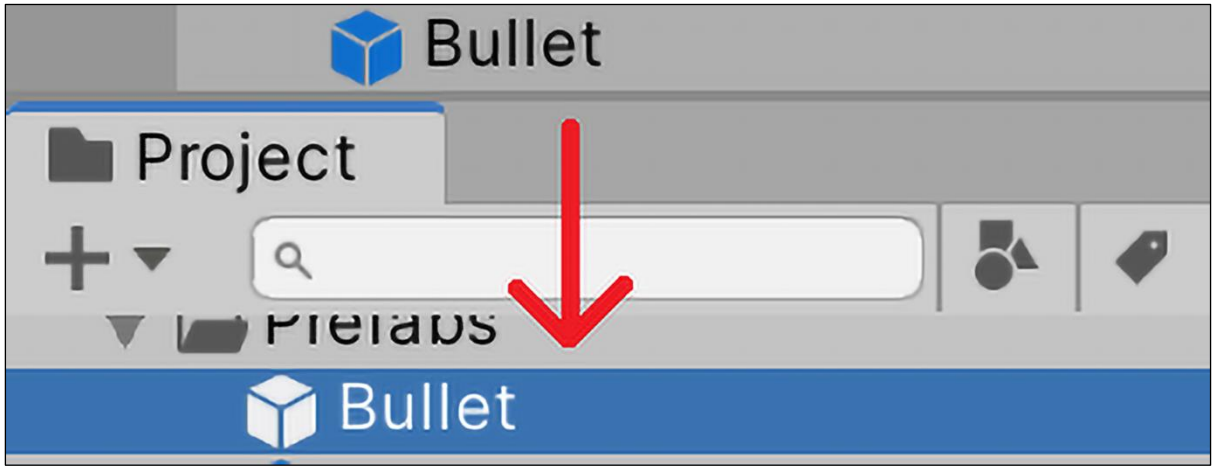



```
using UnityEngine;

public class ForwardMovement : MonoBehaviour
{
    public float speed;

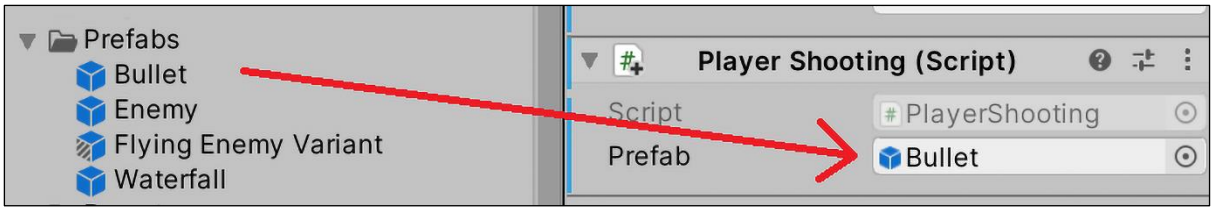
    void Update()
    {
        transform.Translate(0, 0, speed * Time.deltaTime);
    }
}
```






```
using UnityEngine;


public class PlayerShooting : MonoBehaviour
{
    public GameObject prefab;
}
```

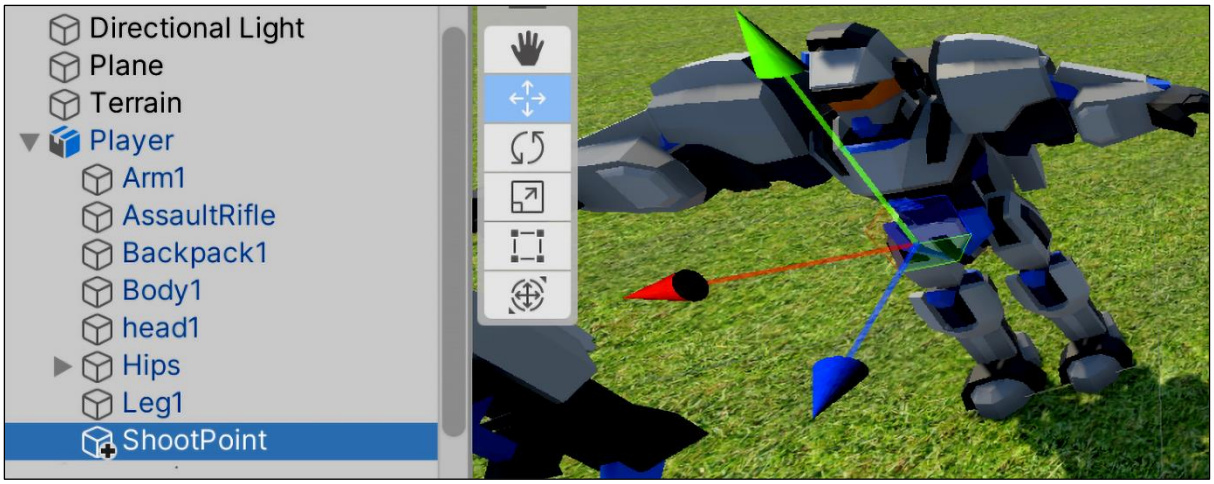



```
void Update()
{
    if (Input.GetKeyDown(KeyCode.Mouse0)) { }
}
```

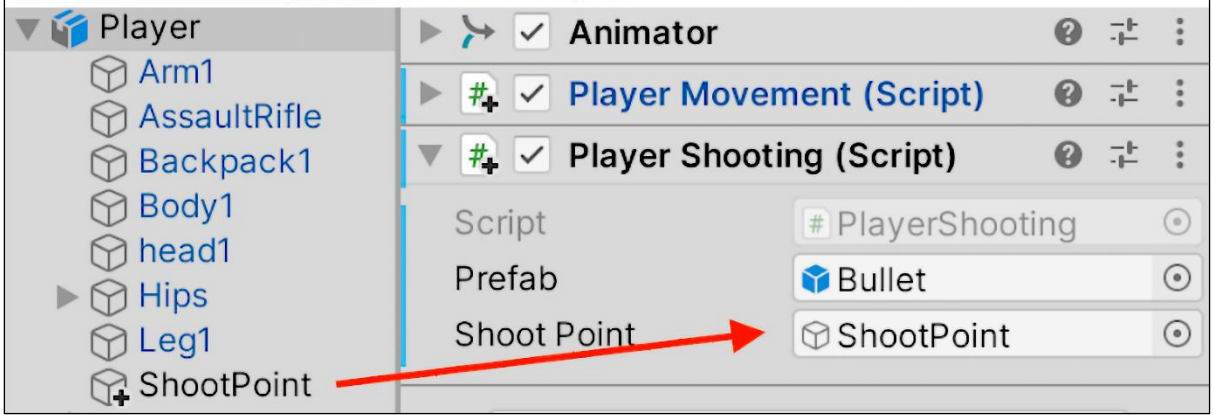
```
if (Input.GetKeyDown(KeyCode.Mouse0))
{
    Instantiate(prefab);
}
```

```
Instantiate(prefab, transform.position, transform.rotation);
```

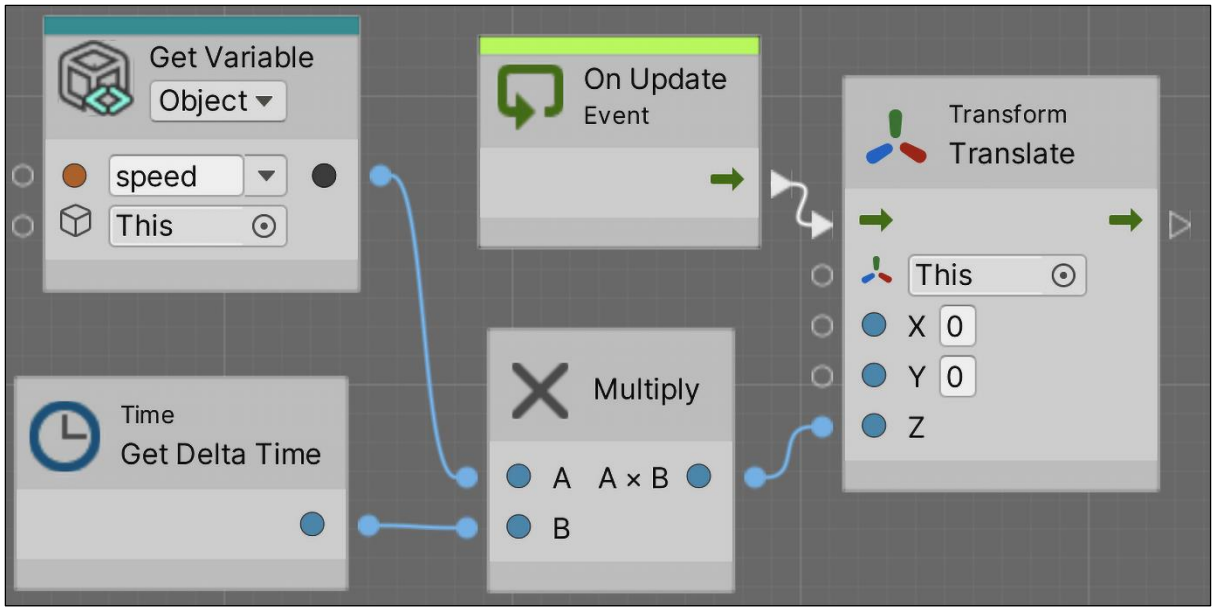
```
GameObject clone = Instantiate(prefab);
clone.transform.position = transform.position;
clone.transform.rotation = transform.rotation;
```

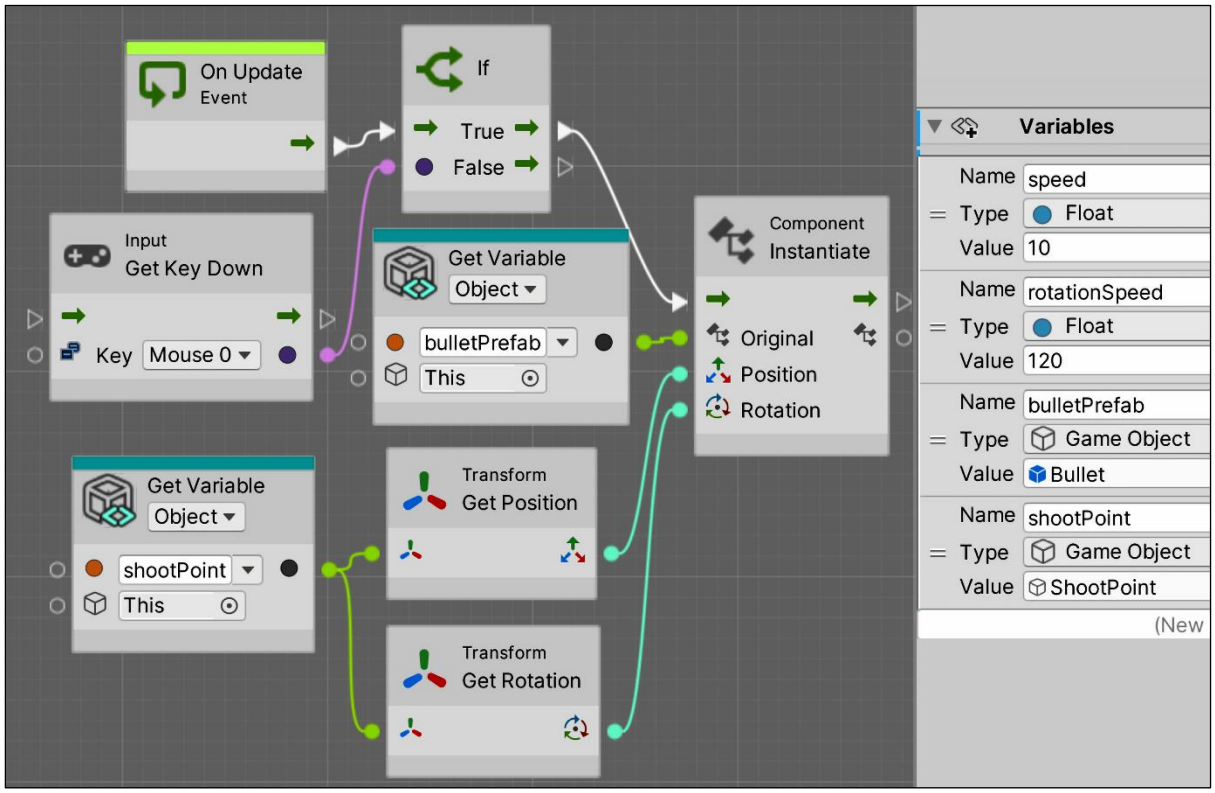



```
public GameObject prefab;
public GameObject shootPoint;
```

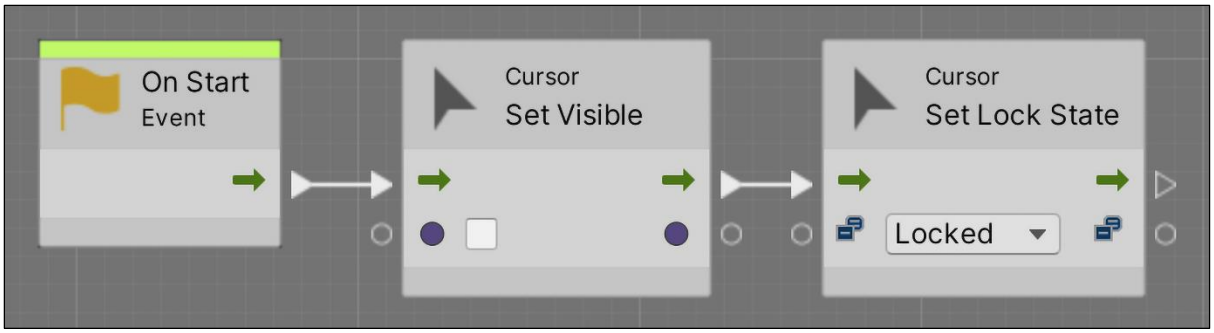



```
clone.transform.position = shootPoint.transform.position;
clone.transform.rotation = shootPoint.transform.rotation;
```


Get Variable
Object
speed
This
On Update
Event
Transform
Translate
This
X 0
Y 0
Z
Time
Get Delta Time
Multiply
A
A × B
B


On Update
Event
If
True
False
Input
Get Key Down
Key Mouse 0
Get Variable
Object
bulletPrefab
This
Component
Instantiate
Original
Position
Rotation
Get Variable
Object
shootPoint
This
Transform
Get Position
Transform
Get Rotation
Variables
Name speed
Type Float
Value 10
Name rotationSpeed
Type Float
Value 120
Name bulletPrefab
Type Game Object
Value Bullet
Name shootPoint
Type Game Object
Value ShootPoint
(New

```
void Start()
{
    Cursor.visible = false;
    Cursor.lockState = CursorLockMode.Locked;
}
```



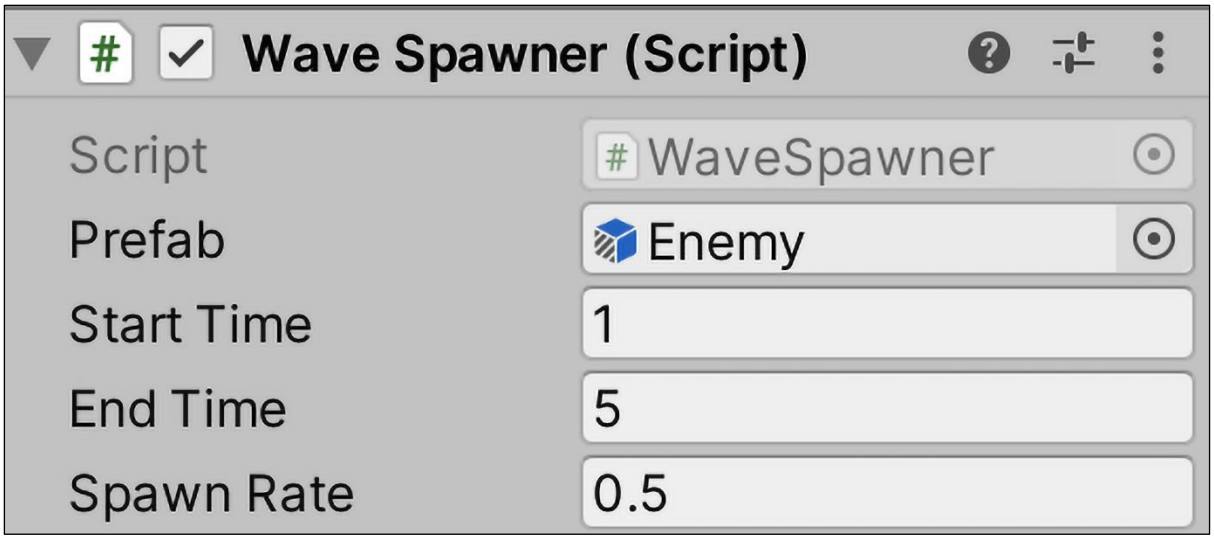

```
public GameObject prefab;
public float startTime;
public float endTime;
public float spawnRate;
```

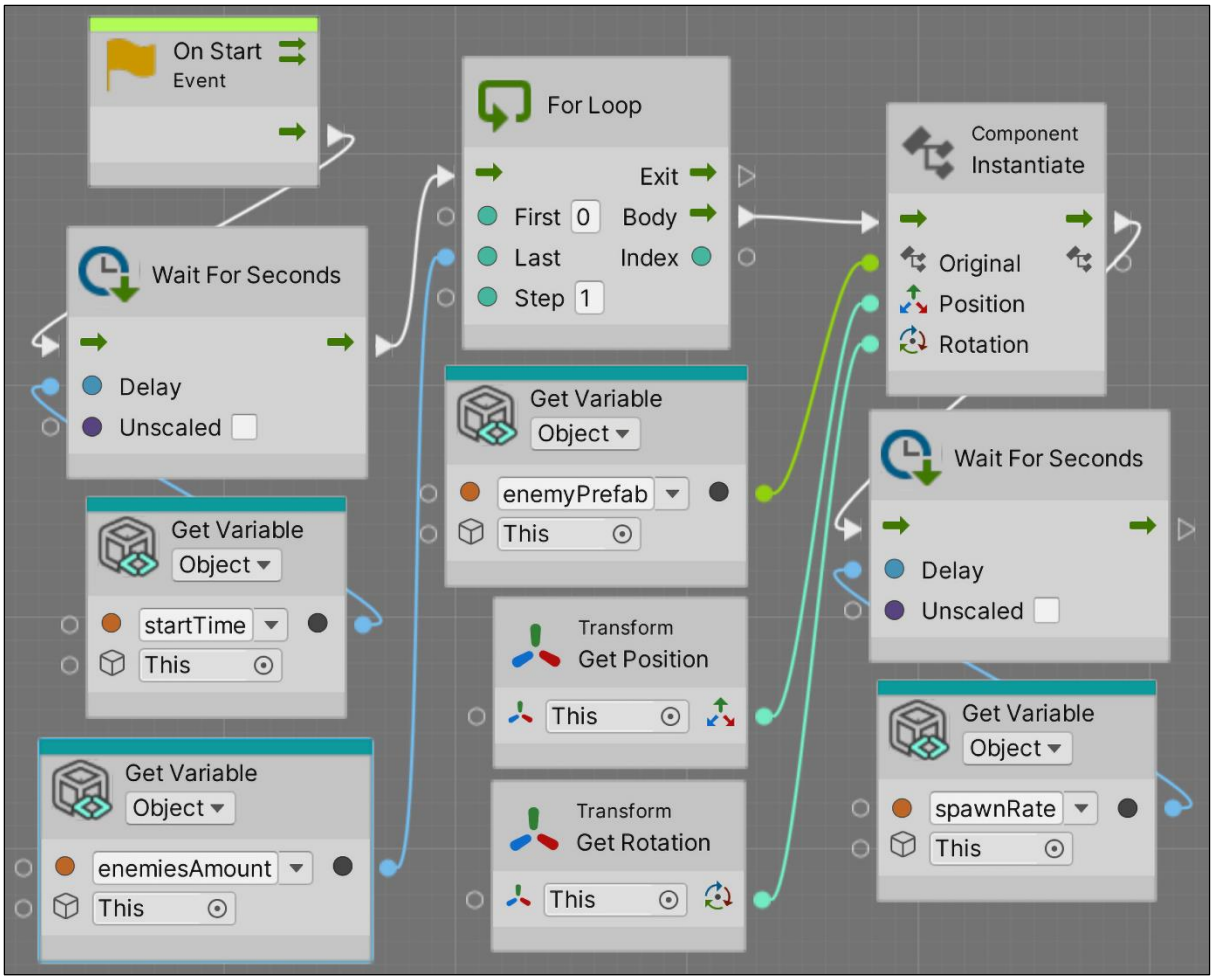
```
void Start()
{
    InvokeRepeating("Spawn", startTime, spawnRate);
}

void Spawn() { }
```

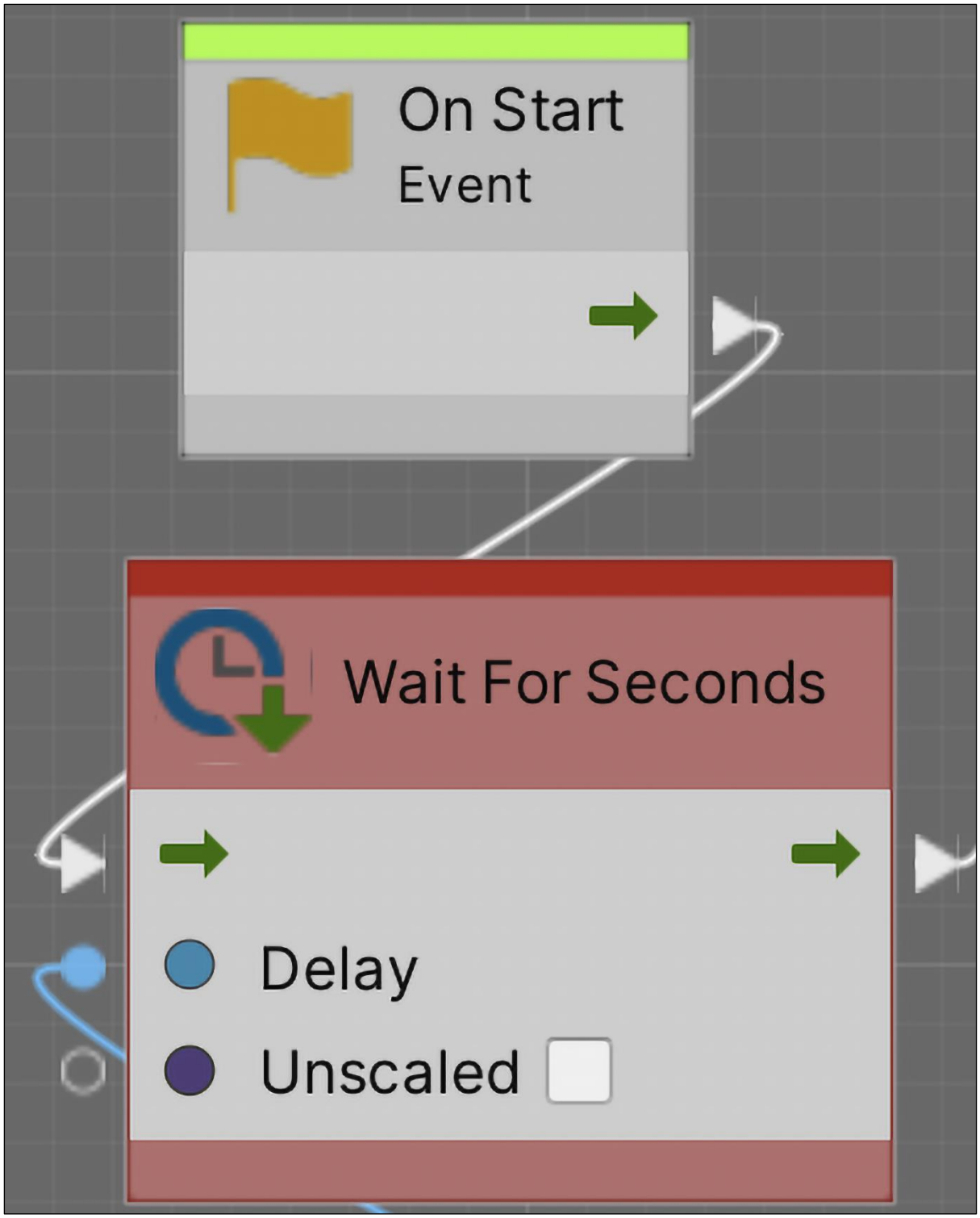
```
void Spawn()
{
    Instantiate(prefab, transform.position, transform.rotation);
}
```

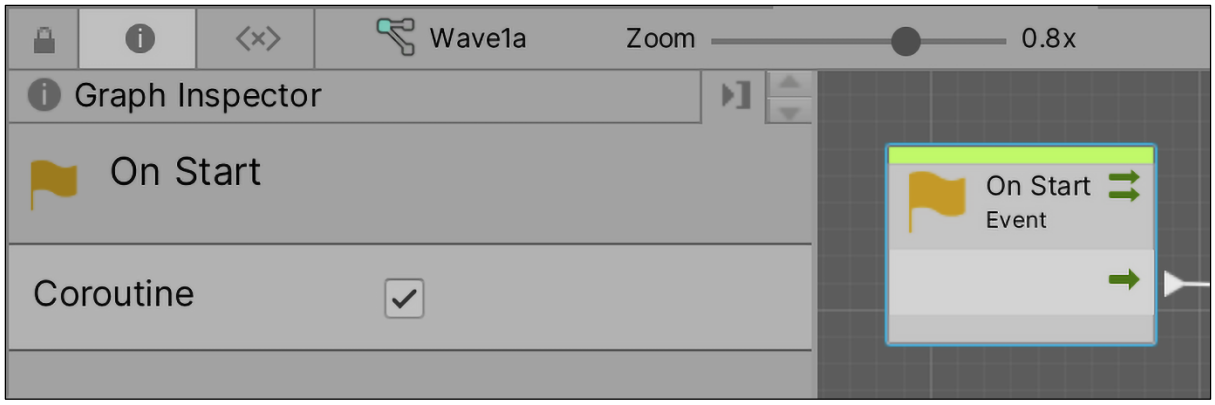
```
InvokeRepeating("Spawn", startTime, spawnRate);
Invoke("CancelInvoke", endTime);
```





[20:23:45] InvalidOperationException: Port 'enter' on 'WaitForSecondsUnit#ed5f4...' can only be triggered in a coroutine.
Unity.VisualScripting.Flow.InvokeDelegate (Unity.VisualScripting.ControlInput input) (at Library/PackageCache/com.unity

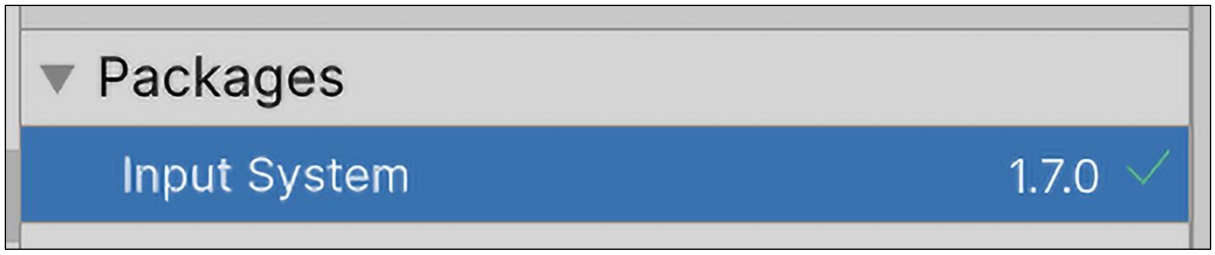

On Start
Event
Wait For Seconds
Delay
Unscaled

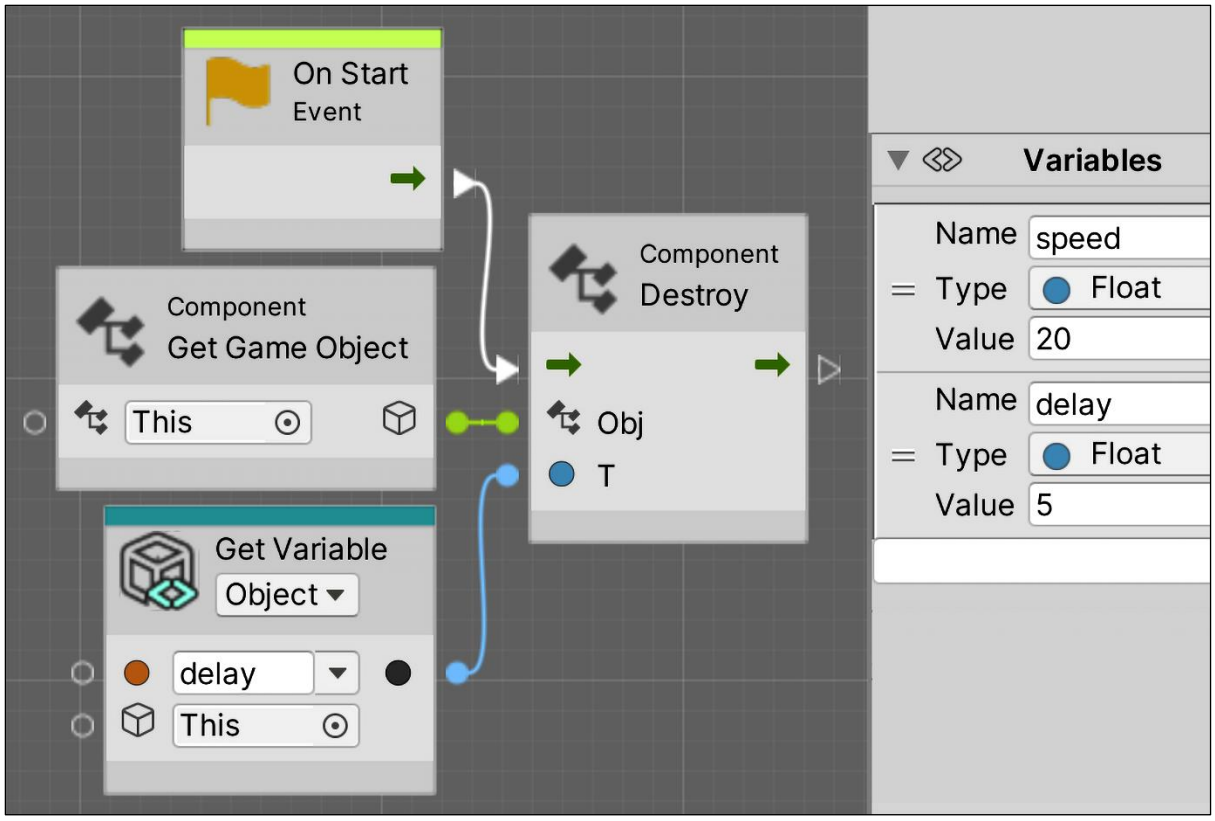


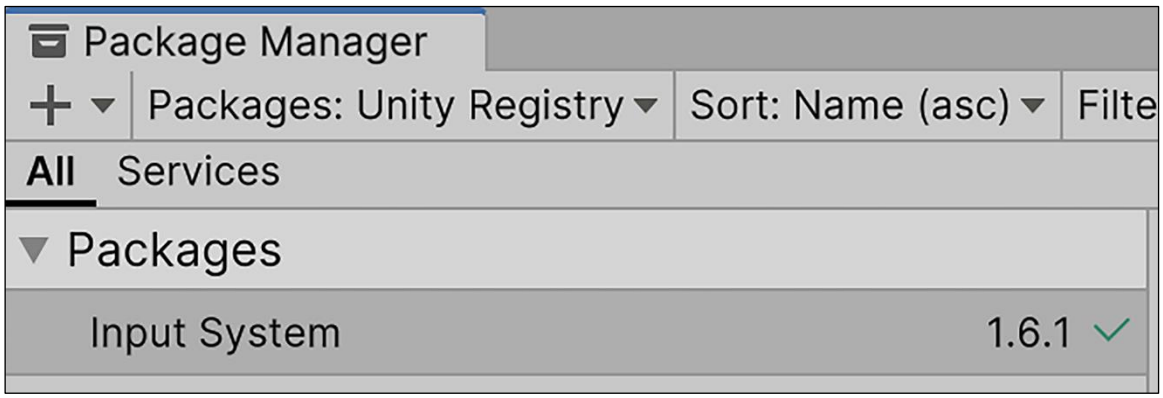

```
void Start()
{
    Destroy(gameObject);
}
```

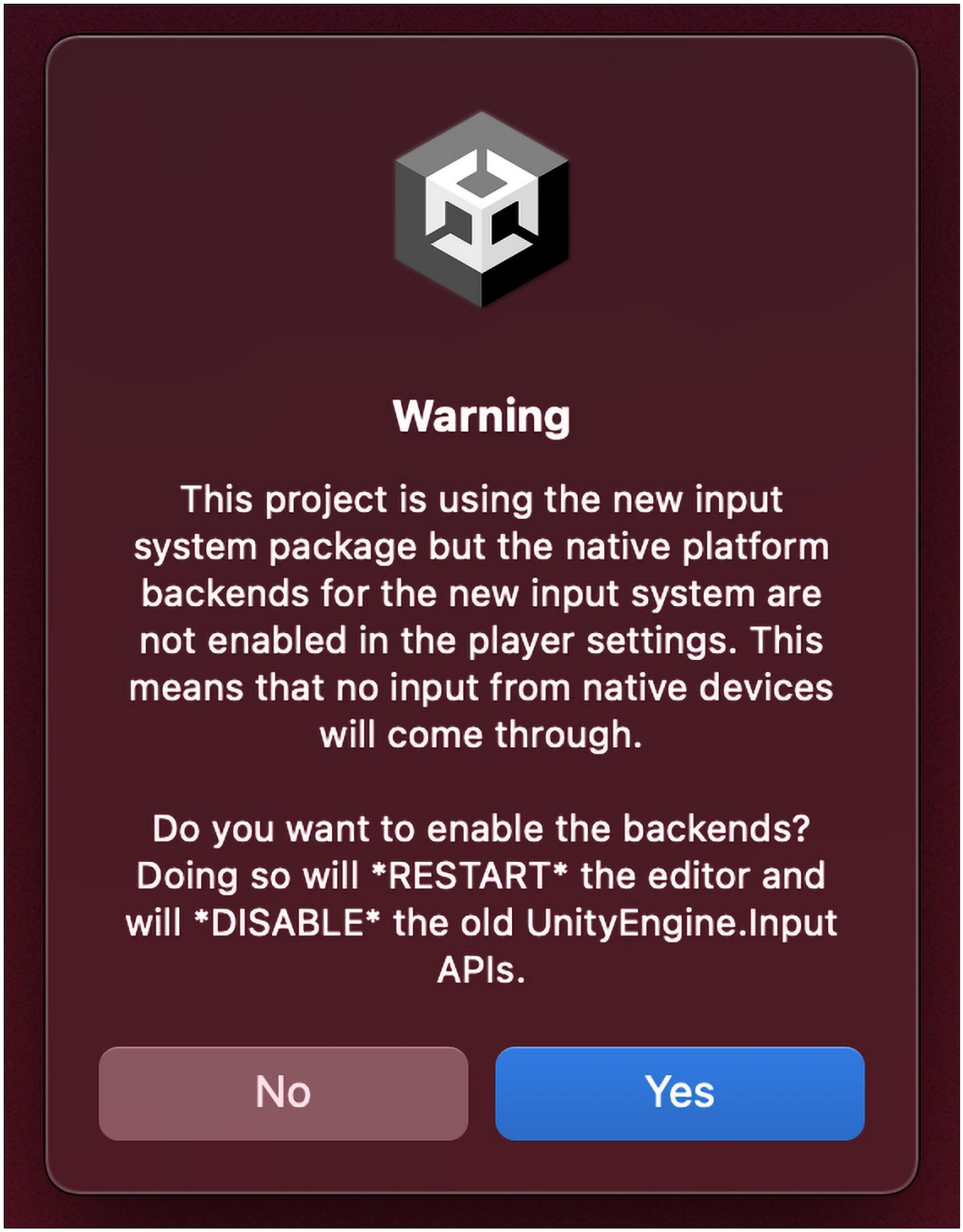
```
public float delay;

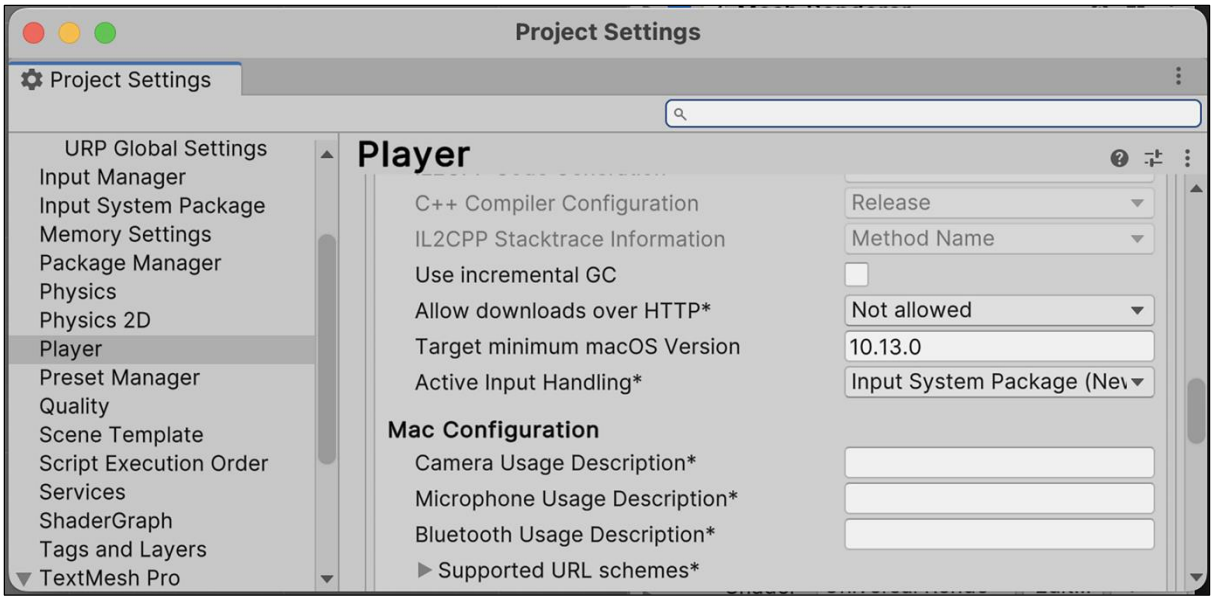
void Start()
{
    Destroy(gameObject, delay);
}
```

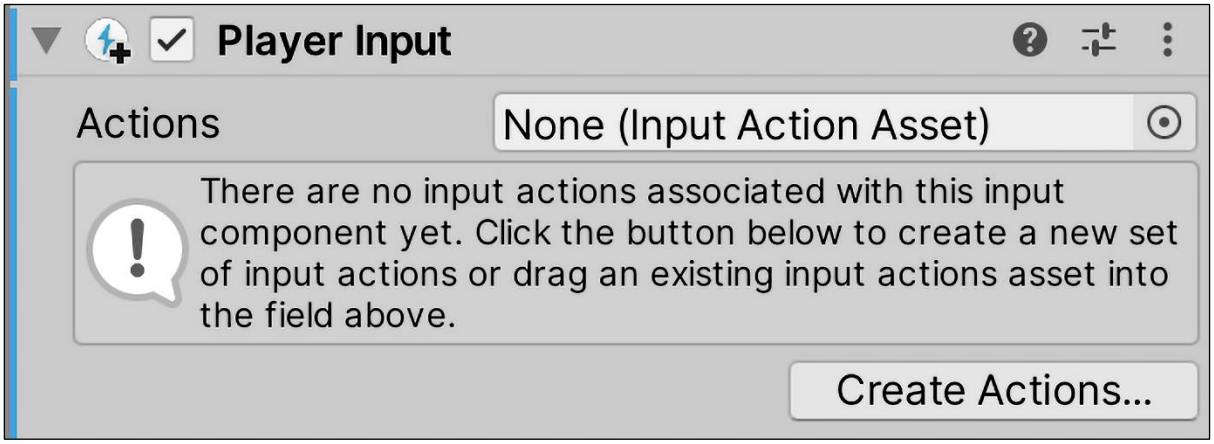

Packages
Input System
1.7.0

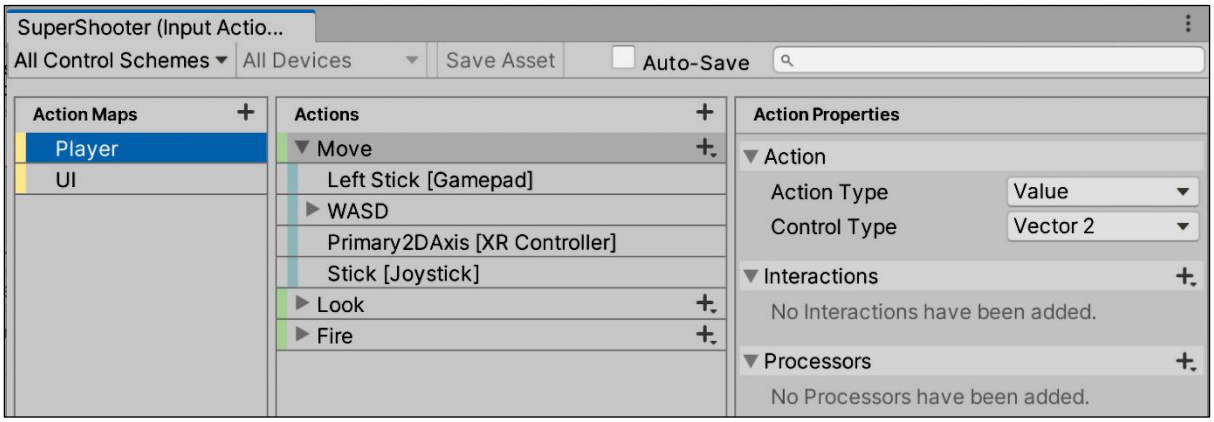

On Start
Event
Component
Get Game Object
This
Component
Destroy
Obj
T
Get Variable
Object
delay
This
Variables
Name
speed
Type
Float
Value
20
Name
delay
Type
Float
Value
5

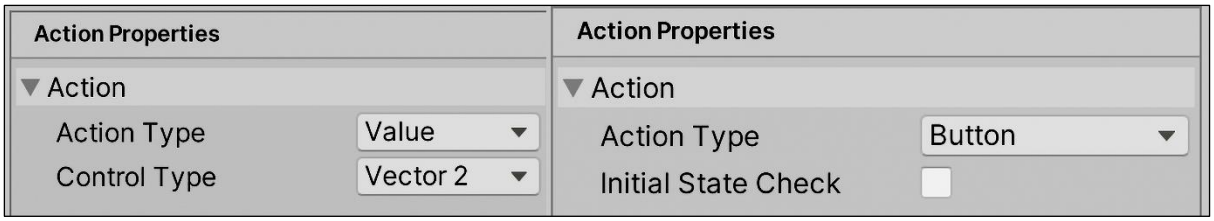

Package Manager
Packages: Unity Registry
Sort: Name (asc)
Filte
All
Services
Packages
Input System
1.6.1

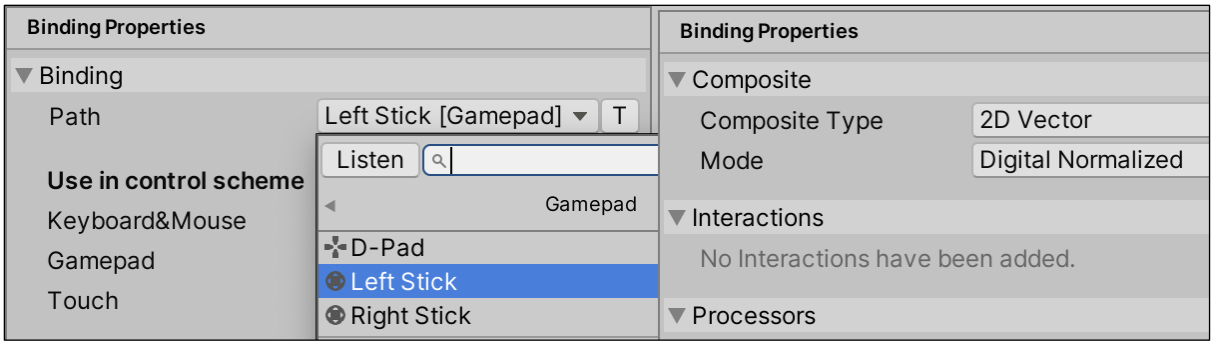

Warning
This project is using the new input system package but the native platform backends for the new input system are not enabled in the player settings. This means that no input from native devices will come through.
Do you want to enable the backends? Doing so will *RESTART* the editor and will *DISABLE* the old UnityEngine.Input APIs.
No
Yes

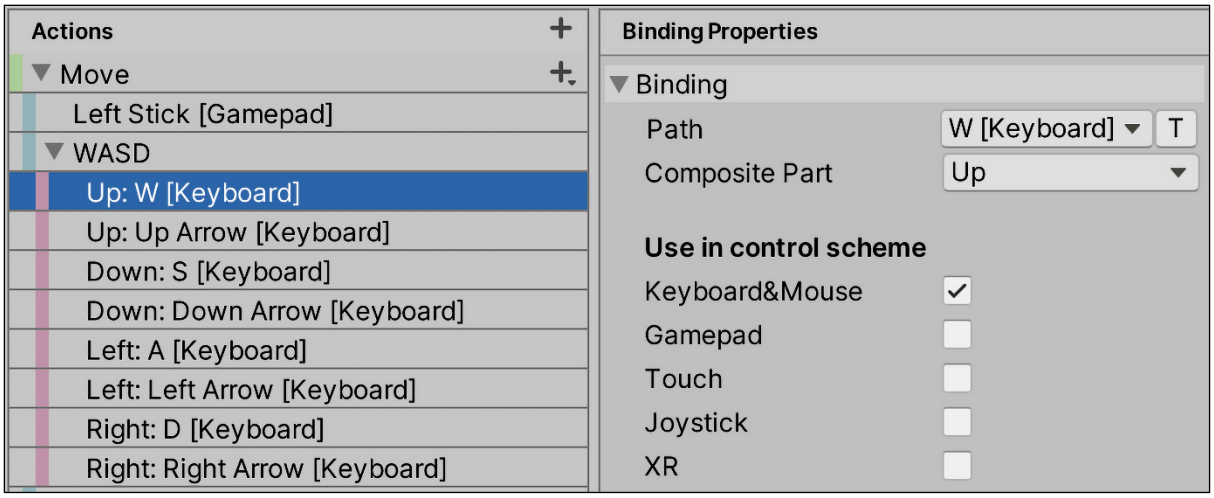

Project Settings
Project Settings
URP Global Settings
Input Manager
Input System Package
Memory Settings
Package Manager
Physics
Physics 2D
Player
Preset Manager
Quality
Scene Template
Script Execution Order
Services
ShaderGraph
Tags and Layers
TextMesh Pro
Player
C++ Compiler Configuration
Release
IL2CPP Stacktrace Information
Method Name
Use incremental GC
Allow downloads over HTTP*
Not allowed
Target minimum macOS Version
10.13.0
Active Input Handling*
Input System Package (Nev
Mac Configuration
Camera Usage Description*
Microphone Usage Description*
Bluetooth Usage Description*
Supported URL schemes*


Player Input
Actions
None (Input Action Asset)
There are no input actions associated with this input component yet. Click the button below to create a new set of input actions or drag an existing input actions asset into the field above.
Create Actions...


SuperShooter (Input Actio...
All Control Schemes
All Devices
Save Asset
Auto-Save
Action Maps
Player
UI
Actions
Move
Left Stick [Gamepad]
WASD
Primary2DAxis [XR Controller]
Stick [Joystick]
Look
Fire
Action Properties
Action
Action Type
Value
Control Type
Vector 2
Interactions
No Interactions have been added.
Processors
No Processors have been added.


Action Properties
Action
Action Type
Value
Control Type
Vector 2
Action Properties
Action
Action Type
Button
Initial State Check


Binding Properties
Binding
Path
Left Stick [Gamepad]
T
Use in control scheme
Keyboard&Mouse
Gamepad
Touch
Listen
Gamepad
D-Pad
Left Stick
Right Stick
Binding Properties
Composite
Composite Type
2D Vector
Mode
Digital Normalized
Interactions
No Interactions have been added.
Processors


Actions
Move
Left Stick [Gamepad]
WASD
Up: W [Keyboard]
Up: Up Arrow [Keyboard]
Down: S [Keyboard]
Down: Down Arrow [Keyboard]
Left: A [Keyboard]
Left: Left Arrow [Keyboard]
Right: D [Keyboard]
Right: Right Arrow [Keyboard]
Binding Properties
Binding
Path
W [Keyboard]
T
Composite Part
Up
Use in control scheme
Keyboard&Mouse
Gamepad
Touch
Joystick
XR


Camera
None (Camera)
Behavior
Send Messages
Will SendMessage() to GameObject: OnDeviceLost, OnDeviceRegained, OnControlsChanged, OnMove, OnLook, OnFire, OnNavigate, OnSubmit, OnCancel, OnPoint, OnClick, OnScrollWheel, OnMiddleClick, OnRightClick, OnTrackedDevicePosition, OnTrackedDeviceOrientation
Open Input Settings
Open Input Debugger

```
using UnityEngine;
using UnityEngine.InputSystem;

public class PlayerMovement : MonoBehaviour
{
    public float speed;
    public float rotationSpeed;
    private Vector2 movementValue;
    private float lookValue;

    private void Awake()
    {
        Cursor.visible = false;
        Cursor.lockState = CursorLockMode.Locked;
    }

    public void OnMove(InputValue value)
    {
        movementValue = value.Get<Vector2>() * speed;
    }

    public void OnLook(InputValue value)
    {
        lookValue = value.Get<Vector2>().x * rotationSpeed;
    }

    void Update()
    {
        transform.Translate(
            movementValue.x * Time.deltaTime,
            0,
            movementValue.y * Time.deltaTime);

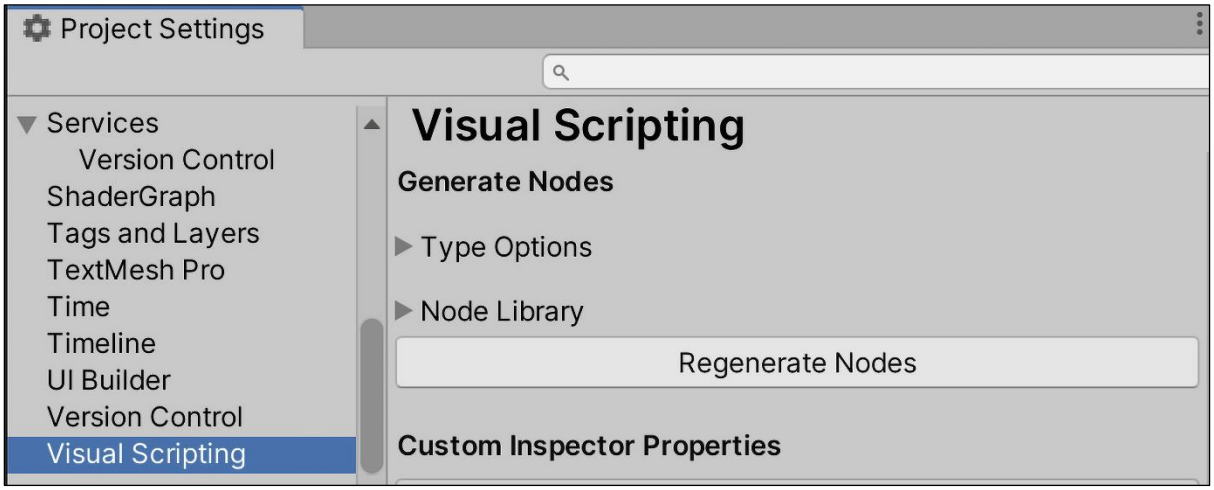
        transform.Rotate(0, lookValue * Time.deltaTime, 0);
    }
}
```

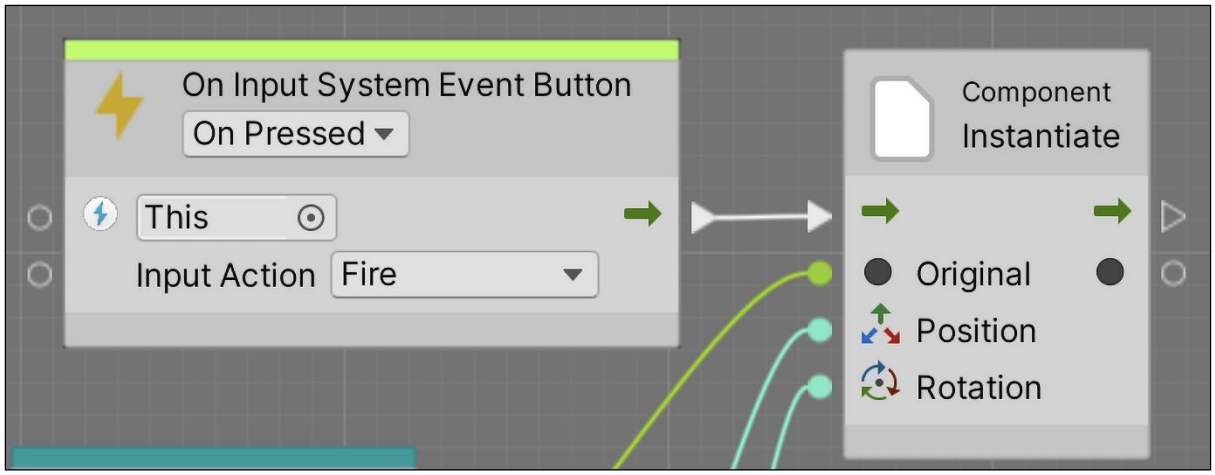
```
public void OnFire()
{
    GameObject clone = Instantiate(prefab);

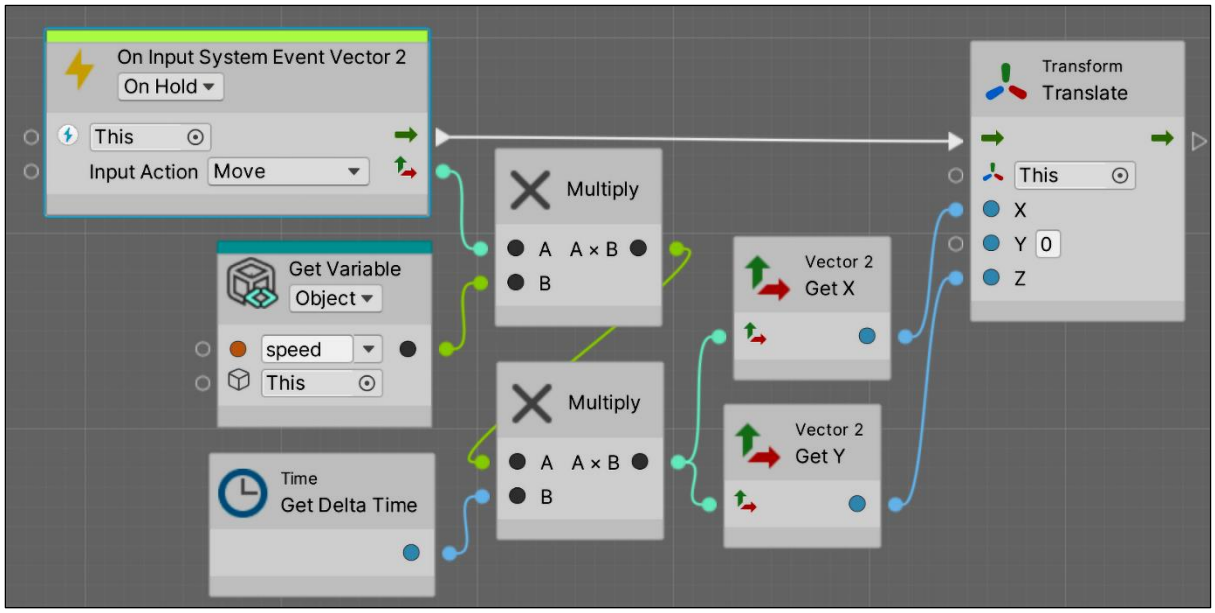
    clone.transform.position = shootPoint.transform.position;
    clone.transform.rotation = shootPoint.transform.rotation;
}
```

```
public void OnFire(InputValue value)
{
    if (value.isPressed)
    {
        GameObject clone = Instantiate(prefab);

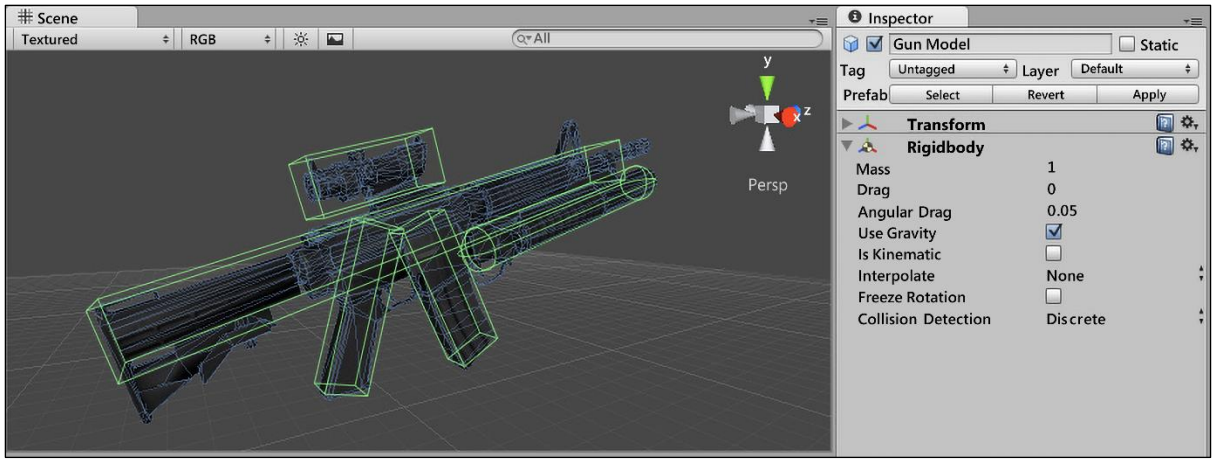
        clone.transform.position = shootPoint.transform.position;
        clone.transform.rotation = shootPoint.transform.rotation;
    }
}
```

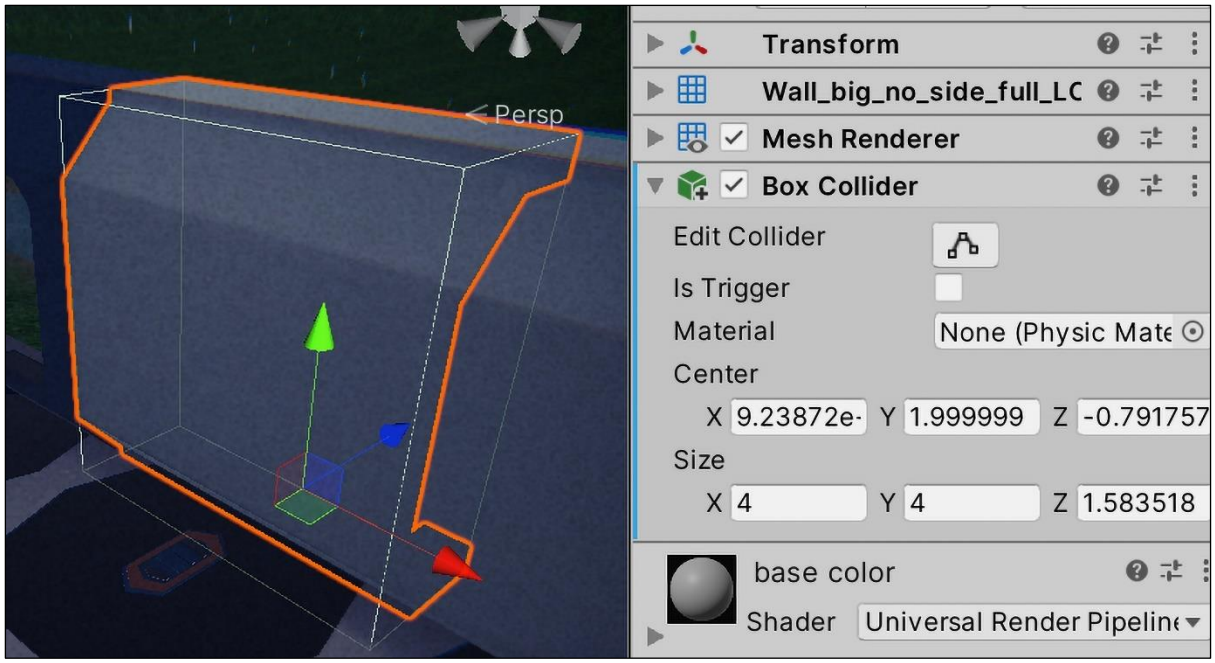


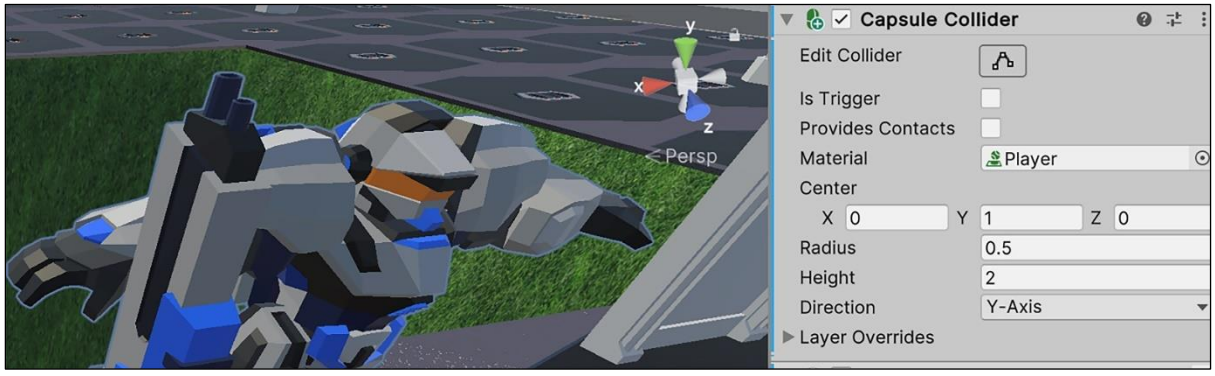

On Input System Event Button
On Pressed
This
Input Action
Fire
Component
Instantiate
Original
Position
Rotation

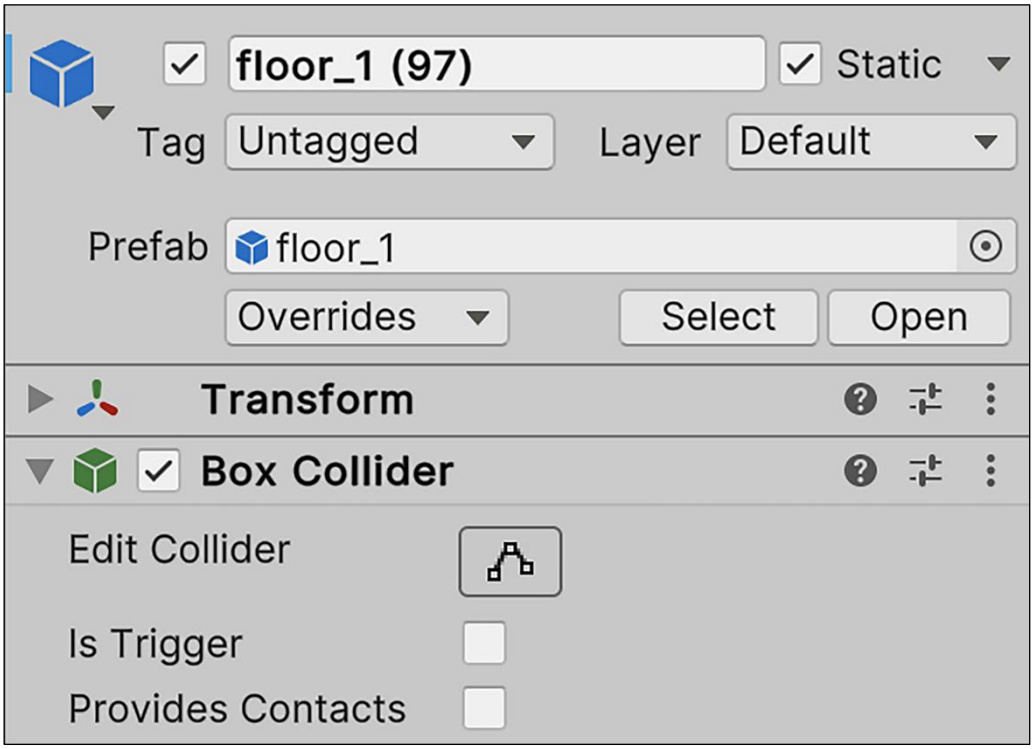

On Input System Event Vector 2
On Hold
This
Input Action
Move
Get Variable
Object
speed
This
Time
Get Delta Time
Multiply
A
A × B
B
Multiply
A
A × B
B
Vector 2
Get X
Vector 2
Get Y
Transform
Translate
This
X
Y
0
Z

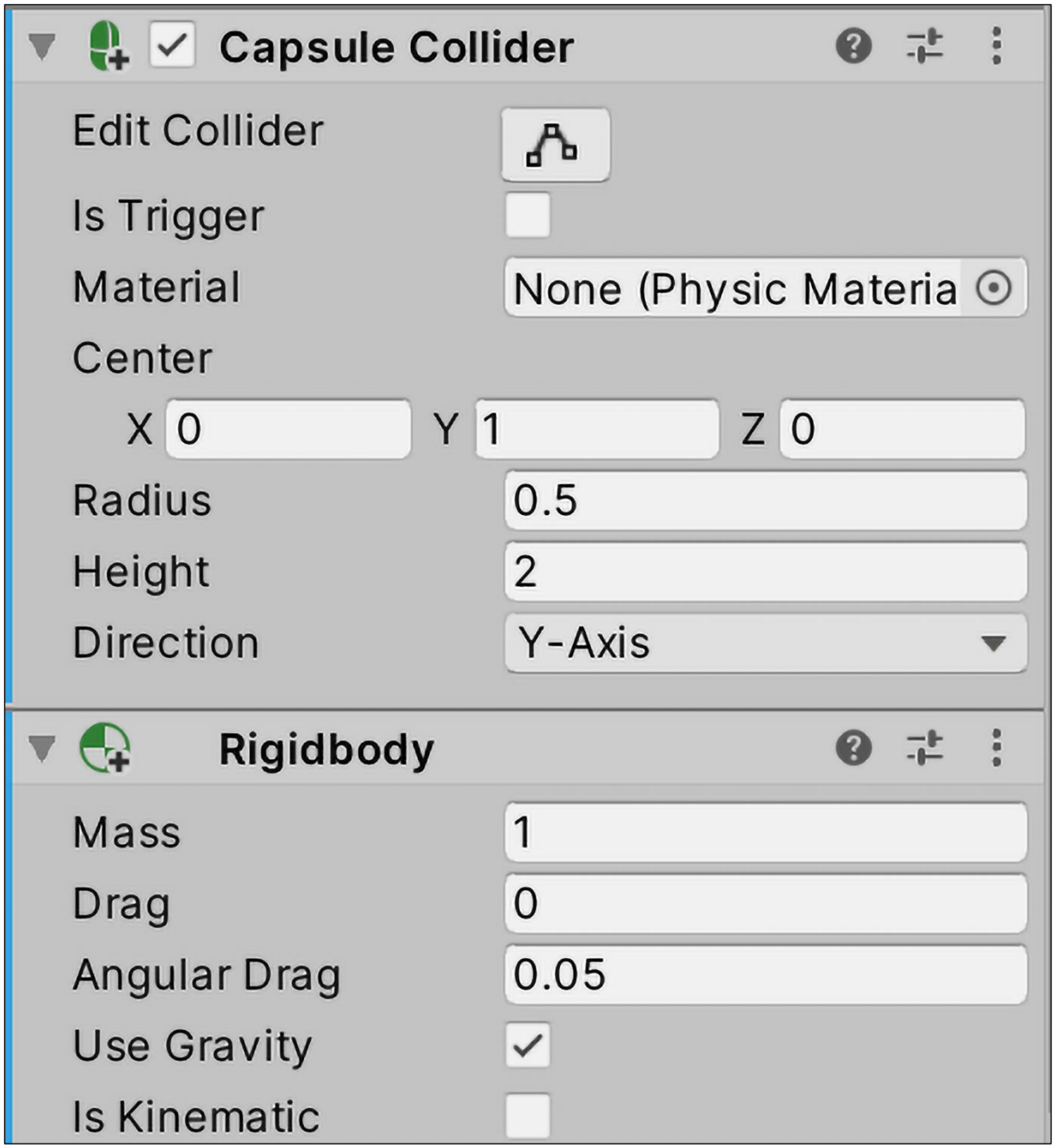
Chapter 7: Collisions and Health: Detecting Collisions Accurately

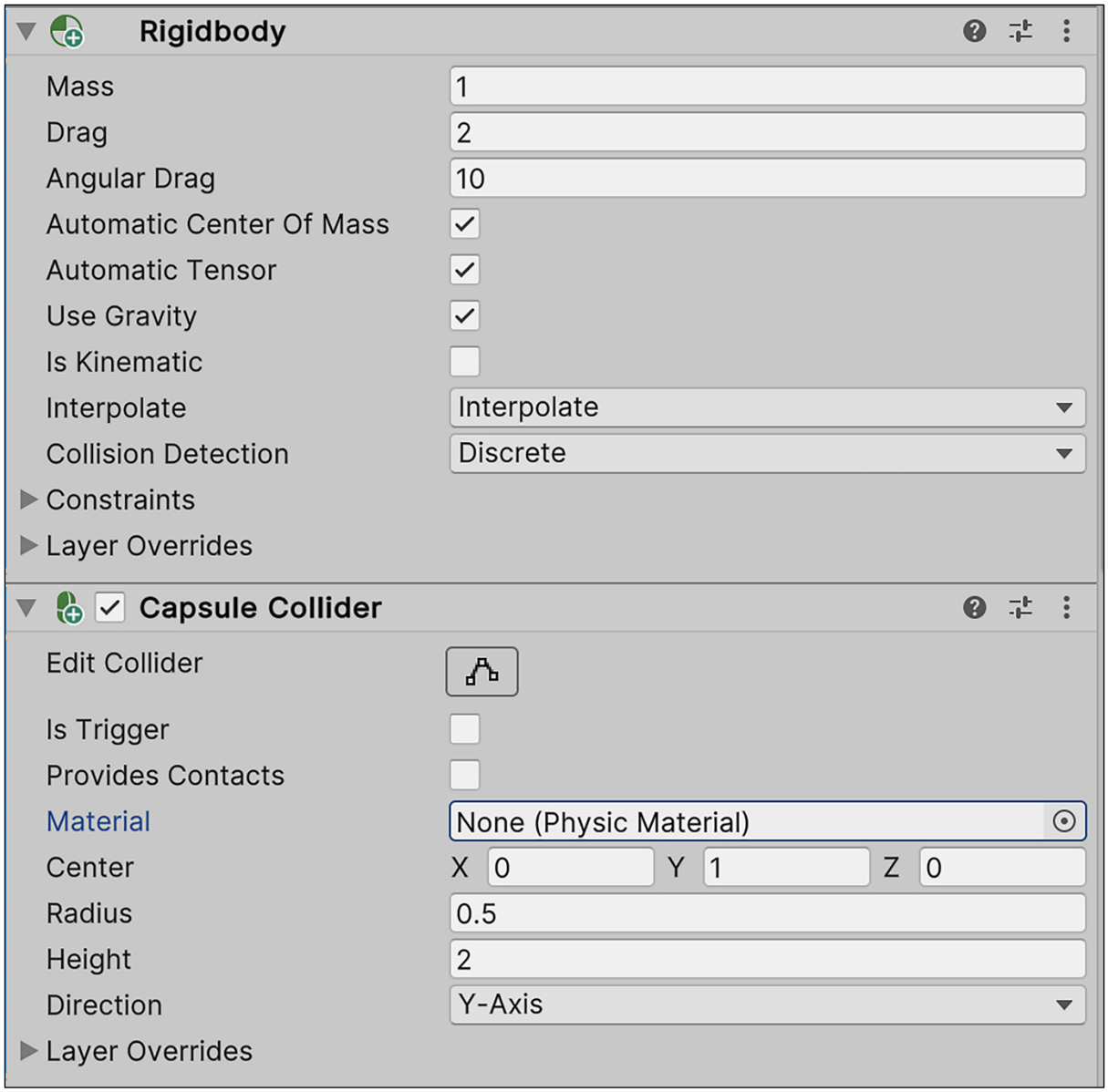


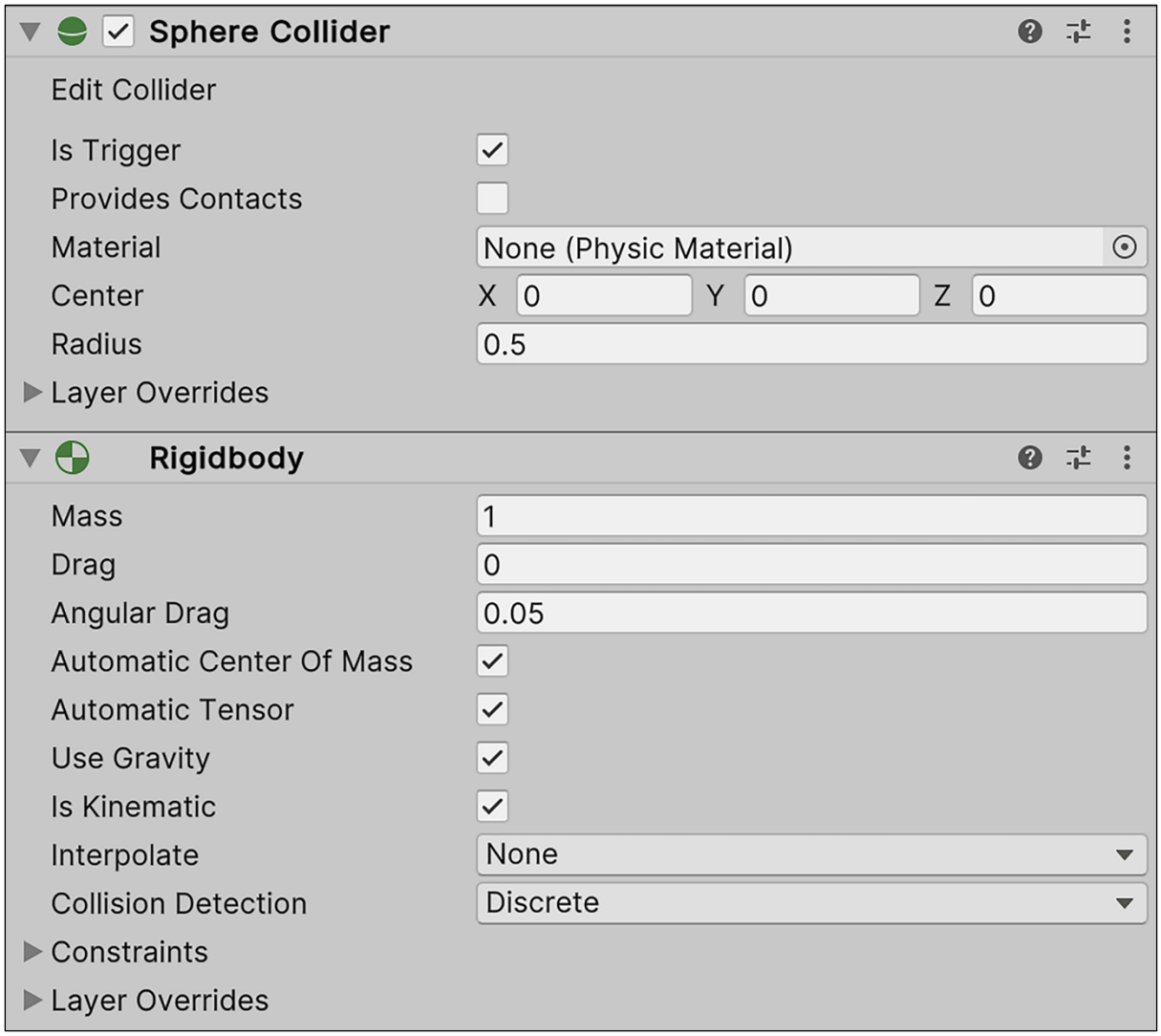


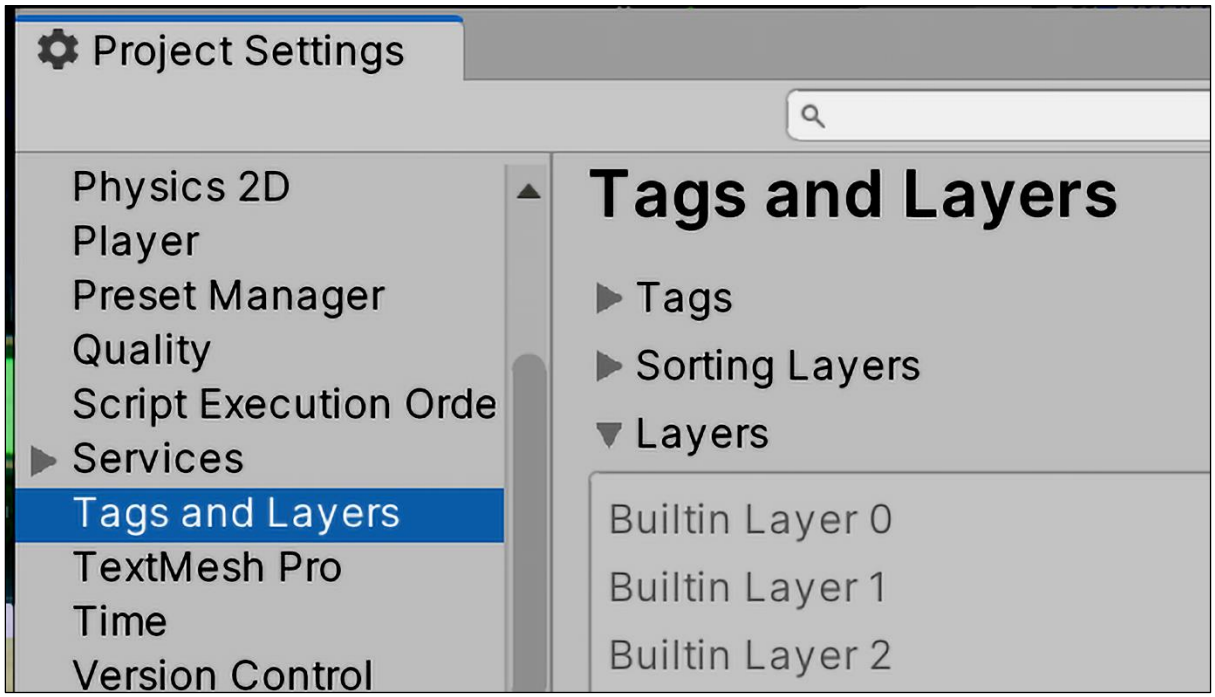


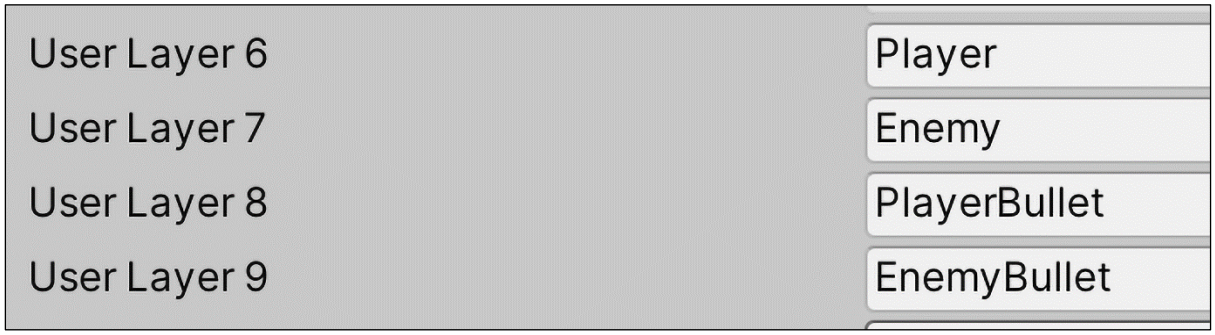

floor_1 (97)
Static
Tag
Untagged
Layer
Default
Prefab
floor_1
Overrides
Select
Open
Transform
Box Collider
Edit Collider
Is Trigger
Provides Contacts

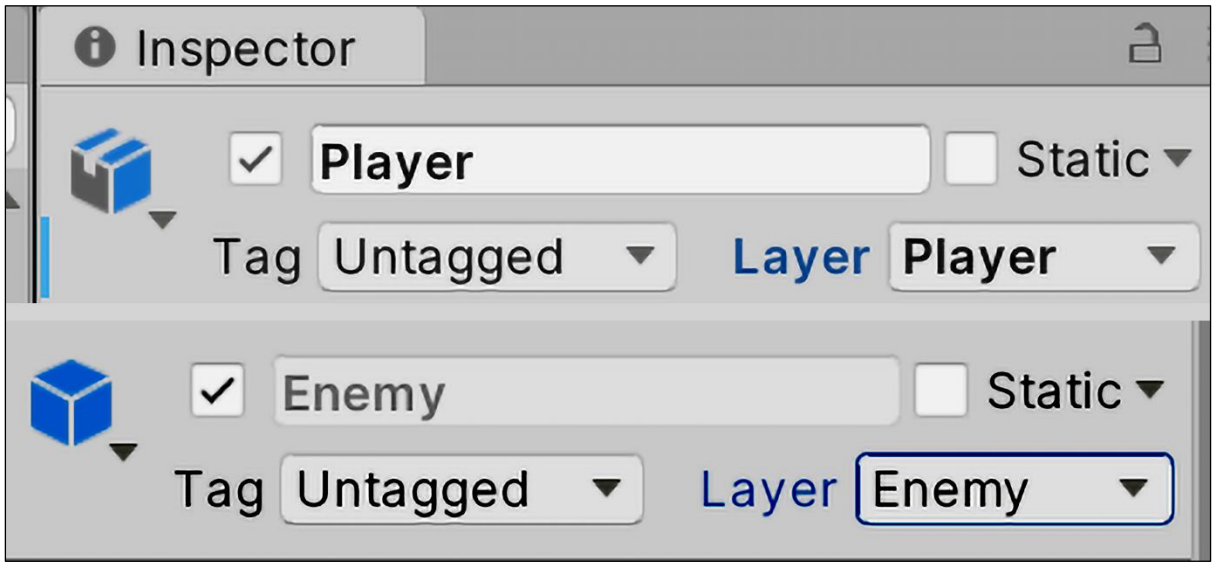

Capsule Collider
Edit Collider
Is Trigger
Material
None (Physic Materia
Center
X 0
Y 1
Z 0
Radius
0.5
Height
2
Direction
Y-Axis
Rigidbody
Mass
1
Drag
0
Angular Drag
0.05
Use Gravity
Is Kinematic

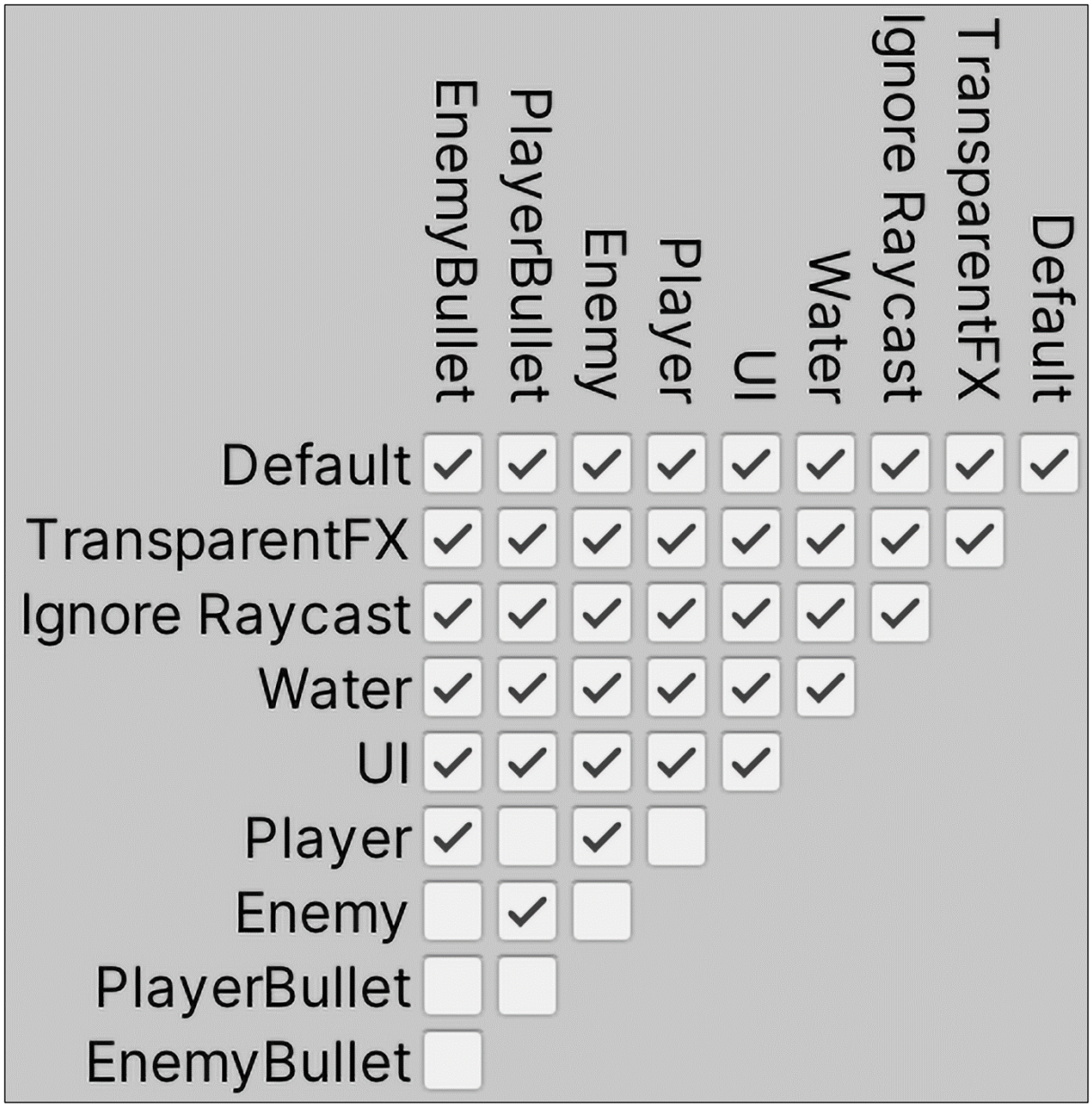

Rigidbody
Mass
1
Drag
2
Angular Drag
10
Automatic Center Of Mass
Automatic Tensor
Use Gravity
Is Kinematic
Interpolate
Interpolate
Collision Detection
Discrete
Constraints
Layer Overrides
Capsule Collider
Edit Collider
Is Trigger
Provides Contacts
Material
None (Physic Material)
Center
X 0
Y 1
Z 0
Radius
0.5
Height
2
Direction
Y-Axis
Layer Overrides


Sphere Collider
Edit Collider
Is Trigger
Provides Contacts
Material
None (Physic Material)
Center
X 0
Y 0
Z 0
Radius
0.5
Layer Overrides
Rigidbody
Mass
1
Drag
0
Angular Drag
0.05
Automatic Center Of Mass
Automatic Tensor
Use Gravity
Is Kinematic
Interpolate
None
Collision Detection
Discrete
Constraints
Layer Overrides


Project Settings
Physics 2D
Player
Preset Manager
Quality
Script Execution Orde
Services
Tags and Layers
TextMesh Pro
Time
Version Control
Tags and Layers
Tags
Sorting Layers
Layers
Builtin Layer 0
Builtin Layer 1
Builtin Layer 2


User Layer 6
Player
User Layer 7
Enemy
User Layer 8
PlayerBullet
User Layer 9
EnemyBullet

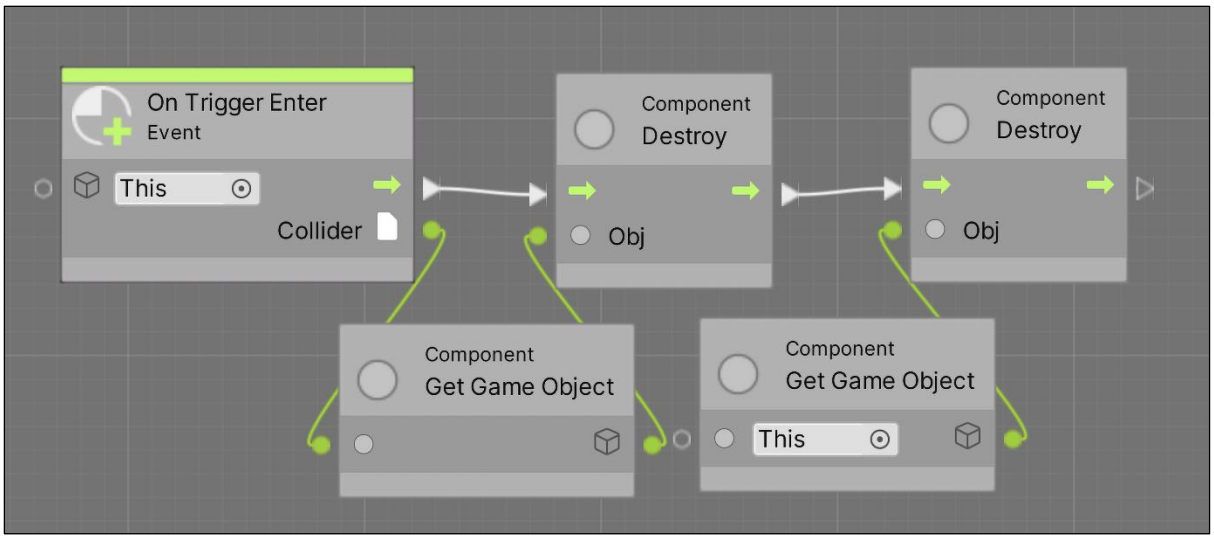

Inspector
Player
Static
Tag
Untagged
Layer
Player
Enemy
Static
Tag
Untagged
Layer
Enemy




```
public class ContactDestroyer : MonoBehaviour
{
    void OnTriggerEnter()
    {
        Destroy(gameObject);
    }
}
```

```
void OnTriggerEnter(Collider other)
```

```
void OnTriggerEnter(Collider other)
{
    Destroy(gameObject);
    Destroy(other.gameObject);
}
```




```
public class Life : MonoBehaviour
{
    public float amount;
}
```

```
Life life = other.GetComponent<Life>();
```

```
public class ContactDamager : MonoBehaviour
{
    public float damage;

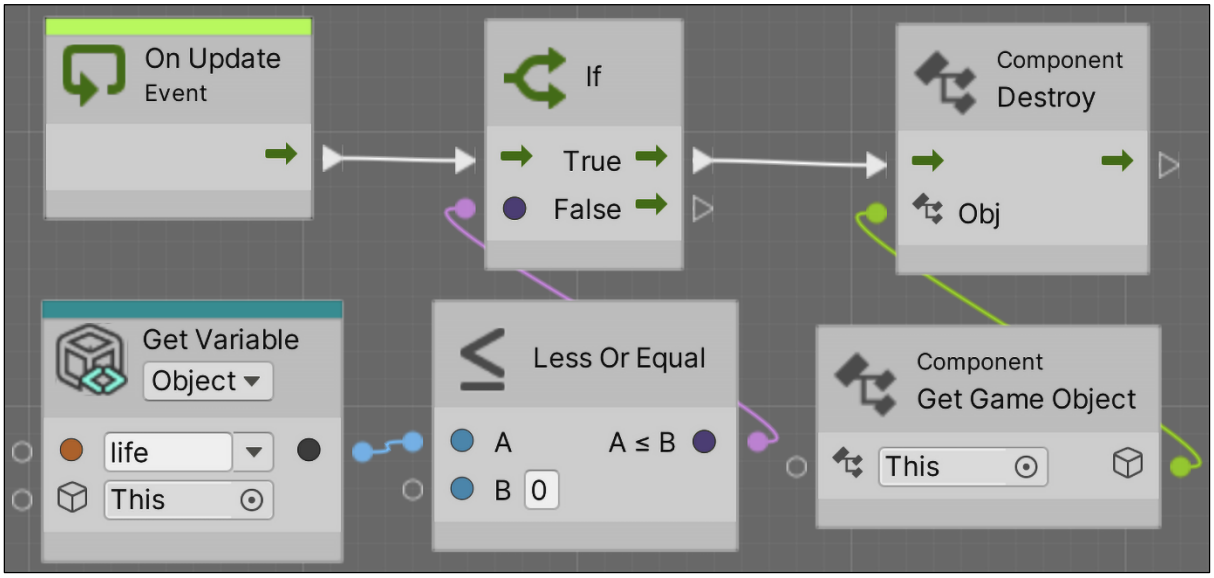
    void OnTriggerEnter(Collider other)
    {
        Destroy(gameObject);

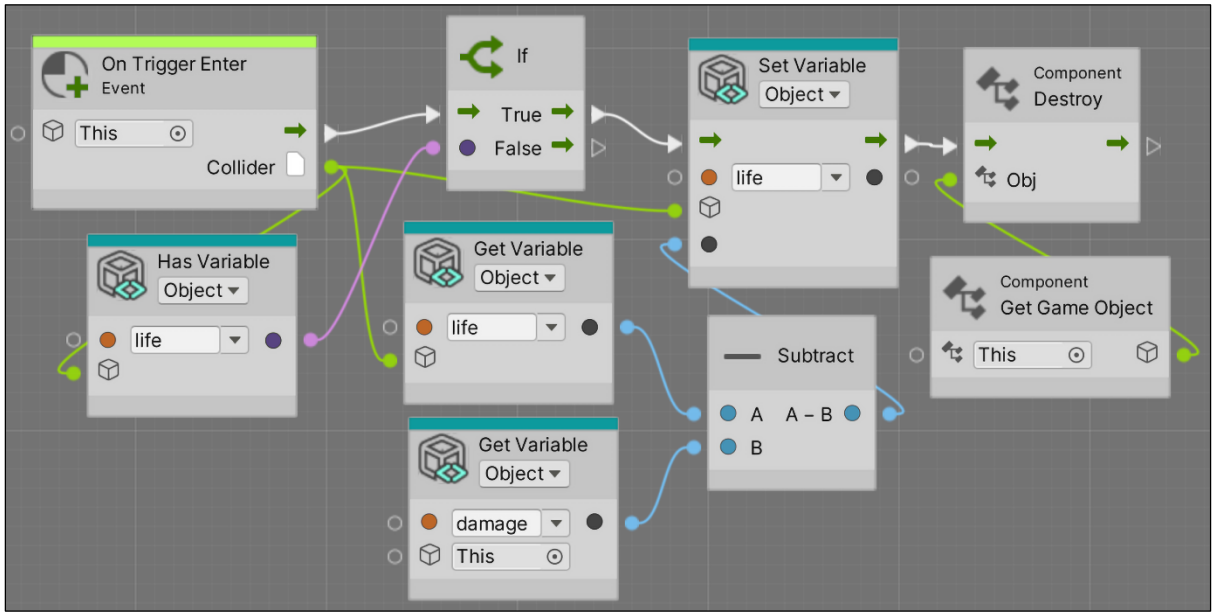
        Life life = other.GetComponent<Life>();

        if (life != null)
        {
            life.amount -= damage;
        }
    }
}
```

```
public class Life : MonoBehaviour
{
    public float amount;

    void Update()
    {
        if (amount <= 0)
        {
            Destroy(gameObject);
        }
    }
}
```





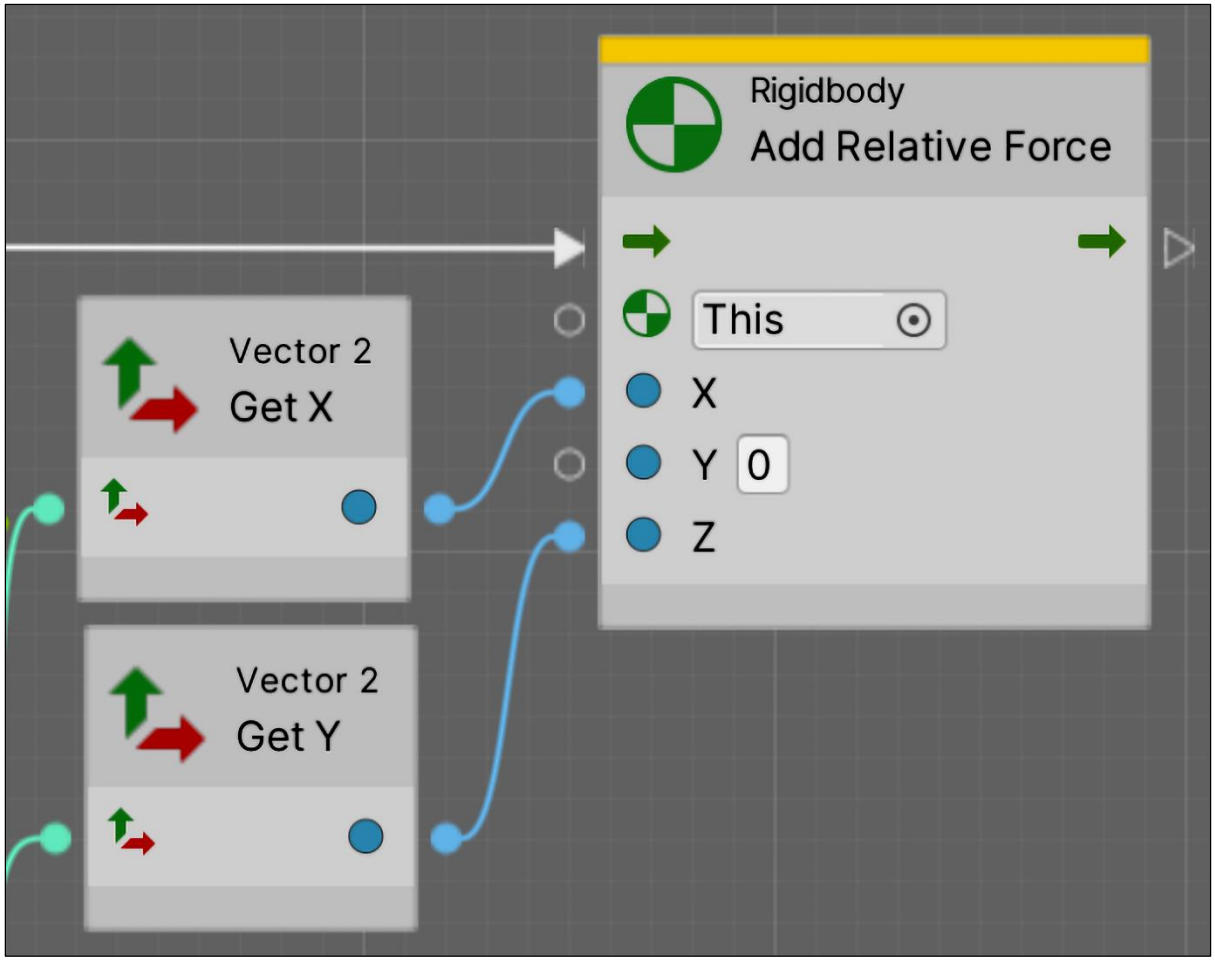

```
private Rigidbody rb;
```

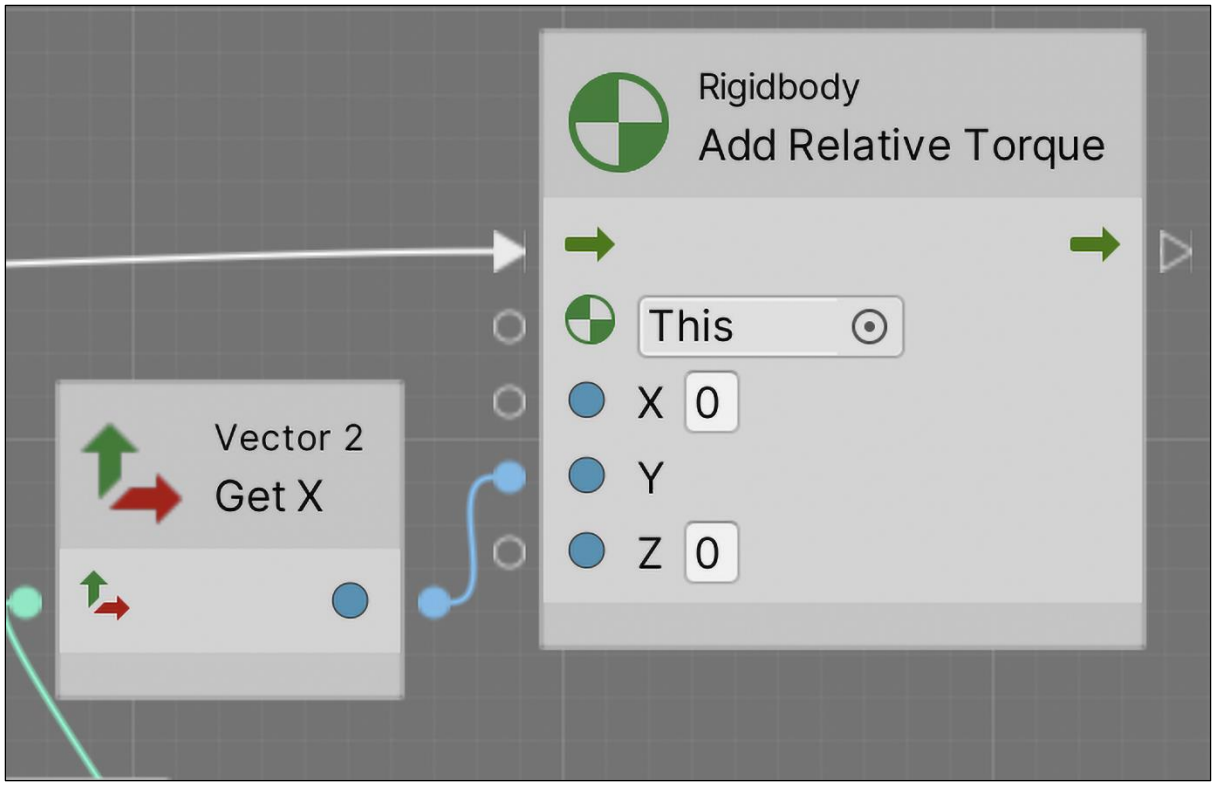
```
private void Awake()
{
    Cursor.visible = false;
    Cursor.lockState = CursorLockMode.Locked;

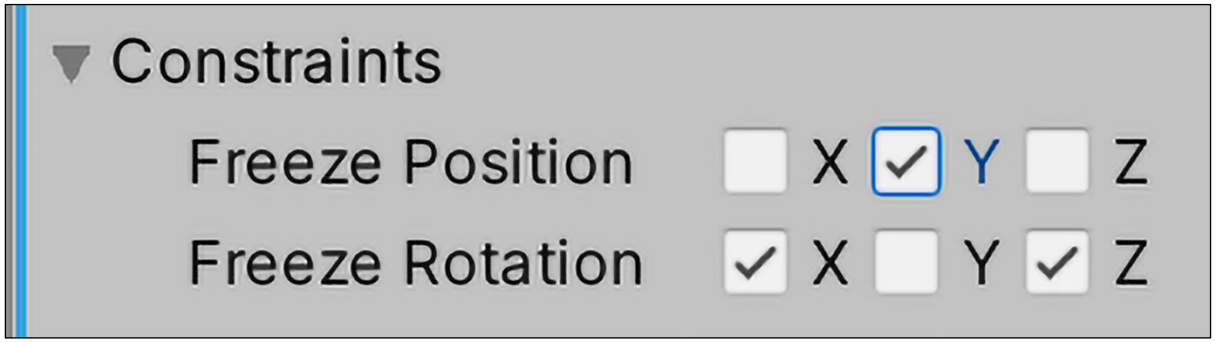
    rb = GetComponent<Rigidbody>();
}
```

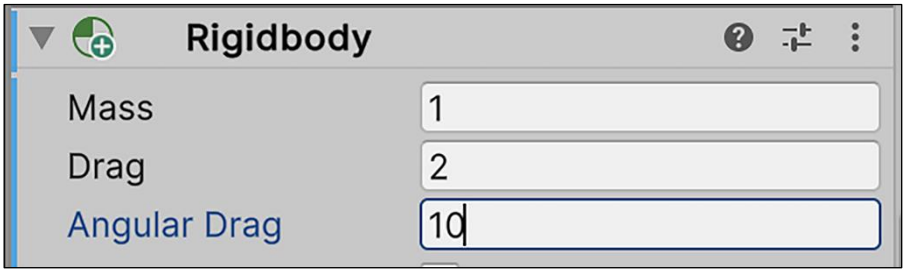
```
void Update()
{
    rb.AddRelativeForce(
        movementValue.x * Time.deltaTime,
        0,
        movementValue.y * Time.deltaTime);

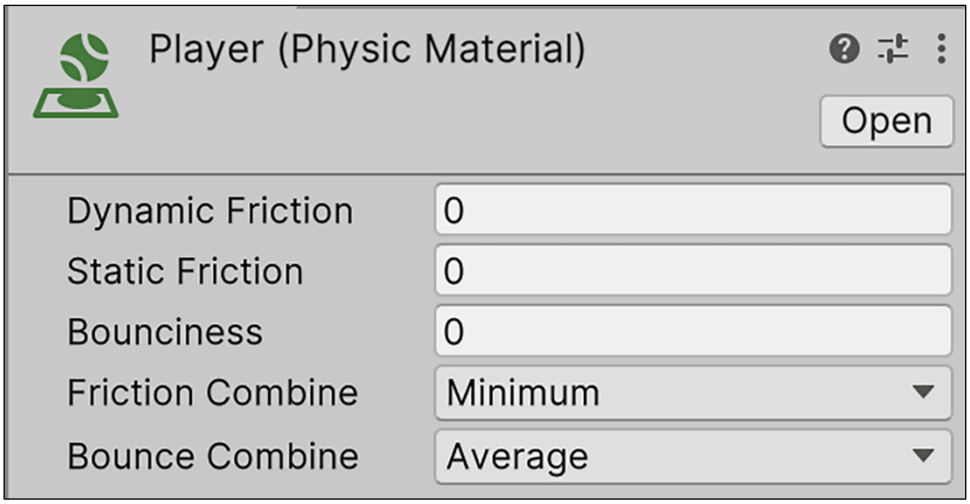
    rb.AddRelativeTorque(0, lookValue* Time.deltaTime, 0);
}
```

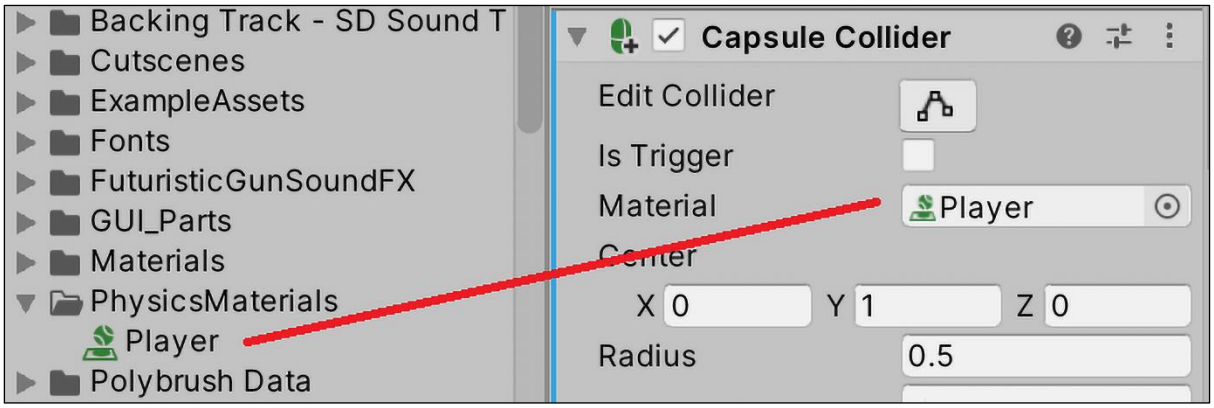



Rigidbody
Add Relative Torque
This
X 0
Y
Z 0
Vector 2
Get X


Constraints
Freeze Position
X
Y
Z
Freeze Rotation
X
Y
Z


Rigidbody
Mass
1
Drag
2
Angular Drag
10


Player (Physic Material)
Open
Dynamic Friction
0
Static Friction
0
Bounciness
0
Friction Combine
Minimum
Bounce Combine
Average


Backing Track - SD Sound T
Cutscenes
ExampleAssets
Fonts
FuturisticGunSoundFX
GUI_Parts
Materials
PhysicsMaterials
Player
Polybrush Data
Capsule Collider
Edit Collider
Is Trigger
Material
Player
Center
X 0
Y 1
Z 0
Radius
0.5

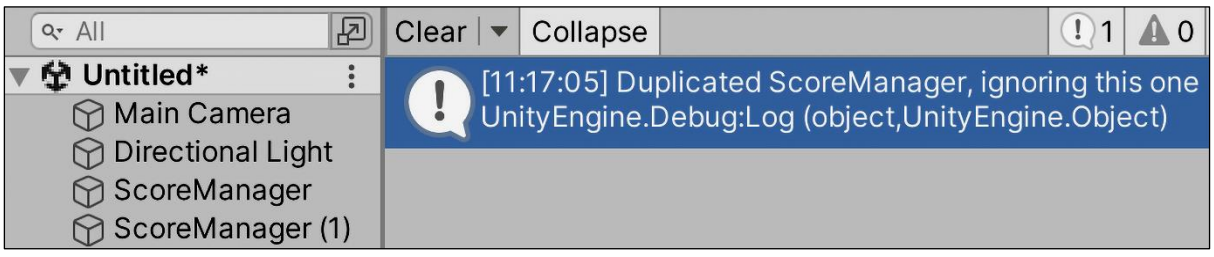
Chapter 8: Victory or Defeat: Designing Win and Lose Conditions

```
public class ScoreManager : MonoBehaviour
{
    public static ScoreManager instance;

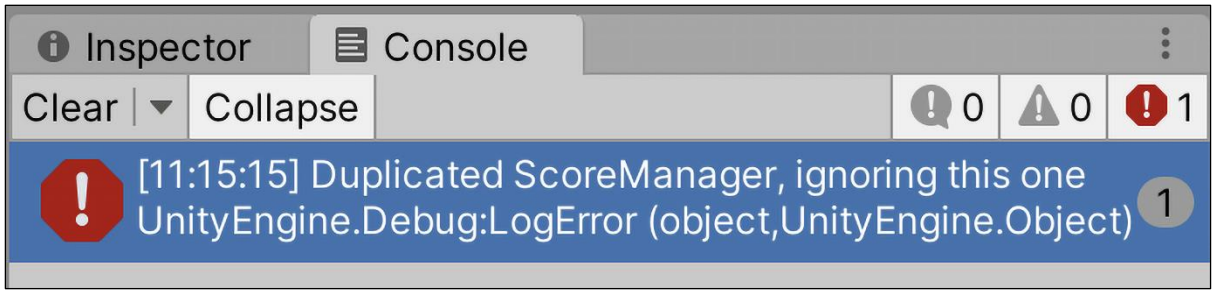
    public int amount;
}
```

```
void Awake()
{
    if (instance == null)
    {
        instance = this;
    }
    else
    {
        print("Duplicated ScoreManager, ignoring this one");
    }
}
```

```
Debug.Log("Duplicated ScoreManager, ignoring this one", gameObject);
```



```
Debug.LogError("Duplicated
```

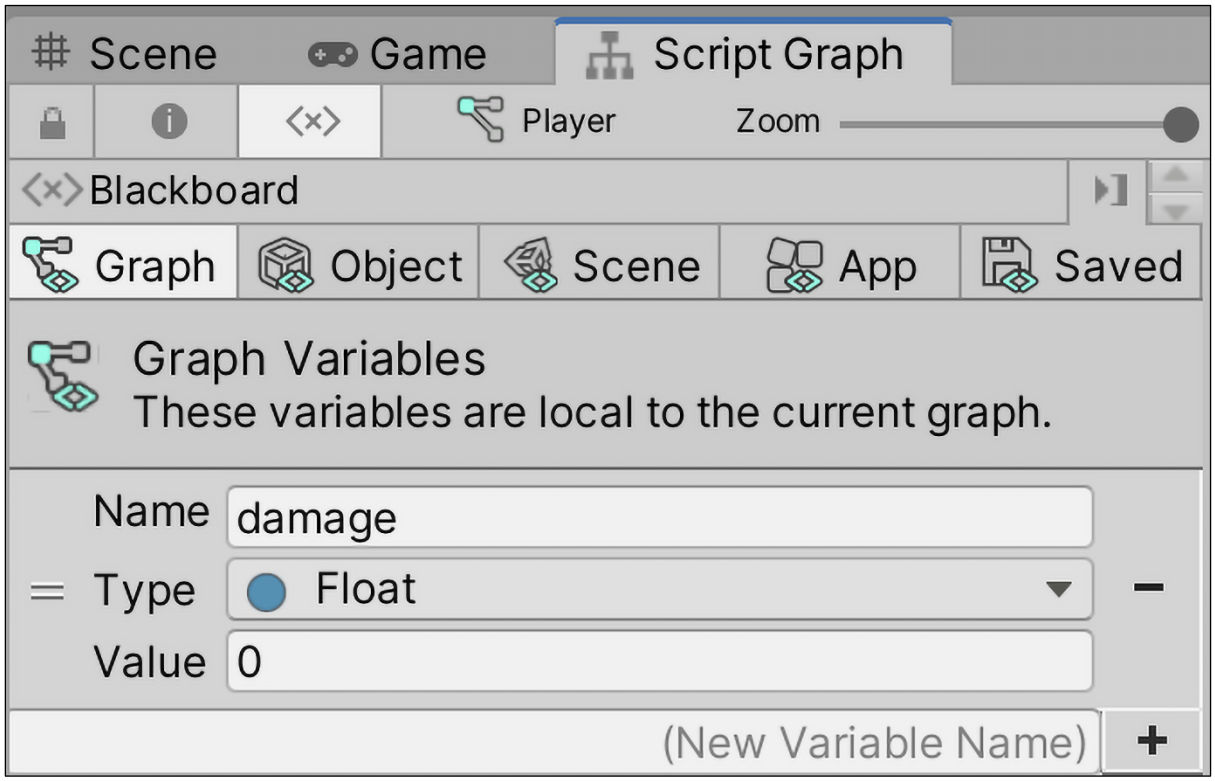


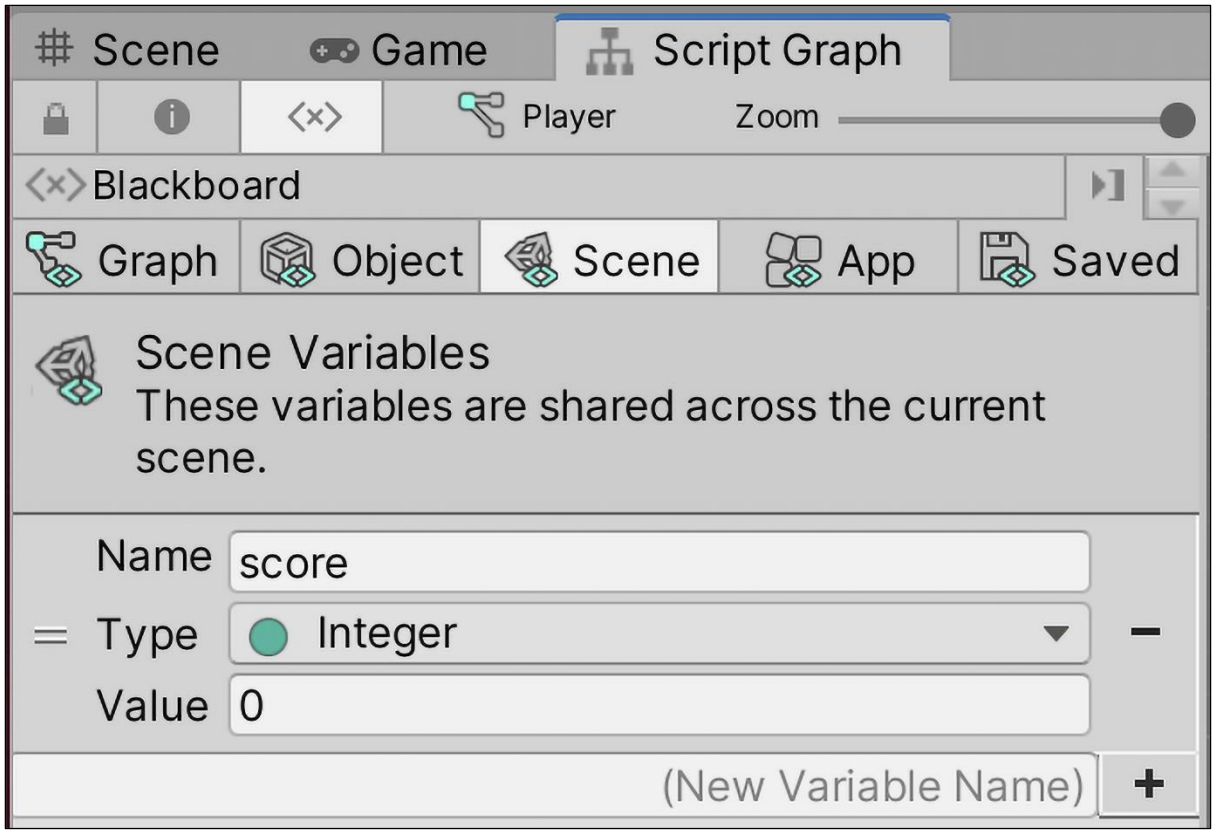

```
void OnDestroy()
{

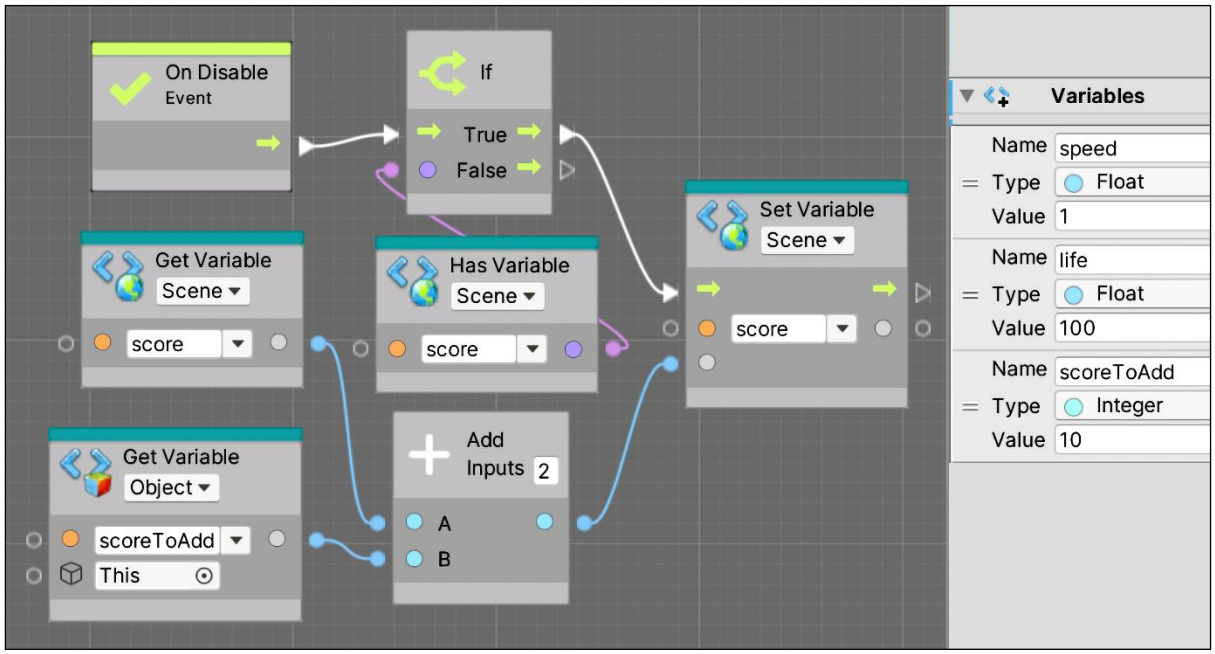
}
```

```
public class ScoreOnDeath : MonoBehaviour
{
    public int amount;

    void OnDestroy()
    {
        ScoreManager.instance.amount += amount;
    }
}
```








```
public List<Enemy> enemies;
```

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

```
public class Enemy : MonoBehaviour
{
    void Start()
    {
        EnemyManager.instance.enemies.Add(this);
    }

    void OnDestroy()
    {
        EnemyManager.instance.enemies.Remove(this);
    }
}
```

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

public class WavesManager : MonoBehaviour
{
    public static WavesManager instance;

    public List<WaveSpawner> waves;

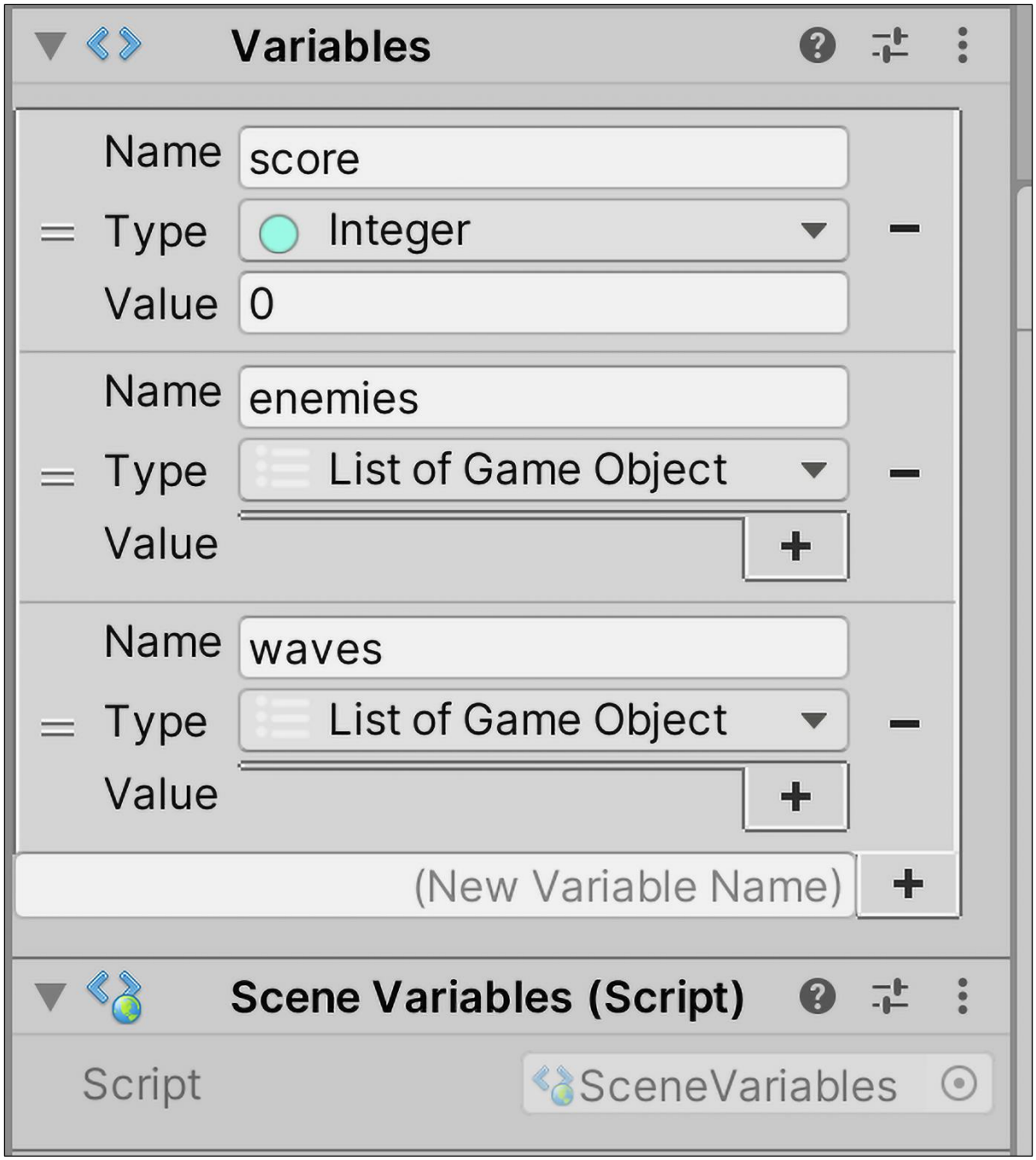
    private void Awake()
    {
        if (instance == null)
            instance = this;
        else
            Debug.LogError("Duplicated WavesManager", gameObject);
    }
}
```

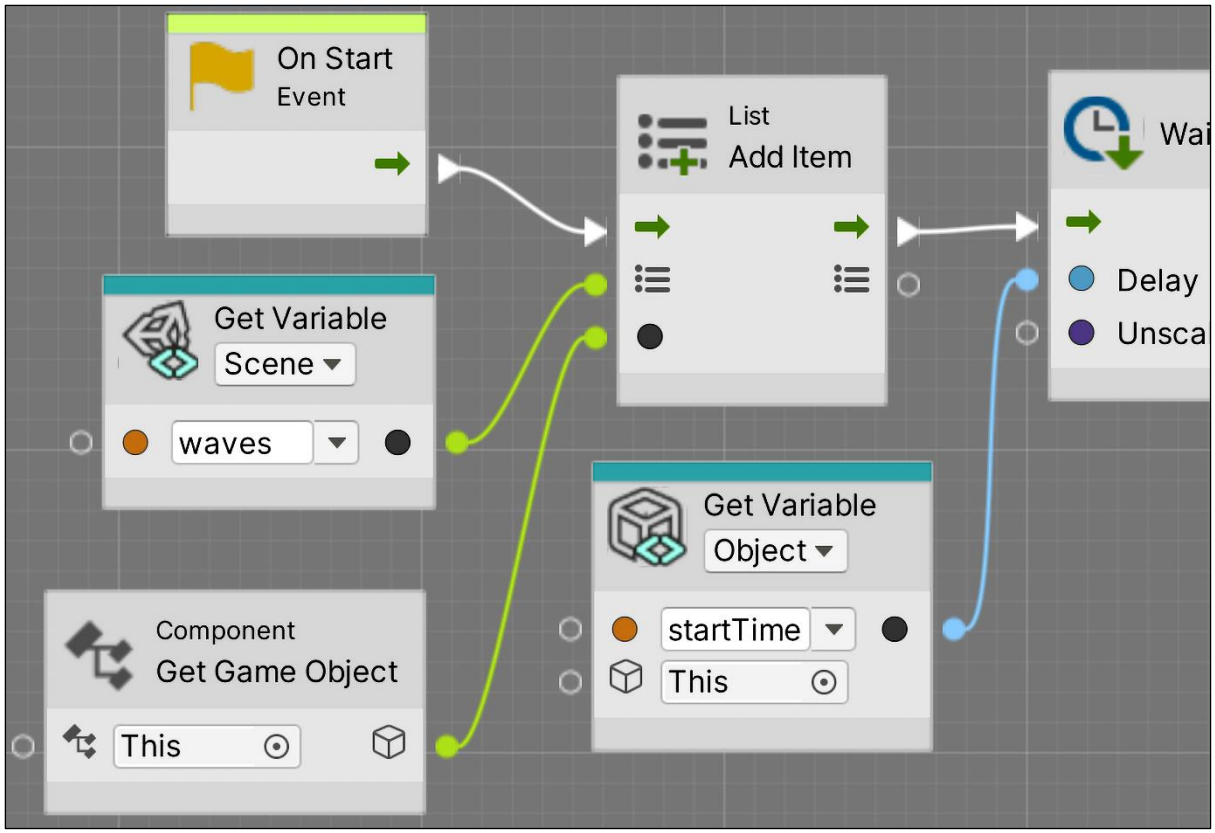
```
public class WaveSpawner : MonoBehaviour
{
    public GameObject prefab;
    public float startTime;
    public float endTime;
    public float spawnRate;

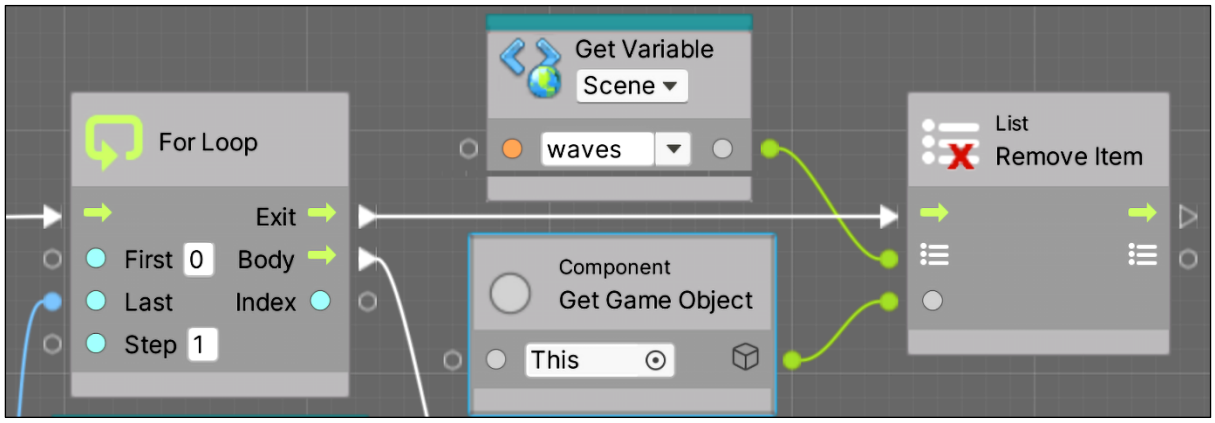
    private void Start()
    {
        WavesManager.instance.waves.Add(this);
        InvokeRepeating("Spawn", startTime, spawnRate);
        Invoke("EndSpawner", endTime);
    }

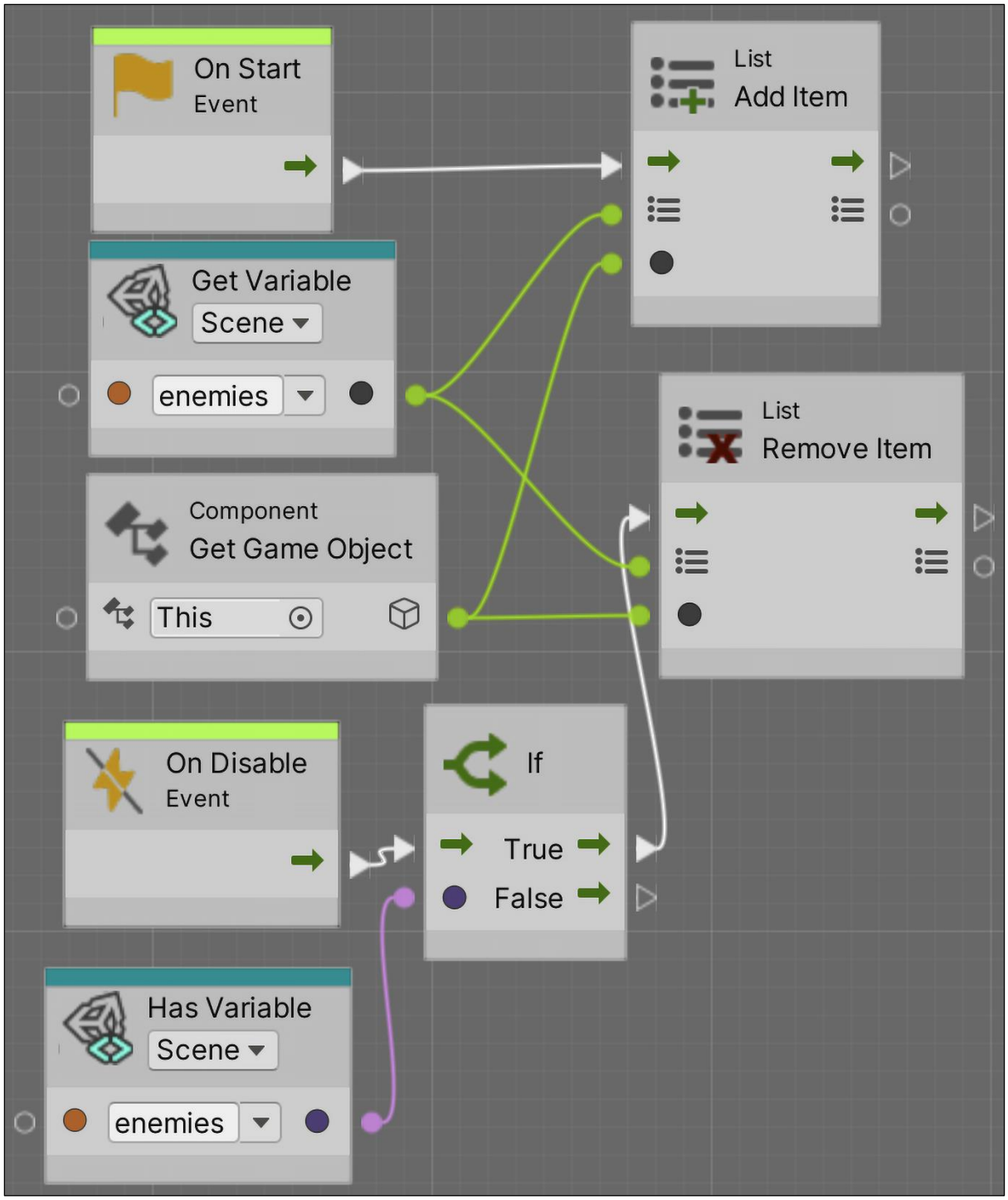
    void Spawn()
    {
        Instantiate(prefab, transform.position, transform.rotation);
    }

    void EndSpawner()
    {
        WavesManager.instance.waves.Remove(this);
        CancelInvoke();
    }
}
```


Variables
Name
score
Type
Integer
Value
0
Name
enemies
Type
List of Game Object
Value
Name
waves
Type
List of Game Object
Value
(New Variable Name)
Scene Variables (Script)
Script
SceneVariables


On Start
Event
List
Add Item
Wai
Delay
Unsca
Get Variable
Scene
waves
Get Variable
Object
startTime
This
Component
Get Game Object
This

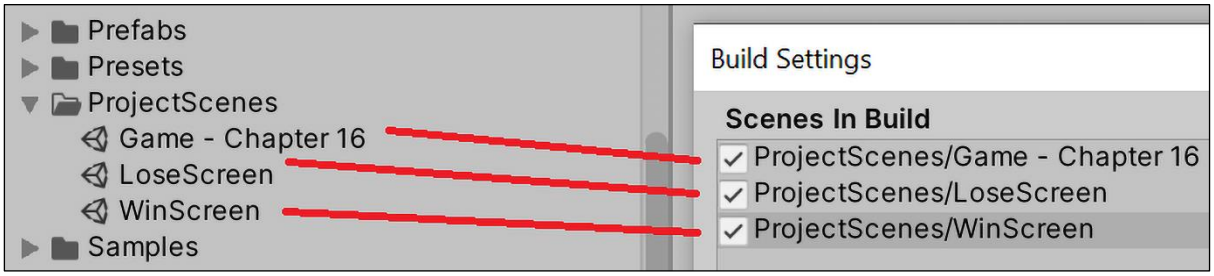

Get Variable
Scene
waves
For Loop
Exit
First 0
Body
Last
Index
Step 1
Component
Get Game Object
This
List
Remove Item


On Start
Event
List
Add Item
Get Variable
Scene
enemies
List
Remove Item
Component
Get Game Object
This
On Disable
Event
If
True
False
Has Variable
Scene
enemies

```
[SerializeField] Life playerLife;

void Update()
{
    if (EnemyManager.instance.enemies.Count <= 0 &&
        WavesManager.instance.waves.Count <= 0)
    {
        SceneManager.LoadScene("You win!");
    }

    if (playerLife.amount <= 0)
    {
        SceneManager.LoadScene("You lose!");
    }
}
```

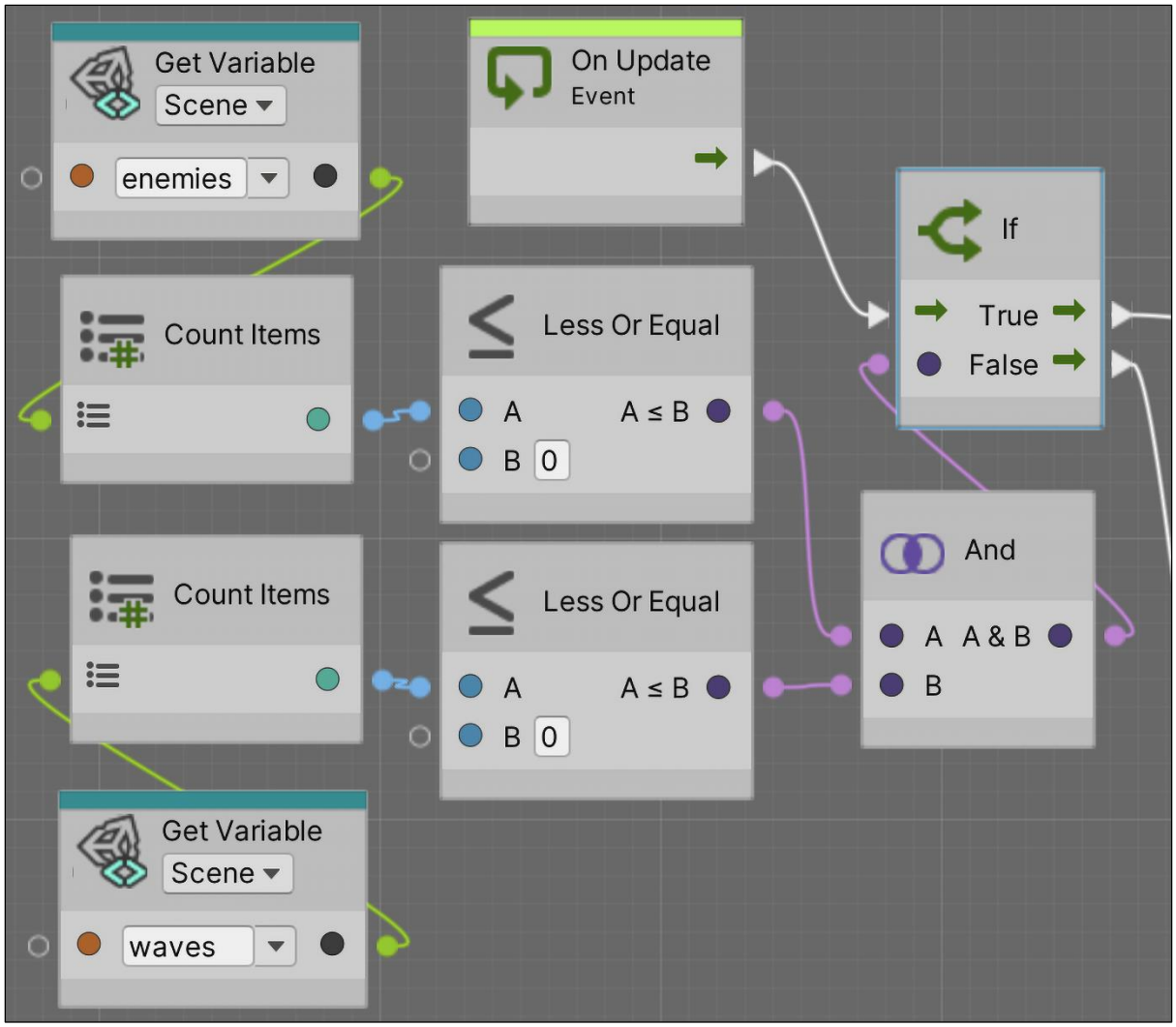


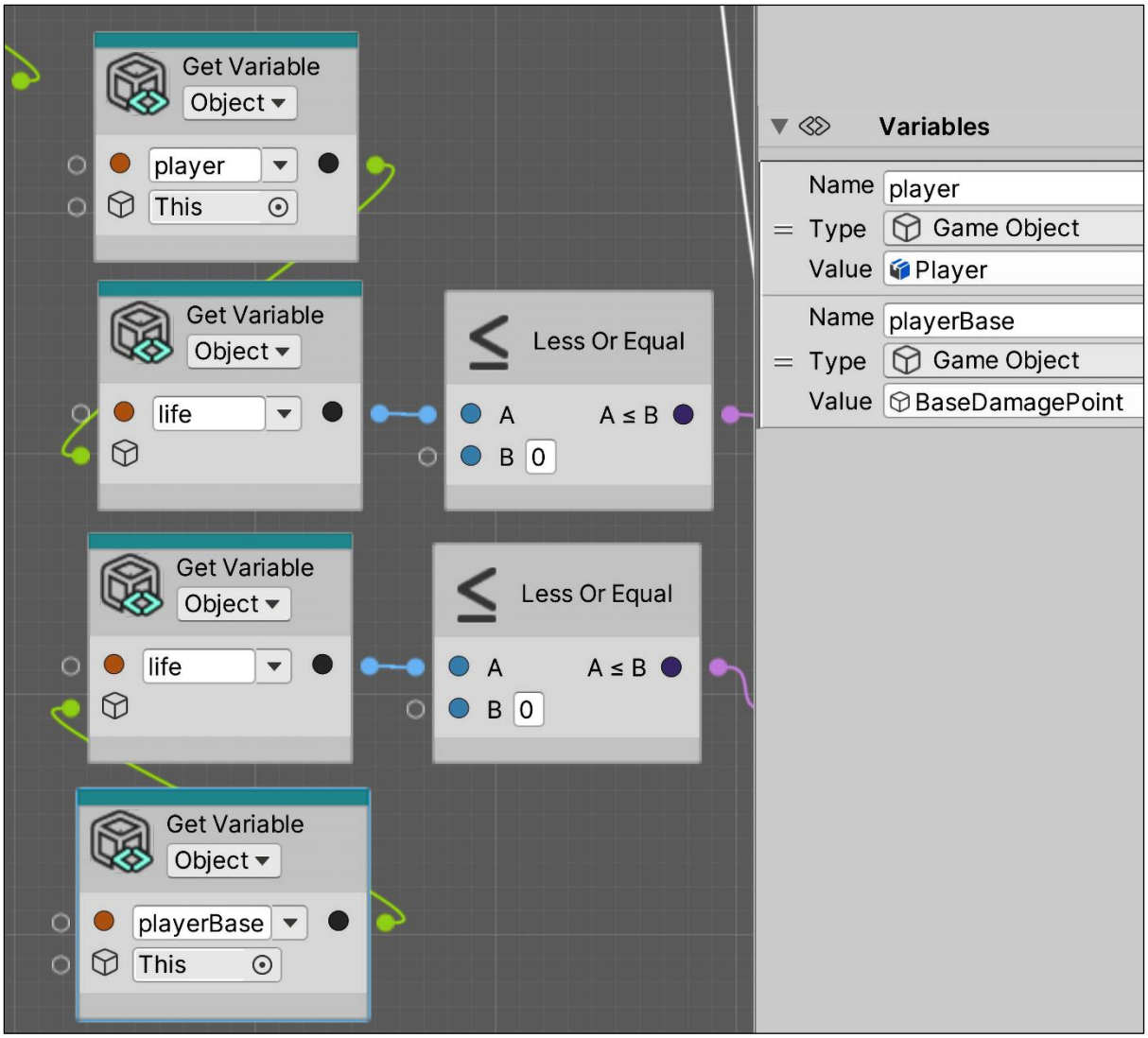
```
using UnityEngine;
using UnityEngine.SceneManagement;

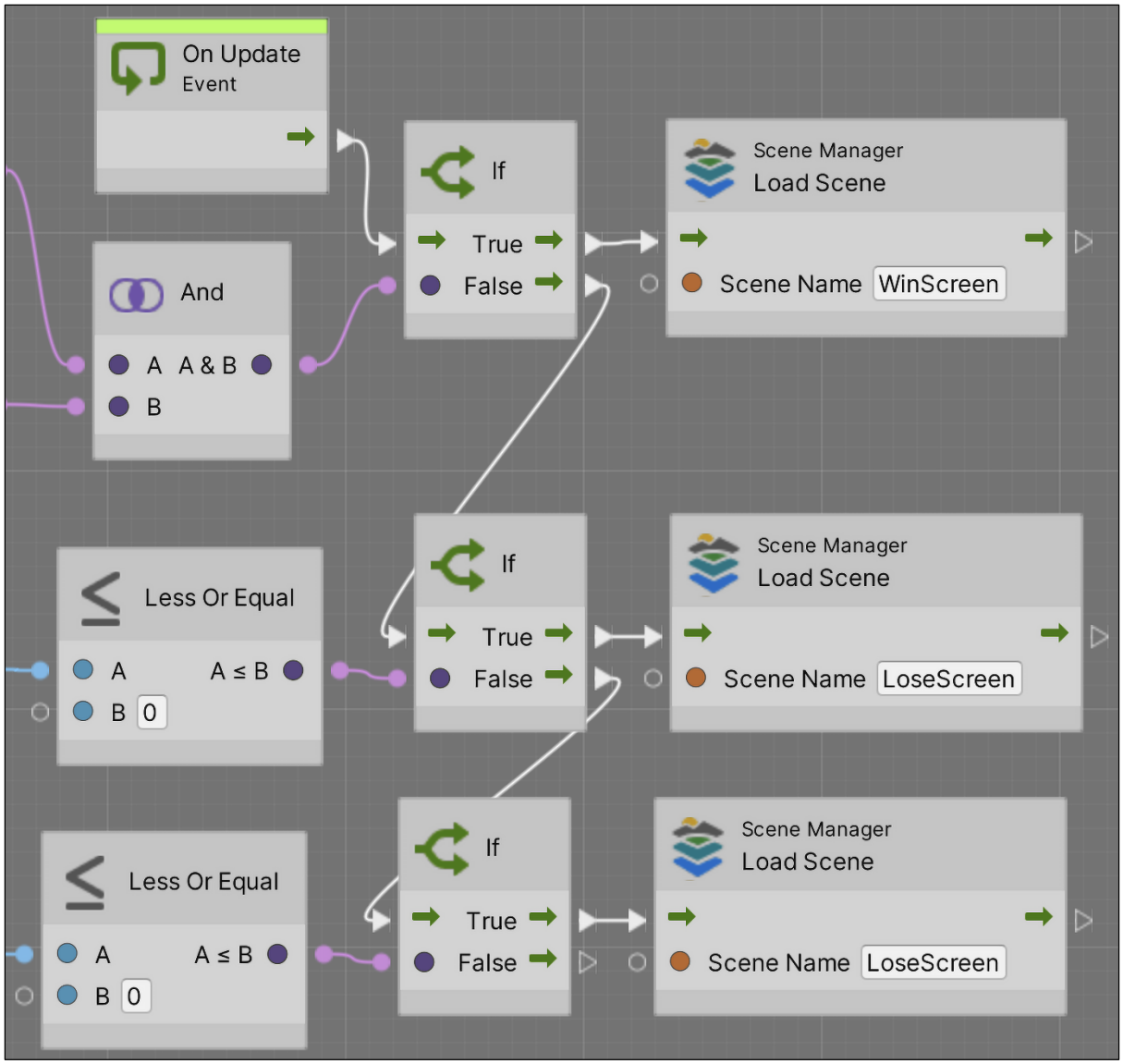
public class WavesGameMode : MonoBehaviour
{
    [SerializeField] Life playerLife;

    void Update()
    {
        if (EnemyManager.instance.enemies.Count <= 0 &&
            WavesManager.instance.waves.Count <= 0)
        {
            SceneManager.LoadScene("WinScreen");
        }

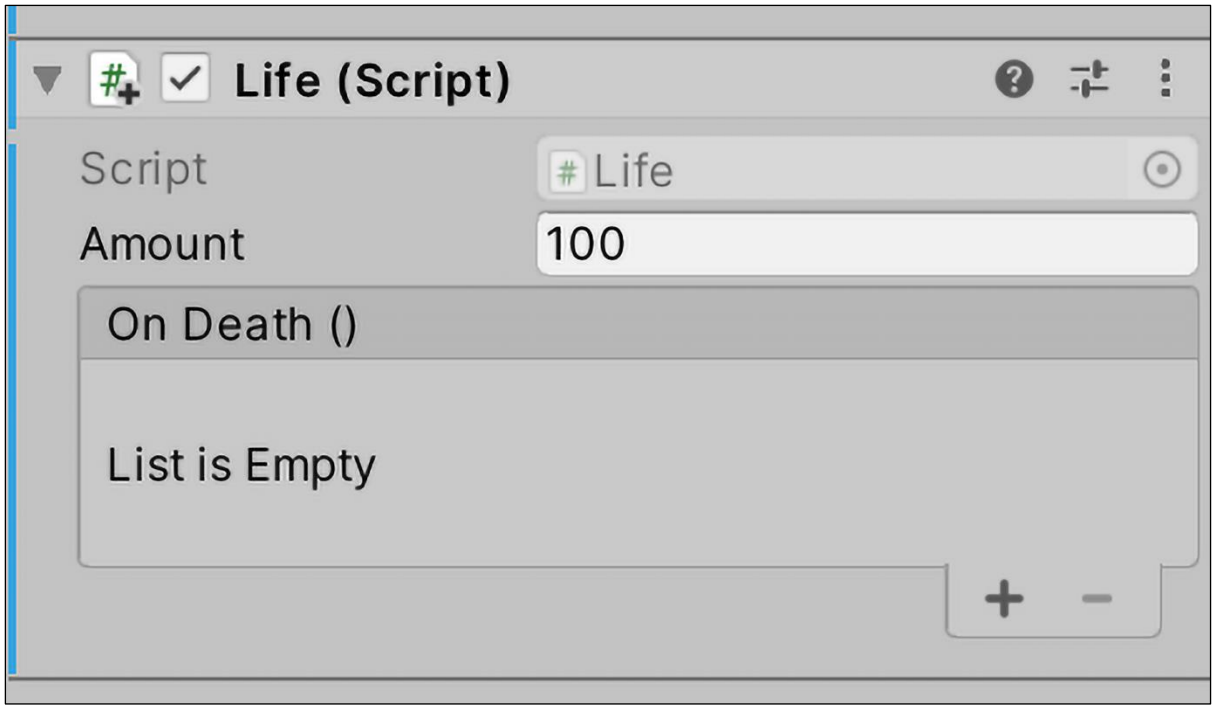
        if (playerLife.amount <= 0)
        {
            SceneManager.LoadScene("LoseScreen");
        }
    }
}
```


Get Variable
Scene
enemies
On Update
Event
If
True
False
Count Items
Less Or Equal
A
A ≤ B
B
0
Count Items
Less Or Equal
A
A ≤ B
B
0
And
A
A & B
B
Get Variable
Scene
waves


Get Variable
Object
player
This
Get Variable
Object
life
Less Or Equal
A
A ≤ B
B 0
Get Variable
Object
life
Less Or Equal
A
A ≤ B
B 0
Get Variable
Object
playerBase
This
Variables
Name player
Type Game Object
Value Player
Name playerBase
Type Game Object
Value BaseDamagePoint




```
public class Life : MonoBehaviour
{
    public float amount;
    public UnityEvent onDeath;
```


Life (Script)
Script
Life
Amount
100
On Death ()
List is Empty

```
public float amount;
public UnityEvent onDeath;

void Update()
{
    if (amount <= 0)
    {
        onDeath.Invoke();
        Destroy(gameObject);
    }
}
```

```
private void Awake()
{
    var life = GetComponent<Life>();
    life.onDeath.AddListener(GivePoints);
}

void GivePoints()
{
    ScoreManager.instance.amount += amount;
}
```

```
void Awake()
{
    playerLife.onDeath.AddListener(OnPlayerDied);
}

void OnPlayerDied()
{
    SceneManager.LoadScene("LoseScreen");
}
```

```
[SerializeField] private Life playerLife;
[SerializeField] private Life playerBaseLife;

void Awake()
{
    playerLife.onDeath.AddListener(OnPlayerOrBaseDied);
    playerBaseLife.onDeath.AddListener(OnPlayerOrBaseDied);
}

void OnPlayerOrBaseDied()
{
    SceneManager.LoadScene("LoseScreen");
}
```

```
public List<Enemy> enemies;
public UnityEvent onChanged;

public void AddEnemy(Enemy enemy)
{
    enemies.Add(enemy);
    onChanged.Invoke();
}

public void RemoveEnemy(Enemy enemy)
{
    enemies.Remove(enemy);
    onChanged.Invoke();
}
```

```
public class Enemy : MonoBehaviour
{
    void Start()
    {
        EnemyManager.instance.AddEnemy(this);
    }

    void OnDestroy()
    {
        EnemyManager.instance.RemoveEnemy(this);
    }
}
```

```
public class WavesManager : MonoBehaviour
{
    public static WavesManager instance;

    public List<WaveSpawner> waves;
    public UnityEvent onChanged;

    private void Awake()
    {
        if (instance == null)
            instance = this;
        else
            Debug.LogError("Duplicated WavesManager", gameObject);
    }

    public void AddWave(WaveSpawner wave)
    {
        waves.Add(wave);
        onChanged.Invoke();
    }

    public void RemoveWave(WaveSpawner wave)
    {
        waves.Remove(wave);
        onChanged.Invoke();
    }
}
```

```
public class WaveSpawner : MonoBehaviour
{
    public GameObject prefab;
    public float startTime;
    public float endTime;
    public float spawnRate;

    private void Start()
    {
        WavesManager.instance.AddWave(this);
        InvokeRepeating("Spawn", startTime, spawnRate);
        Invoke("EndSpawner", endTime);
    }

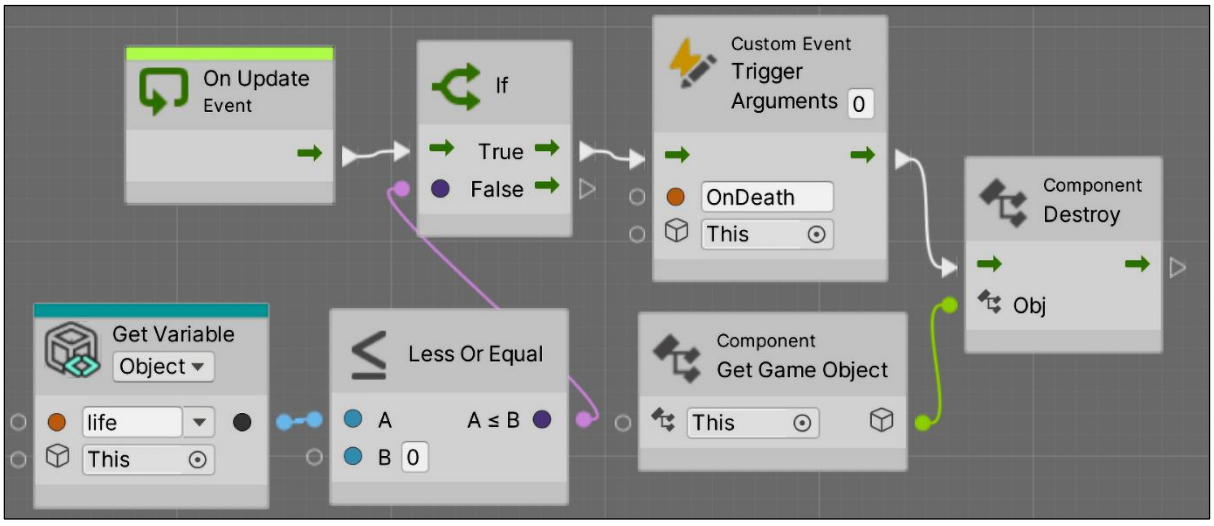
    void Spawn()
    {
        Instantiate(prefab, transform.position, transform.rotation);
    }

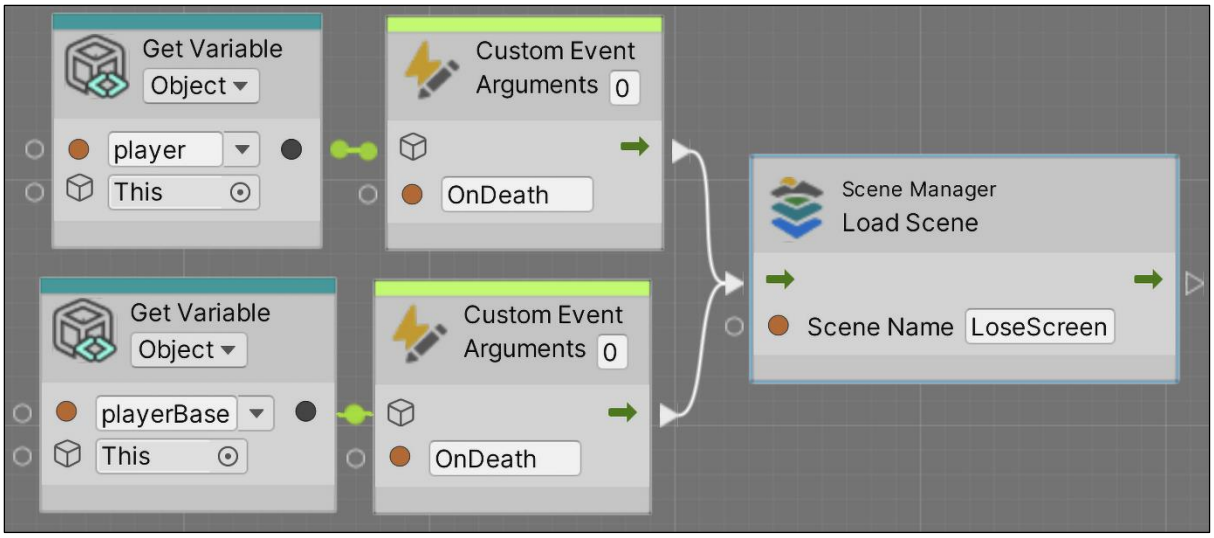
    void EndSpawner()
    {
        WavesManager.instance.RemoveWave(this);
        CancelInvoke();
    }
}
```

```
void Start()
{
    playerLife.onDeath.AddListener(OnPlayerOrBaseDied);
    playerBaseLife.onDeath.AddListener(OnPlayerOrBaseDied);
    EnemyManager.instance.onChanged.AddListener(CheckWinCondition);
    WavesManager.instance.onChanged.AddListener(CheckWinCondition);
}

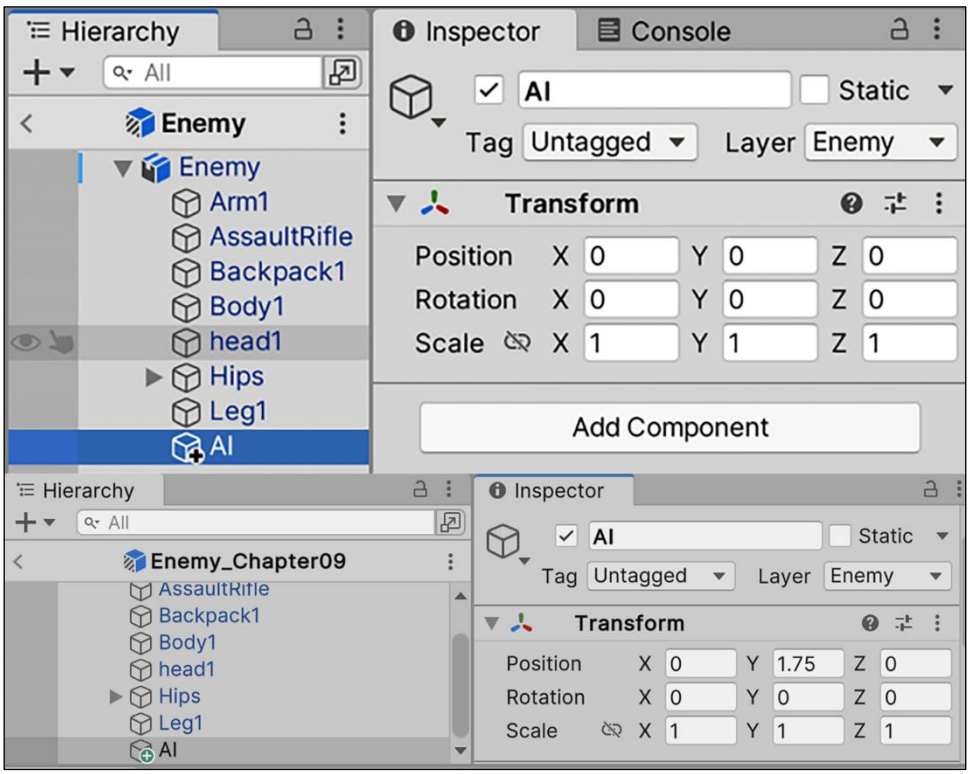
void OnPlayerOrBaseDied()
{
    SceneManager.LoadScene("LoseScreen");
}

void CheckWinCondition()
{
    if (EnemyManager.instance.enemies.Count <= 0 && WavesManager.instance.waves.Count <= 0)
    {
        SceneManager.LoadScene("WinScreen");
    }
}
```




Get Variable
Object
player
This
Custom Event
Arguments
0
OnDeath
Scene Manager
Load Scene
Scene Name
LoseScreen
Get Variable
Object
playerBase
This
Custom Event
Arguments
0
OnDeath

Chapter 9: Starting your AI Journey: Building Intelligent Enemies for Your Game




```
using UnityEngine;


public class Sight : MonoBehaviour
{
    public float distance;
    public float angle;
    public LayerMask objectsLayers;
    public LayerMask obstaclesLayers;
}
```

```
private void Update()
{
    Collider[] colliders = Physics.OverlapSphere(
        transform.position, distance, objectsLayers);

    for (int i = 0; i < colliders.Length; i++)
    {
        Collider collider = colliders[i];
    }
}
```

```
Vector3 directionToCollider = Vector3.Normalize(
    collider.bounds.center - transform.position);
Vector3 directionToController = Vector3.Normalize(
    collider.bounds.center - transform.position);
```

```
float angleToCollider = Vector3.Angle(
    transform.forward, directionToCollider);
```

```
if (angleToCollider < angle)
{
    if (!Physics.Linecast(transform.position,
            collider.bounds.center, obstaclesLayers))
    {
    }
}
```

```
public float distance;
public float angle;
public LayerMask objectsLayers;
public LayerMask obstaclesLayers;
public Collider detectedObject;

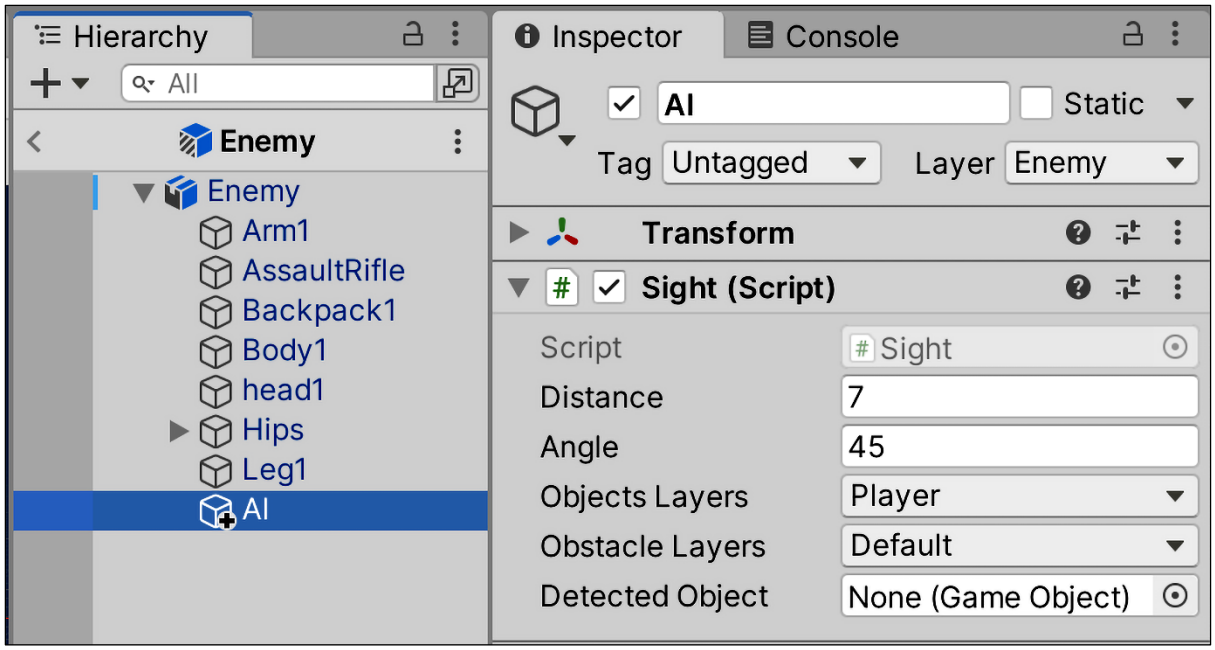
private void Update()
{
    Collider[] colliders = Physics.OverlapSphere(
        transform.position, distance, (int) objectsLayers);

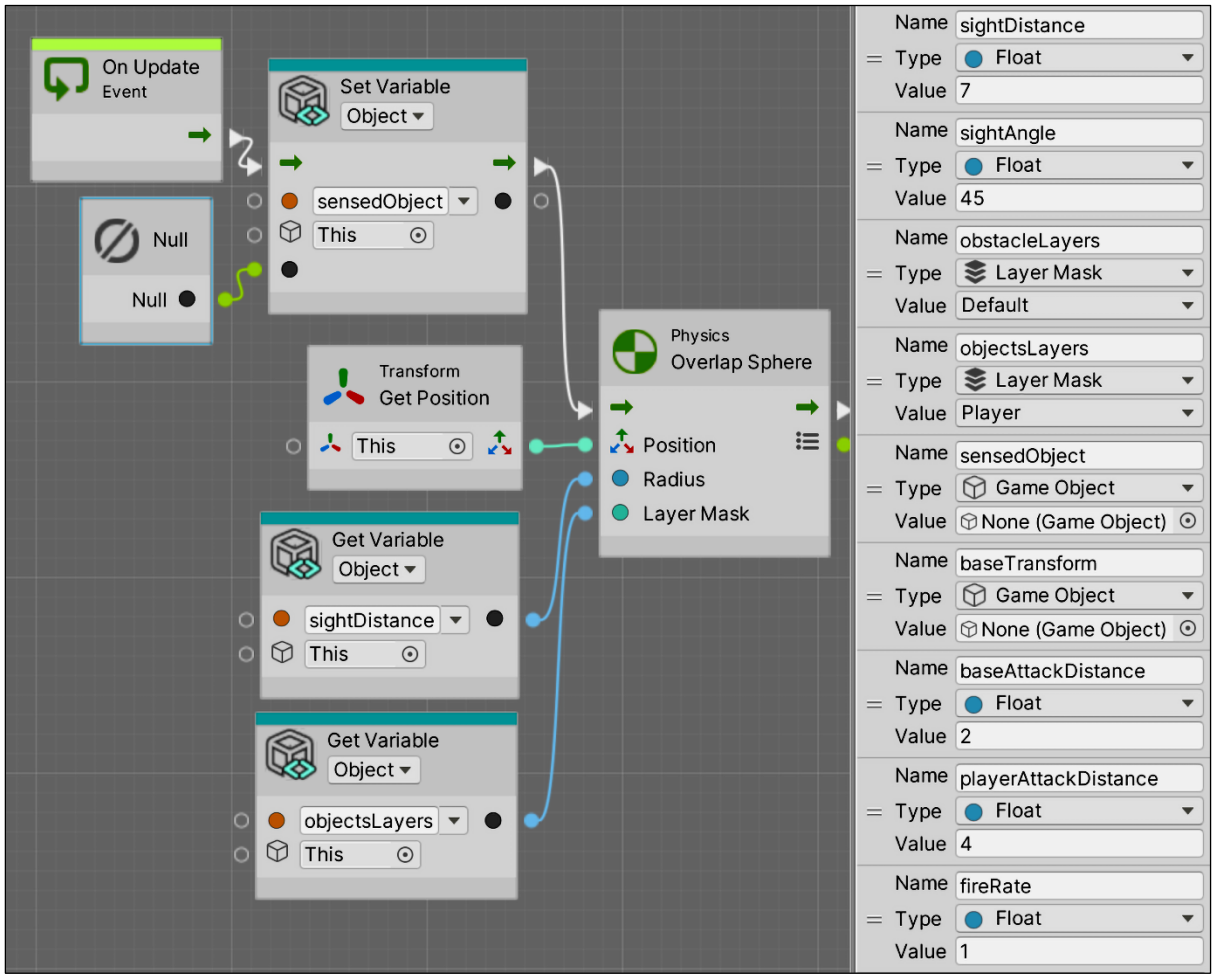
    detectedObject = null;
    for (int i = 0; i < colliders.Length; i++)
    {
        Collider collider = colliders[i];

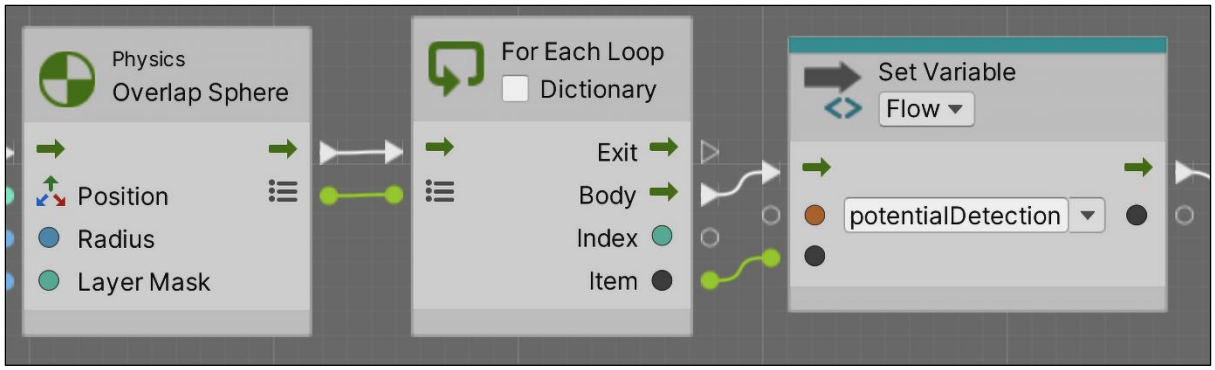
        Vector3 directionToController = Vector3.Normalize(
            collider.bounds.center - transform.position);

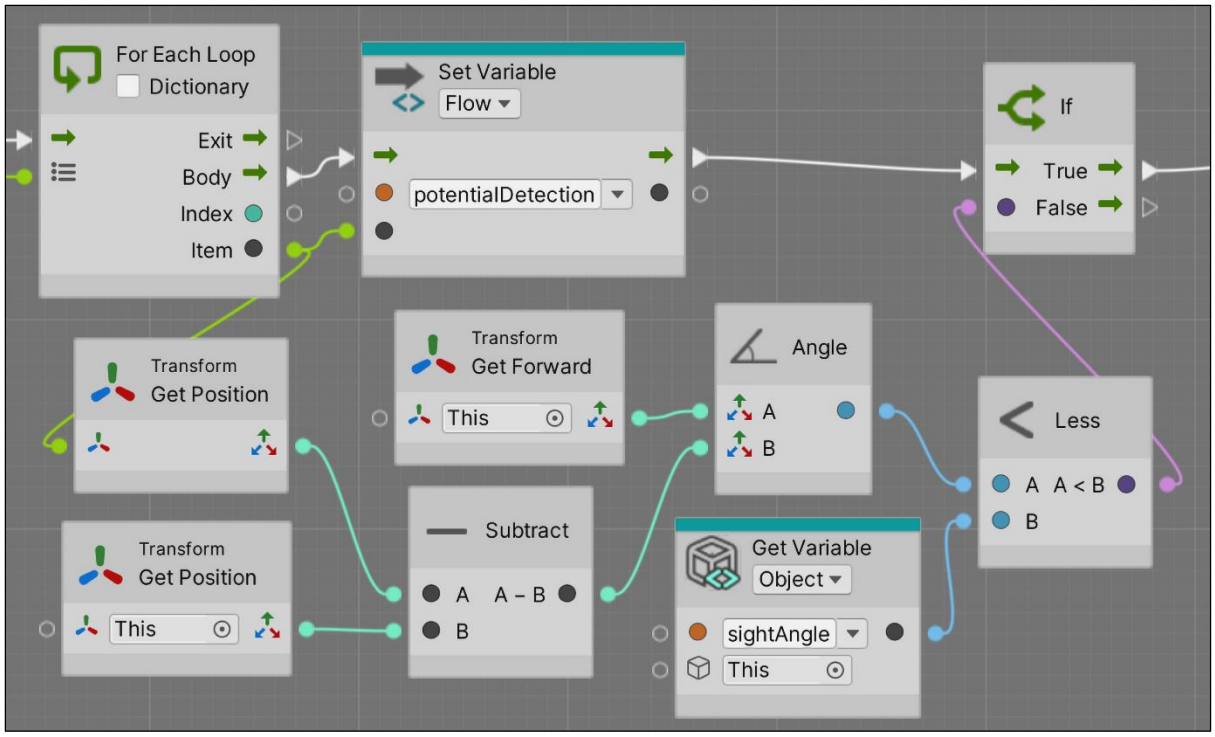
        float angleToCollider = Vector3.Angle(
            transform.forward, directionToController);

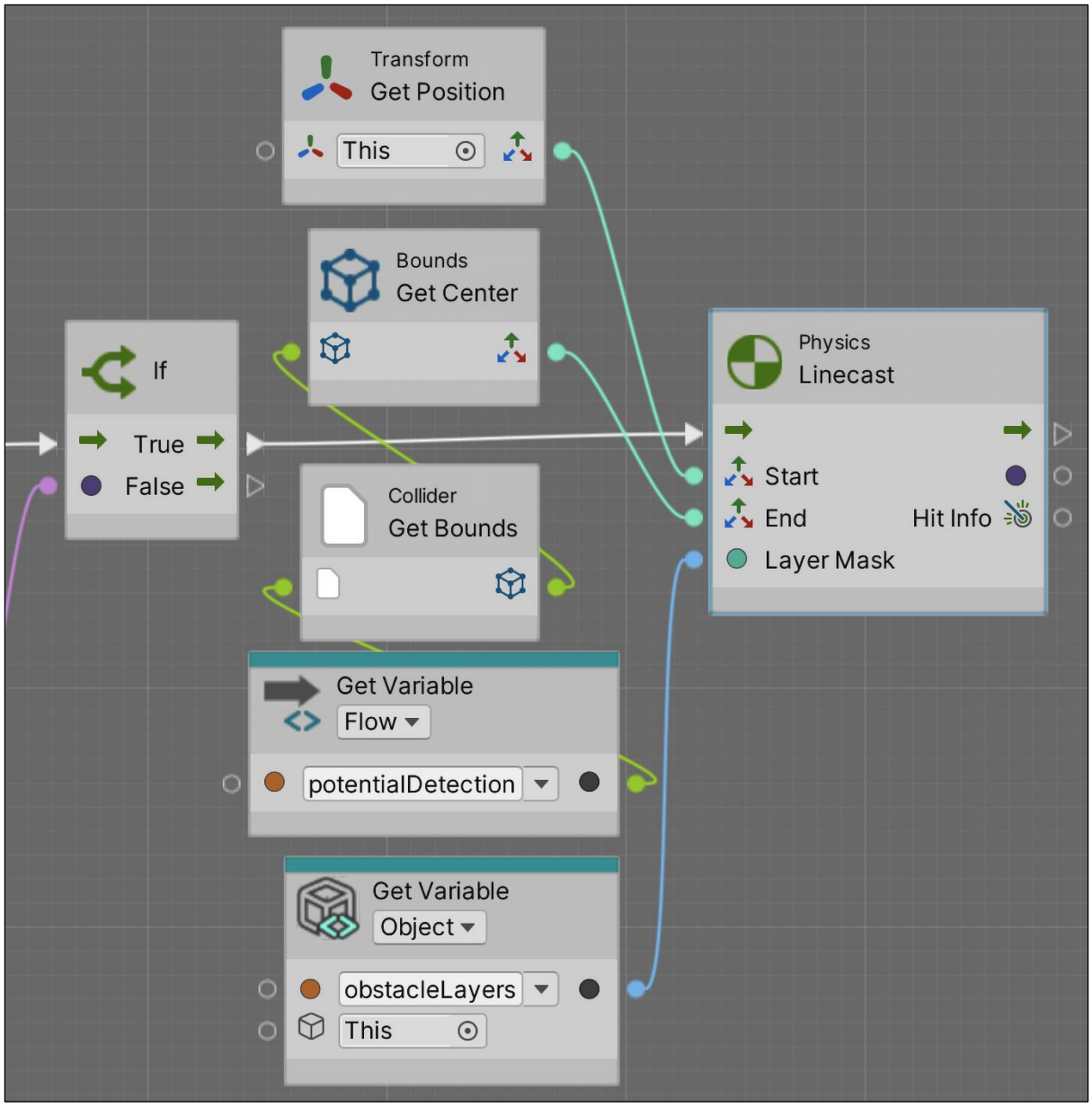
        if (angleToCollider < angle)
        {
            if (!Physics.Linecast(transform.position,
                    collider.bounds.center, (int) obstaclesLayers))
            {
                detectedObject = collider;
                break;
            }
        }
    }
}
```

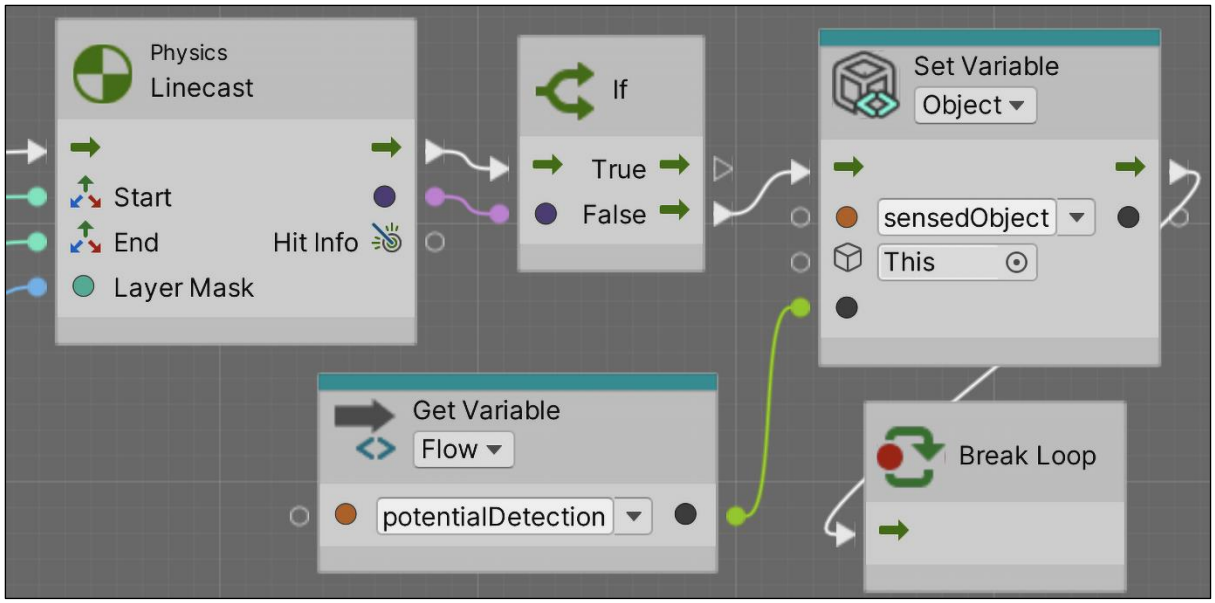

Hierarchy
All
Enemy
Enemy
Arm1
AssaultRifle
Backpack1
Body1
head1
Hips
Leg1
AI
Inspector
Console
AI
Static
Tag
Untagged
Layer
Enemy
Transform
Sight (Script)
Script
Sight
Distance
7
Angle
45
Objects Layers
Player
Obstacle Layers
Default
Detected Object
None (Game Object)

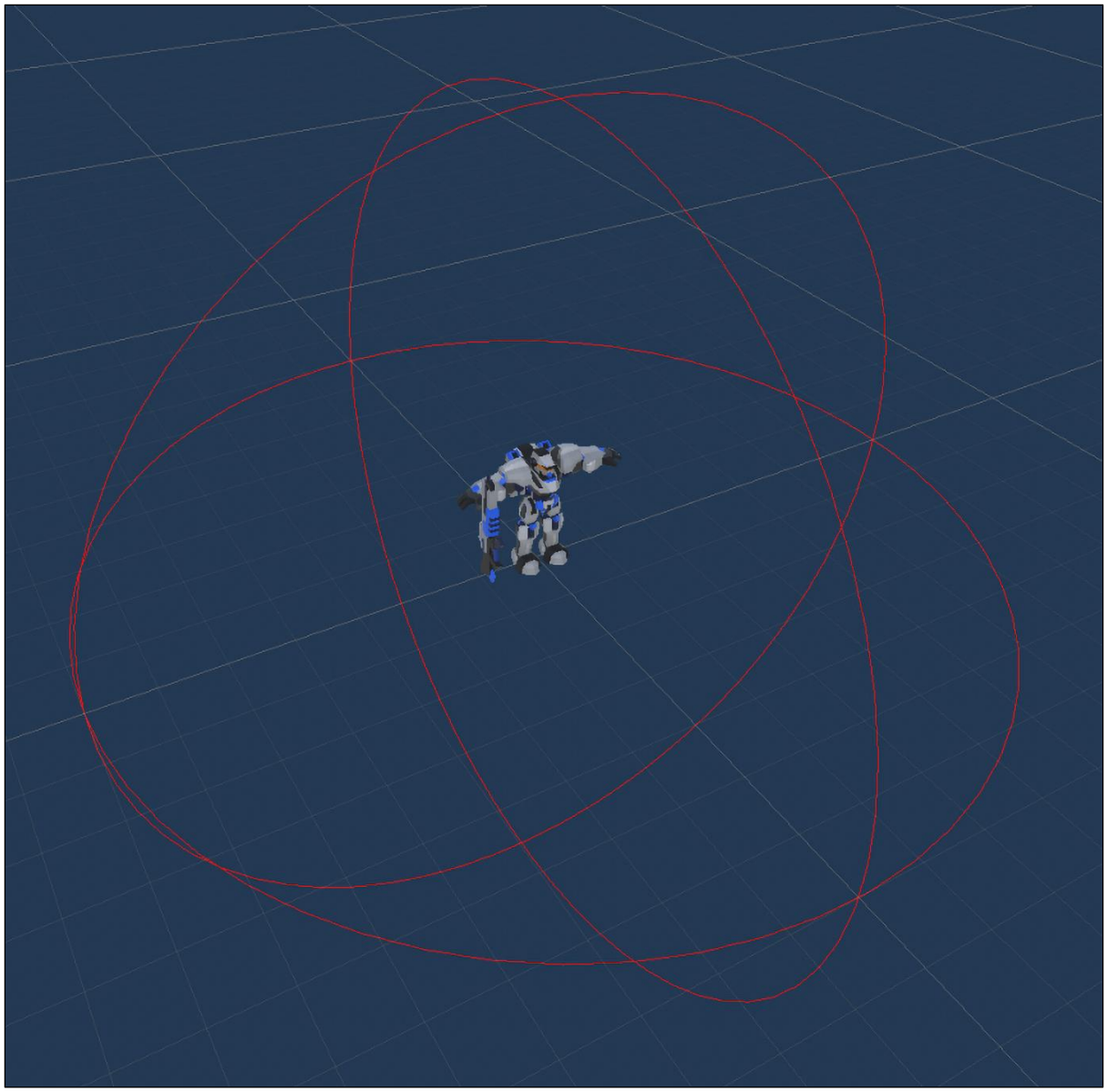

On Update
Event
Set Variable
Object
sensedObject
This
Null
Null
Transform
Get Position
This
Physics
Overlap Sphere
Position
Radius
Layer Mask
Get Variable
Object
sightDistance
This
Get Variable
Object
objectsLayers
This
Name sightDistance
Type Float
Value 7
Name sightAngle
Type Float
Value 45
Name obstacleLayers
Type Layer Mask
Value Default
Name objectsLayers
Type Layer Mask
Value Player
Name sensedObject
Type Game Object
Value None (Game Object)
Name baseTransform
Type Game Object
Value None (Game Object)
Name baseAttackDistance
Type Float
Value 2
Name playerAttackDistance
Type Float
Value 4
Name fireRate
Type Float
Value 1


Physics
Overlap Sphere
Position
Radius
Layer Mask
For Each Loop
Dictionary
Exit
Body
Index
Item
Set Variable
Flow
potentialDetection


For Each Loop
Dictionary
Exit
Body
Index
Item
Set Variable
Flow
potentialDetection
If
True
False
Transform
Get Position
Transform
Get Forward
This
Angle
A
B
Less
A A < B
B
Transform
Get Position
This
Subtract
A A – B
B
Get Variable
Object
sightAngle
This


Transform
Get Position
This
Bounds
Get Center
If
True
False
Collider
Get Bounds
Physics
Linecast
Start
End
Hit Info
Layer Mask
Get Variable
Flow
potentialDetection
Get Variable
Object
obstacleLayers
This

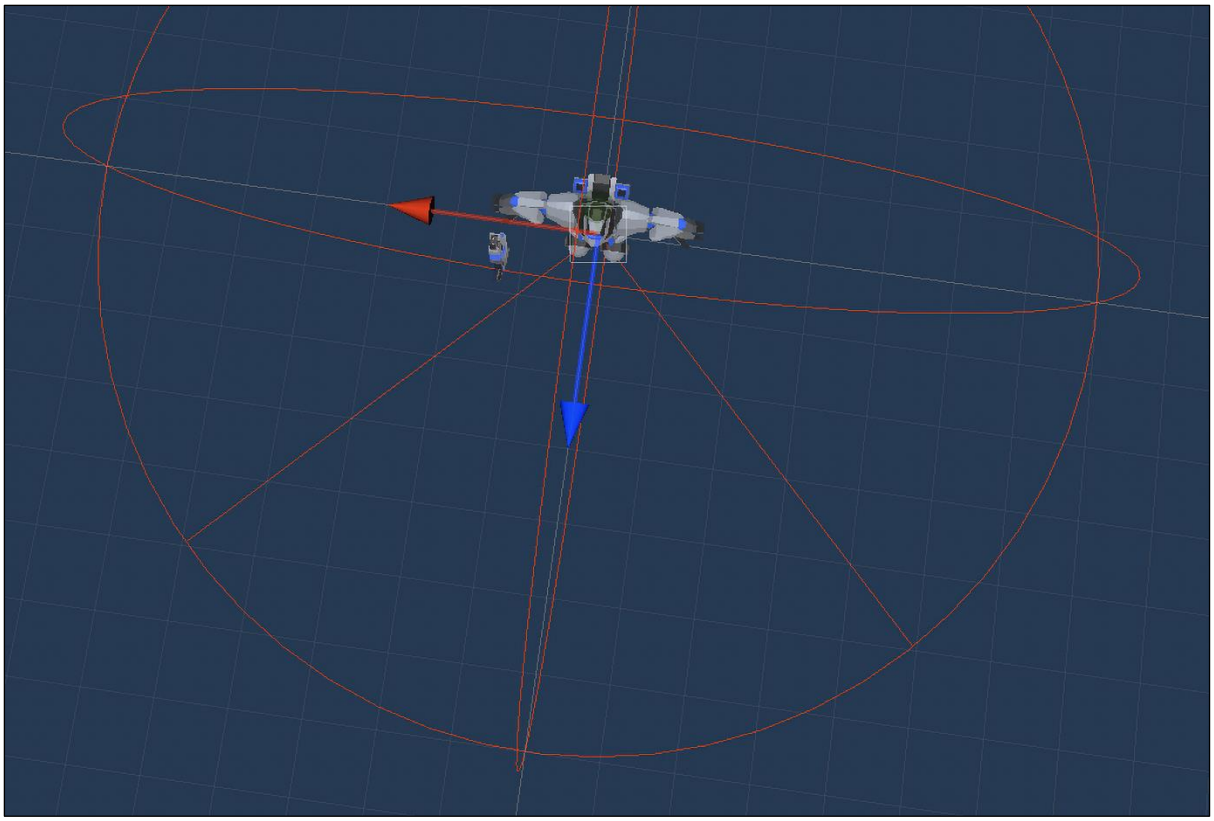

Physics
Linecast
Start
End
Layer Mask
Hit Info
If
True
False
Set Variable
Object
sensedObject
This
Get Variable
Flow
potentialDetection
Break Loop



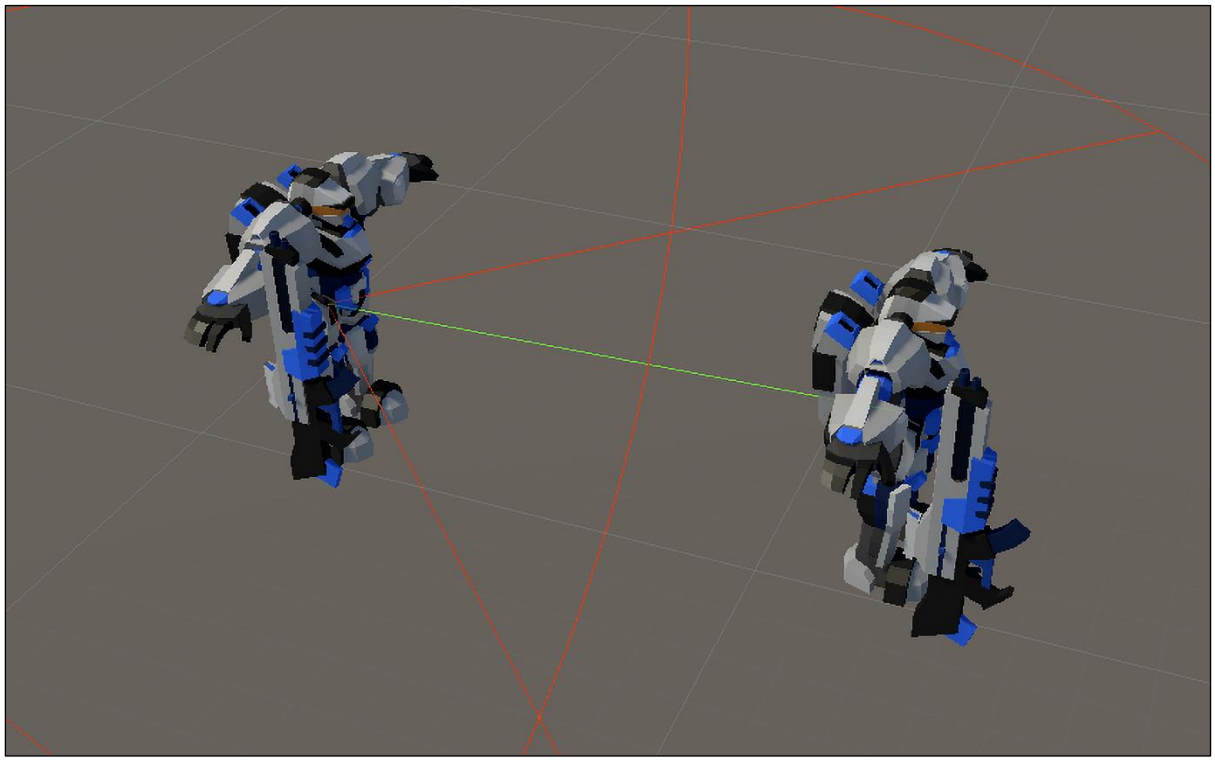
```
void OnDrawGizmos()
{
    Gizmos.color = Color.red;
    Gizmos.DrawWireSphere(transform.position, distance);
}
```

```
Vector3 rightDirection = Quaternion.Euler(0, angle, 0) * transform.forward;
Gizmos.DrawRay(transform.position, rightDirection * distance);

Vector3 leftDirection = Quaternion.Euler(0, -angle, 0) * transform.forward;
Gizmos.DrawRay(transform.position, leftDirection * distance);
```

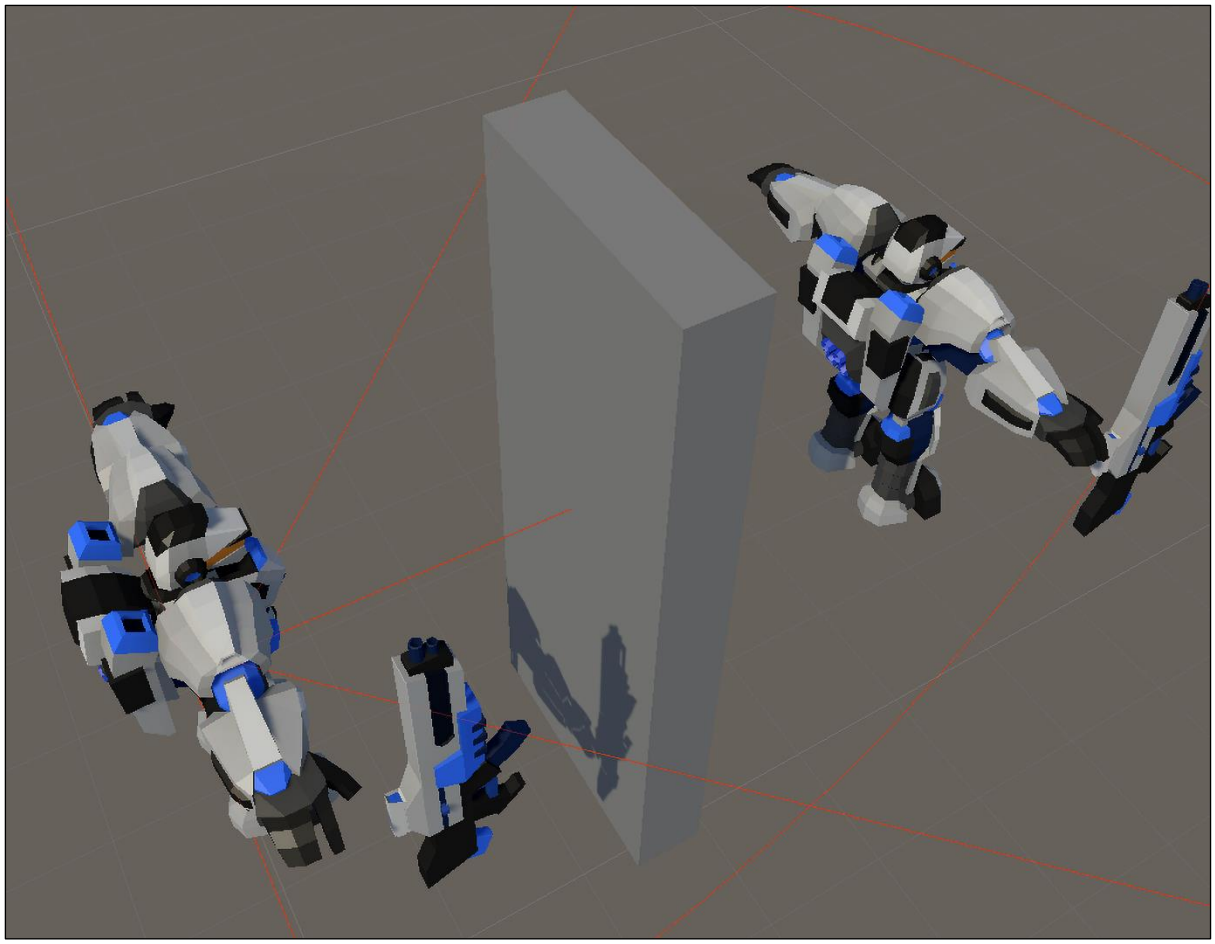


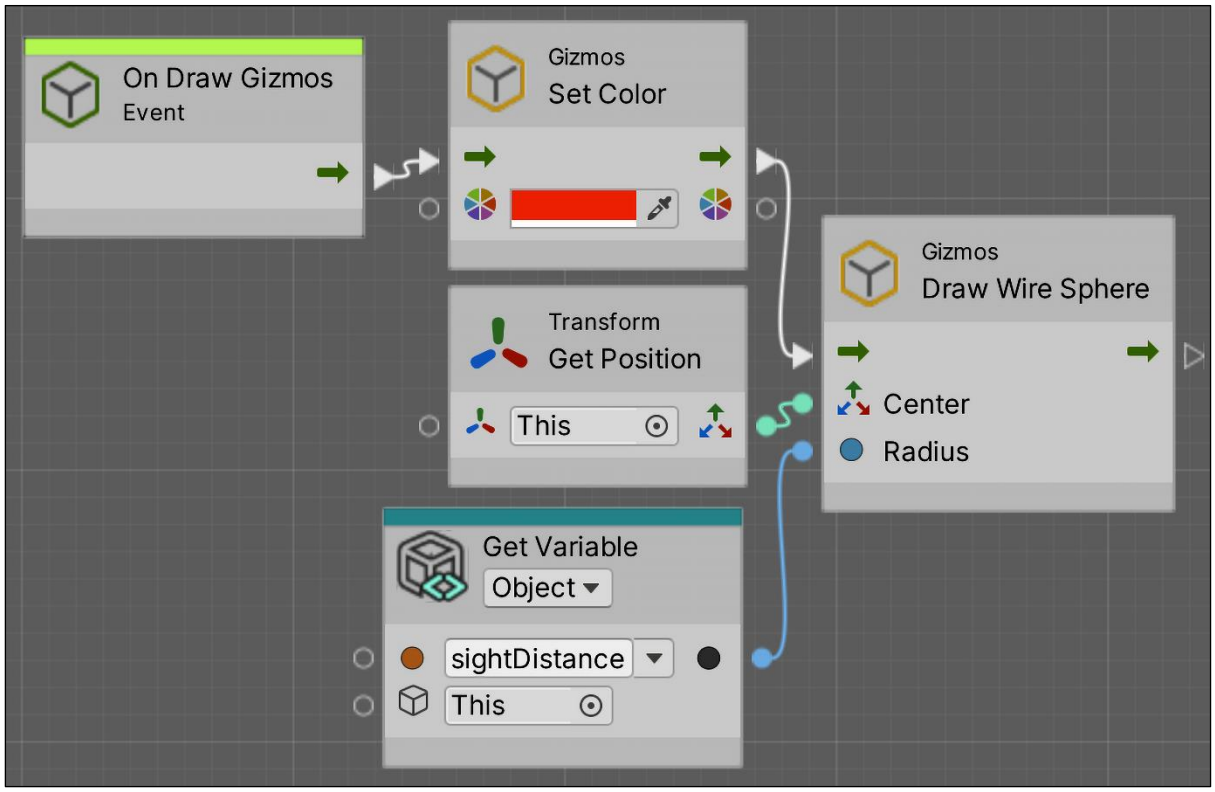
```
if (angleToCollider < angle)
{
    if (!Physics.Linecast(transform.position,
            collider.bounds.center, obstaclesLayers))
    {
        Debug.DrawLine(transform.position,
            collider.bounds.center, Color.green);
        detectedObject = collider;
        break;
    }
}
```

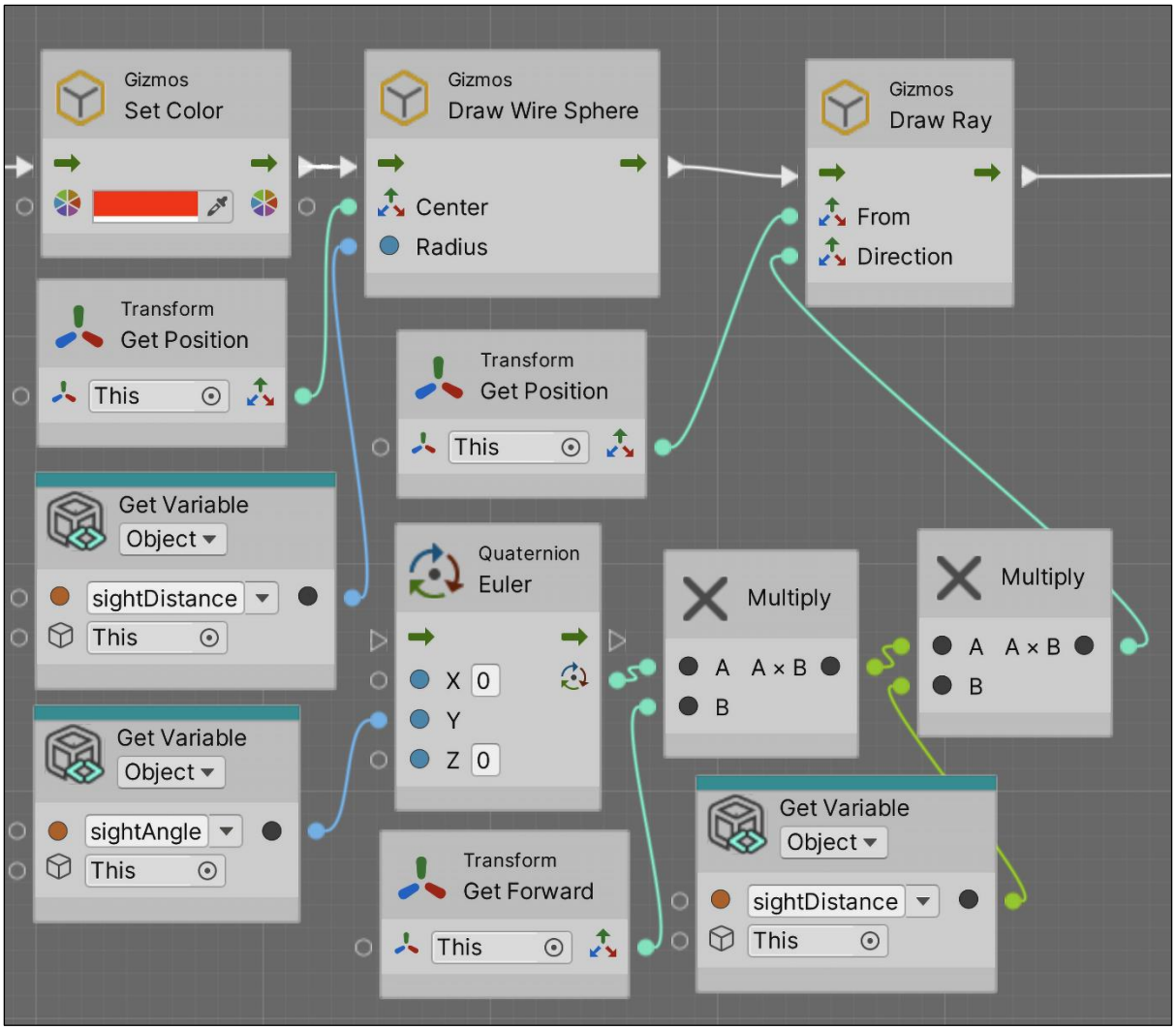


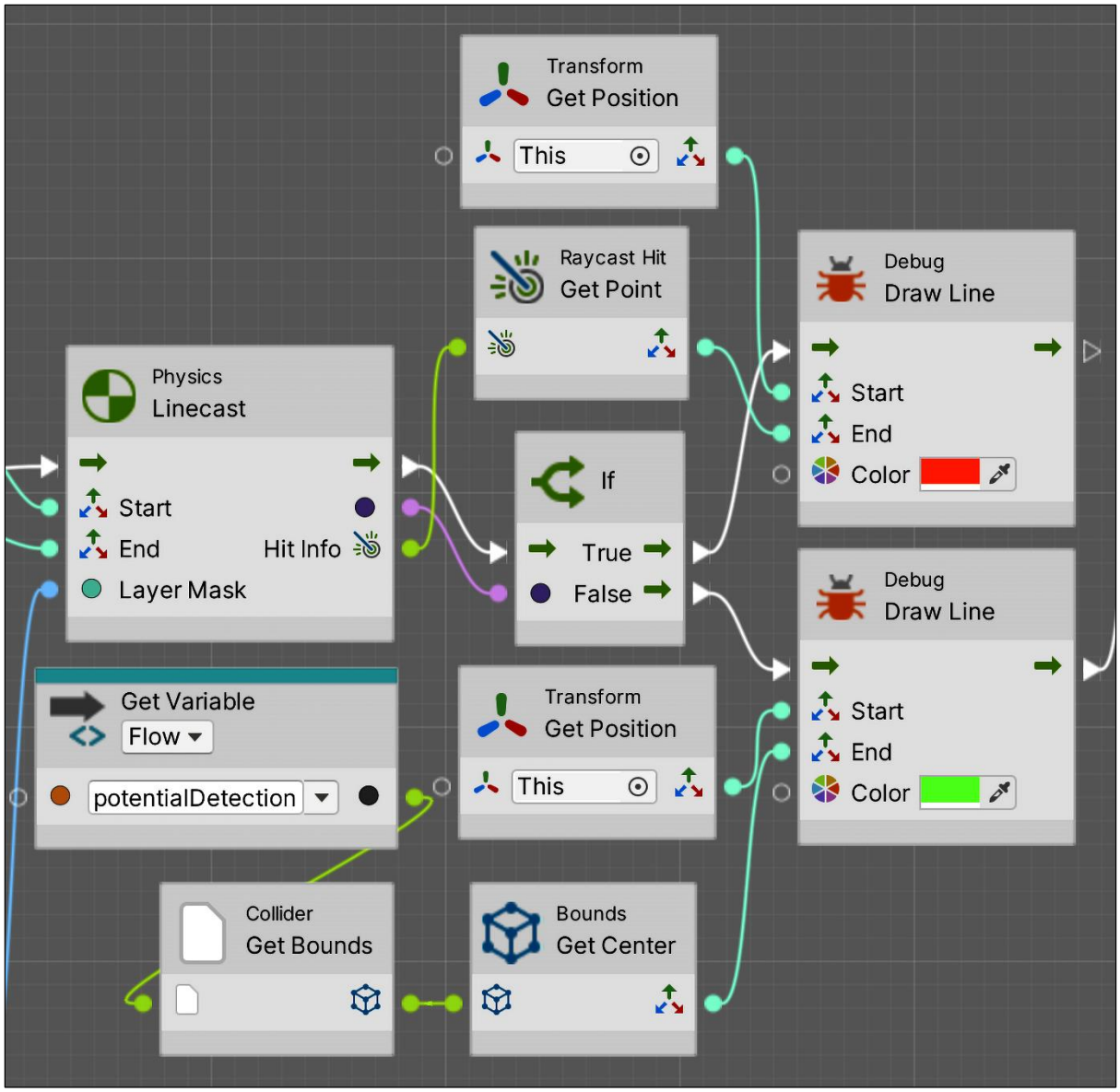
```
if (!Physics.Linecast(
        transform.position, collider.bounds.center,
        out RaycastHit hit, obstaclesLayers))
{
```

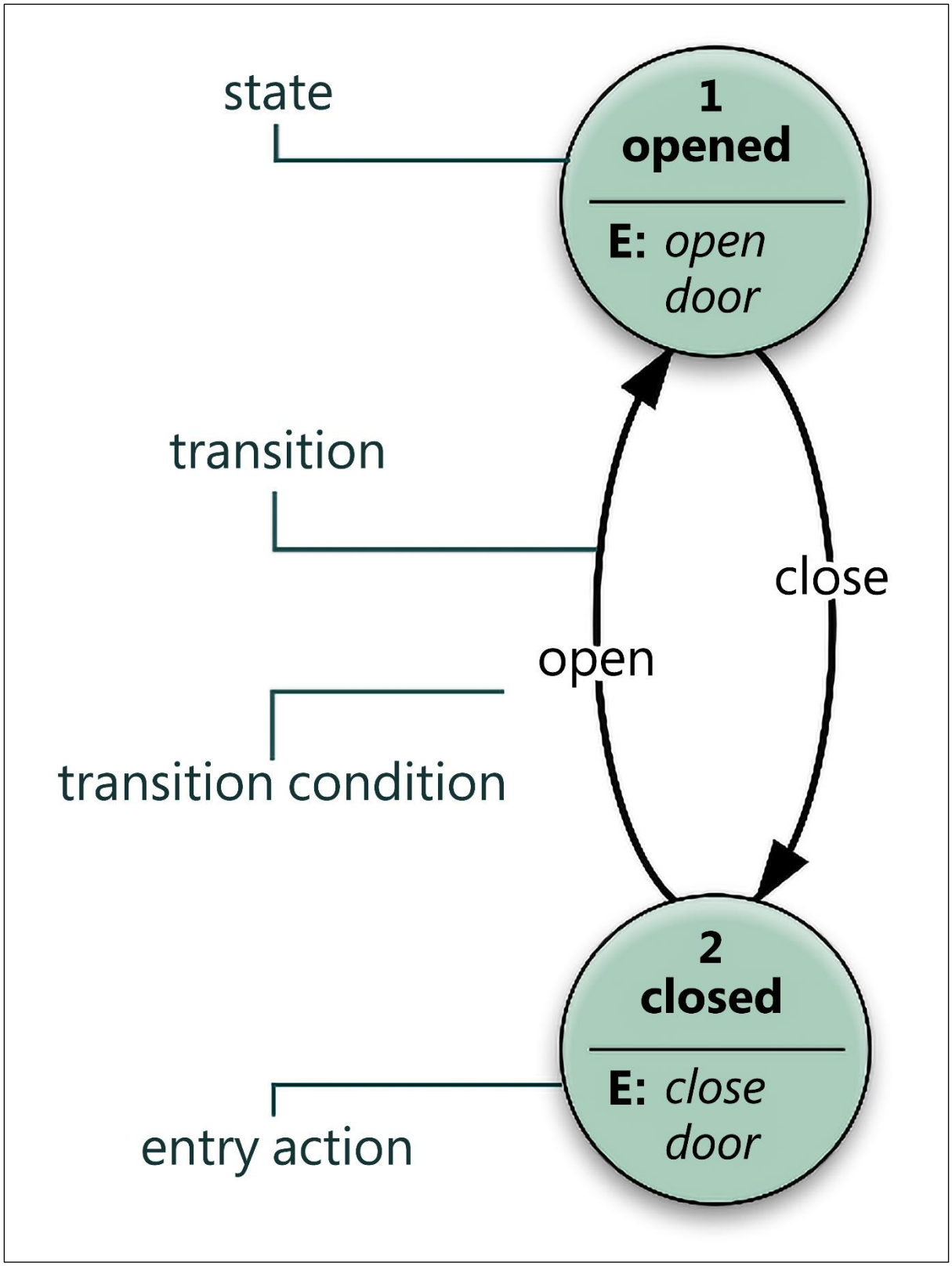
```
if (!Physics.Linecast(
        transform.position, collider.bounds.center,
        out RaycastHit hit, obstaclesLayers))
{
    Debug.DrawLine(transform.position,
        collider.bounds.center, Color.green);
    detectedObject = collider;
    break;
}
else
{
    Debug.DrawLine(transform.position, hit.point, Color.red);
}
```




On Draw Gizmos
Event
Gizmos
Set Color
Transform
Get Position
This
Gizmos
Draw Wire Sphere
Center
Radius
Get Variable
Object
sightDistance
This


Gizmos
Set Color
Gizmos
Draw Wire Sphere
Center
Radius
Gizmos
Draw Ray
From
Direction
Transform
Get Position
This
Transform
Get Position
This
Get Variable
Object
sightDistance
This
Quaternion
Euler
X 0
Y
Z 0
Multiply
A
A × B
B
Multiply
A
A × B
B
Get Variable
Object
sightAngle
This
Transform
Get Forward
This
Get Variable
Object
sightDistance
This


Transform
Get Position
This
Raycast Hit
Get Point
Debug
Draw Line
Start
End
Color
Physics
Linecast
Start
End
Hit Info
Layer Mask
If
True
False
Debug
Draw Line
Start
End
Color
Get Variable
Flow
potentialDetection
Transform
Get Position
This
Collider
Get Bounds
Bounds
Get Center

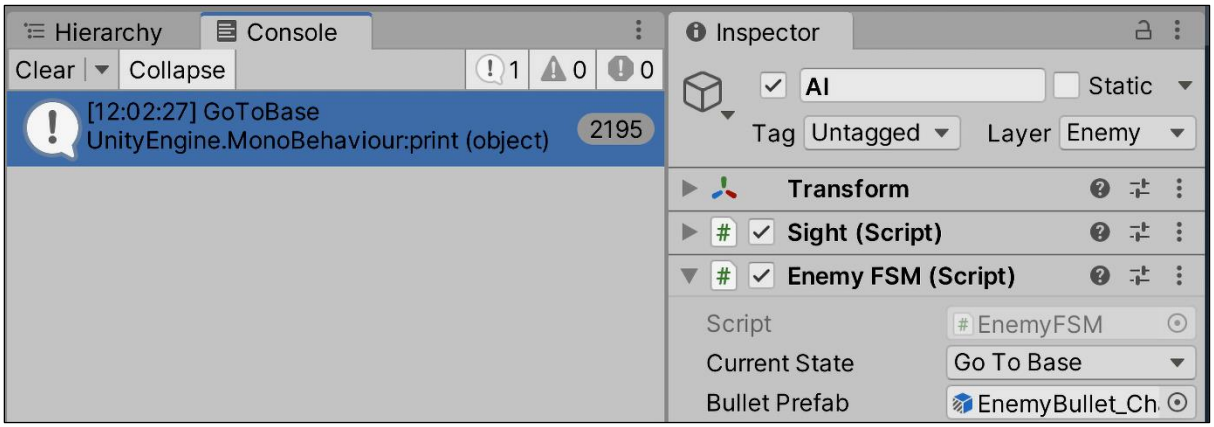

state
1
opened
E: open door
transition
close
open
transition condition
2
closed
E: close door
entry action

```
public class EnemyFSM : MonoBehaviour
{
    public enum EnemyState { GoToBase, AttackBase, ChasePlayer, AttackPlayer }

    public EnemyState currentState;
}
```

```
void Update()
{
    if (currentState == EnemyState.GoToBase) { GoToBase(); }
    else if (currentState == EnemyState.AttackBase) { AttackBase(); }
    else if (currentState == EnemyState.ChasePlayer) { ChasePlayer(); }
    else { AttackPlayer(); }
}

void GoToBase() { print("GoToBase"); }
void AttackBase() { print("AttackBase"); }
void ChasePlayer() { print("ChasePlayer"); }
void AttackPlayer() { print("AttackPlayer"); }
```



```
public Sight sightSensor;

void GoToBase()
{
    if (sightSensor.detectedObject != null)
    {
        currentState = EnemyState.ChasePlayer;
    }
}
```

```
public Transform baseTransform;
public float baseAttackDistance;

void GoToBase()
{
    if (sightSensor.detectedObject != null)
    {
        currentState = EnemyState.ChasePlayer;
    }

    float distanceToBase = Vector3.Distance(
        transform.position, baseTransform.position);

    if (distanceToBase < baseAttackDistance)
    {
        currentState = EnemyState.AttackBase;
    }
}
```

```
public float playerAttackDistance;

void ChasePlayer()
{
    if (sightSensor.detectedObject == null)
    {
        currentState = EnemyState.GoToBase;
        return;
    }

    float distanceToPlayer = Vector3.Distance(transform.position,
        sightSensor.detectedObject.transform.position);

    if (distanceToPlayer <= playerAttackDistance)
    {
        currentState = EnemyState.AttackPlayer;
    }
}
```

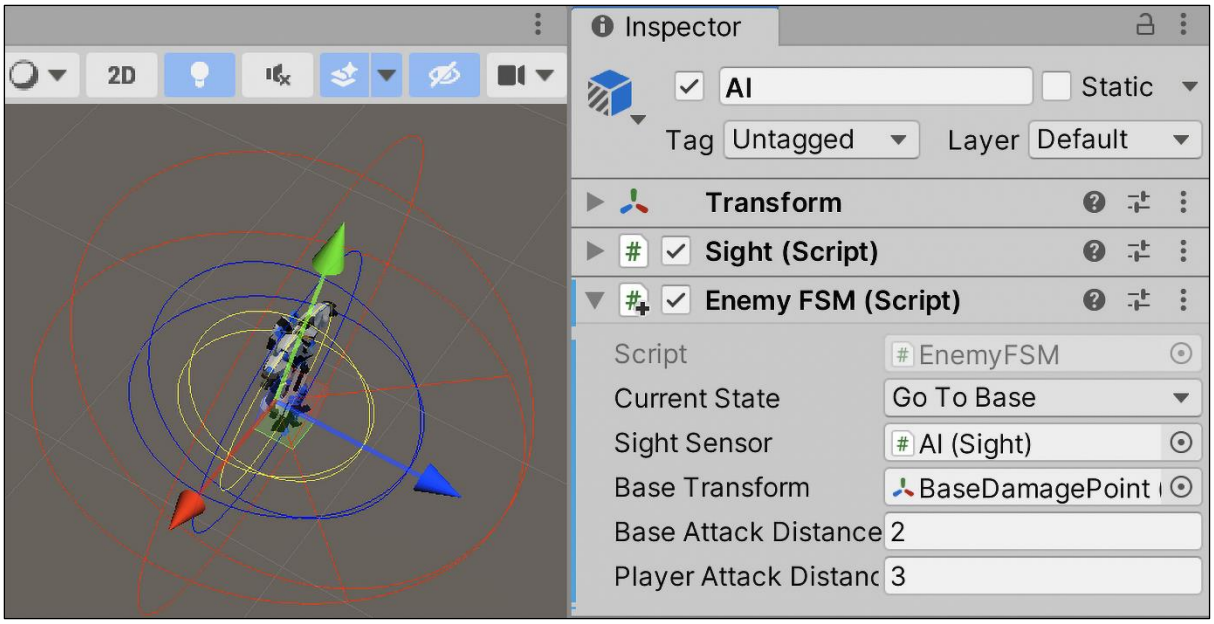
```
void AttackPlayer()
{
    if (sightSensor.detectedObject == null)
    {
        currentState = EnemyState.GoToBase;
        return;
    }


    float distanceToPlayer = Vector3.Distance(transform.position,
        sightSensor.detectedObject.transform.position);

    if (distanceToPlayer > playerAttackDistance * 1.1f)
    {
        currentState = EnemyState.ChasePlayer;
    }
}
```

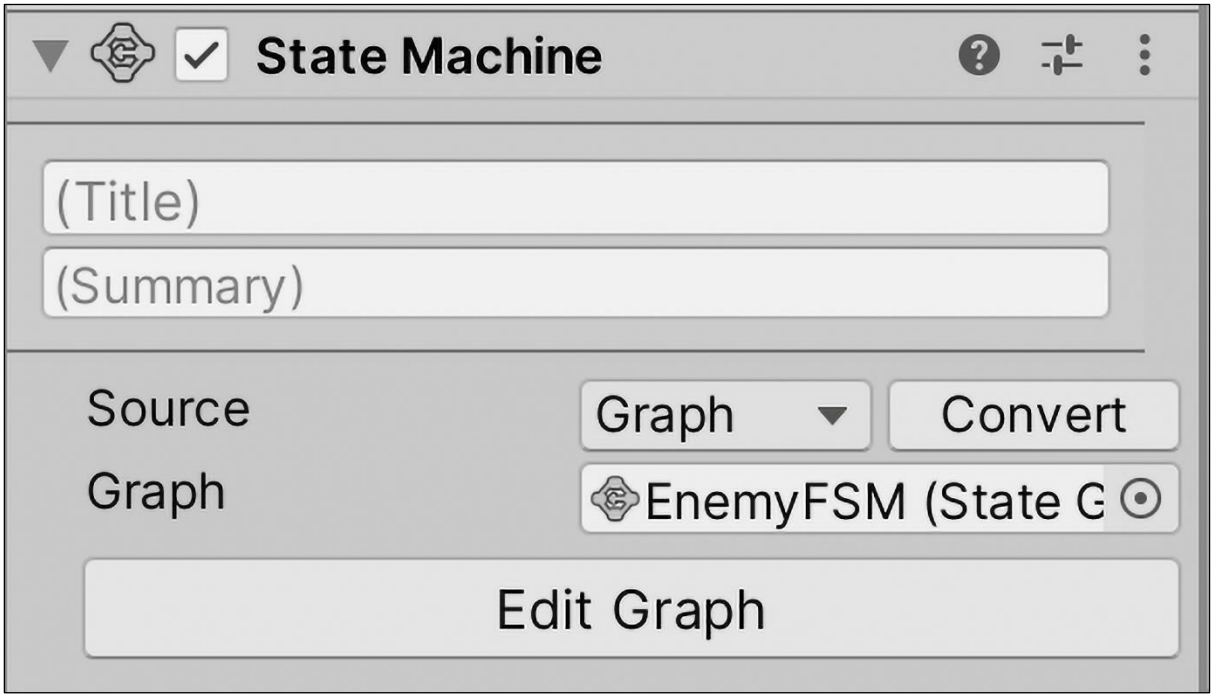
```
 private void OnDrawGizmos()
 {
     Gizmos.color = Color.blue;
     Gizmos.DrawWireSphere(transform.position, playerAttackDistance);

     Gizmos.color = Color.yellow;
     Gizmos.DrawWireSphere(transform.position, baseAttackDistance);
 }
```

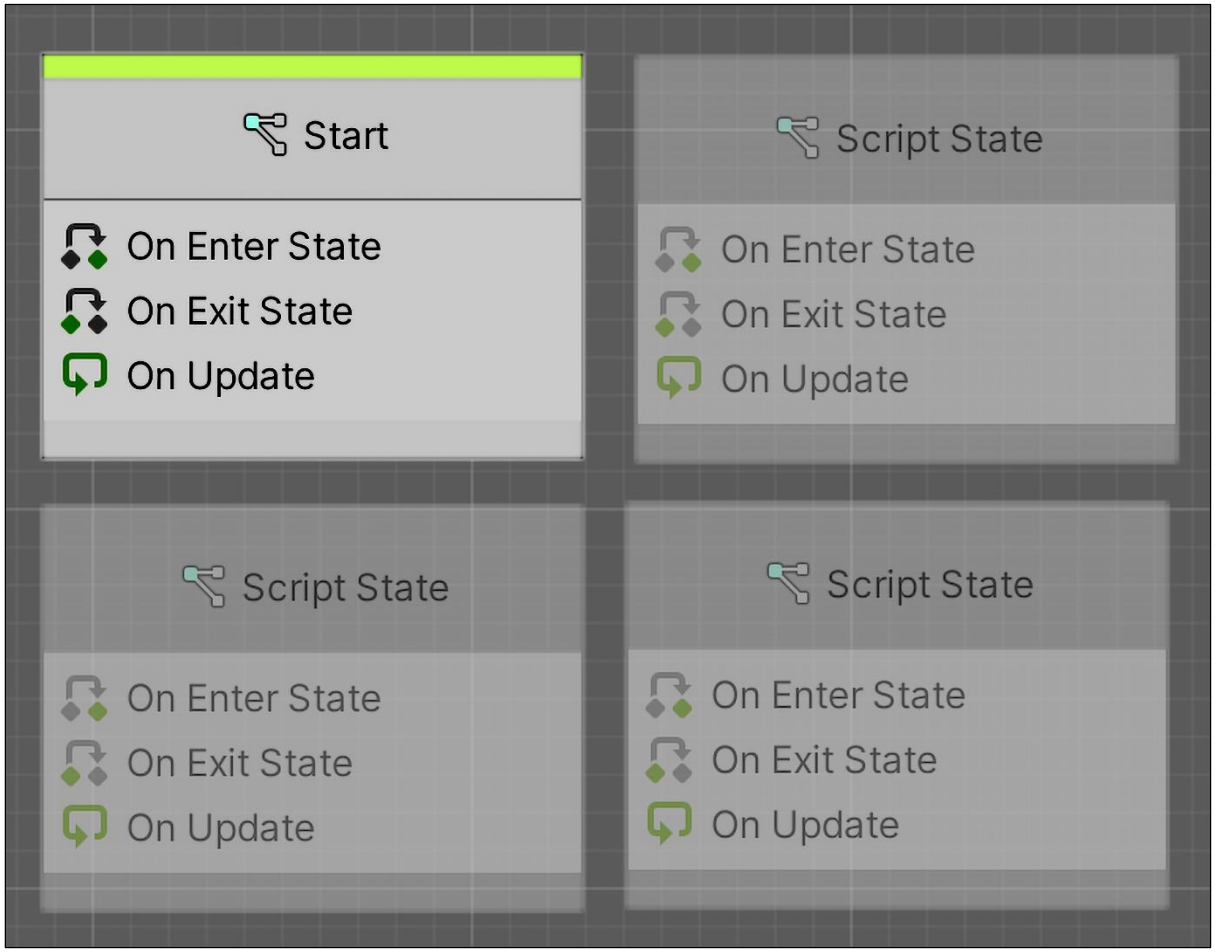


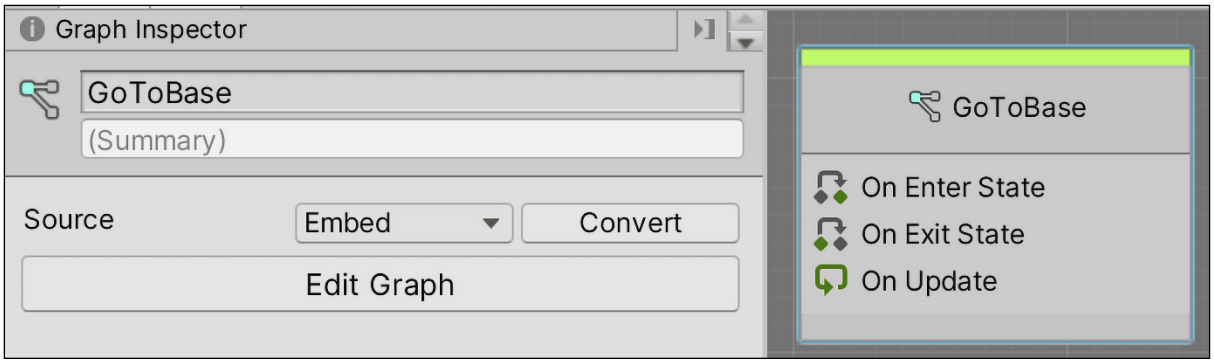

```
private Transform baseTransform;

private void Awake()
{
    baseTransform = GameObject.Find("BaseDamagePoint").transform;
}
```

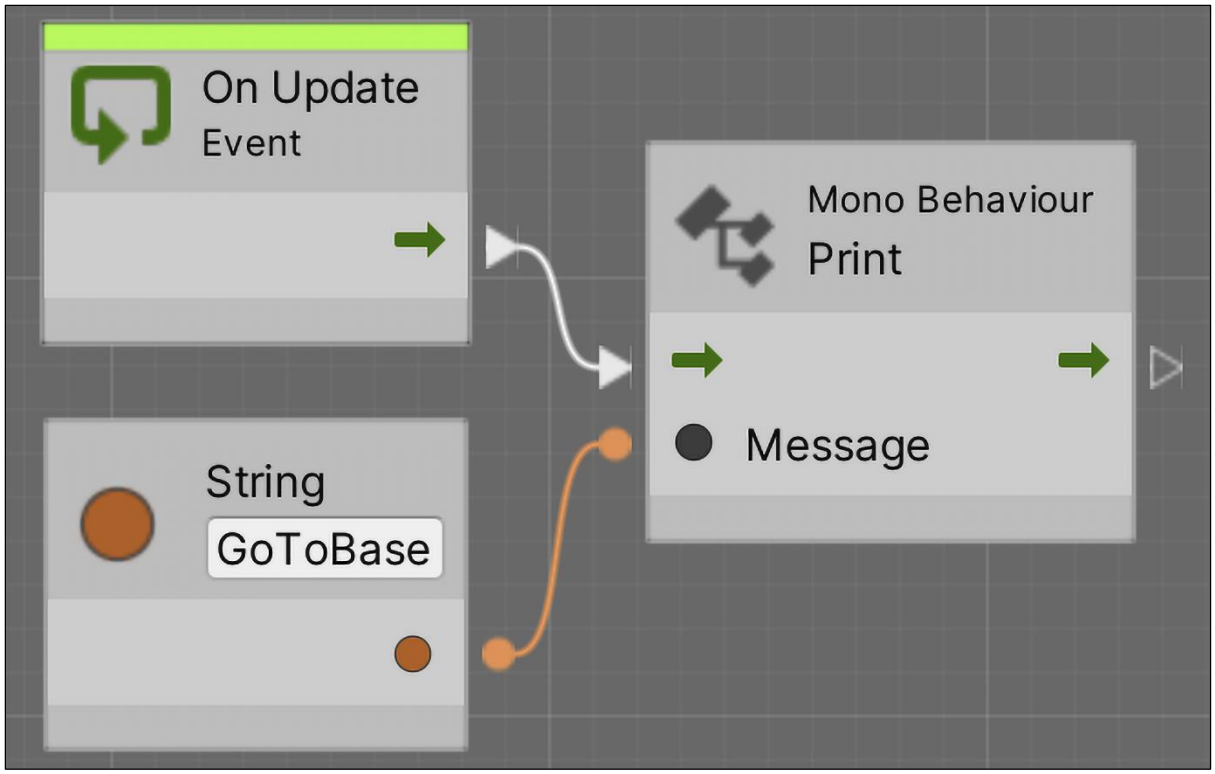


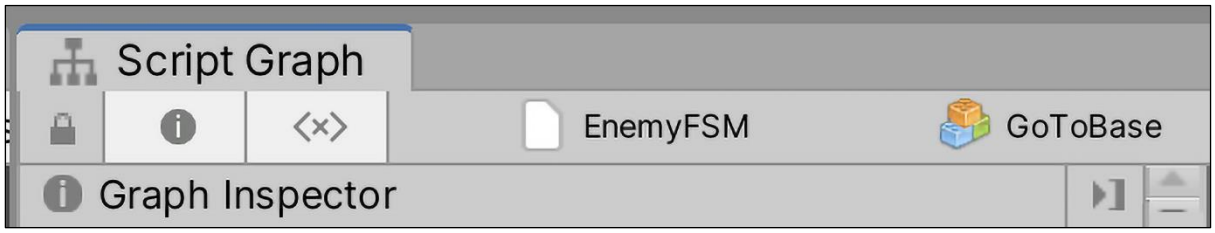

Create Script State
Create Super State
Create Any State

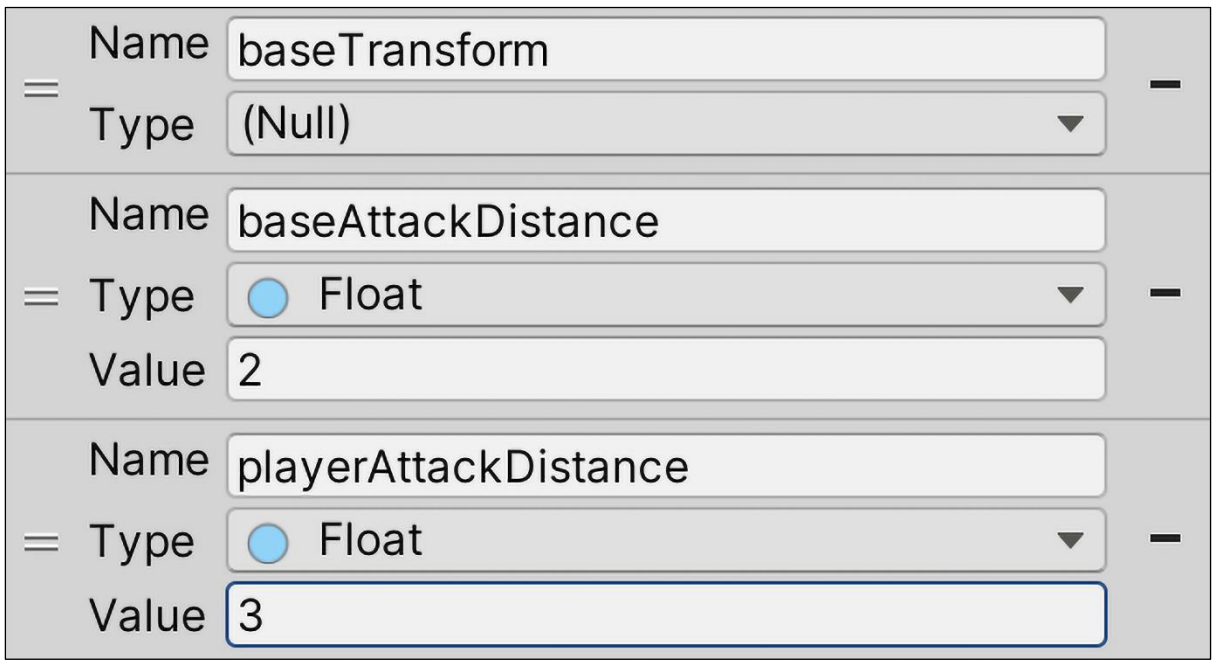

Start
On Enter State
On Exit State
On Update
Script State
On Enter State
On Exit State
On Update
Script State
On Enter State
On Exit State
On Update
Script State
On Enter State
On Exit State
On Update

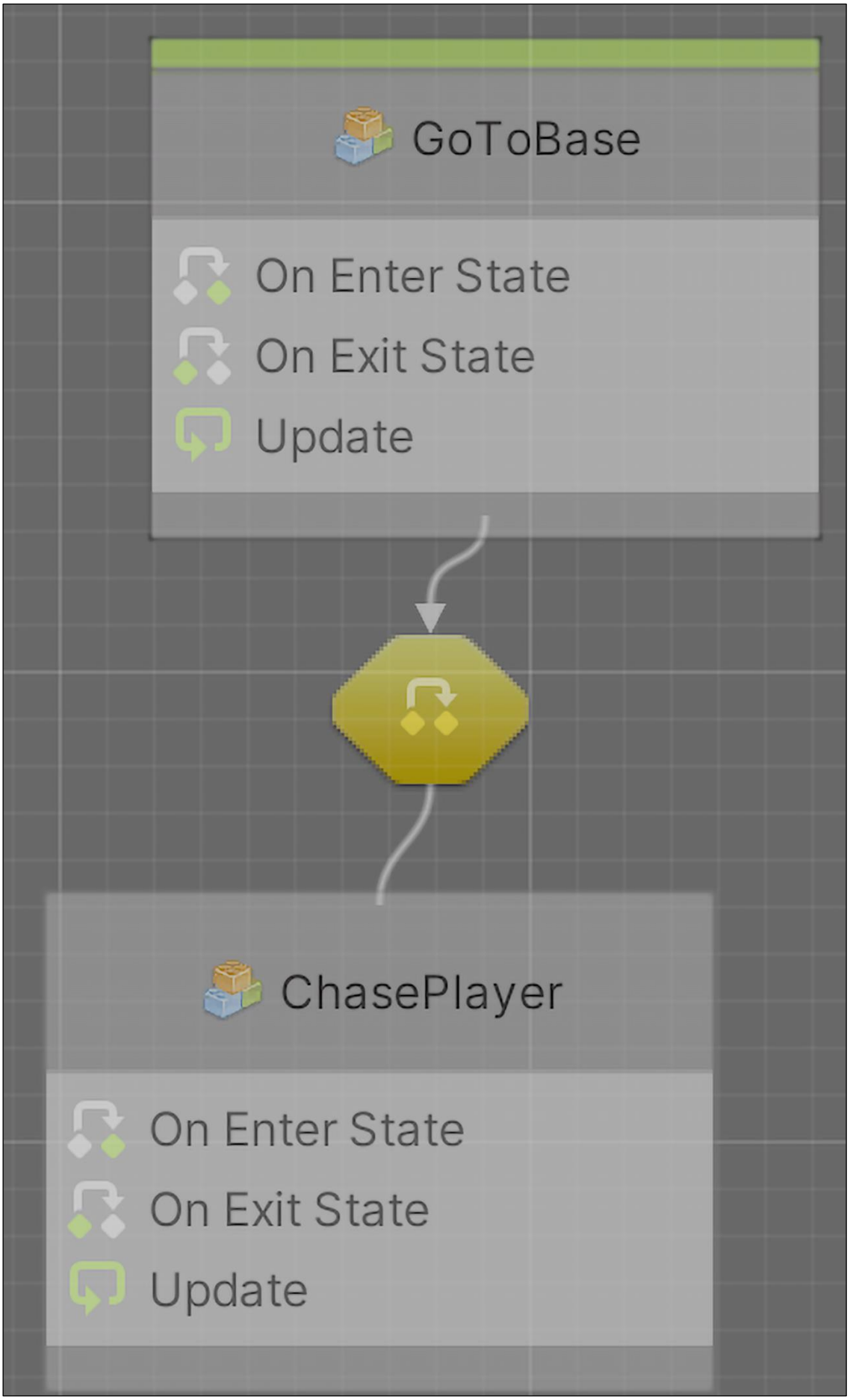

Graph Inspector
GoToBase
(Summary)
Source
Embed
Convert
Edit Graph
GoToBase
On Enter State
On Exit State
On Update

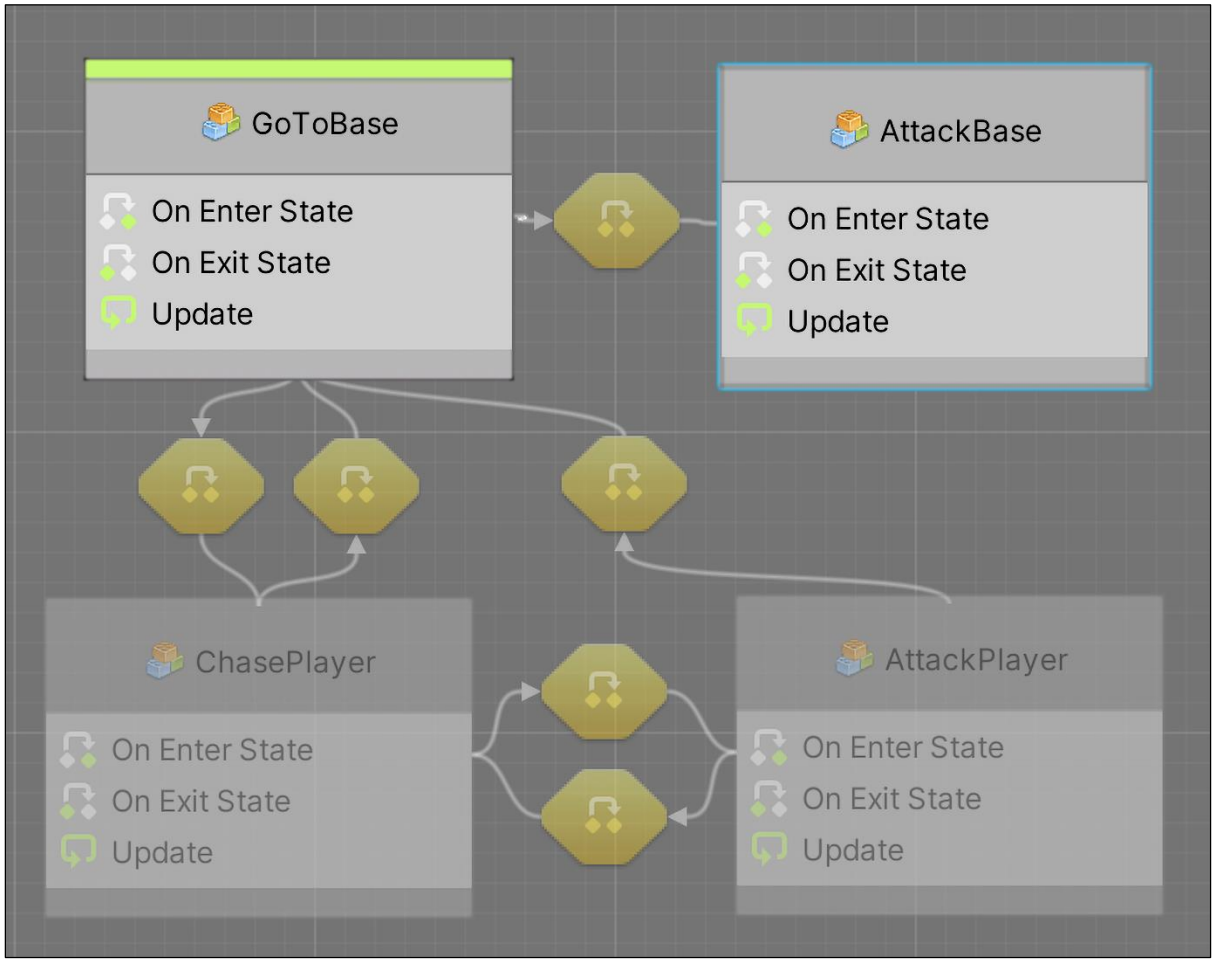

GoToBase
On Enter State
On Exit State
On Update
AttackBase
On Enter State
On Exit State
On Update
ChasePlayer
On Enter State
On Exit State
On Update
AttackPlayer
On Enter State
On Exit State
On Update

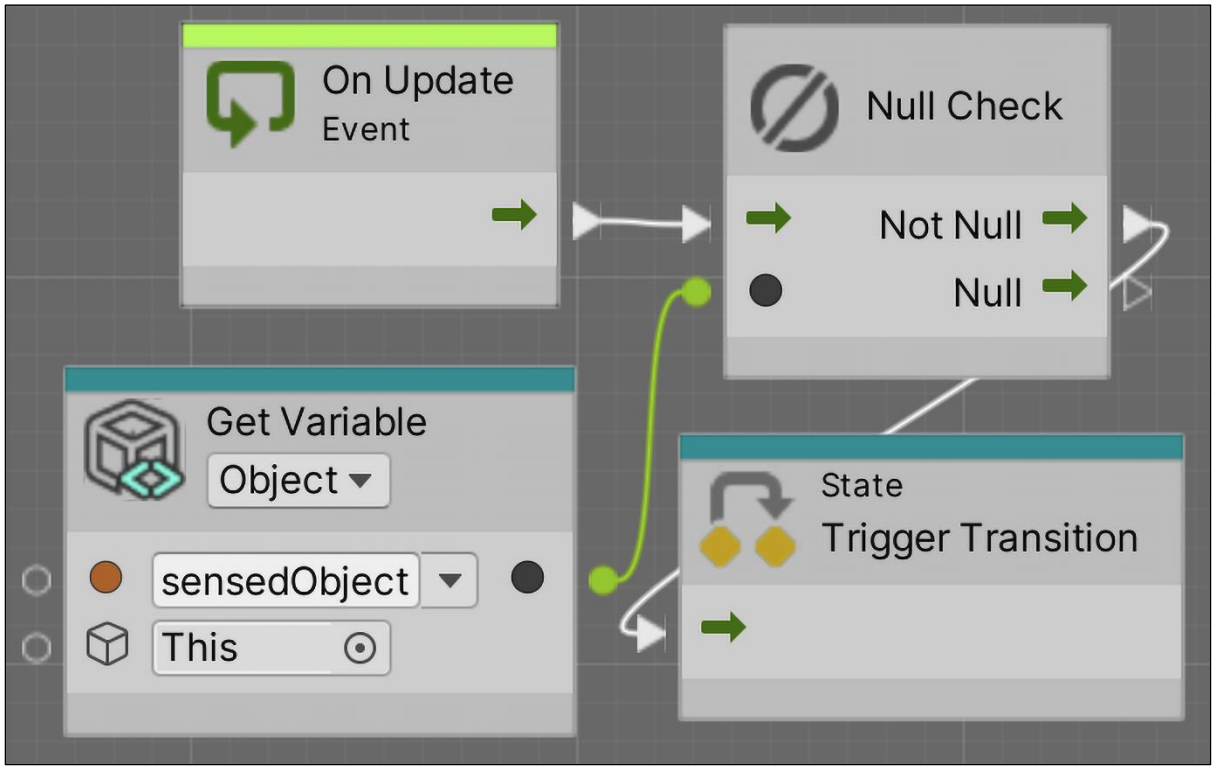

On Update
Event
Mono Behaviour
Print
Message
String
GoToBase

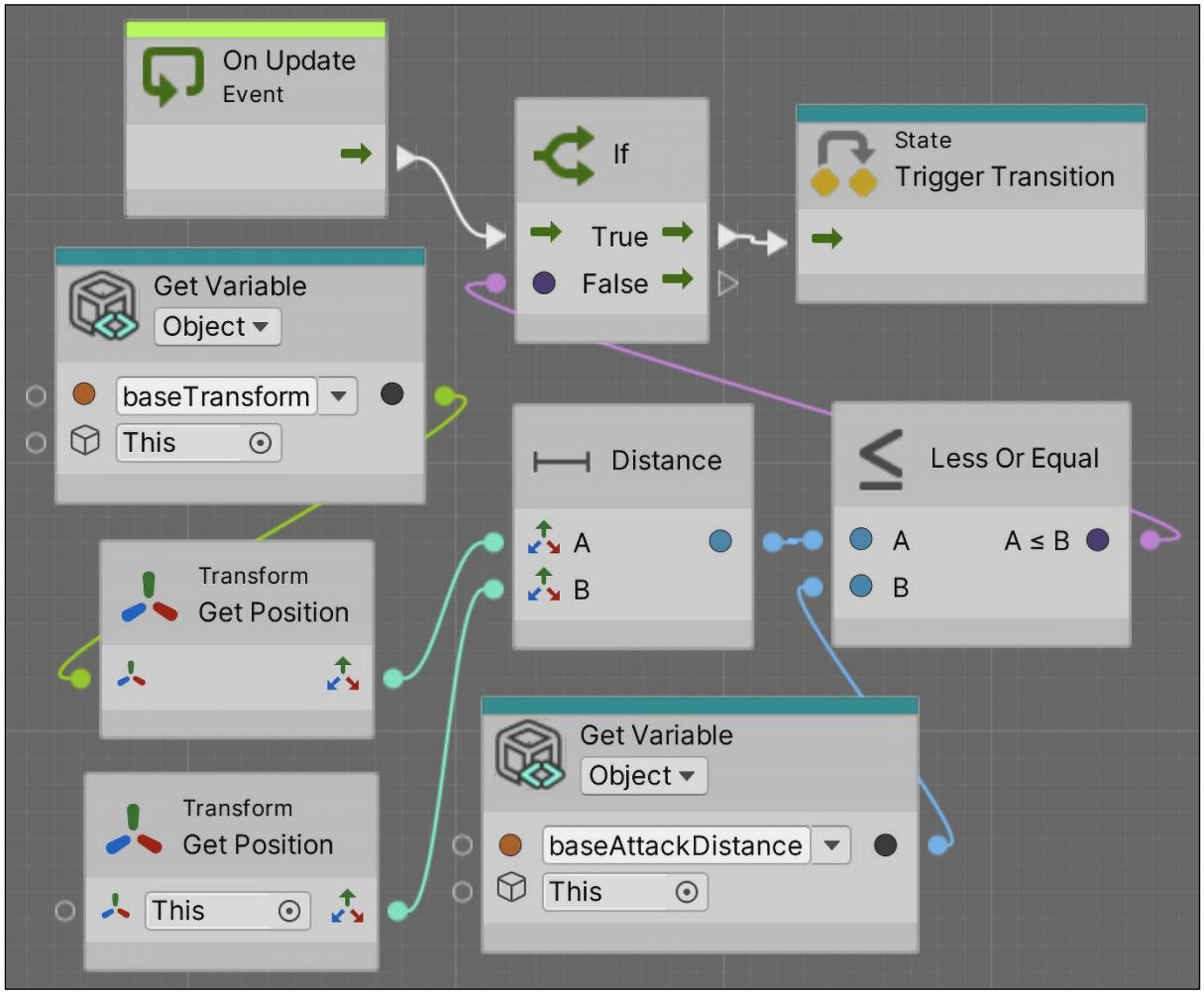

Script Graph
EnemyFSM
GoToBase
Graph Inspector

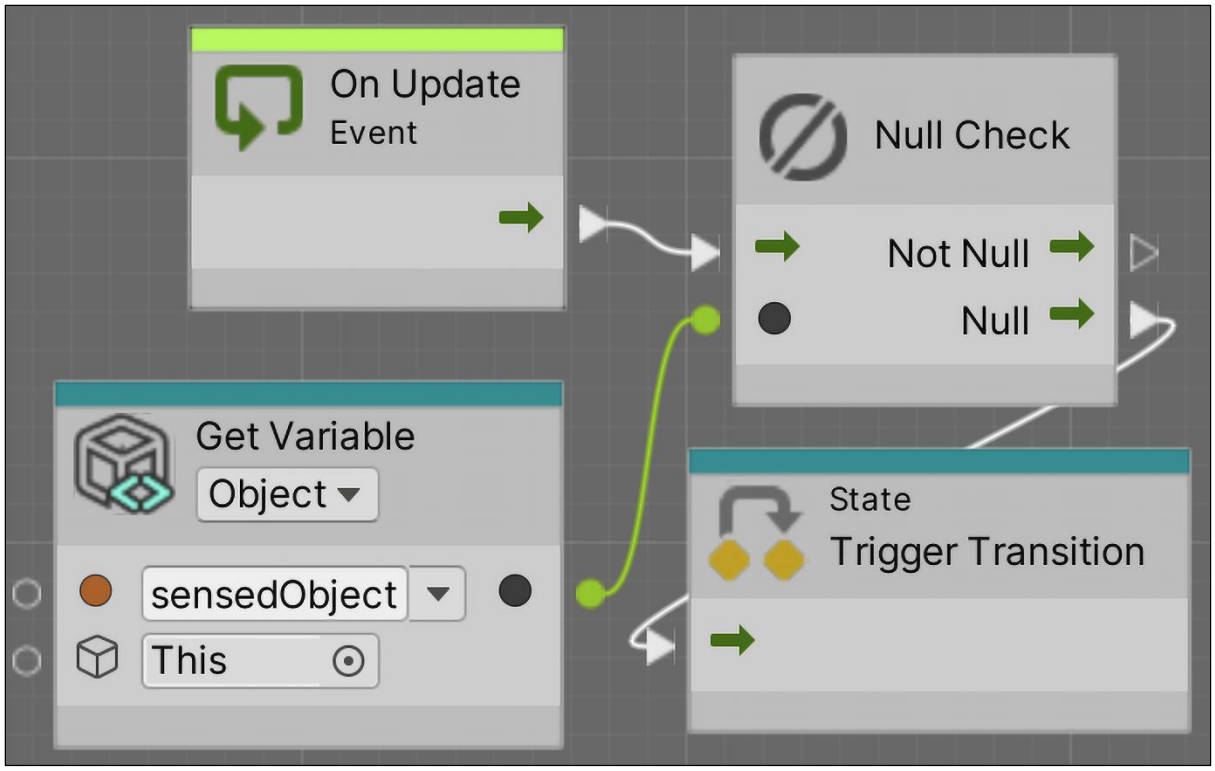

Name
baseTransform
Type
(Null)
Name
baseAttackDistance
Type
Float
Value
2
Name
playerAttackDistance
Type
Float
Value
3

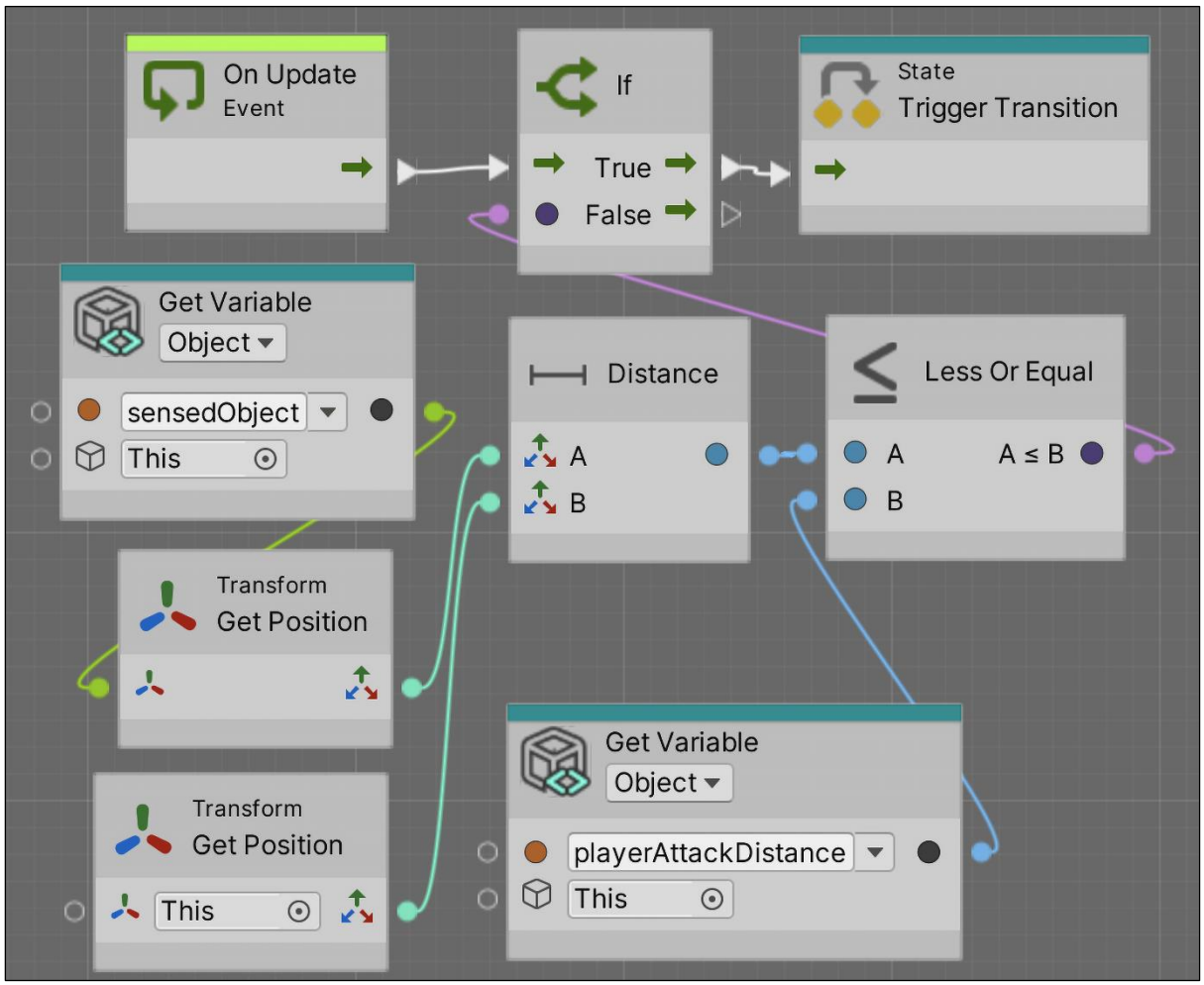

GoToBase
On Enter State
On Exit State
Update
ChasePlayer
On Enter State
On Exit State
Update

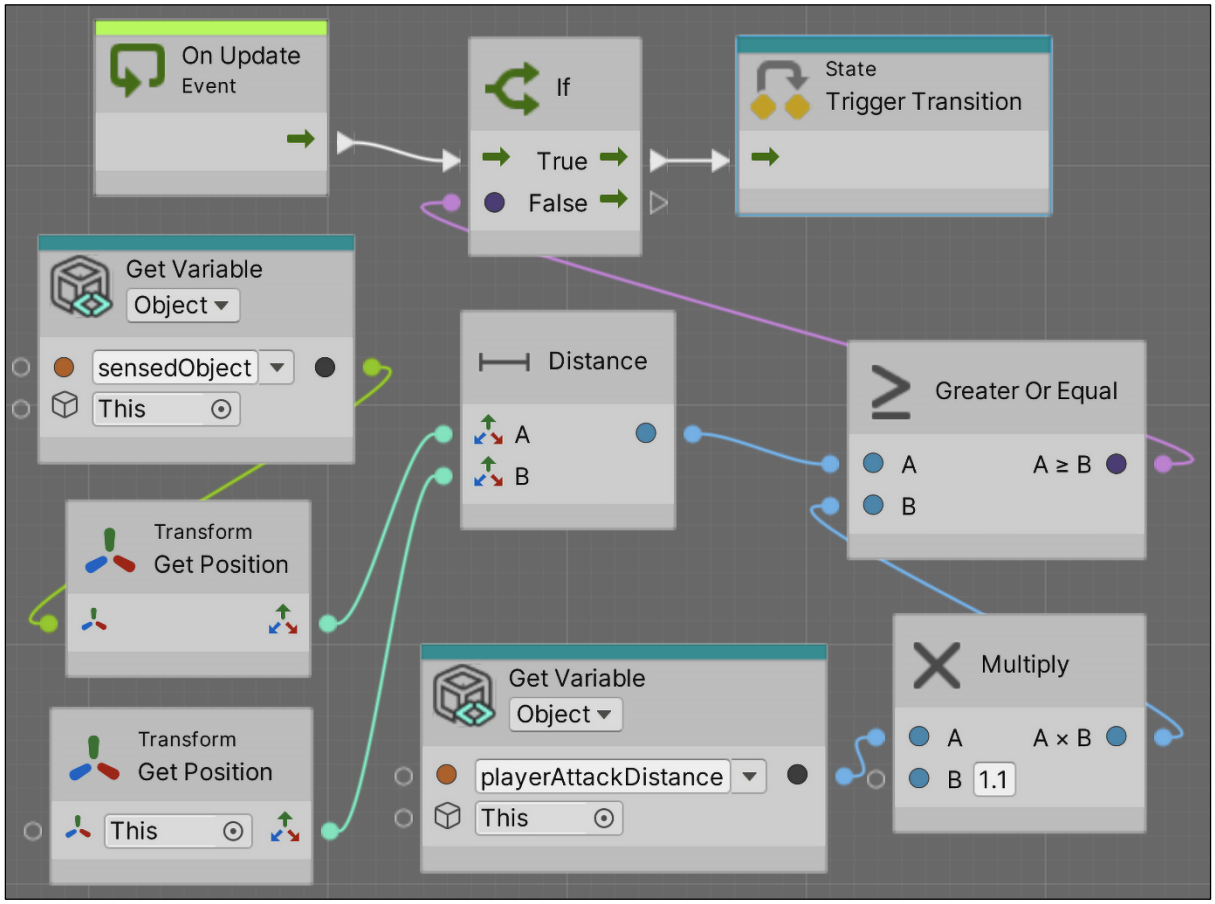

GoToBase
On Enter State
On Exit State
Update
AttackBase
On Enter State
On Exit State
Update
ChasePlayer
On Enter State
On Exit State
Update
AttackPlayer
On Enter State
On Exit State
Update

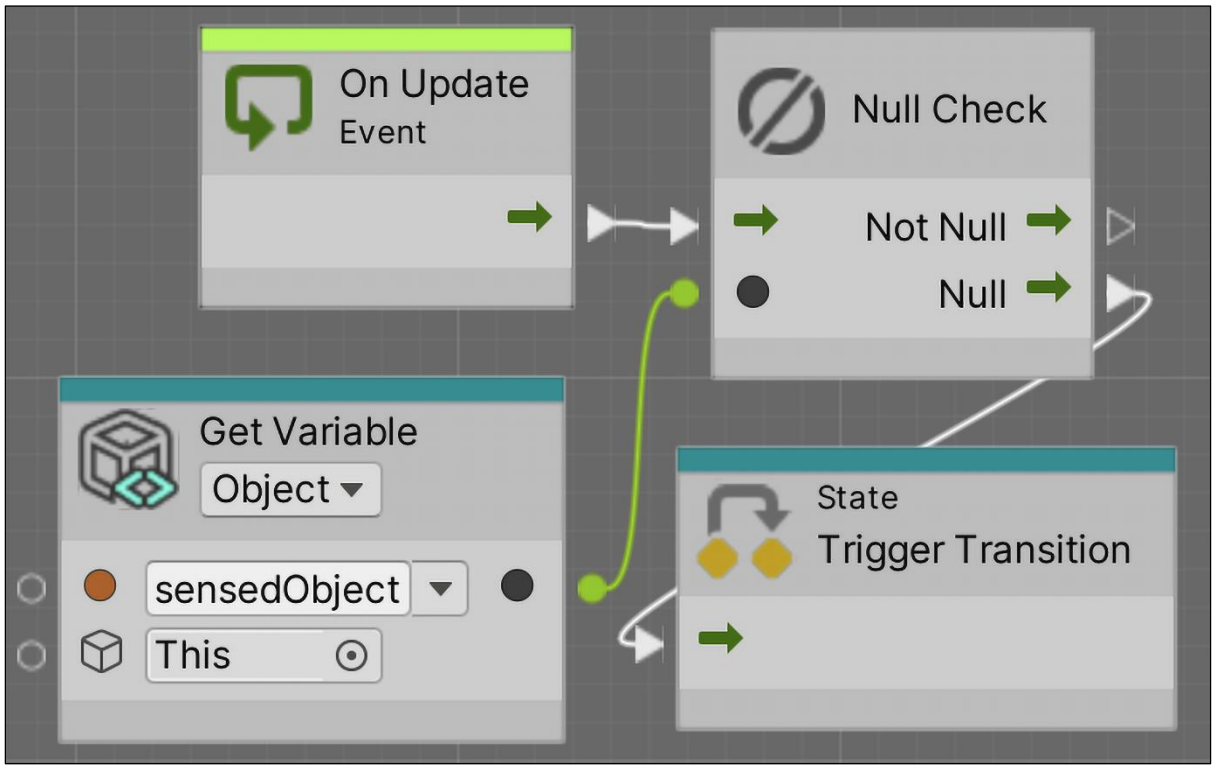

On Update
Event
Null Check
Not Null
Null
Get Variable
Object
sensedObject
This
State
Trigger Transition

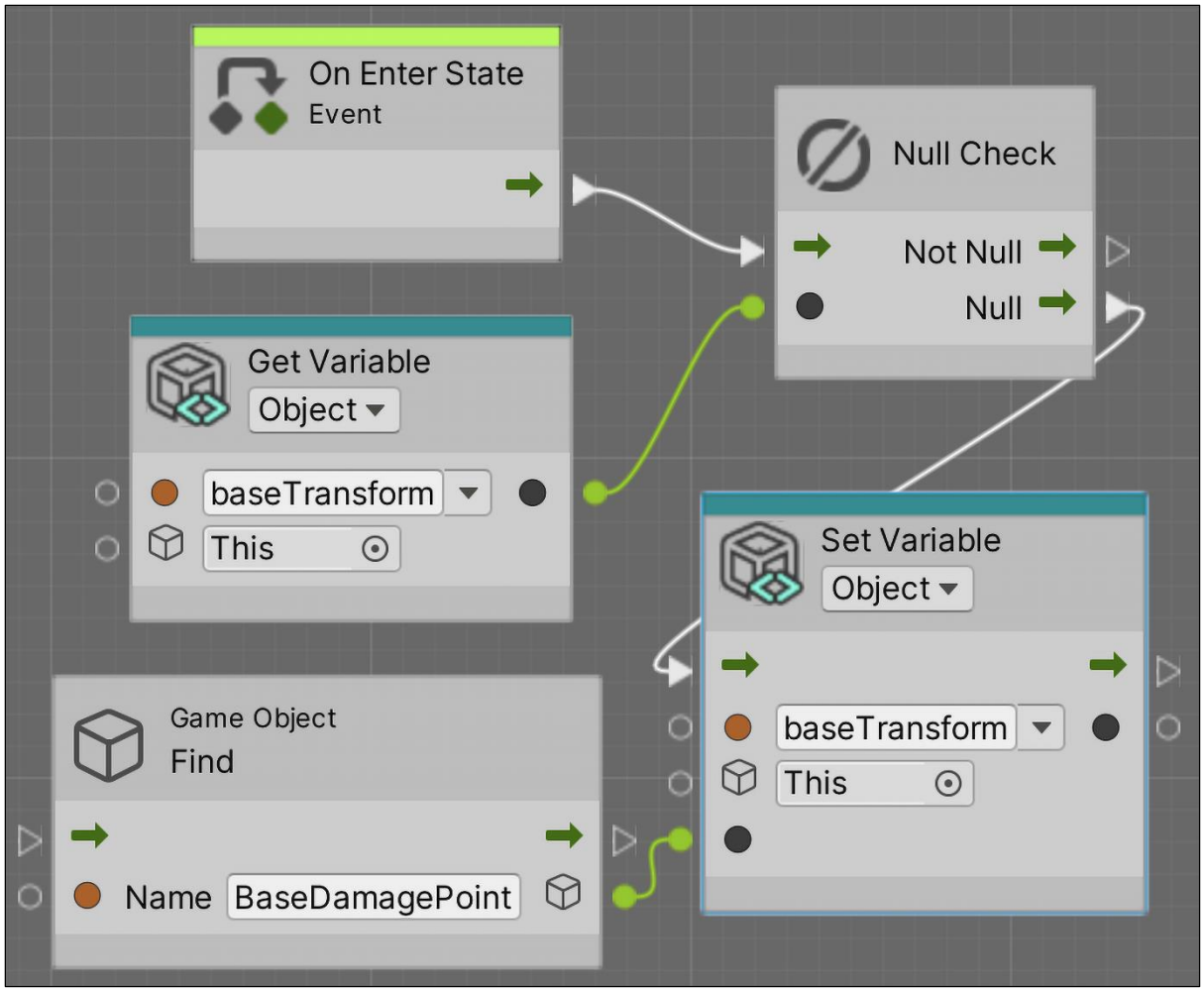

On Update
Event
If
True
False
State
Trigger Transition
Get Variable
Object
baseTransform
This
Distance
A
B
Less Or Equal
A
B
A ≤ B
Transform
Get Position
Transform
Get Position
This
Get Variable
Object
baseAttackDistance
This

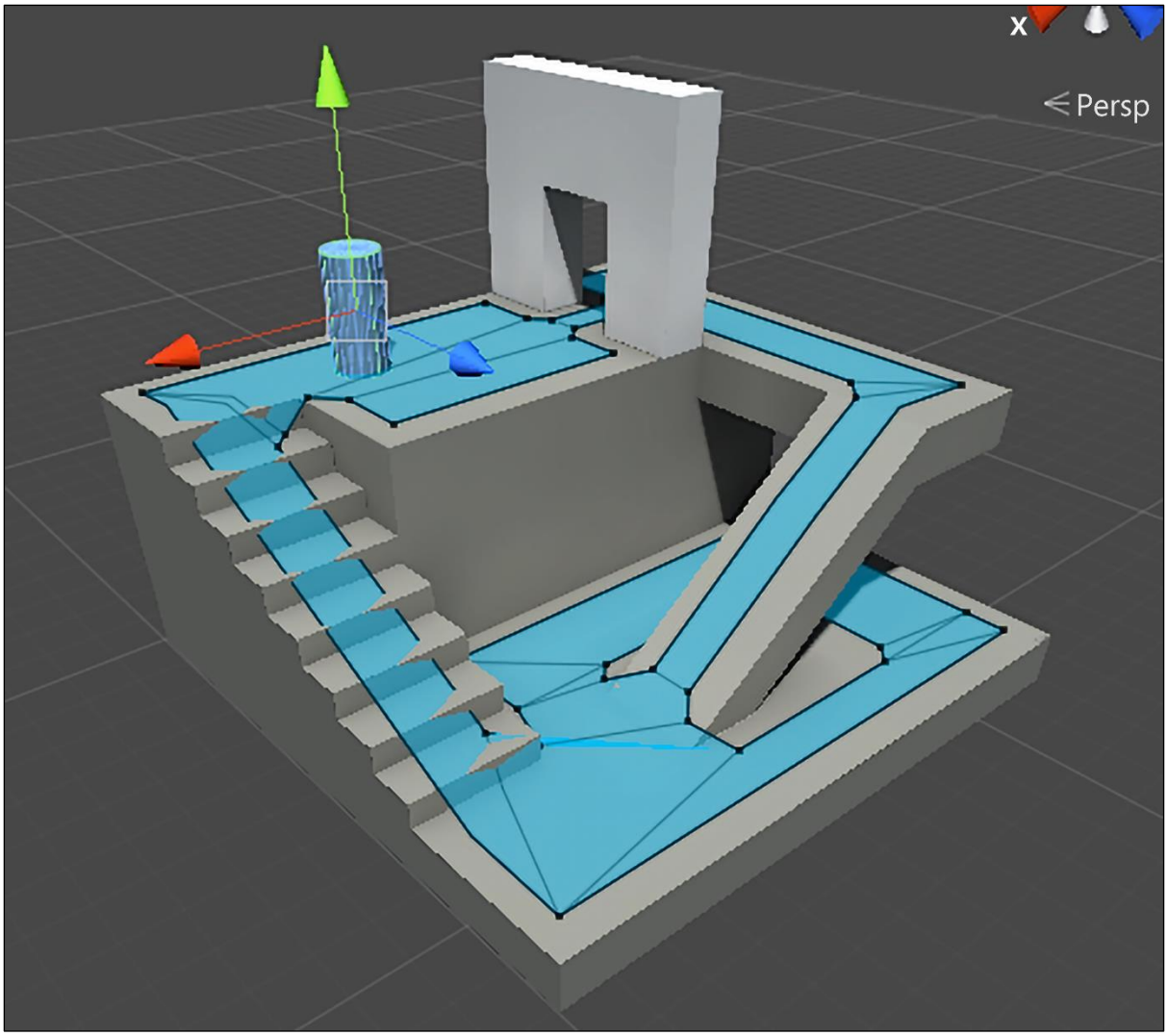

On Update
Event
Null Check
Not Null
Null
Get Variable
Object
sensedObject
This
State
Trigger Transition

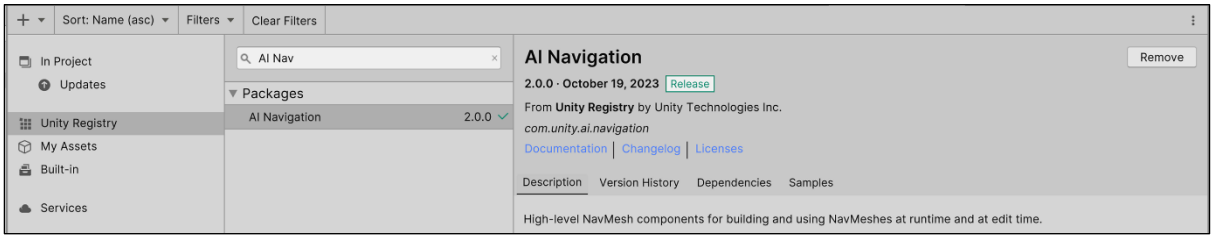

On Update
Event
If
True
False
State
Trigger Transition
Get Variable
Object
sensedObject
This
Distance
A
B
Less Or Equal
A
B
A ≤ B
Transform
Get Position
Transform
Get Position
This
Get Variable
Object
playerAttackDistance
This


On Update
Event
If
True
False
State
Trigger Transition
Get Variable
Object
sensedObject
This
Distance
A
B
Greater Or Equal
A
B
A ≥ B
Transform
Get Position
Transform
Get Position
This
Get Variable
Object
playerAttackDistance
This
Multiply
A
B
1.1
A × B


On Update
Event
Null Check
Not Null
Null
Get Variable
Object
sensedObject
This
State
Trigger Transition


On Enter State
Event
Null Check
Not Null
Null
Get Variable
Object
baseTransform
This
Set Variable
Object
baseTransform
This
Game Object
Find
Name
BaseDamagePoint

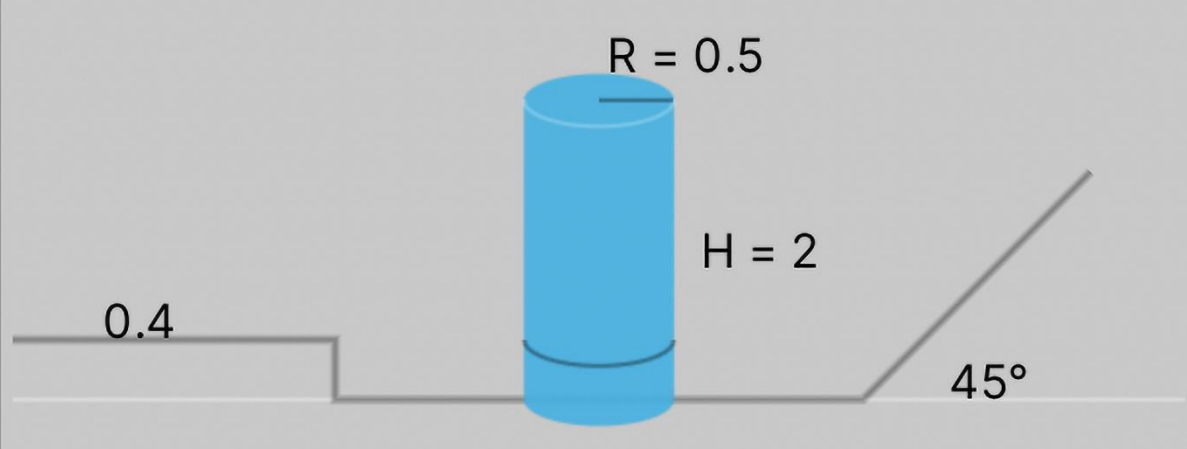

X
Persp


Sort: Name (asc)
Filters
Clear Filters
In Project
Updates
Unity Registry
My Assets
Built-in
Services
AI Nav
Packages
AI Navigation
2.0.0
AI Navigation
Remove
2.0.0 · October 19, 2023
Release
From Unity Registry by Unity Technologies Inc.
com.unity.ai.navigation
Documentation | Changelog | Licenses
Description
Version History
Dependencies
Samples
High-level NavMesh components for building and using NavMeshes at runtime and at edit time.

Inspector | Navigation

Agents | Areas | Bake | Object

Baked Agent Size



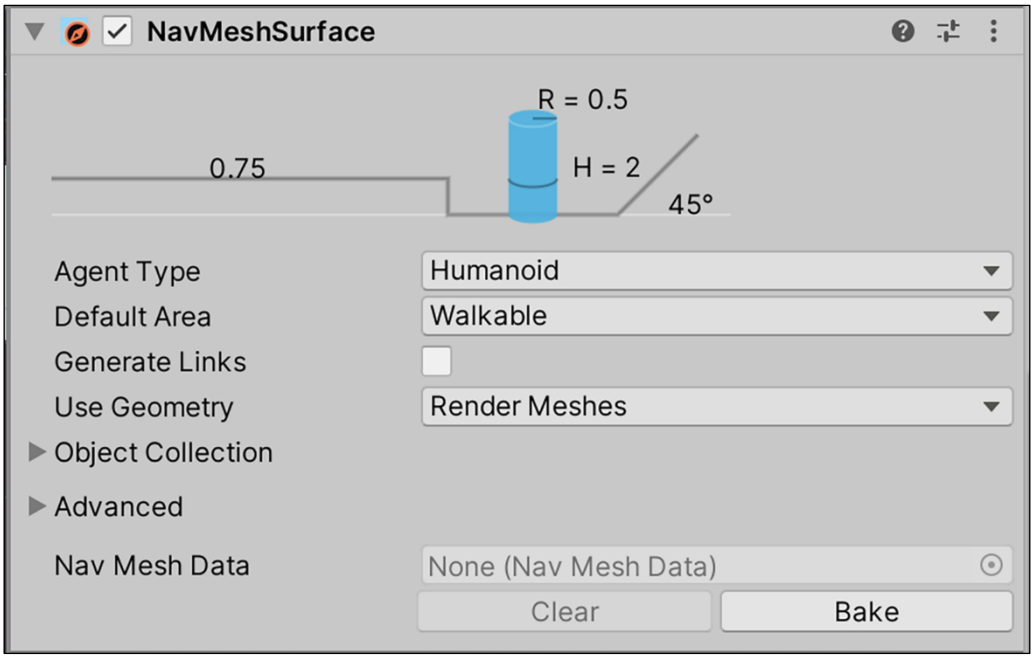
Agent Radius	0.5
Agent Height	2
Max Slope	45
Step Height	0.4

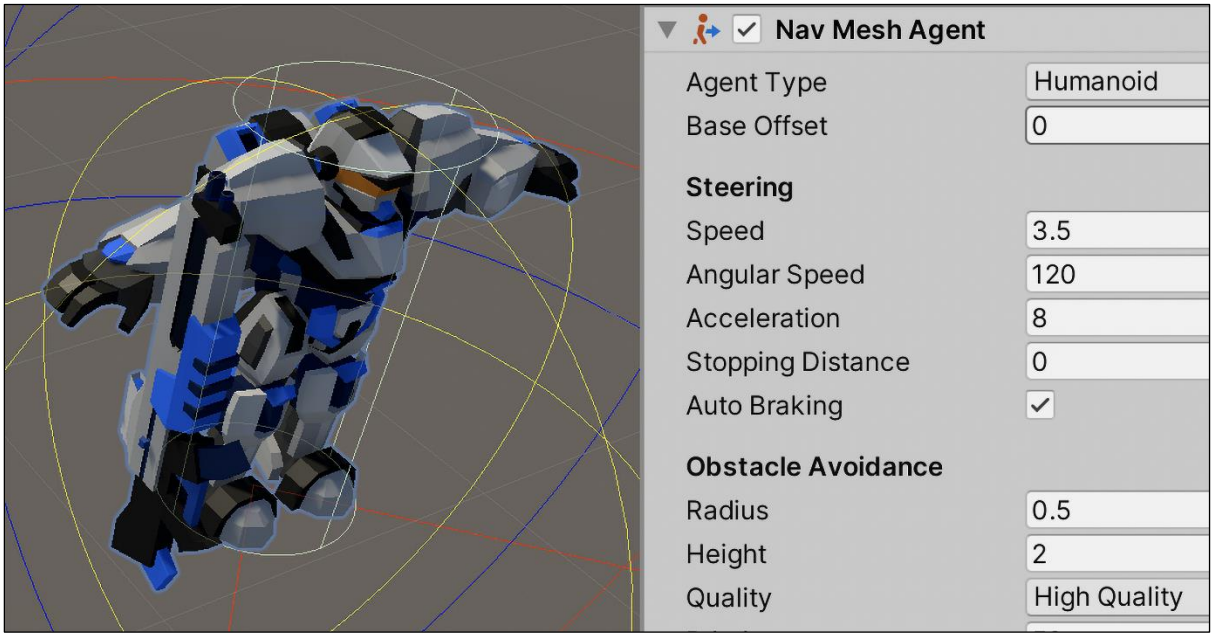
Generated Off Mesh Links

Drop Height	0
Jump Distance	0

▶ Advanced

Clear | Bake






```
private NavMeshAgent agent;

private void Awake()
{
    baseTransform = GameObject.Find("BaseDamagePoint").transform;
    agent = GetComponentInParent<NavMeshAgent>();
}
```

```
void GoToBase()
{
    agent.SetDestination(baseTransform.position);
```

```
void AttackBase()
{
    agent.isStopped = true;
}
```

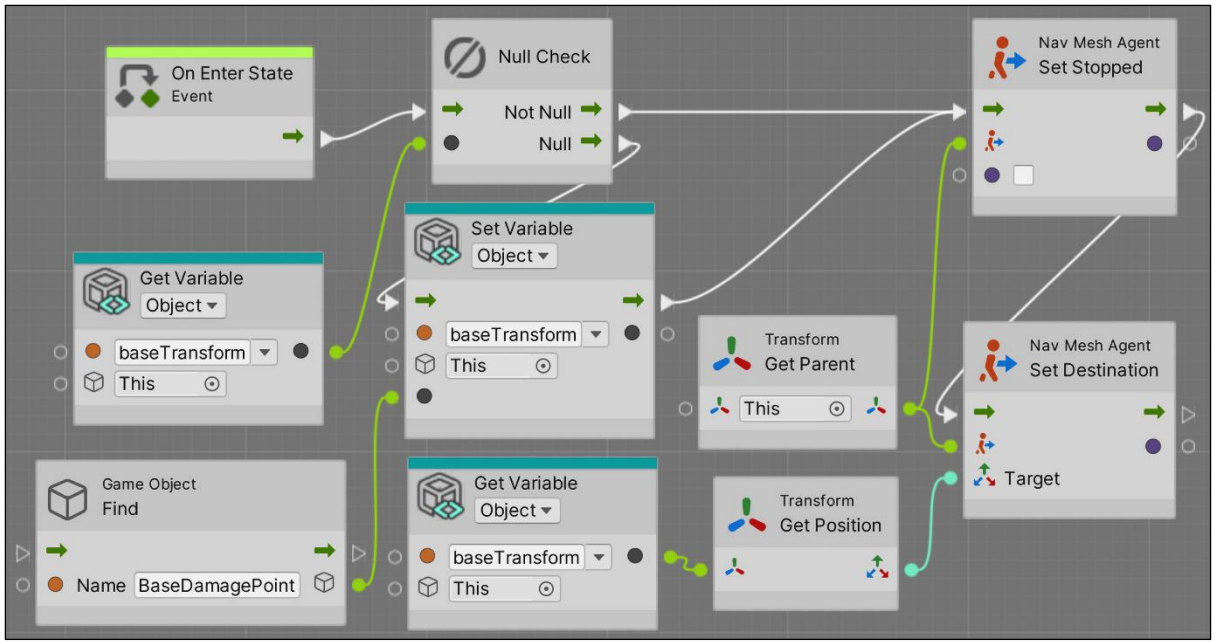
```
void GoToBase()
{
    agent.isStopped = false;
    agent.SetDestination(baseTransform.position);
```

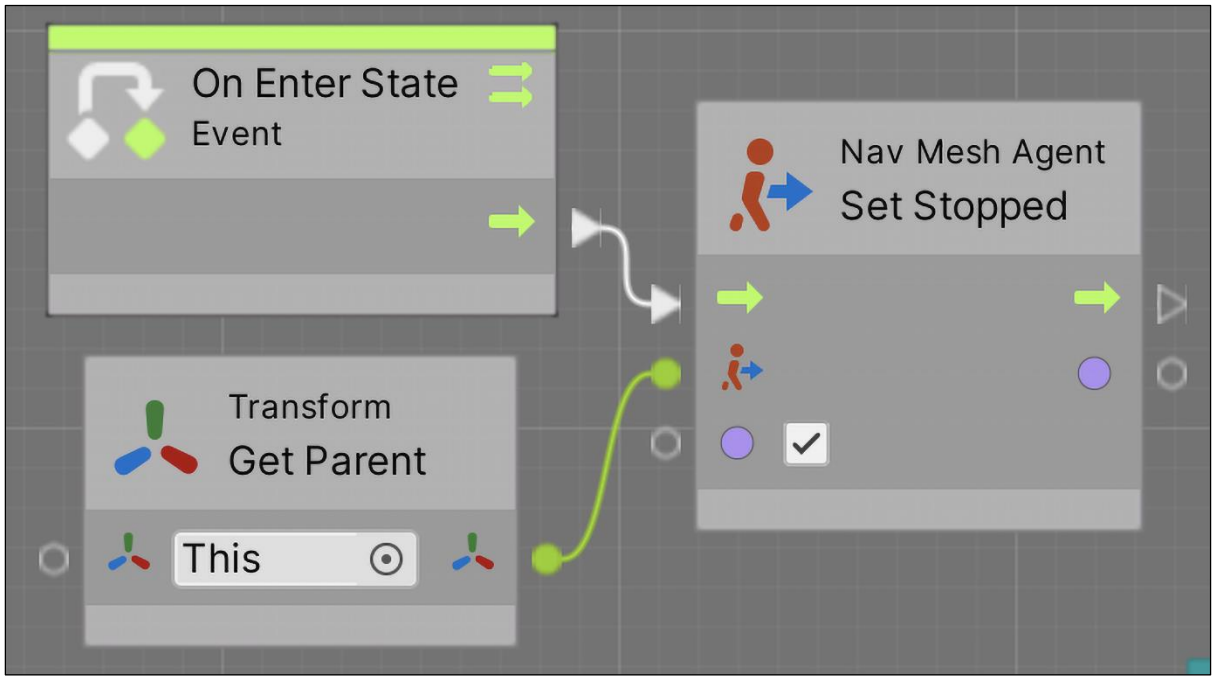
```
void ChasePlayer()
{
    agent.isStopped = false;

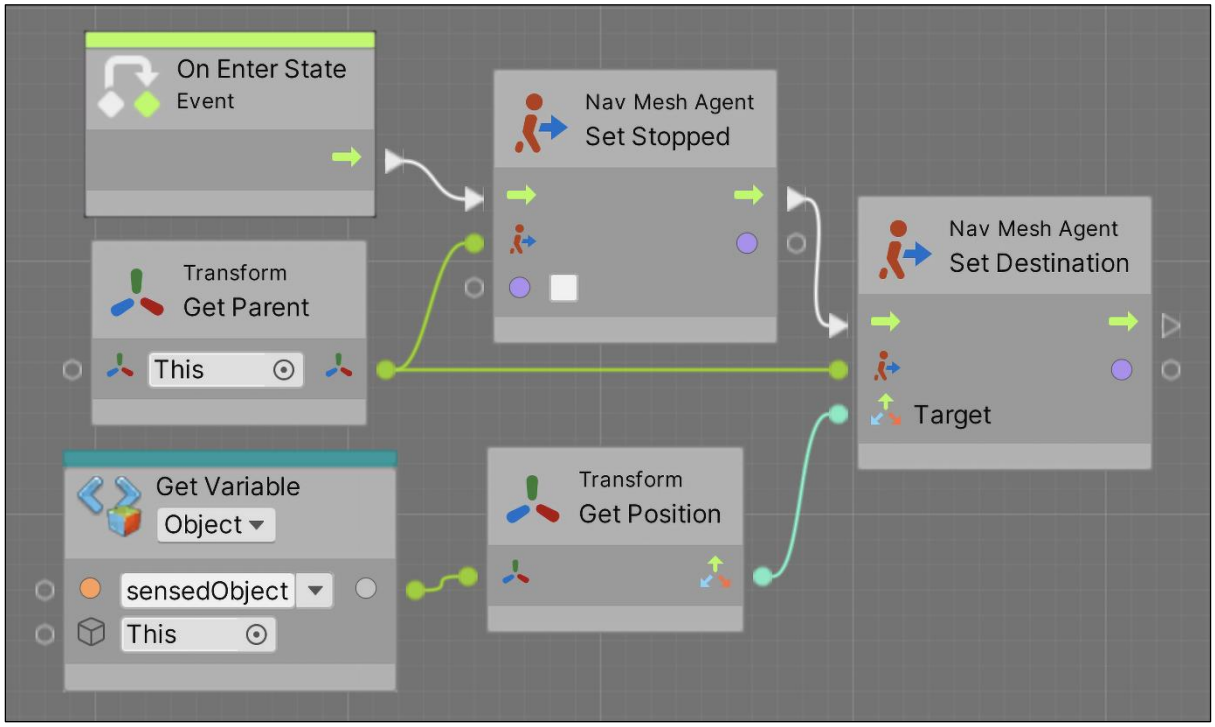
    if (sightSensor.detectedObject == null)
    {
        currentState = EnemyState.GoToBase;
        return;
    }

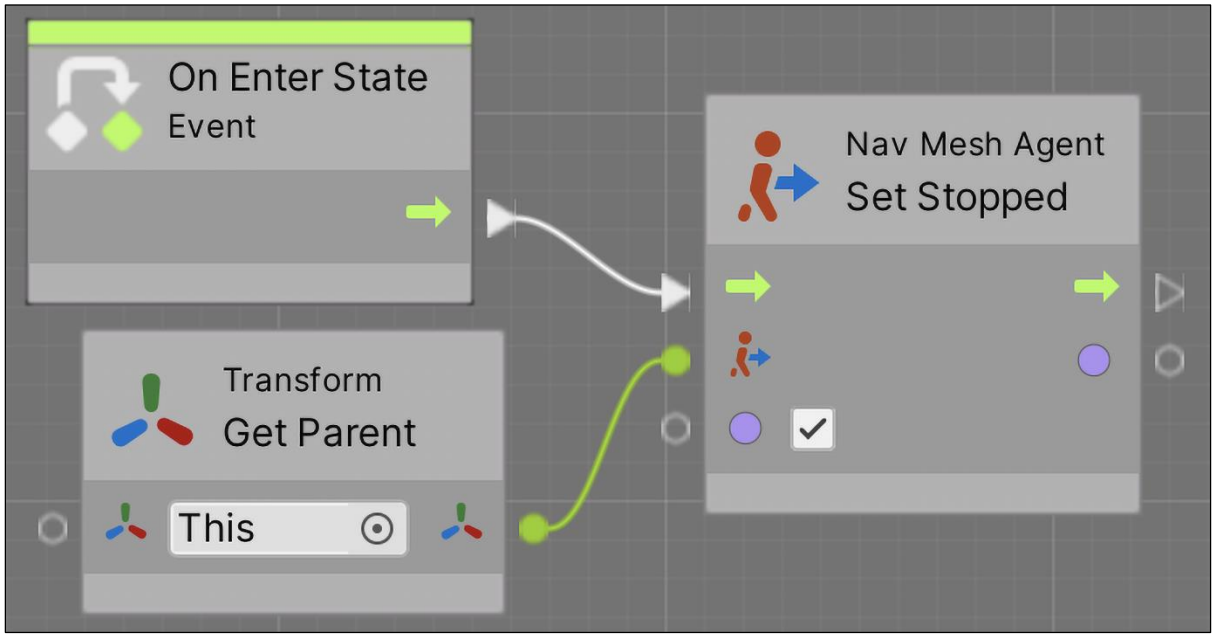
    agent.SetDestination(sightSensor.detectedObject.transform.position);
```

```
void AttackPlayer()
{
    agent.isStopped = true;
```






On Enter State
Event
Nav Mesh Agent
Set Stopped
Nav Mesh Agent
Set Destination
Transform
Get Parent
This
Target
Get Variable
Object
sensedObject
This
Transform
Get Position


On Enter State
Event
Nav Mesh Agent
Set Stopped
Transform
Get Parent
This

```
void AttackPlayer()
{
    agent.isStopped = true;

    if (sightSensor.detectedObject == null)
    {
        currentState = EnemyState.GoToBase;
        return;
    }

    Shoot();

    float distanceToPlayer = Vector3.Distance(transform.position,
        sightSensor.detectedObject.transform.position);

    if (distanceToPlayer > playerAttackDistance * 1.1f)
    {
        currentState = EnemyState.ChasePlayer;
    }
}

void AttackBase()
{
    agent.isStopped = true;
    Shoot();
}

void Shoot()
{

}
```

```
public float lastShootTime;
public GameObject bulletPrefab;
public float fireRate;

void Shoot()
{
    var timeSinceLastShoot= Time.time - lastShootTime;
    if (timeSinceLastShoot > fireRate)
    {
        lastShootTime = Time.time;
        Instantiate(bulletPrefab,
            transform.position, transform.rotation);
    }
}
```

```
        LookTo(sightSensor.detectedObject.transform.position);
        Shoot();

        float distanceToPlayer = Vector3.Distance(transform.position,
            sightSensor.detectedObject.transform.position);

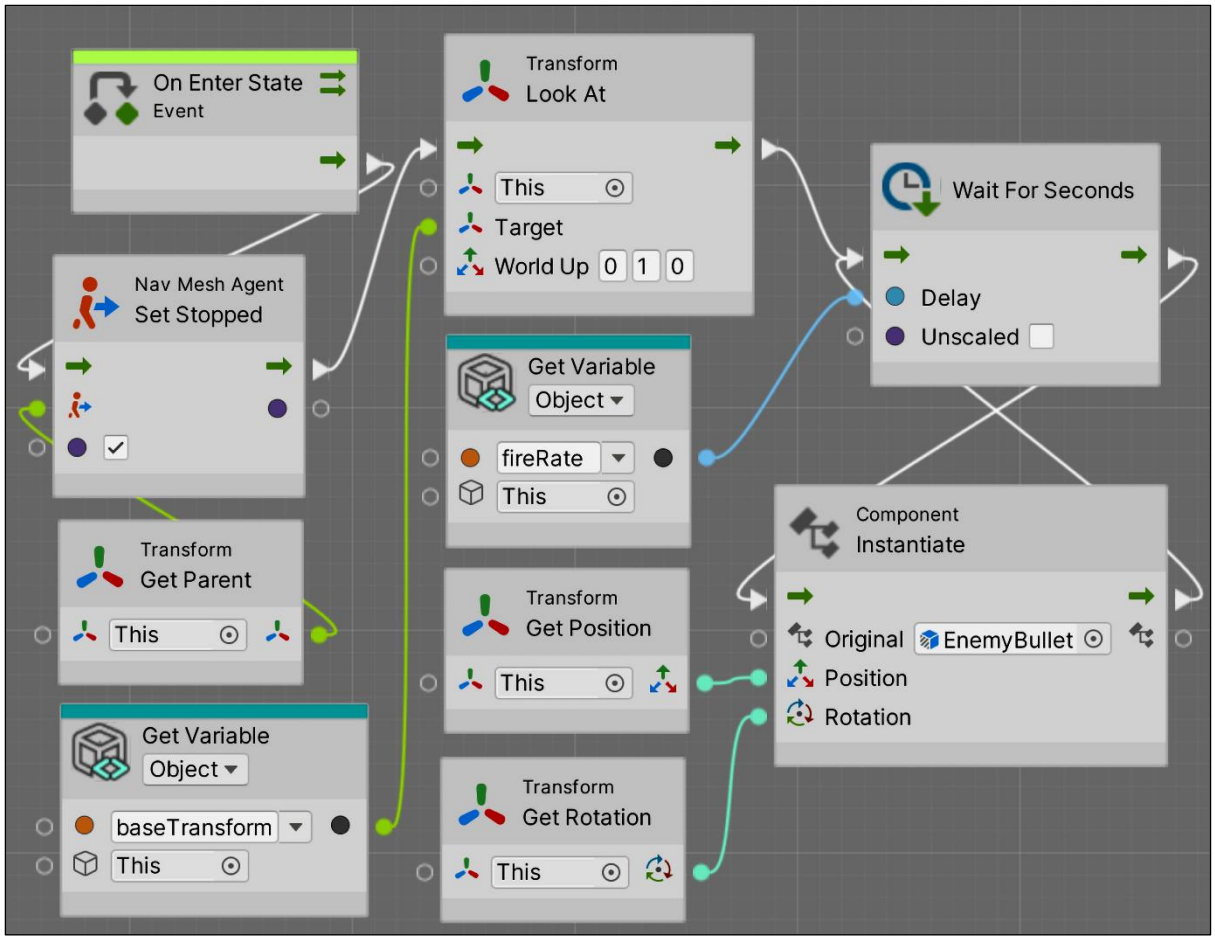
        if (distanceToPlayer > playerAttackDistance * 1.1f)
        {
            currentState = EnemyState.ChasePlayer;
        }
    }

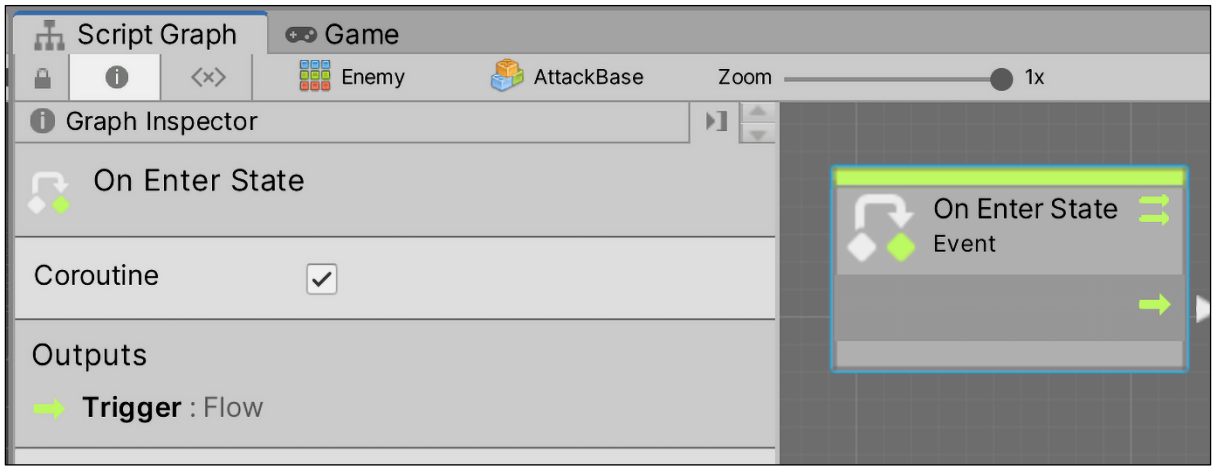
    void AttackBase()
    {
        agent.isStopped = true;
        LookTo(baseTransform.position);
        Shoot();
    }

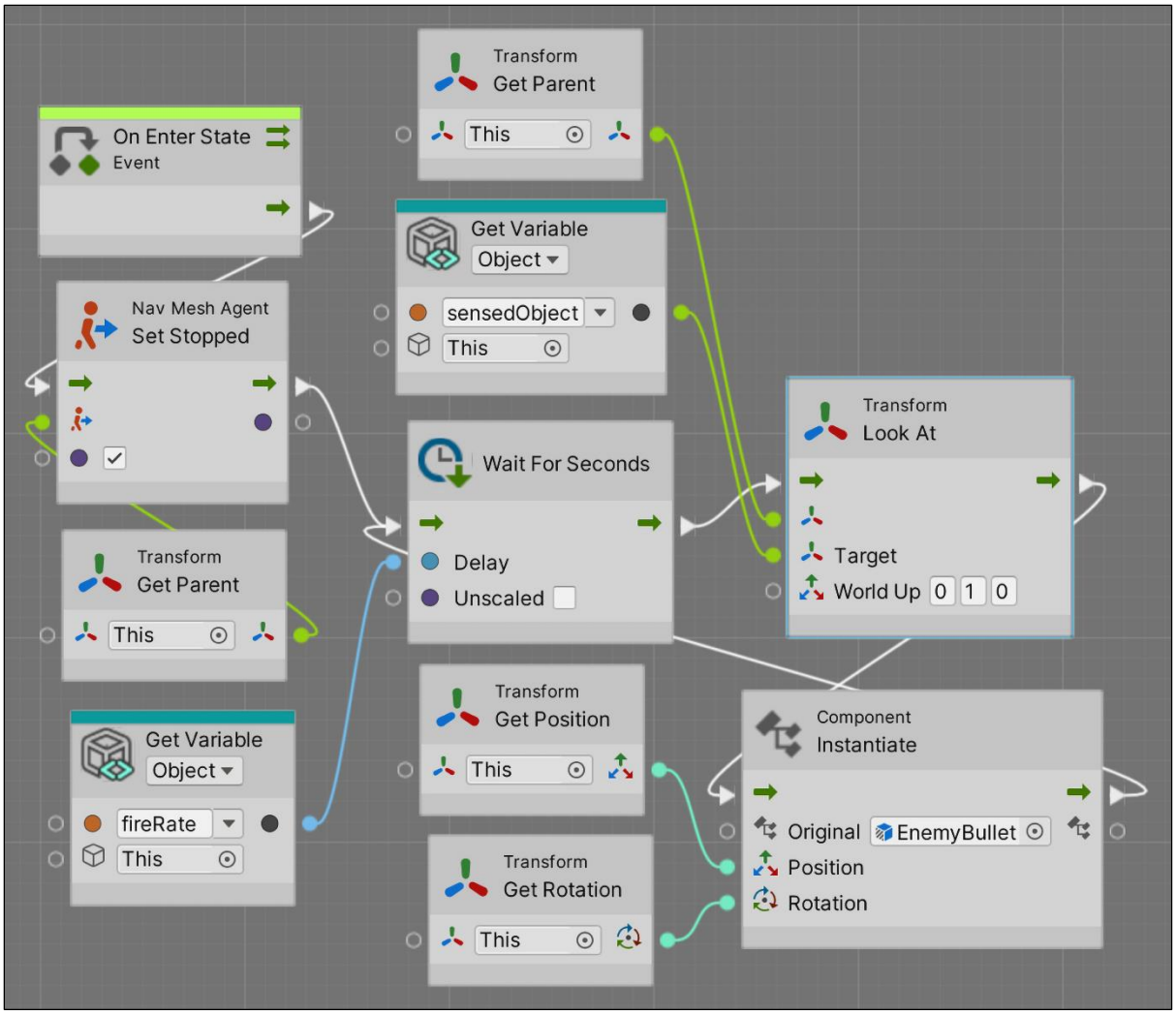
    void LookTo(Vector3 targetPosition)
    {

    }
```

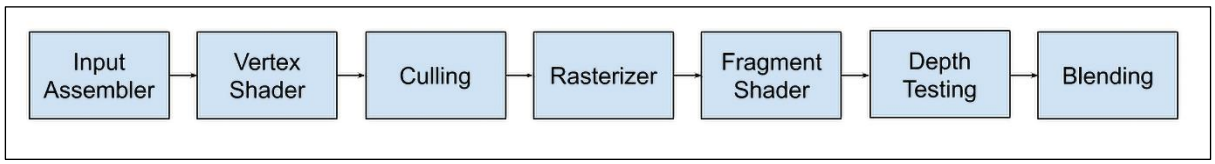
```
void LookTo(Vector3 targetPosition)
{
    Vector3 directionToPosition = Vector3.Normalize(
        targetPosition - transform.parent.position);
    directionToPosition.y = 0;
    transform.parent.forward = directionToPosition;
}
```

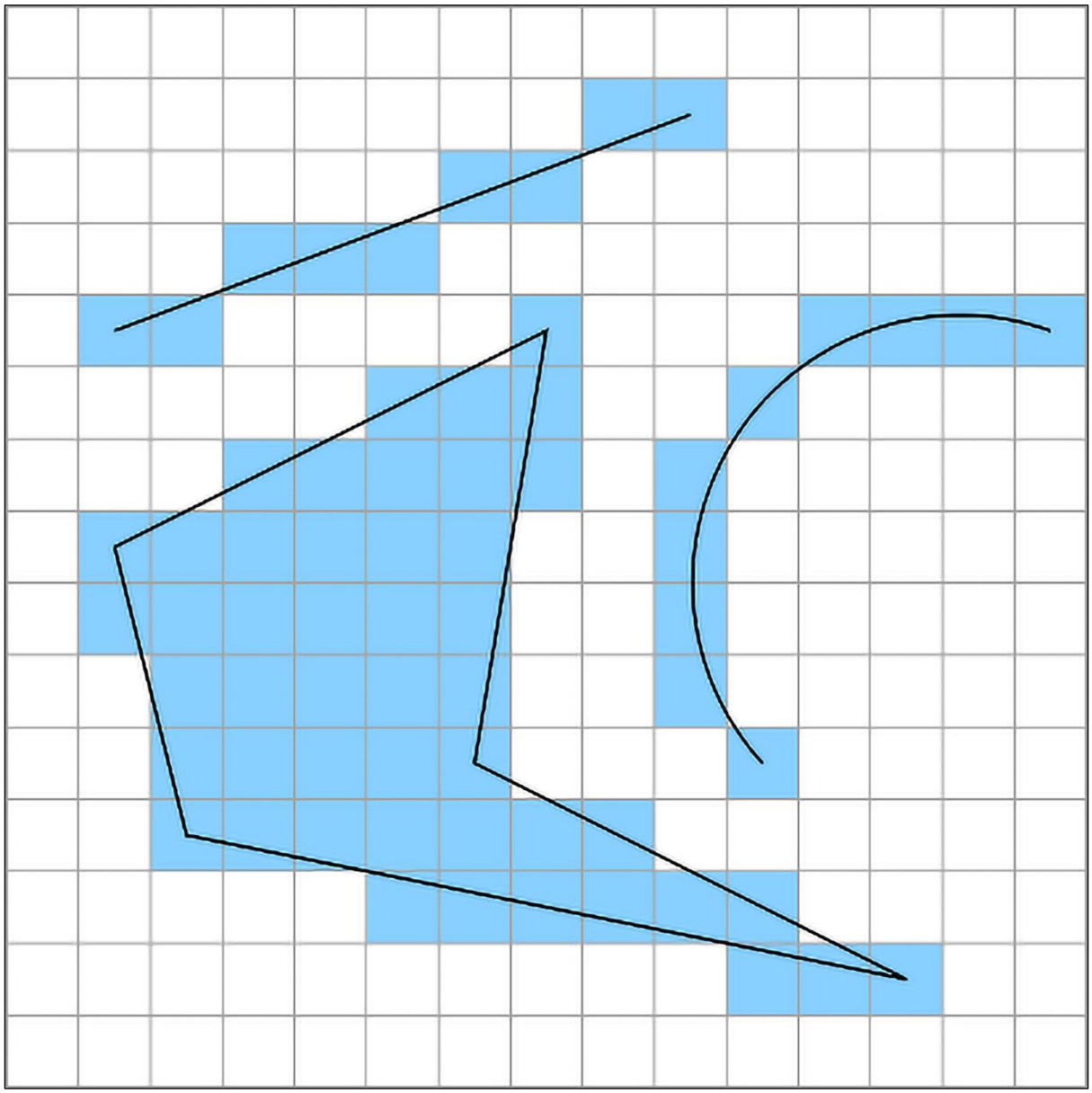

On Enter State
Event
Transform
Look At
This
Target
World Up 0 1 0
Wait For Seconds
Delay
Unscaled
Nav Mesh Agent
Set Stopped
Get Variable
Object
fireRate
This
Component
Instantiate
Original EnemyBullet
Position
Rotation
Transform
Get Parent
This
Transform
Get Position
This
Get Variable
Object
baseTransform
This
Transform
Get Rotation
This

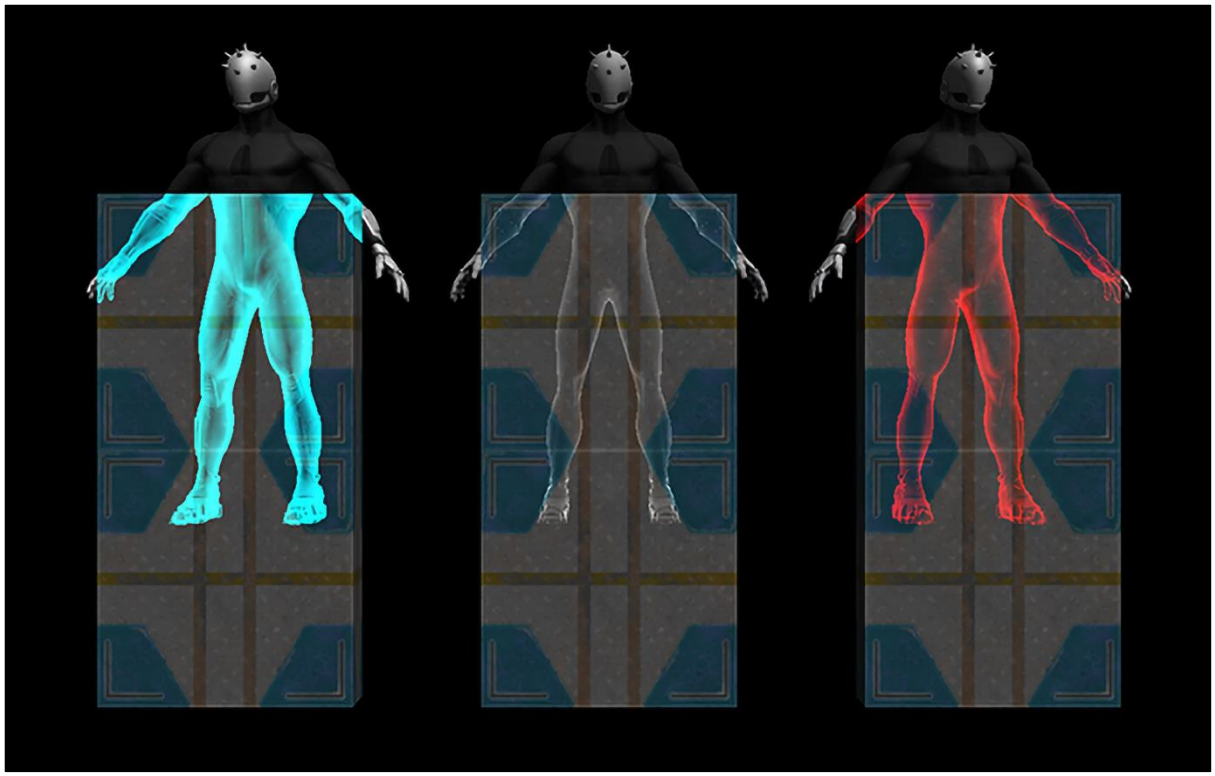

Script Graph
Game
Enemy
AttackBase
Zoom
1x
Graph Inspector
On Enter State
Coroutine
Outputs
Trigger : Flow
On Enter State
Event

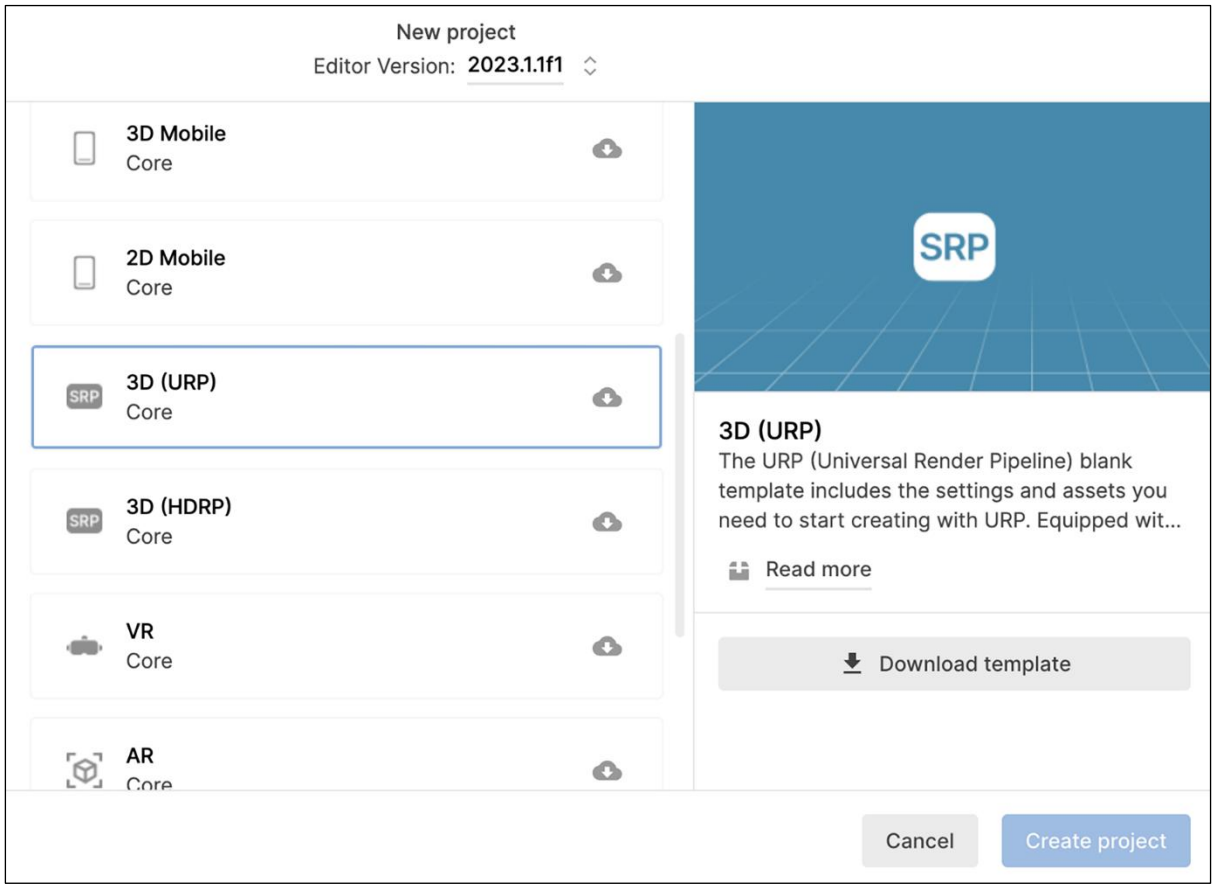

On Enter State
Event
Transform
Get Parent
This
Get Variable
Object
sensedObject
This
Nav Mesh Agent
Set Stopped
Wait For Seconds
Delay
Unscaled
Transform
Look At
Target
World Up 0 1 0
Transform
Get Parent
This
Get Variable
Object
fireRate
This
Transform
Get Position
This
Component
Instantiate
Original EnemyBullet
Position
Rotation
Transform
Get Rotation
This

Chapter 10: Material Alchemy: URP and Shader Graph for Stunning Visuals

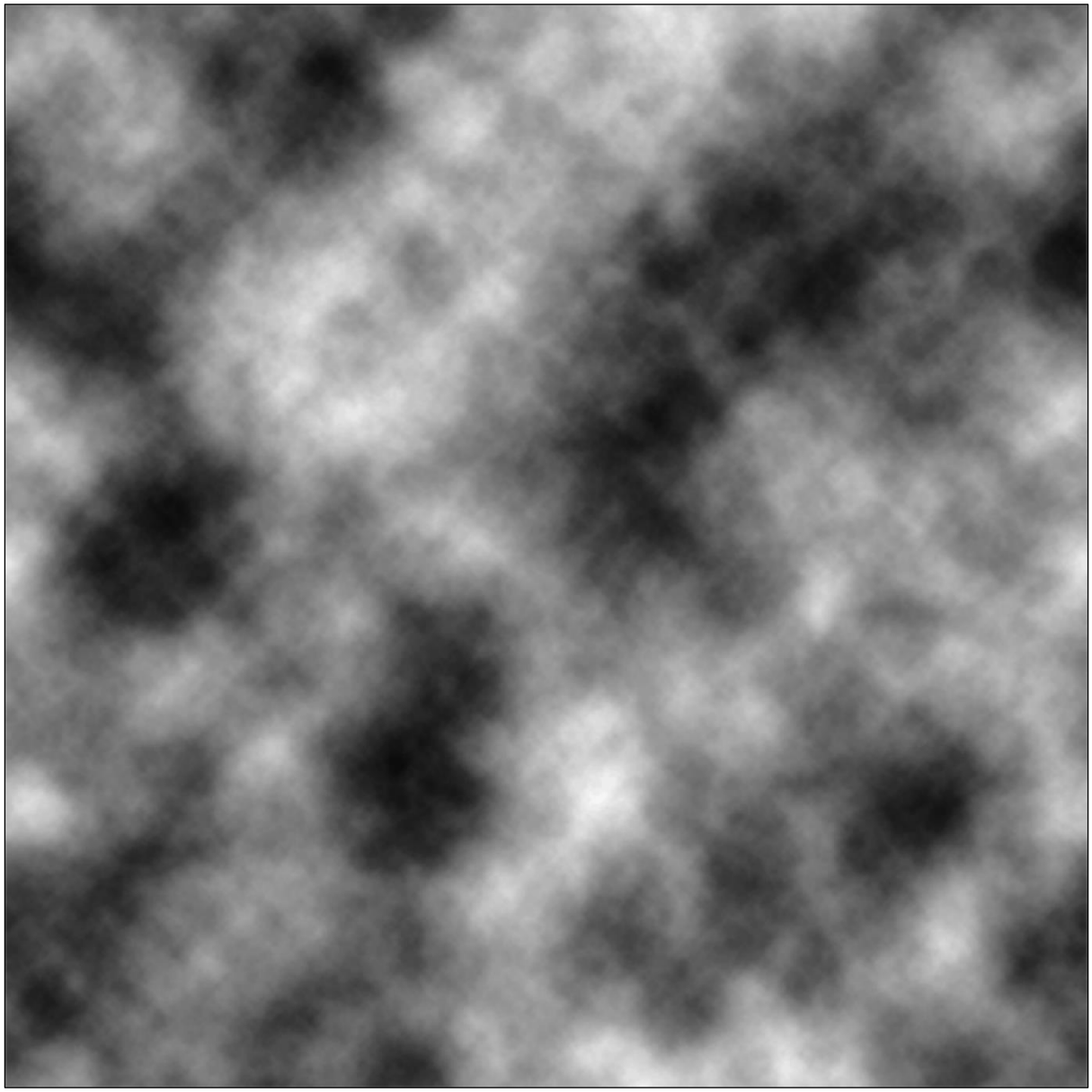


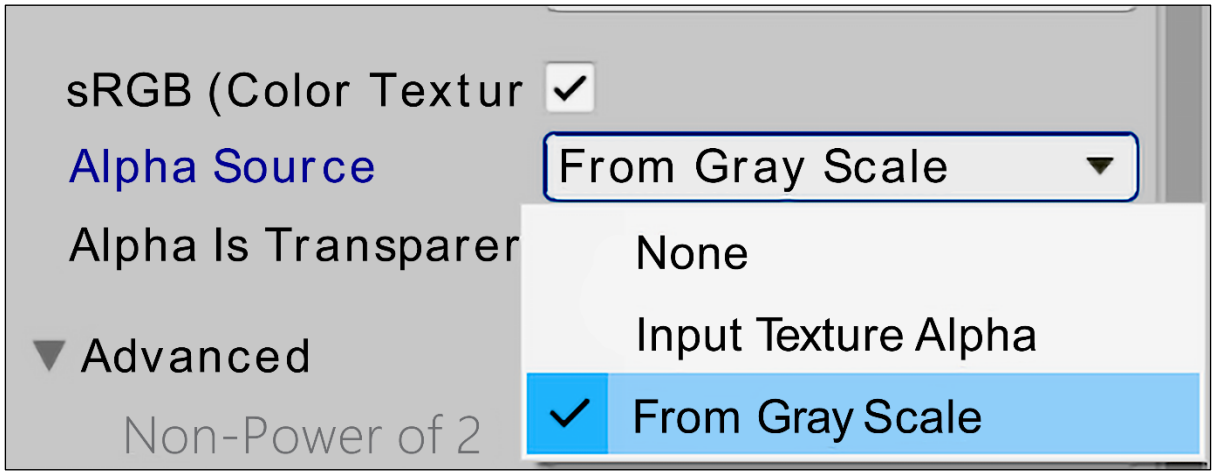


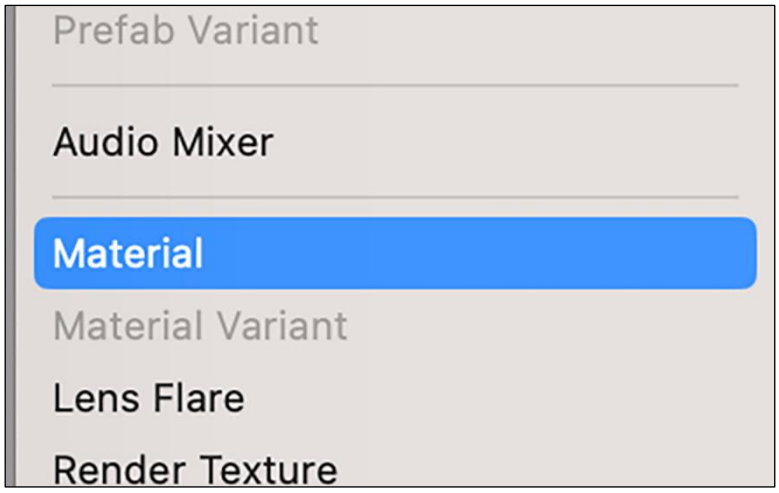


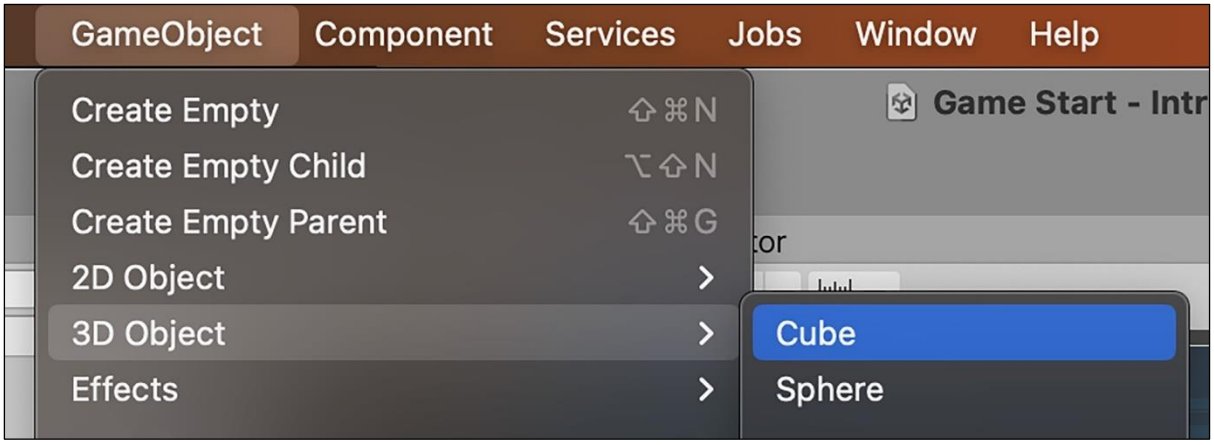

New project
Editor Version: 2023.1.1f1
3D Mobile
Core
2D Mobile
Core
3D (URP)
Core
3D (HDRP)
Core
VR
Core
AR
Core
SRP
3D (URP)
The URP (Universal Render Pipeline) blank template includes the settings and assets you need to start creating with URP. Equipped wit...
Read more
Download template
Cancel
Create project

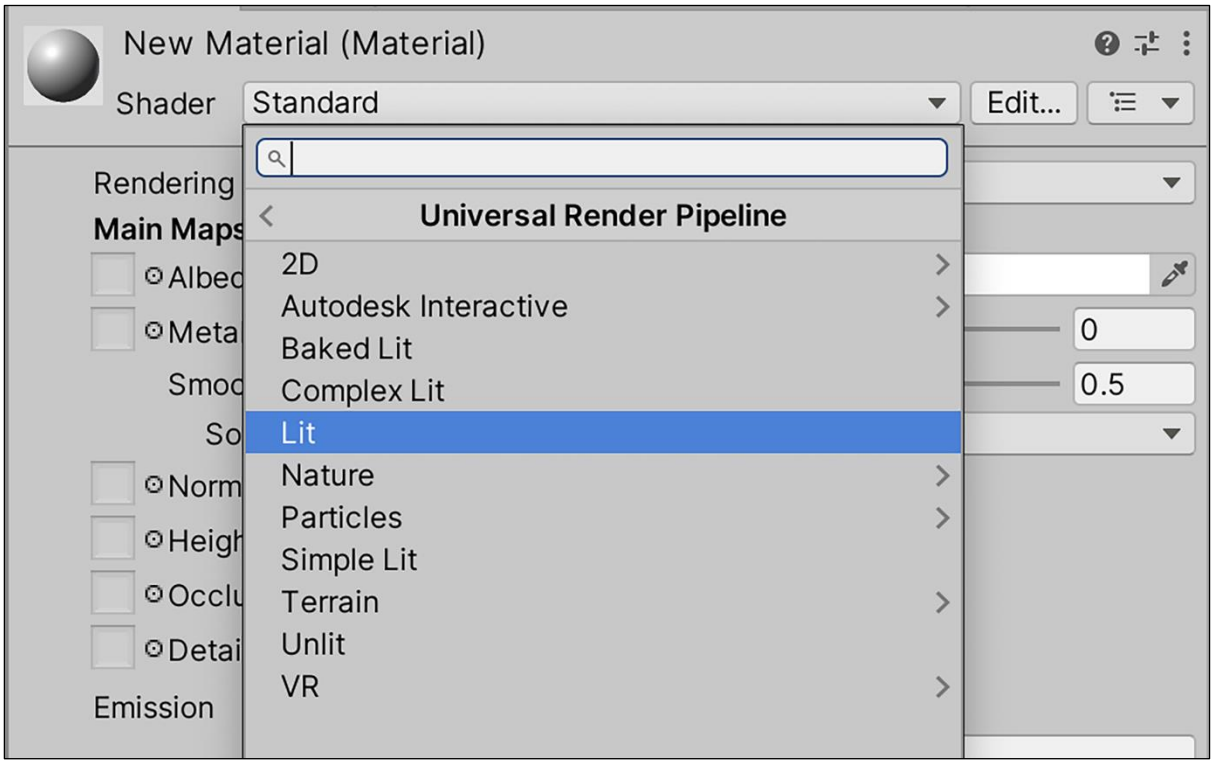


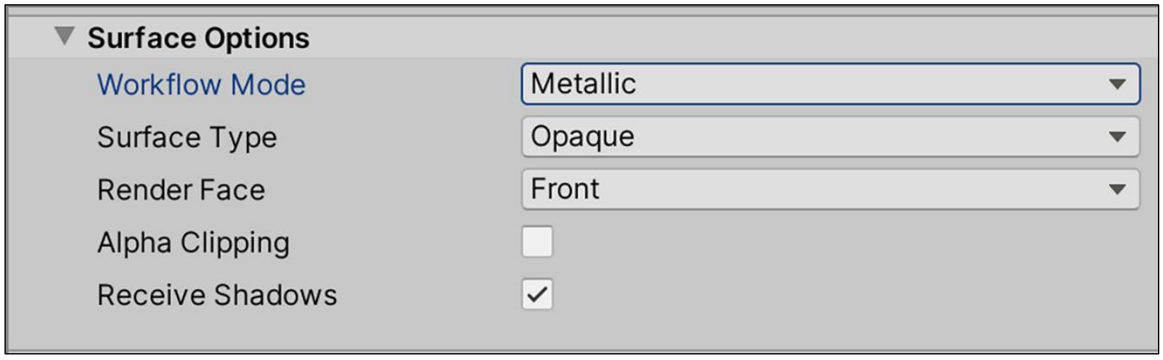


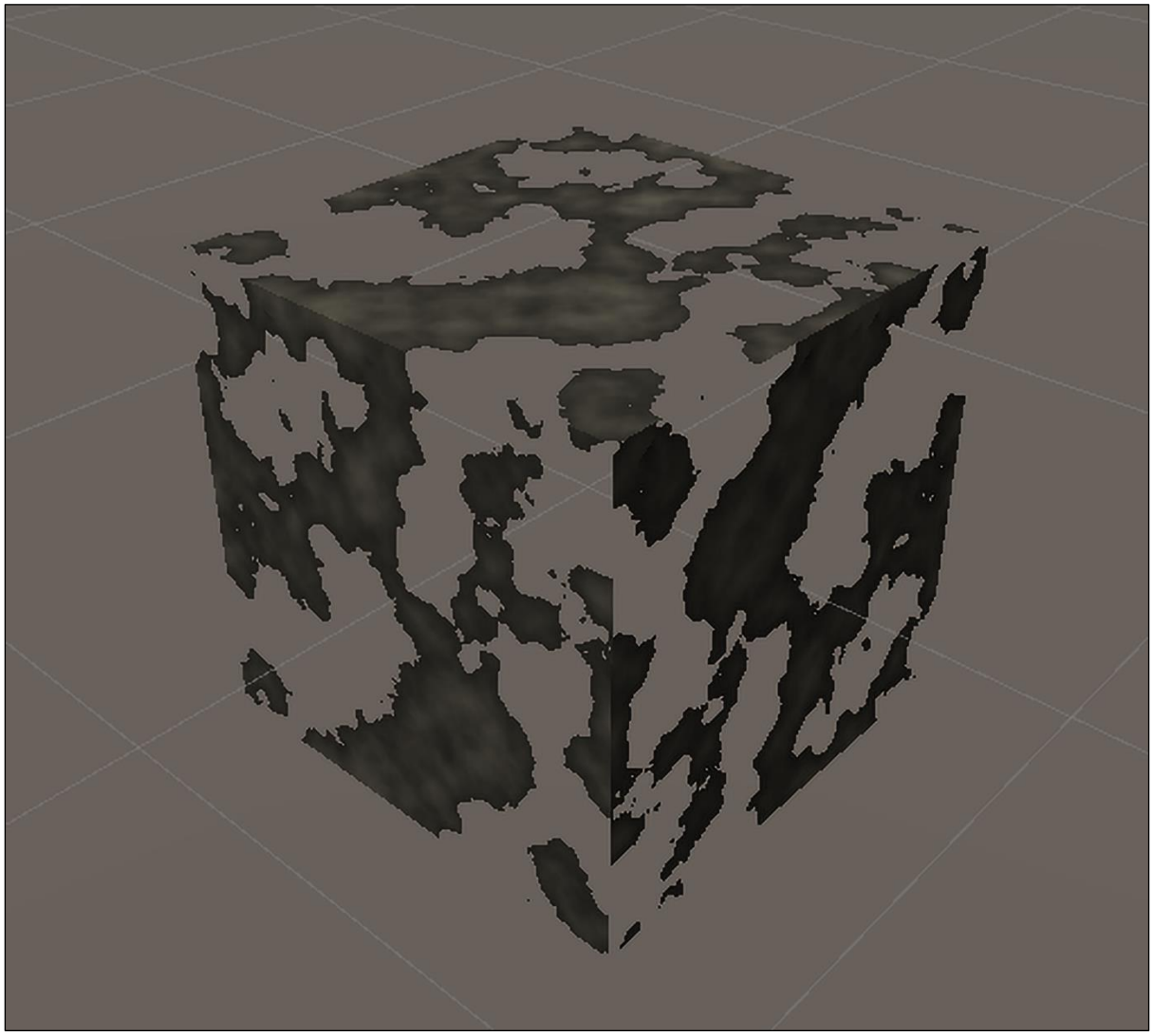

sRGB (Color Textur
Alpha Source
From Gray Scale
Alpha Is Transparer
None
Input Texture Alpha
From Gray Scale
Advanced
Non-Power of 2

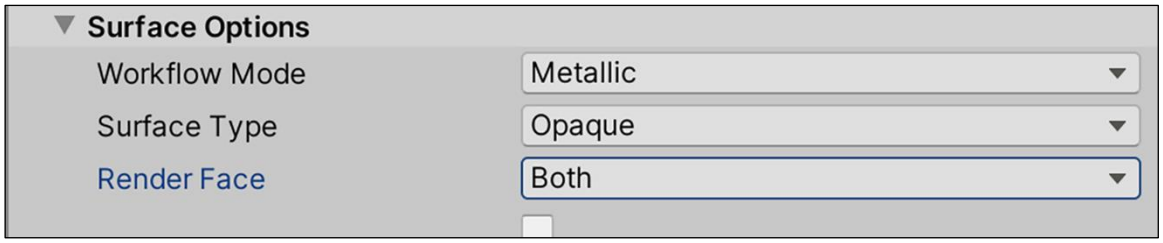

Prefab Variant
Audio Mixer
Material
Material Variant
Lens Flare
Render Texture

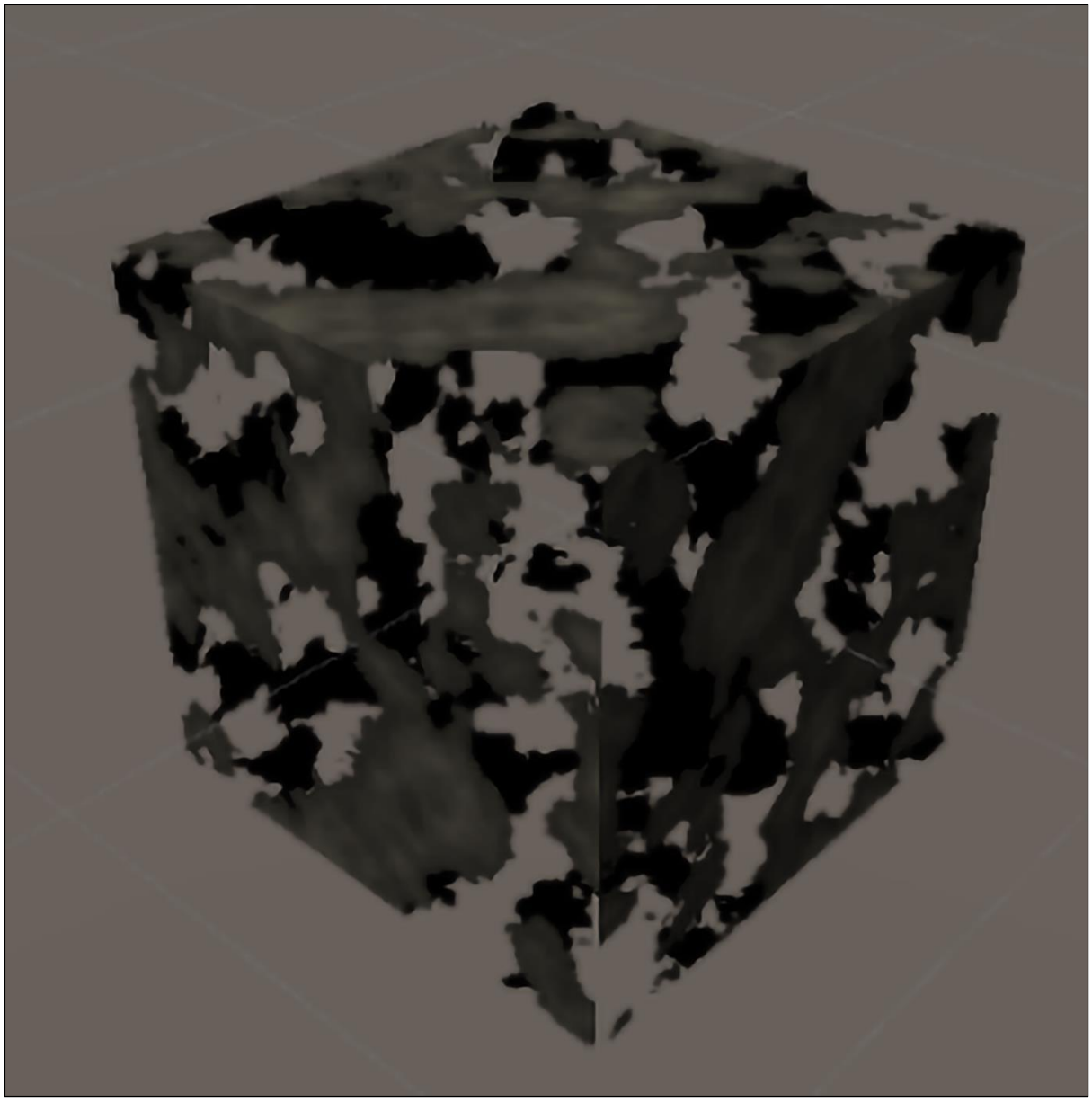

GameObject
Component
Services
Jobs
Window
Help
Create Empty
Create Empty Child
Create Empty Parent
2D Object
3D Object
Effects
Cube
Sphere
Game Start - Intr

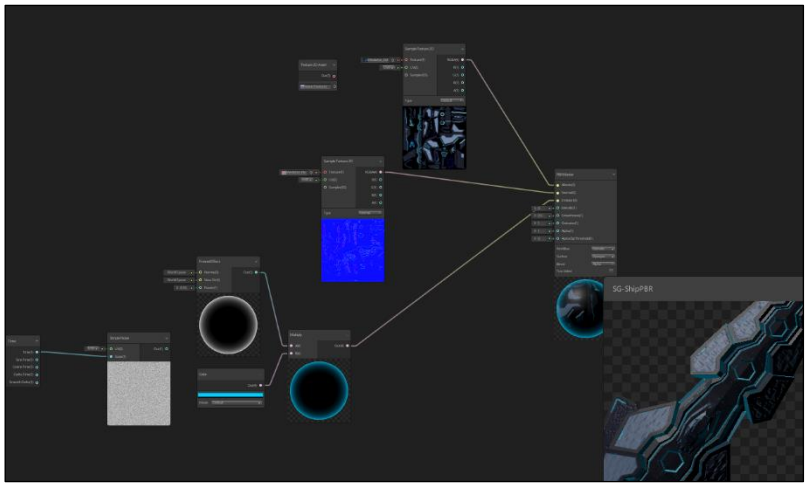

New Material (Material)
Shader
Standard
Edit...
Rendering
Main Maps
Albed
Meta
Smoo
So
Norm
Heigh
Occlu
Detai
Emission
Universal Render Pipeline
2D
Autodesk Interactive
Baked Lit
Complex Lit
Lit
Nature
Particles
Simple Lit
Terrain
Unlit
VR
0
0.5

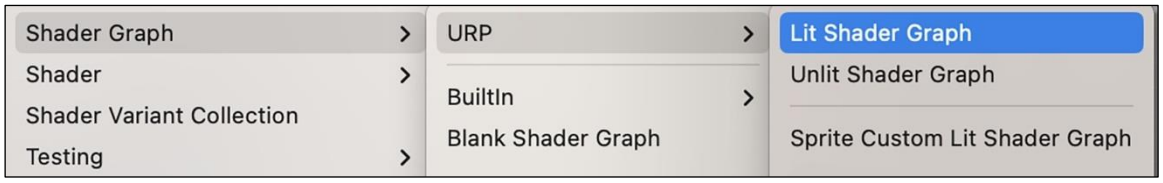

Surface Options
Workflow Mode
Metallic
Surface Type
Opaque
Render Face
Front
Alpha Clipping
Receive Shadows

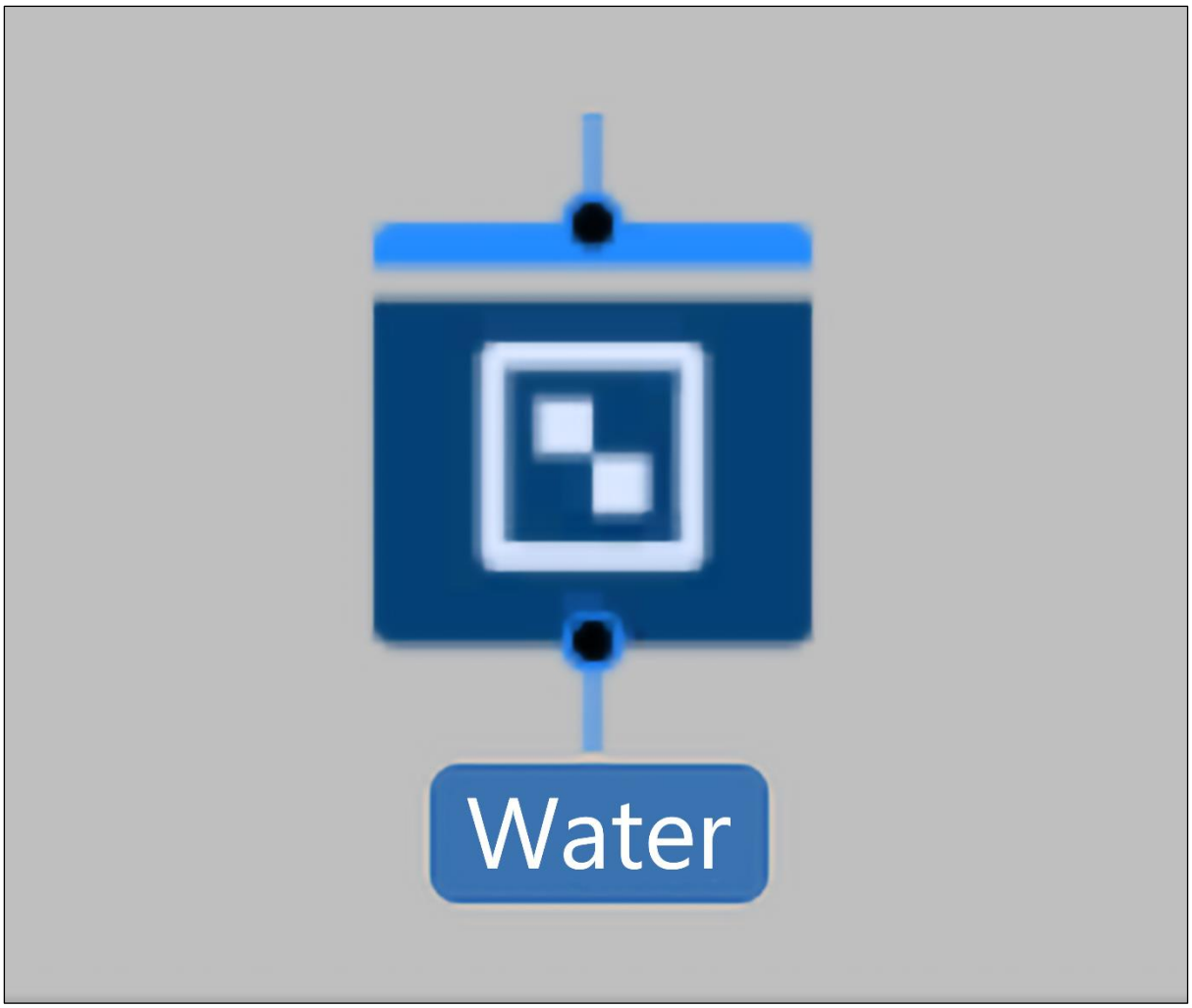


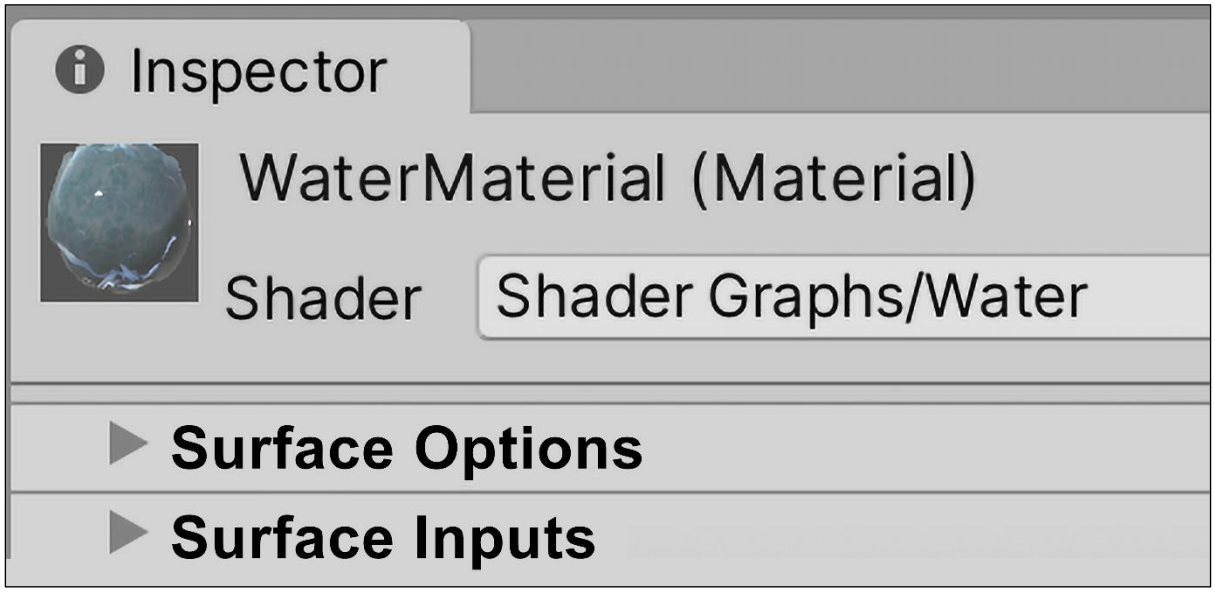

Surface Options
Workflow Mode
Metallic
Surface Type
Opaque
Render Face
Both

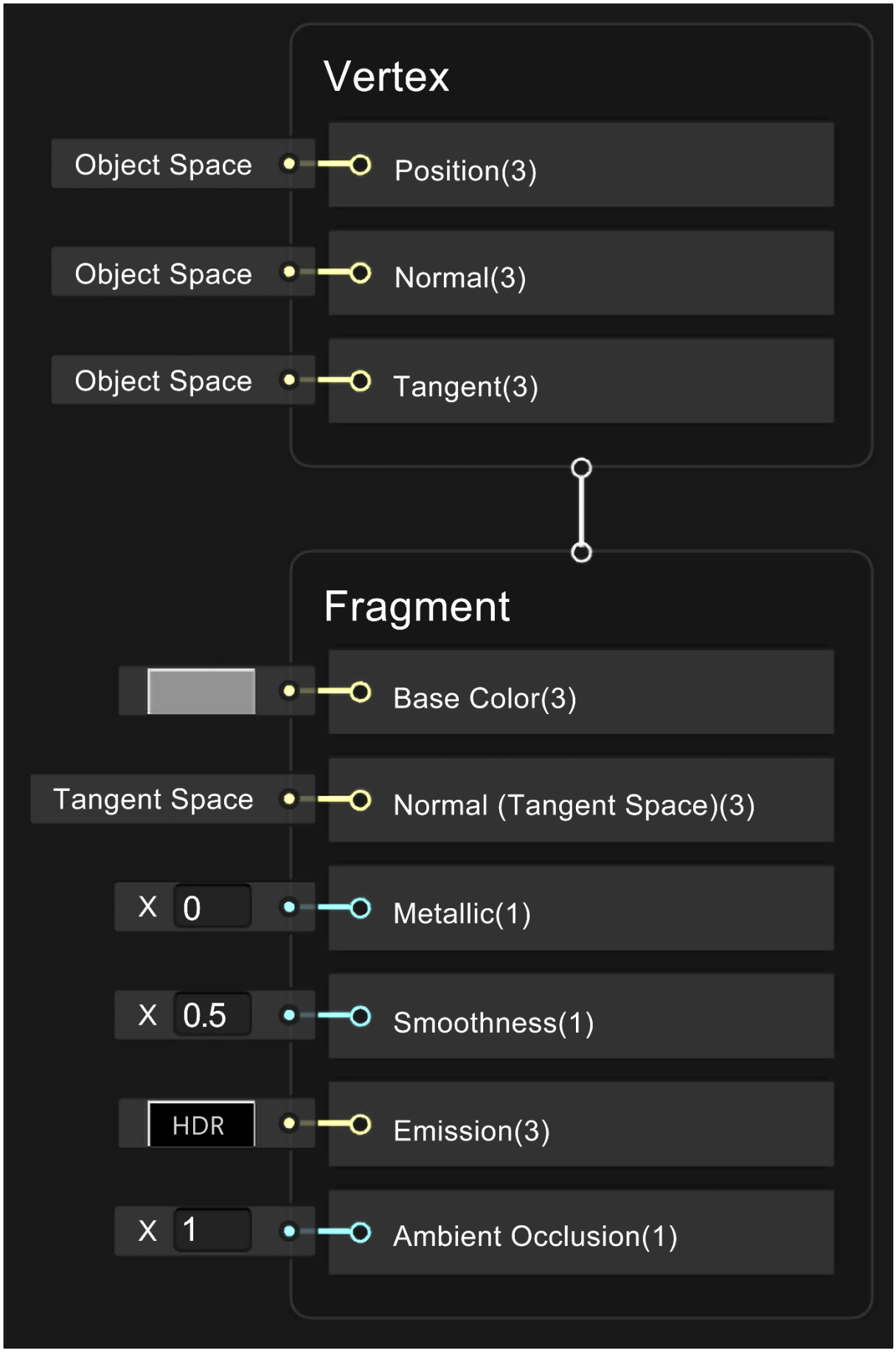


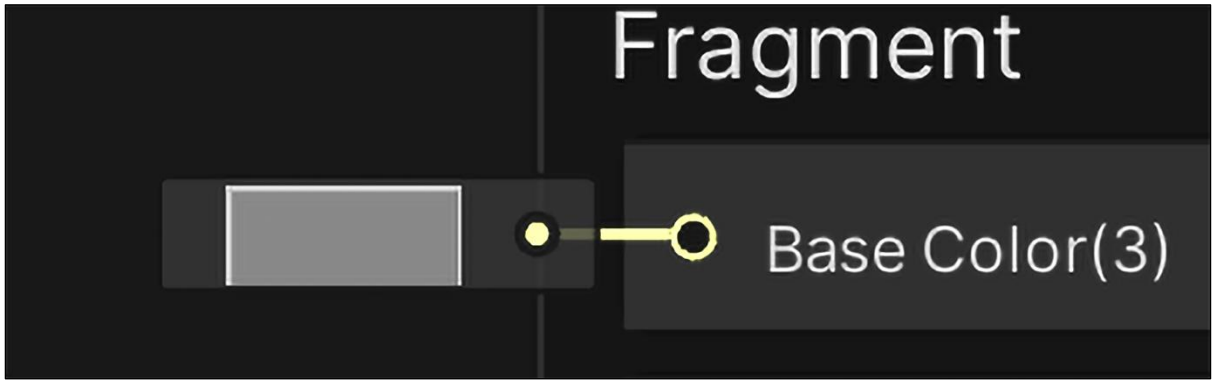


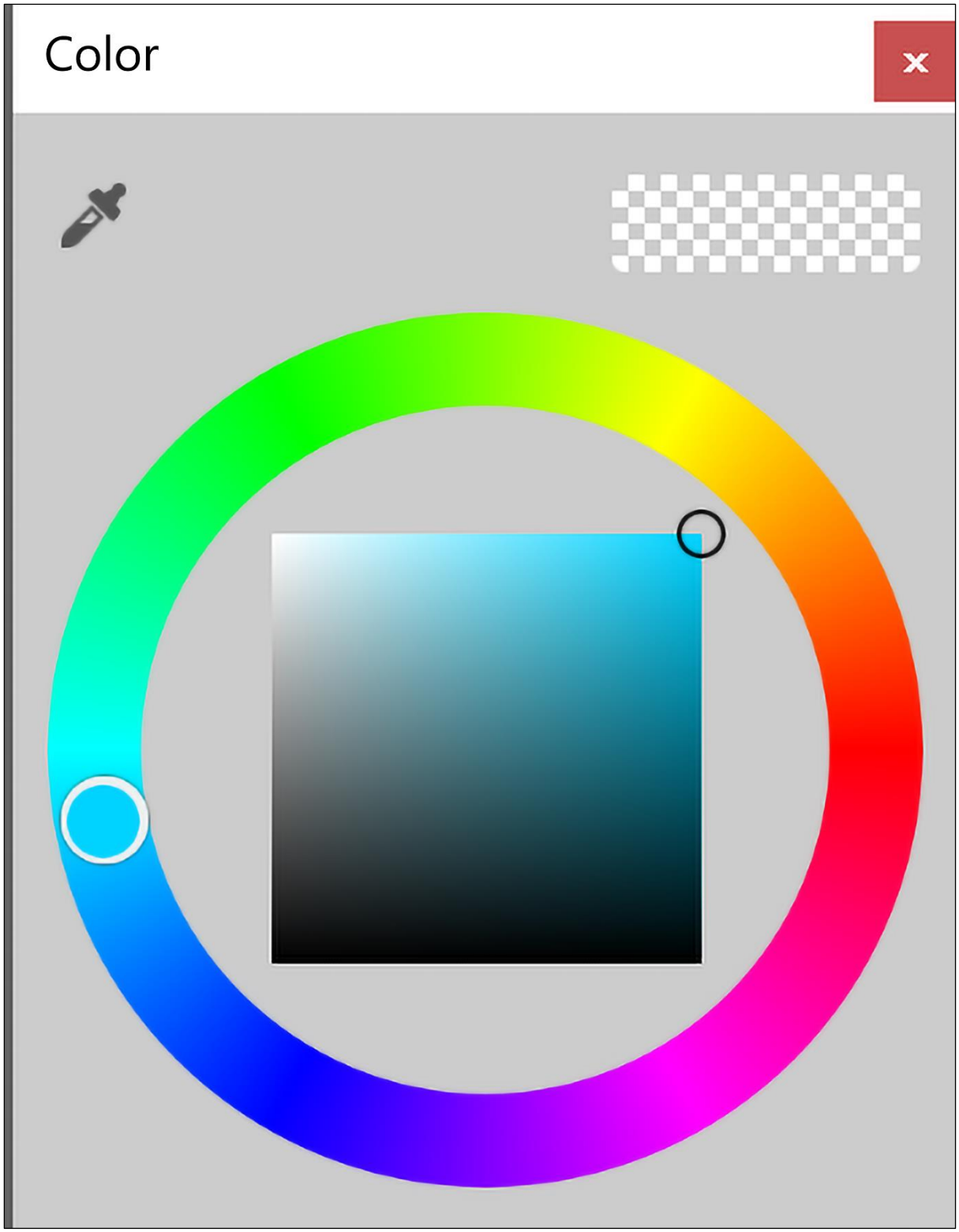

Shader Graph
Shader
Shader Variant Collection
Testing
URP
BuiltIn
Blank Shader Graph
Lit Shader Graph
Unlit Shader Graph
Sprite Custom Lit Shader Graph

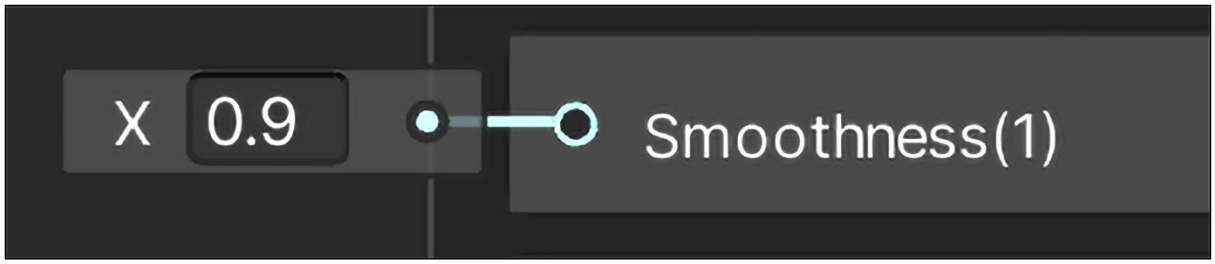

Water


Inspector
WaterMaterial (Material)
Shader
Shader Graphs/Water
Surface Options
Surface Inputs

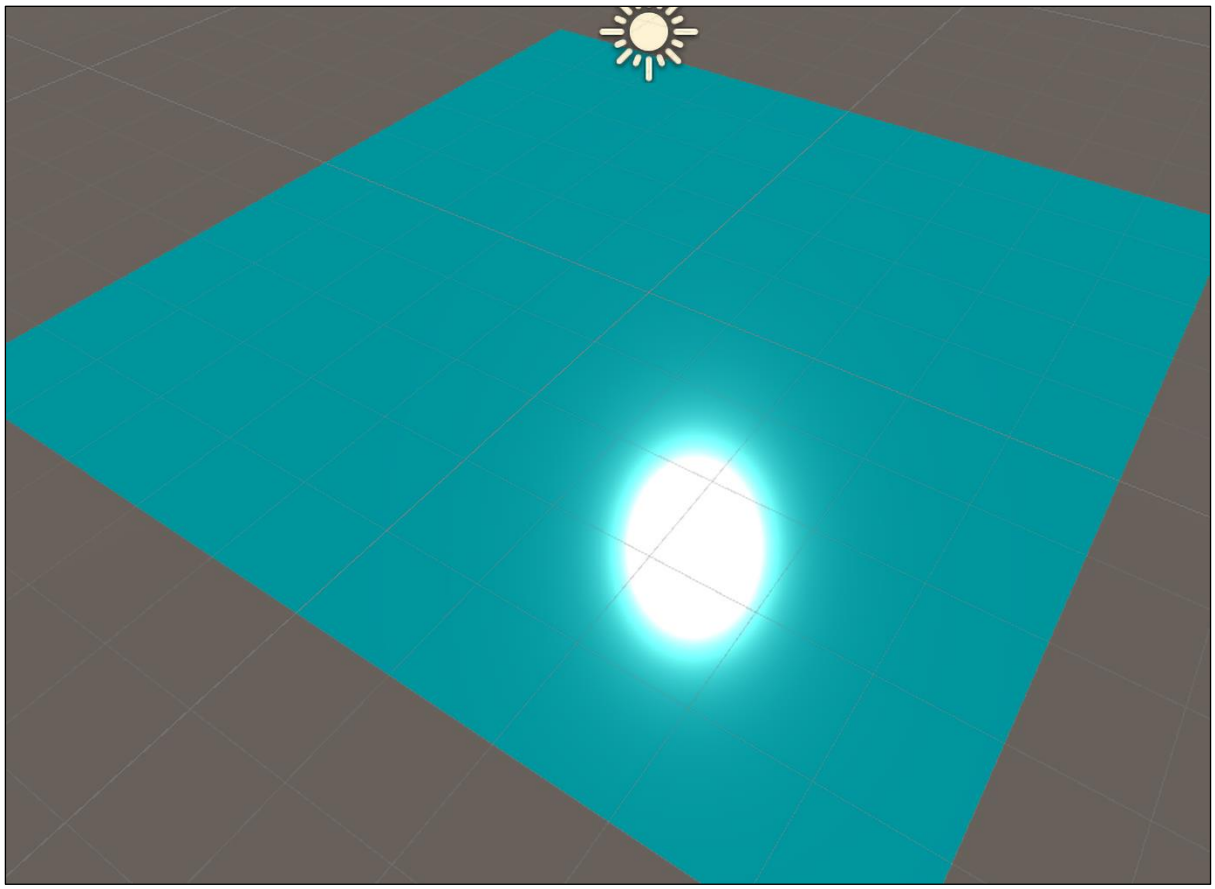

Vertex
Object Space
Position(3)
Object Space
Normal(3)
Object Space
Tangent(3)
Fragment
Base Color(3)
Tangent Space
Normal (Tangent Space)(3)
X 0
Metallic(1)
X 0.5
Smoothness(1)
HDR
Emission(3)
X 1
Ambient Occlusion(1)

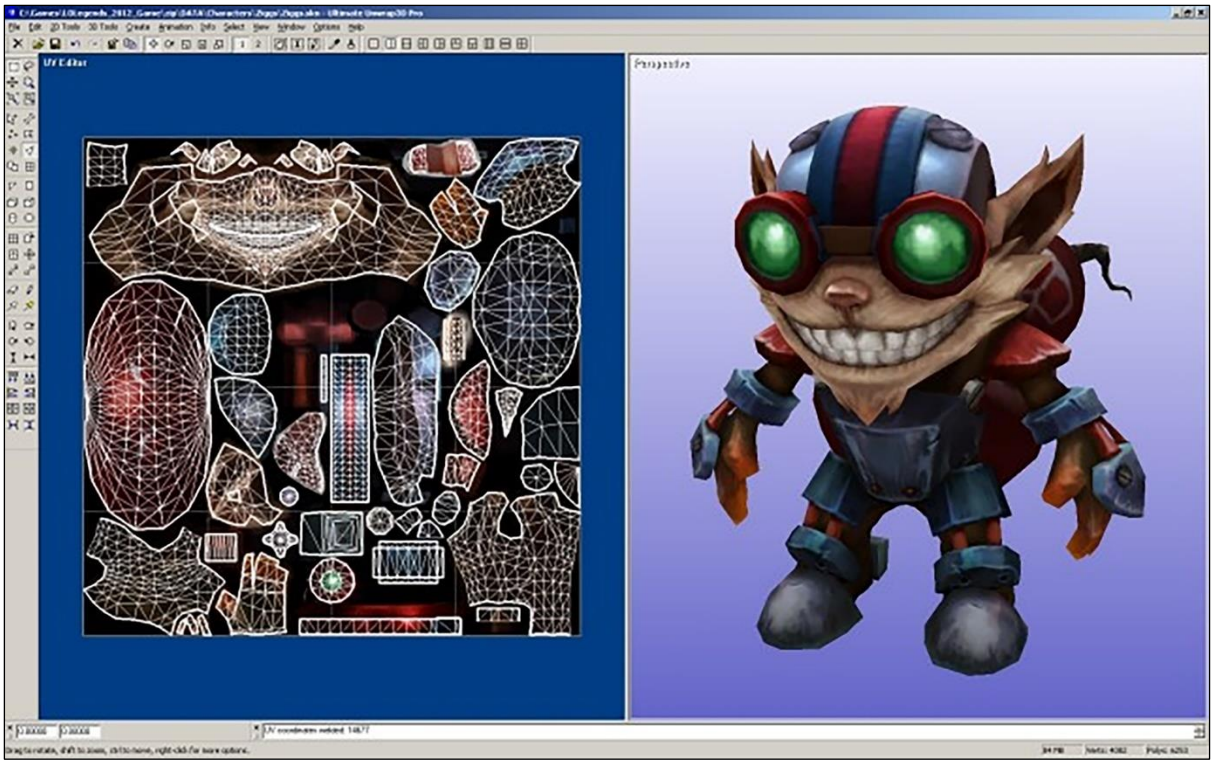

Fragment
Base Color(3)

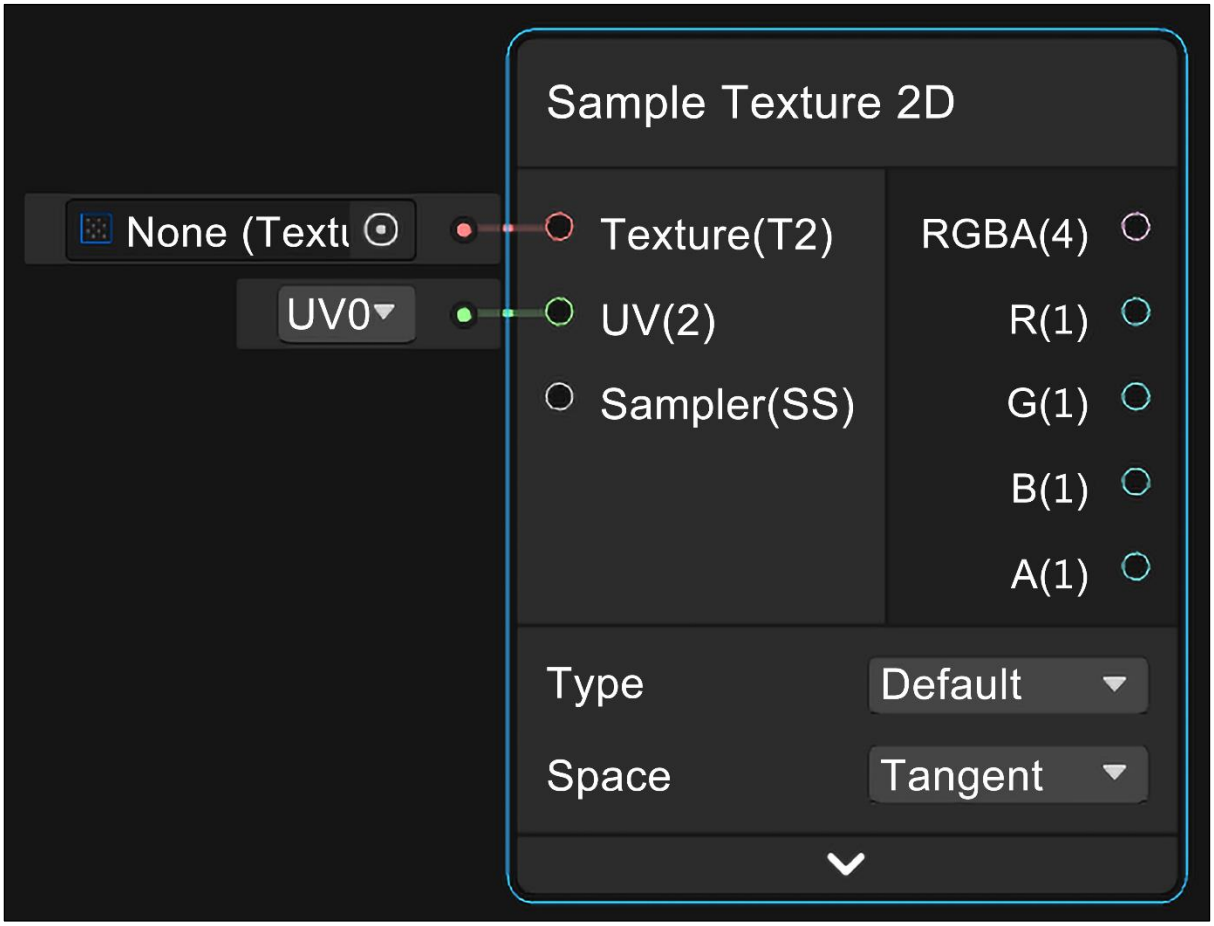

Color


X
0.9
Smoothness(1)


Scene
Game
Water
Save Asset
Save As...
Show In Project

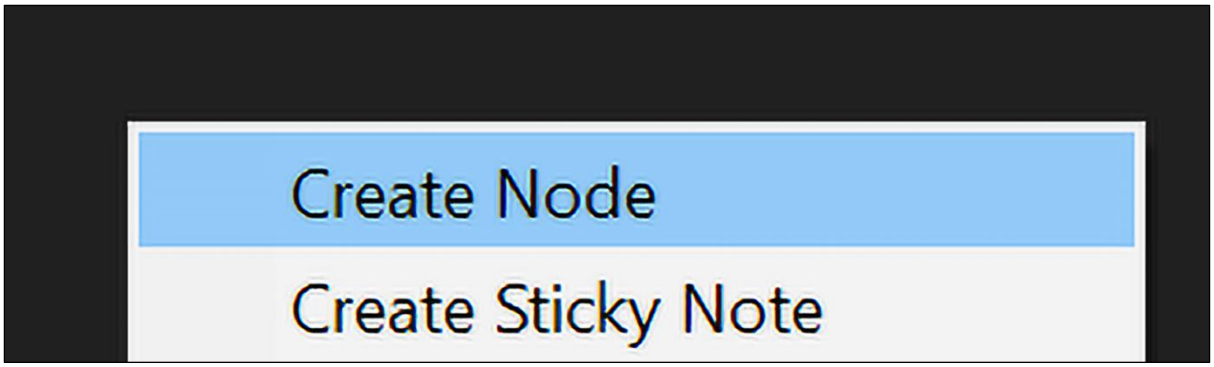


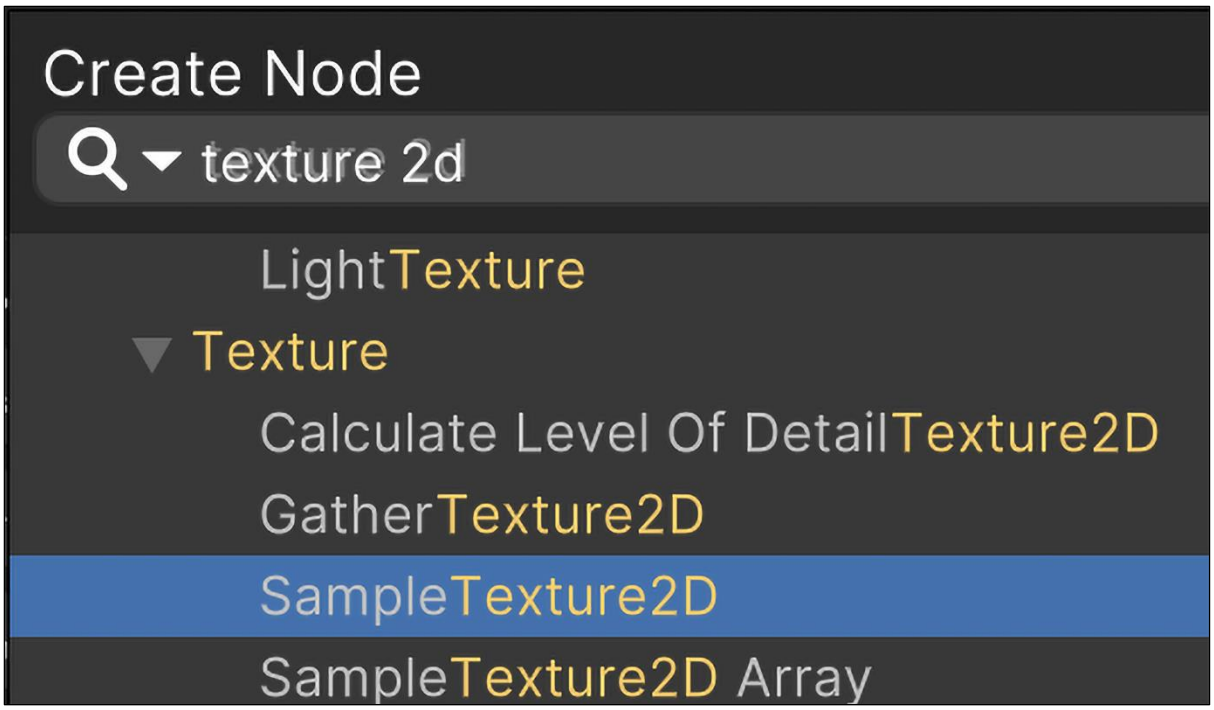


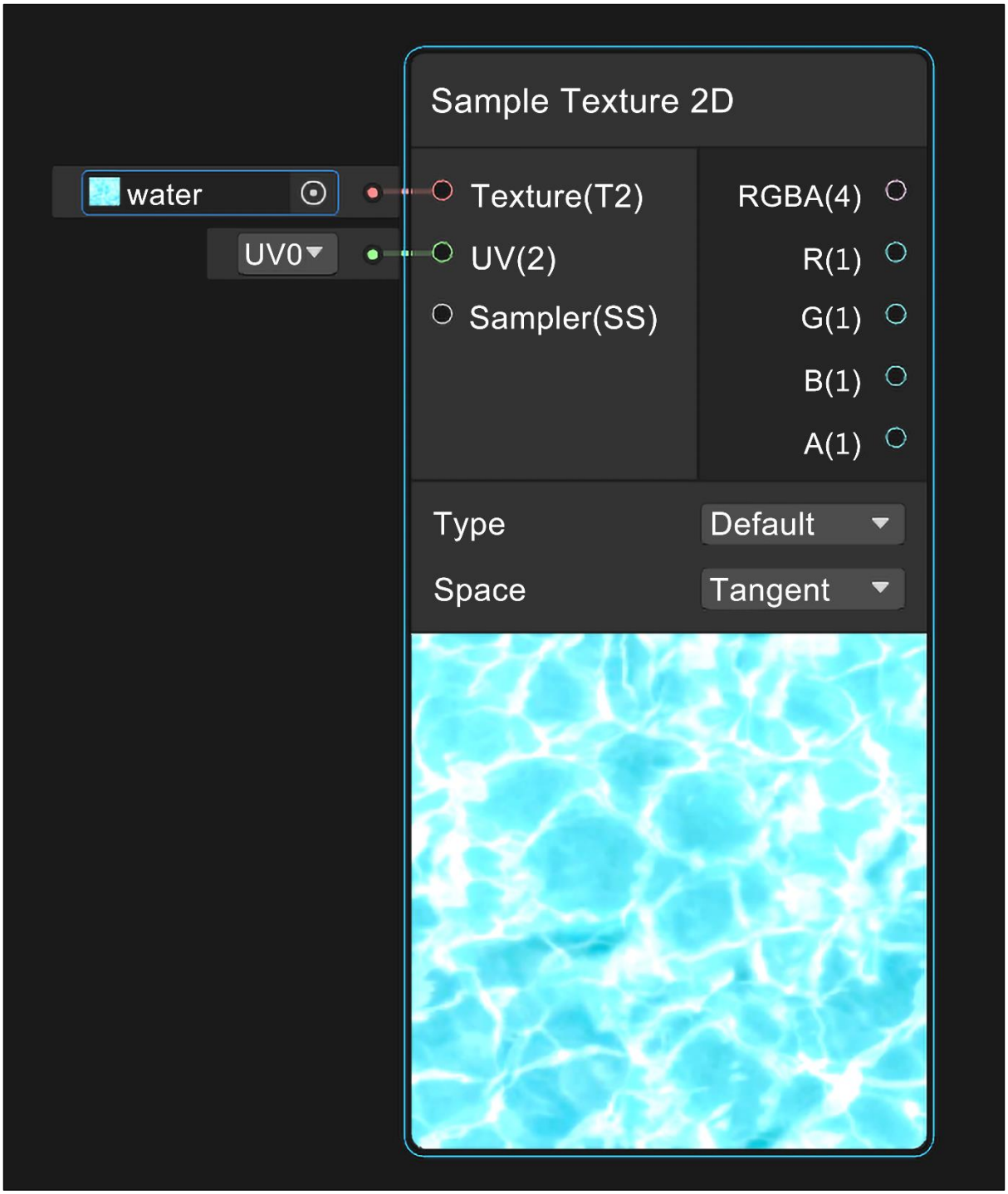

Sample Texture 2D
None (Textu
UV0
Texture(T2)
UV(2)
Sampler(SS)
RGBA(4)
R(1)
G(1)
B(1)
A(1)
Type
Default
Space
Tangent



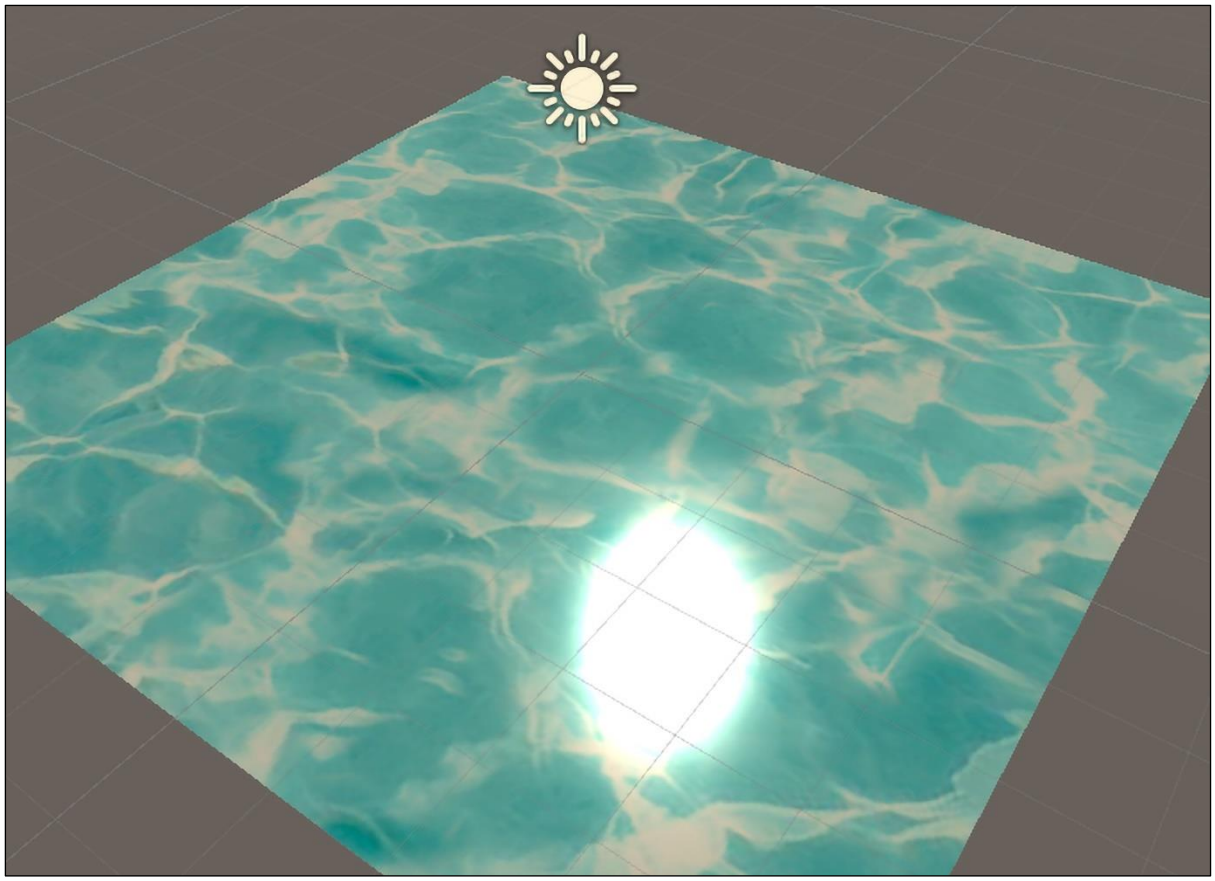
Wrap Mode Repeat

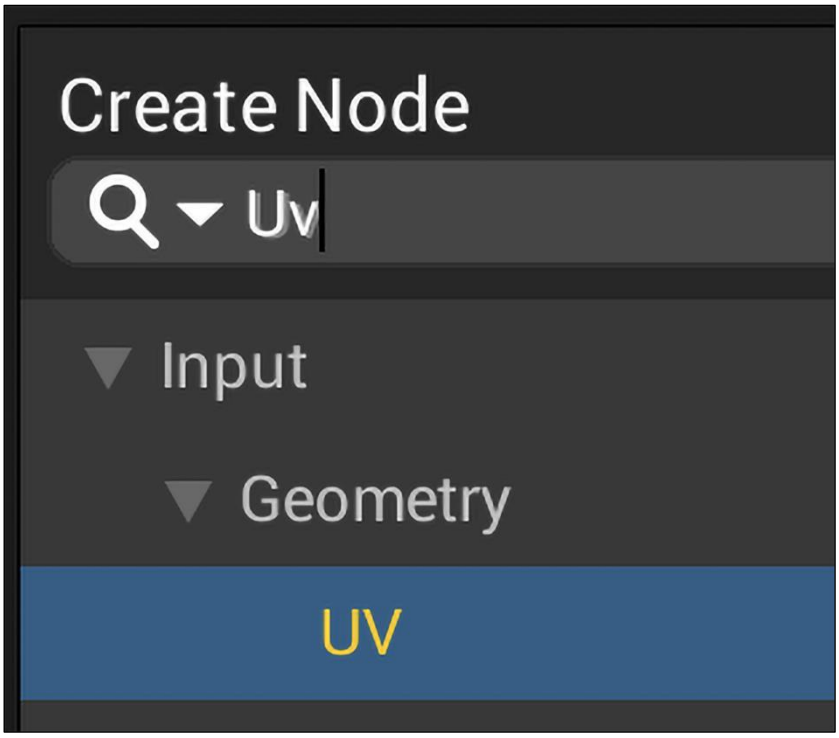

Create Node
Create Sticky Note

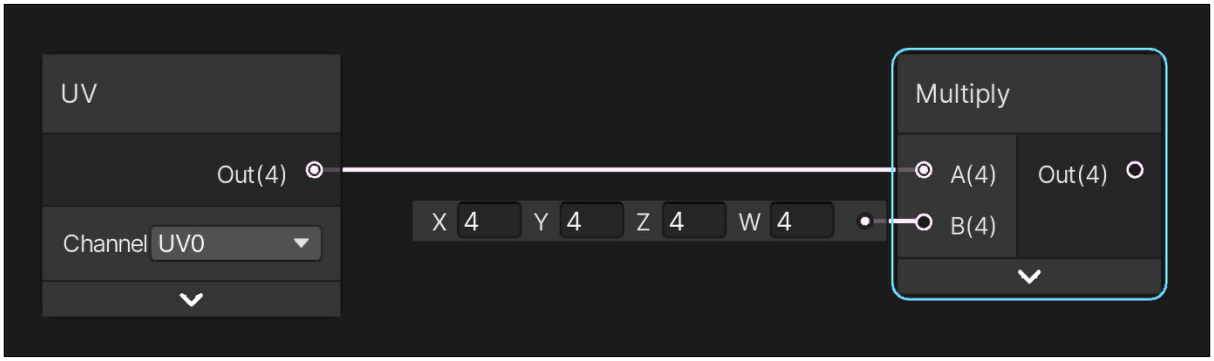

Create Node
texture 2d
LightTexture
Texture
Calculate Level Of DetailTexture2D
GatherTexture2D
SampleTexture2D
SampleTexture2D Array

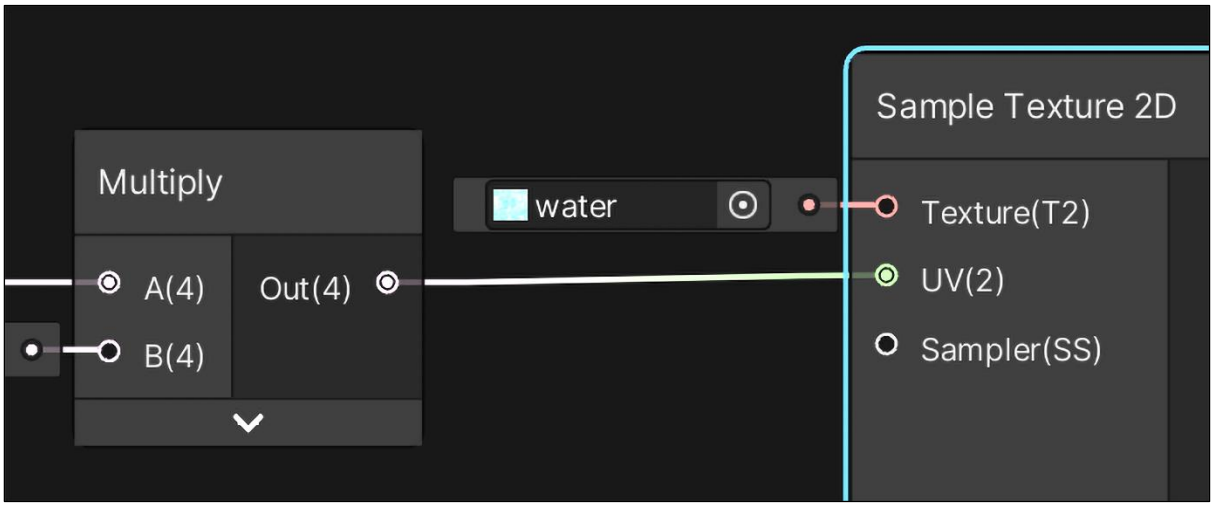

Sample Texture 2D
water
UV0
Texture(T2)
UV(2)
Sampler(SS)
RGBA(4)
R(1)
G(1)
B(1)
A(1)
Type
Default
Space
Tangent

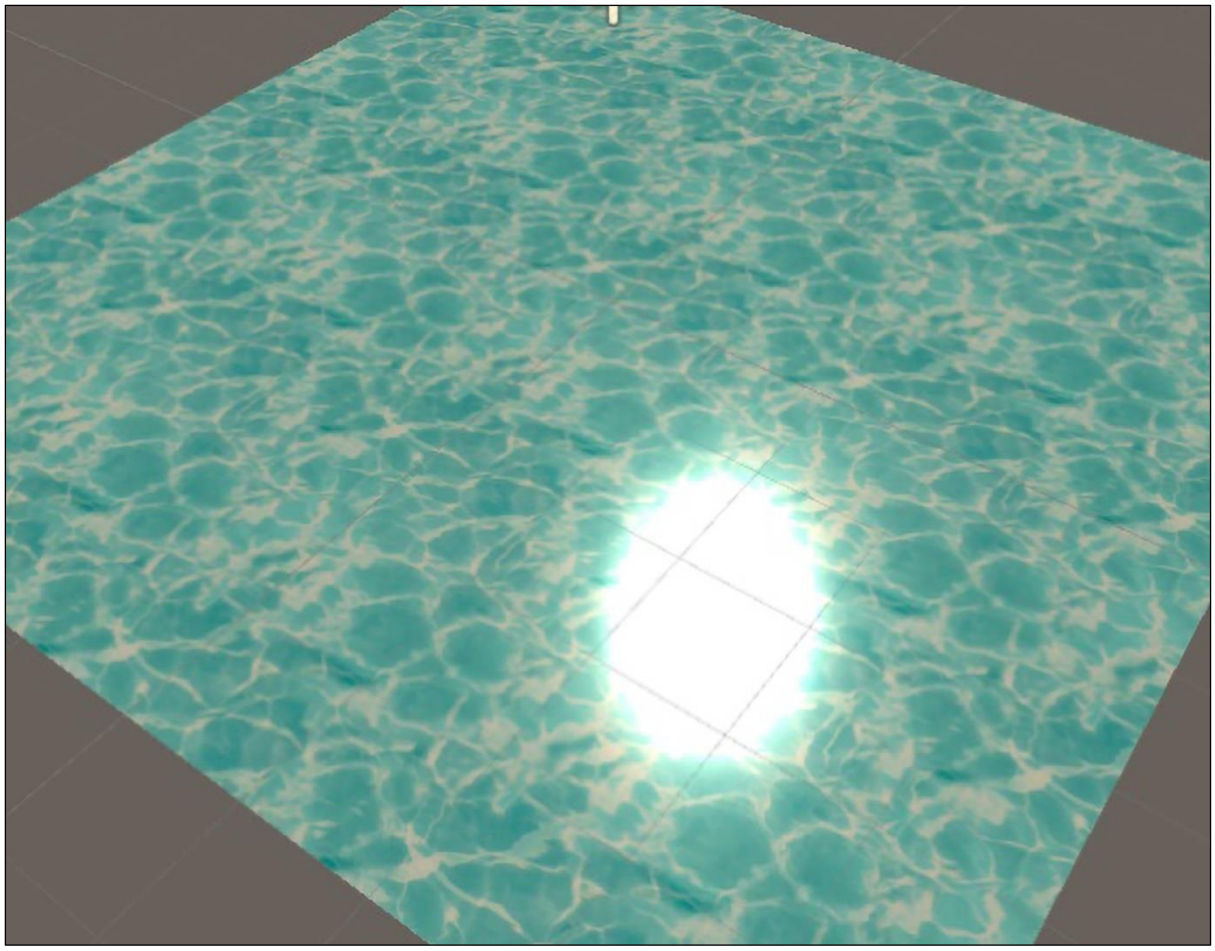

Sample Texture 2D
Texture(T2)
UV(2)
Sampler(SS)
RGBA(4)
R(1)
G(1)
B(1)
Fragment
Base Color(3)
Tangent Space
Normal (Tangent Space)
X 0
Metallic(1)

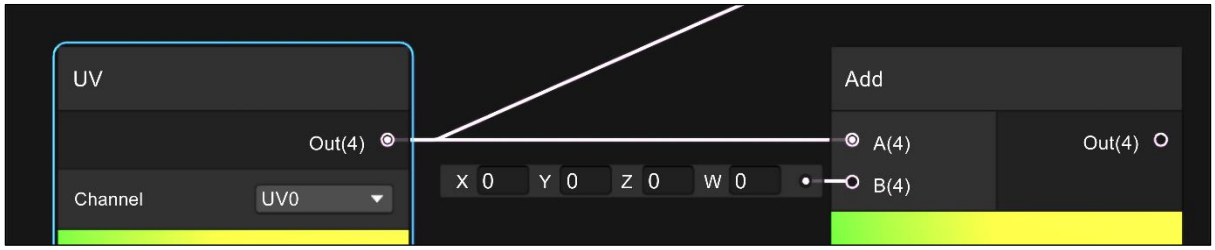


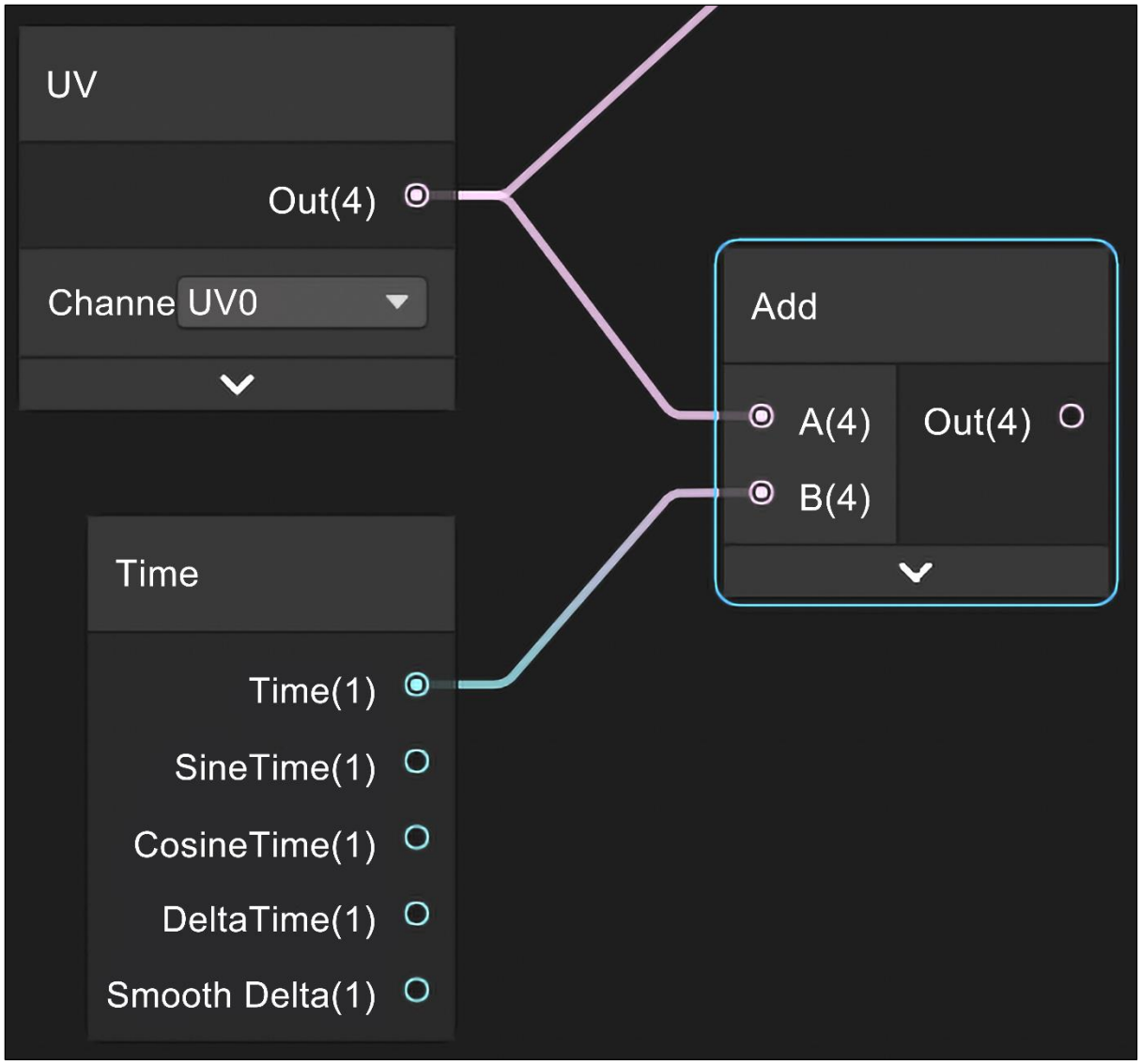

Create Node
Uv
Input
Geometry
UV

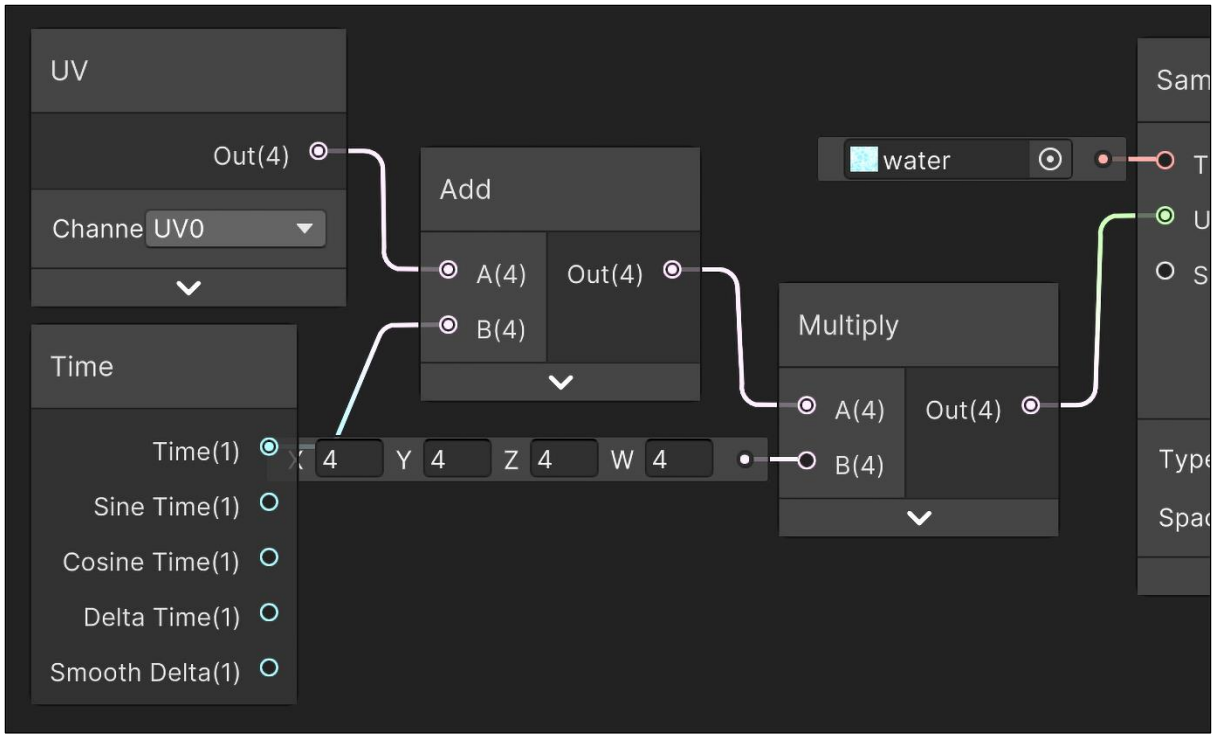

UV
Out(4)
Channel UV0
X 4 Y 4 Z 4 W 4
Multiply
A(4)
B(4)
Out(4)

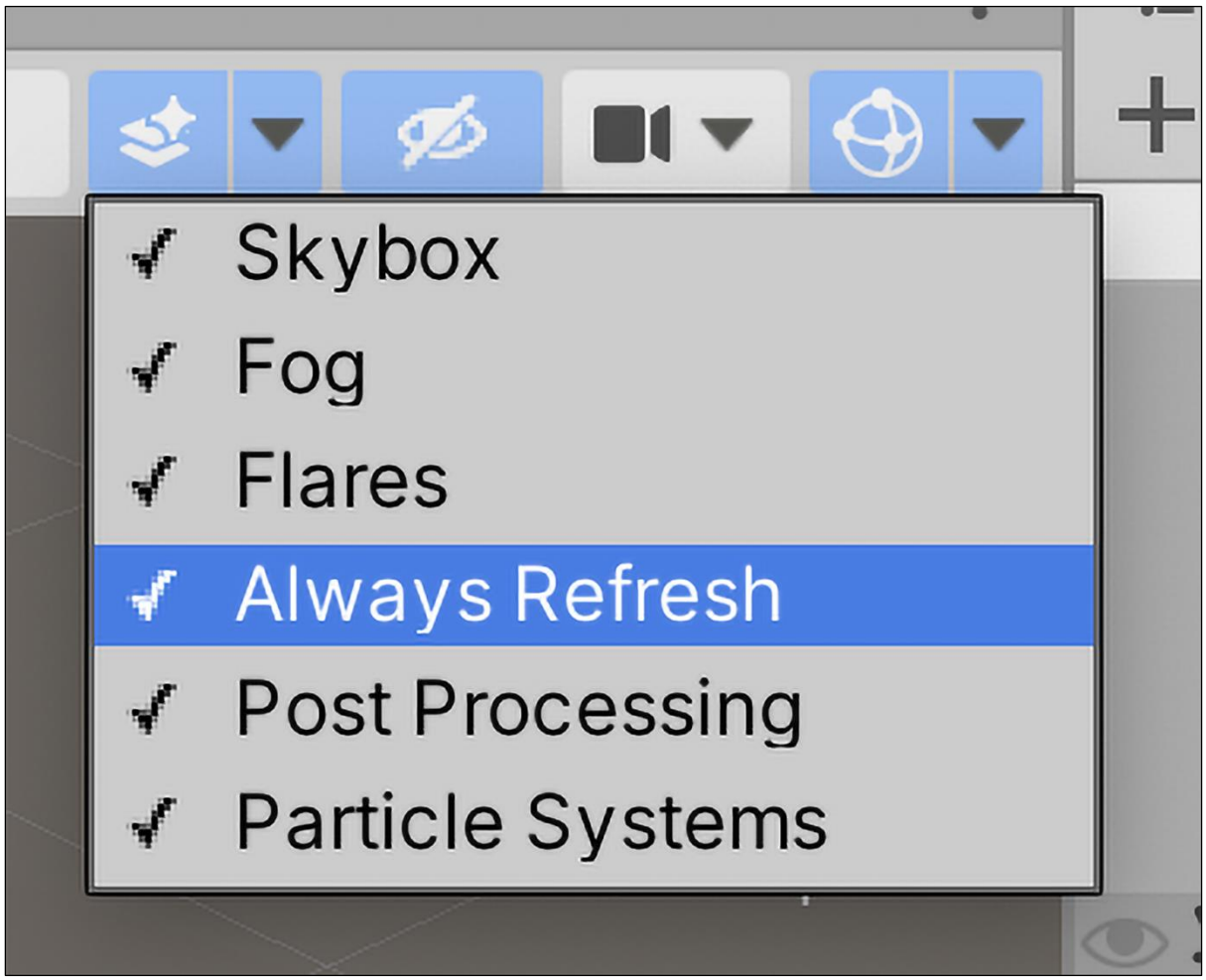

Multiply
A(4)
B(4)
Out(4)
water
Sample Texture 2D
Texture(T2)
UV(2)
Sampler(SS)

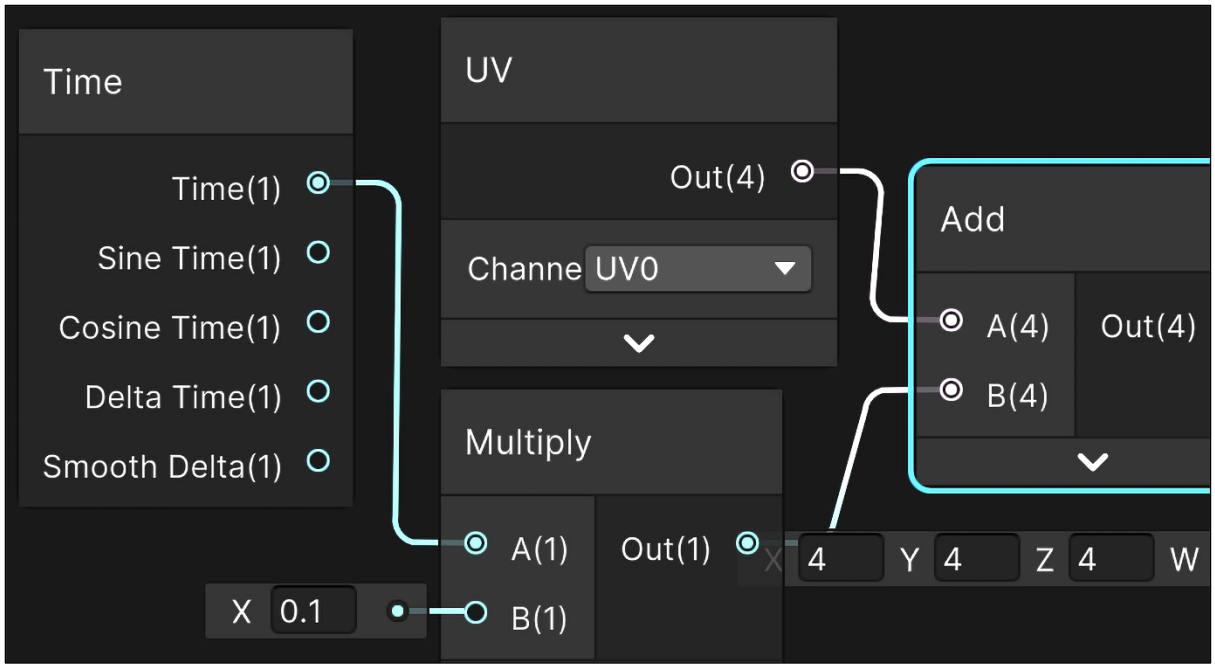


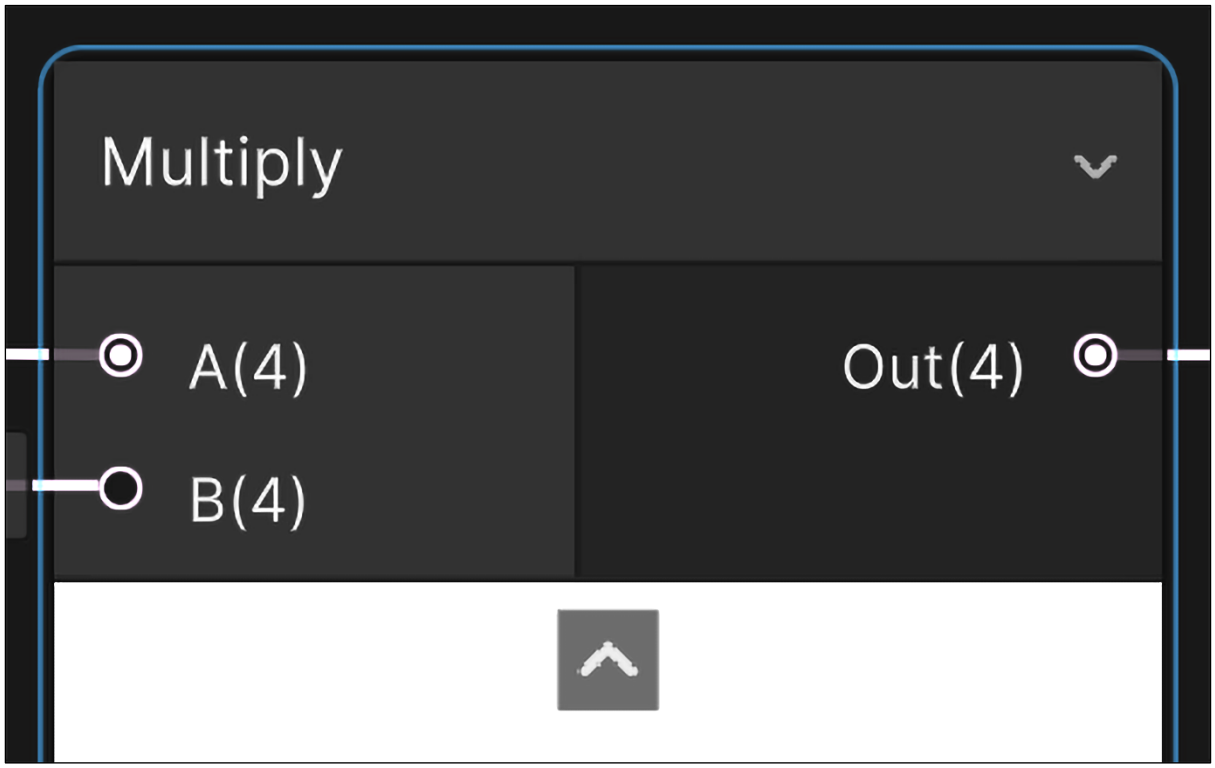

UV
Out(4)
Channel
UV0
X 0
Y 0
Z 0
W 0
Add
A(4)
B(4)
Out(4)

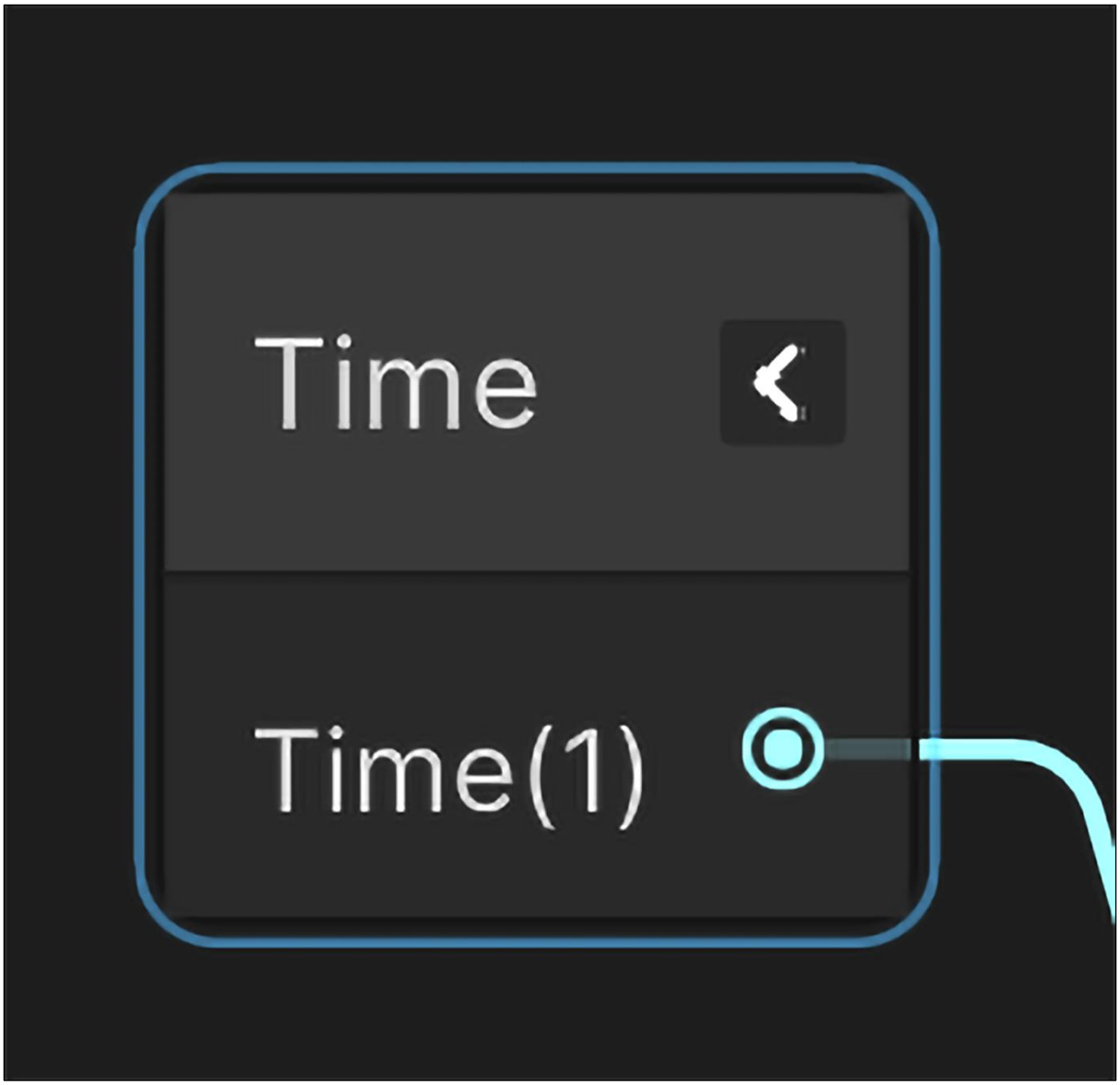

UV
Out(4)
Channe UV0
Add
A(4)
Out(4)
B(4)
Time
Time(1)
SineTime(1)
CosineTime(1)
DeltaTime(1)
Smooth Delta(1)

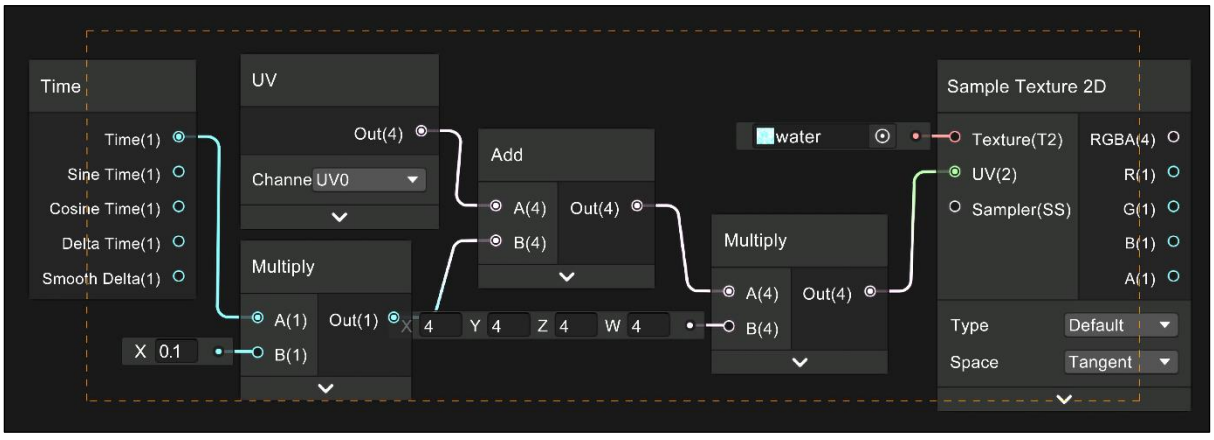

UV
Out(4)
Channe UV0
Add
A(4)
B(4)
Out(4)
water
Sam
T
U
S
Multiply
A(4)
B(4)
Out(4)
Time
Time(1)
Sine Time(1)
Cosine Time(1)
Delta Time(1)
Smooth Delta(1)
X 4 Y 4 Z 4 W 4
Type
Spac

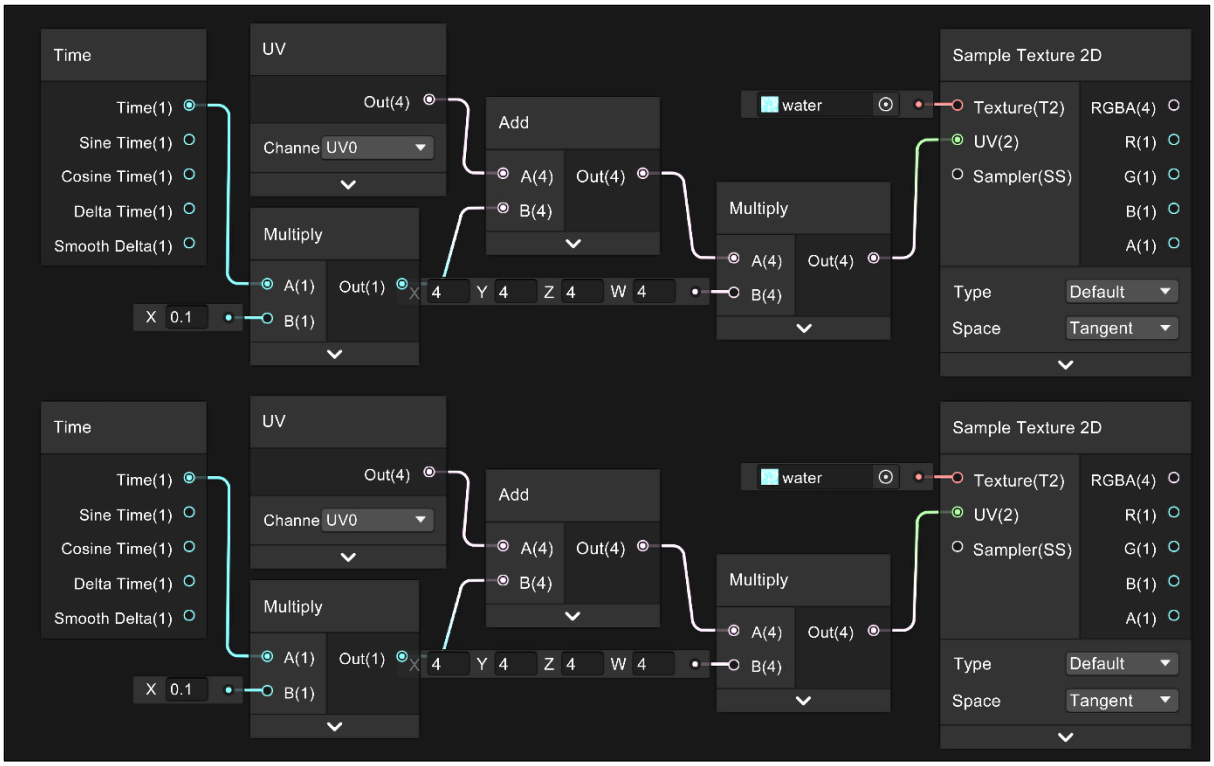

Skybox
Fog
Flares
Always Refresh
Post Processing
Particle Systems

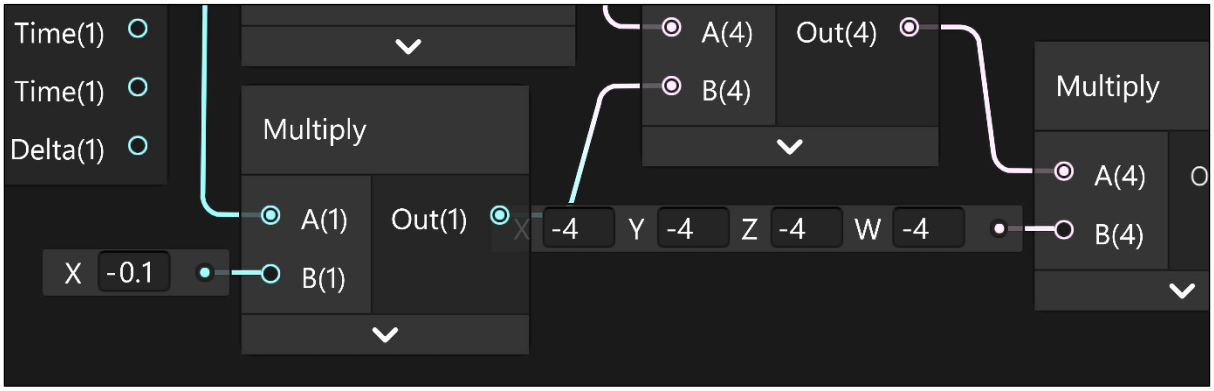

Time
Time(1)
Sine Time(1)
Cosine Time(1)
Delta Time(1)
Smooth Delta(1)
UV
Out(4)
Channe UV0
Add
A(4)
B(4)
Out(4)
Multiply
A(1)
B(1)
Out(1)
X 0.1
X 4
Y 4
Z 4
W

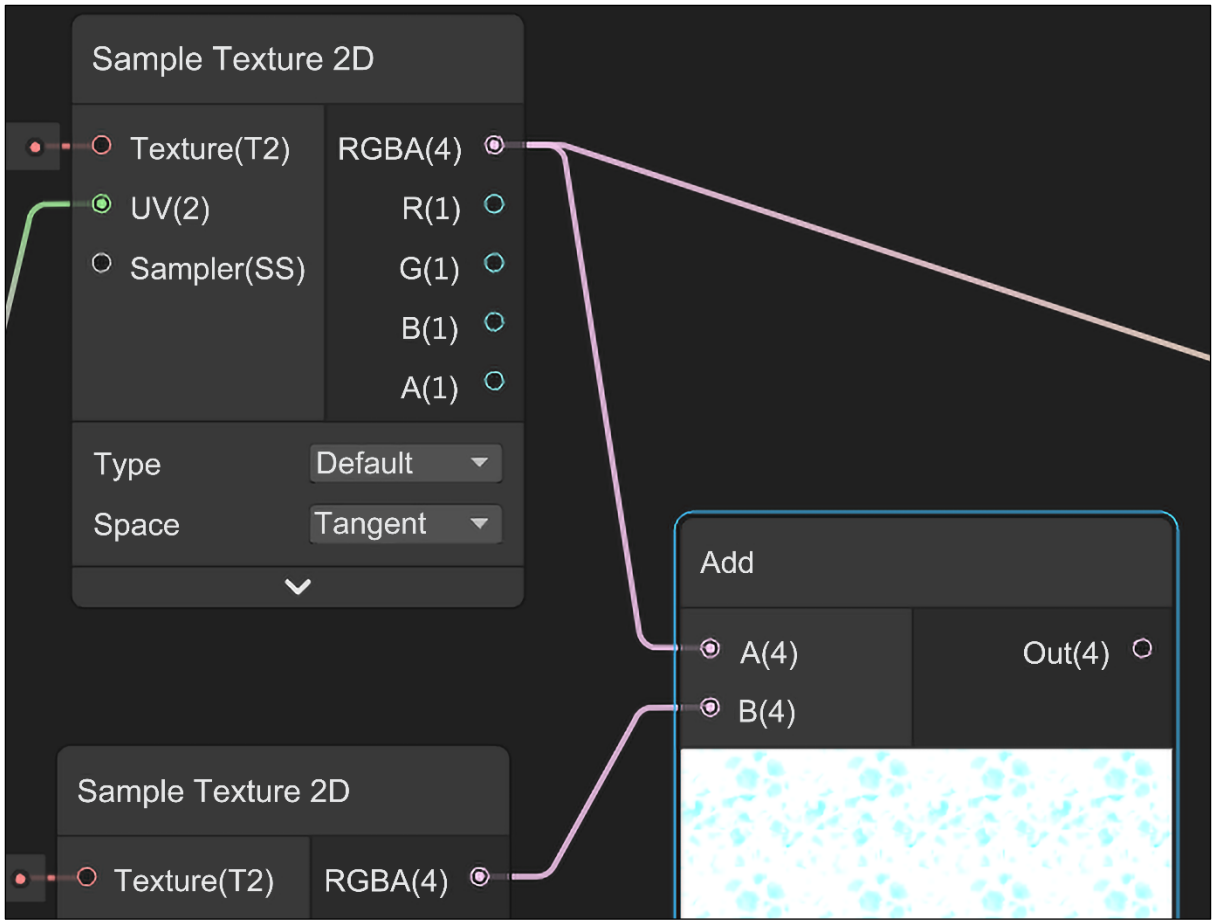

Multiply
A(4)
B(4)
Out(4)


Time
Time(1)

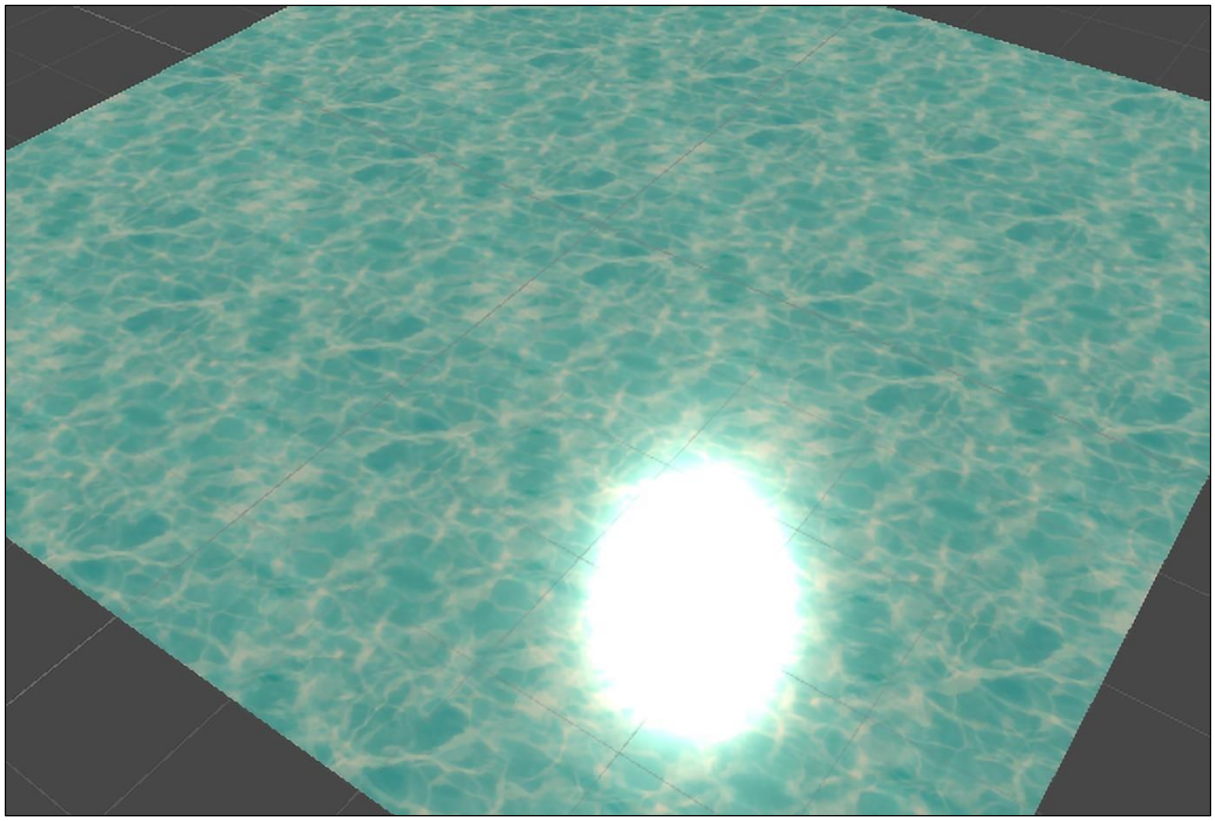

Time
Time(1)
Sine Time(1)
Cosine Time(1)
Delta Time(1)
Smooth Delta(1)
UV
Out(4)
Channe UV0
Multiply
A(1)
B(1)
Out(1)
X 0.1
Add
A(4)
B(4)
Out(4)
X 4 Y 4 Z 4 W 4
water
Multiply
A(4)
B(4)
Out(4)
Sample Texture 2D
Texture(T2)
UV(2)
Sampler(SS)
RGBA(4)
R(1)
G(1)
B(1)
A(1)
Type Default
Space Tangent

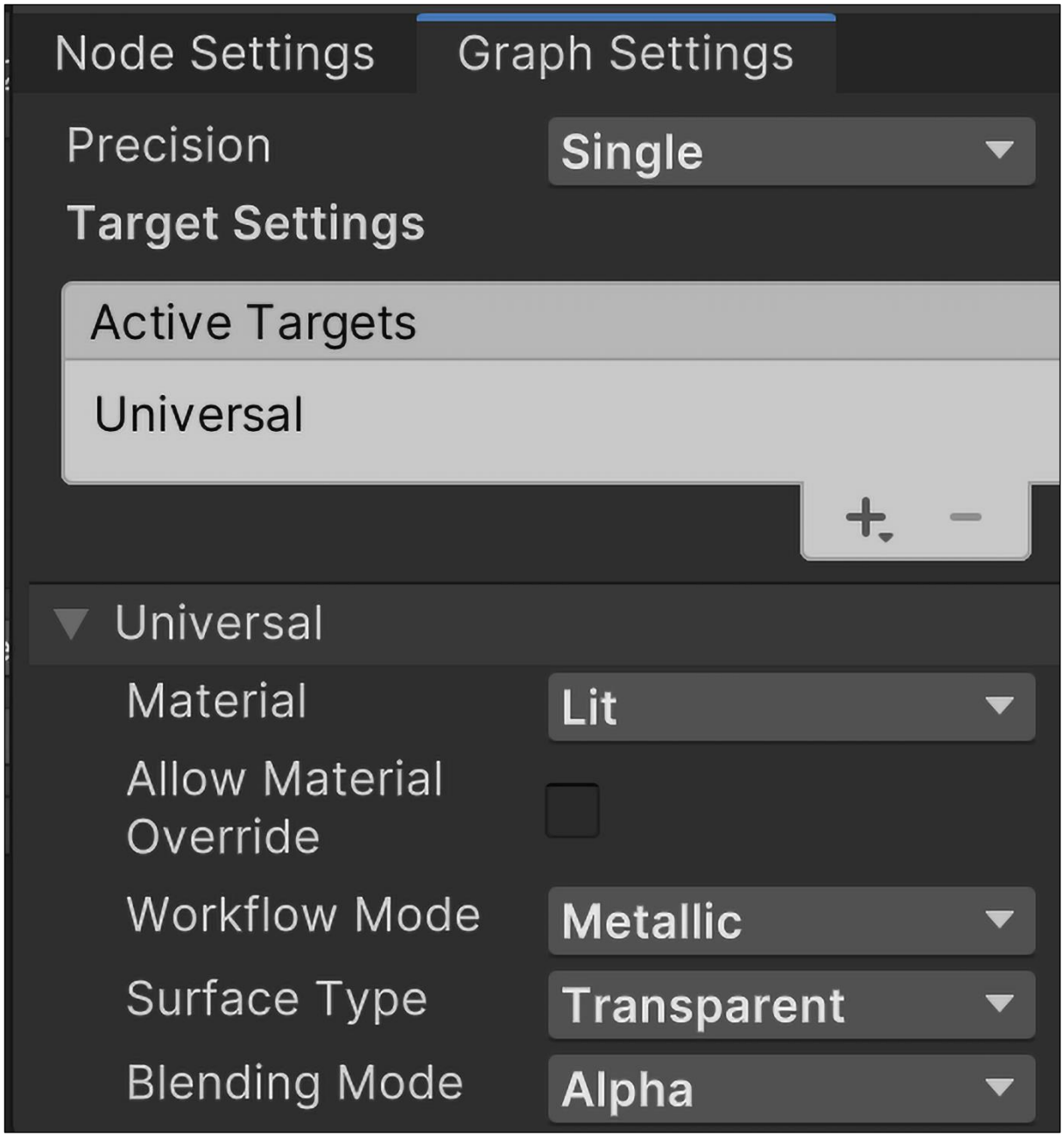

Time
Time(1)
Sine Time(1)
Cosine Time(1)
Delta Time(1)
Smooth Delta(1)
UV
Out(4)
Channe UV0
Add
A(4)
B(4)
Out(4)
Multiply
A(1)
B(1)
Out(1)
X 0.1
4 Y 4 Z 4 W 4
water
Multiply
A(4)
B(4)
Out(4)
Sample Texture 2D
Texture(T2)
UV(2)
Sampler(SS)
RGBA(4)
R(1)
G(1)
B(1)
A(1)
Type Default
Space Tangent


Time(1)
Time(1)
Delta(1)
Multiply
A(1)
B(1)
Out(1)
X -0.1
A(4)
B(4)
Out(4)
-4 Y -4 Z -4 W -4
Multiply
A(4)
B(4)

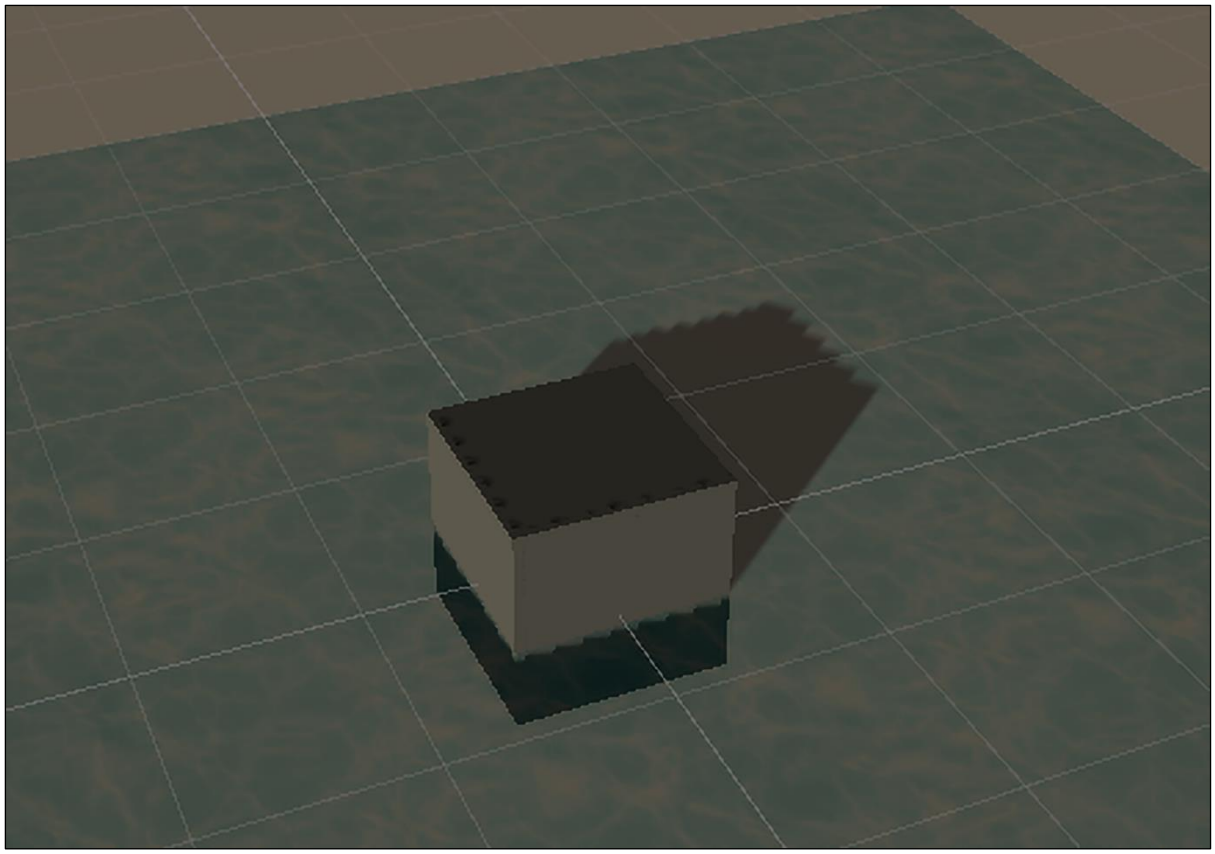

Sample Texture 2D
Texture(T2)
UV(2)
Sampler(SS)
RGBA(4)
R(1)
G(1)
B(1)
A(1)
Type
Default
Space
Tangent
Add
A(4)
B(4)
Out(4)
Sample Texture 2D
Texture(T2)
RGBA(4)


Add
A(4)
B(4)
Out(4)
X 0.5 Y 0.5 Z 0.5 W 0.5
Multiply
A(4)
B(4)
Out(4)

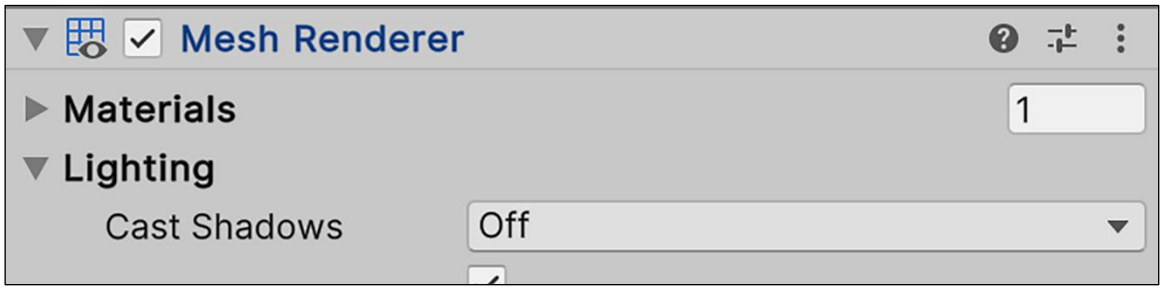


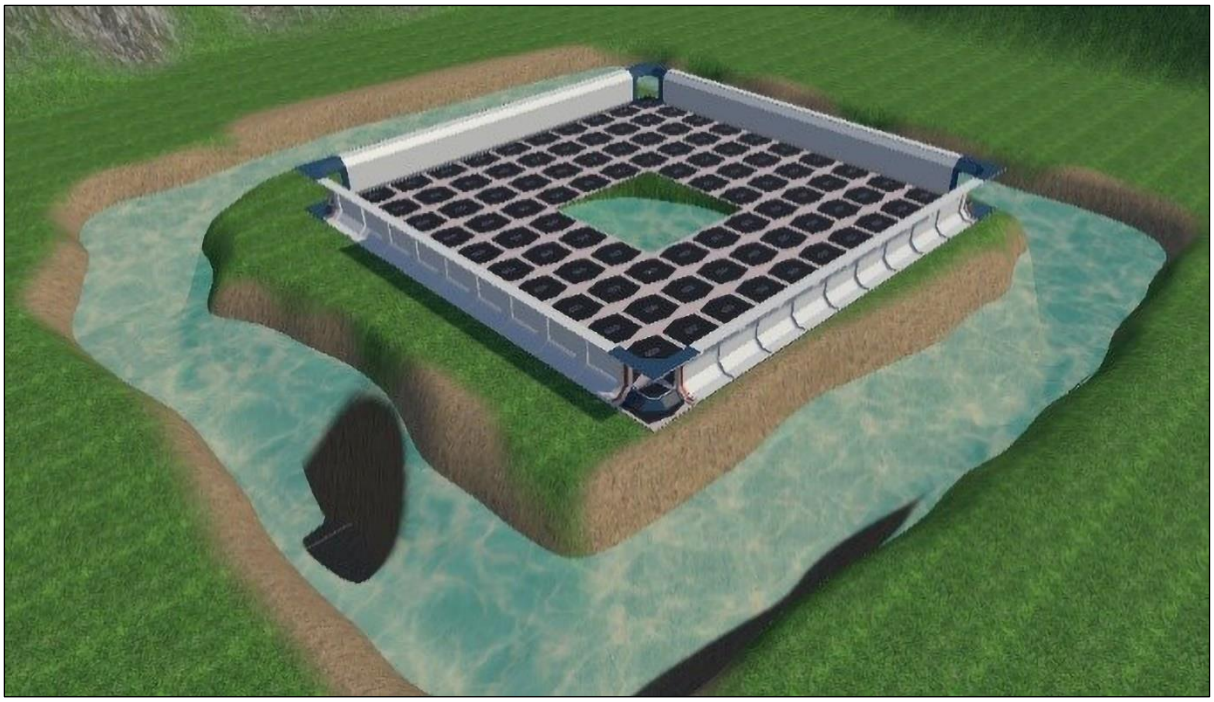

Node Settings
Graph Settings
Precision
Single
Target Settings
Active Targets
Universal
Universal
Material
Lit
Allow Material Override
Workflow Mode
Metallic
Surface Type
Transparent
Blending Mode
Alpha

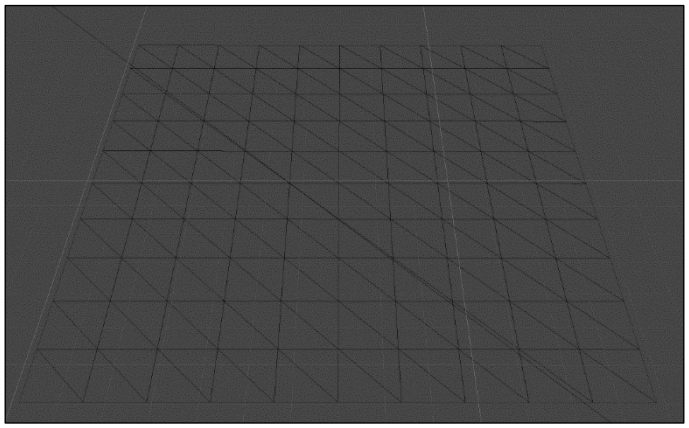

X
0.5
Alpha(1)

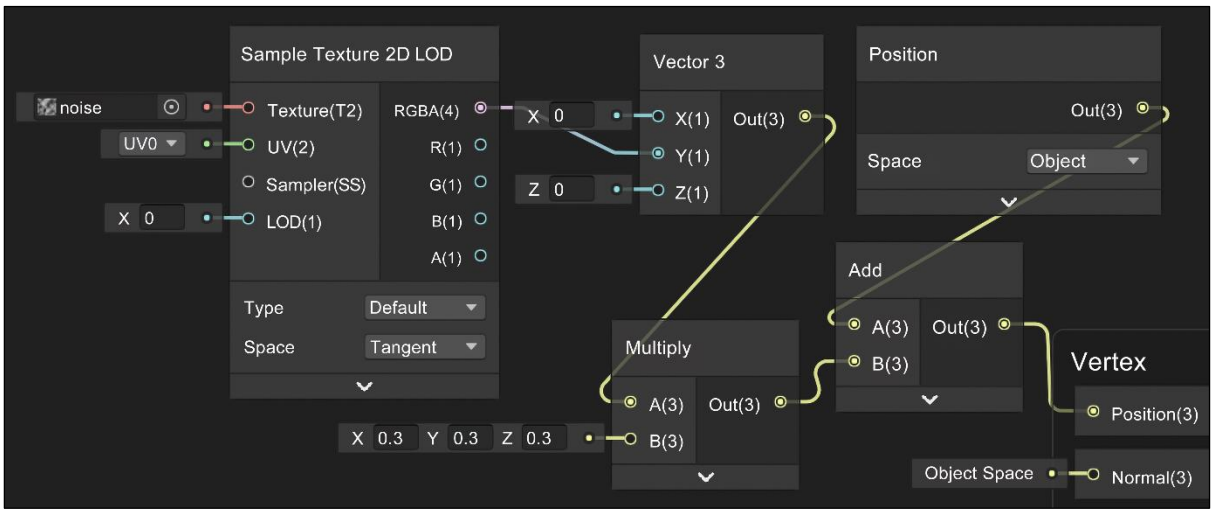


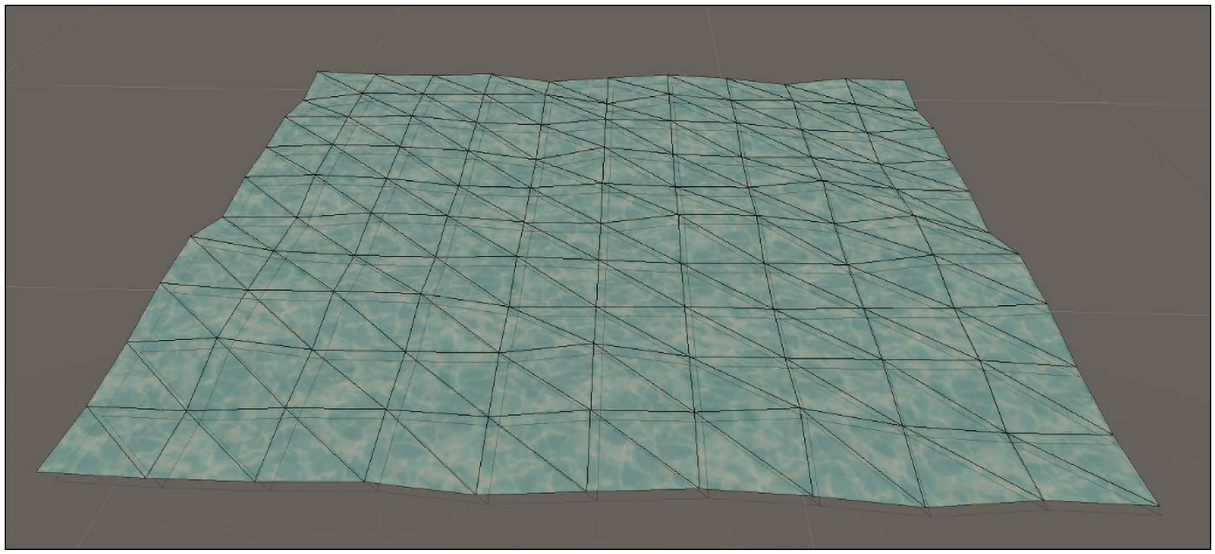

2D

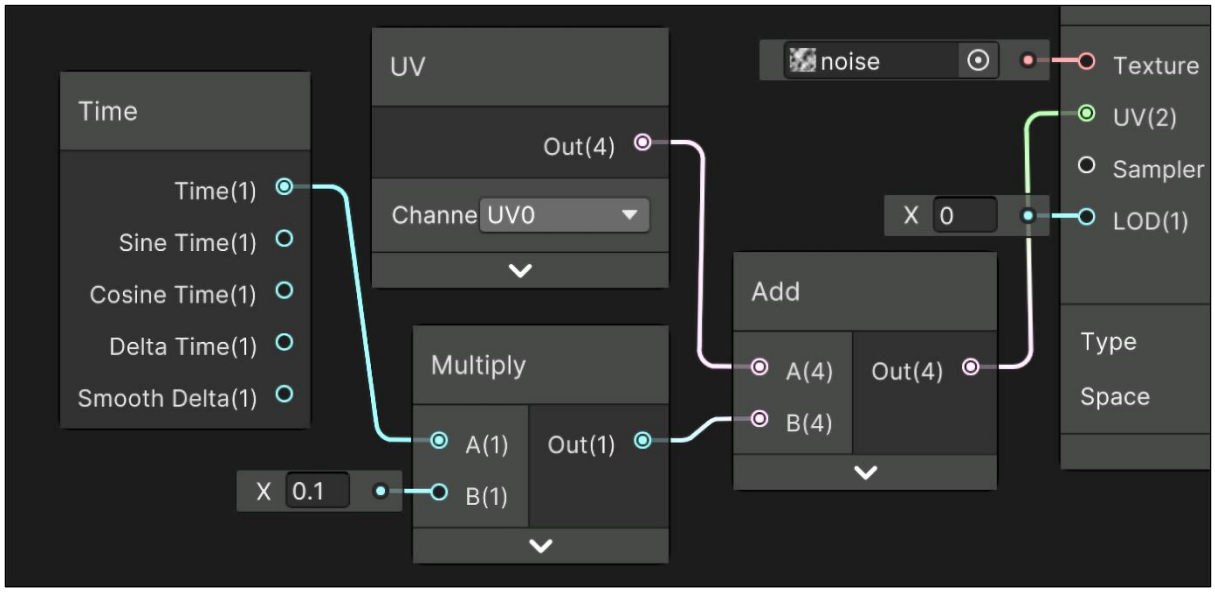

Mesh Renderer
Materials
1
Lighting
Cast Shadows
Off



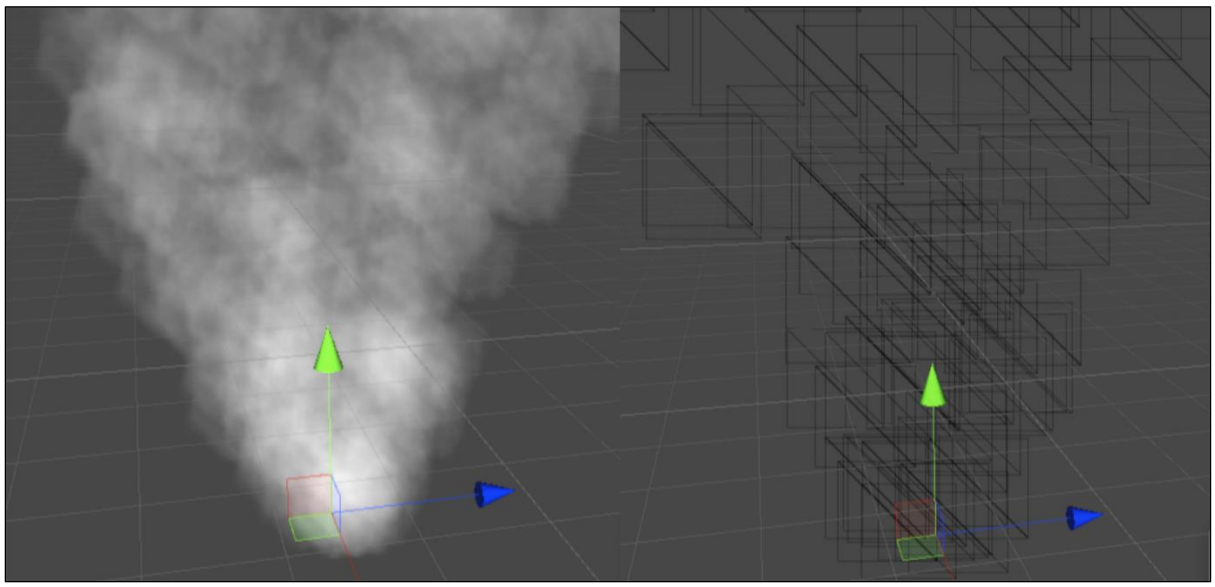


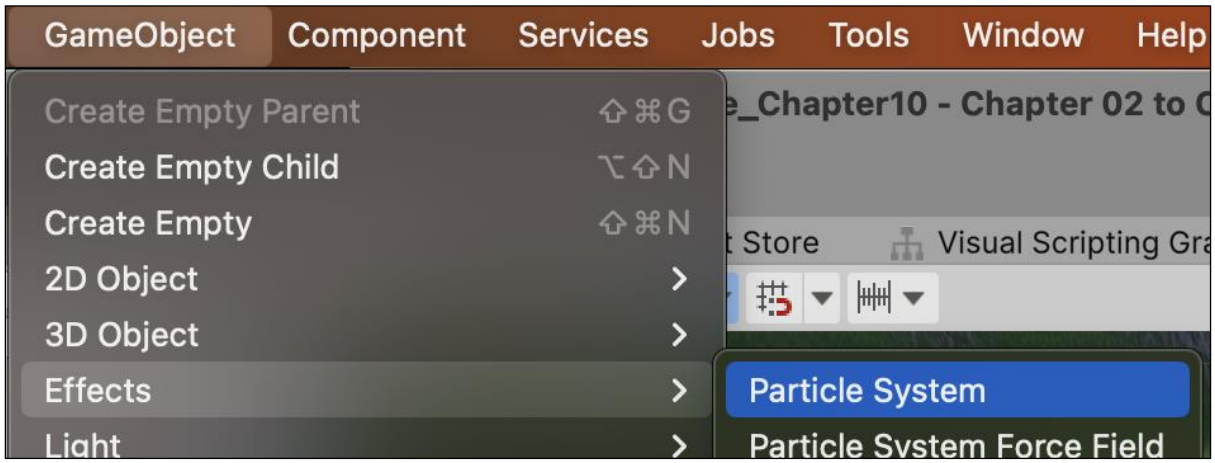

Sample Texture 2D LOD
noise
UV0
X 0
Texture(T2)
UV(2)
Sampler(SS)
LOD(1)
RGBA(4)
R(1)
G(1)
B(1)
A(1)
Type
Default
Space
Tangent
Vector 3
X 0
Z 0
X(1)
Y(1)
Z(1)
Out(3)
Position
Out(3)
Space
Object
Add
A(3)
B(3)
Out(3)
Multiply
A(3)
B(3)
Out(3)
X 0.3 Y 0.3 Z 0.3
Vertex
Position(3)
Object Space
Normal(3)



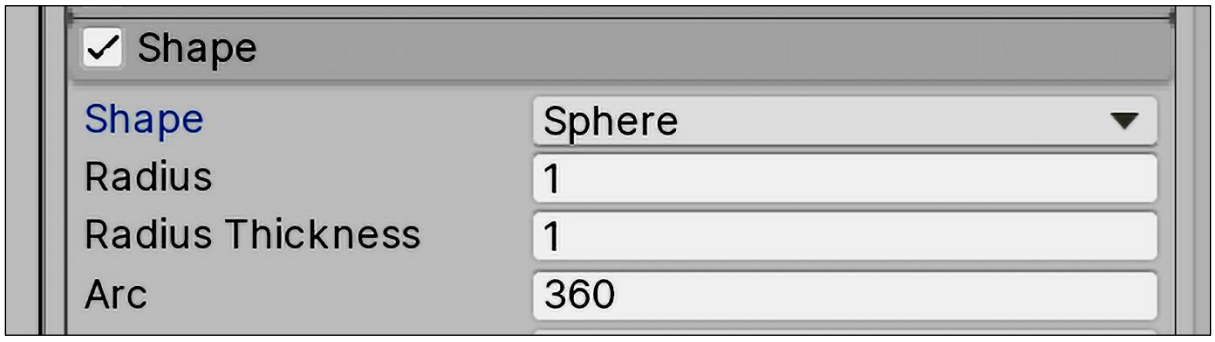

Time
Time(1)
Sine Time(1)
Cosine Time(1)
Delta Time(1)
Smooth Delta(1)
UV
Out(4)
Channe UV0
Multiply
A(1)
B(1)
Out(1)
X 0.1
noise
Add
A(4)
B(4)
Out(4)
X 0
Texture
UV(2)
Sampler
LOD(1)
Type
Space

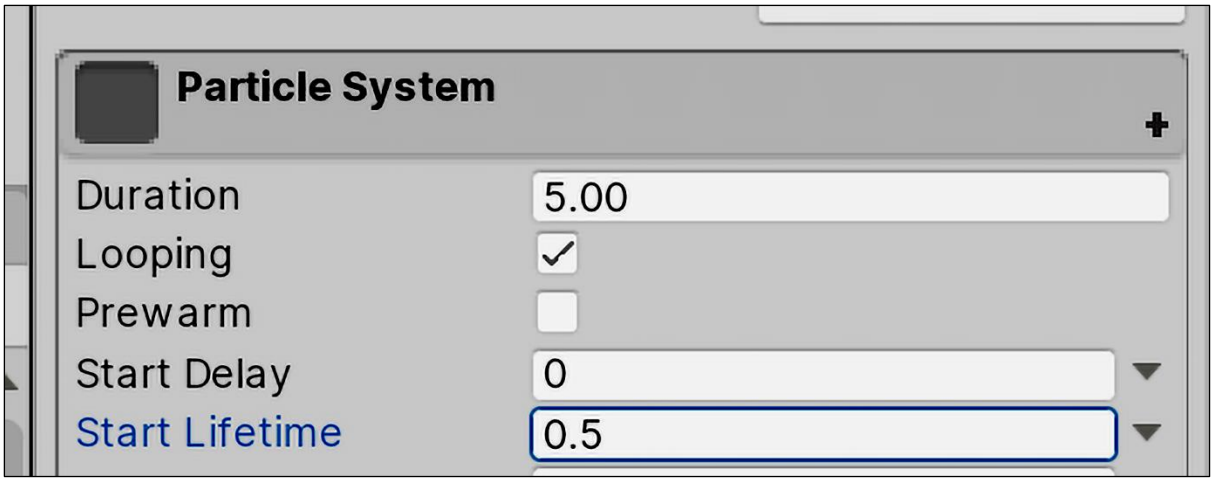
Chapter 11: Captivating Visual Effects: Harnessing Particle Systems and VFX Graph

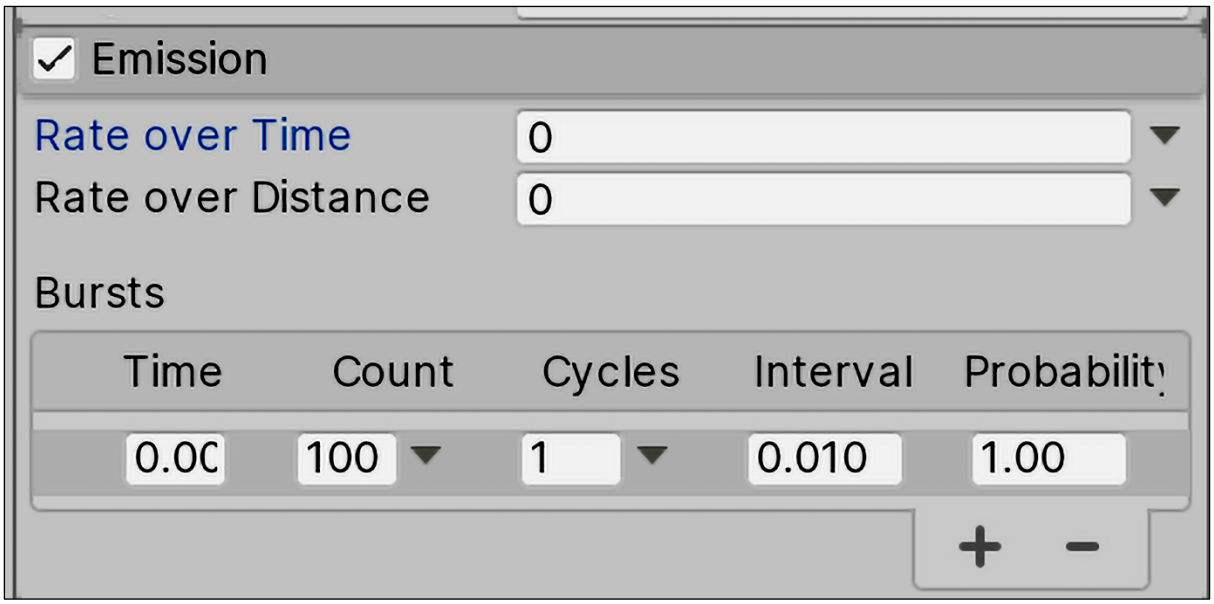


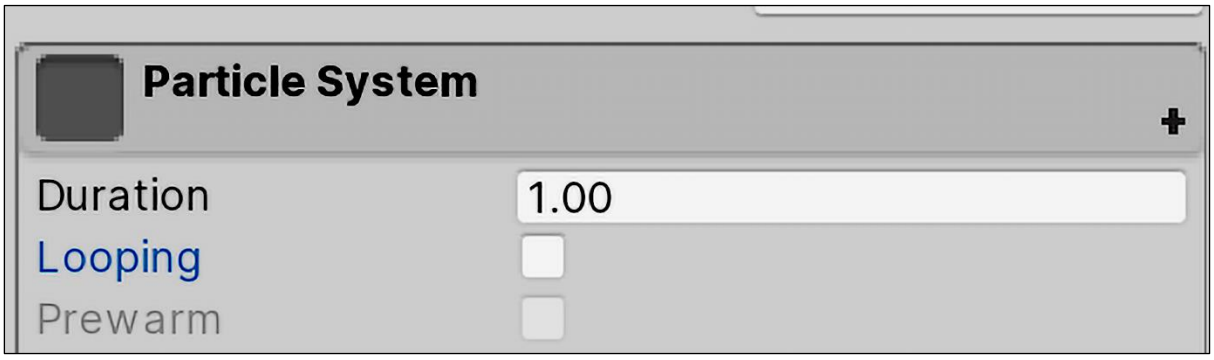





Shape
Shape
Sphere
Radius
1
Radius Thickness
1
Arc
360

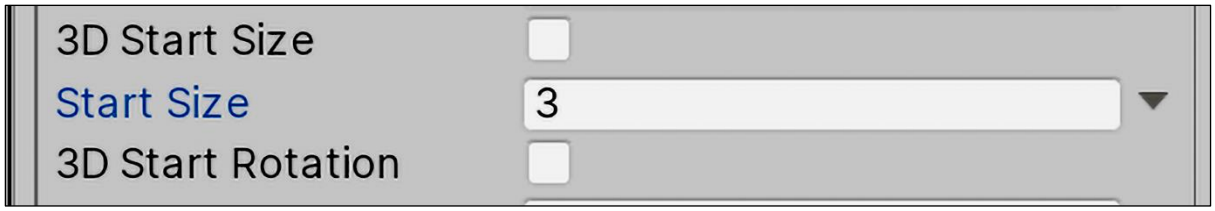

Particle System
Duration
5.00
Looping
Prewarm
Start Delay
0
Start Lifetime
0.5

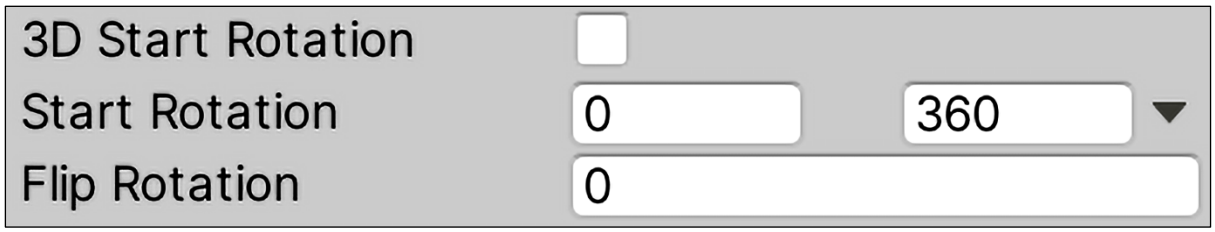

Emission
Rate over Time
0
Rate over Distance
0
Bursts
Time
Count
Cycles
Interval
Probability
0.00
100
1
0.010
1.00

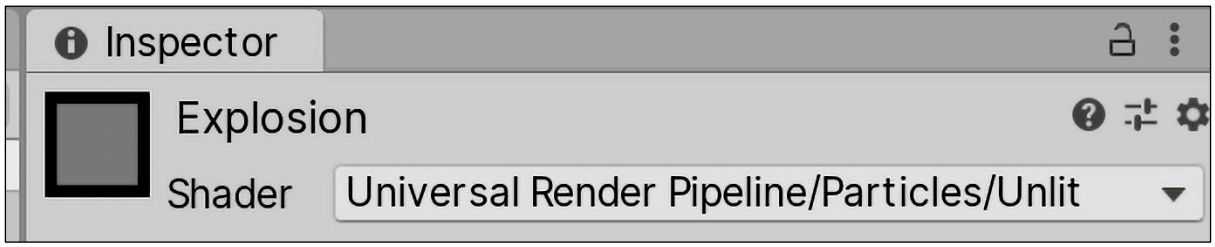

Particle System
Duration
1.00
Looping
Prewarm

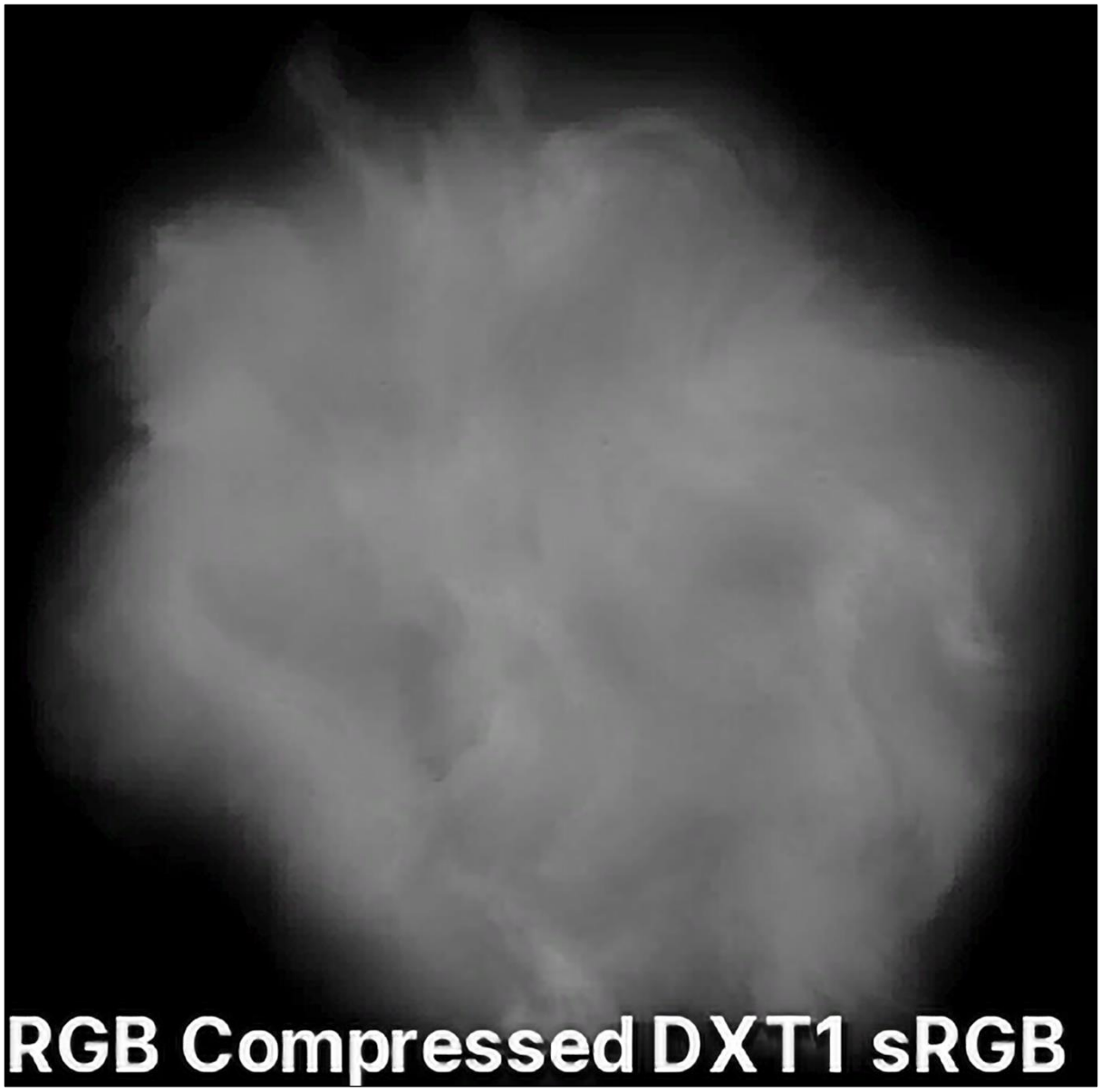

Particle Effect
Play
Restart
Stop


Auto Random Seed
Stop Action
Destroy
Culling Mode
Automatic
Ring Buffer Mode
Disabled


3D Start Size
Start Size
3
3D Start Rotation


3D Start Rotation
Start Rotation
0
360
Flip Rotation
0


Inspector
Explosion
Shader
Universal Render Pipeline/Particles/Unlit


RGB Compressed DXT1 sRGB

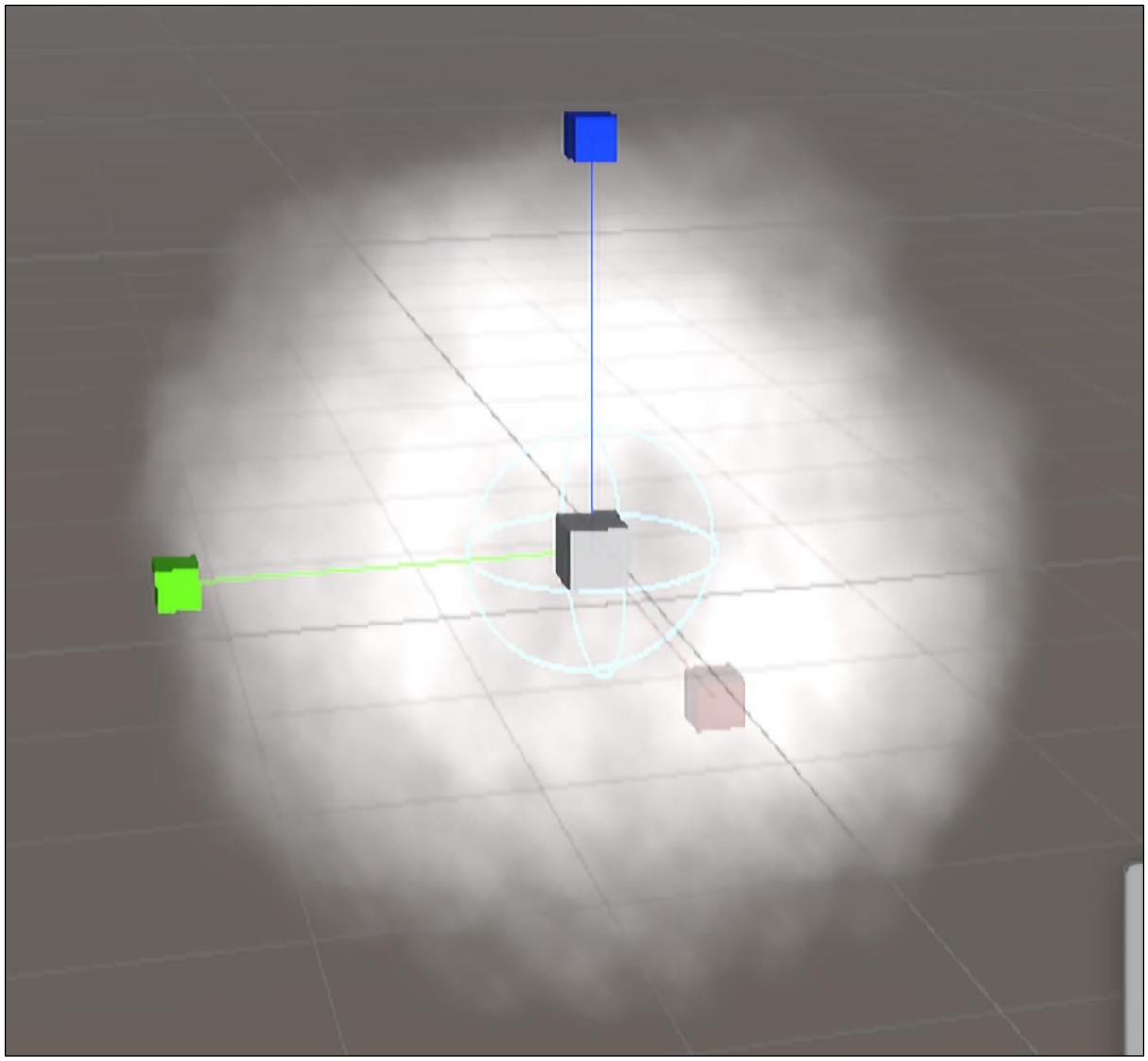

Surface Options
Surface Type
Transparent
Blending Mode
Additive

Renderer

Render Mode: Billboard

Normal Direction: 1

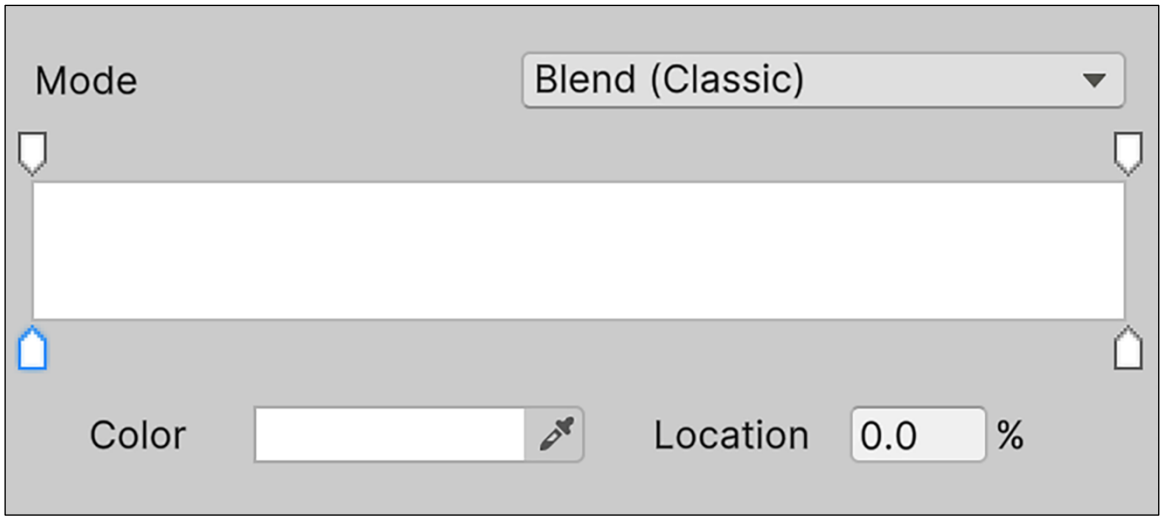
Material: Explosion

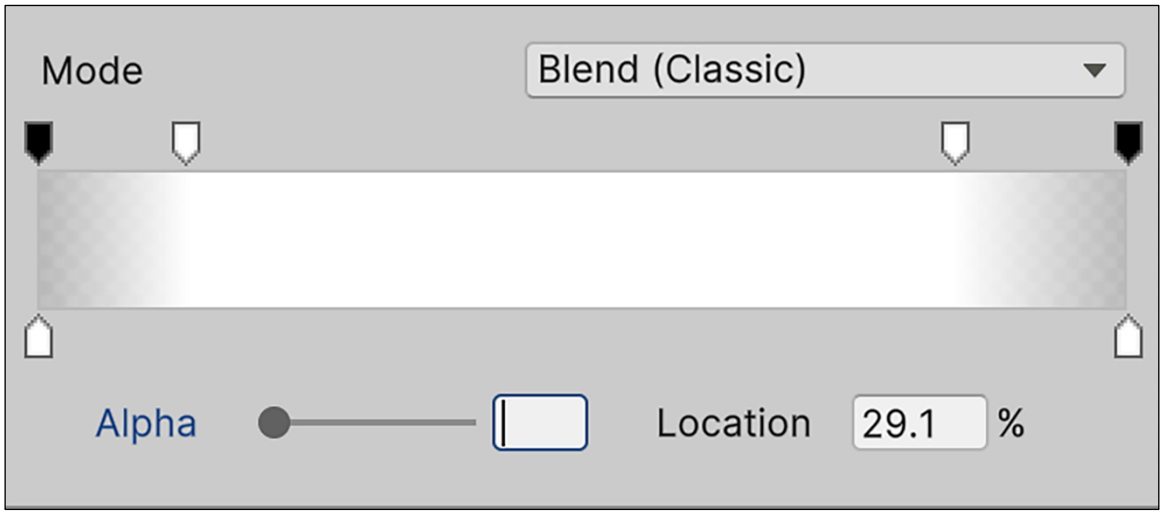


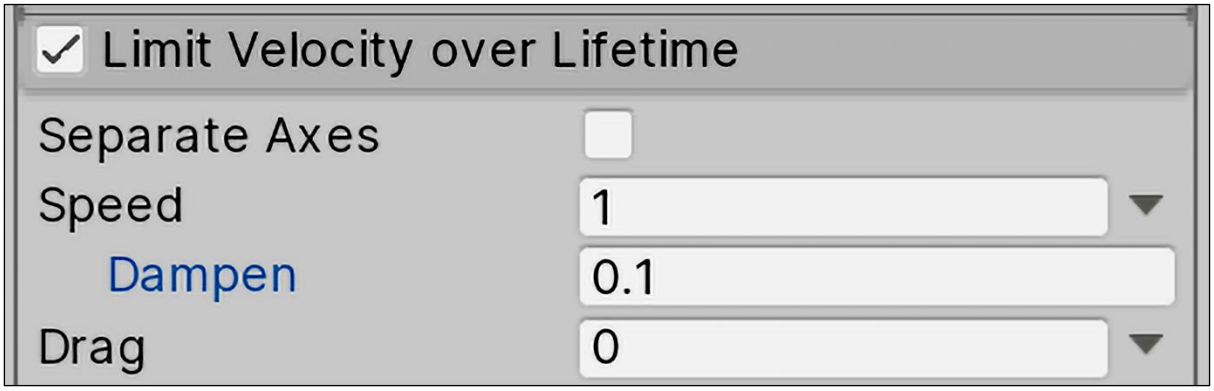
Force over Lifetime

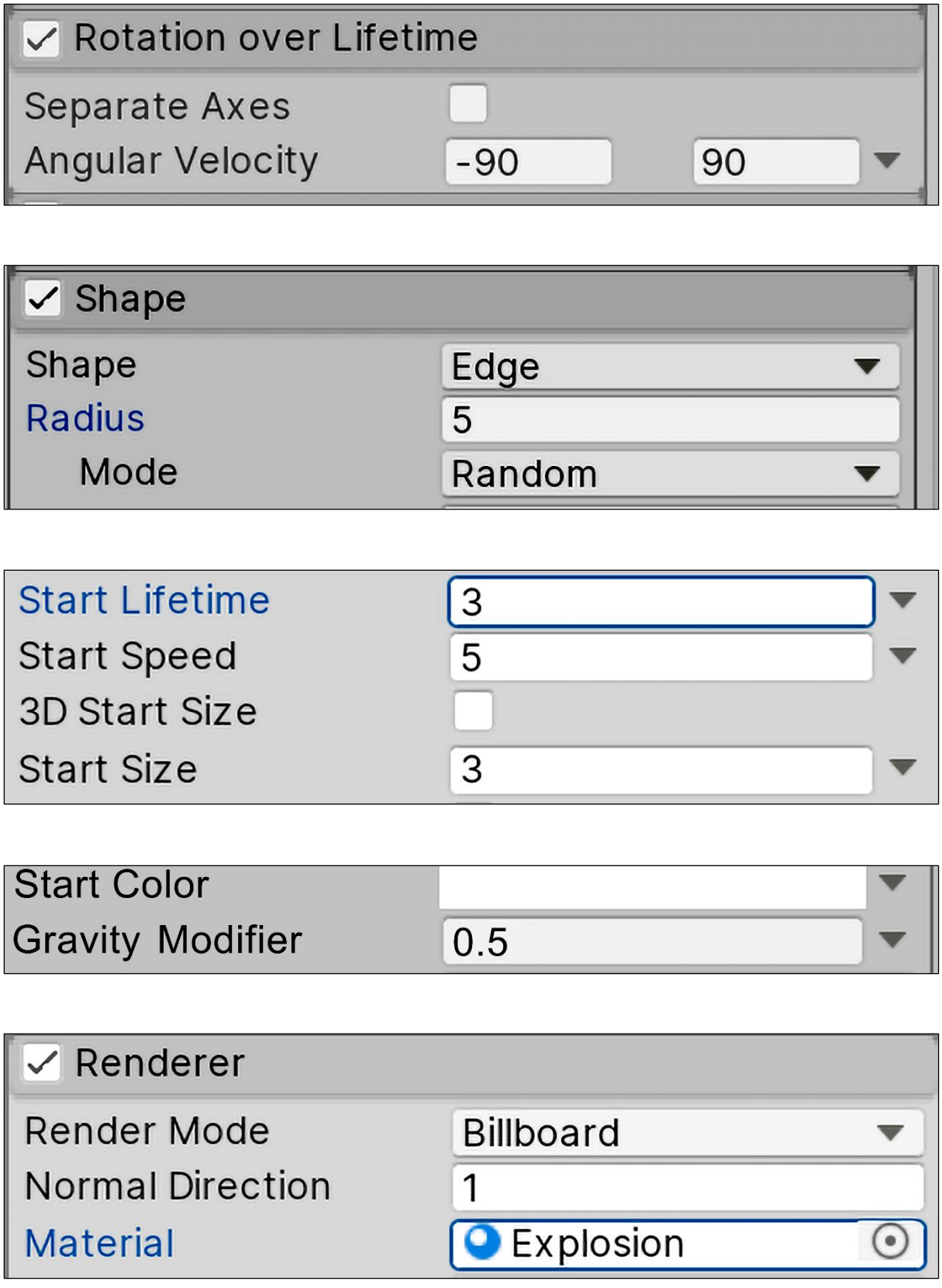
Color over Lifetime

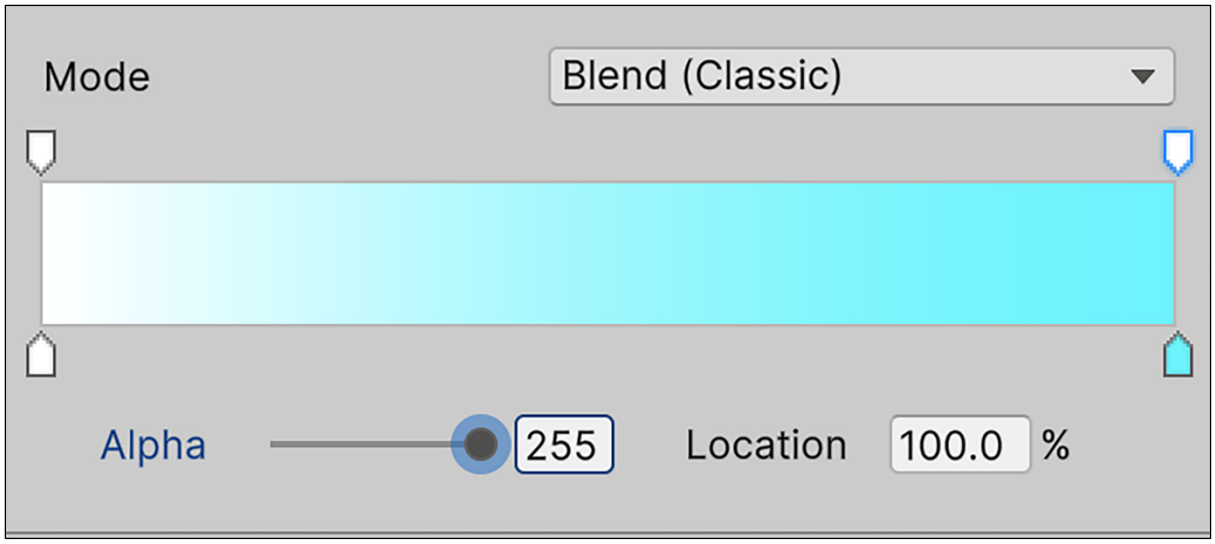
Color by Speed

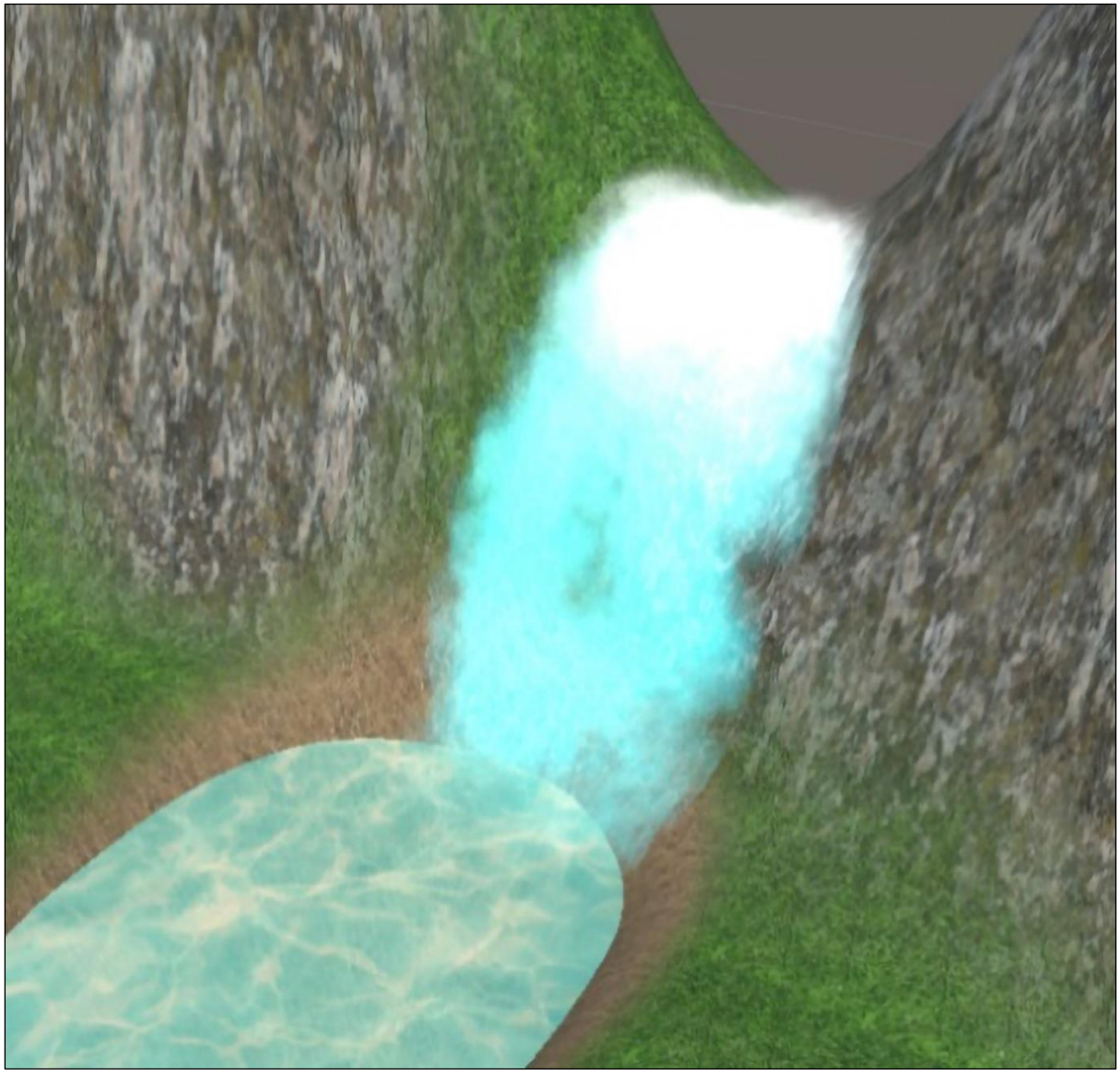

Mode
Blend (Classic)
Color
Location
0.0
%

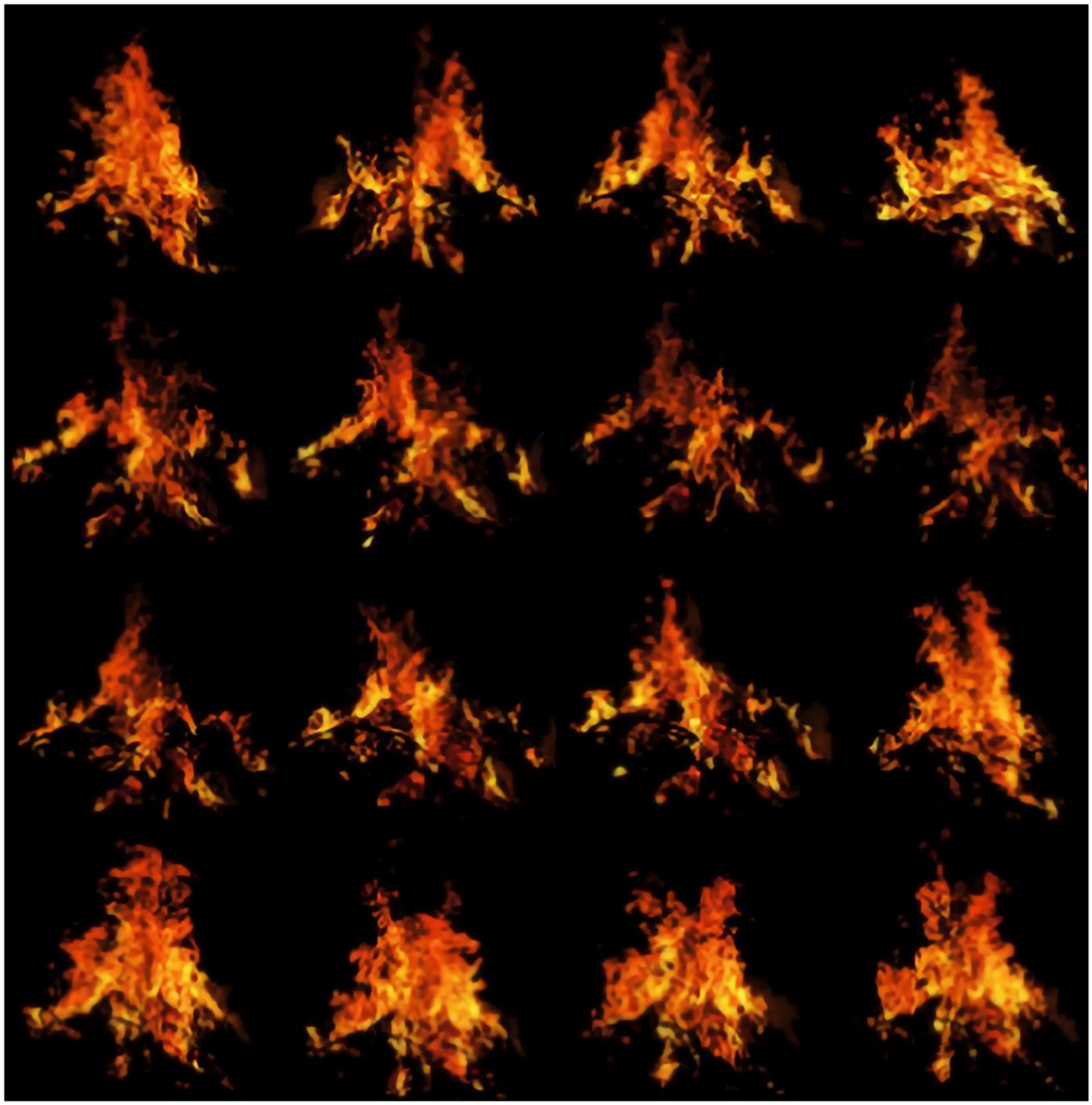

Mode
Blend (Classic)
Alpha
Location
29.1
%

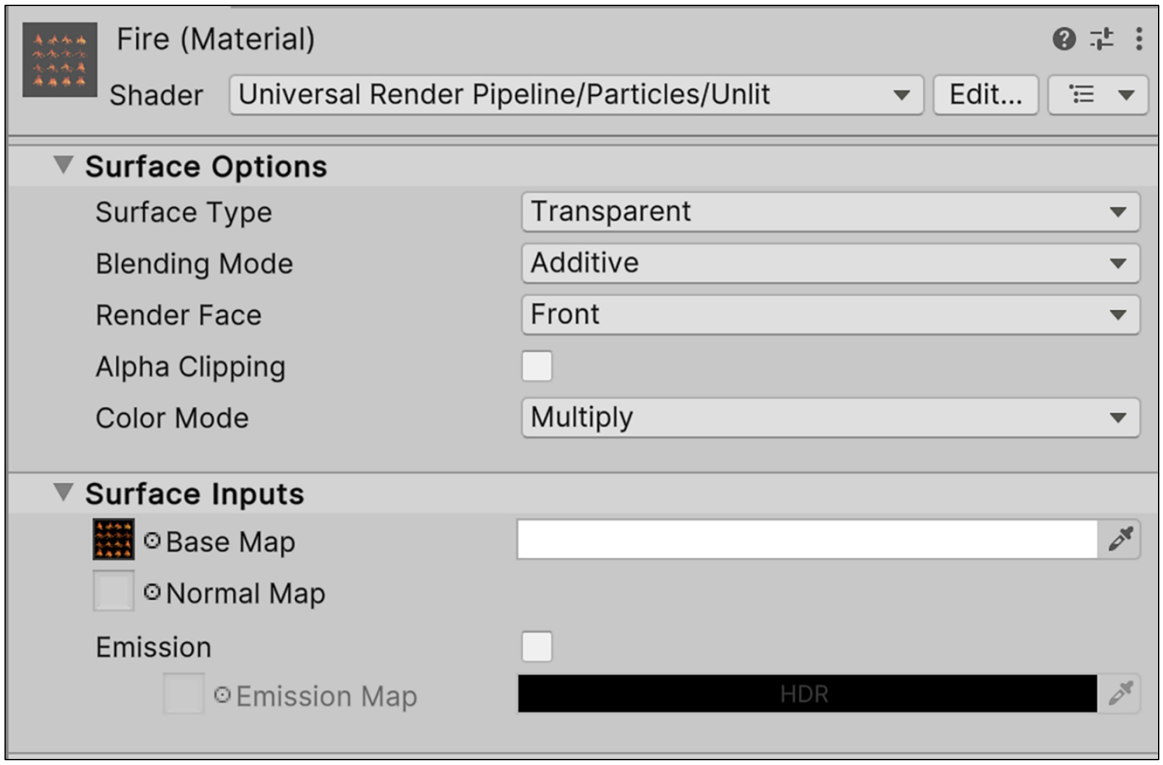

Limit Velocity over Lifetime
Separate Axes
Speed
1
Dampen
0.1
Drag
0

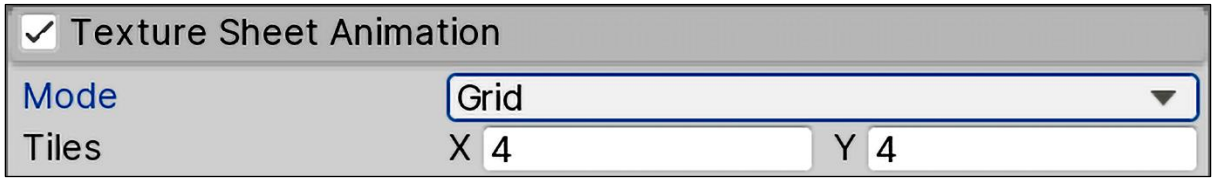

Rotation over Lifetime
Separate Axes
Angular Velocity
-90
90
Shape
Shape
Edge
Radius
5
Mode
Random
Start Lifetime
3
Start Speed
5
3D Start Size
Start Size
3
Start Color
Gravity Modifier
0.5
Renderer
Render Mode
Billboard
Normal Direction
1
Material
Explosion

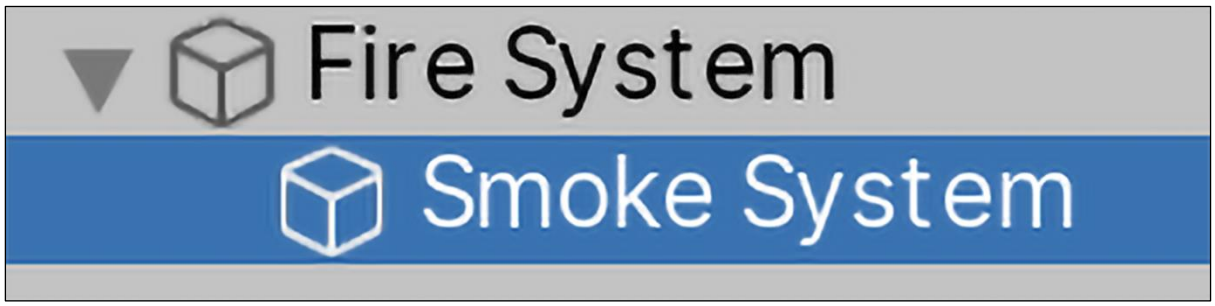

Mode
Blend (Classic)
Alpha
255
Location
100.0
%



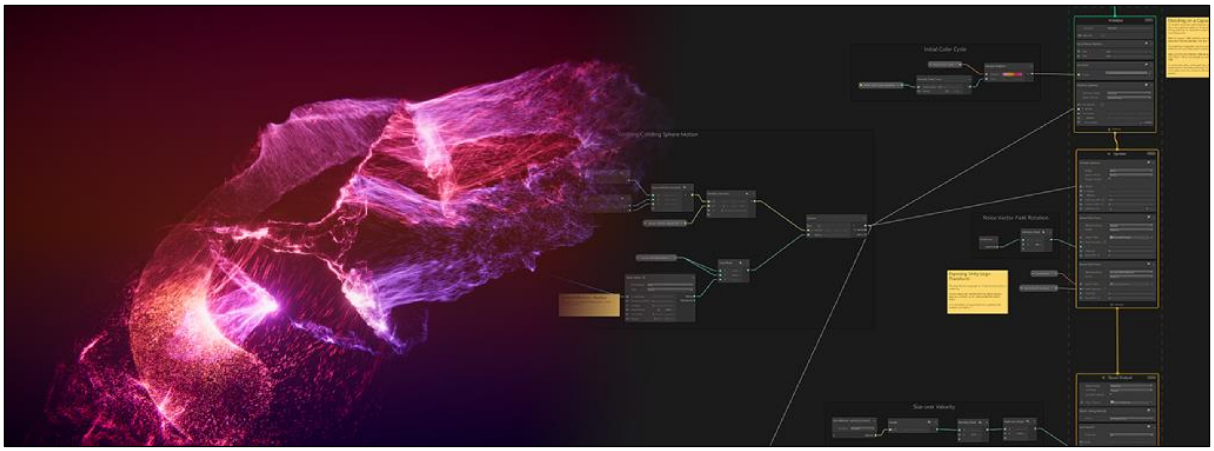


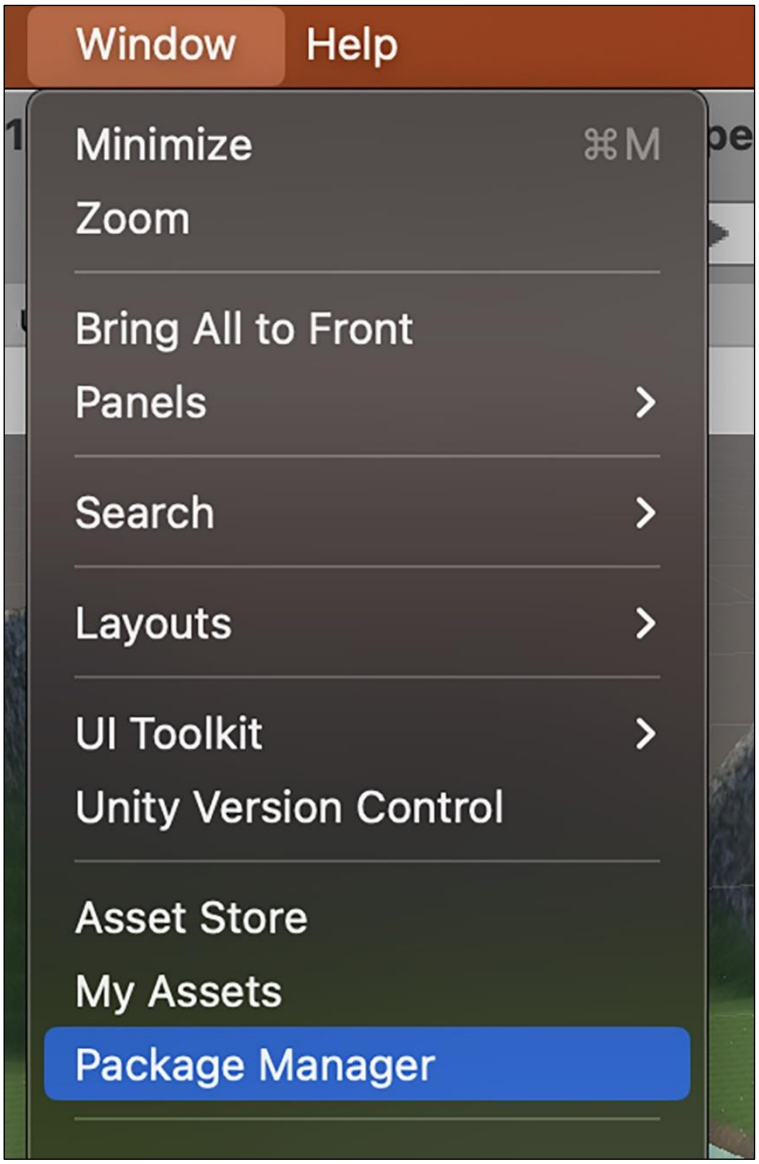

Fire (Material)
Shader
Universal Render Pipeline/Particles/Unlit
Edit...
Surface Options
Surface Type
Transparent
Blending Mode
Additive
Render Face
Front
Alpha Clipping
Color Mode
Multiply
Surface Inputs
Base Map
Normal Map
Emission
Emission Map
HDR

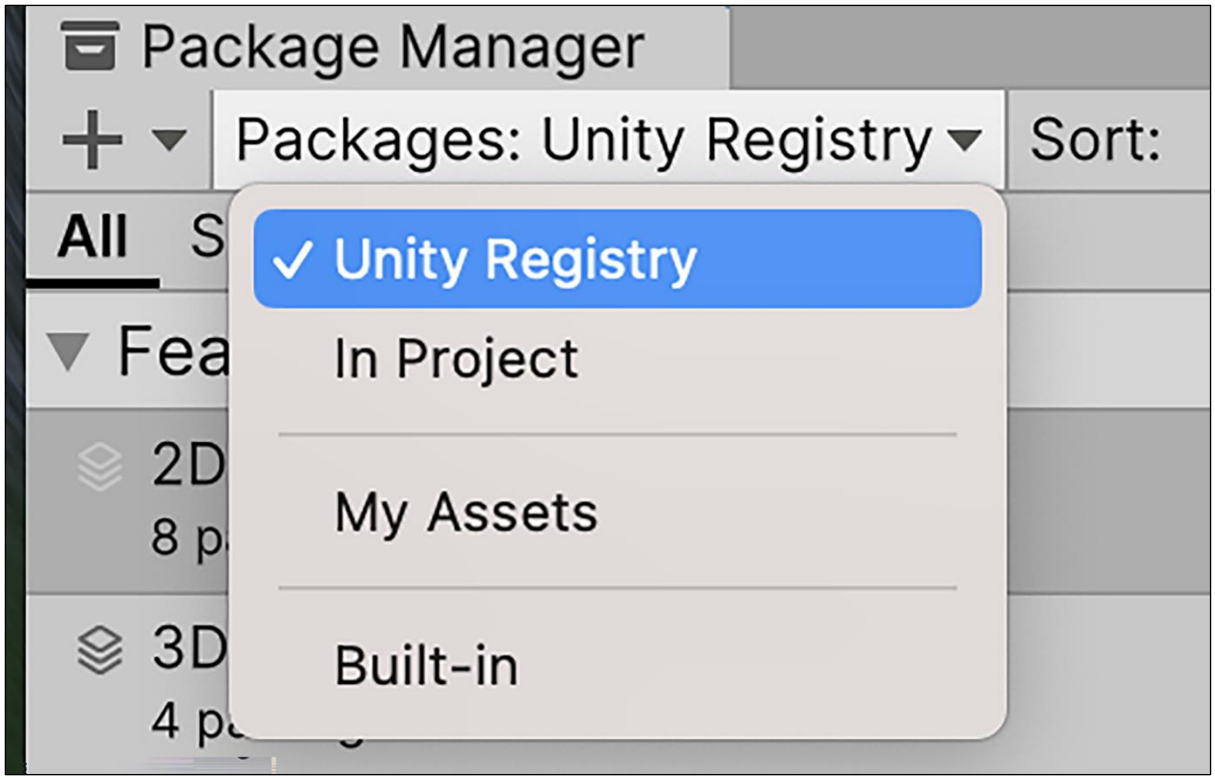

Texture Sheet Animation
Mode
Grid
Tiles
X 4
Y 4


Fire System
Smoke System



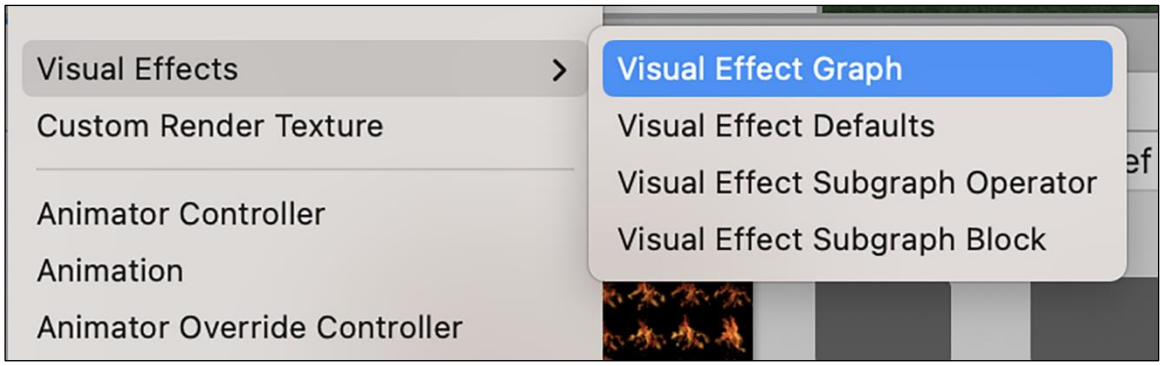


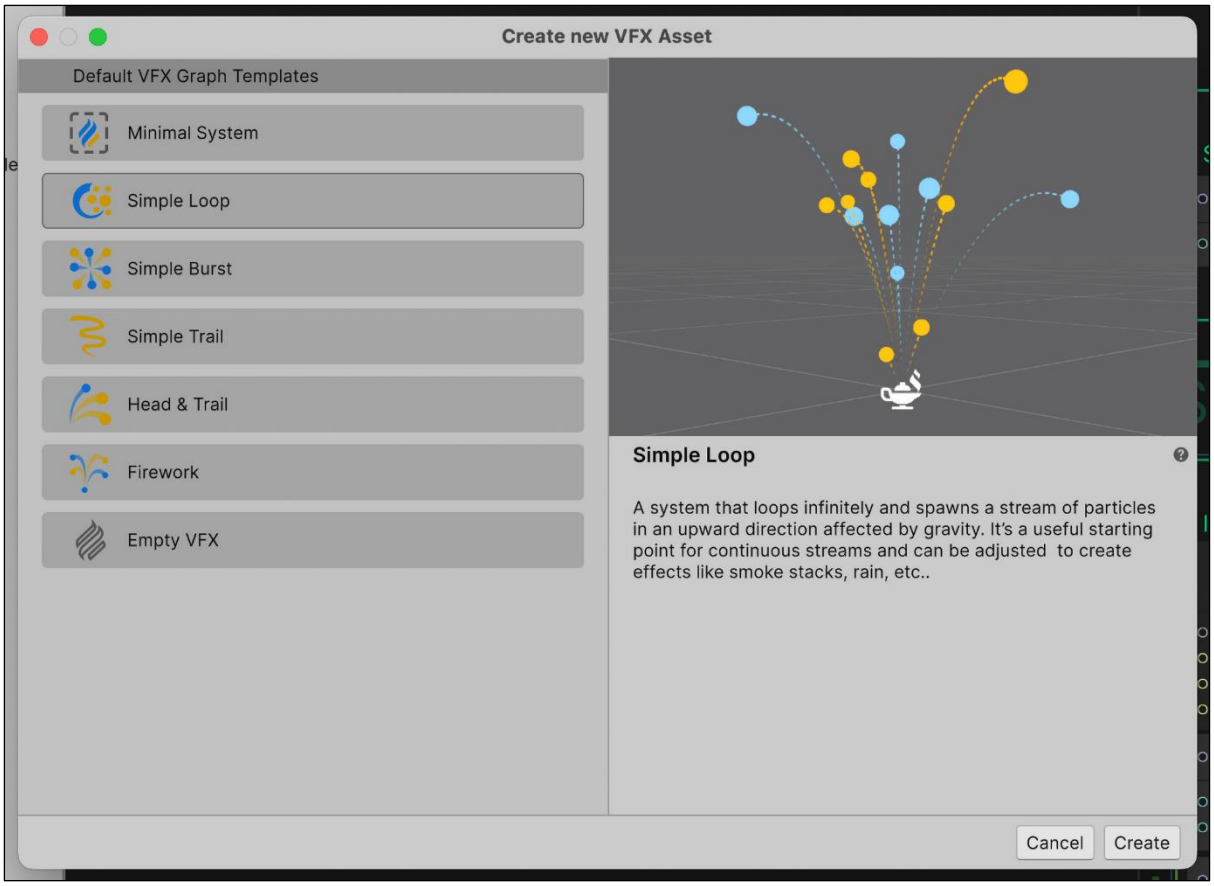

Window
Help
Minimize ⌘M
Zoom
Bring All to Front
Panels
Search
Layouts
UI Toolkit
Unity Version Control
Asset Store
My Assets
Package Manager

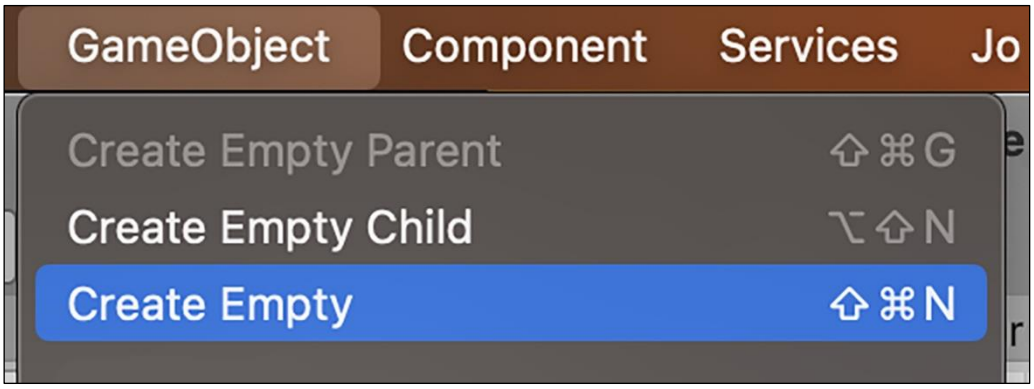

Package Manager
Packages: Unity Registry
Sort:
All
Unity Registry
In Project
My Assets
Built-in

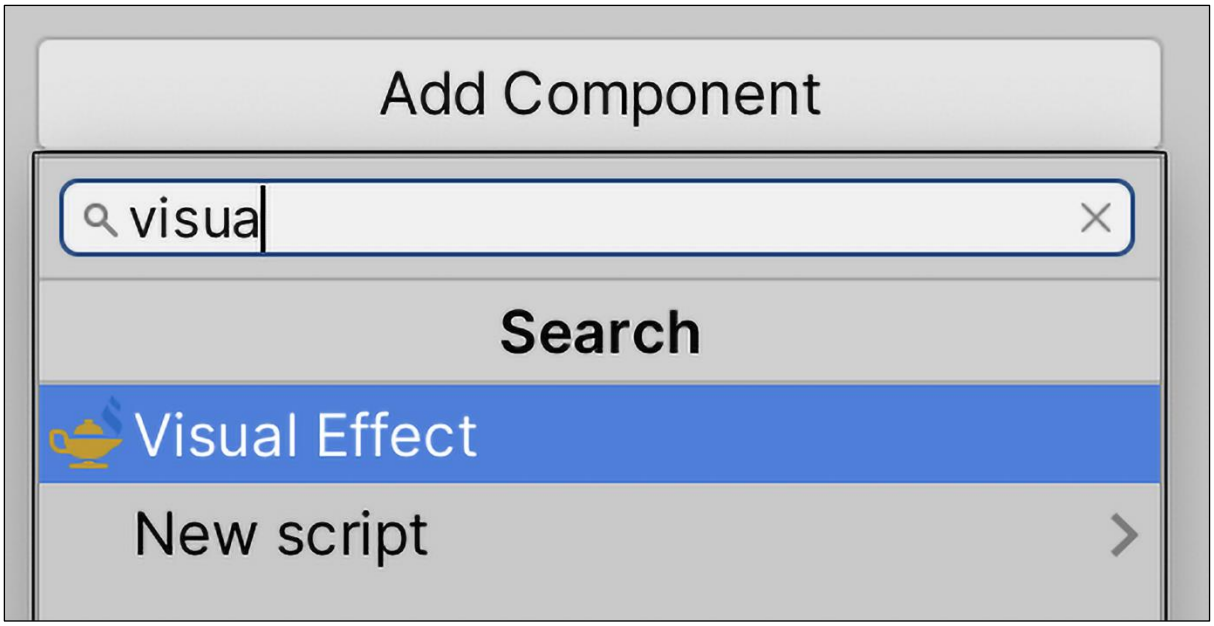

Description
Version History
Dependencies
Samples
15.0.6
Installed
Remove
Released
June 13, 2023
See changelog

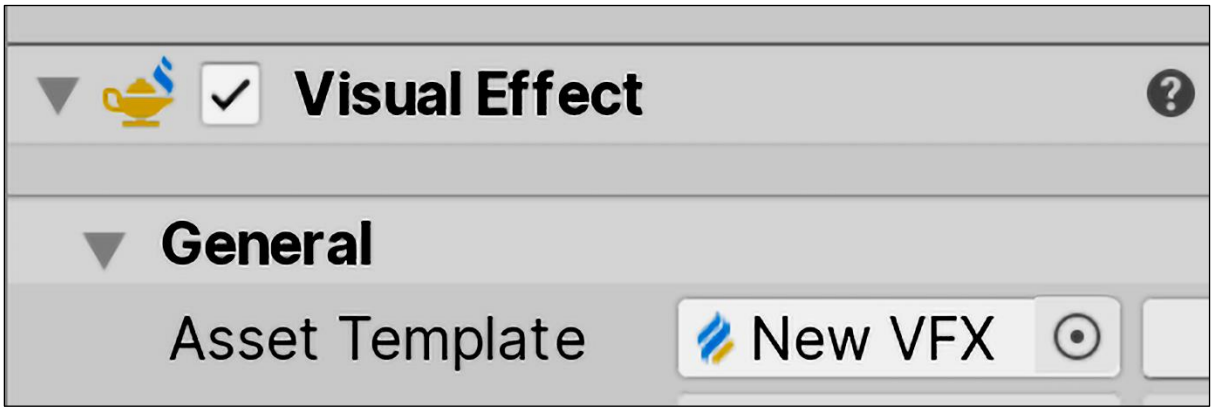

Packages
Visual Effect Graph
15.0.6

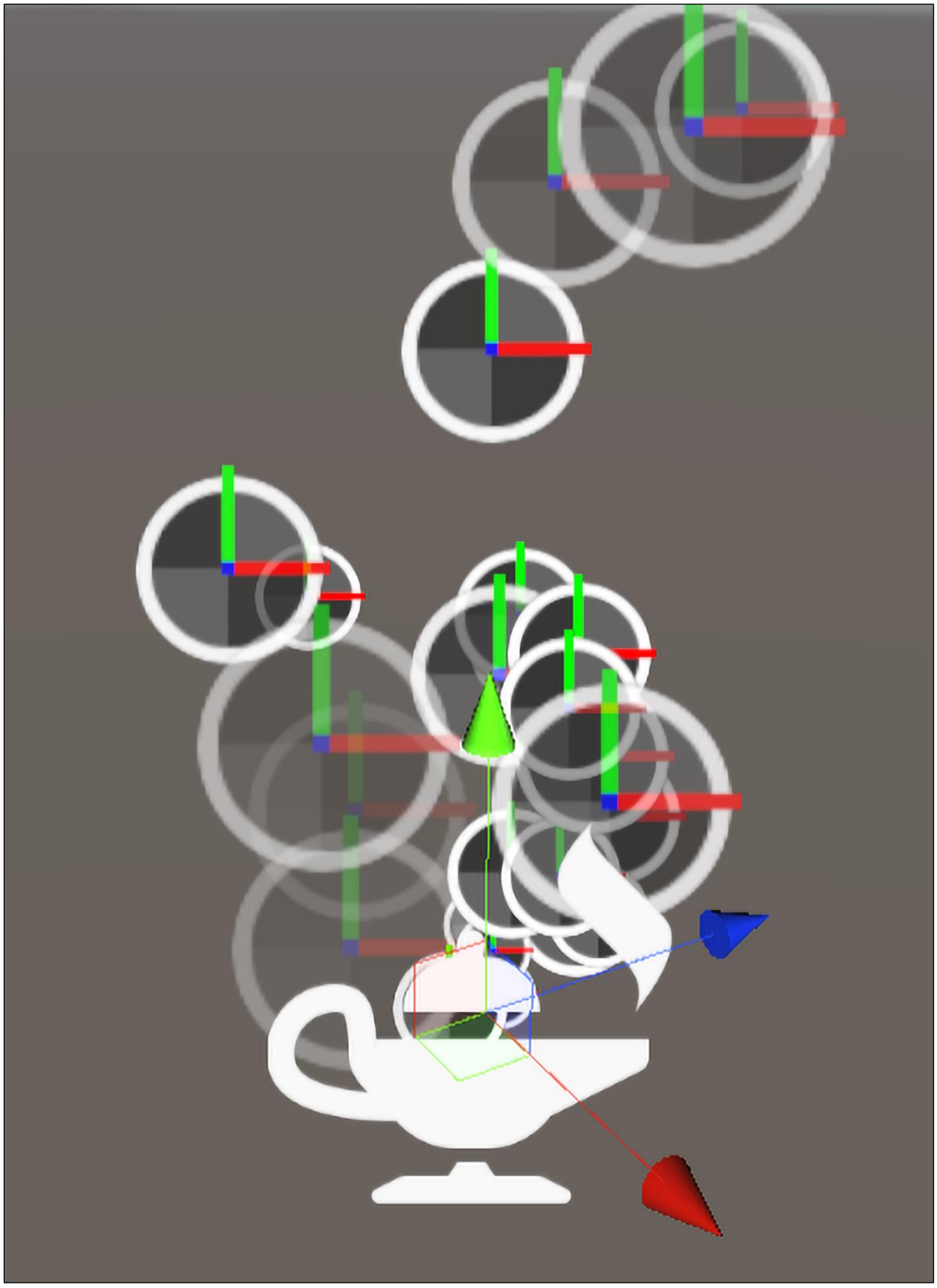

Visual Effects
Custom Render Texture
Animator Controller
Animation
Animator Override Controller
Visual Effect Graph
Visual Effect Defaults
Visual Effect Subgraph Operator
Visual Effect Subgraph Block

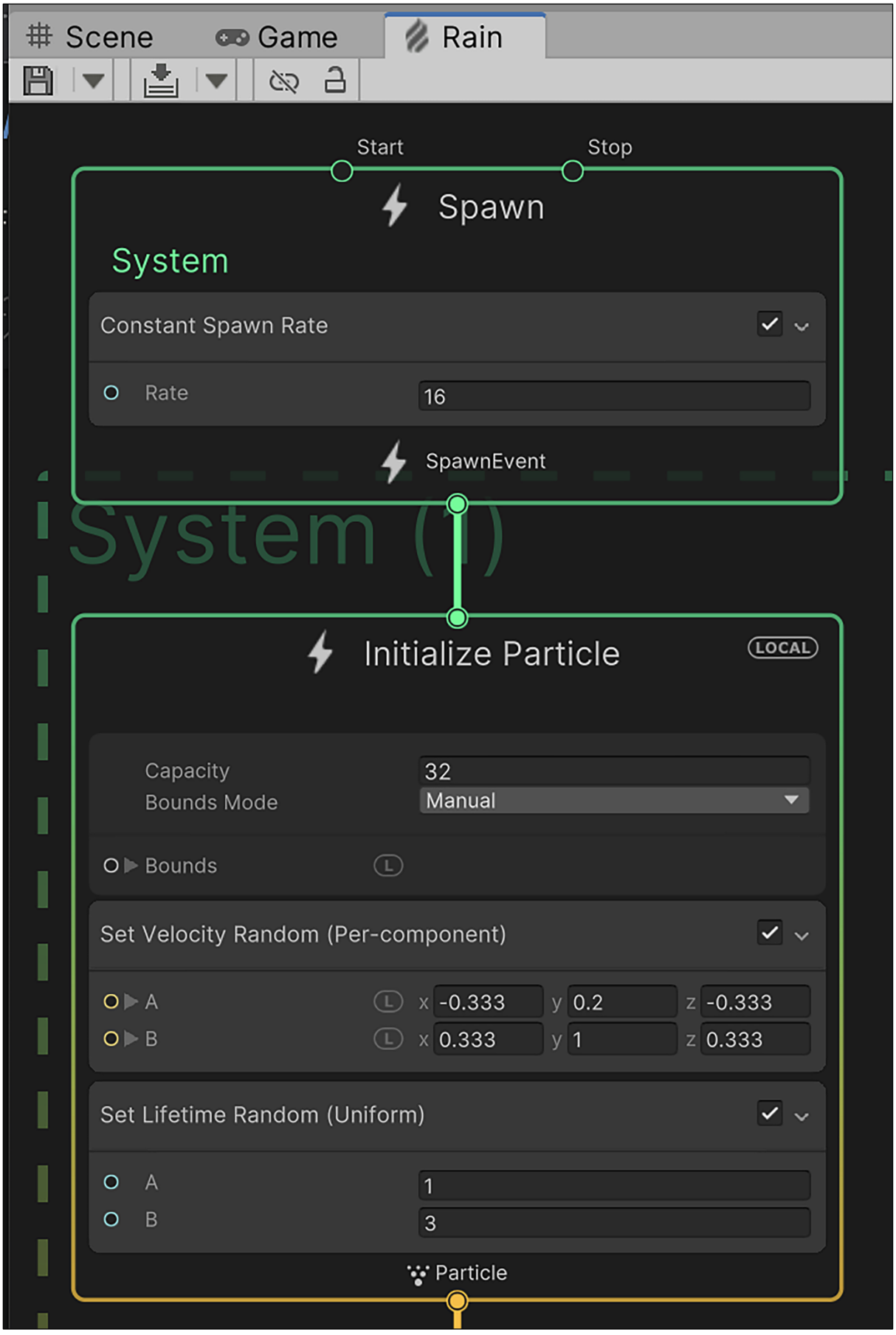

Create new VFX Asset
Default VFX Graph Templates
Minimal System
Simple Loop
Simple Burst
Simple Trail
Head & Trail
Firework
Empty VFX
Simple Loop
A system that loops infinitely and spawns a stream of particles in an upward direction affected by gravity. It's a useful starting point for continuous streams and can be adjusted to create effects like smoke stacks, rain, etc..
Cancel
Create

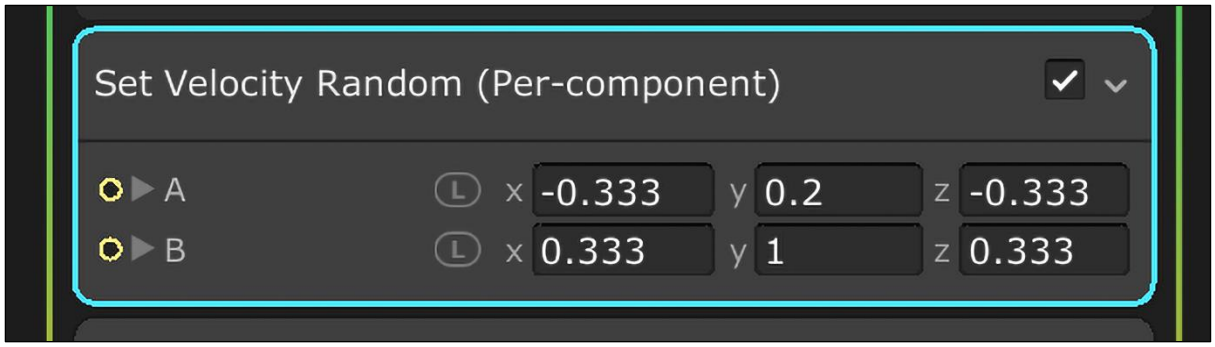

GameObject
Component
Services
Jo
Create Empty Parent
Create Empty Child
Create Empty

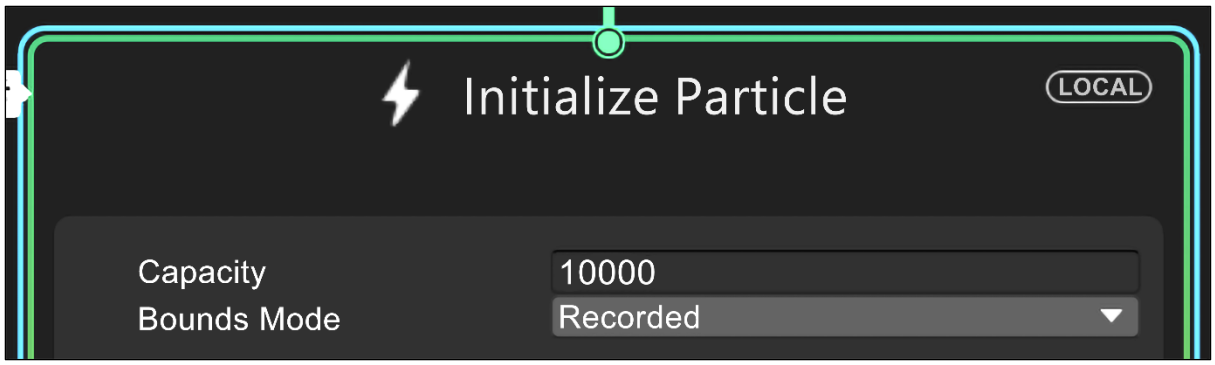

Add Component
visua
Search
Visual Effect
New script

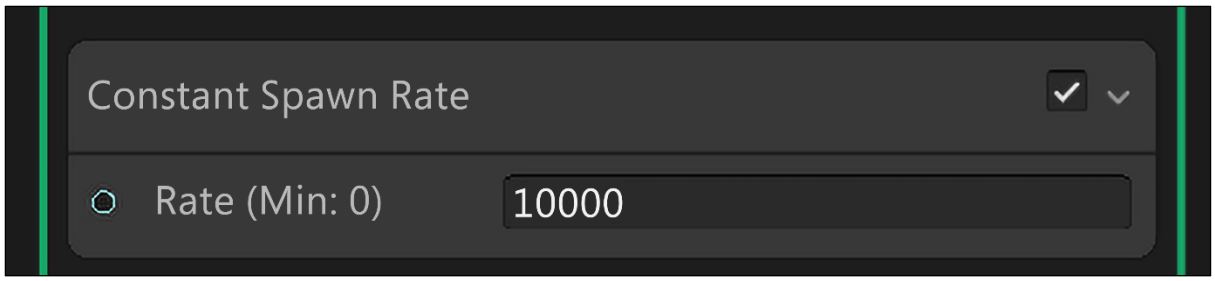

Visual Effect
General
Asset Template
New VFX

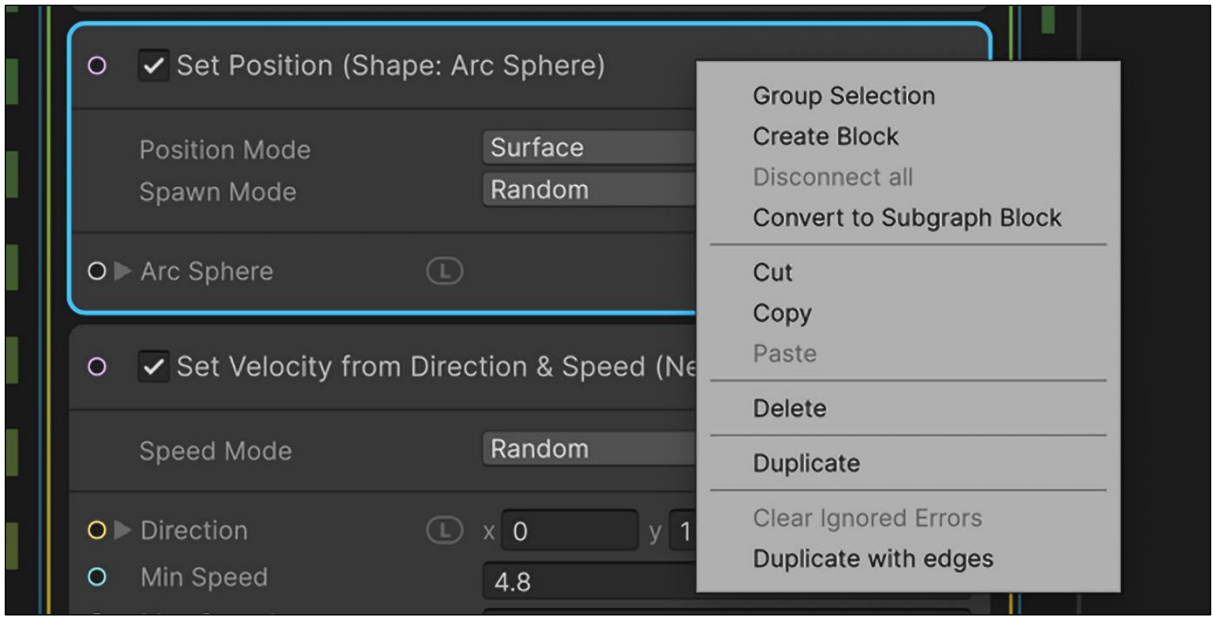


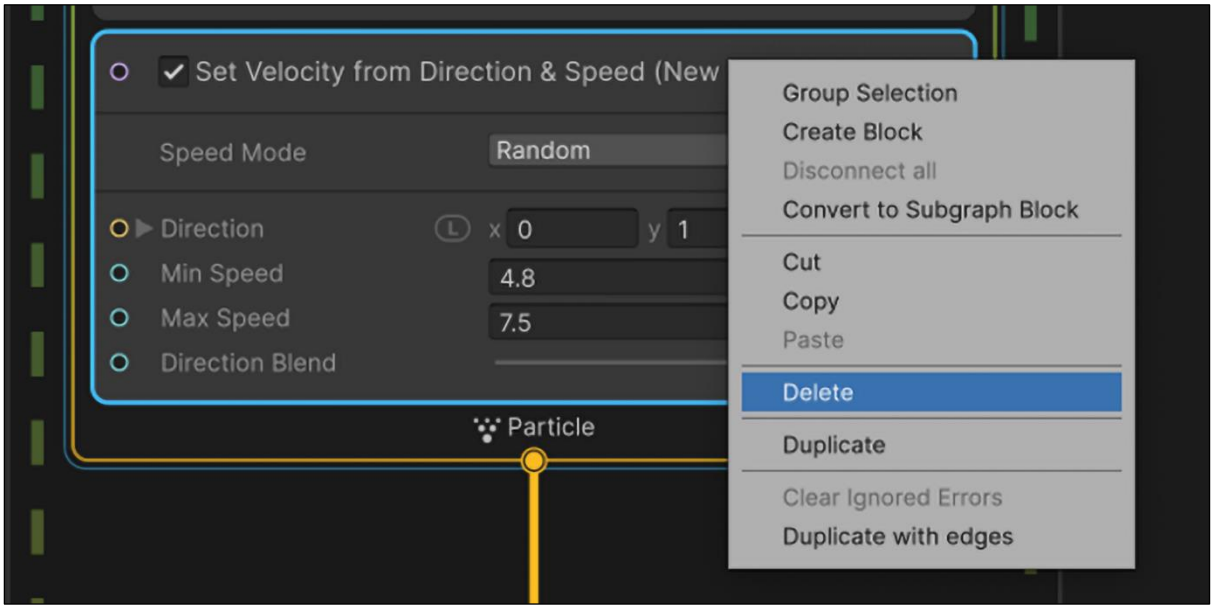

Scene
Game
Rain
Start
Stop
Spawn
System
Constant Spawn Rate
Rate
16
SpawnEvent
System (1)
Initialize Particle
LOCAL
Capacity
32
Bounds Mode
Manual
Bounds
Set Velocity Random (Per-component)
A
x -0.333 y 0.2 z -0.333
B
x 0.333 y 1 z 0.333
Set Lifetime Random (Uniform)
A
1
B
3
Particle

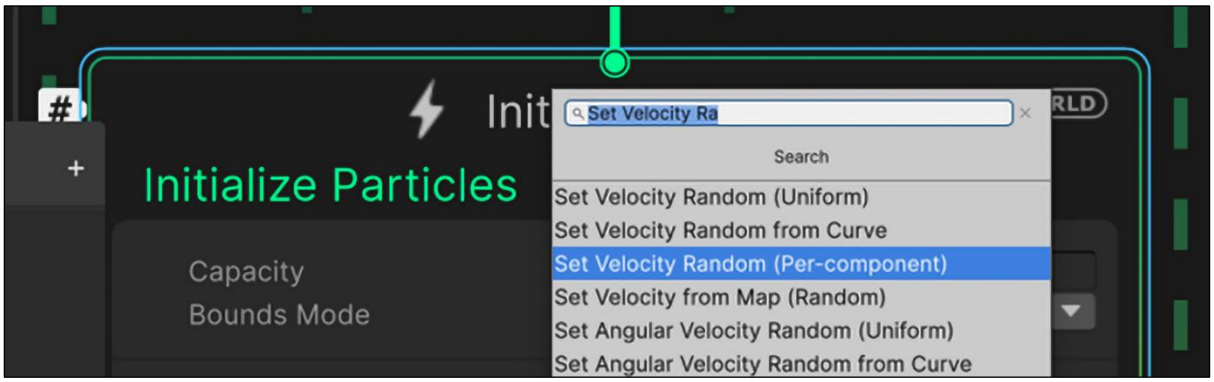

Set Velocity Random (Per-component)
A
x -0.333
y 0.2
z -0.333
B
x 0.333
y 1
z 0.333

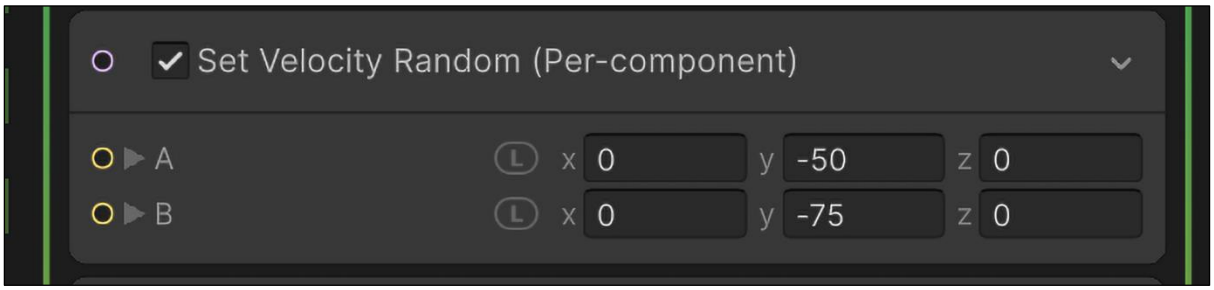

Initialize Particle
LOCAL
Capacity
10000
Bounds Mode
Recorded

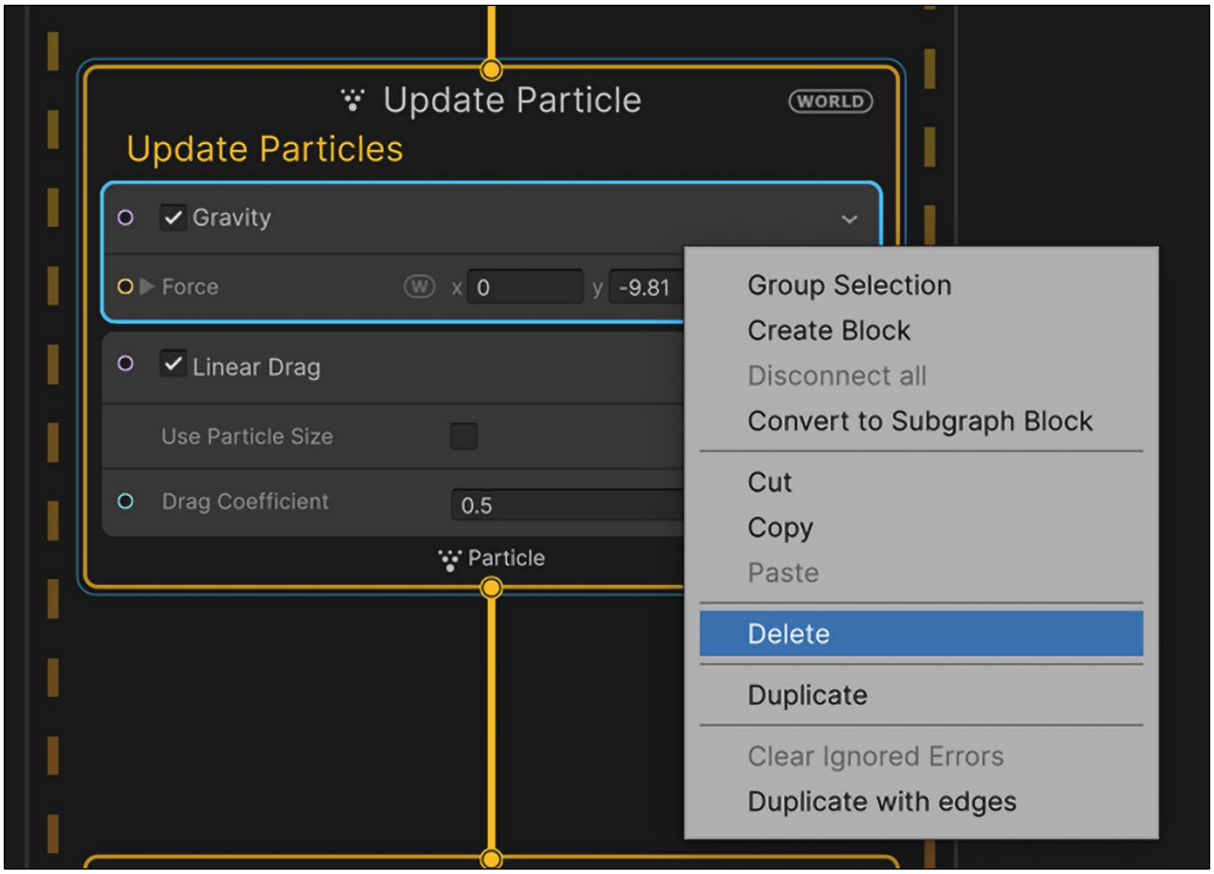

Constant Spawn Rate
Rate (Min: 0)
10000

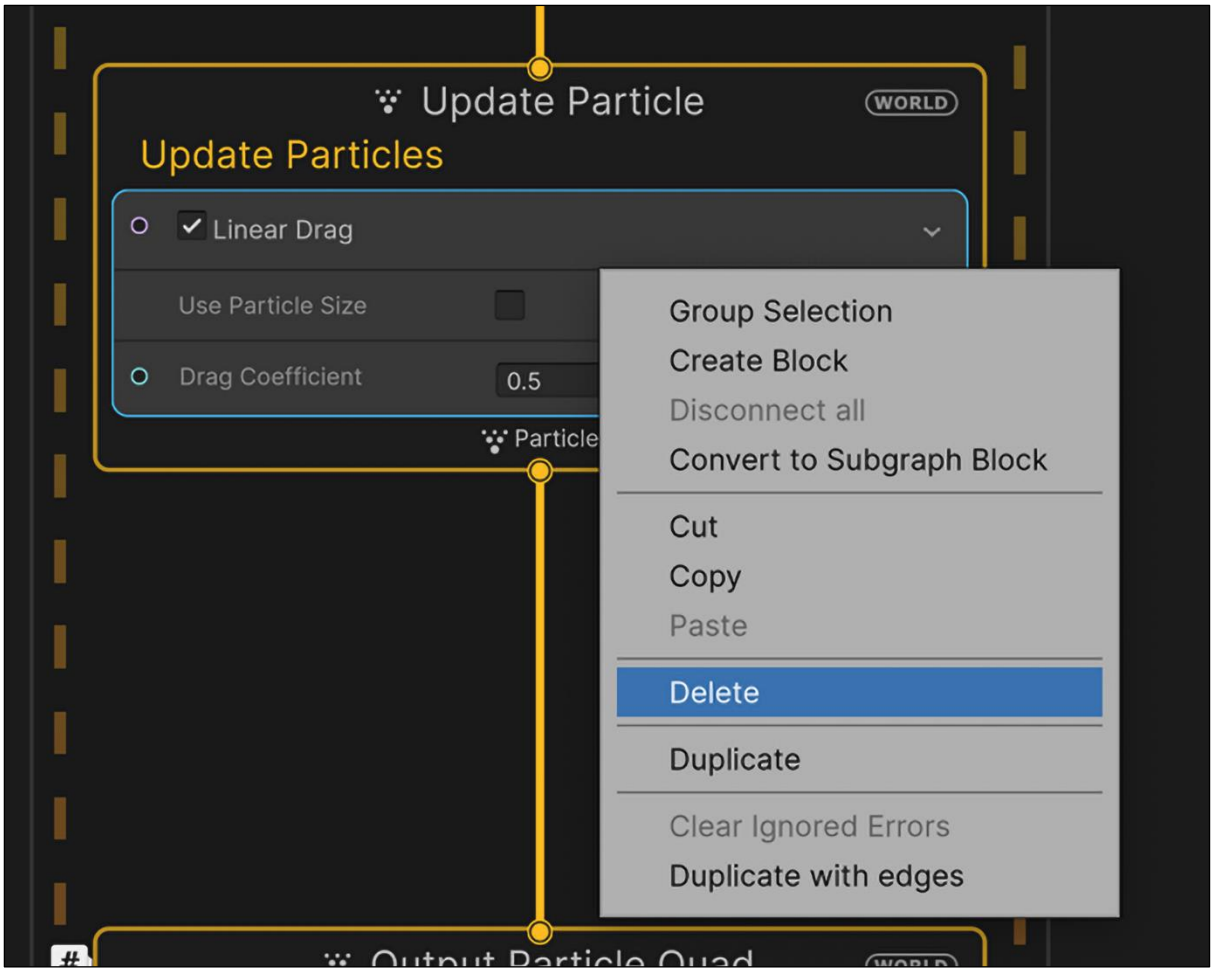

Set Position (Shape: Arc Sphere)
Position Mode
Surface
Spawn Mode
Random
Arc Sphere
Set Velocity from Direction & Speed (Ne
Speed Mode
Random
Direction
x 0
Min Speed
4.8
Group Selection
Create Block
Disconnect all
Convert to Subgraph Block
Cut
Copy
Paste
Delete
Duplicate
Clear Ignored Errors
Duplicate with edges

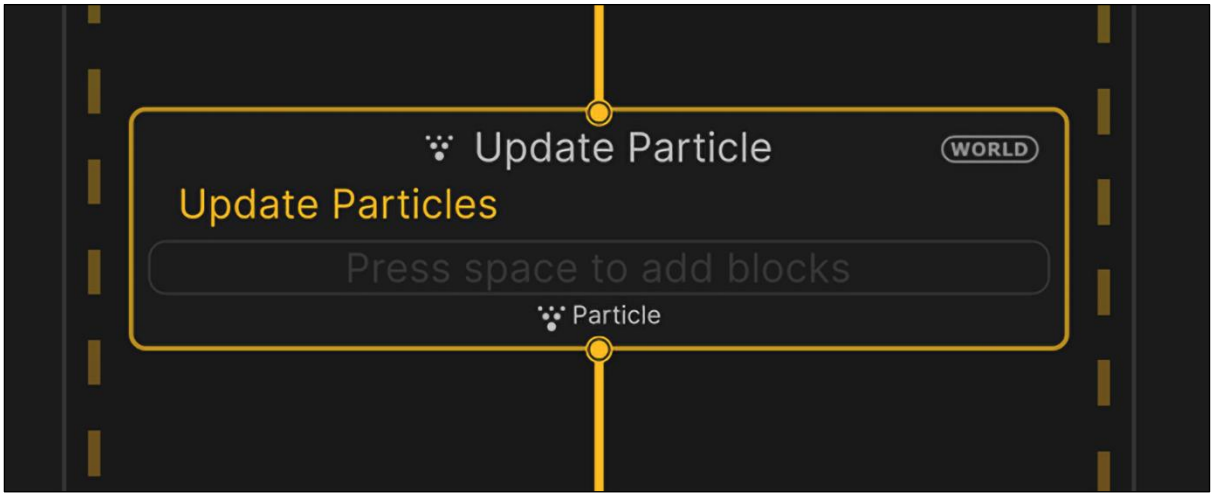

Set Velocity from Direction & Speed (New
Speed Mode
Random
Direction
x 0
y 1
Min Speed
4.8
Max Speed
7.5
Direction Blend
Particle
Group Selection
Create Block
Disconnect all
Convert to Subgraph Block
Cut
Copy
Paste
Delete
Duplicate
Clear Ignored Errors
Duplicate with edges

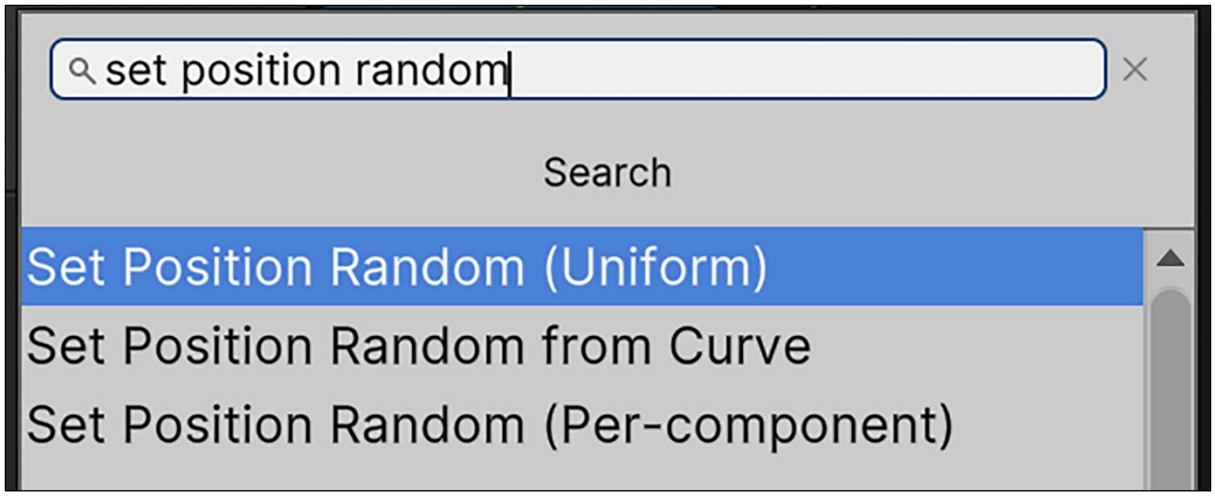

Init
Initialize Particles
Capacity
Bounds Mode
Set Velocity Ra
Search
Set Velocity Random (Uniform)
Set Velocity Random from Curve
Set Velocity Random (Per-component)
Set Velocity from Map (Random)
Set Angular Velocity Random (Uniform)
Set Angular Velocity Random from Curve

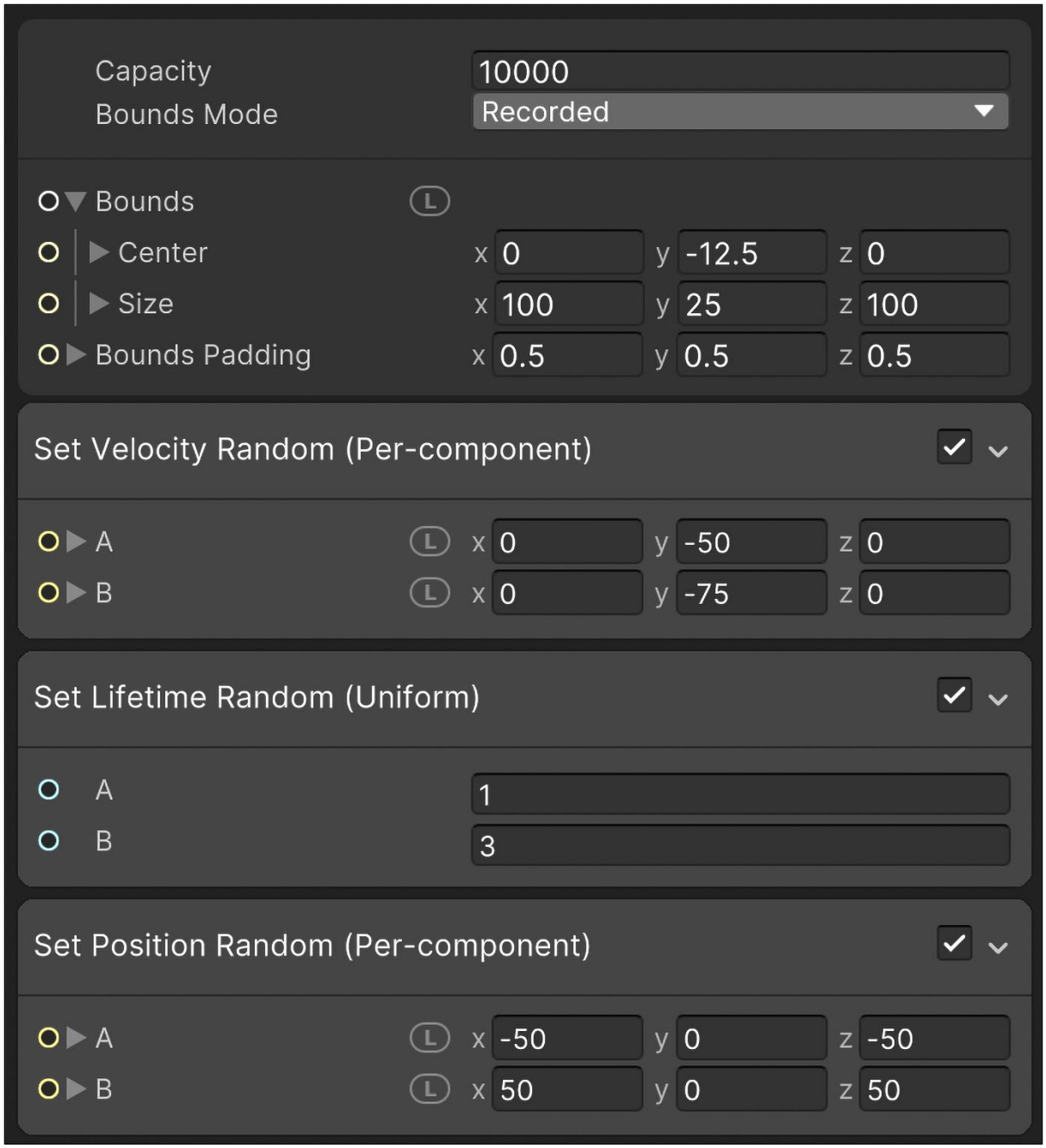

Set Velocity Random (Per-component)
A
x 0
y -50
z 0
B
x 0
y -75
z 0

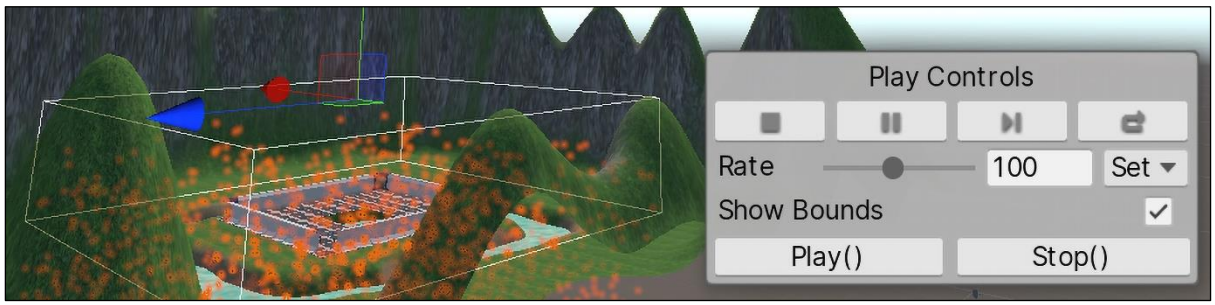

Update Particle
WORLD
Update Particles
Gravity
Force
x 0
y -9.81
Linear Drag
Use Particle Size
Drag Coefficient
0.5
Particle
Group Selection
Create Block
Disconnect all
Convert to Subgraph Block
Cut
Copy
Paste
Delete
Duplicate
Clear Ignored Errors
Duplicate with edges


Update Particle
WORLD
Update Particles
Linear Drag
Use Particle Size
Drag Coefficient
0.5
Particle
Group Selection
Create Block
Disconnect all
Convert to Subgraph Block
Cut
Copy
Paste
Delete
Duplicate
Clear Ignored Errors
Duplicate with edges


Update Particle
WORLD
Update Particles
Press space to add blocks
Particle

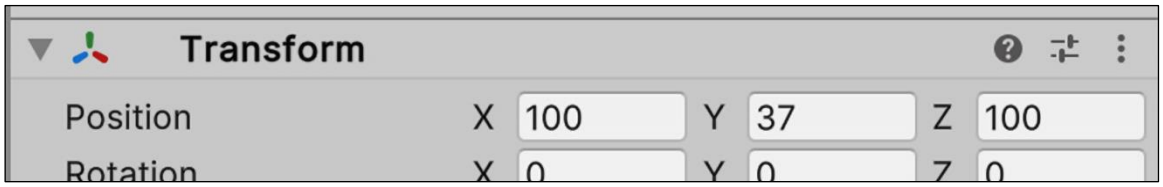

set position random
Search
Set Position Random (Uniform)
Set Position Random from Curve
Set Position Random (Per-component)


Capacity
10000
Bounds Mode
Recorded
Bounds
Center
x 0
y -12.5
z 0
Size
x 100
y 25
z 100
Bounds Padding
x 0.5
y 0.5
z 0.5
Set Velocity Random (Per-component)
A
x 0
y -50
z 0
B
x 0
y -75
z 0
Set Lifetime Random (Uniform)
A
1
B
3
Set Position Random (Per-component)
A
x -50
y 0
z -50
B
x 50
y 0
z 50

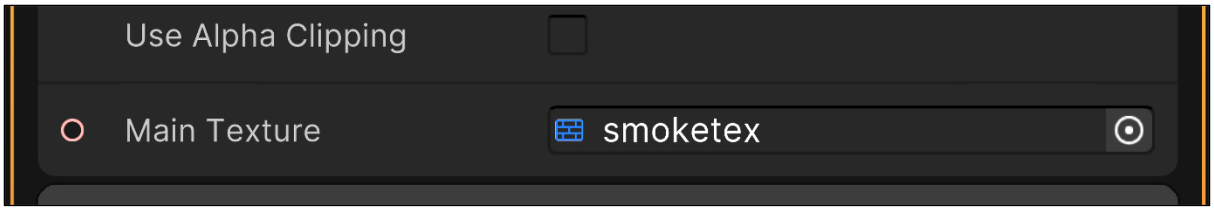

Play Controls
Rate
100
Set
Show Bounds
Play()
Stop()


VE
Rate
100
Set
Show Bounds
Show Event Tester
Play()
Stop()

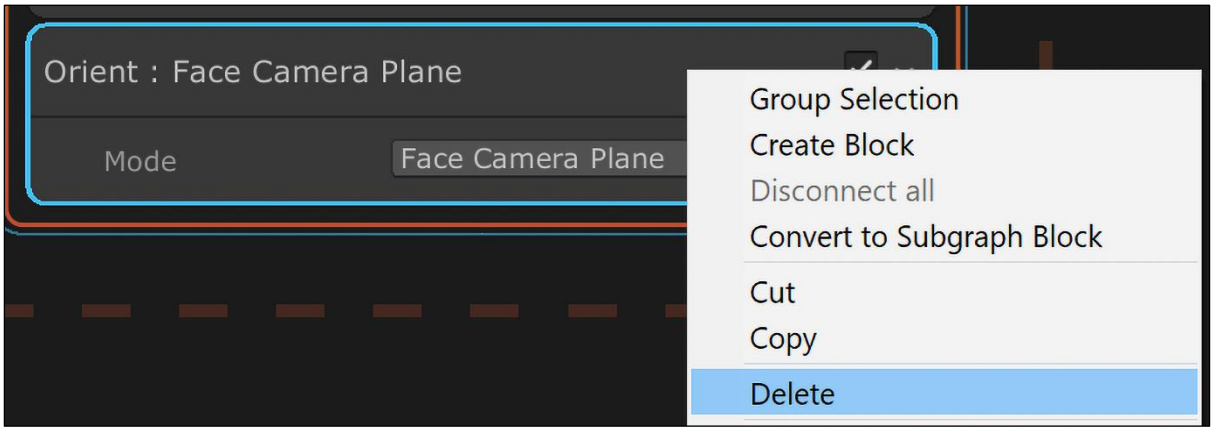

Scene
Rain
Compile


Transform
Position
X 100
Y 37
Z 100
Rotation
X 0
Y 0
Z 0

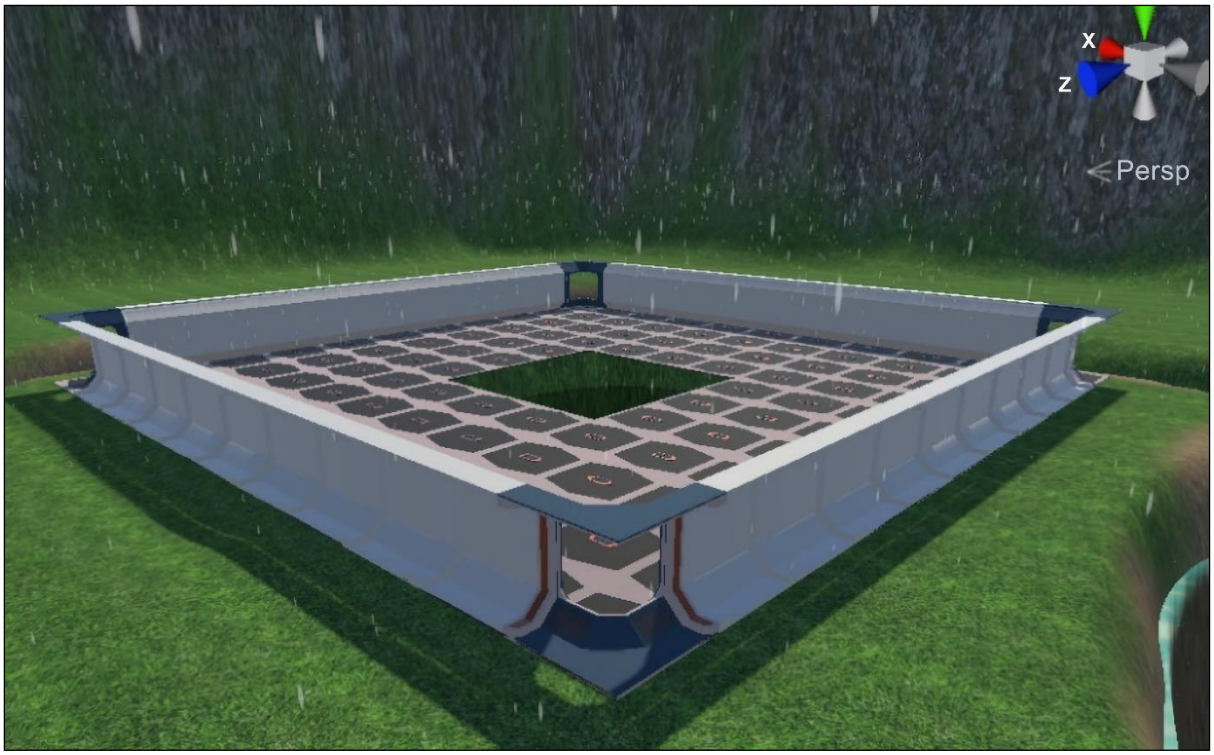

Set Lifetime Random (Uniform)
A
0.5
B
0.5


Use Alpha Clipping
Main Texture
smoketex


Use Soft Particle
Blend Mode
Additive
Use Alpha Clipping


Orient : Face Camera Plane
Mode
Face Camera Plane
Group Selection
Create Block
Disconnect all
Convert to Subgraph Block
Cut
Copy
Delete





Visual Effect Graph

Remove

15.0.6 · June 13, 2023 Release

From **Unity Registry** by Unity Technologies Inc.

com.unity.visualeffectgraph

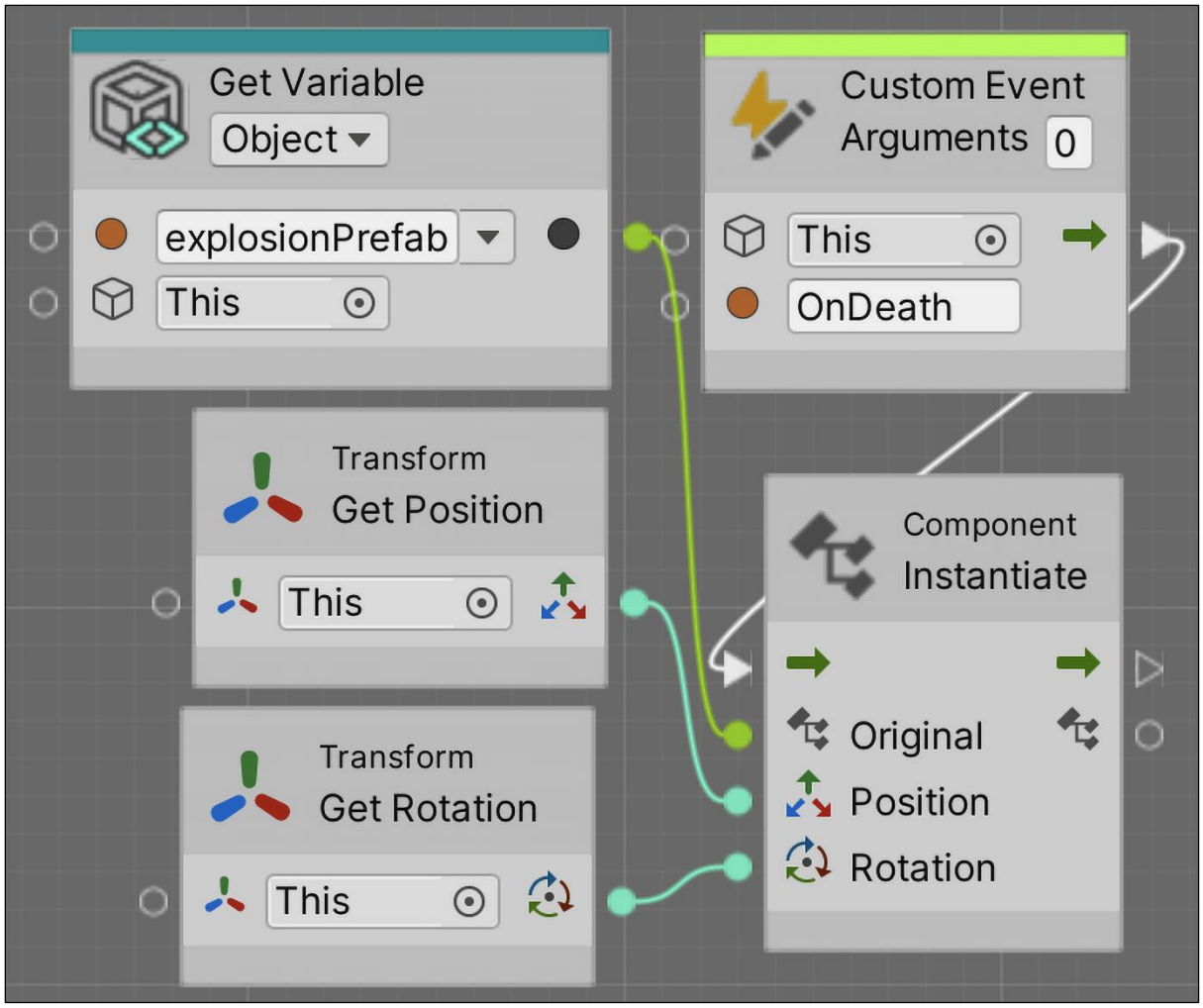
Documentation | Changelog | Licenses

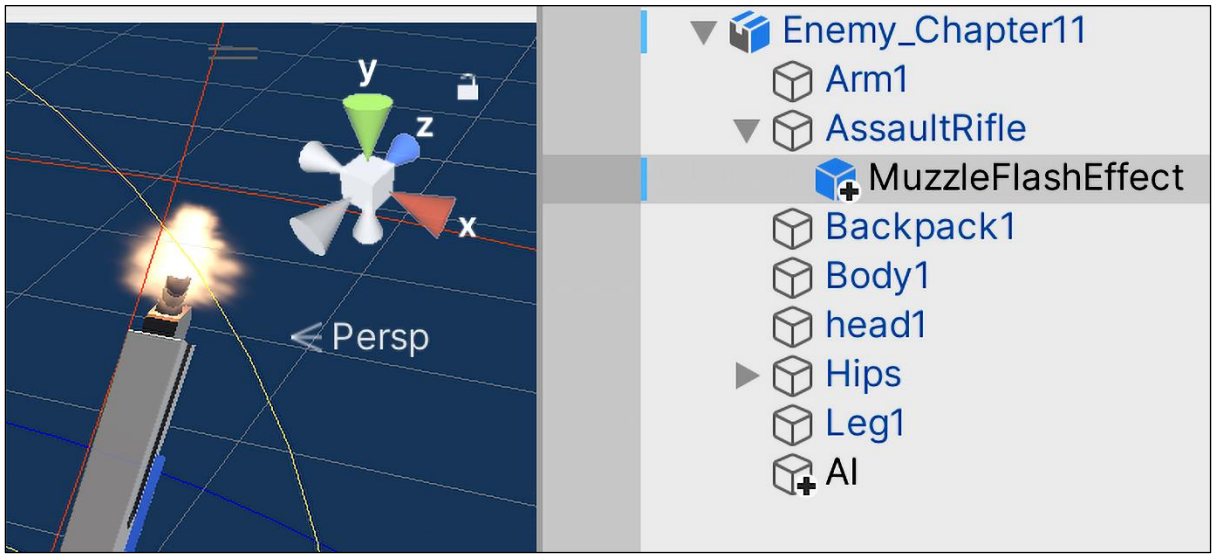
open VFX Graph Samples project on Github

```
public class ExplosionOnDeath : MonoBehaviour
{
    public GameObject particlePrefab;

    void Awake()
    {
        var life = GetComponent<Life>();
        life.onDeath.AddListener(OnDeath);
    }

    void OnDeath()
    {
        Instantiate(particlePrefab,
            transform.position,
            transform.rotation);
    }
}
```


Get Variable
Object
explosionPrefab
This
Custom Event
Arguments 0
This
OnDeath
Transform
Get Position
This
Transform
Get Rotation
This
Component
Instantiate
Original
Position
Rotation

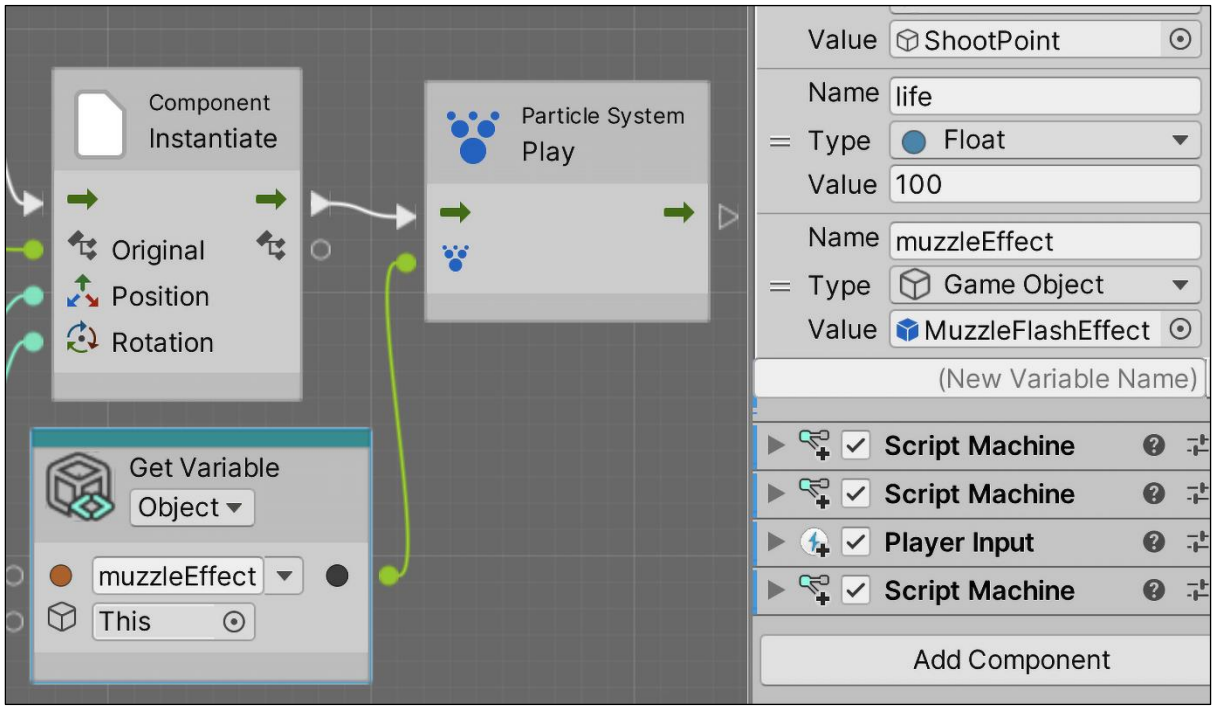

y
z
x
Persp
Enemy_Chapter11
Arm1
AssaultRifle
MuzzleFlashEffect
Backpack1
Body1
head1
Hips
Leg1
AI

```
public GameObject prefab;
public GameObject shootPoint;
public ParticleSystem muzzleEffect;

public void OnFire(InputValue value)
{
    if (value.isPressed)
    {
        GameObject clone = Instantiate(prefab);

        clone.transform.position = shootPoint.transform.position;
        clone.transform.rotation = shootPoint.transform.rotation;

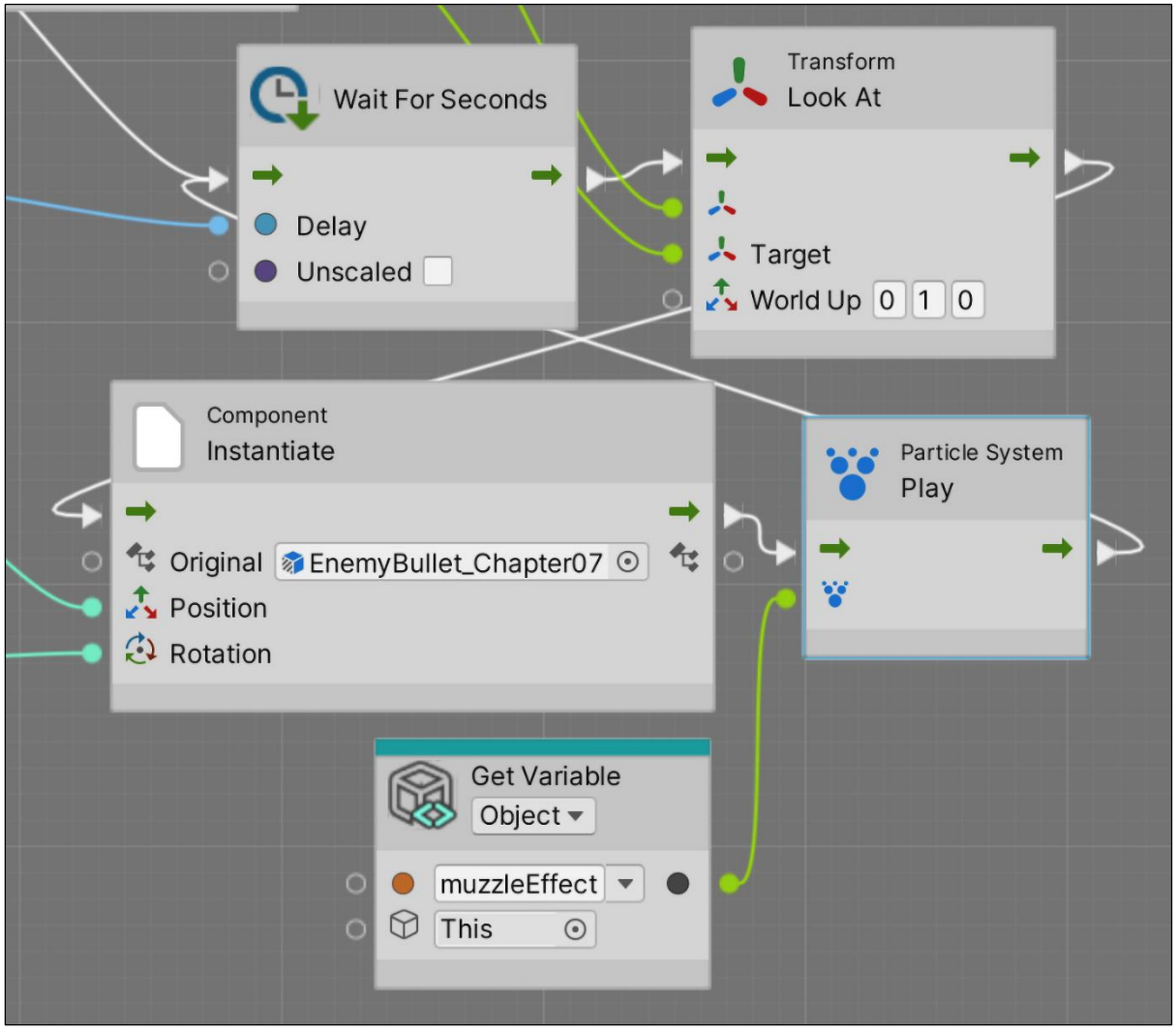
        muzzleEffect.Play();
    }
}
```



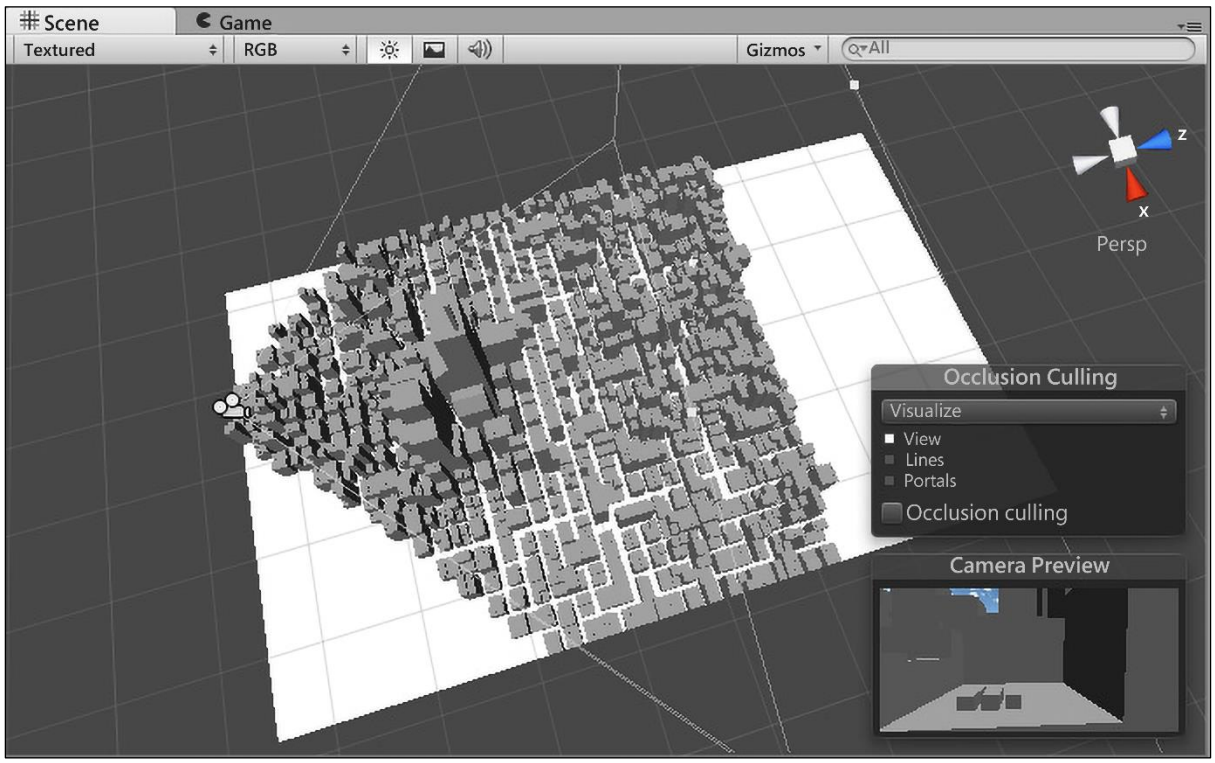
```
public ParticleSystem muzzleEffect;

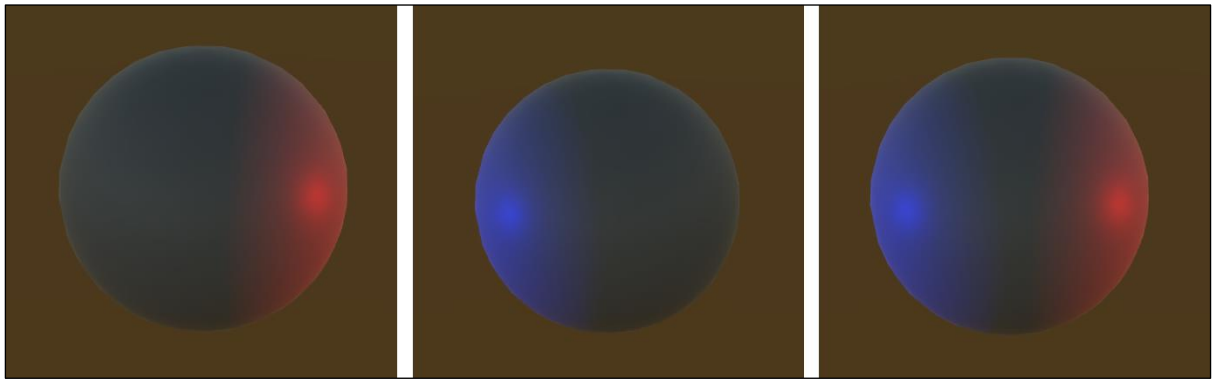
void Shoot()
{
    var timeSinceLastShoot :float = Time.time - lastShootTime;
    if(timeSinceLastShoot < fireRate)
        return;

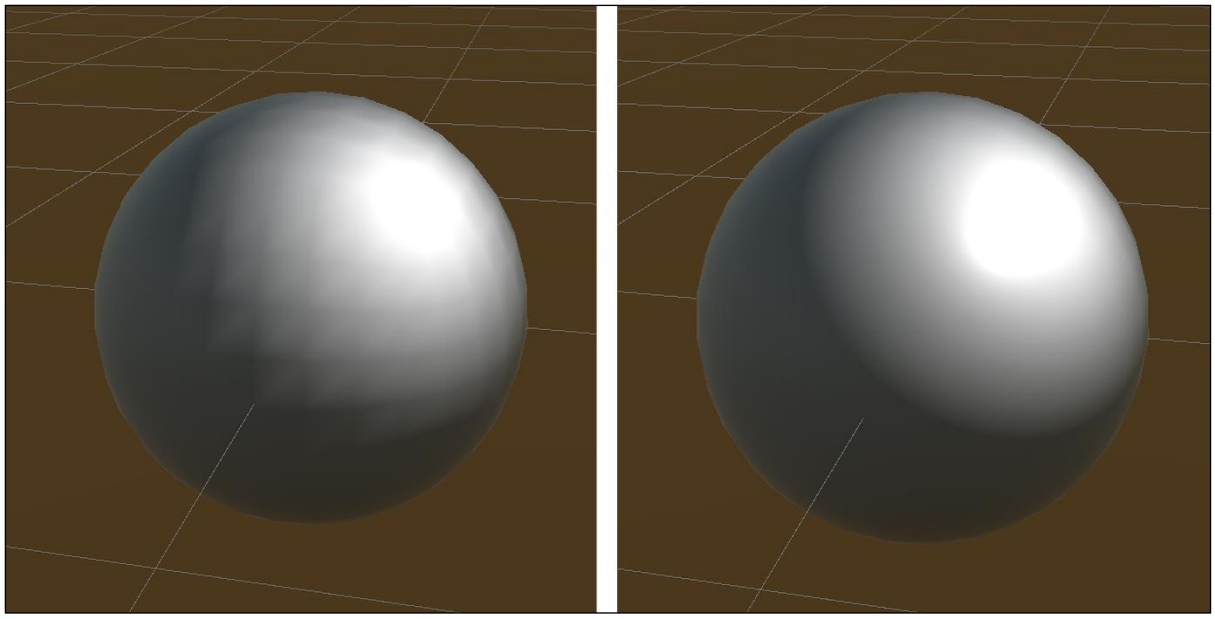
    lastShootTime = Time.time;
    Instantiate(bulletPrefab, transform.position, transform.rotation);
    muzzleEffect.Play();
}
```

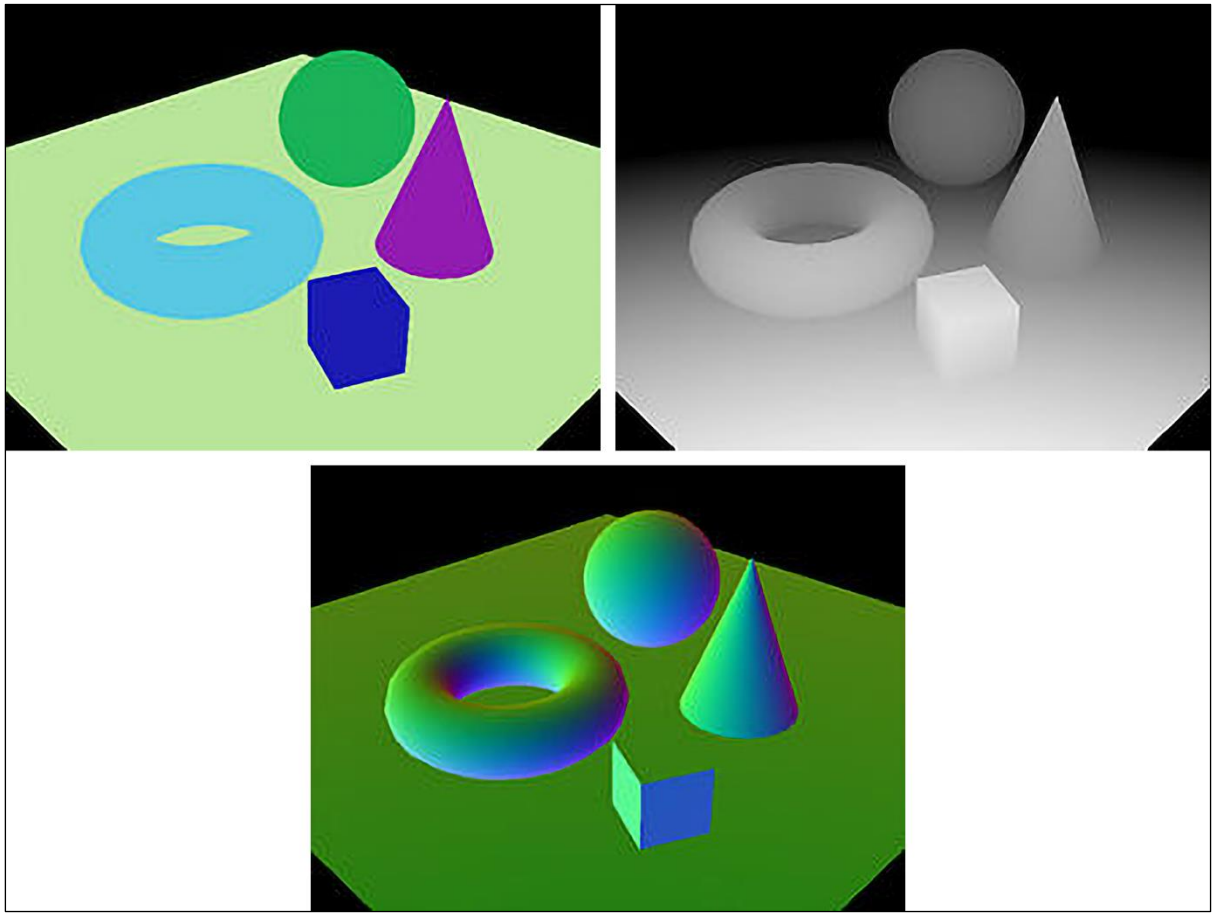


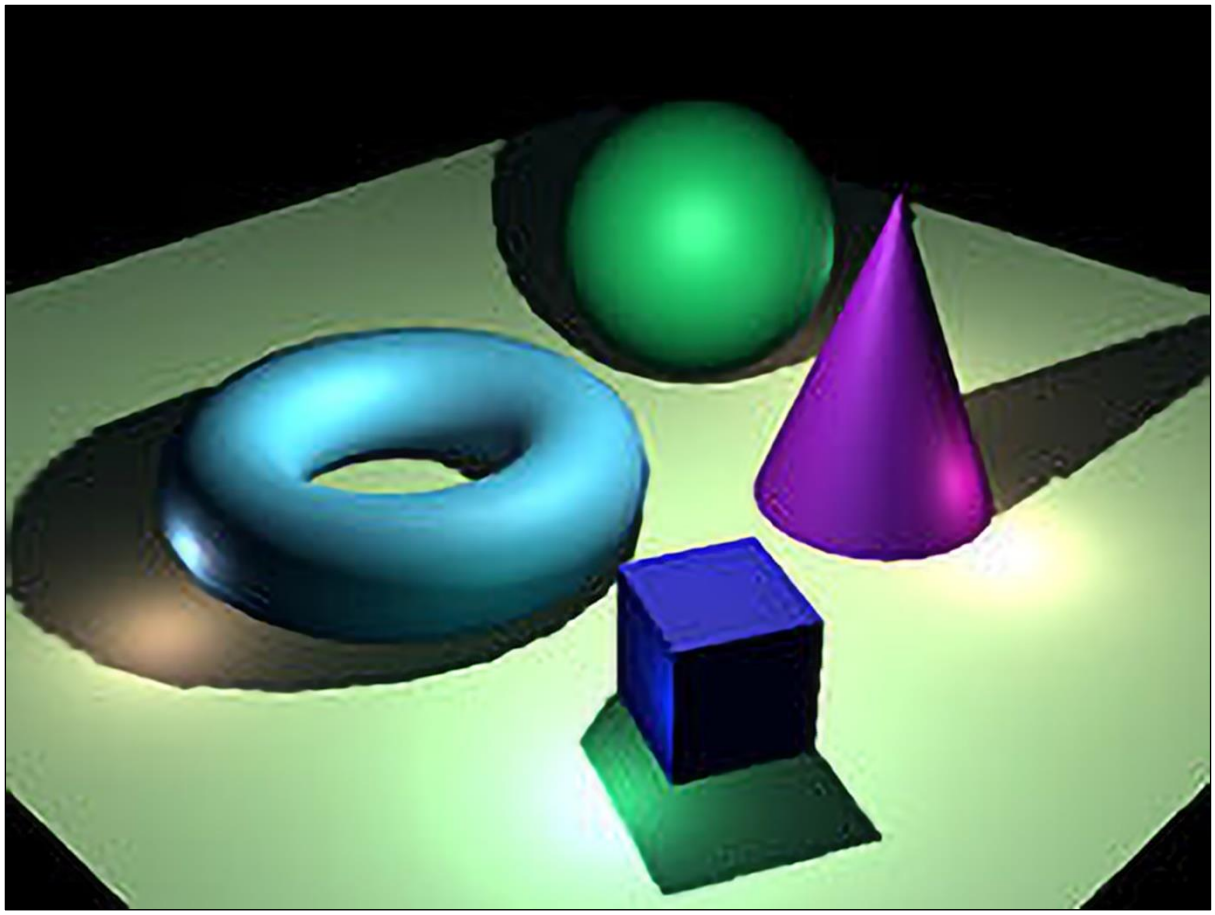
Chapter 12: Enlightening Worlds: Illuminating Scenes with the Universal Render Pipeline

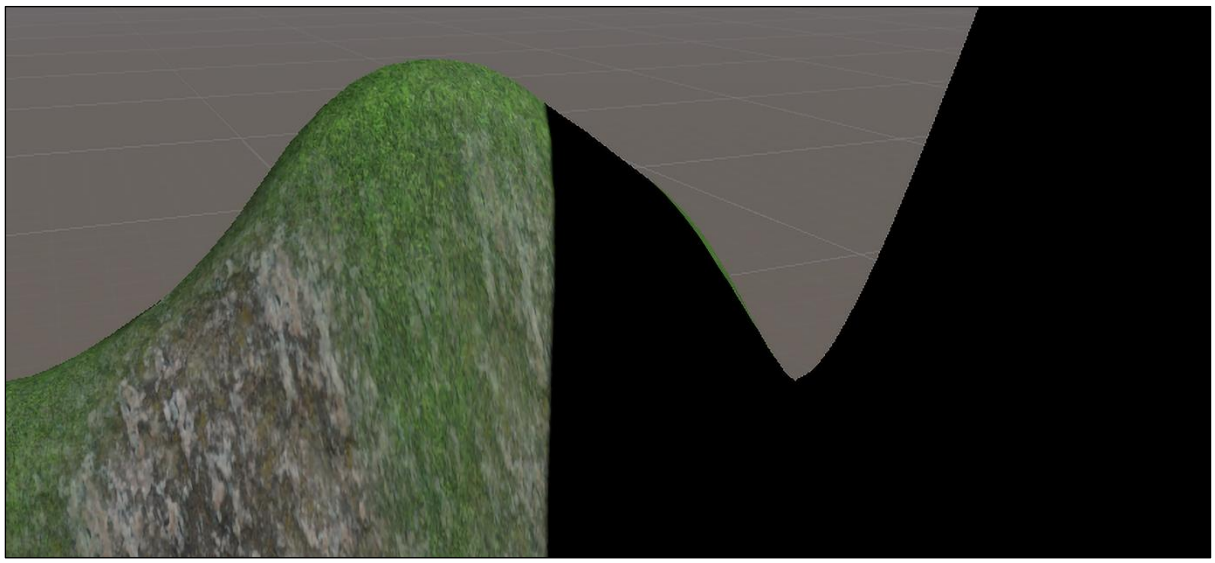


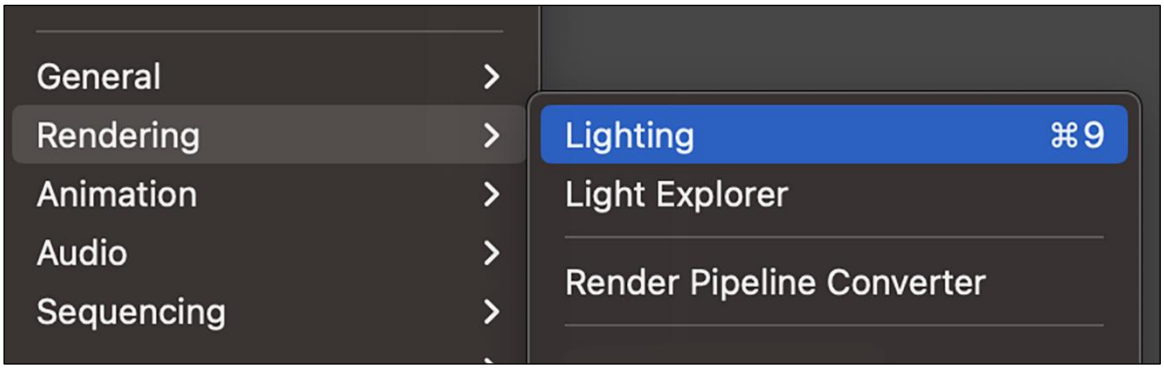


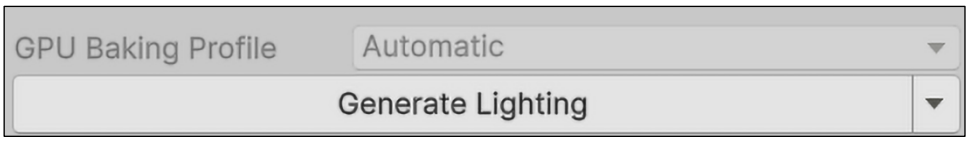




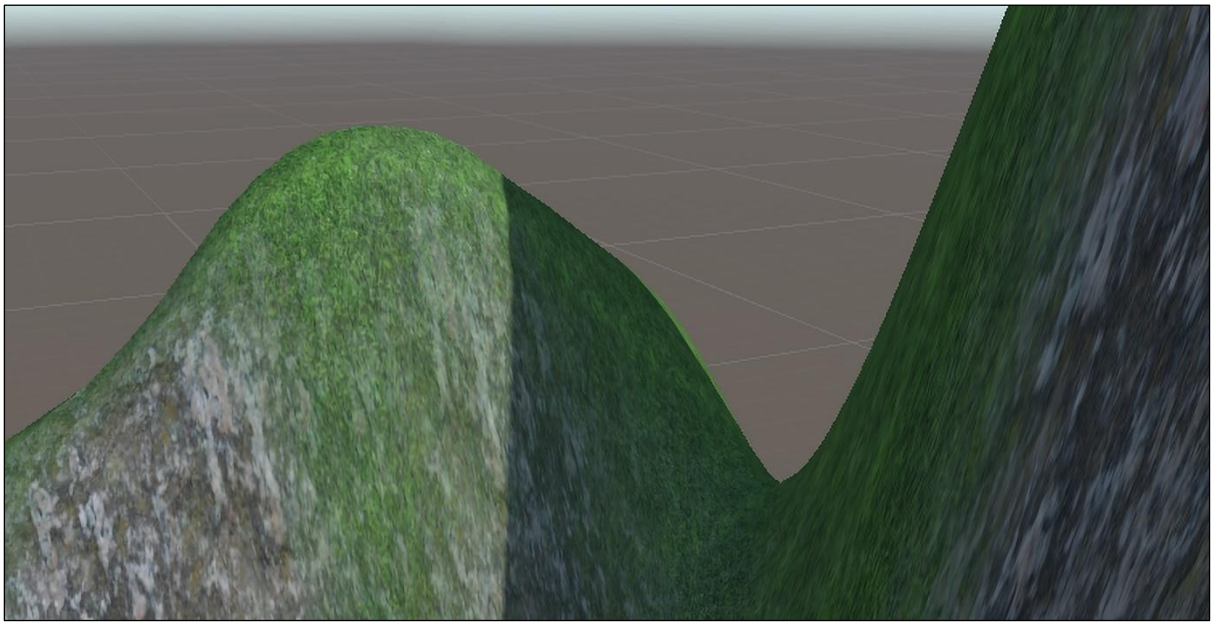


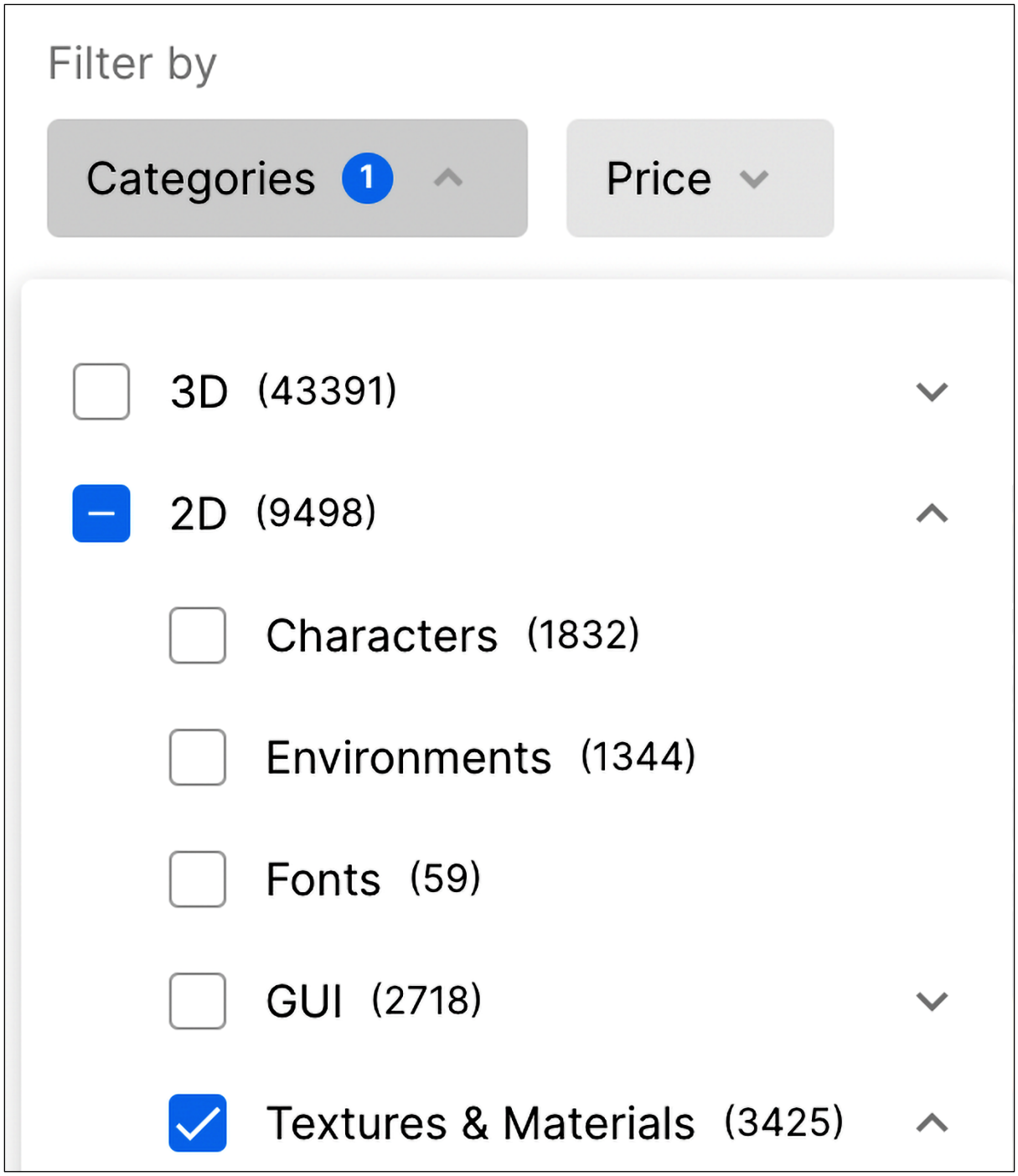



General
Rendering
Animation
Audio
Sequencing
Lighting ⌘9
Light Explorer
Render Pipeline Converter


GPU Baking Profile
Automatic
Generate Lighting


Global Illumination [0:01:25]




Filter by
Categories 1
Price
3D (43391)
2D (9498)
Characters (1832)
Environments (1344)
Fonts (59)
GUI (2718)
Textures & Materials (3425)



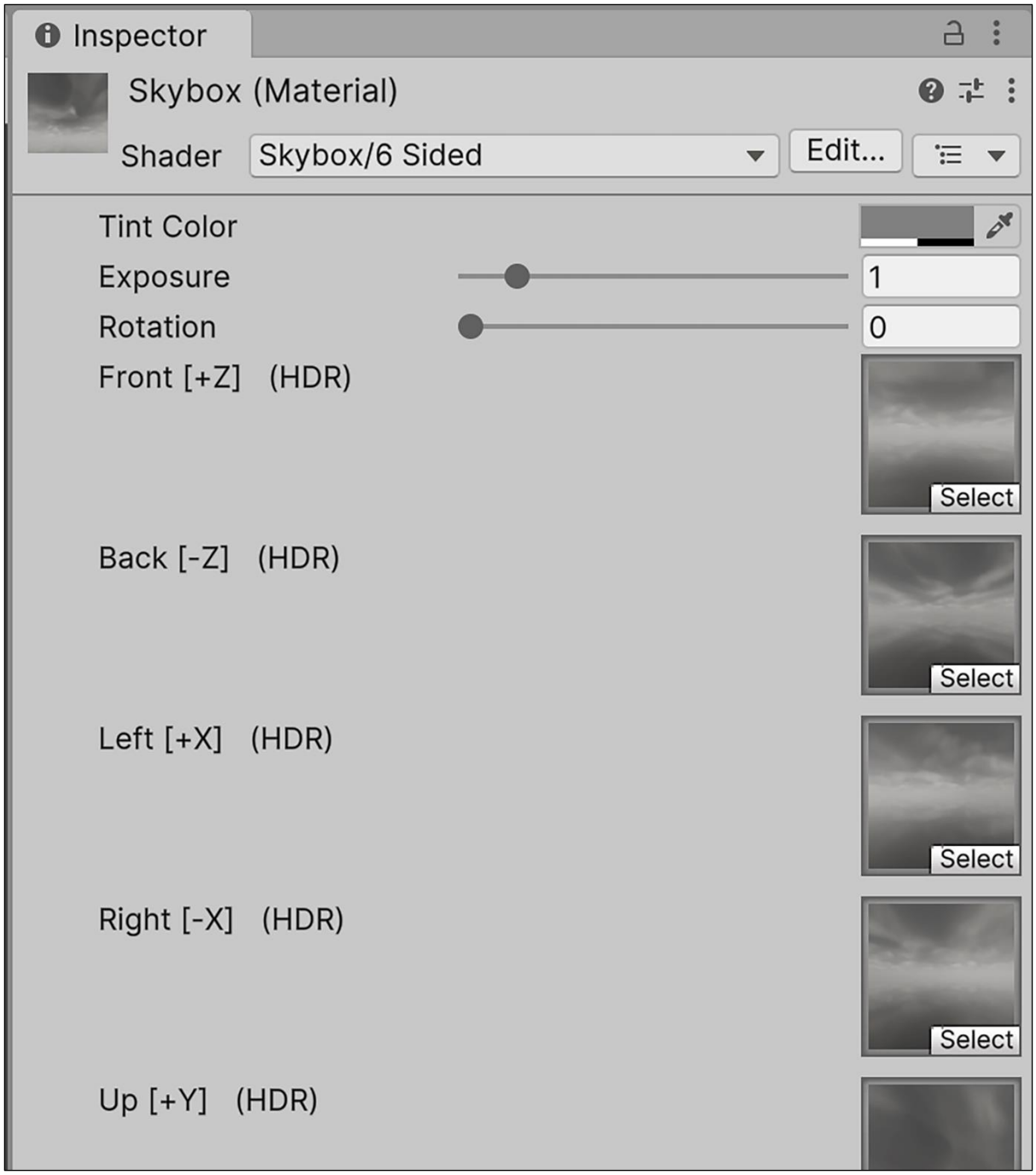
RPGWHITELOCK

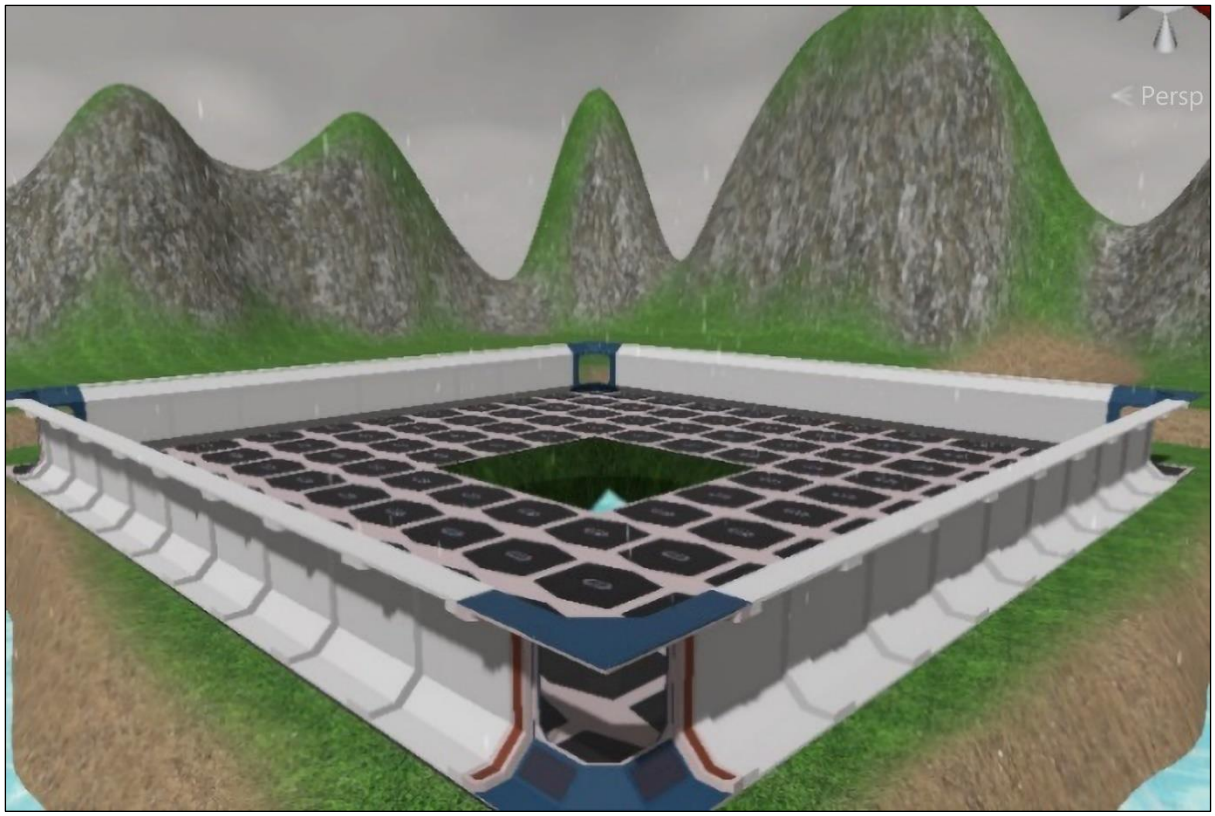
AllSky Free - 10 Sky / Sky...

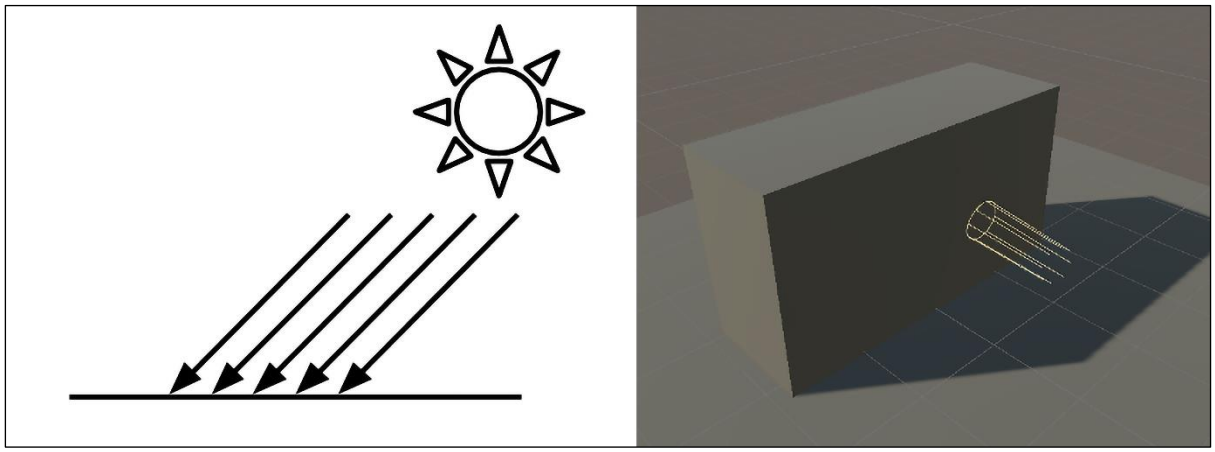
★★★★★ (139) | ♥ (8958)

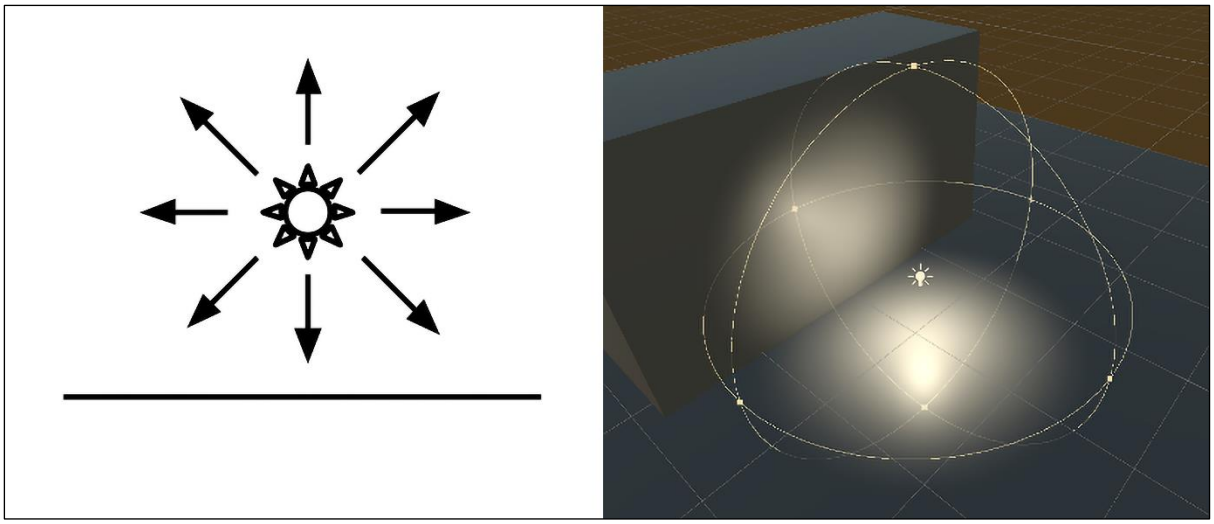
FREE

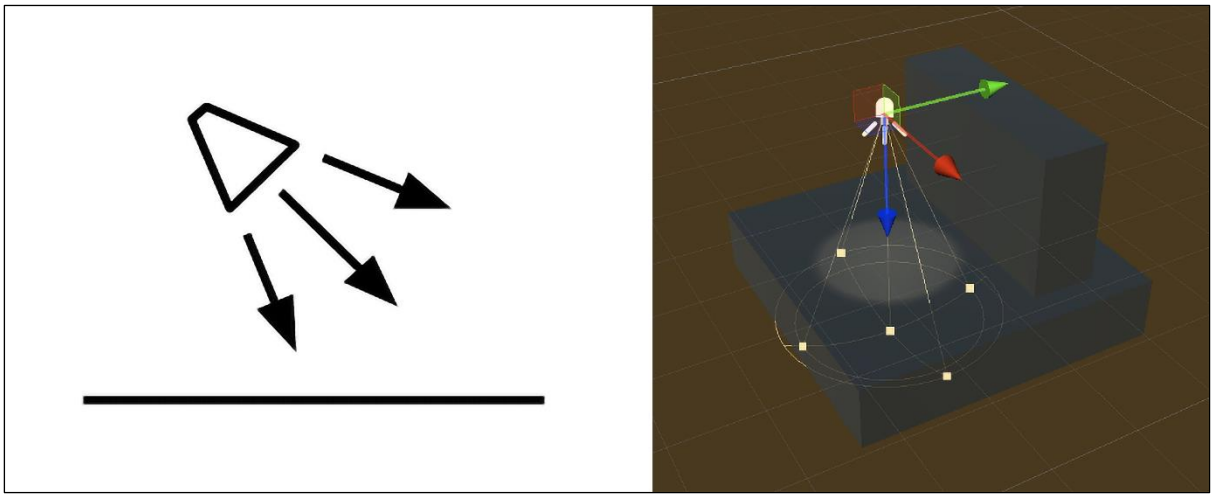
Add to My Assets


Inspector
Skybox (Material)
Shader
Skybox/6 Sided
Edit...
Tint Color
Exposure
1
Rotation
0
Front [+Z] (HDR)
Select
Back [-Z] (HDR)
Select
Left [+X] (HDR)
Select
Right [-X] (HDR)
Select
Up [+Y] (HDR)

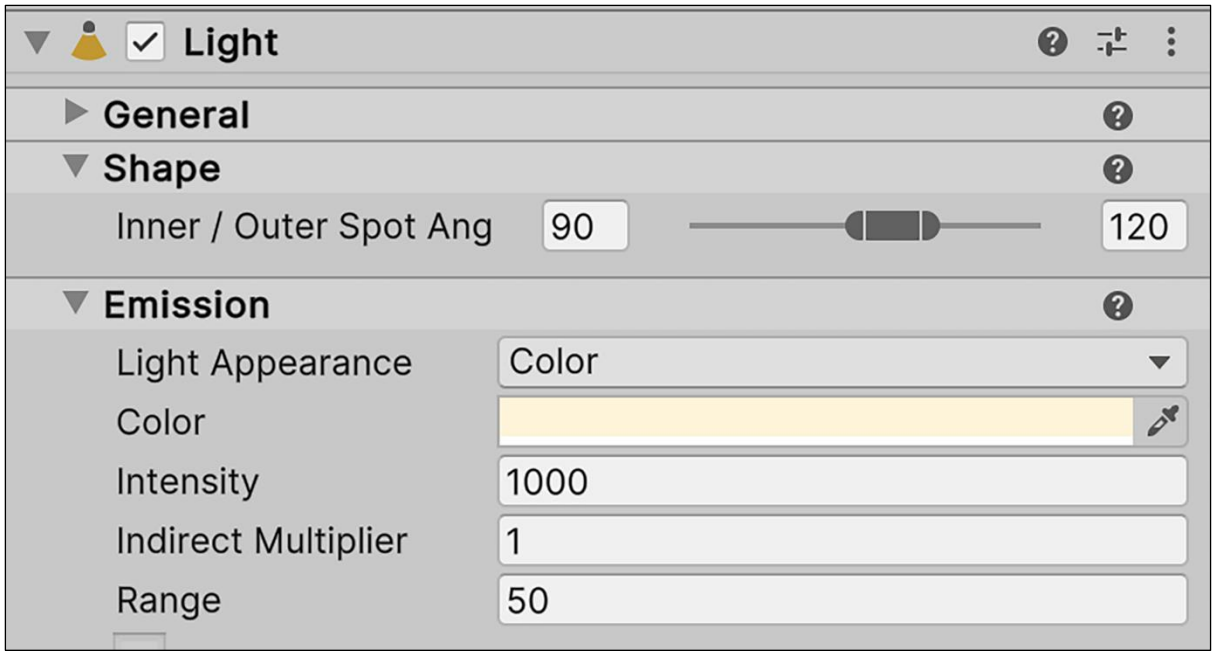

Persp

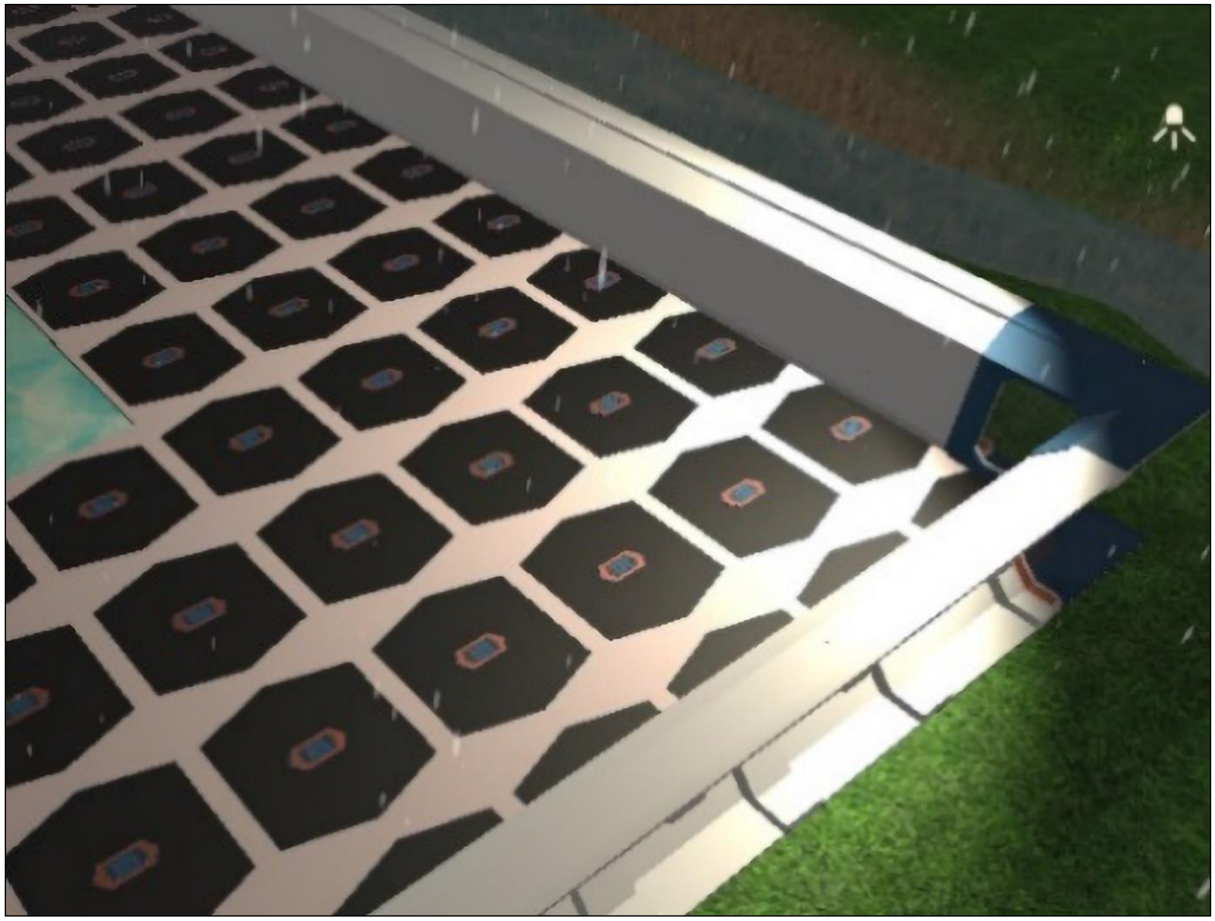


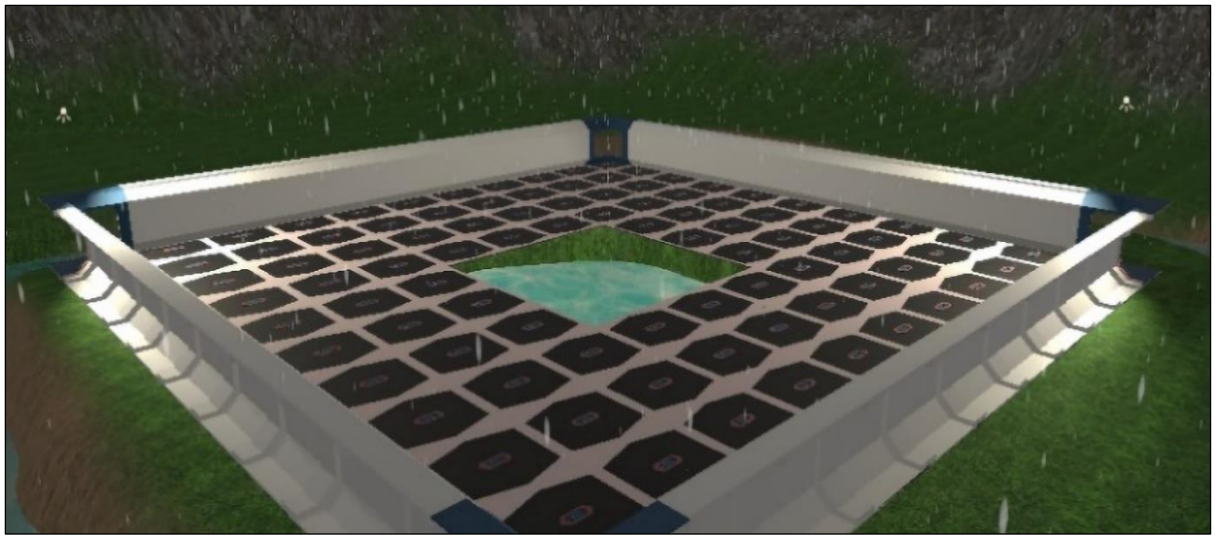


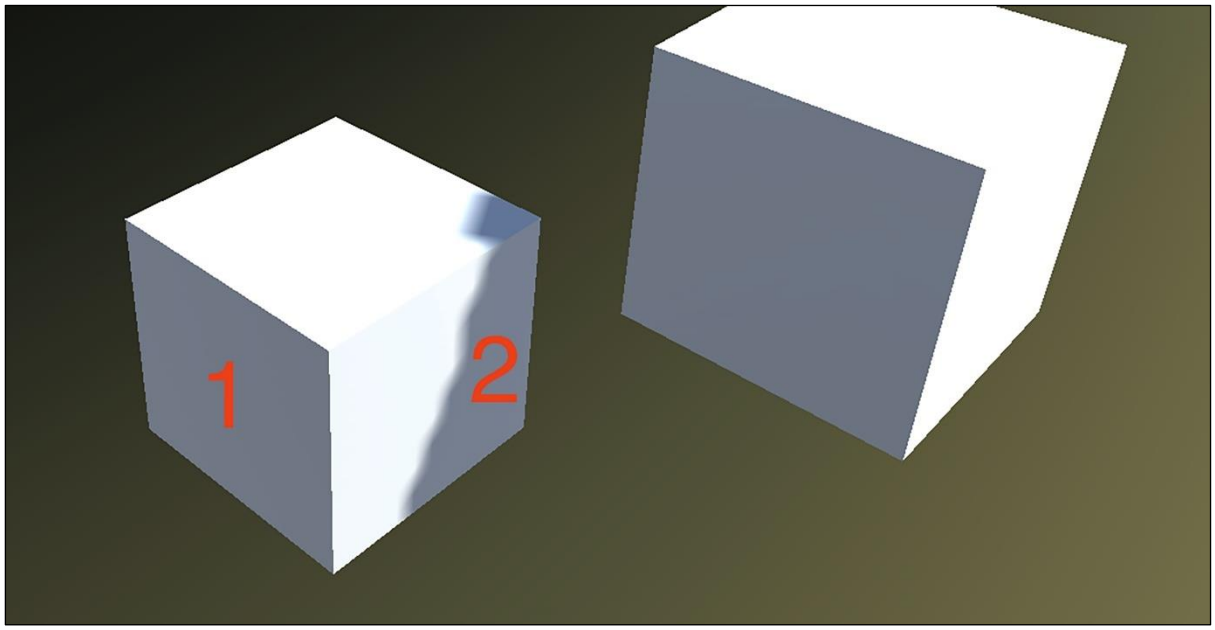


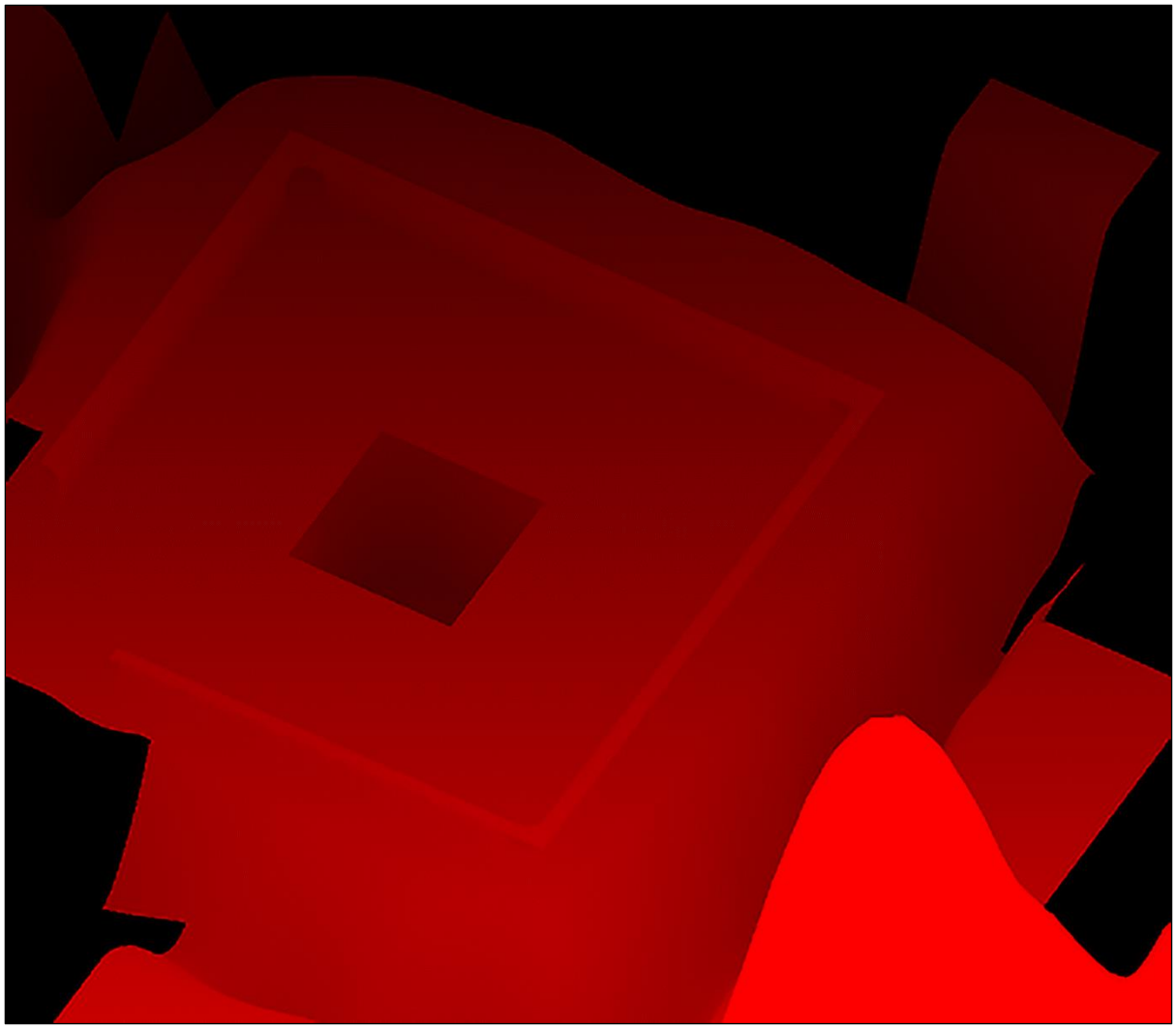

Light
General
Emission
Light Appearance
Color
Color
Intensity
1
Indirect Multiplier
1

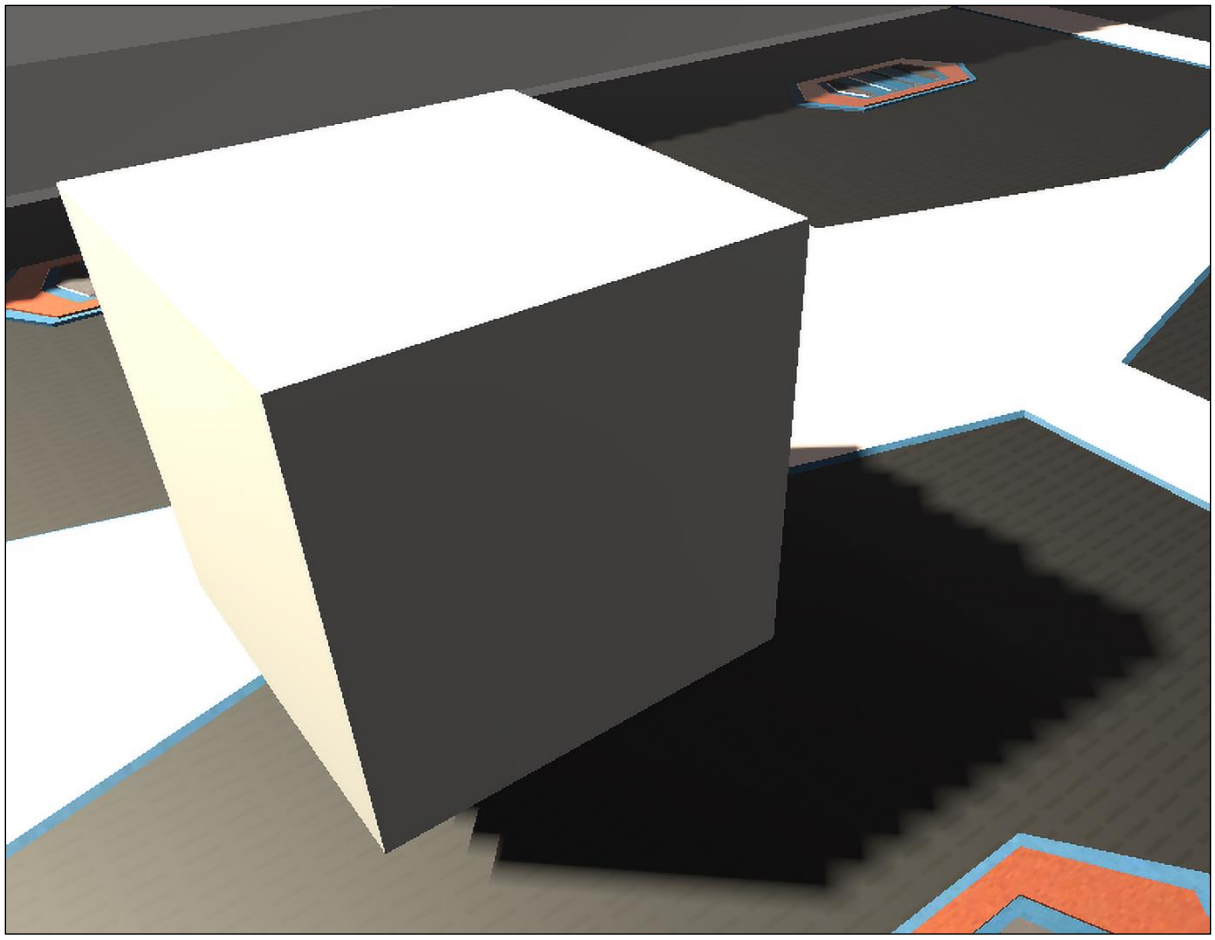

Light
General
Shape
Inner / Outer Spot Ang
90
120
Emission
Light Appearance
Color
Color
Intensity
1000
Indirect Multiplier
1
Range
50

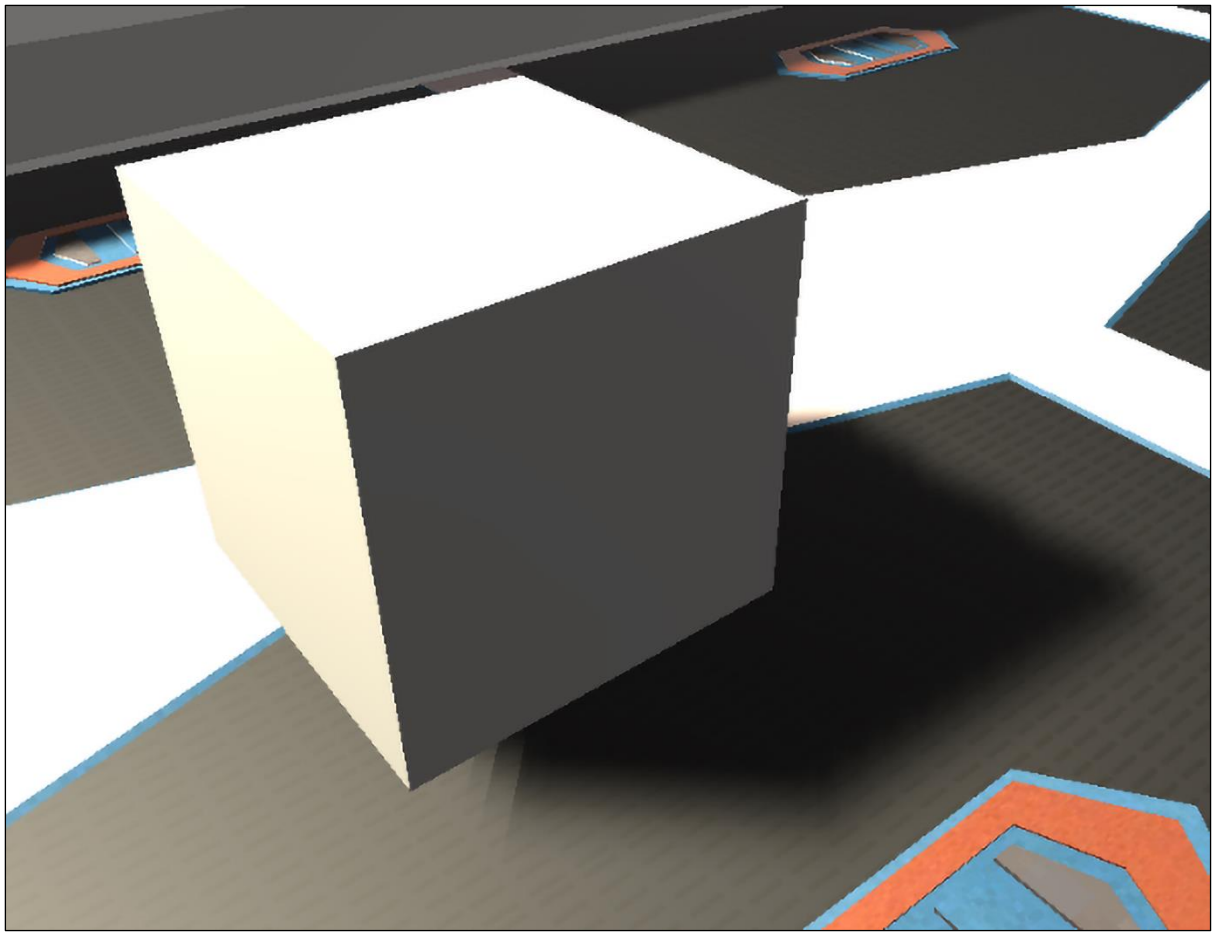


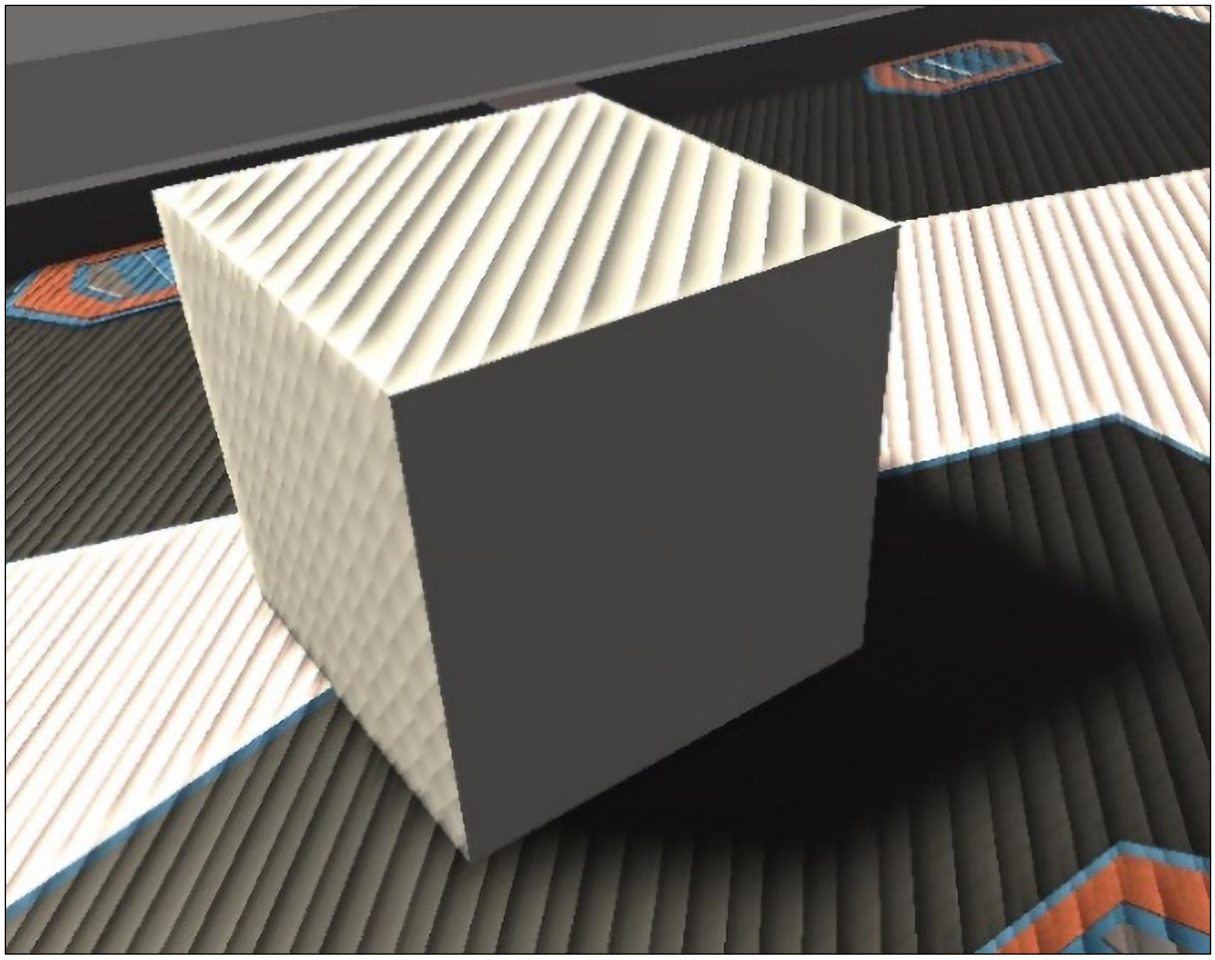


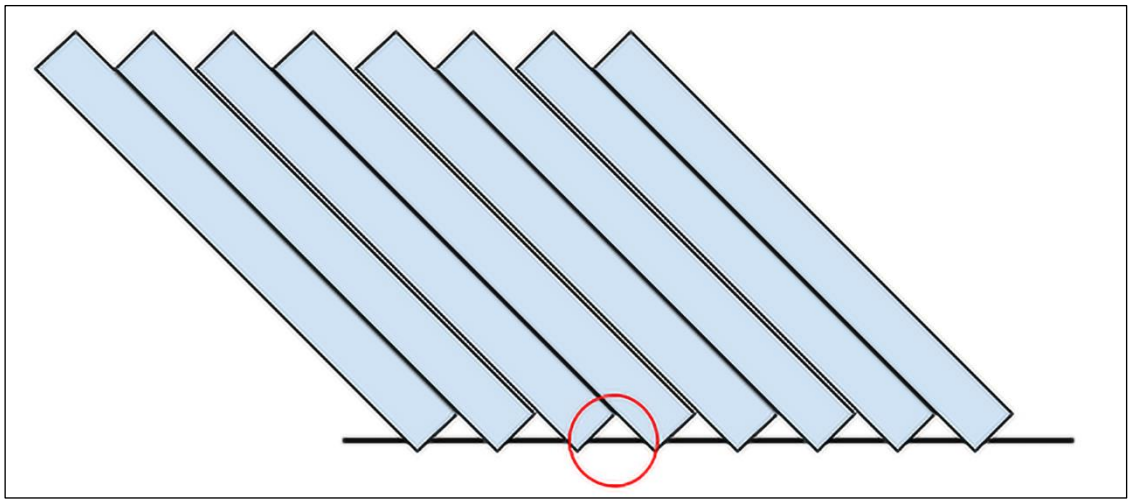

1
2

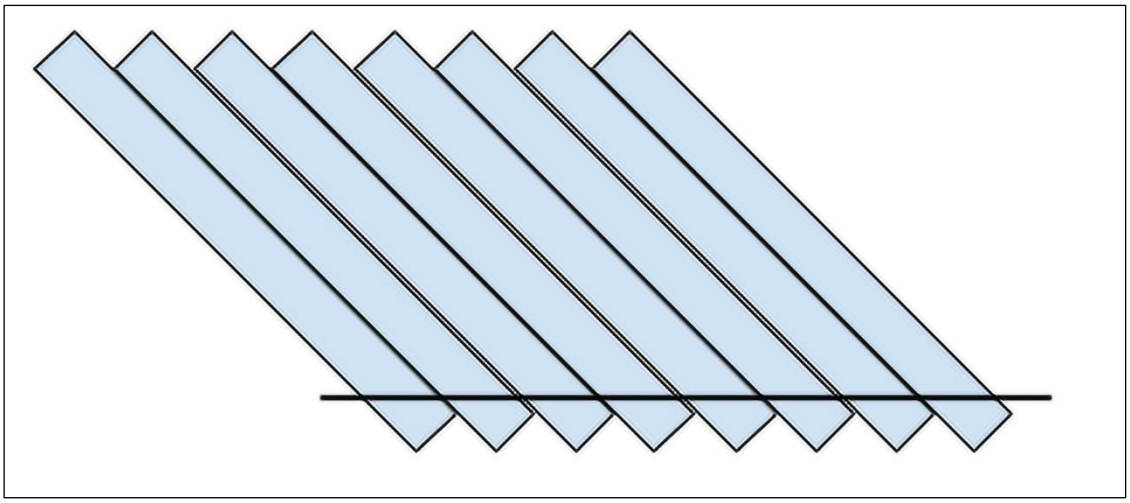


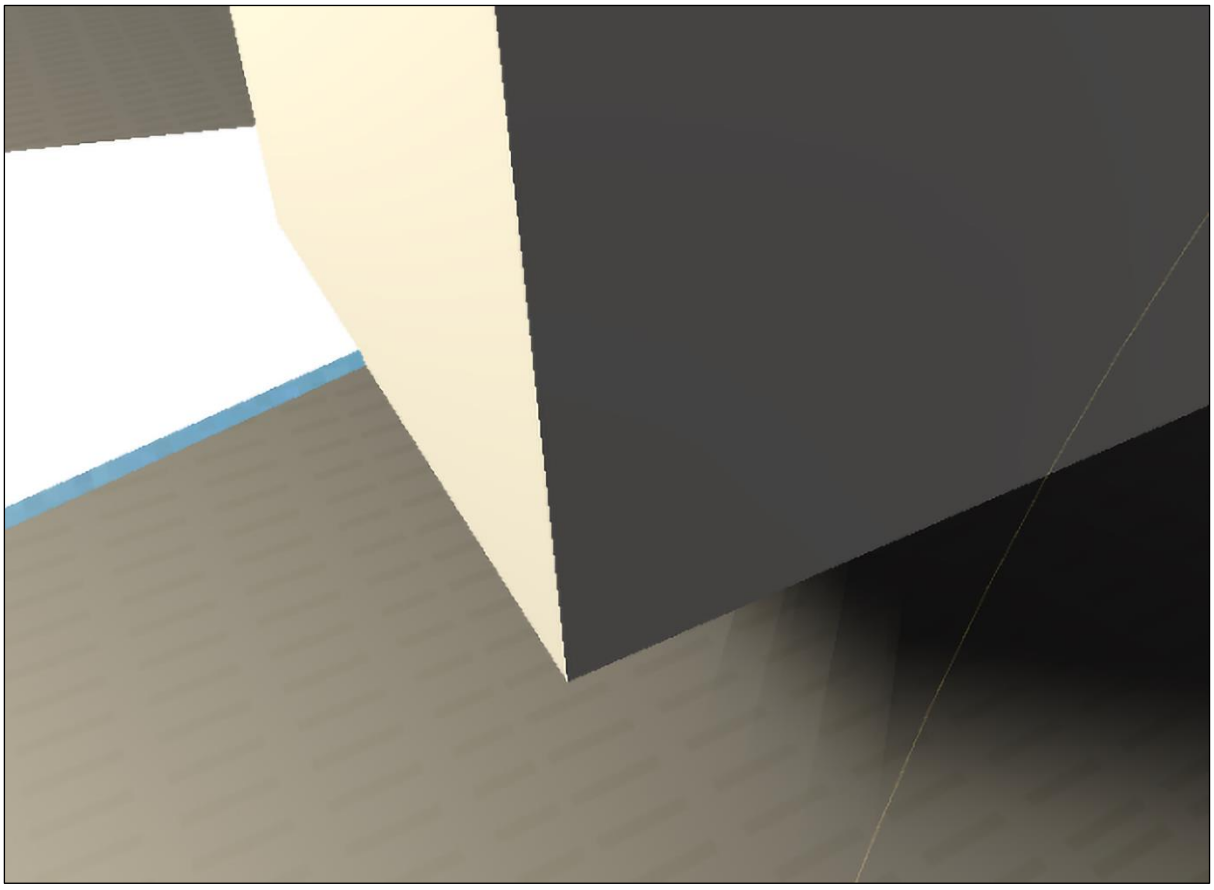


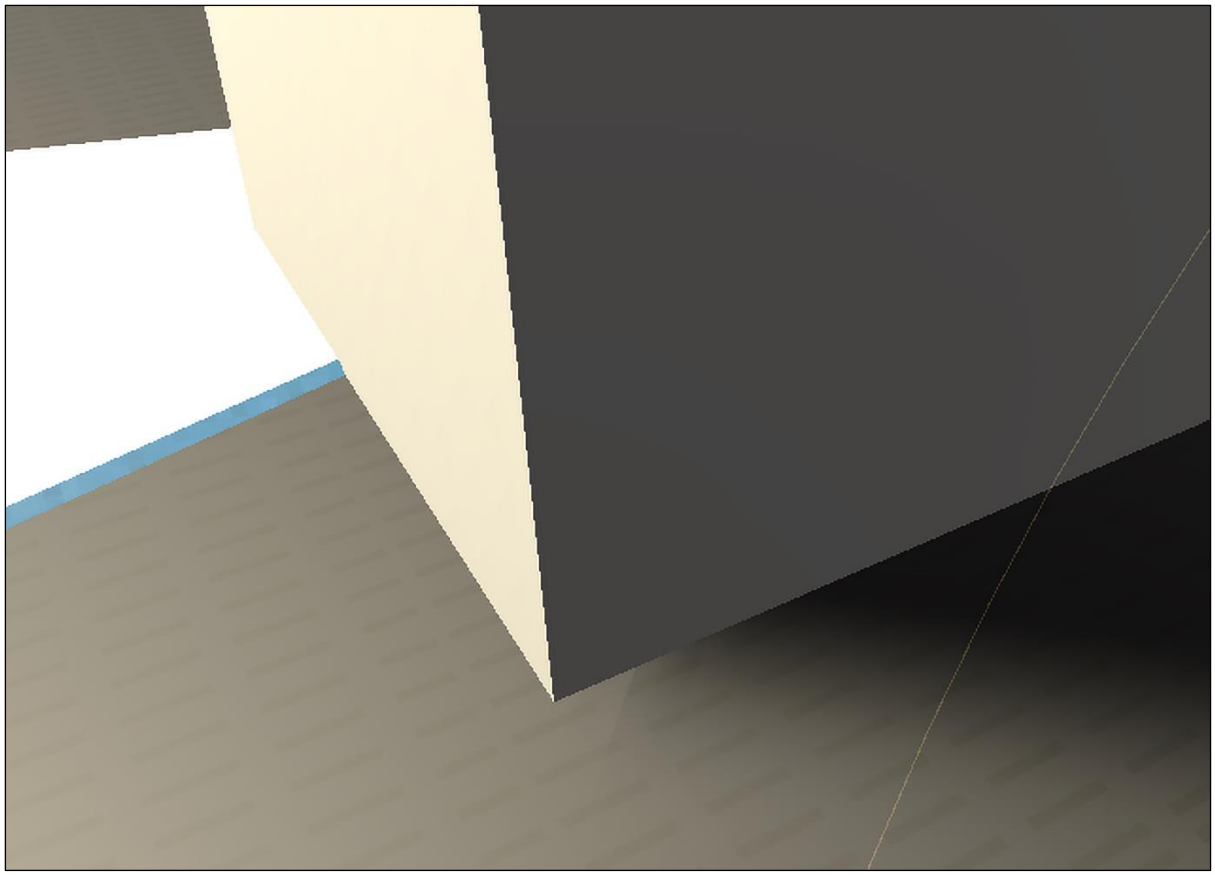




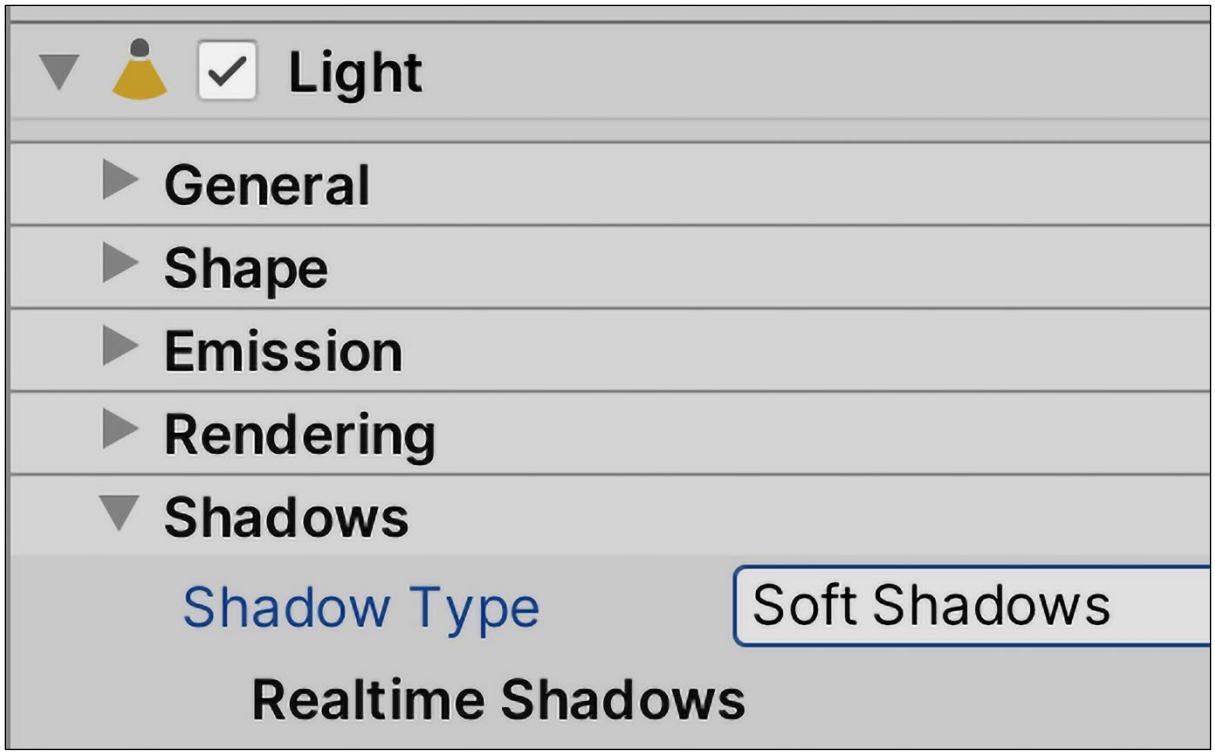




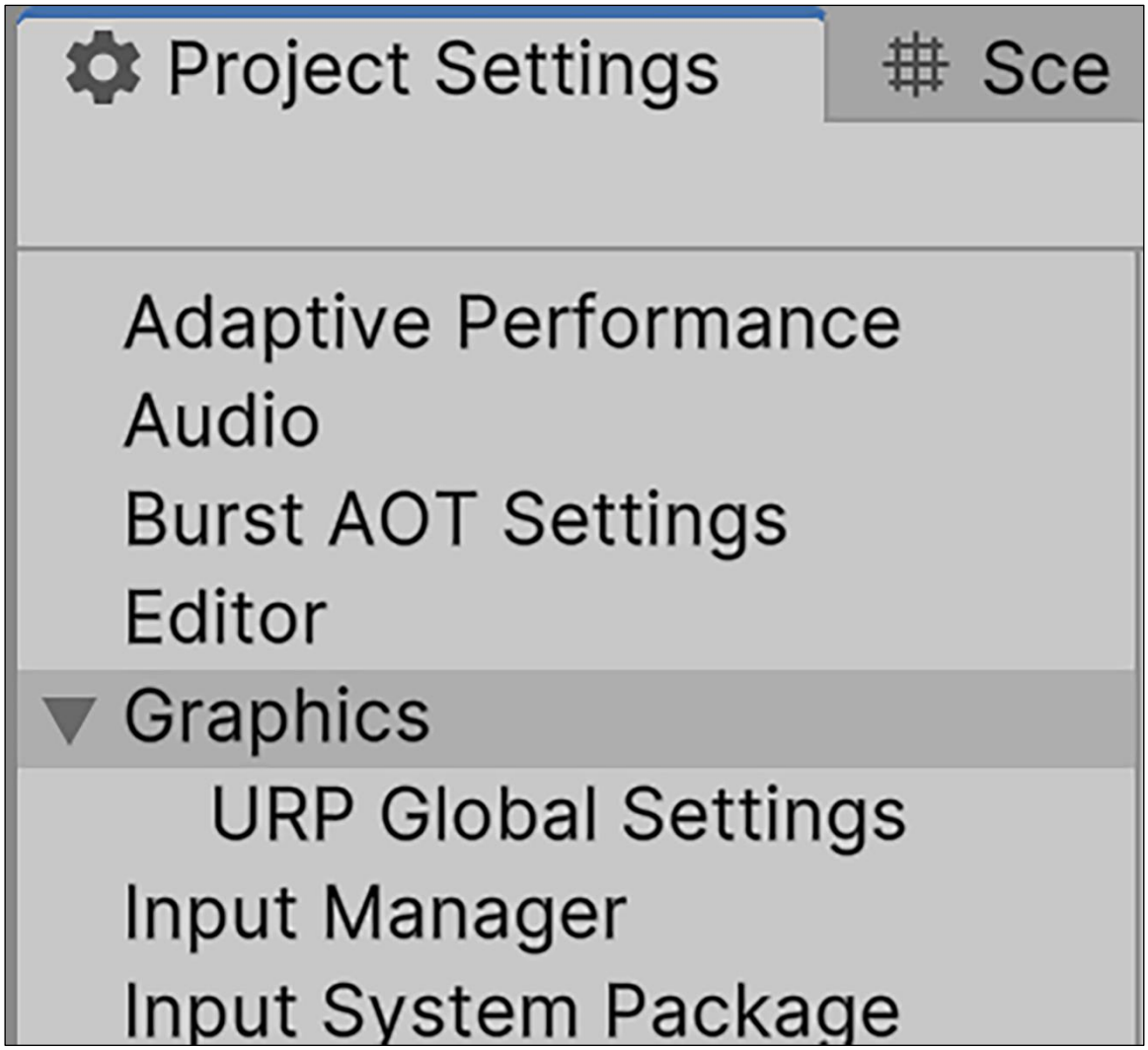


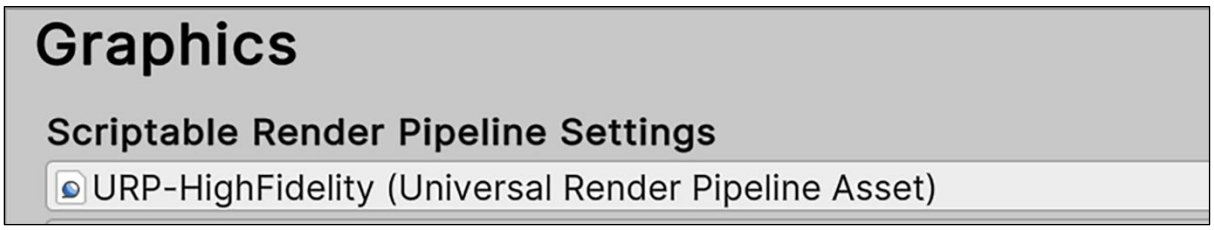


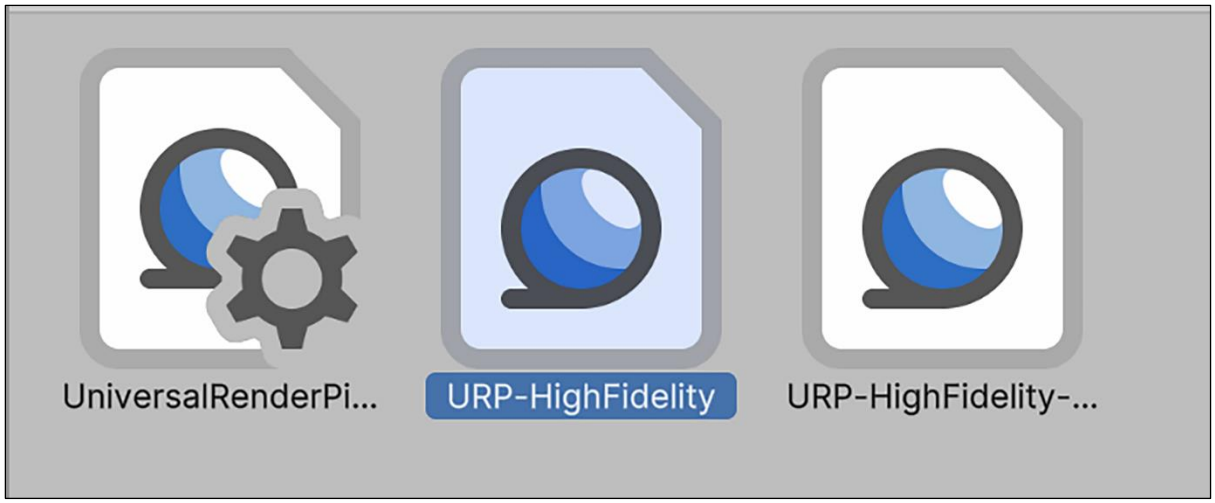

GameObject
Spot Light
Spot Light (1)

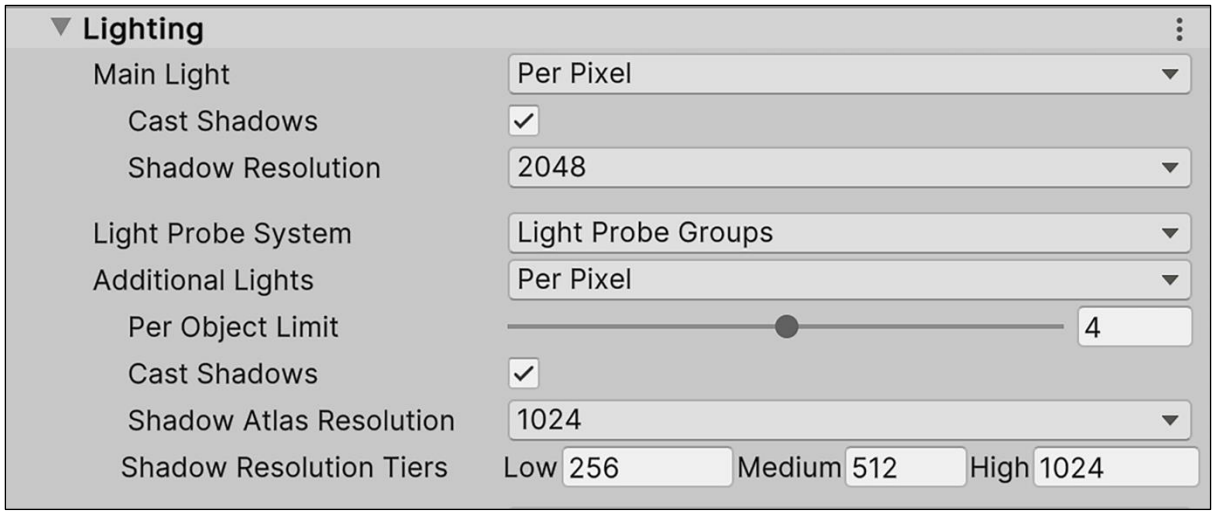

Light
General
Shape
Emission
Rendering
Shadows
Shadow Type
Soft Shadows
Realtime Shadows

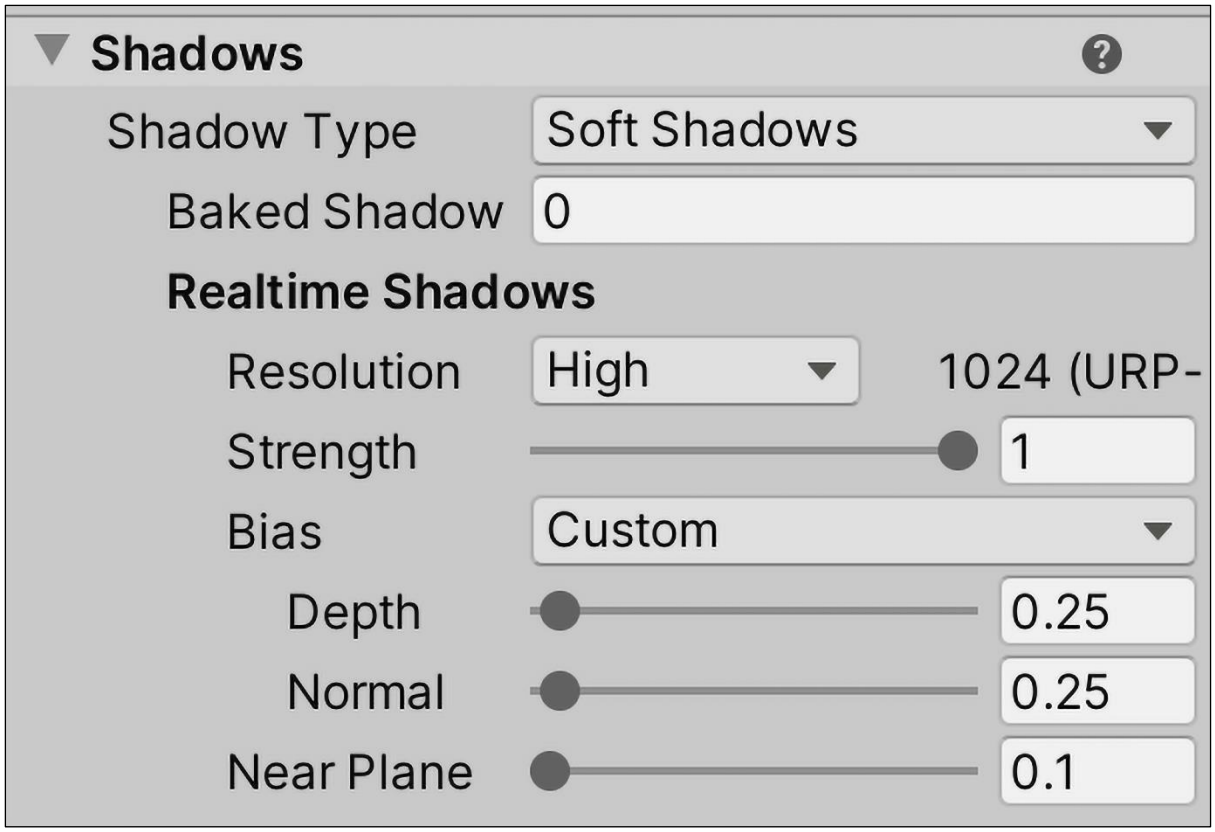

Rendering
Render Mode
Auto
Culling Mask
Mixed...
Shadows
Shadow Type
No Shadows

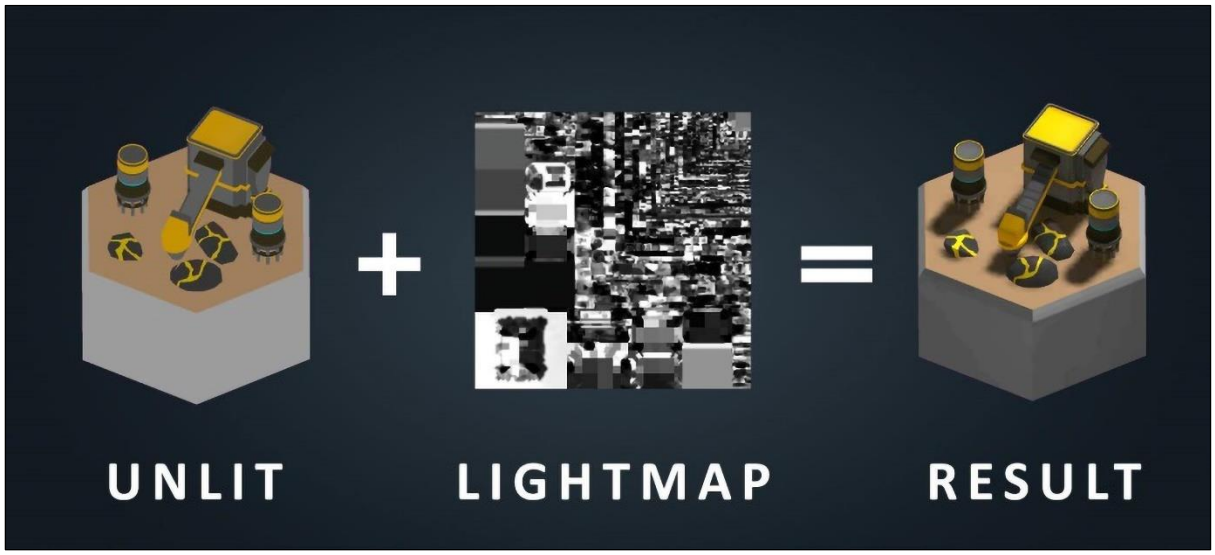

Project Settings
Sce
Adaptive Performance
Audio
Burst AOT Settings
Editor
Graphics
URP Global Settings
Input Manager
Input System Package

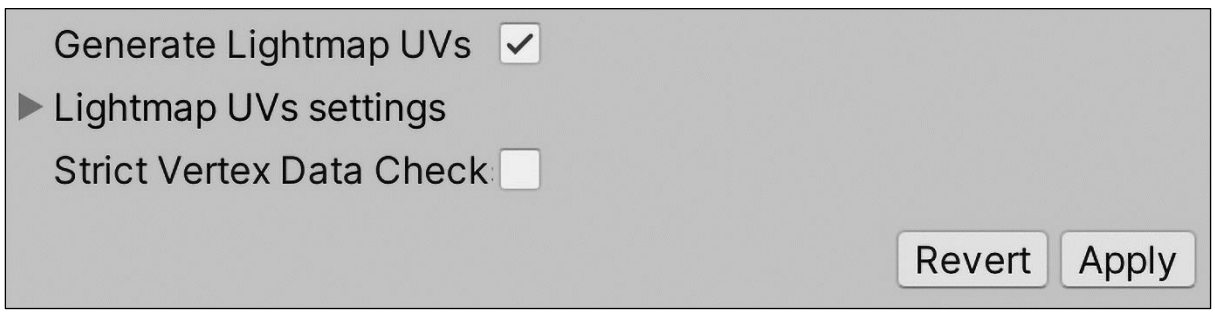

Graphics
Scriptable Render Pipeline Settings
URP-HighFidelity (Universal Render Pipeline Asset)

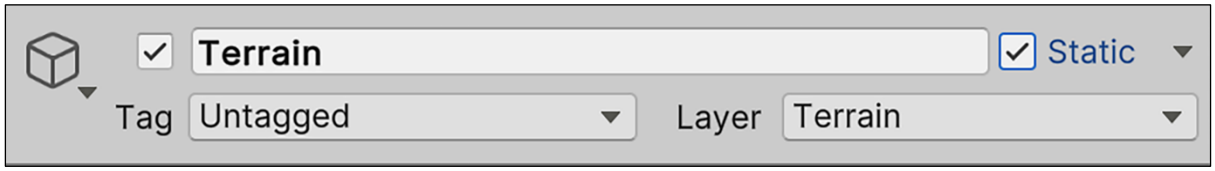

UniversalRenderPi...
URP-HighFidelity
URP-HighFidelity-...

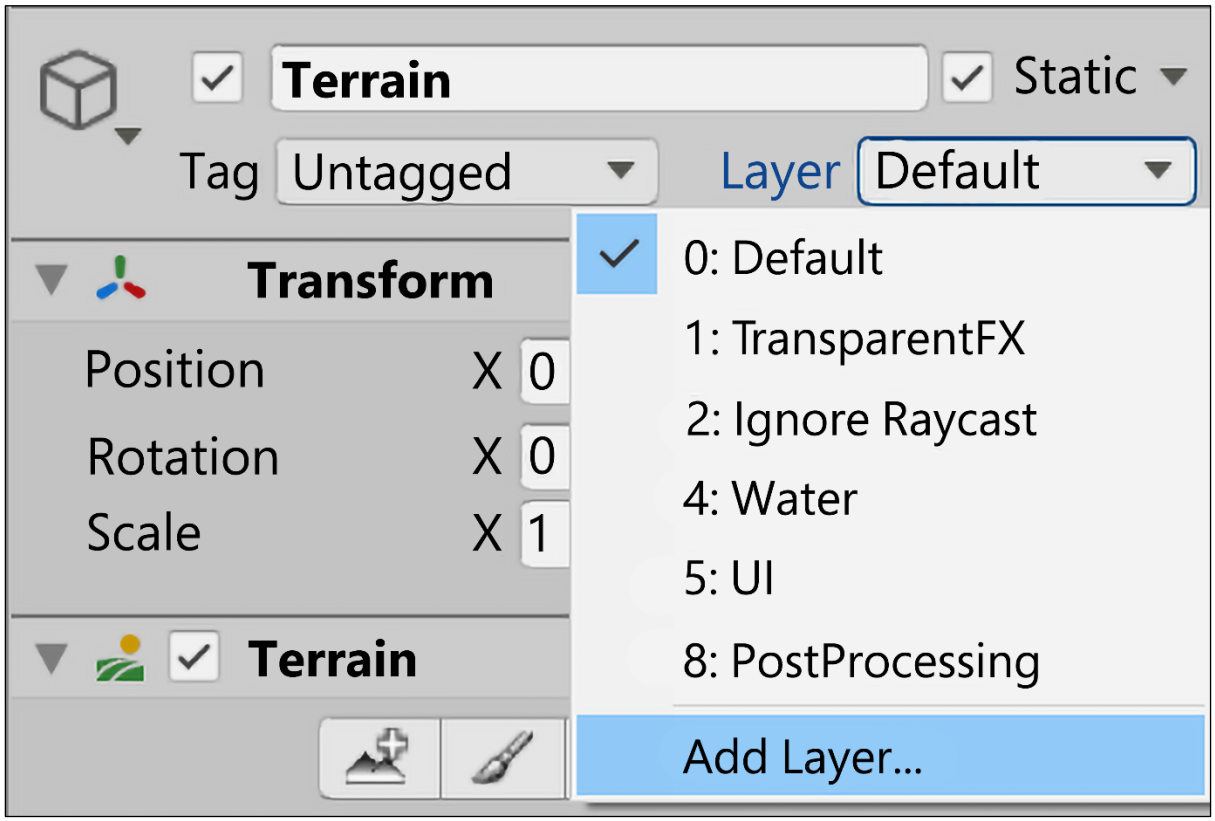

Lighting
Main Light
Per Pixel
Cast Shadows
Shadow Resolution
2048
Light Probe System
Light Probe Groups
Additional Lights
Per Pixel
Per Object Limit
4
Cast Shadows
Shadow Atlas Resolution
1024
Shadow Resolution Tiers
Low 256
Medium 512
High 1024

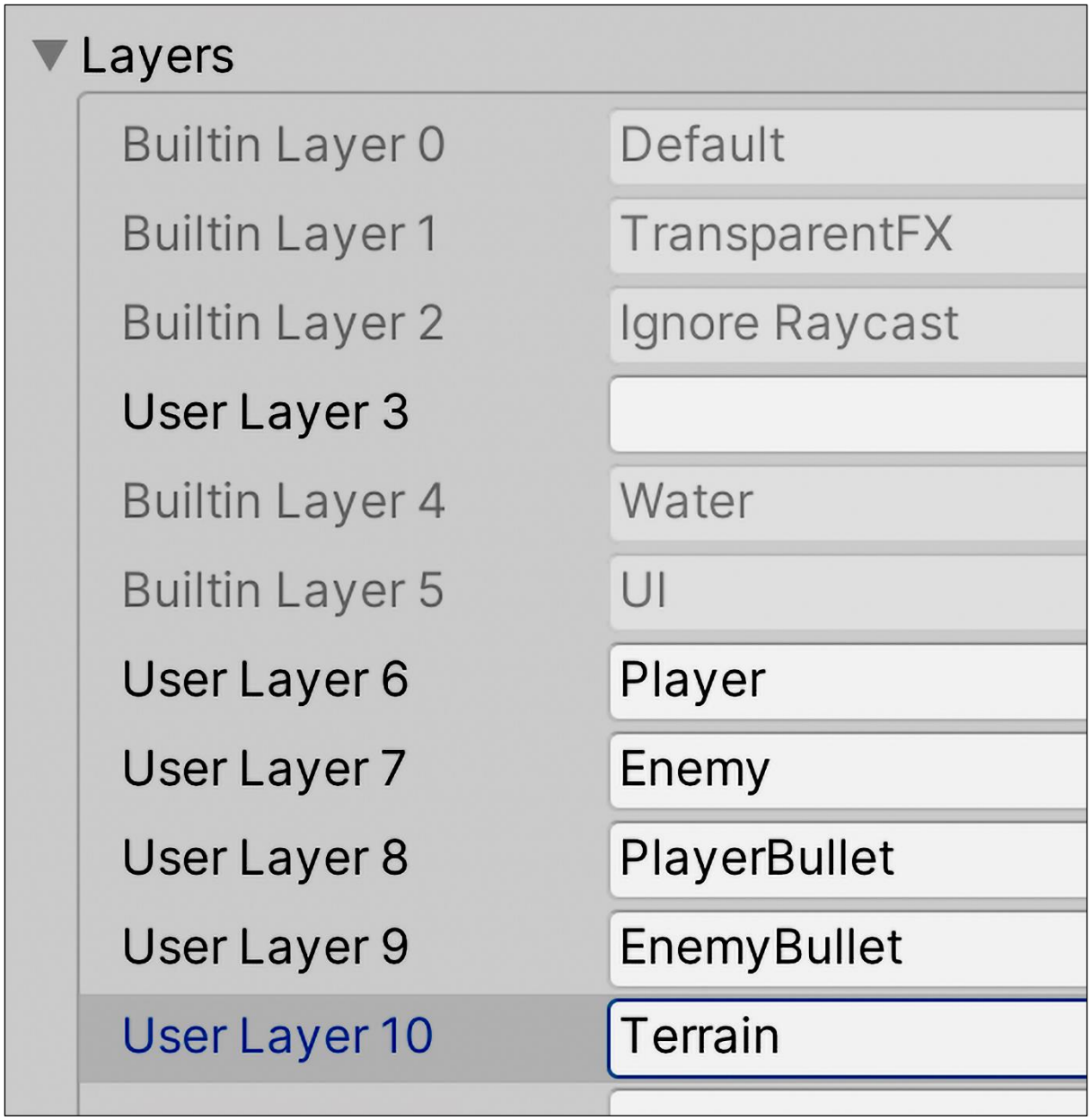

Shadows
Shadow Type
Soft Shadows
Baked Shadow
0
Realtime Shadows
Resolution
High
1024 (URP-
Strength
1
Bias
Custom
Depth
0.25
Normal
0.25
Near Plane
0.1

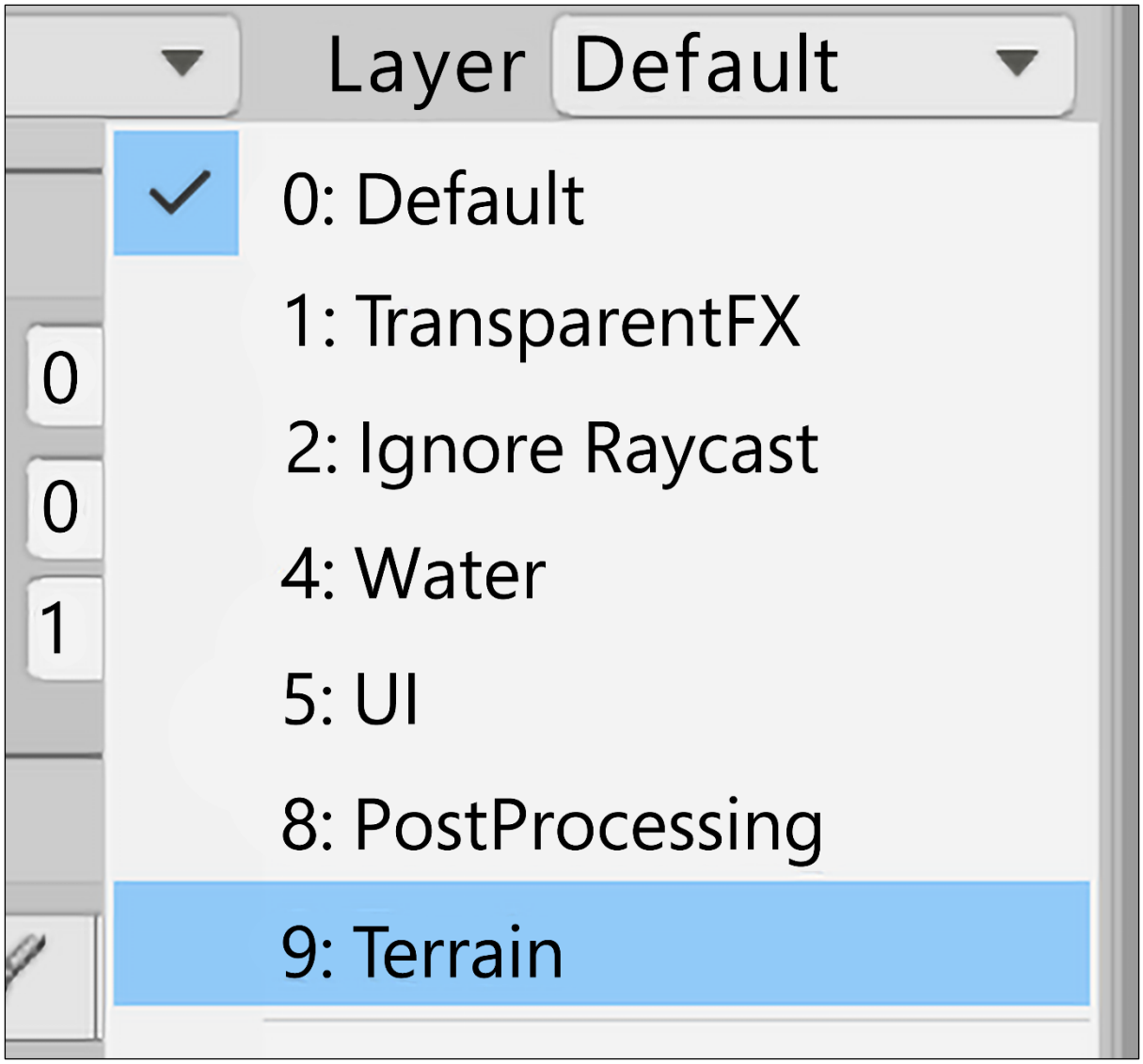

UNLIT
LIGHTMAP
RESULT

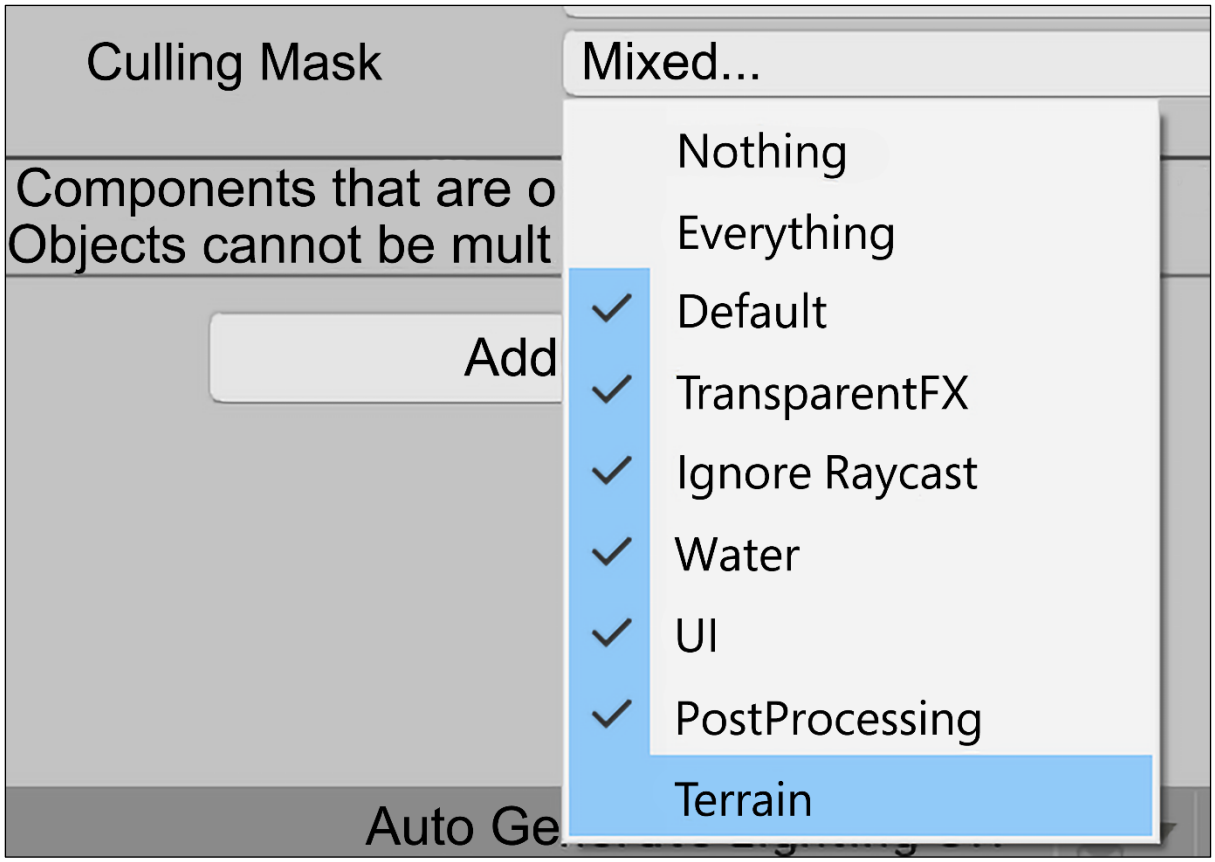

Generate Lightmap UVs
Lightmap UVs settings
Strict Vertex Data Check
Revert
Apply

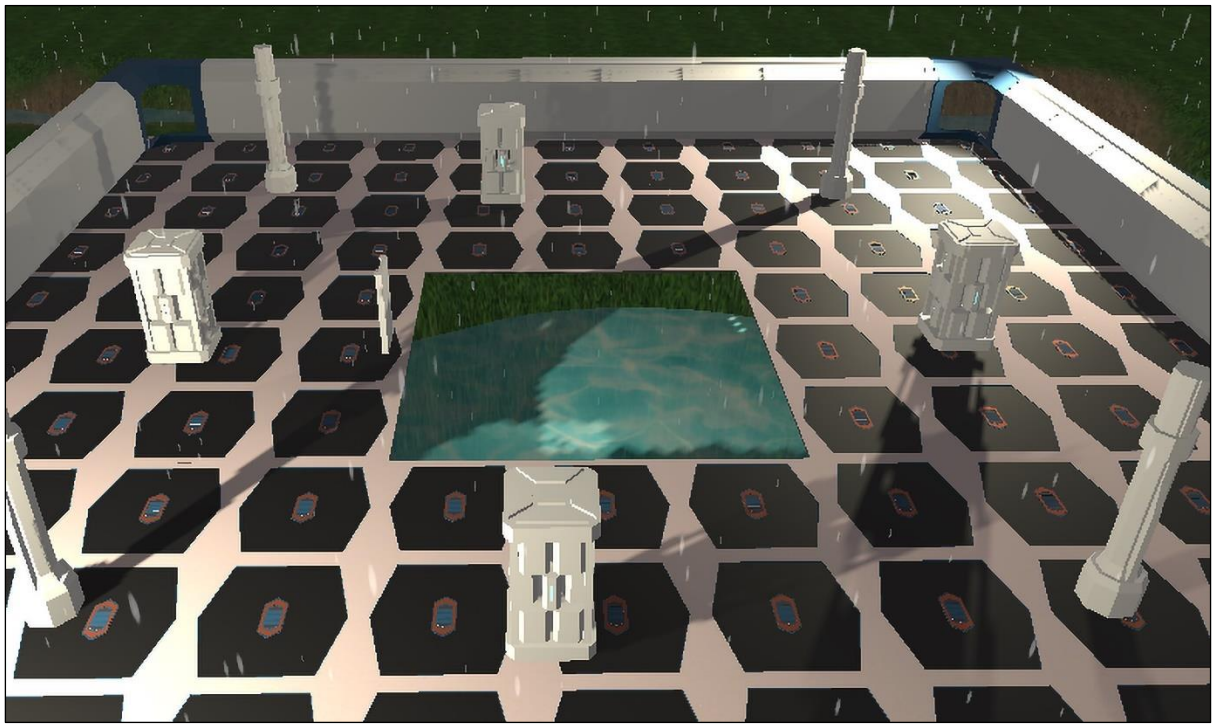

Terrain
Static
Tag
Untagged
Layer
Terrain

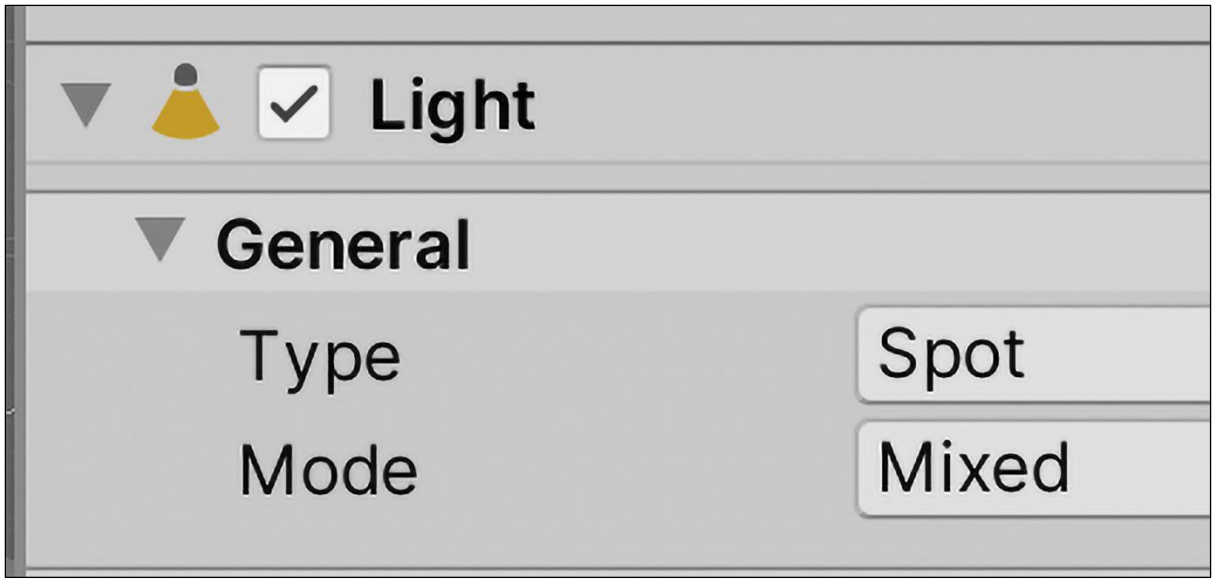

Terrain
Static
Tag
Untagged
Layer
Default
Transform
Position
X 0
Rotation
X 0
Scale
X 1
Terrain
0: Default
1: TransparentFX
2: Ignore Raycast
4: Water
5: UI
8: PostProcessing
Add Layer...

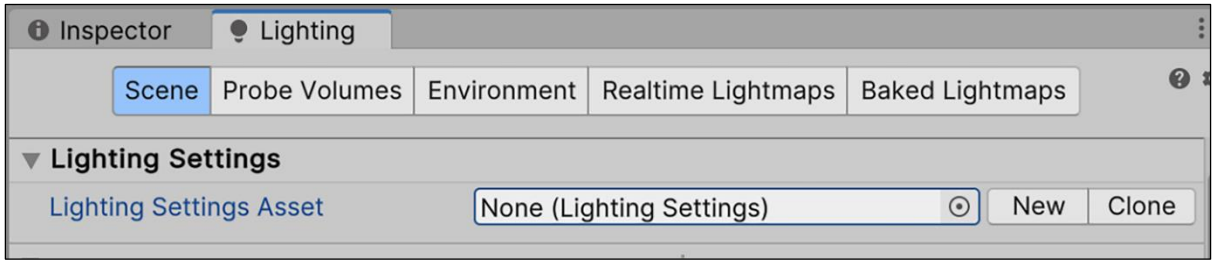

Layers
Builtin Layer 0
Default
Builtin Layer 1
TransparentFX
Builtin Layer 2
Ignore Raycast
User Layer 3
Builtin Layer 4
Water
Builtin Layer 5
UI
User Layer 6
Player
User Layer 7
Enemy
User Layer 8
PlayerBullet
User Layer 9
EnemyBullet
User Layer 10
Terrain

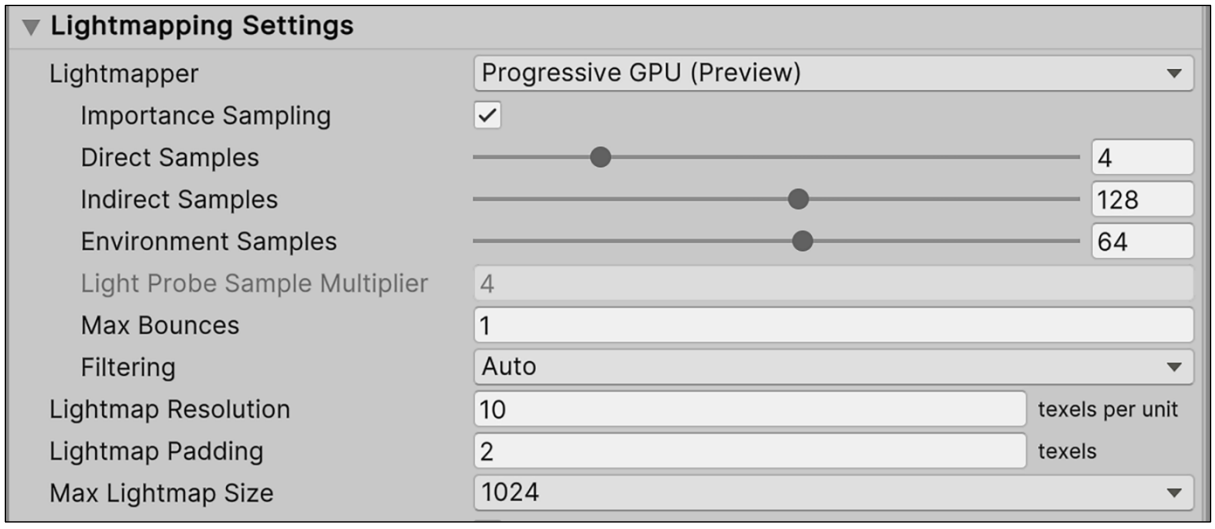

Layer
Default
0: Default
1: TransparentFX
2: Ignore Raycast
4: Water
5: UI
8: PostProcessing
9: Terrain
0
0
1

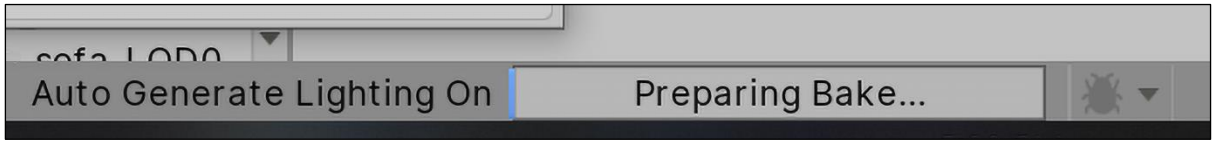

Culling Mask
Mixed...
Components that are o
Objects cannot be mult
Add
Nothing
Everything
Default
TransparentFX
Ignore Raycast
Water
UI
PostProcessing
Terrain
Auto Ge

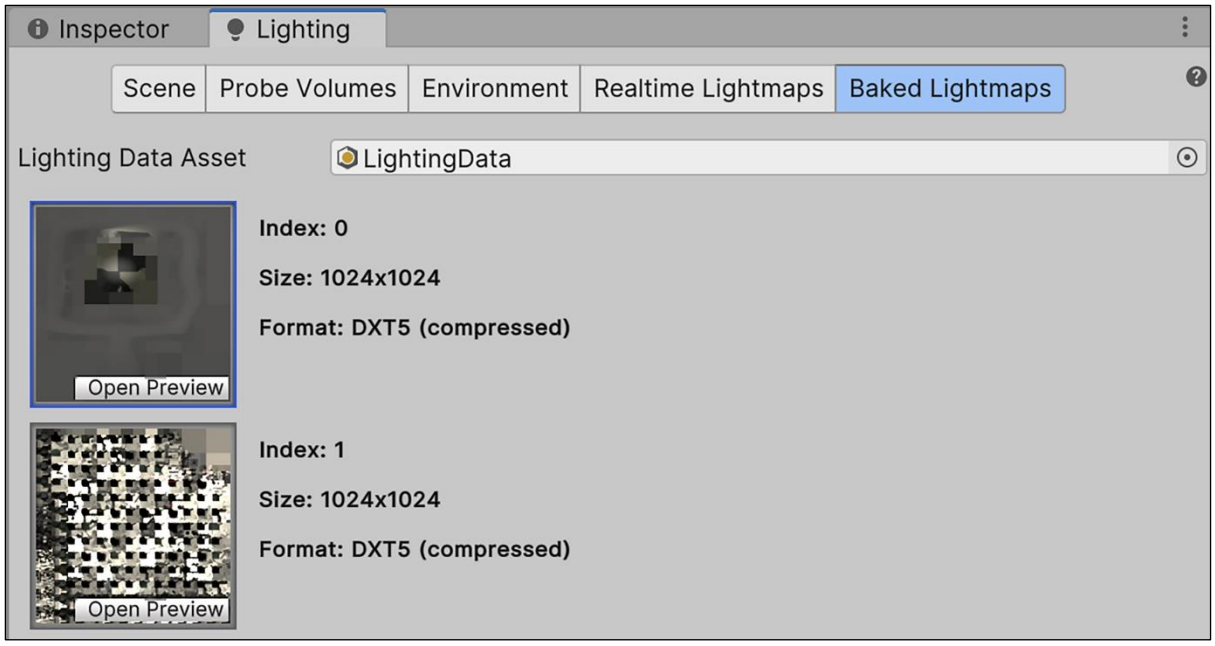


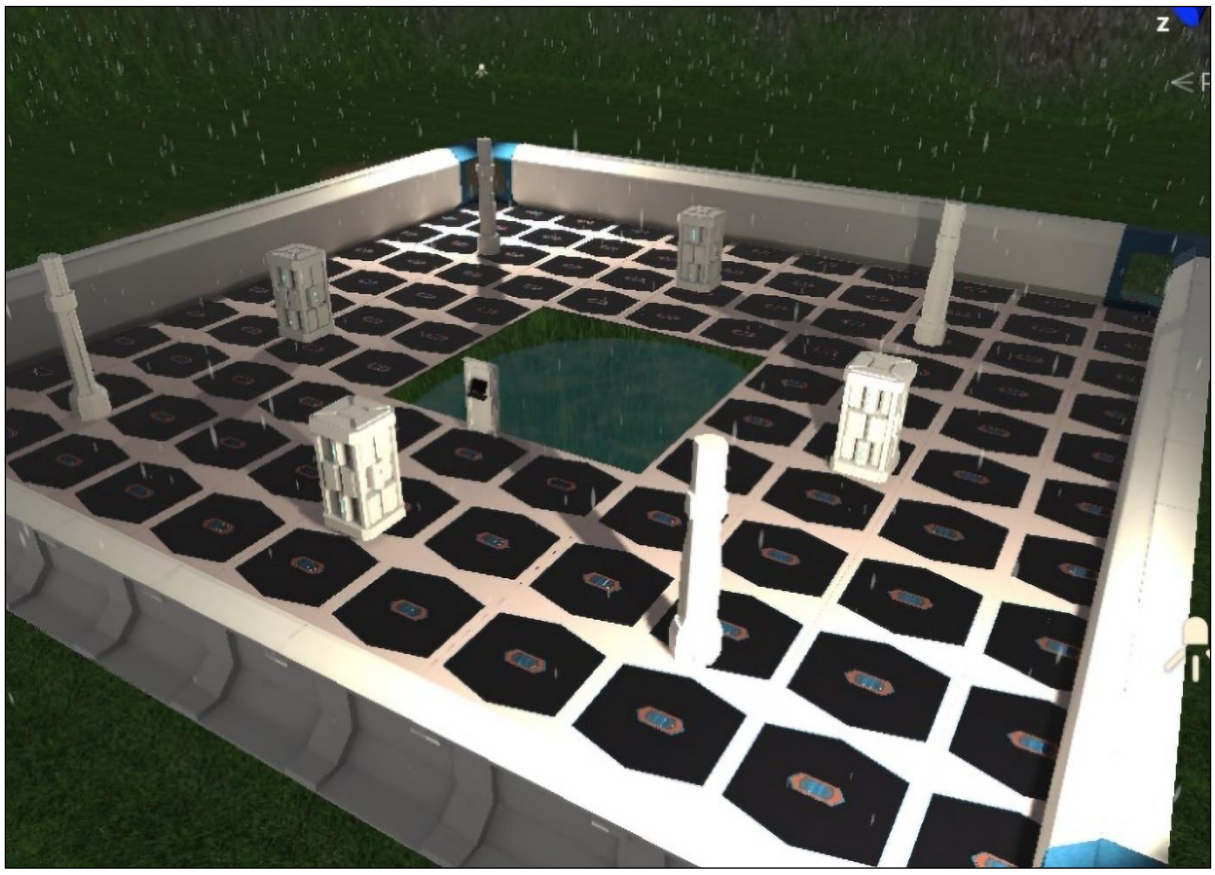

Light
General
Type
Spot
Mode
Mixed

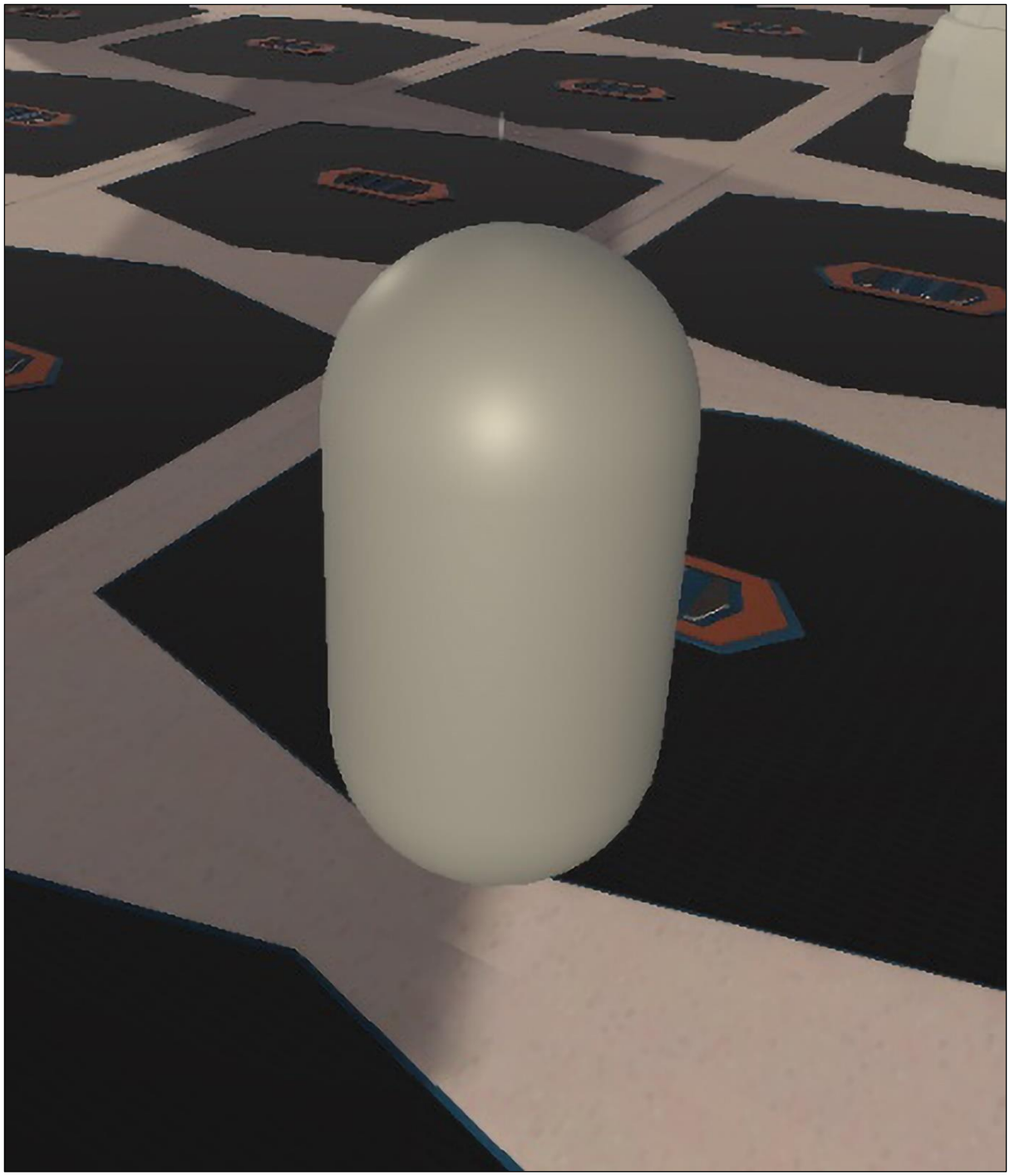

Inspector
Lighting
Scene
Probe Volumes
Environment
Realtime Lightmaps
Baked Lightmaps
Lighting Settings
Lighting Settings Asset
None (Lighting Settings)
New
Clone

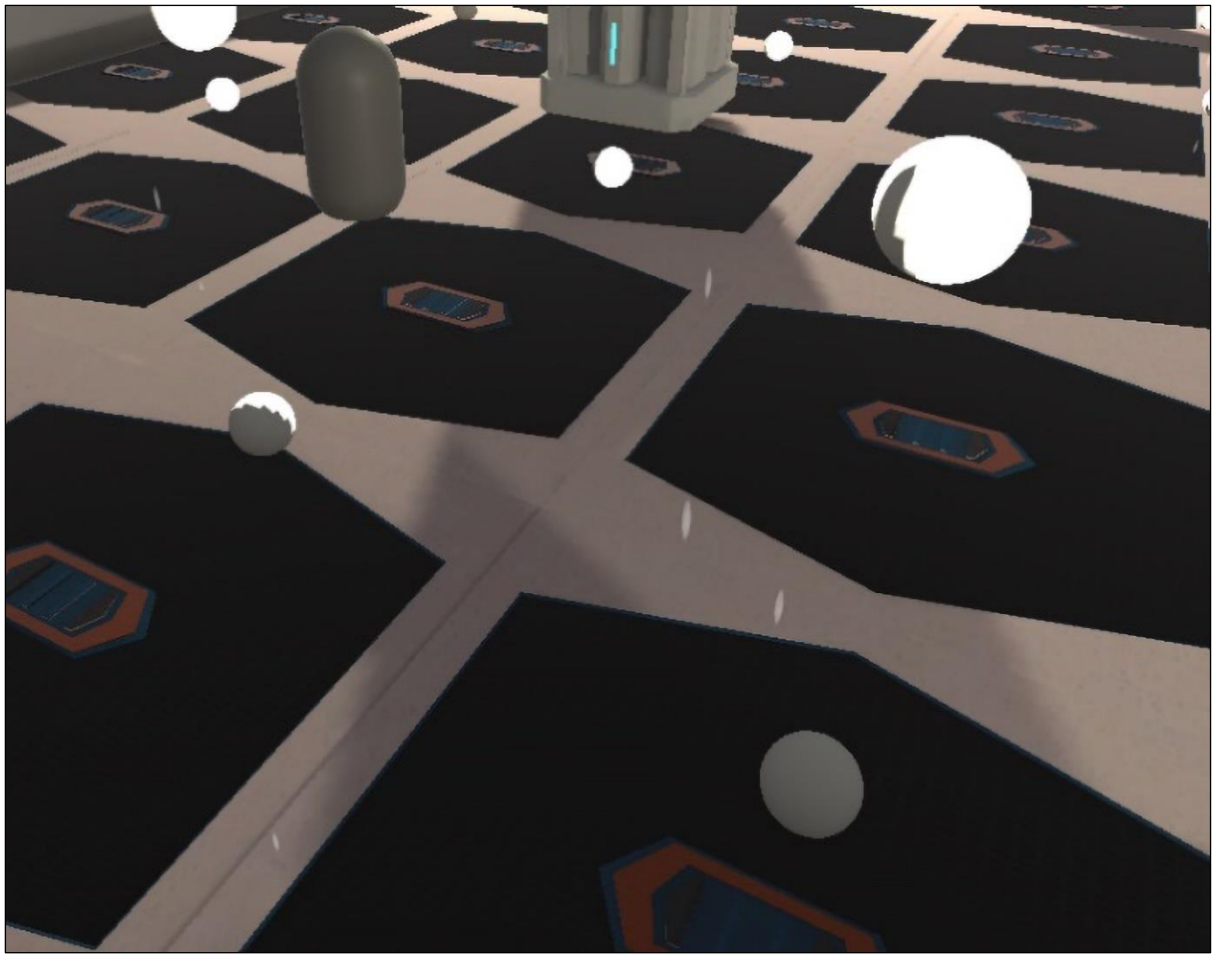

Lightmapping Settings
Lightmapper
Progressive GPU (Preview)
Importance Sampling
Direct Samples
4
Indirect Samples
128
Environment Samples
64
Light Probe Sample Multiplier
4
Max Bounces
1
Filtering
Auto
Lightmap Resolution
10
texels per unit
Lightmap Padding
2
texels
Max Lightmap Size
1024

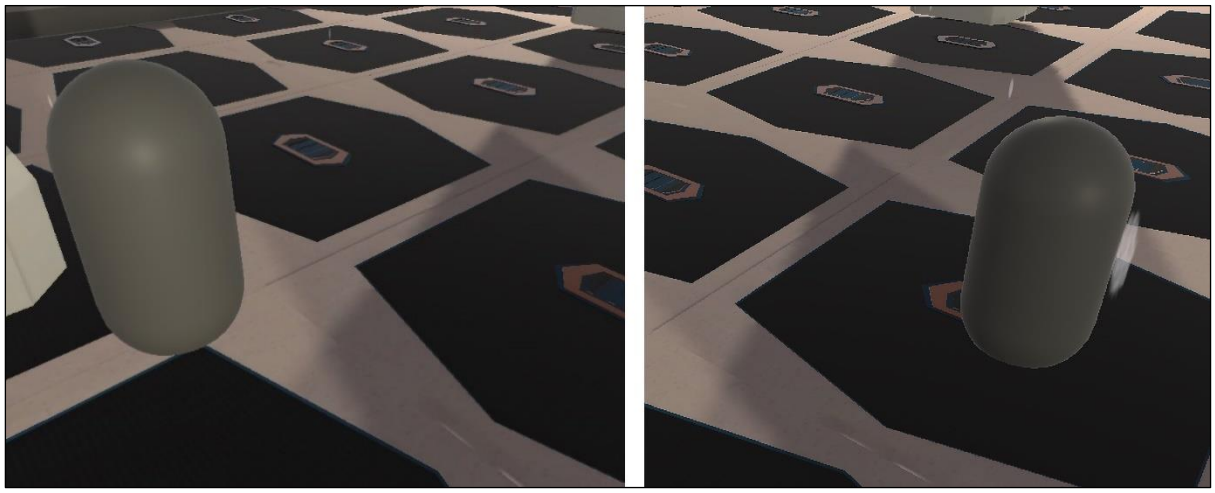

Auto Generate Lighting On
Preparing Bake...


Inspector
Lighting
Scene
Probe Volumes
Environment
Realtime Lightmaps
Baked Lightmaps
Lighting Data Asset
LightingData
Open Preview
Index: 0
Size: 1024x1024
Format: DXT5 (compressed)
Open Preview
Index: 1
Size: 1024x1024
Format: DXT5 (compressed)







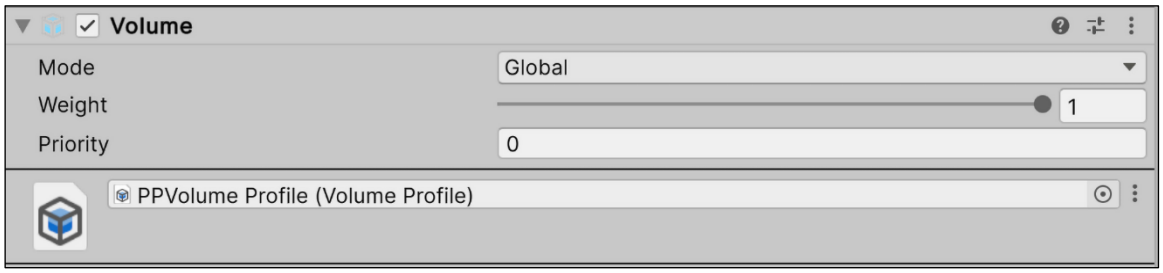


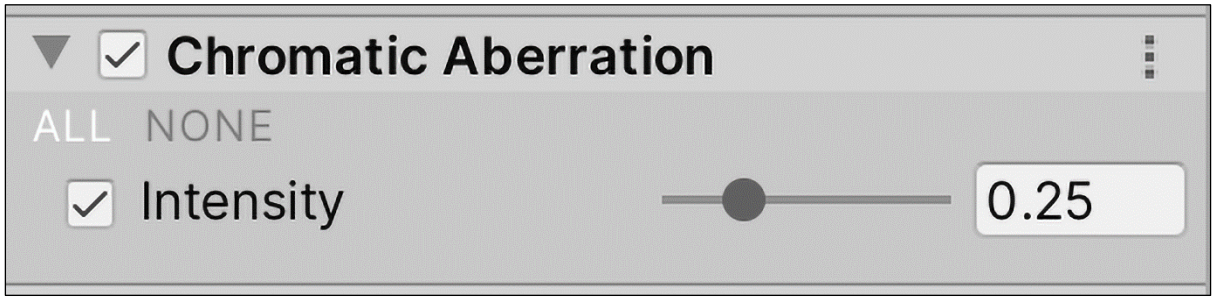


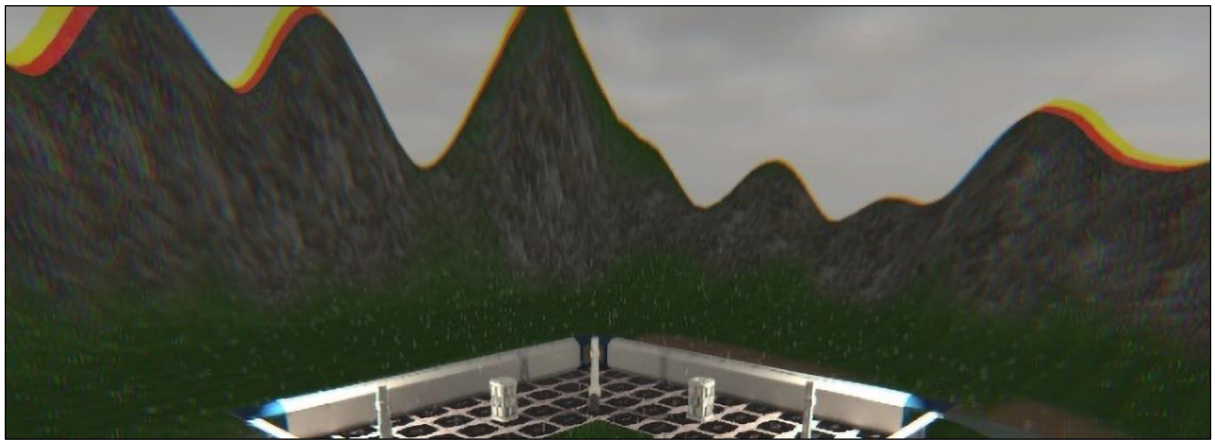

Persp
Edit Light Probes
Show Wireframe
Selected Probe Position
X 0
Y 0
Z 0
Add Probe
Select All
Delete Selected
Duplicate Selected

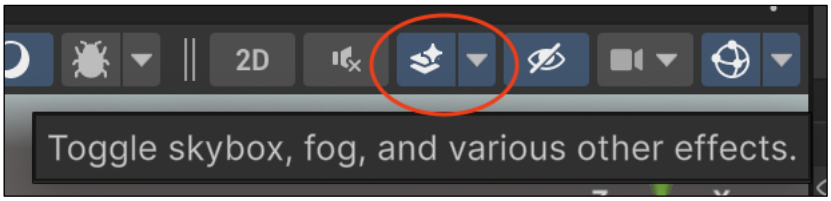
Chapter 13: Immersive Realism: Achieving Fullscreen Effects with Postprocessing

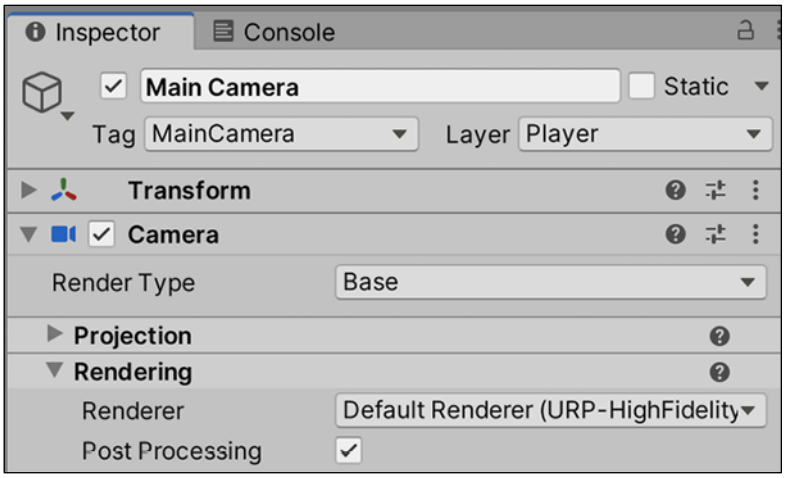






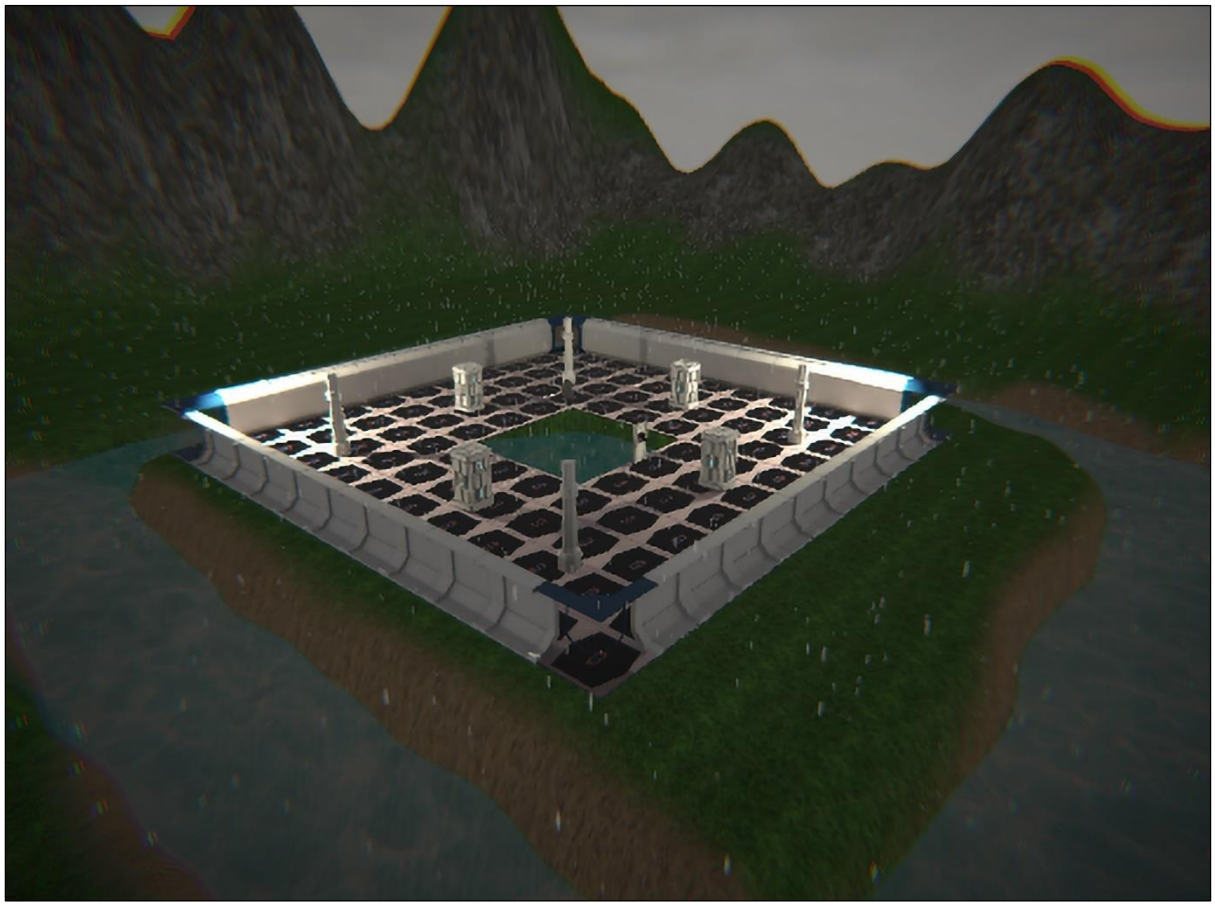


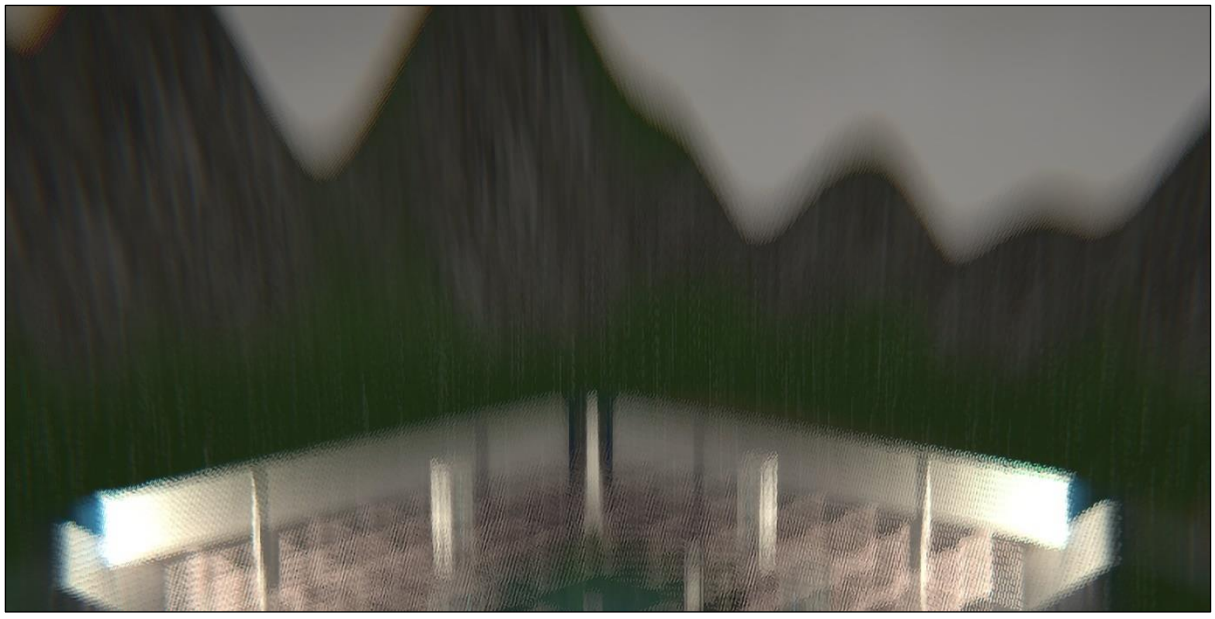

2D
Toggle skybox, fog, and various other effects.

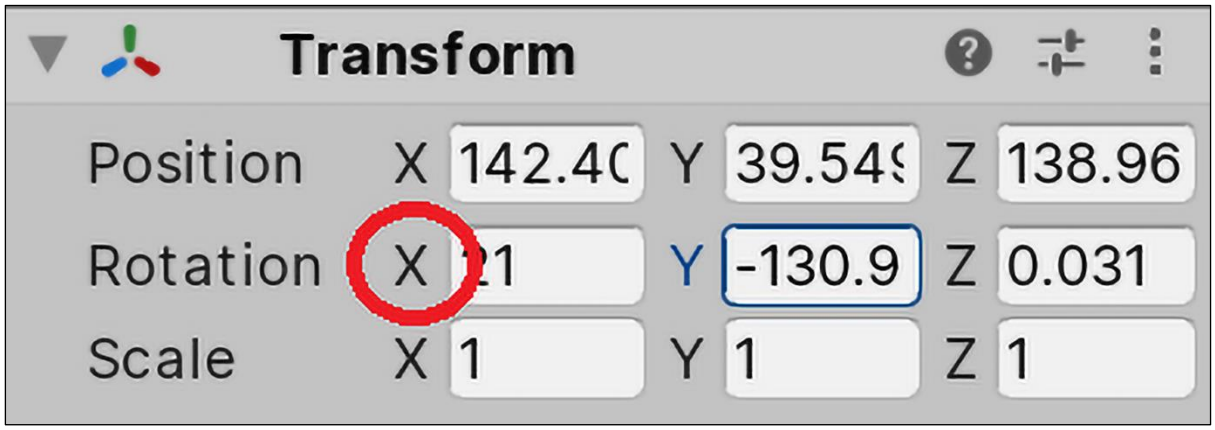

Inspector
Console
Main Camera
Static
Tag
MainCamera
Layer
Player
Transform
Camera
Render Type
Base
Projection
Rendering
Renderer
Default Renderer (URP-HighFidelity
Post Processing

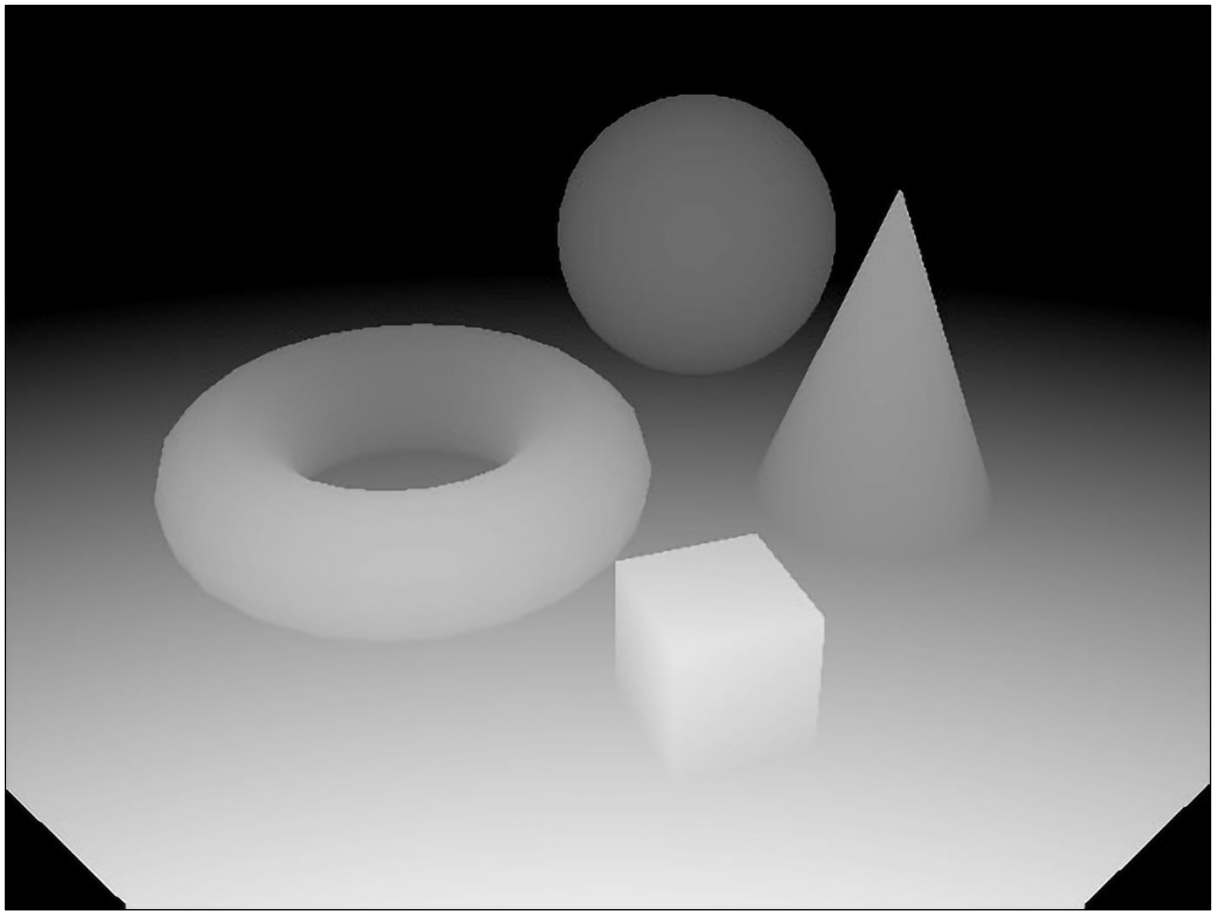




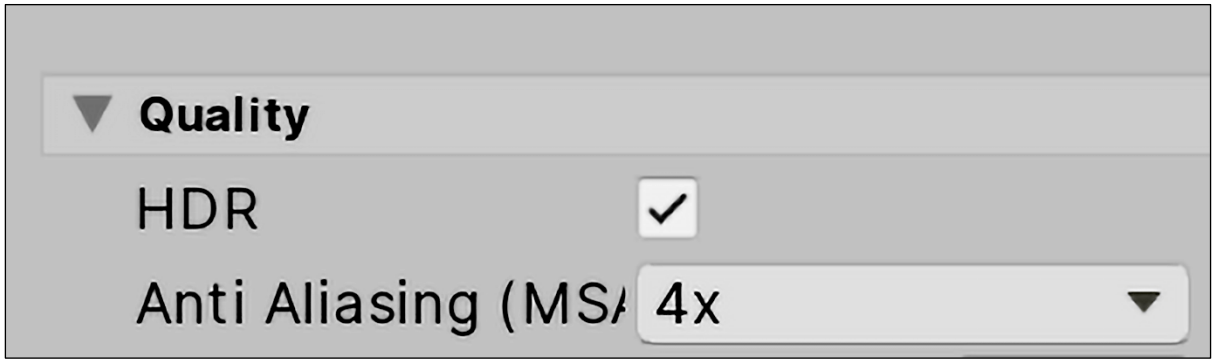


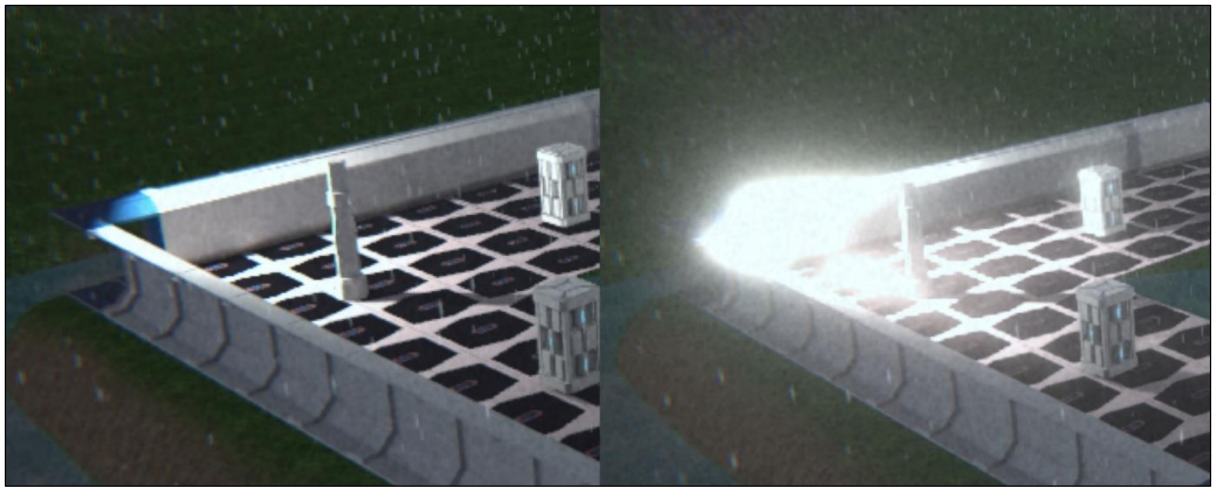


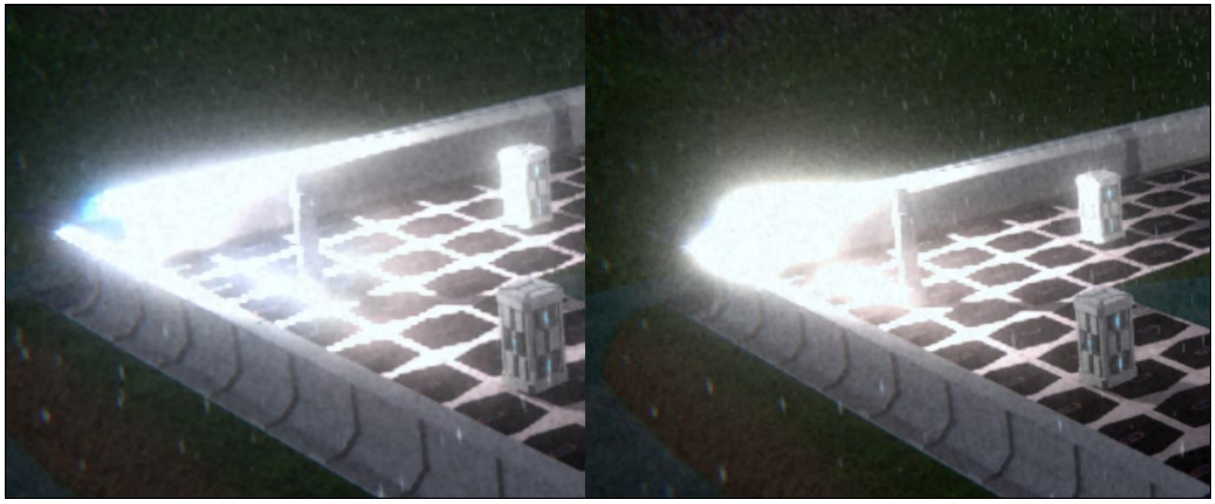

Transform
Position X 142.4(Y 39.54 Z 138.96
Rotation X 21 Y -130.9 Z 0.031
Scale X 1 Y 1 Z 1

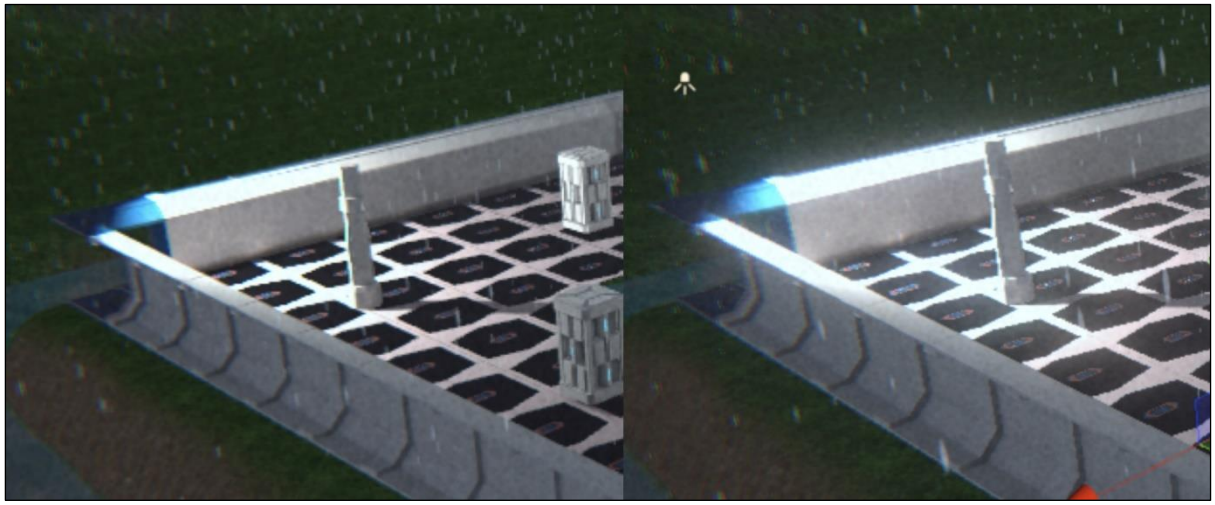


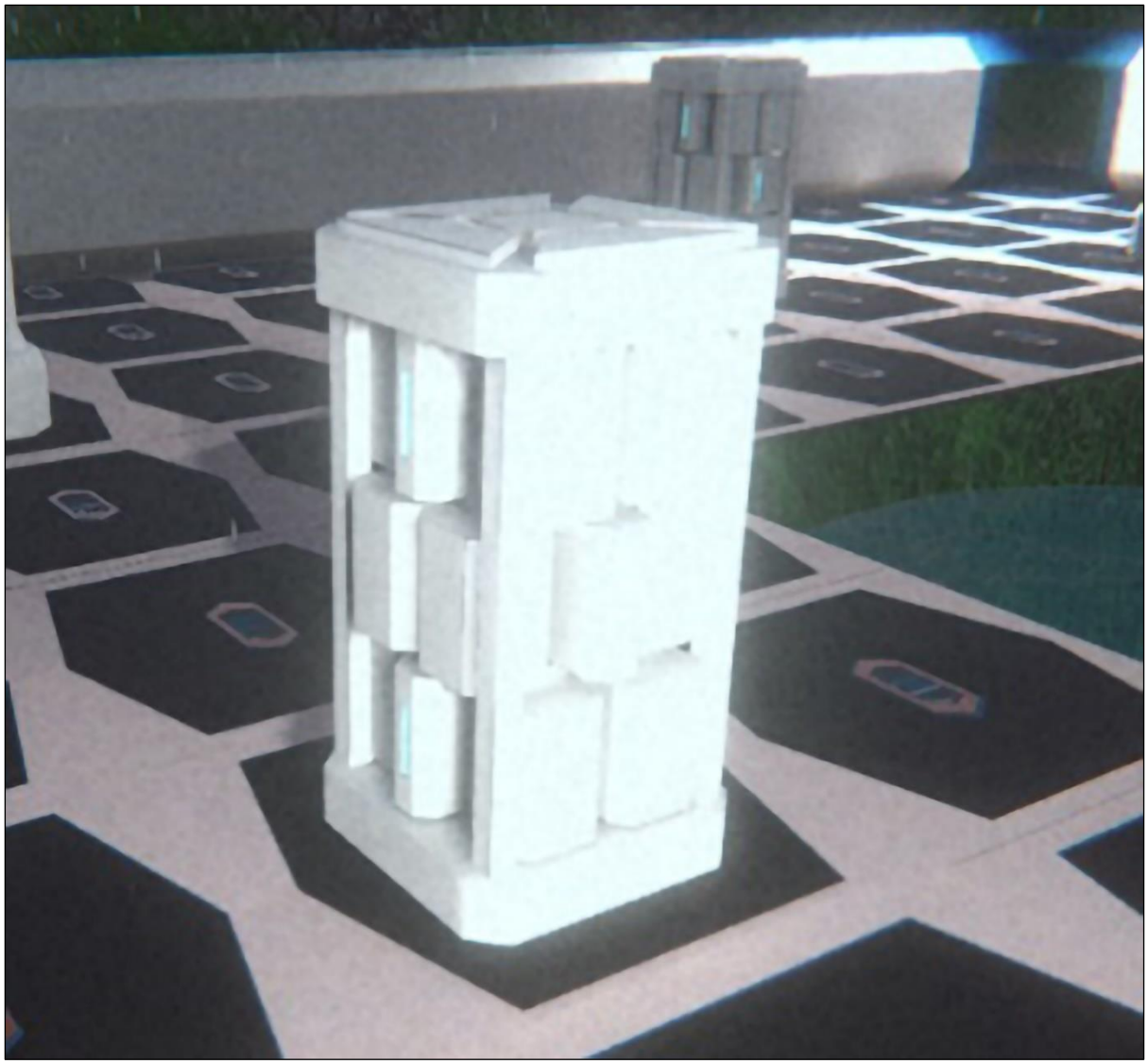


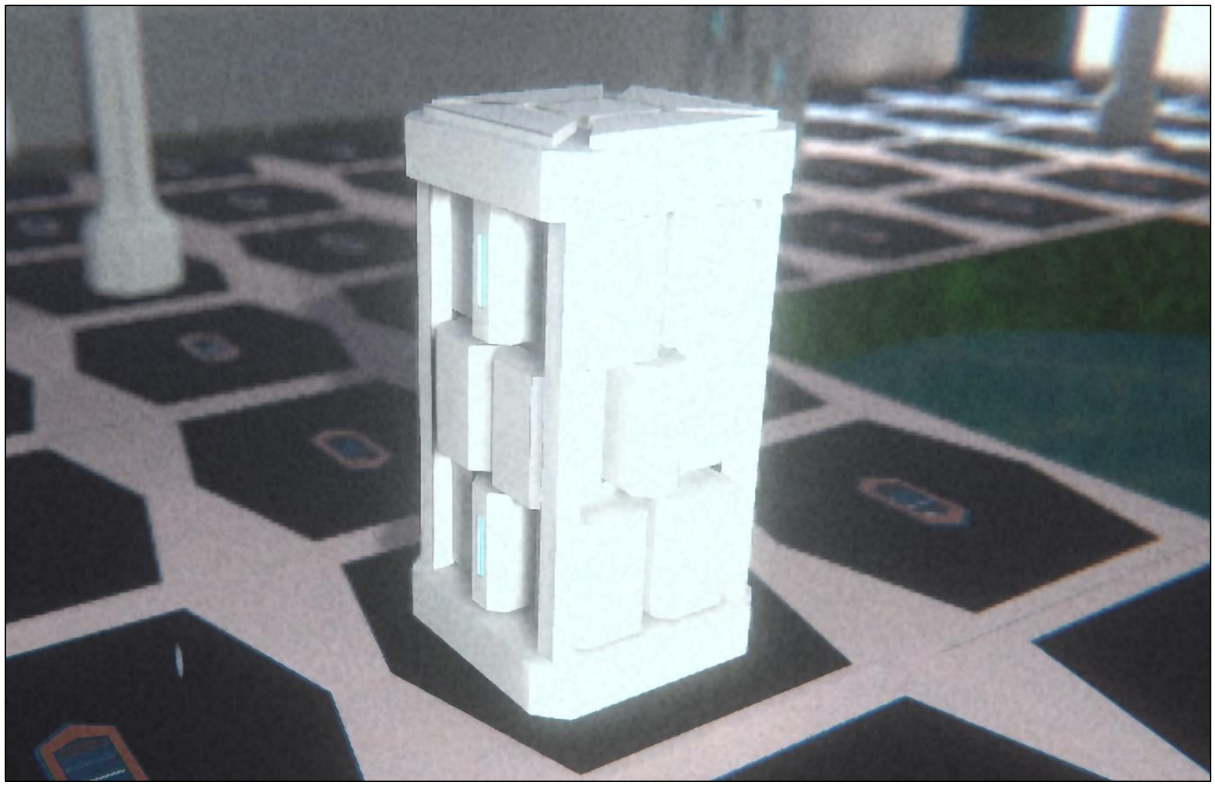

Quality
HDR
Anti Aliasing (MSA
4x

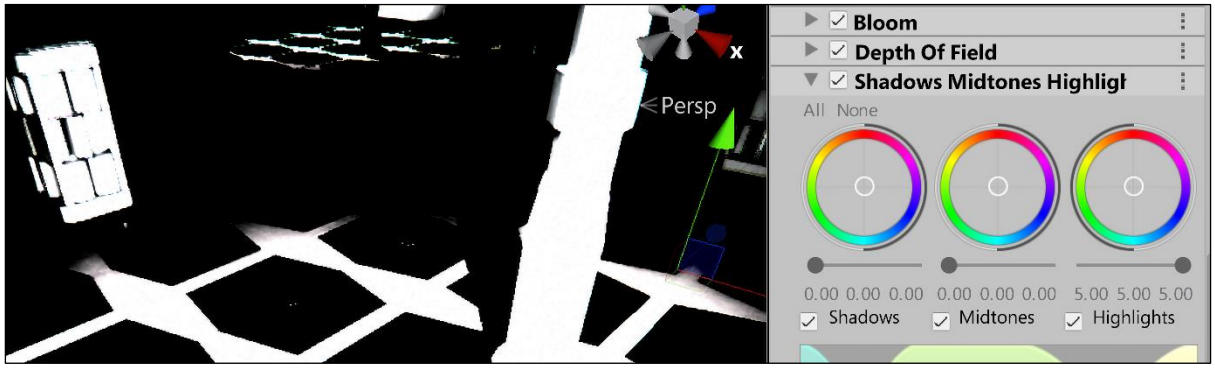


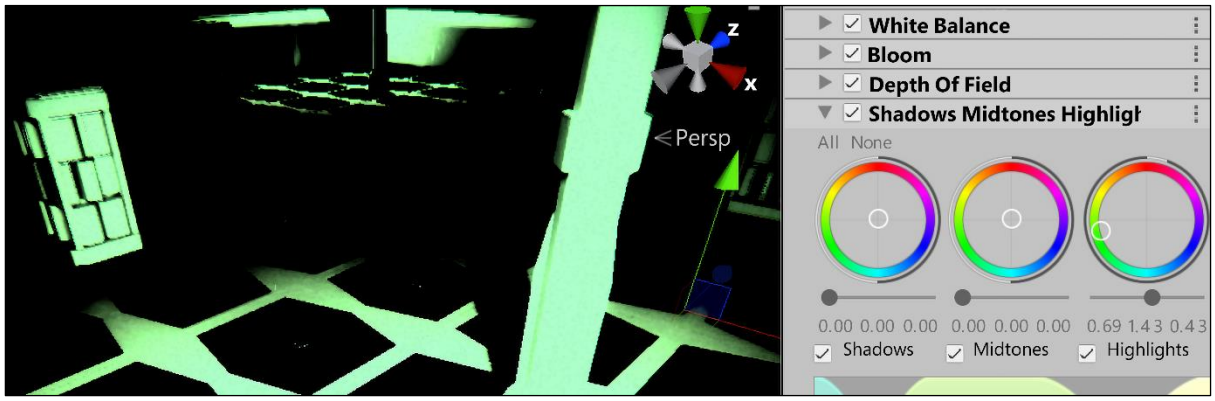


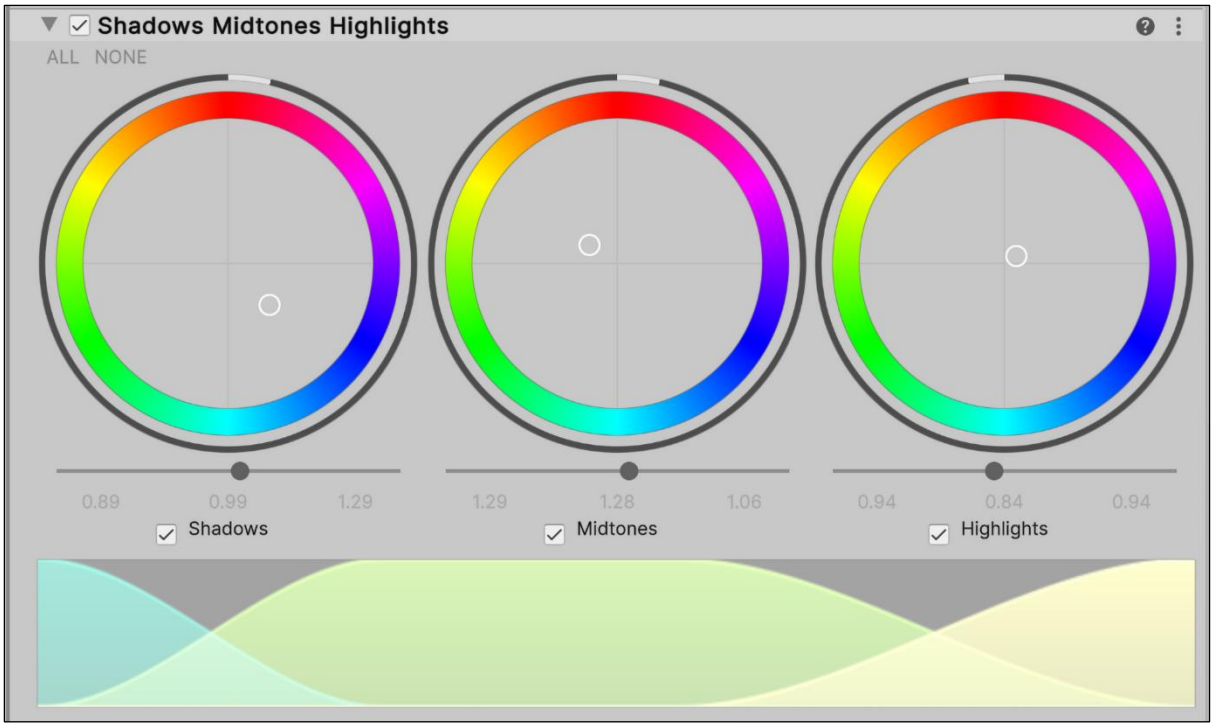


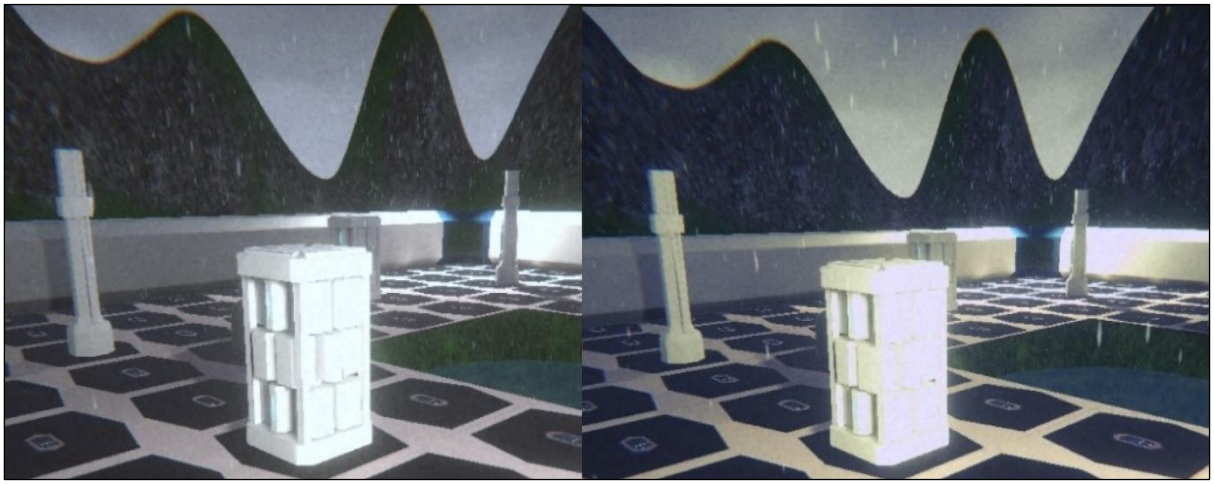




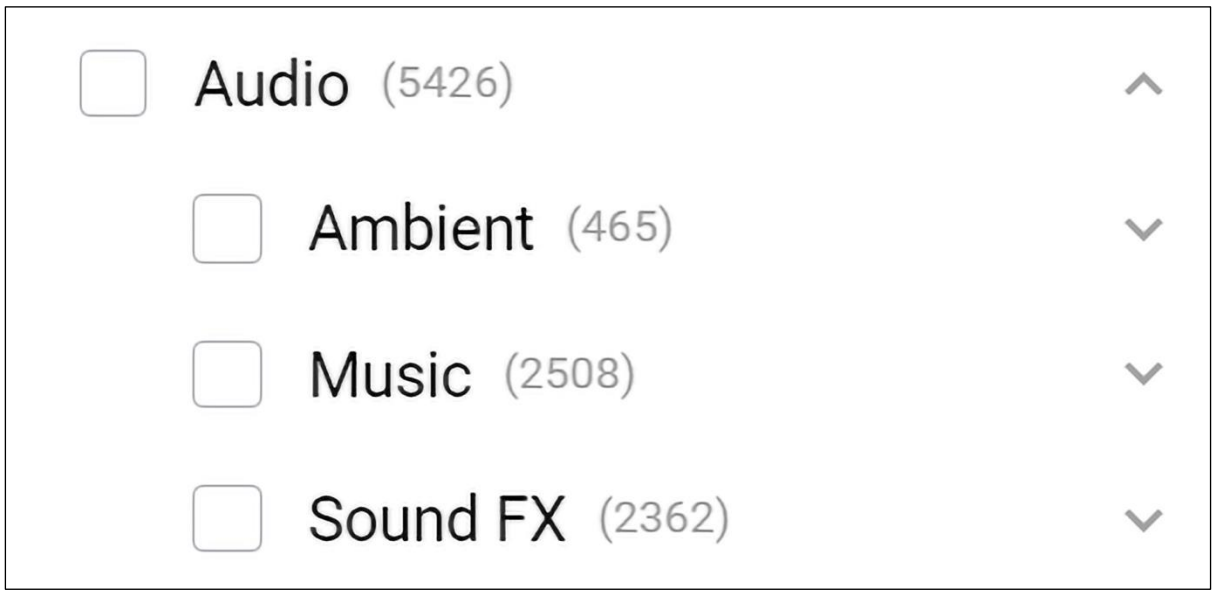

x
Persp
Bloom
Depth Of Field
Shadows Midtones Highligl
All None
0.00 0.00 0.00 0.00 0.00 0.00 5.00 5.00 5.00
Shadows
Midtones
Highlights

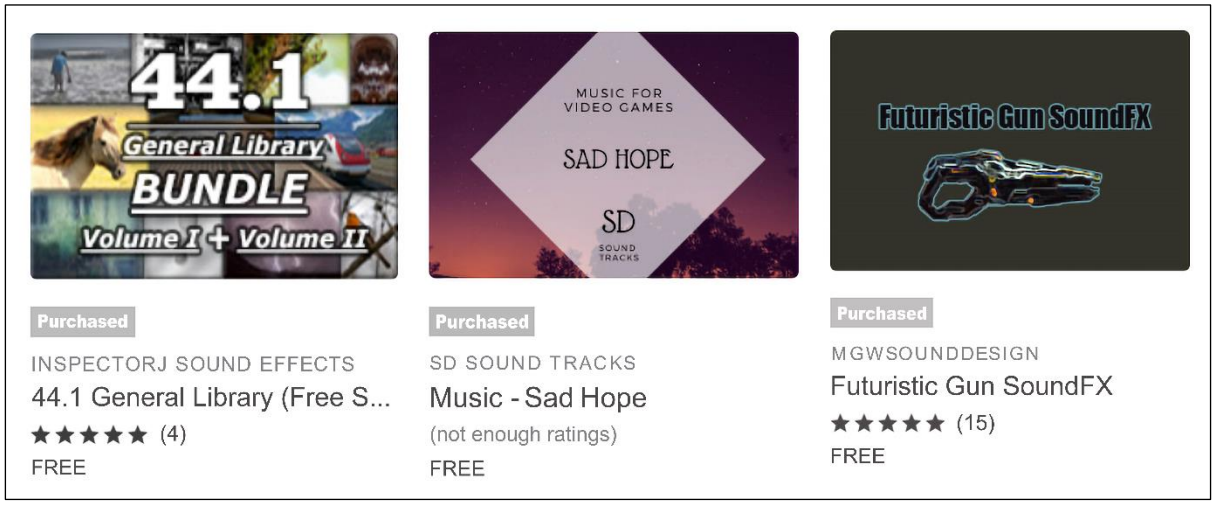

z
x
Persp
White Balance
Bloom
Depth Of Field
Shadows Midtones Highligl
All None
0.00 0.00 0.00 0.00 0.00 0.00 0.69 1.43 0.43
Shadows
Midtones
Highlights

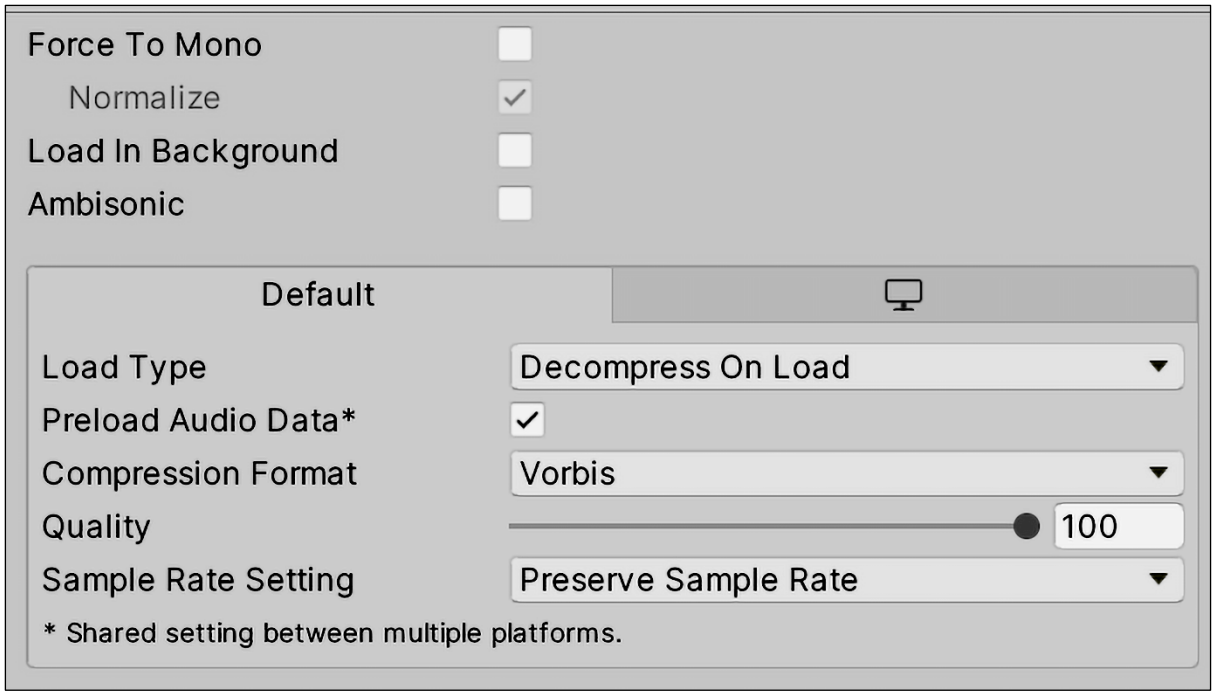

Shadows Midtones Highlights
ALL NONE
0.89
0.99
1.29
1.29
1.28
1.06
0.94
0.84
0.94
Shadows
Midtones
Highlights



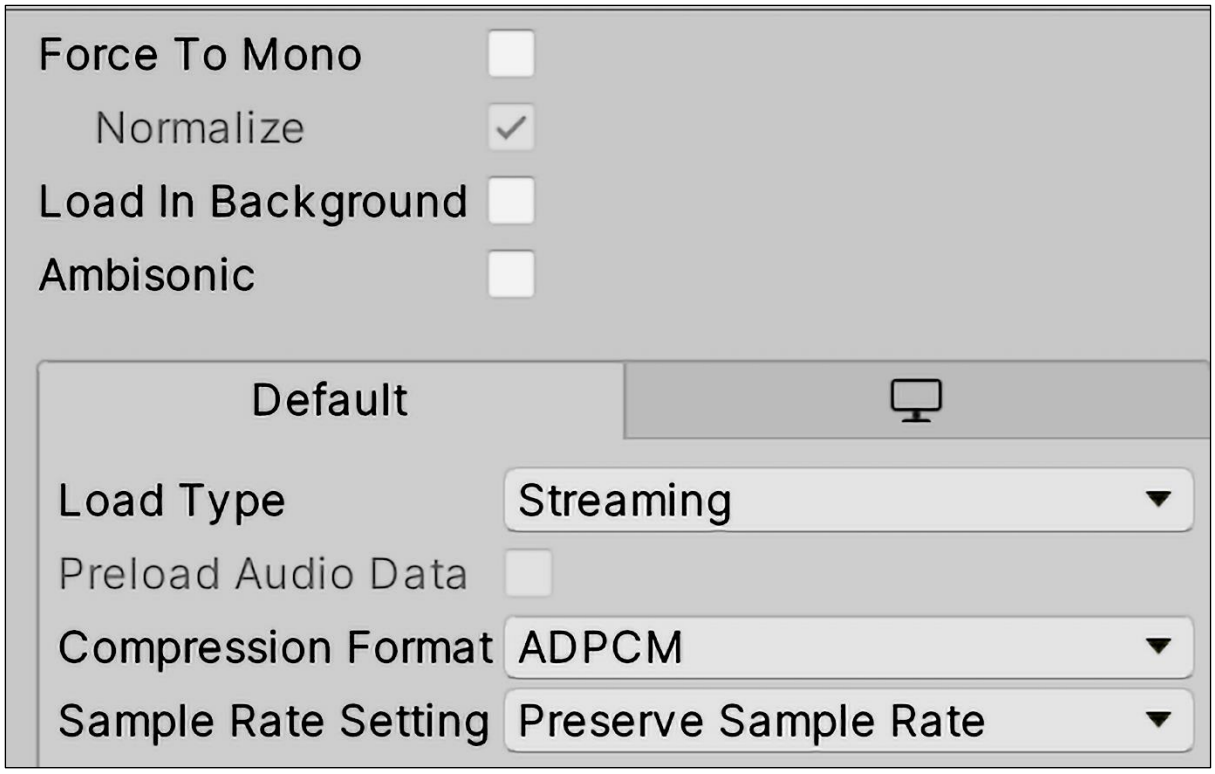
Chapter 14: Harmonious Soundscapes: Integrating Audio and Music

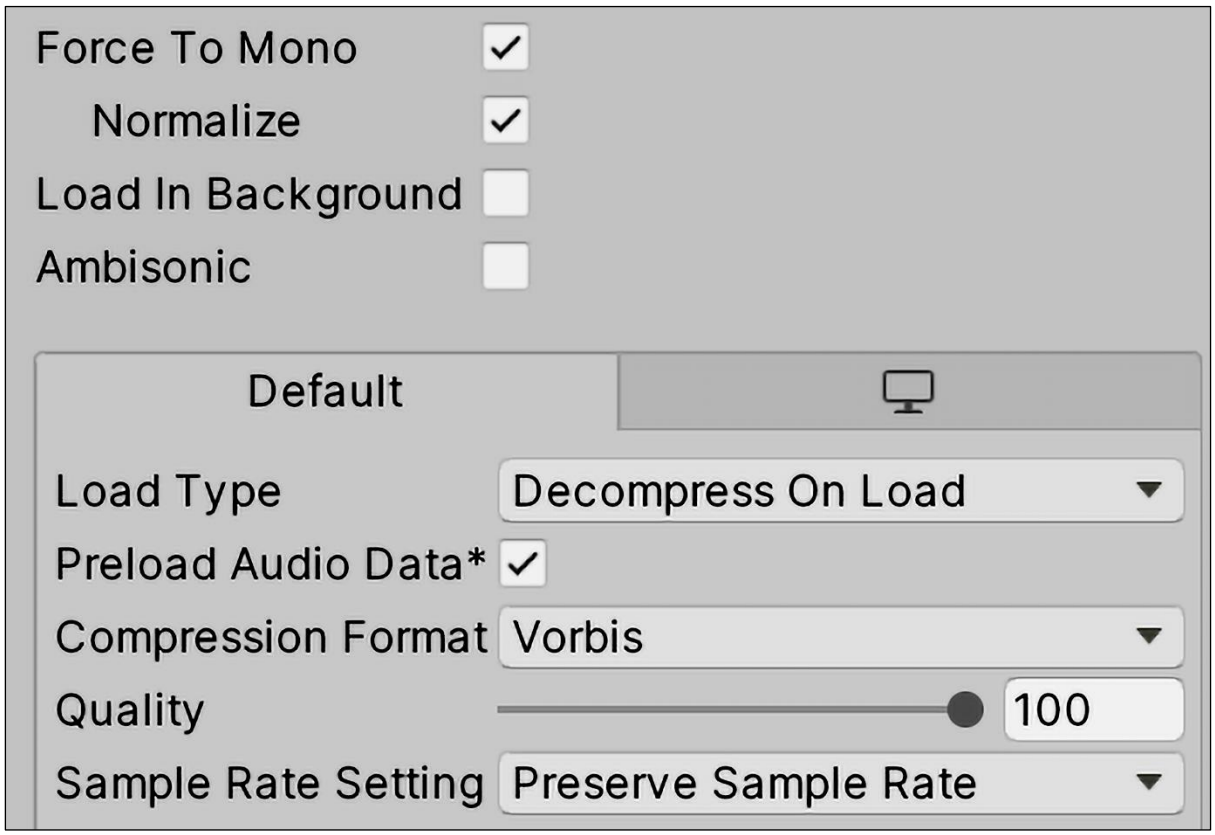


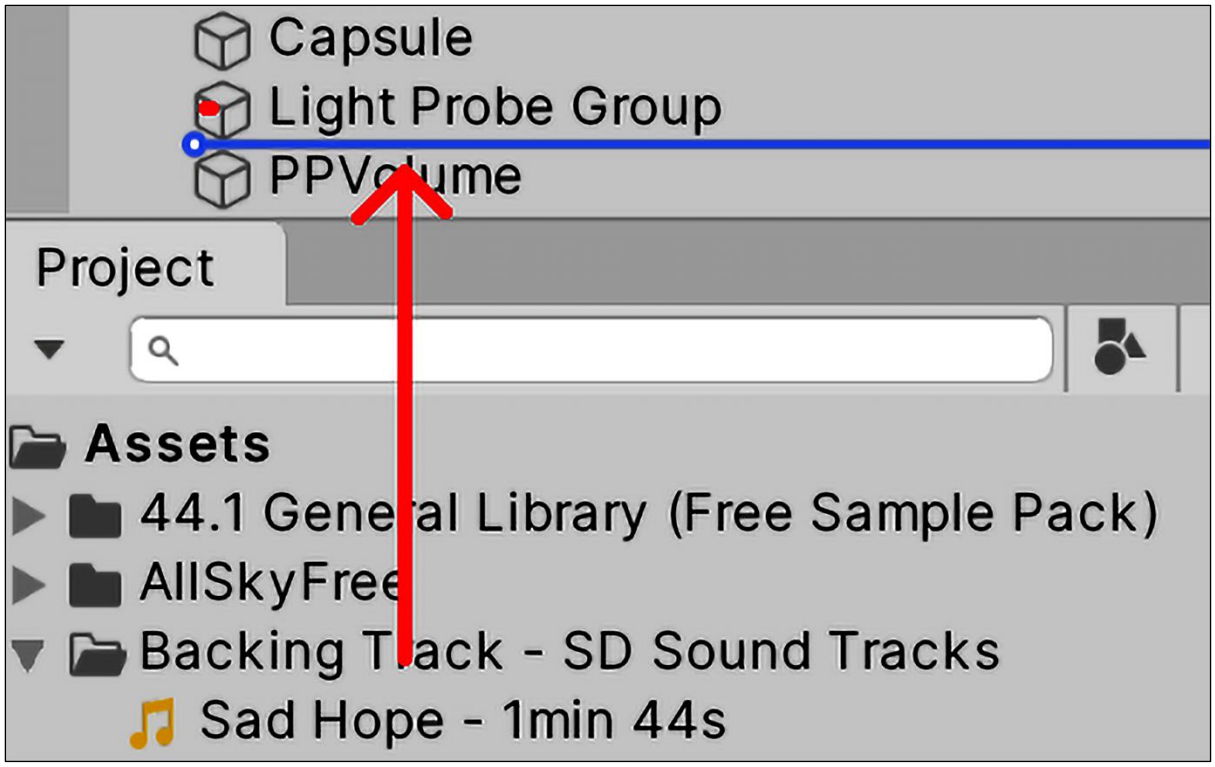


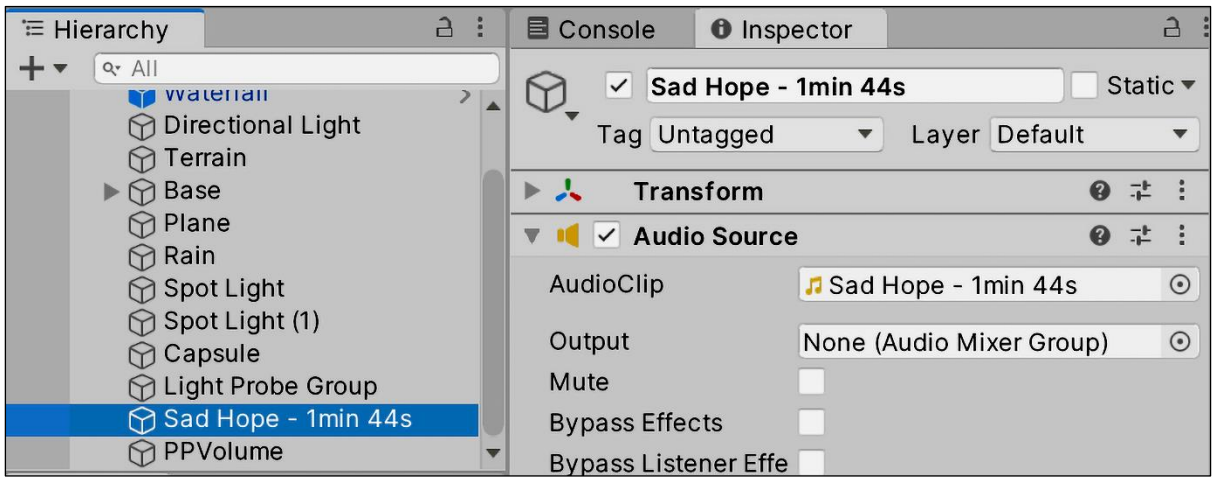

Force To Mono
Normalize
Load In Background
Ambisonic
Default
Load Type
Decompress On Load
Preload Audio Data*
Compression Format
Vorbis
Quality
100
Sample Rate Setting
Preserve Sample Rate
* Shared setting between multiple platforms.

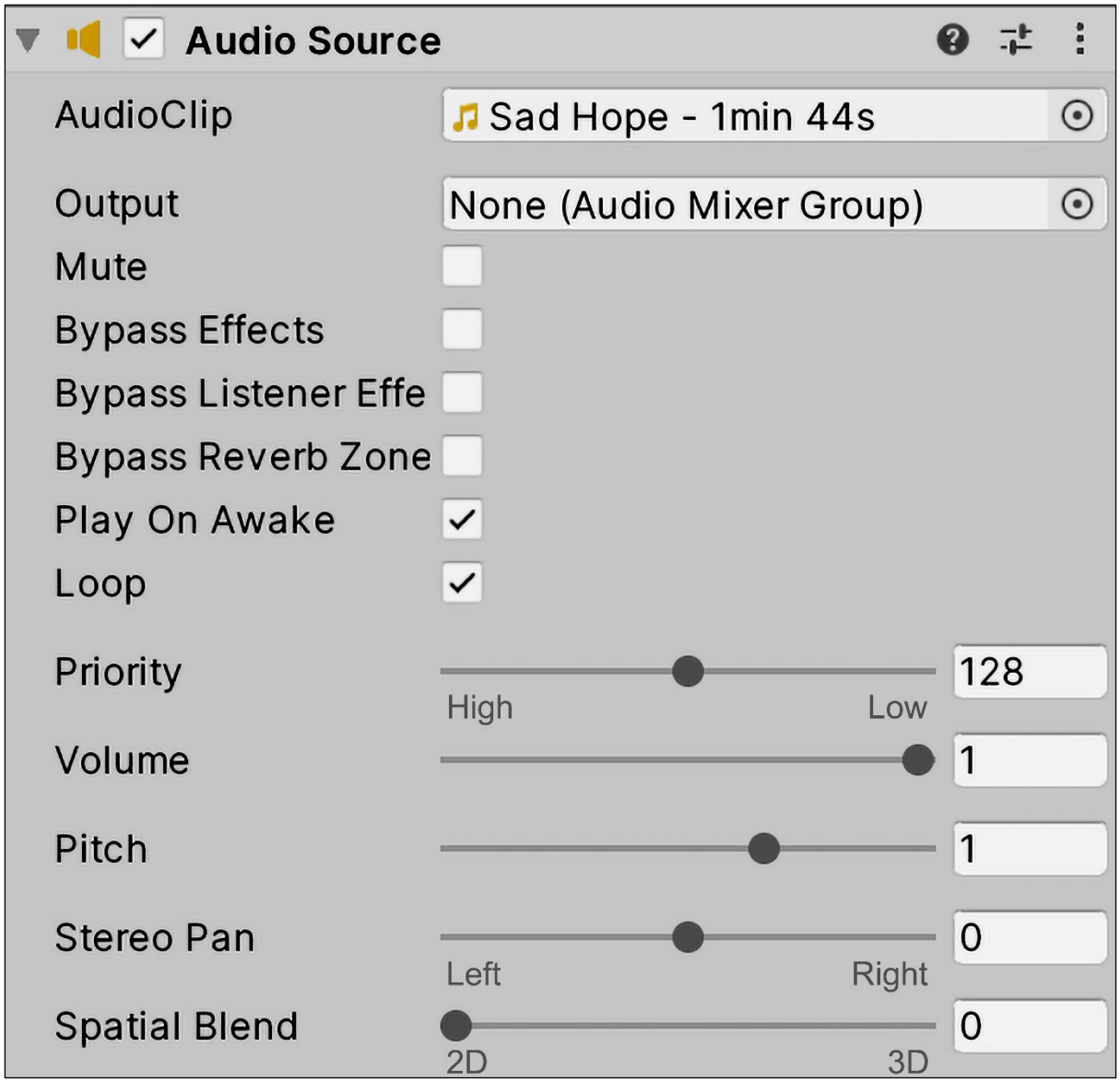

Original Size: 258.4 KB
Imported Size: 72.1 KB
Ratio: 27.88%
Original Size: 258.4 KB
Imported Size: 14.8 KB
Ratio: 5.72%

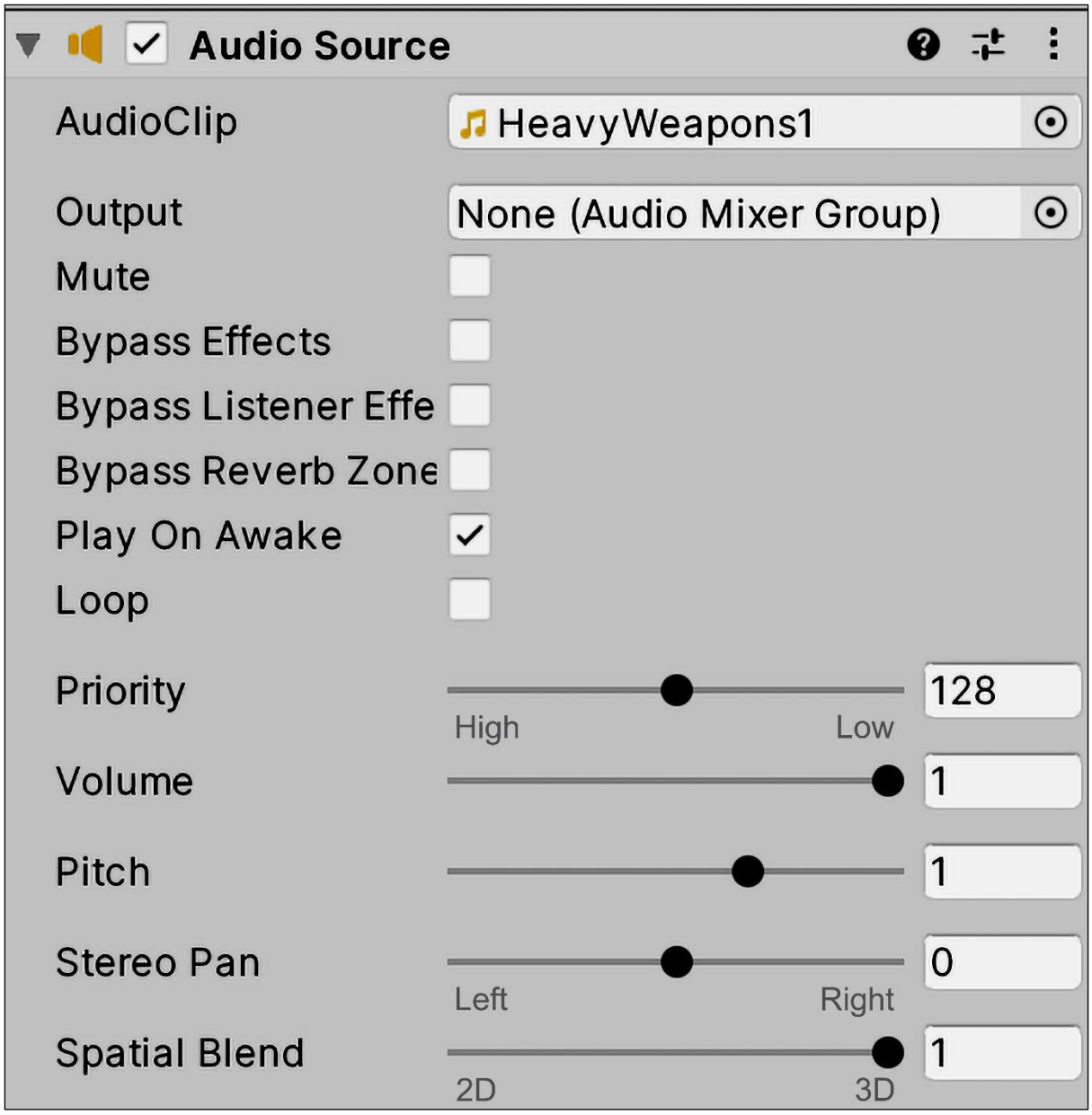

Force To Mono
Normalize
Load In Background
Ambisonic
Default
Load Type
Streaming
Preload Audio Data
Compression Format
ADPCM
Sample Rate Setting
Preserve Sample Rate

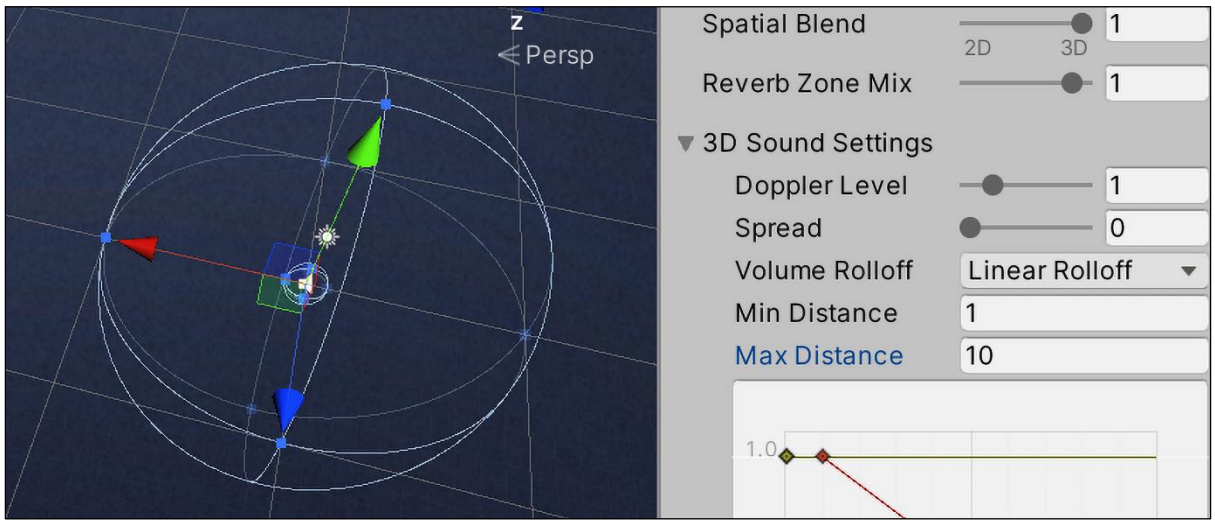

Force To Mono
Normalize
Load In Background
Ambisonic
Default
Load Type
Decompress On Load
Preload Audio Data*
Compression Format
Vorbis
Quality
100
Sample Rate Setting
Preserve Sample Rate

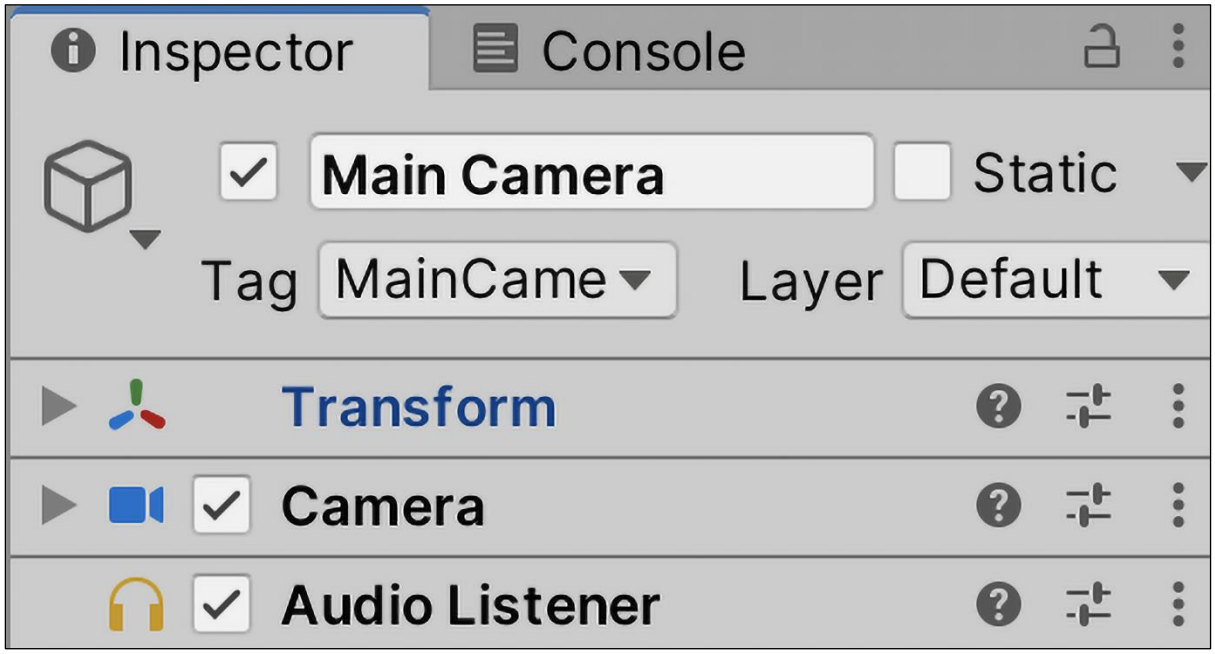

Capsule
Light Probe Group
PPVolume
Project
Assets
44.1 General Library (Free Sample Pack)
AllSkyFree
Backing Track - SD Sound Tracks
Sad Hope - 1min 44s

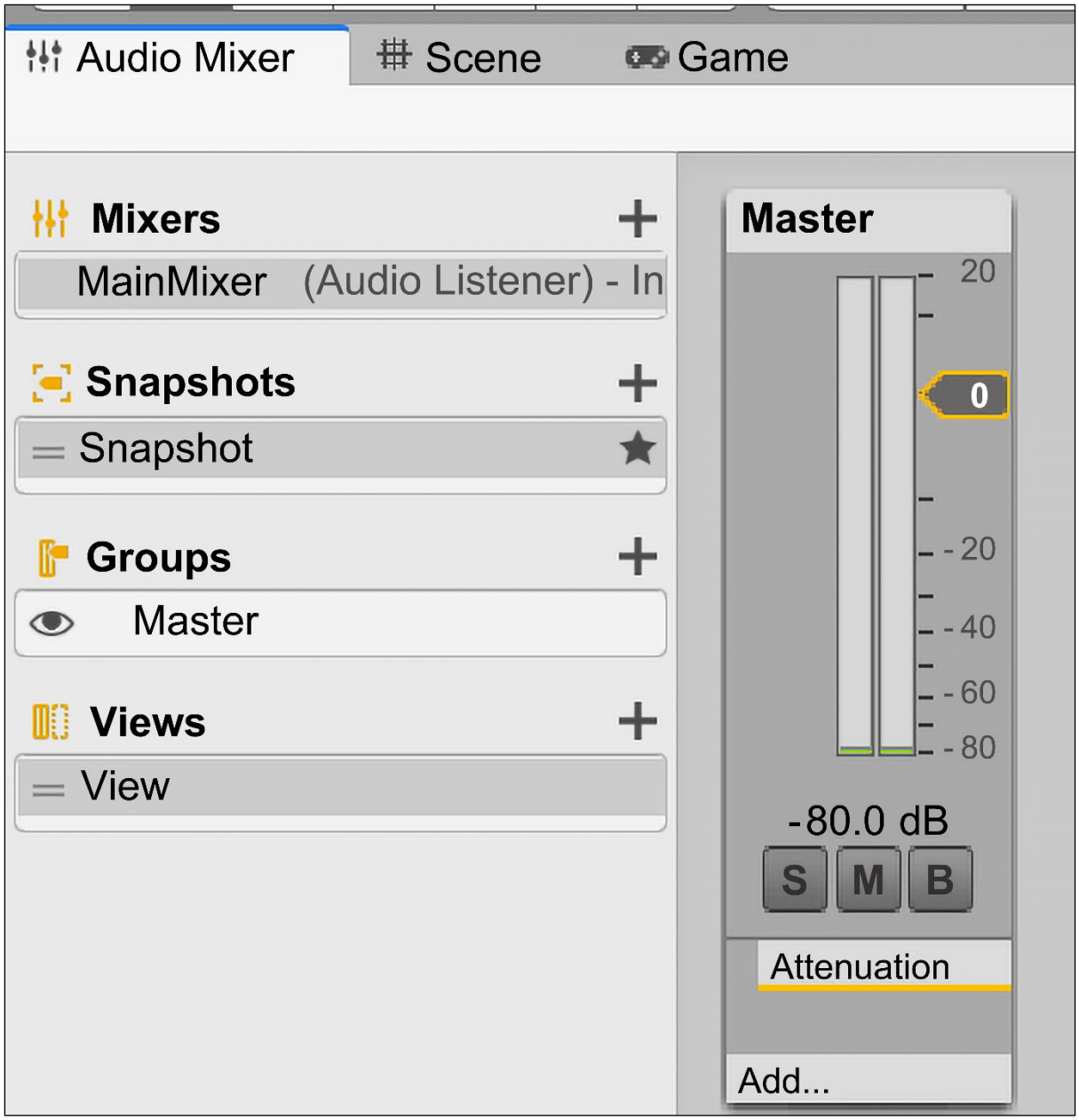

Hierarchy
All
Directional Light
Terrain
Base
Plane
Rain
Spot Light
Spot Light (1)
Capsule
Light Probe Group
Sad Hope - 1min 44s
PPVolume
Console
Inspector
Sad Hope - 1min 44s
Static
Tag
Untagged
Layer
Default
Transform
Audio Source
AudioClip
Sad Hope - 1min 44s
Output
None (Audio Mixer Group)
Mute
Bypass Effects
Bypass Listener Effe


Audio Source
AudioClip
Sad Hope - 1min 44s
Output
None (Audio Mixer Group)
Mute
Bypass Effects
Bypass Listener Effe
Bypass Reverb Zone
Play On Awake
Loop
Priority
128
High
Low
Volume
1
Pitch
1
Stereo Pan
0
Left
Right
Spatial Blend
0
2D
3D

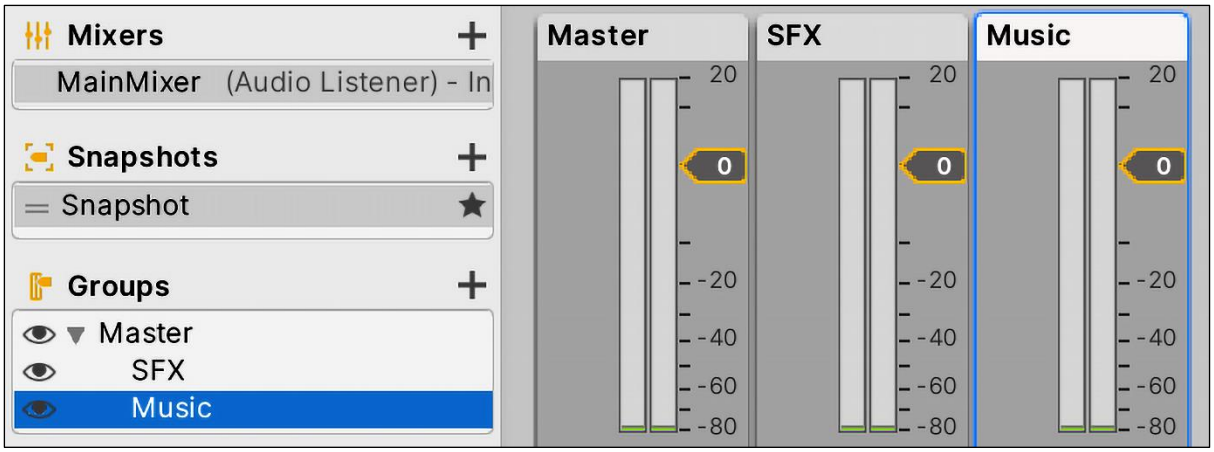

Audio Source
AudioClip
HeavyWeapons1
Output
None (Audio Mixer Group)
Mute
Bypass Effects
Bypass Listener Effe
Bypass Reverb Zone
Play On Awake
Loop
Priority
128
High
Low
Volume
1
Pitch
1
Stereo Pan
0
Left
Right
Spatial Blend
1
2D
3D

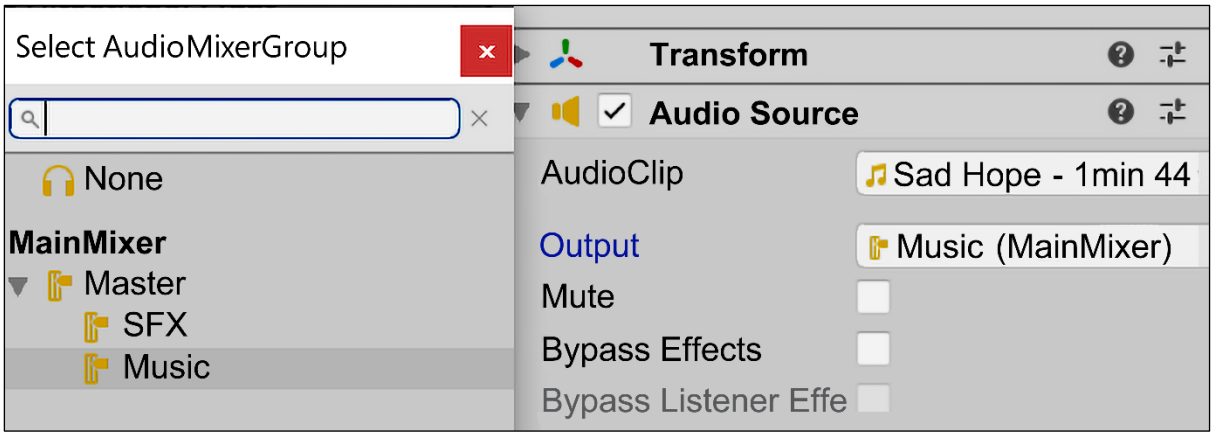

z
Persp
Spatial Blend
1
2D
3D
Reverb Zone Mix
1
3D Sound Settings
Doppler Level
1
Spread
0
Volume Rolloff
Linear Rolloff
Min Distance
1
Max Distance
10
1.0

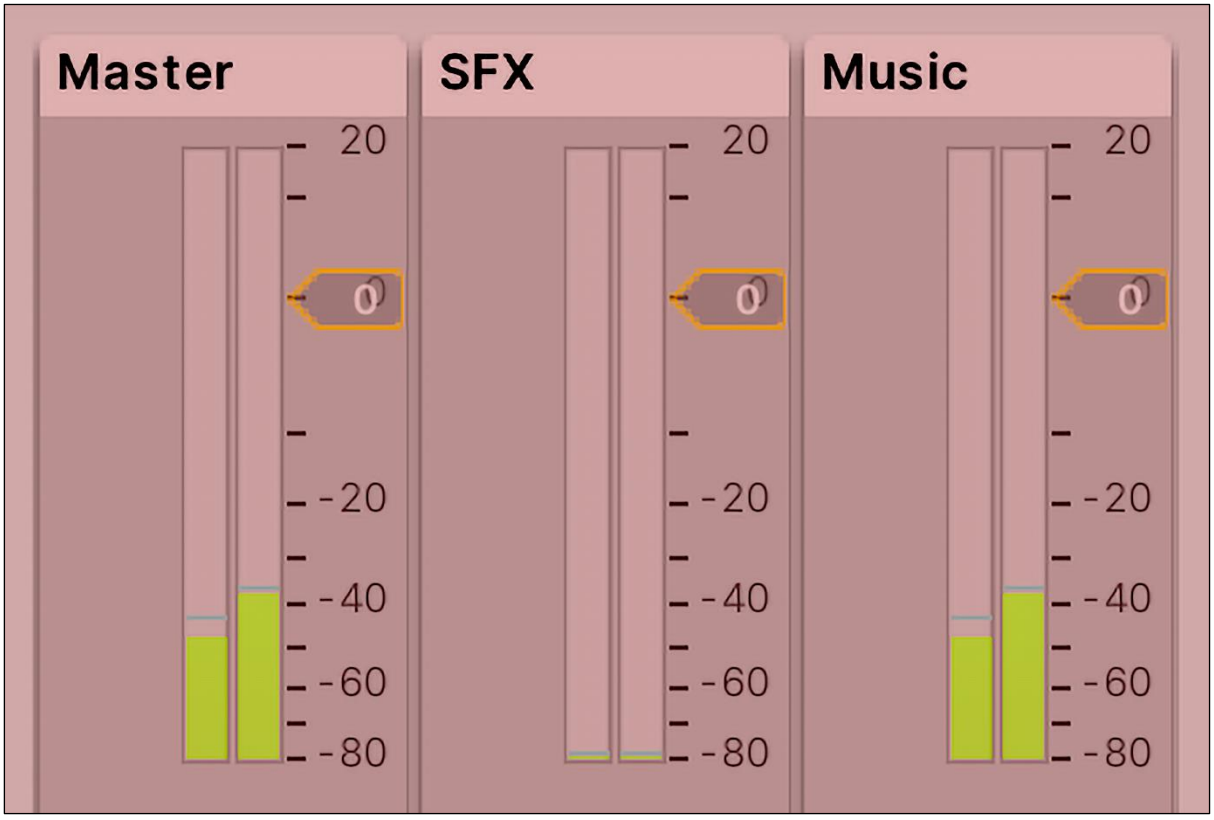

Inspector
Console
Main Camera
Static
Tag
MainCame
Layer
Default
Transform
Camera
Audio Listener


Audio Mixer
Scene
Game
Mixers
MainMixer (Audio Listener) - In
Snapshots
Snapshot
Groups
Master
Views
View
Master
20
0
-20
-40
-60
-80
-80.0 dB
S
M
B
Attenuation
Add...

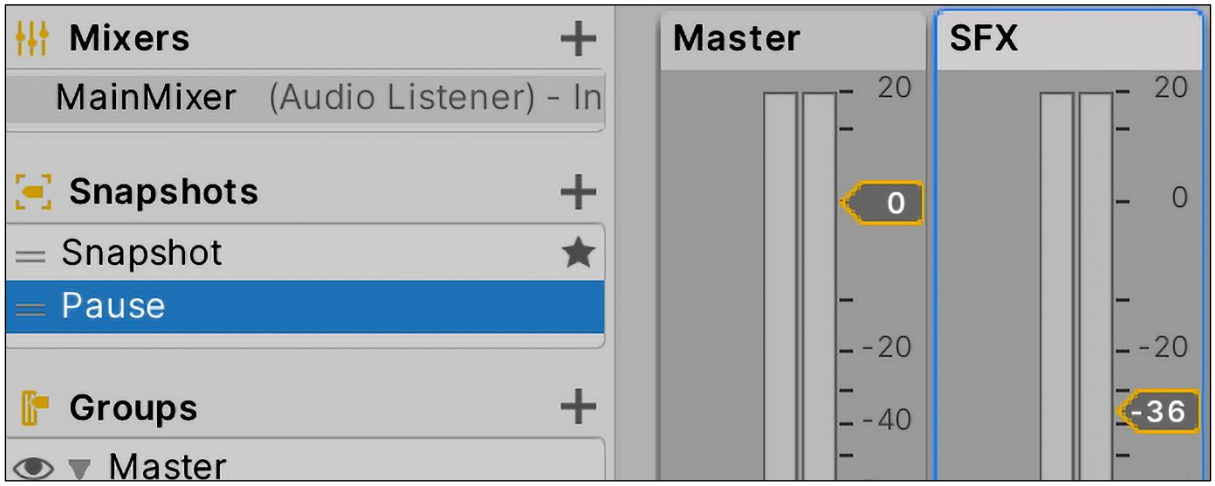

Groups

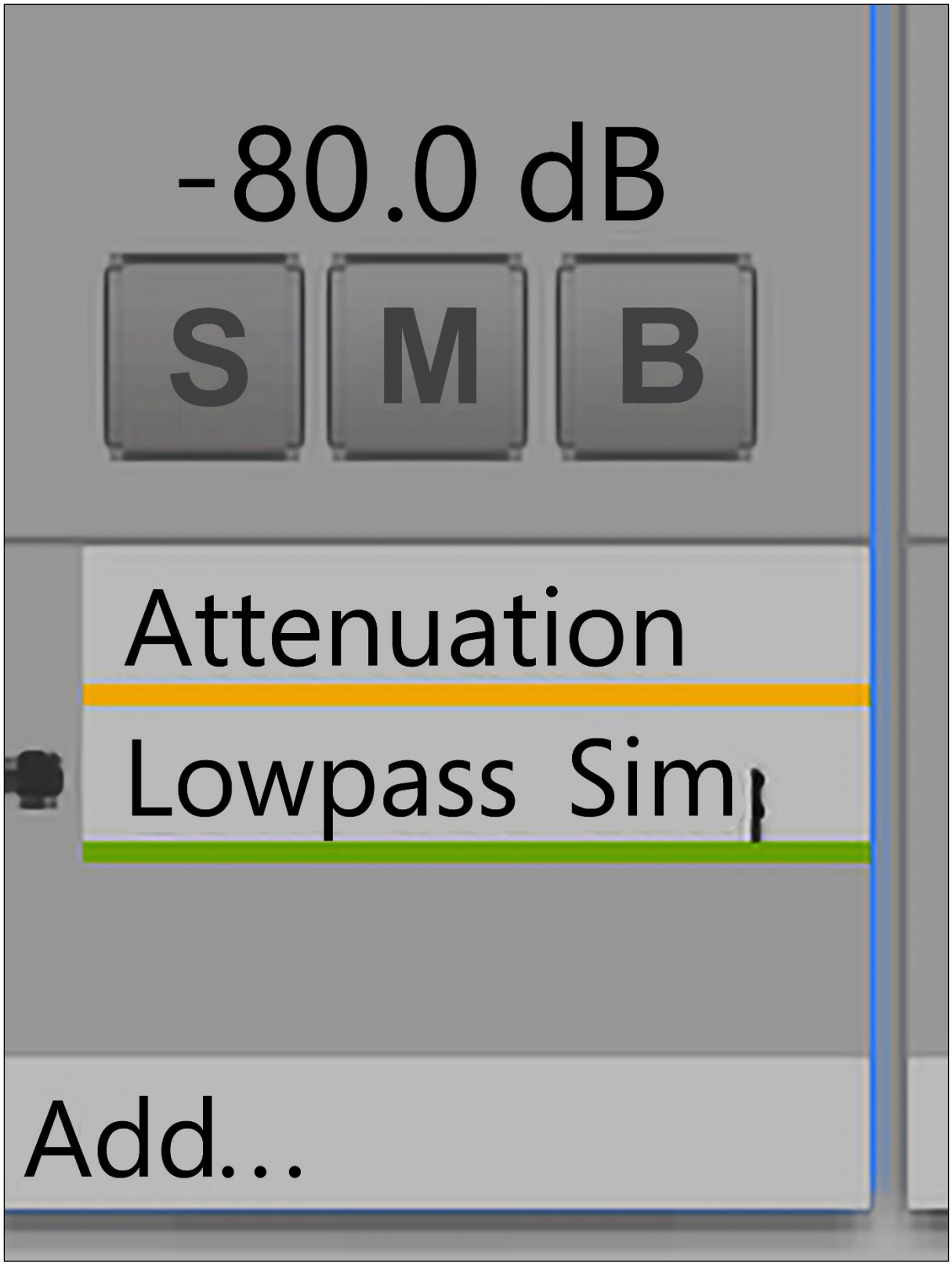

Mixers
MainMixer (Audio Listener) - In
Snapshots
Snapshot
Groups
Master
SFX
Music
Master
SFX
Music
20
0
-20
-40
-60
-80

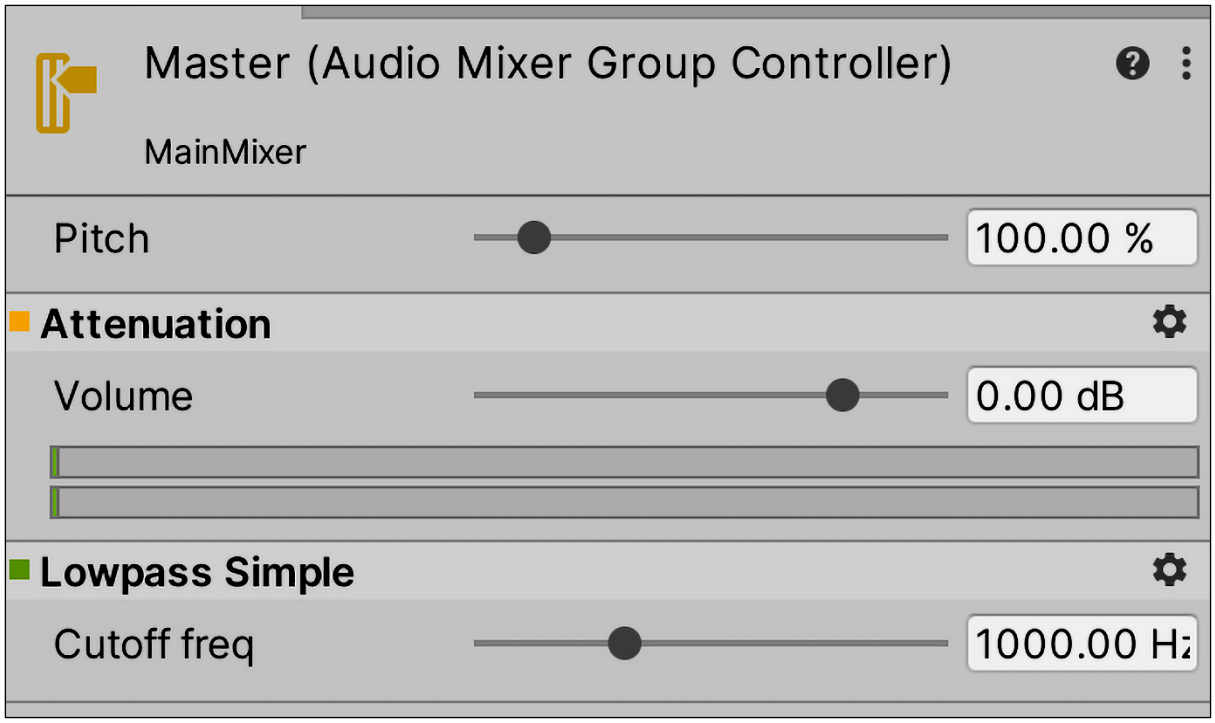

Select AudioMixerGroup
None
MainMixer
Master
SFX
Music
Transform
Audio Source
AudioClip
Sad Hope - 1min 44
Output
Music (MainMixer)
Mute
Bypass Effects
Bypass Listener Effe

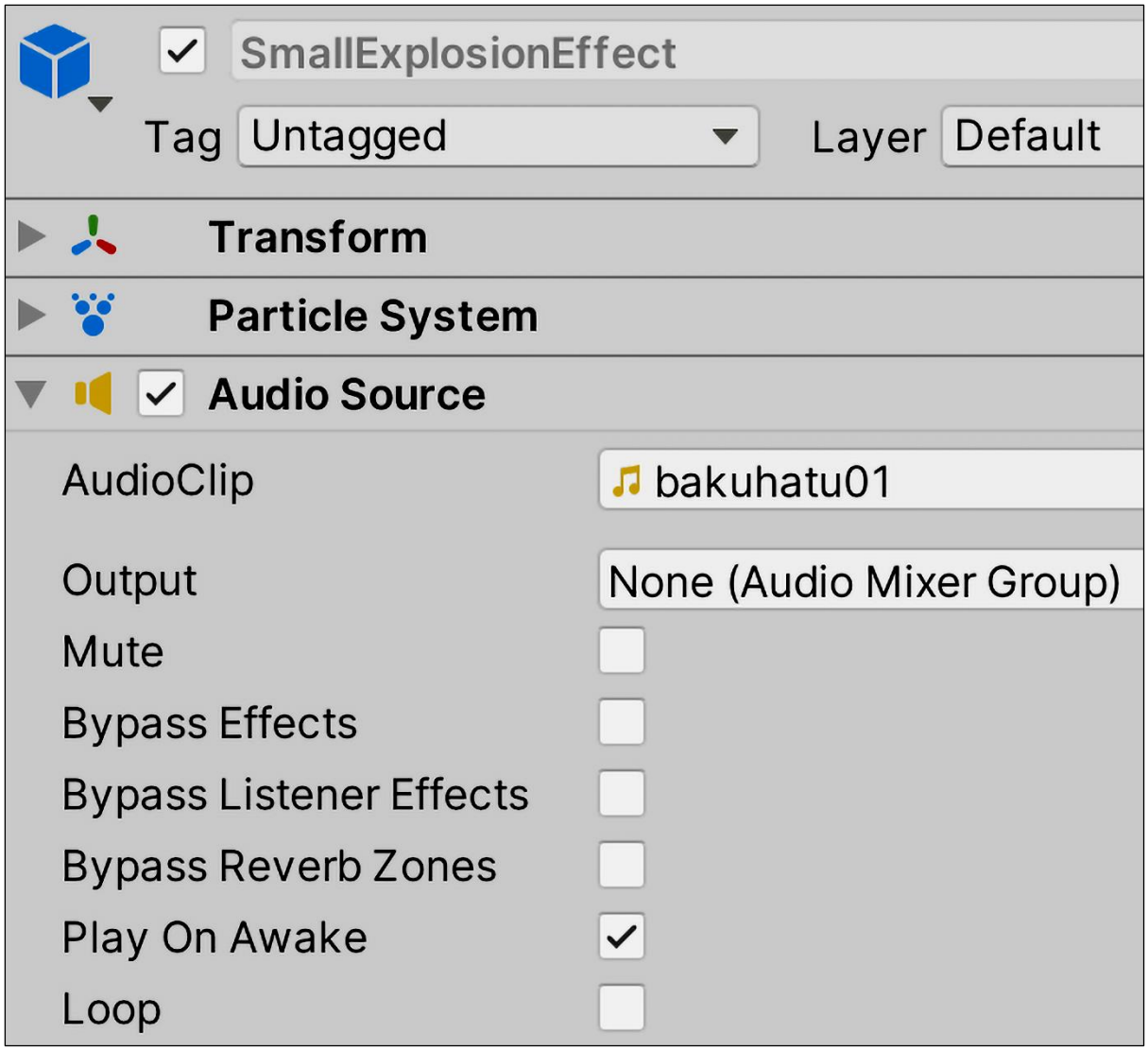

Master
SFX
Music
20
0
-20
-40
-60
-80


Snapshots
Snapshot
Pause


Mixers
MainMixer (Audio Listener) - In
Snapshots
Snapshot
Pause
Groups
Master
Master
SFX
20
0
-20
-40
20
0
-20
-36


-80.0 dB
S
M
B
Attenuation
Lowpass Sim
Add...


Master (Audio Mixer Group Controller)
MainMixer
Pitch
100.00 %
Attenuation
Volume
0.00 dB
Lowpass Simple
Cutoff freq
1000.00 Hz

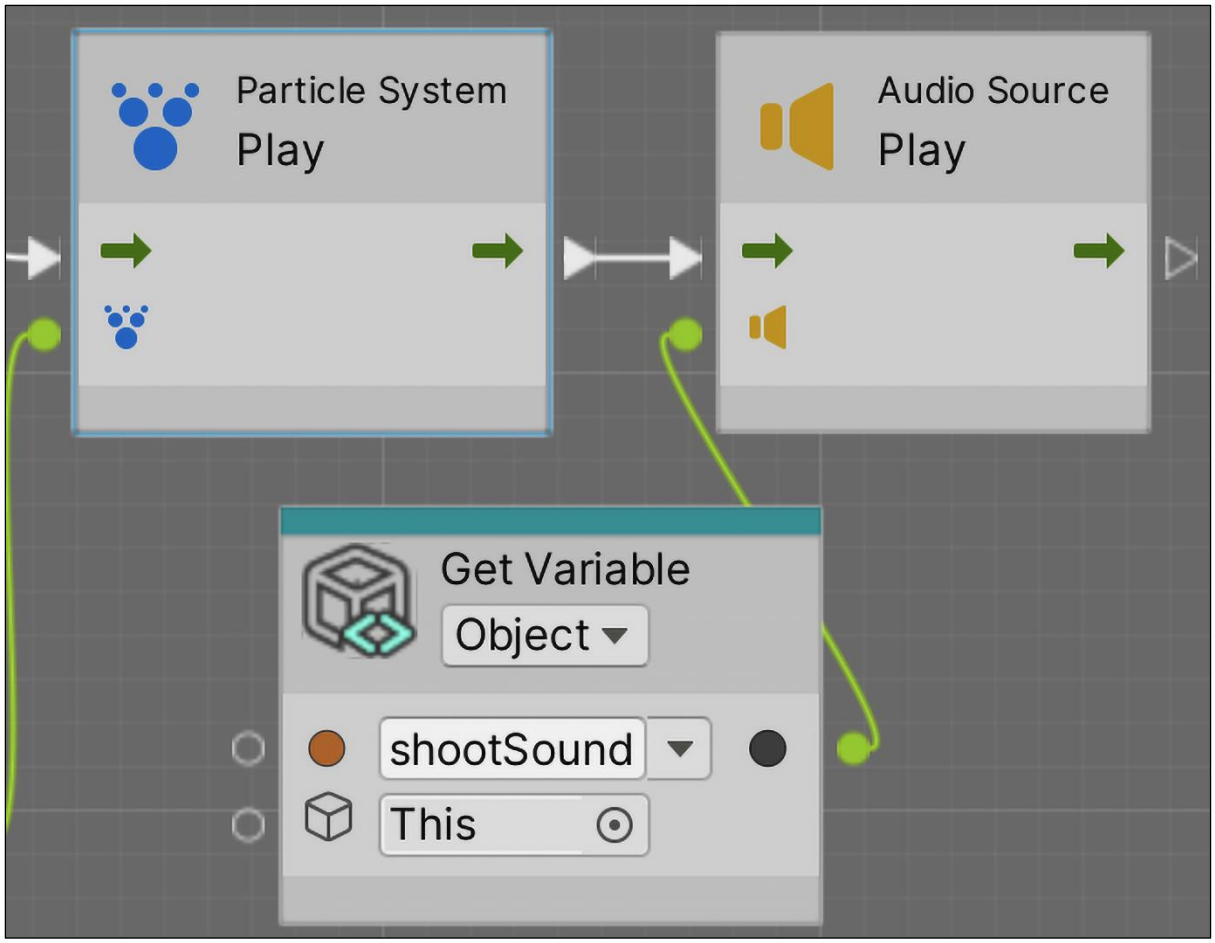

SmallExplosionEffect
Tag
Untagged
Layer
Default
Transform
Particle System
Audio Source
AudioClip
bakuhatu01
Output
None (Audio Mixer Group)
Mute
Bypass Effects
Bypass Listener Effects
Bypass Reverb Zones
Play On Awake
Loop

```
public GameObject prefab;
public GameObject shootPoint;
public ParticleSystem muzzleEffect;
public AudioSource shootSound;

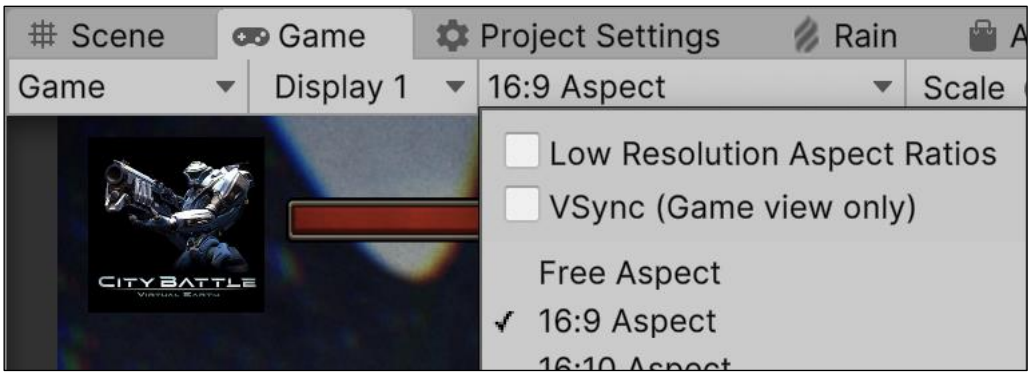
public void OnFire(InputValue value)
{
    if (value.isPressed)
    {
        GameObject clone = Instantiate(prefab);

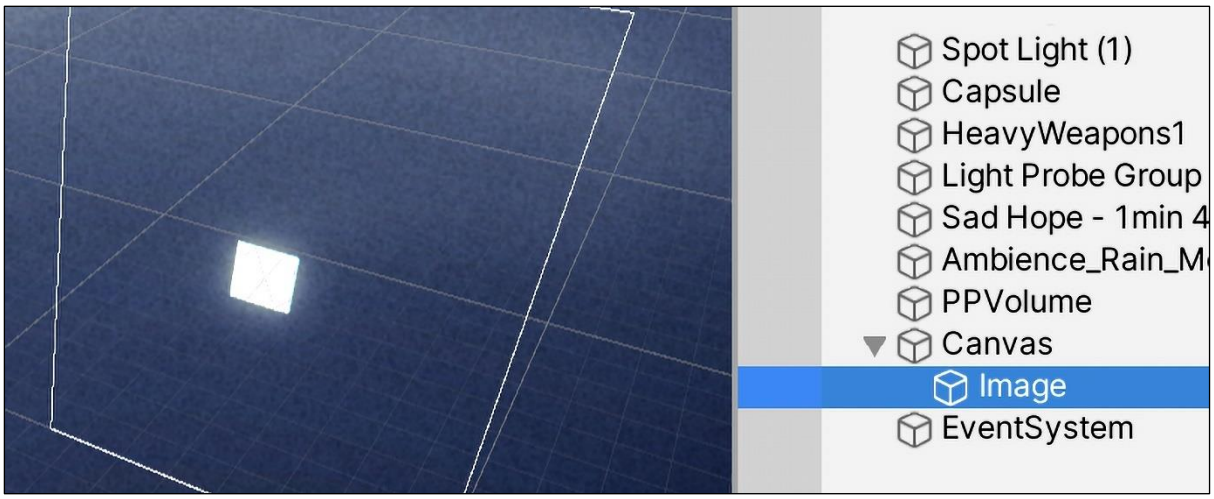
        clone.transform.position = shootPoint.transform.position;
        clone.transform.rotation = shootPoint.transform.rotation;

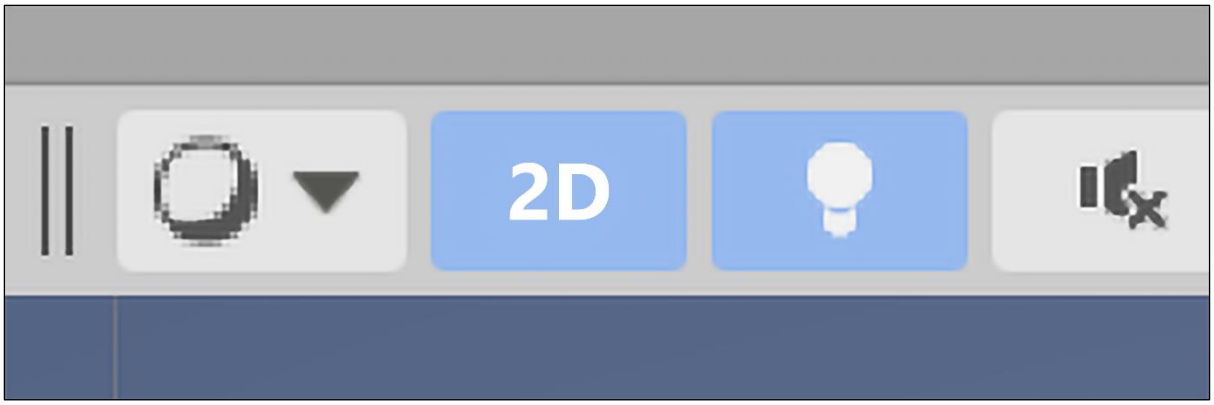
        muzzleEffect.Play();
        shootSound.Play();
    }
}
```

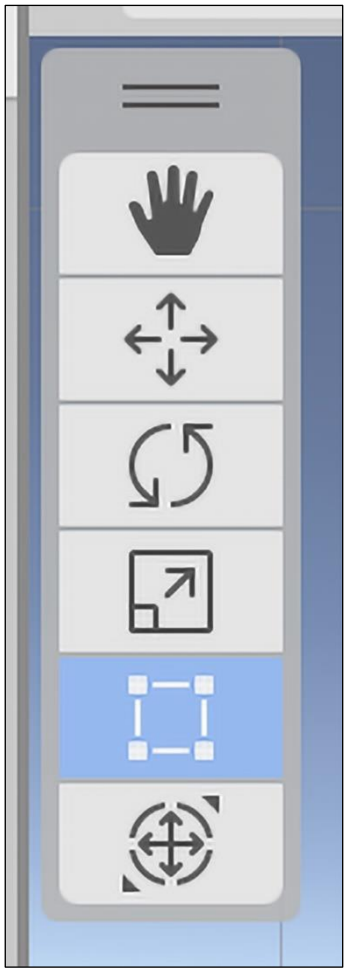

Particle System
Play
Audio Source
Play
Get Variable
Object
shootSound
This

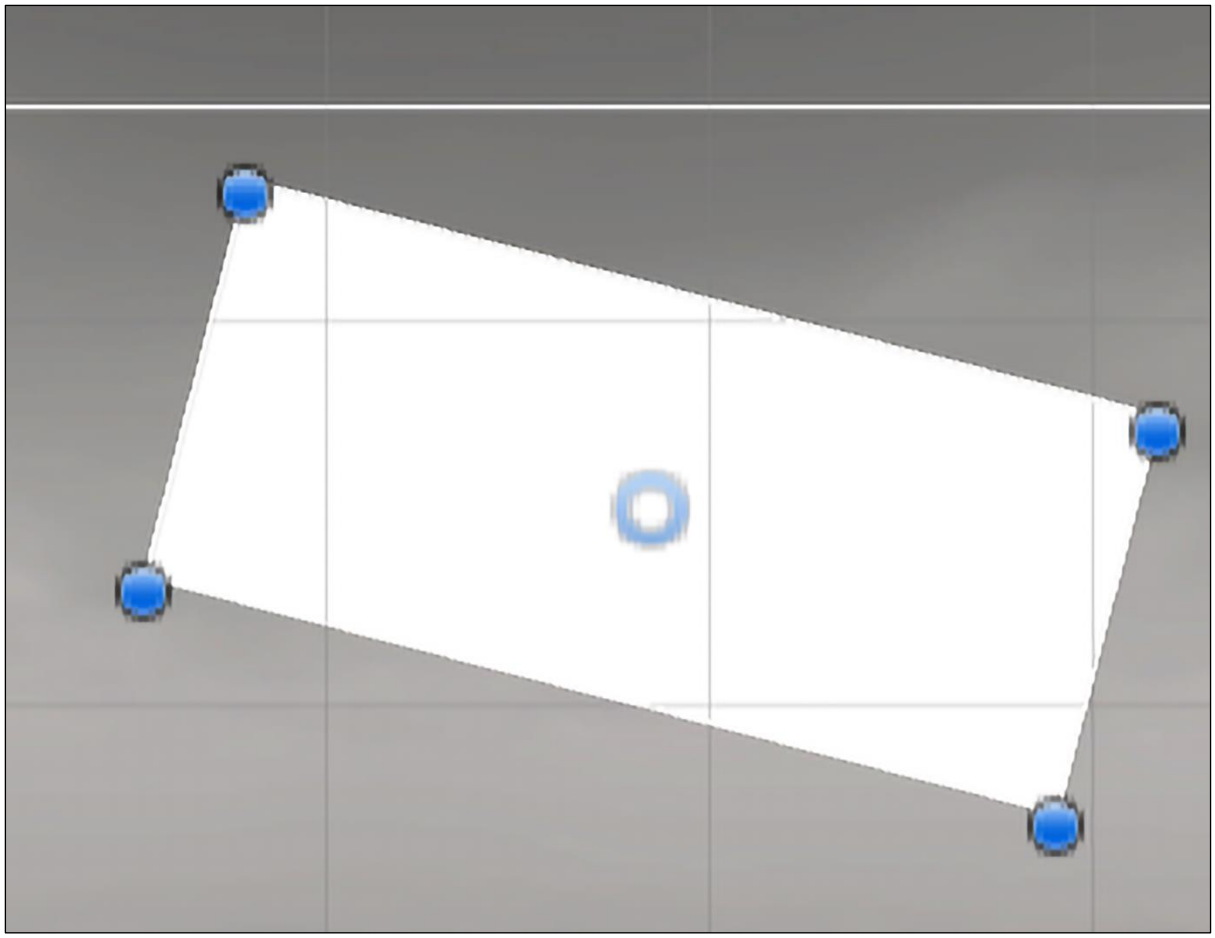
Chapter 15: Interface Brilliance: Designing User-Friendly UI

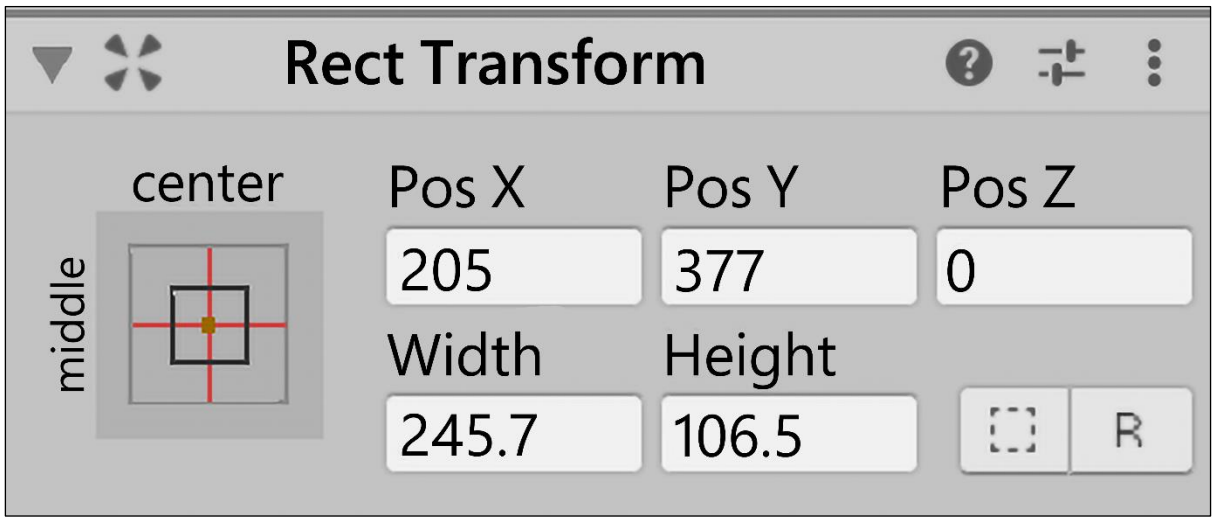




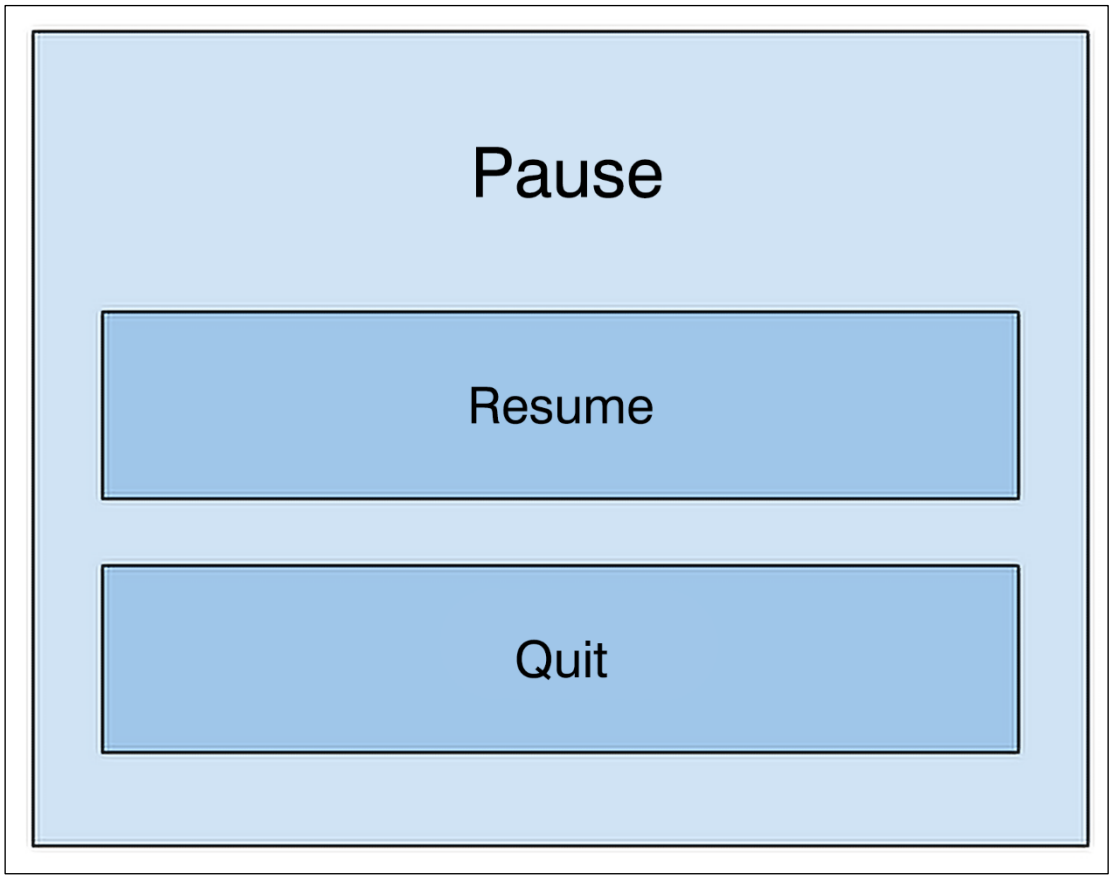







Rect Transform
center
middle
Pos X
Pos Y
Pos Z
205
377
0
Width
Height
245.7
106.5
R


Hero Avatar
Hero Health
Score: 10
Bullets: 10
Remaining Waves: 3
Remaining Enemies: 3
Base Health


Pause
Resume
Quit

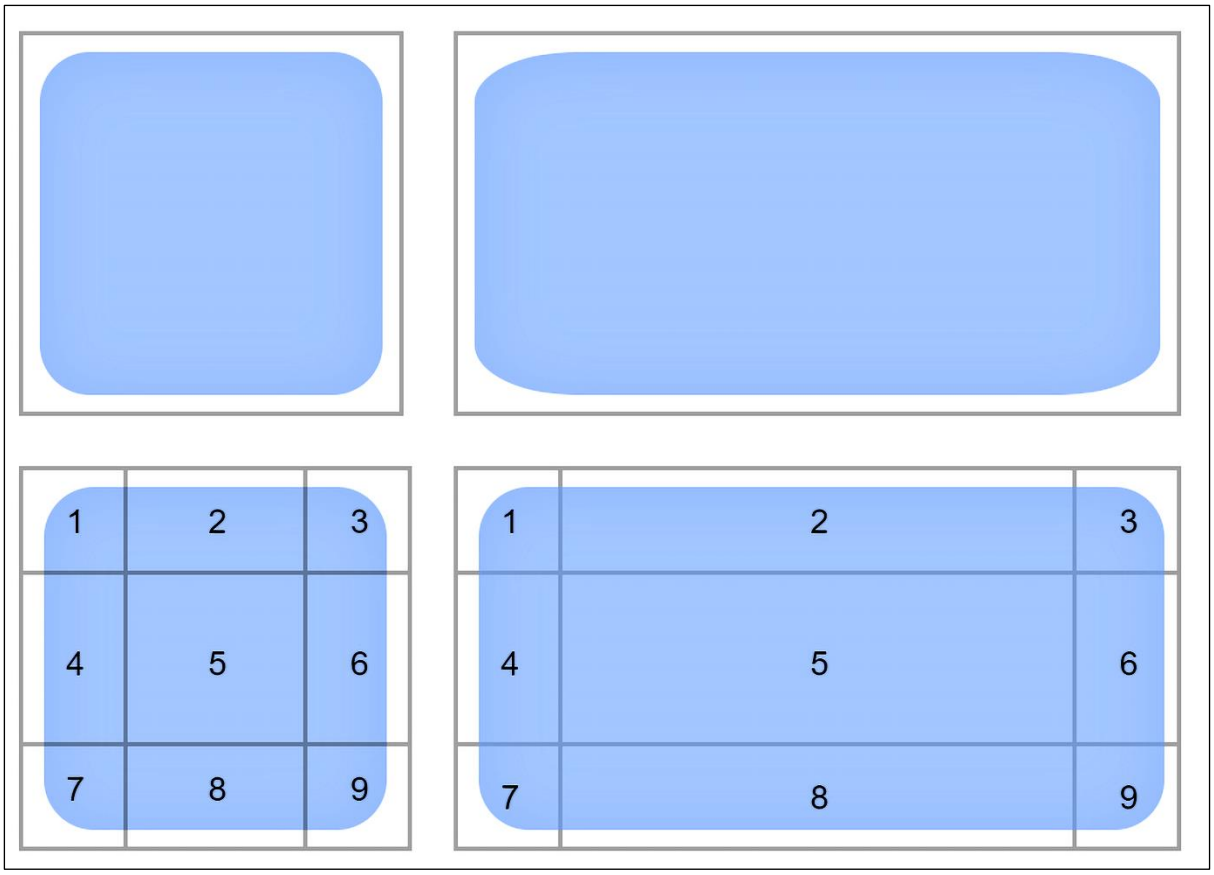


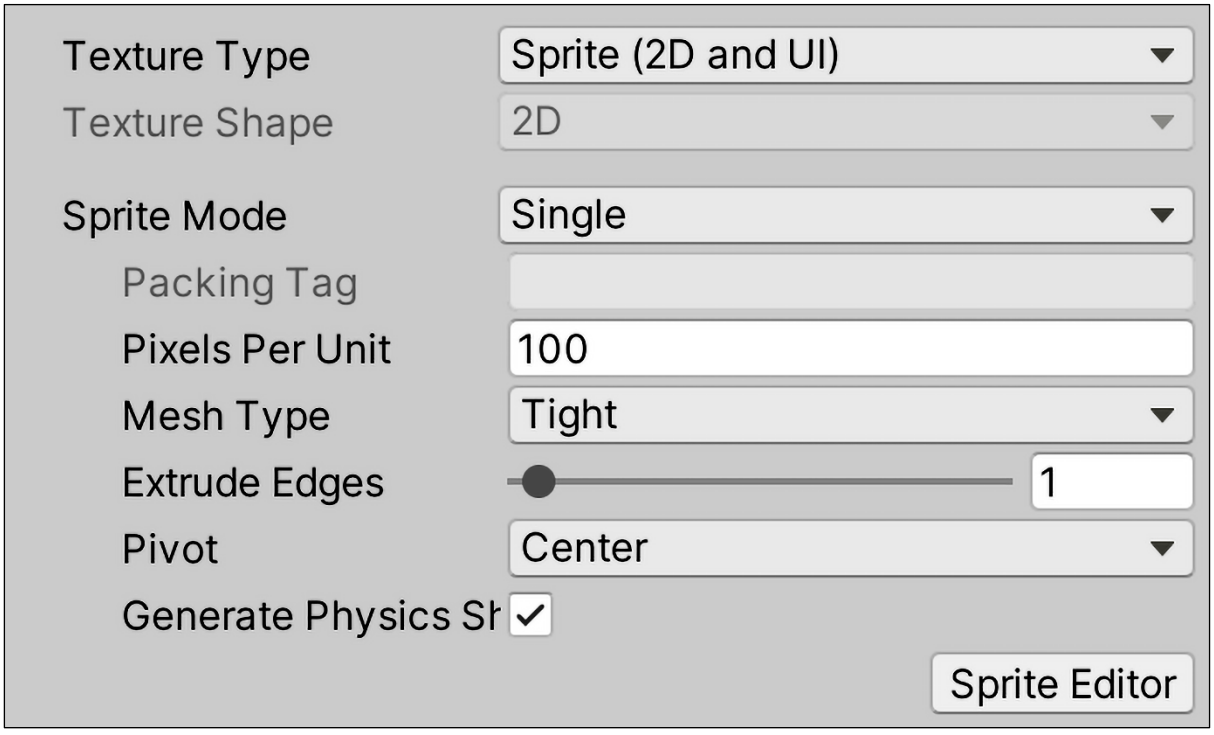
PONETI

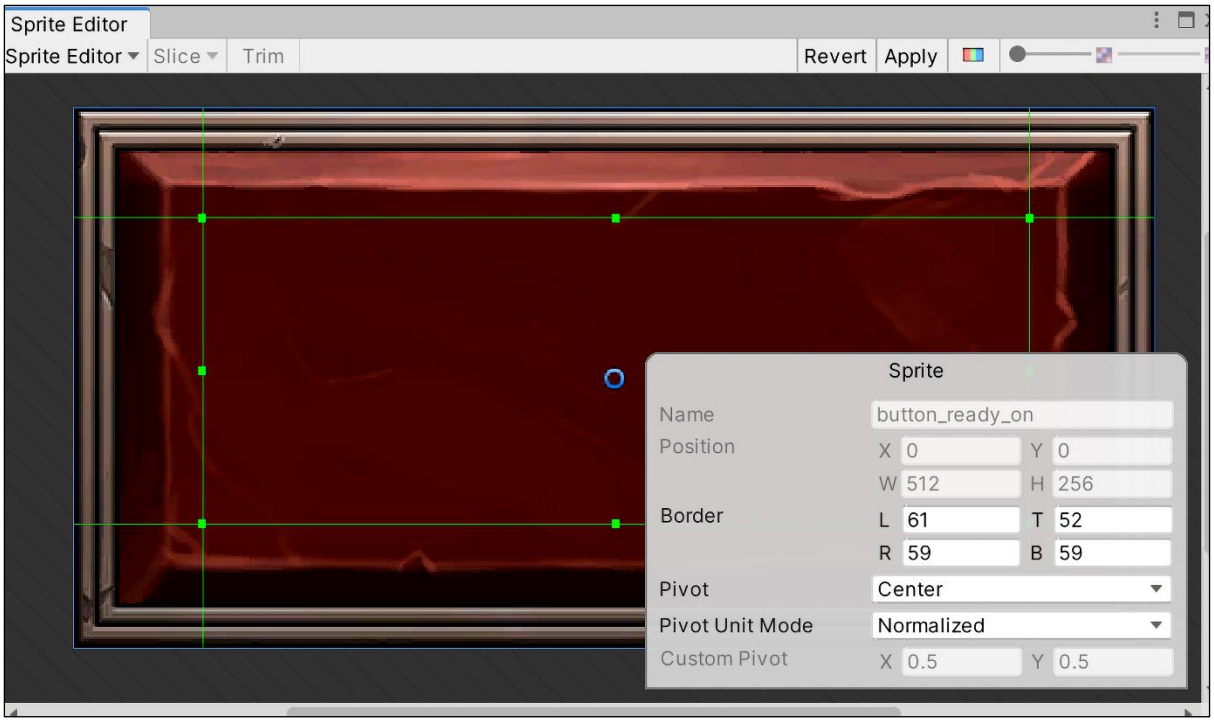
GUI Parts

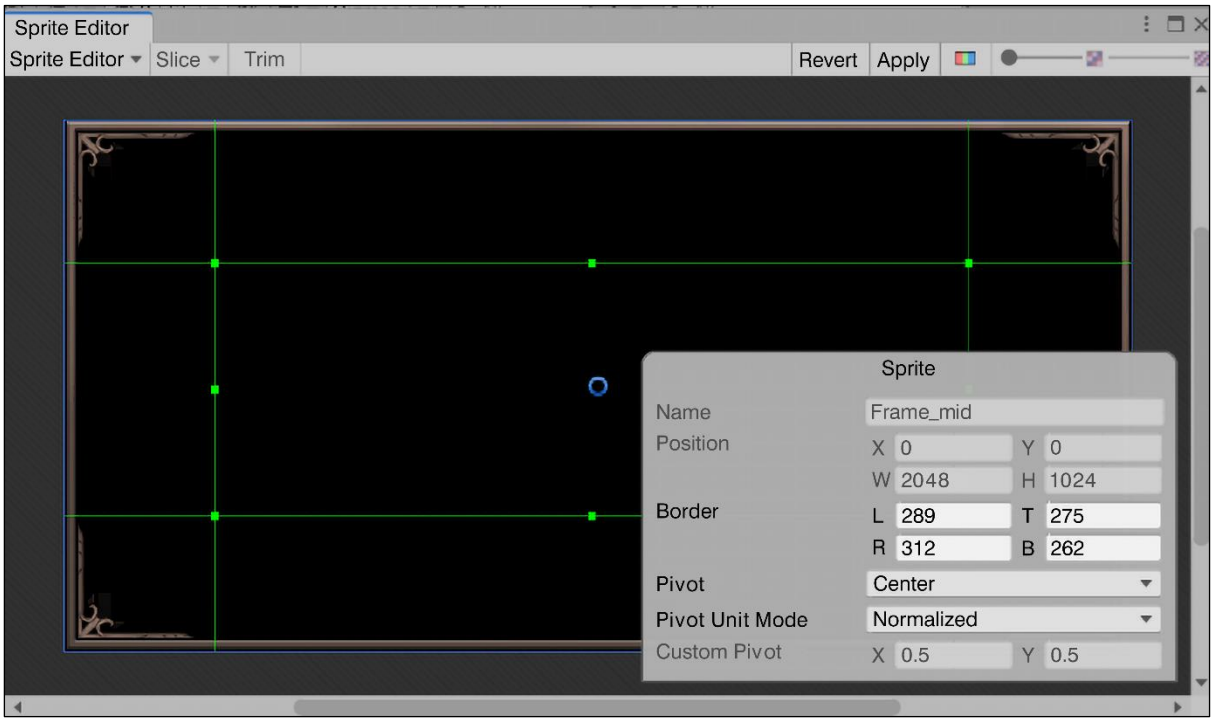
★★★★★ (4)

FREE


1
2
3
4
5
6
7
8
9
1
2
3
4
5
6
7
8
9


Texture Type
Sprite (2D and UI)
Texture Shape
2D
Sprite Mode
Single
Packing Tag
Pixels Per Unit
100
Mesh Type
Tight
Extrude Edges
1
Pivot
Center
Generate Physics Sh
Sprite Editor


Sprite Editor
Sprite Editor
Slice
Trim
Revert
Apply
Sprite
Name
button_ready_on
Position
X 0
Y 0
W 512
H 256
Border
L 61
T 52
R 59
B 59
Pivot
Center
Pivot Unit Mode
Normalized
Custom Pivot
X 0.5
Y 0.5


Sprite Editor
Sprite Editor
Slice
Trim
Revert
Apply
Sprite
Name
Frame_mid
Position
X 0
Y 0
W 2048
H 1024
Border
L 289
T 275
R 312
B 262
Pivot
Center
Pivot Unit Mode
Normalized
Custom Pivot
X 0.5
Y 0.5

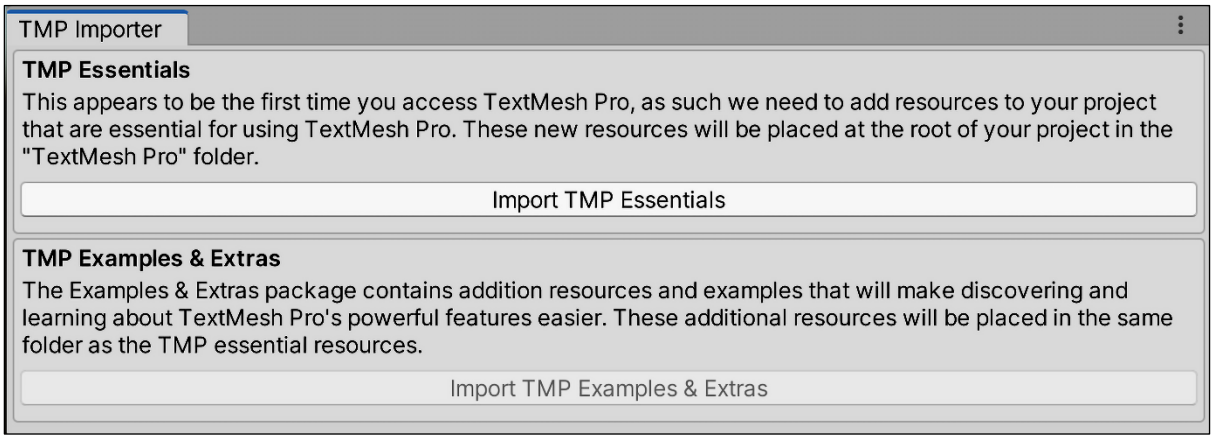


militech_r_2019-04-13.ttf



militech_o_2019-04-13.ttf





Font Asset Creator

Font Settings

Source Font File	Aa militech_o_2019-04-13
Sampling Point Size	Auto Sizing
Padding	5
Packing Method	Optimum
Atlas Resolution	512 × 512
Character Set	ASCII
Render Mode	SDFAA
Get Kerning Pairs	☐

Generate Font Atlas

Generation completed in: 47.29 ms X

Font: Militech Style: Outlined
Point Size: 88 SP/PD Ratio: 5.7%

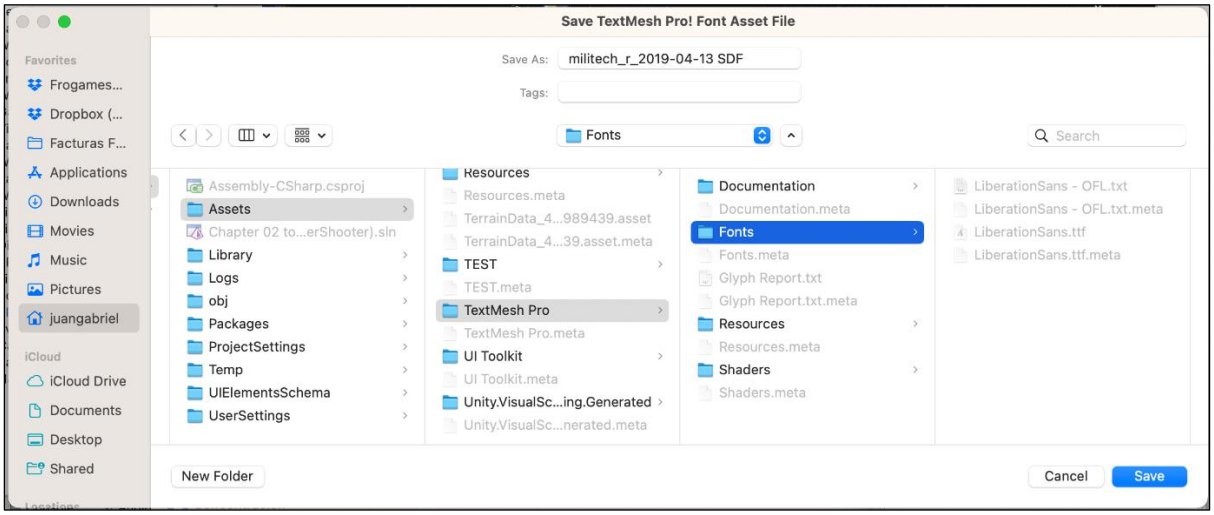
Characters included: 97/99
Missing characters: 2
Excluded characters: 0

Characters missing from font file:

ID: 8203	Hex: 200B	Char []
ID: 9633	Hex: 25A1	Char [□]

Save | Save as...




Save TextMesh Pro! Font Asset File
Save As: militech_r_2019-04-13 SDF
Tags:
Fonts
Search
Favorites
Frogames...
Dropbox (...
Facturas F...
Applications
Downloads
Movies
Music
Pictures
juangabriel
iCloud
iCloud Drive
Documents
Desktop
Shared
Assembly-CSharp.csproj
Assets
Chapter 02 to...erShooter).sln
Library
Logs
obj
Packages
ProjectSettings
Temp
UIElementsSchema
UserSettings
Resources
Resources.meta
TerrainData_4...989439.asset
TerrainData_4...39.asset.meta
TEST
TEST.meta
TextMesh Pro
TextMesh Pro.meta
UI Toolkit
UI Toolkit.meta
Unity.VisualSc...ing.Generated
Unity.VisualSc...nerated.meta
Documentation
Documentation.meta
Fonts
Fonts.meta
Glyph Report.txt
Glyph Report.txt.meta
Resources
Resources.meta
Shaders
Shaders.meta
LiberationSans - OFL.txt
LiberationSans - OFL.txt.meta
LiberationSans.ttf
LiberationSans.ttf.meta
New Folder
Cancel
Save

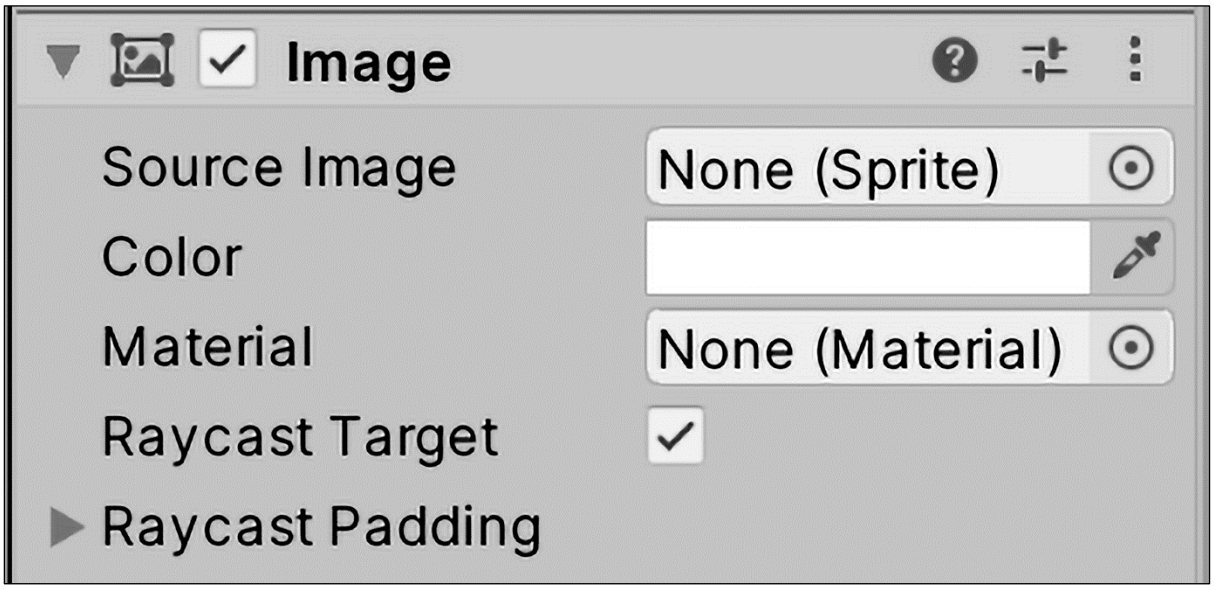
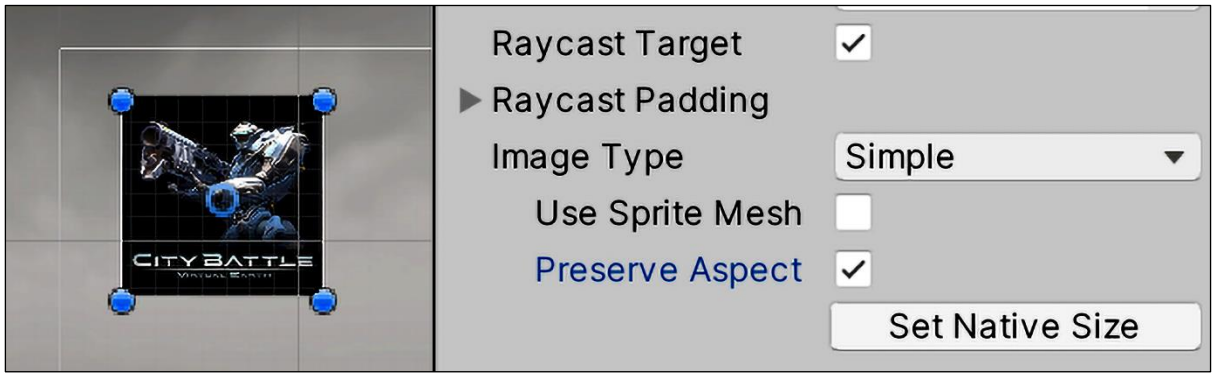
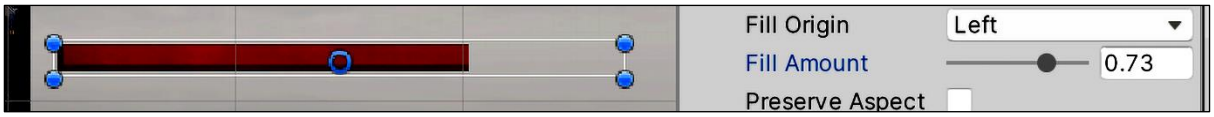

Image
Source Image
None (Sprite)
Color
Material
None (Material)
Raycast Target
Raycast Padding

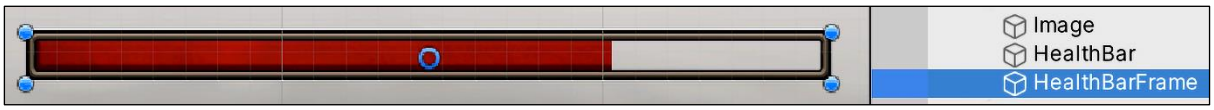



Image
Source Image
avatar
Color
Material
None (Material)

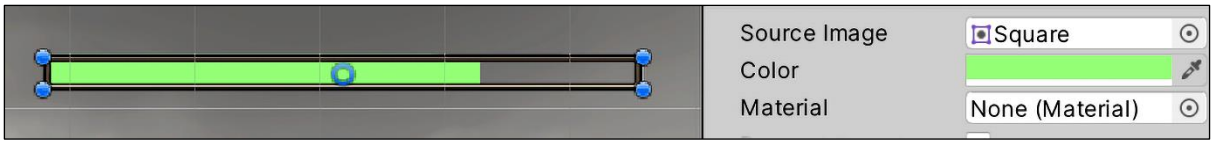

Raycast Target
Raycast Padding
Image Type
Simple
Use Sprite Mesh
Preserve Aspect
Set Native Size

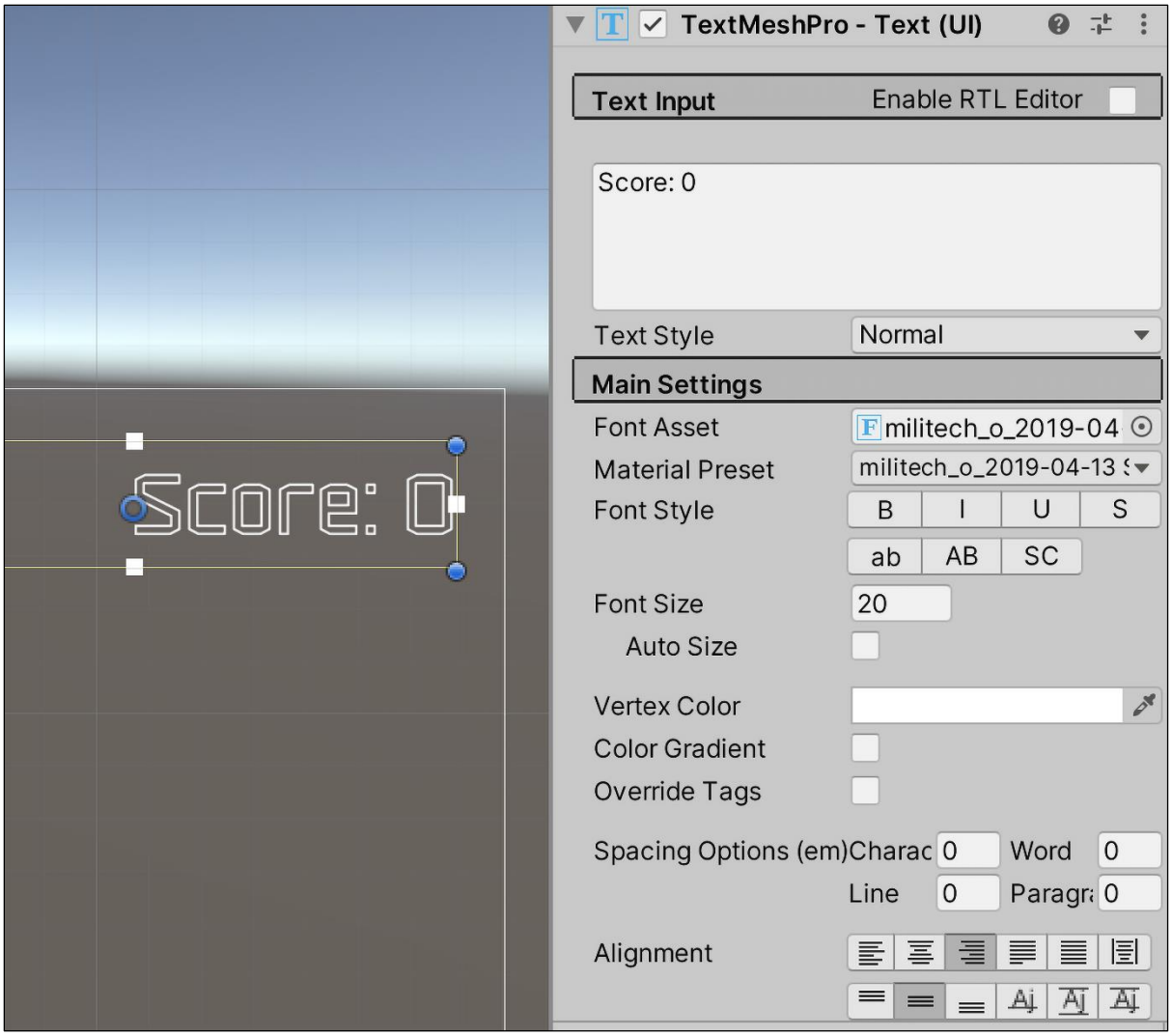

CITY BATTLE
VIRTUAL EARTH

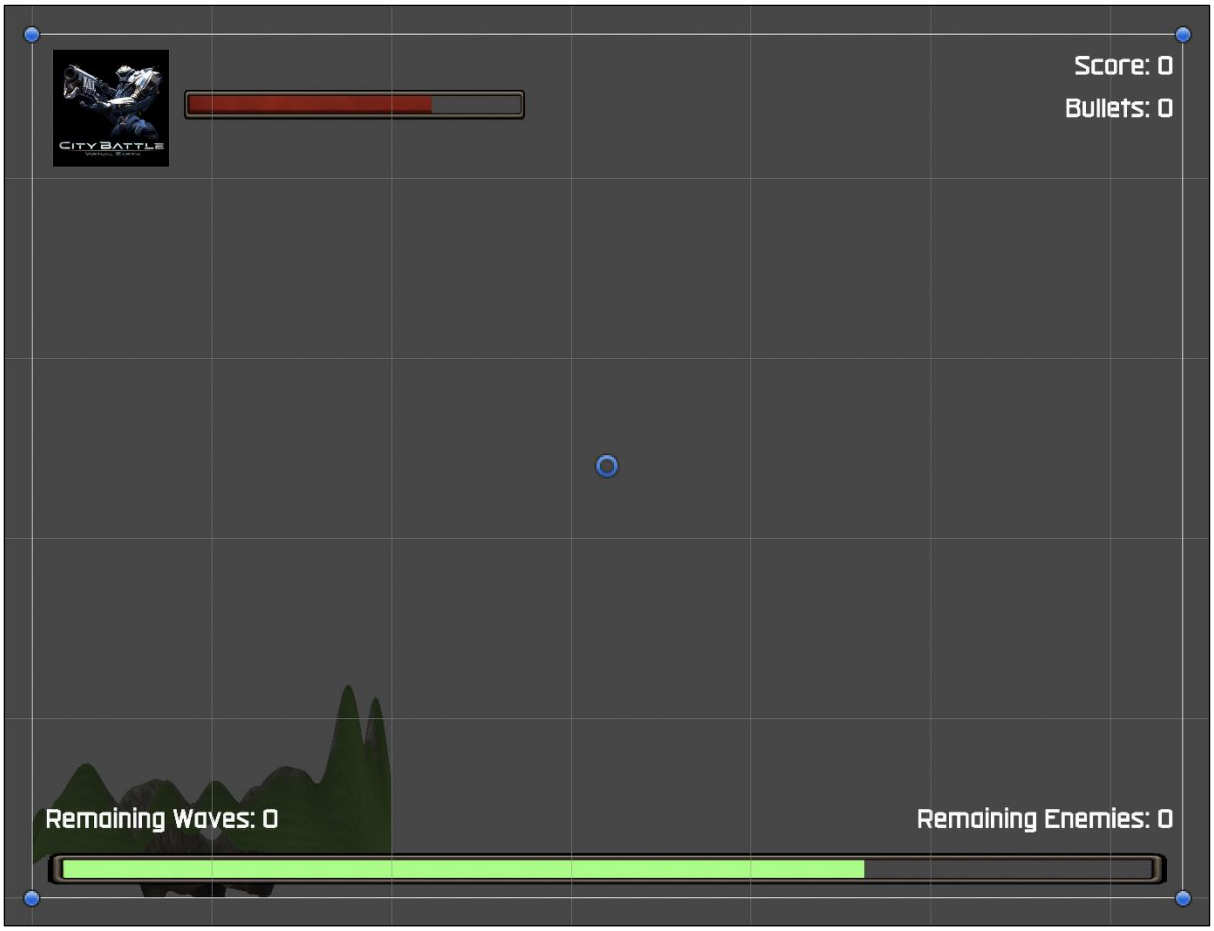

Fill Origin
Left
Fill Amount
0.73
Preserve Aspect

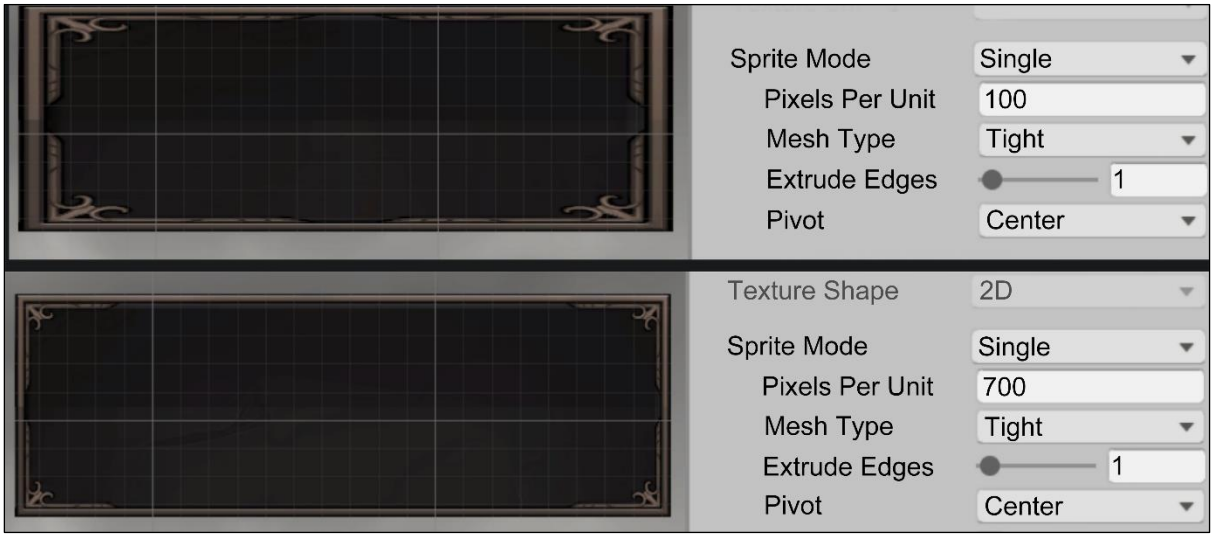

Image
HealthBar
HealthBarFrame

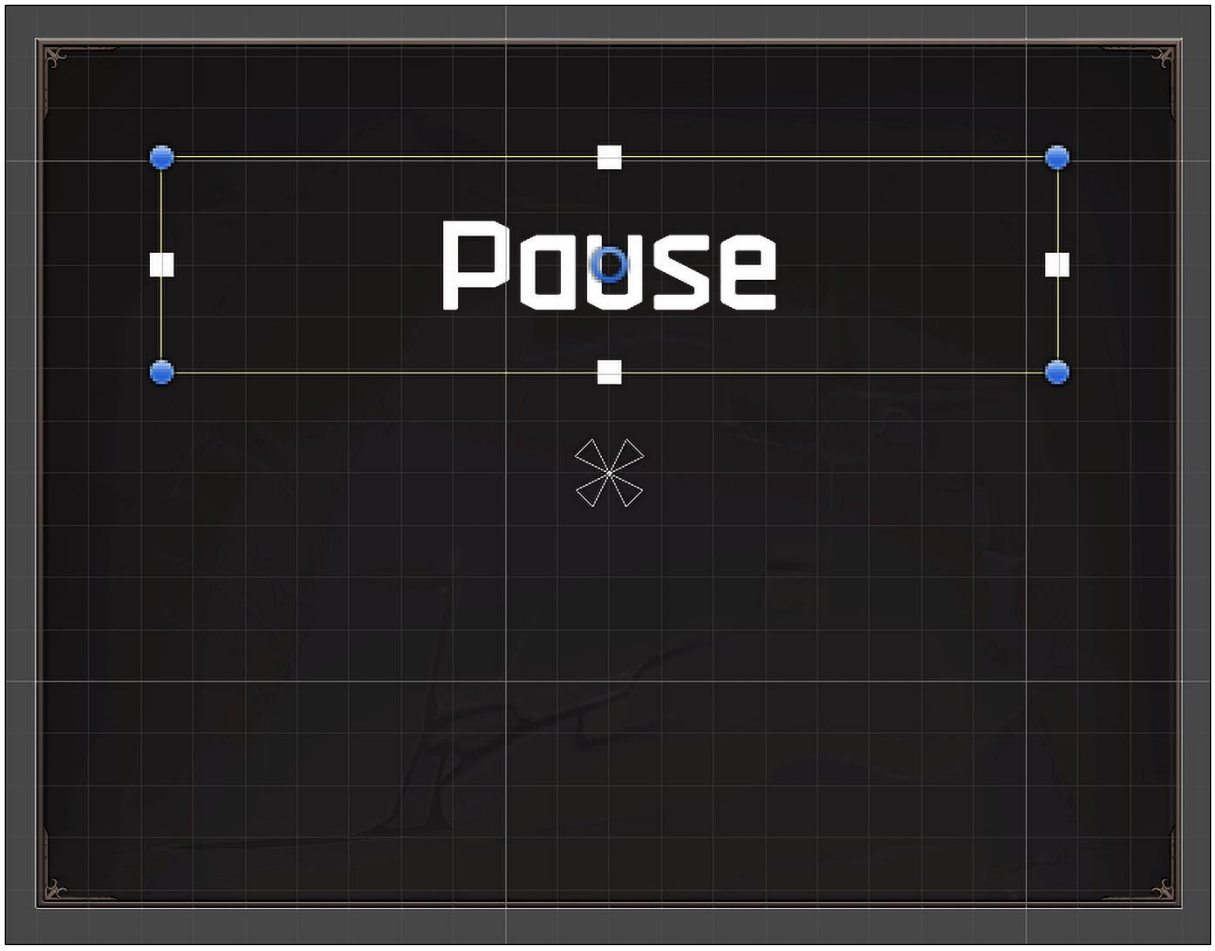

CITY BATTLE

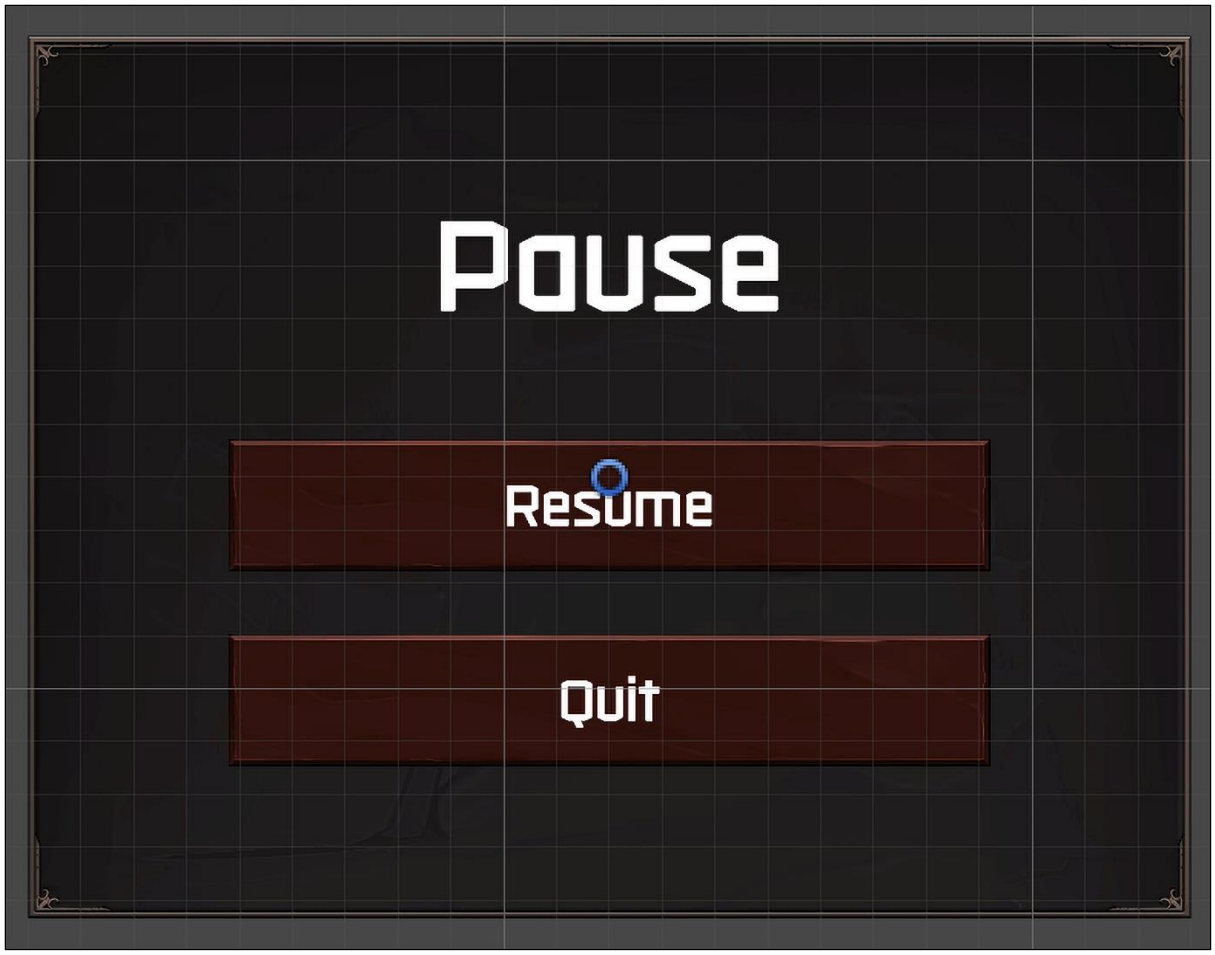

Source Image
Square
Color
Material
None (Material)

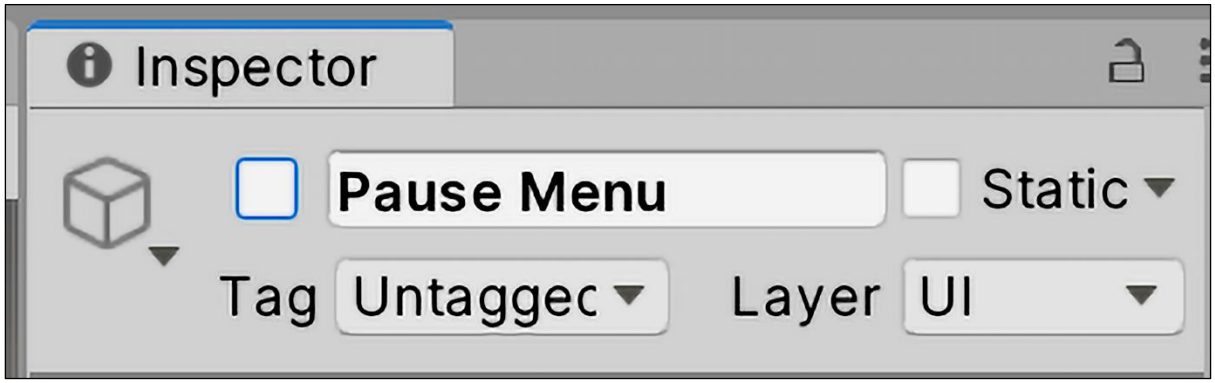

Score: 0
TextMeshPro - Text (UI)
Text Input
Enable RTL Editor
Score: 0
Text Style
Normal
Main Settings
Font Asset
militech_o_2019-04
Material Preset
militech_o_2019-04-13
Font Style
B
I
U
S
ab
AB
SC
Font Size
20
Auto Size
Vertex Color
Color Gradient
Override Tags
Spacing Options (em)
Charac
0
Word
0
Line
0
Paragra
0
Alignment

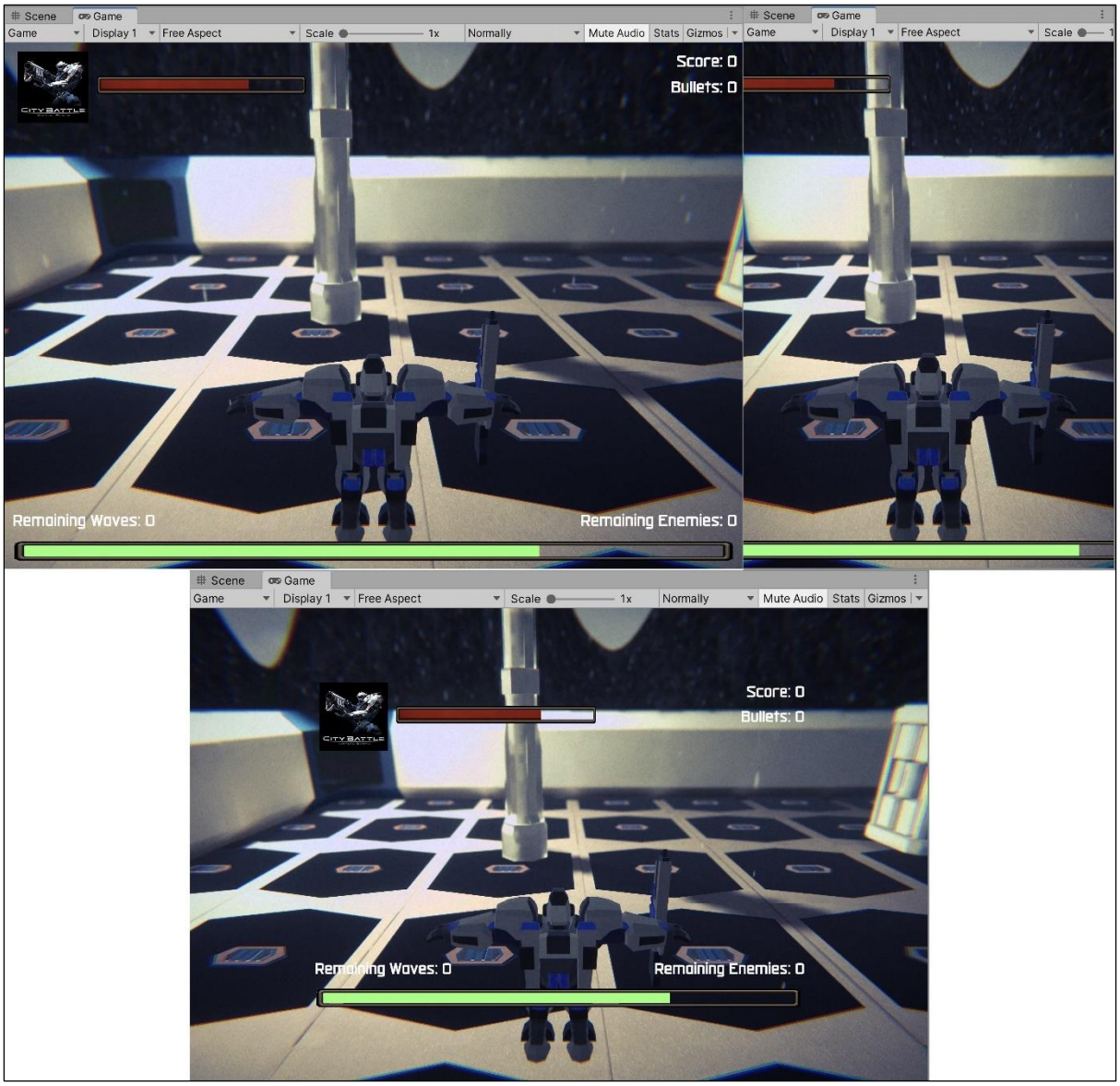

Score: 0
Bullets: 0
Remaining Waves: 0
Remaining Enemies: 0


Sprite Mode
Single
Pixels Per Unit
100
Mesh Type
Tight
Extrude Edges
1
Pivot
Center
Texture Shape
2D
Sprite Mode
Single
Pixels Per Unit
700
Mesh Type
Tight
Extrude Edges
1
Pivot
Center

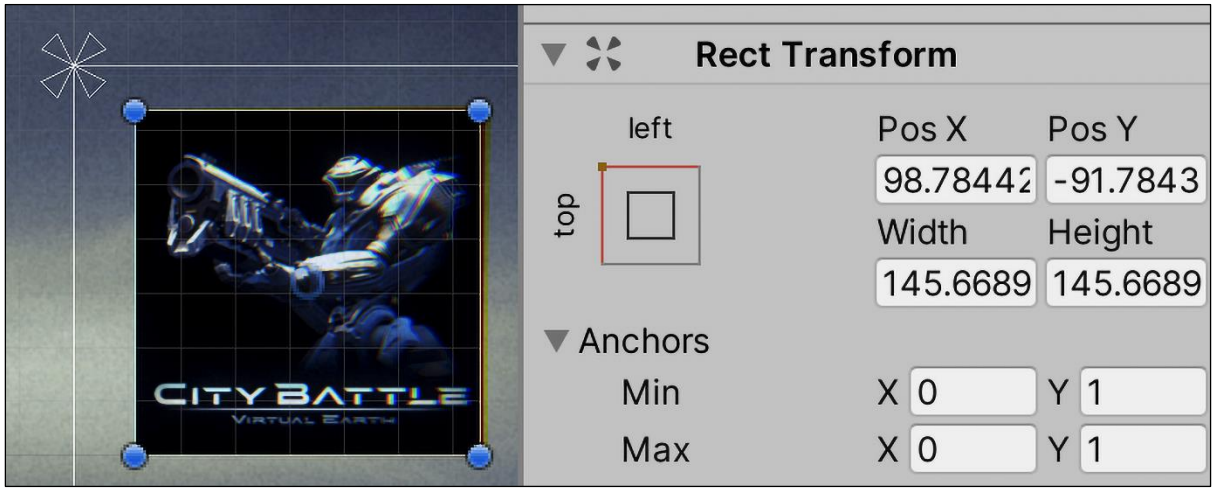

Pouse

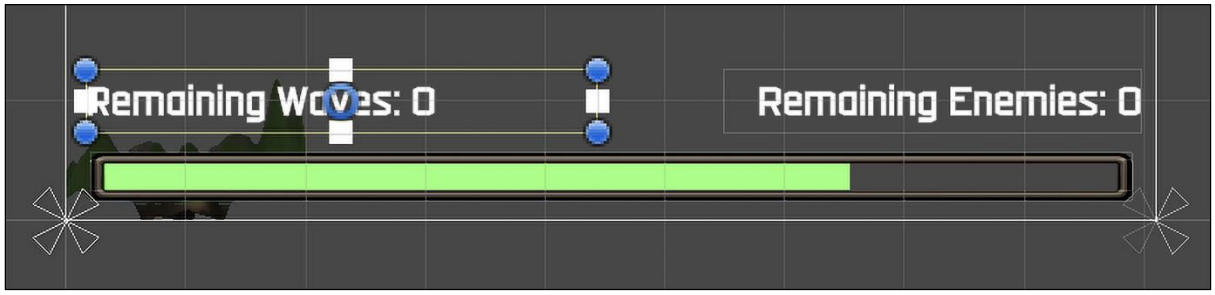

Pouse
Resume
Quit


Inspector
Pause Menu
Static
Tag
Untaggec
Layer
UI


Scene
Game
Game
Display 1
Free Aspect
Scale
1x
Normally
Mute Audio
Stats
Gizmos
Score: 0
Bullets: 0
Remaining Waves: 0
Remaining Enemies: 0
Scene
Game
Game
Display 1
Free Aspect
Scale
Scene
Game
Game
Display 1
Free Aspect
Scale
1x
Normally
Mute Audio
Stats
Gizmos
Score: 0
Bullets: 0
Remaining Waves: 0
Remaining Enemies: 0


CITY BATTLE
VIRTUAL EARTH


CITY BATTLE
VIRTUAL EARTH
Rect Transform
left
top
Pos X
Pos Y
98.78442
-91.7843
Width
Height
145.6689
145.6689
Anchors
Min
X 0
Y 1
Max
X 0
Y 1

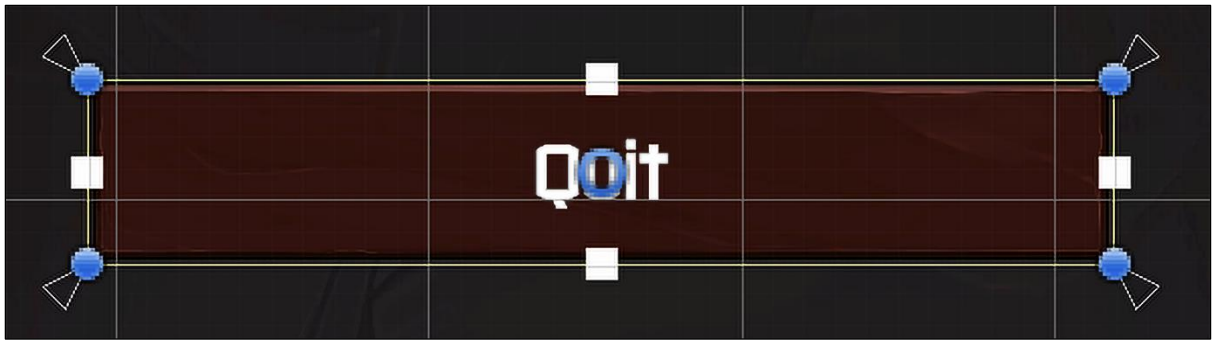

Remaining Waves: 0
Remaining Enemies: 0

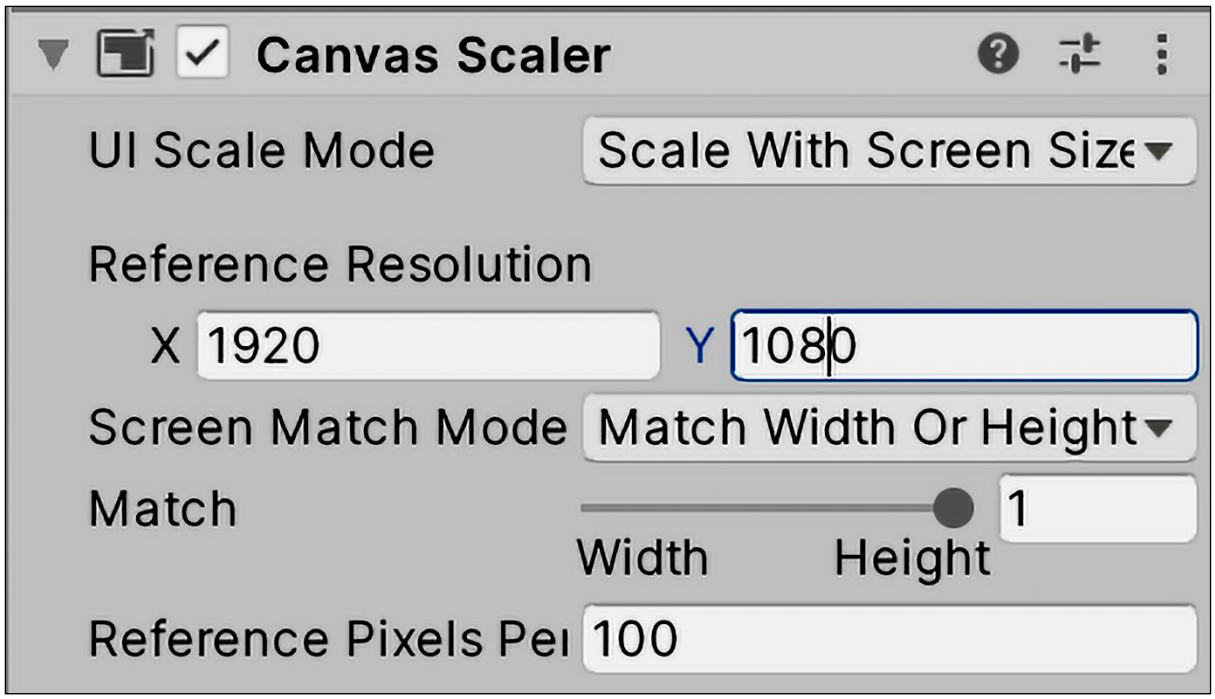

Score: 0
Bullets: 0

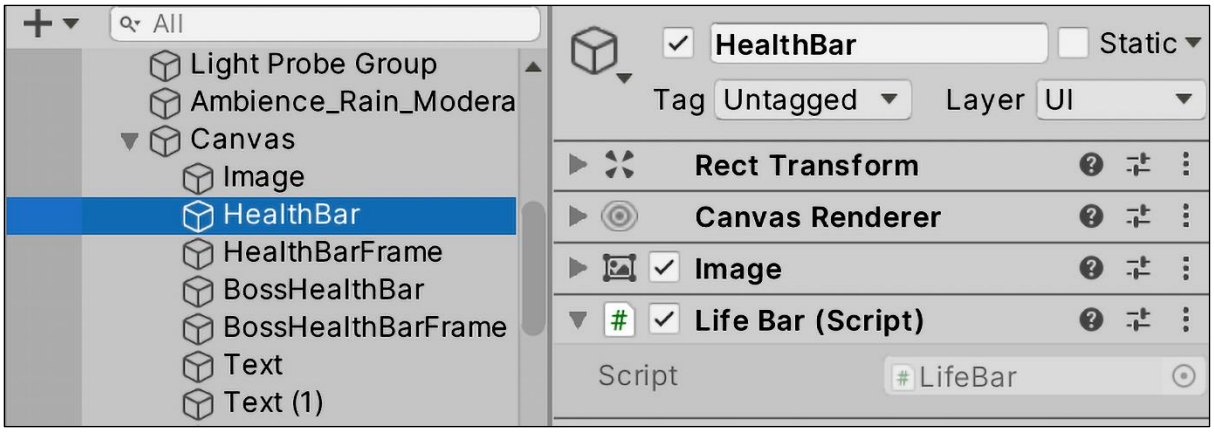

Score: 0
Bullets: 0
Preview
Remaining Waves: 0
Remaining Enemies: 0



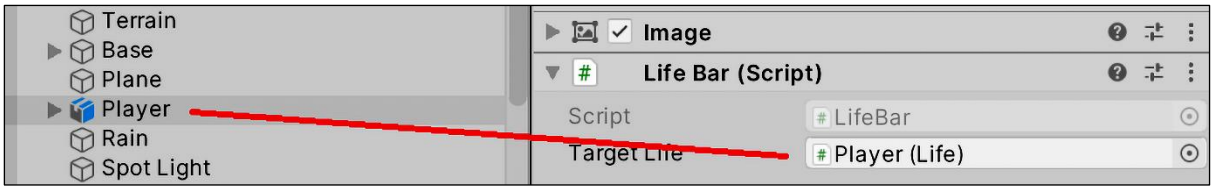

Rect Transform
stretch
bottom
Left
Pos Y
Pos Z
20
30
0
Right
Height
20
19
R


Qoit


Canvas Scaler
UI Scale Mode
Scale With Screen Size
Reference Resolution
X 1920
Y 1080
Screen Match Mode
Match Width Or Height
Match
1
Width
Height
Reference Pixels Per
100




```
public class LifeBar : MonoBehaviour
{
    public Life targetLife;
}
```




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

```
Image image;
public Life targetLife;
```

```
void Awake()
{
    image = GetComponent<Image>();
}
```

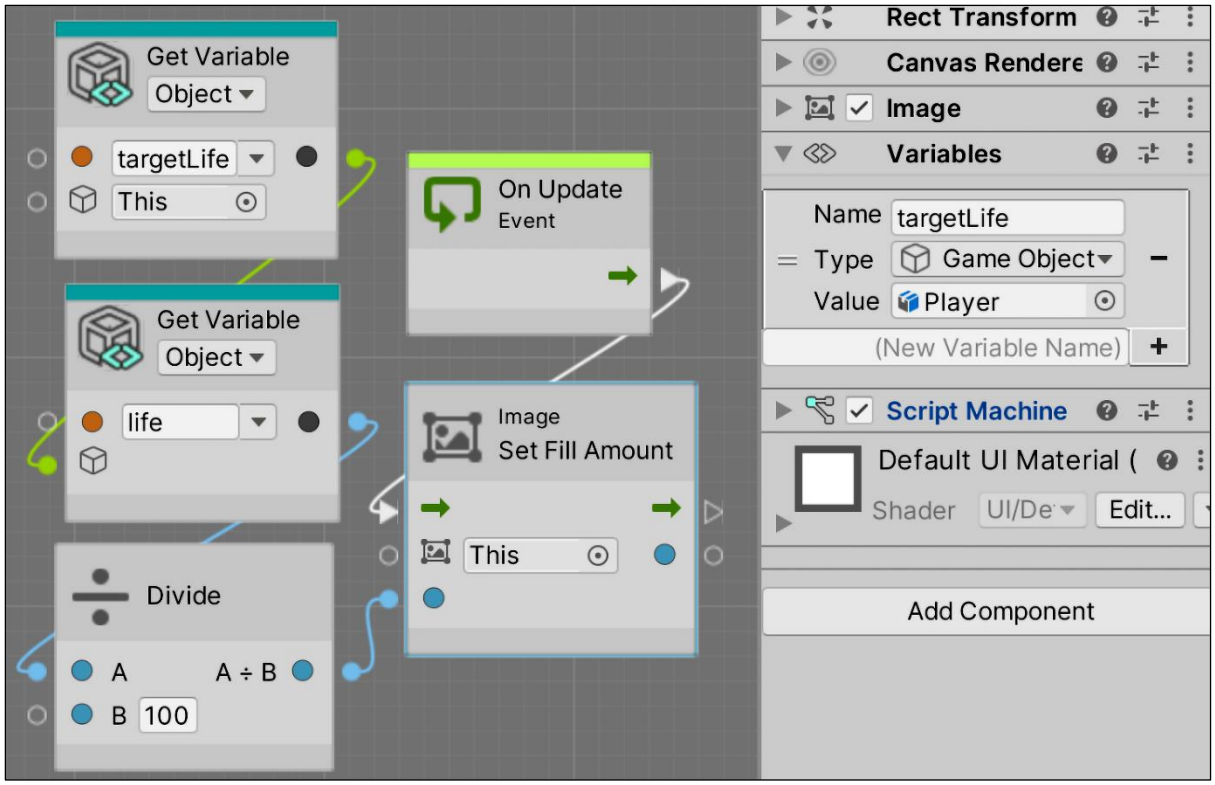
```
void Update()
{
    image.fillAmount = targetLife.amount / 100;
}
```

```
using UnityEngine;
using UnityEngine.UI;

public class LifeBar : MonoBehaviour
{
    Image image;
    public Life targetLife;

    void Awake()
    {
        image = GetComponent<Image>();
    }

    void Update()
    {
        image.fillAmount = targetLife.amount / 100;
    }
}
```



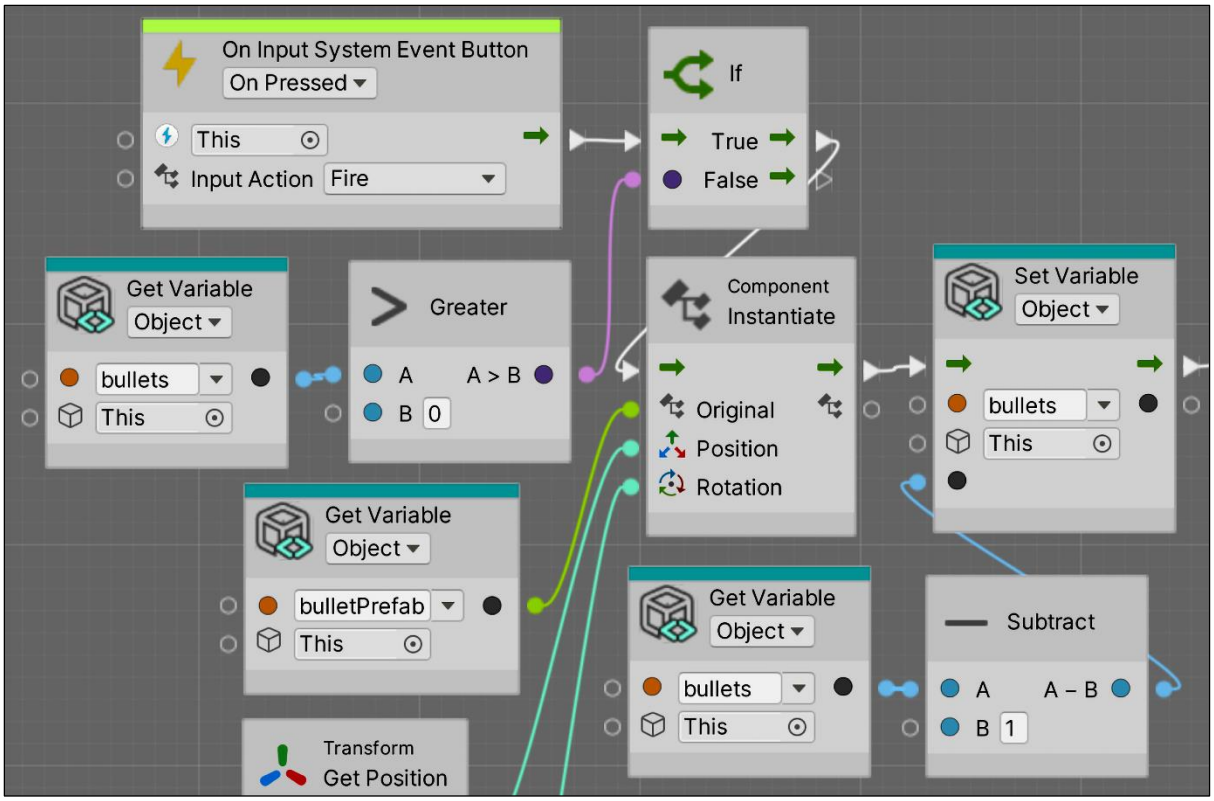

```
public int bulletsAmount;

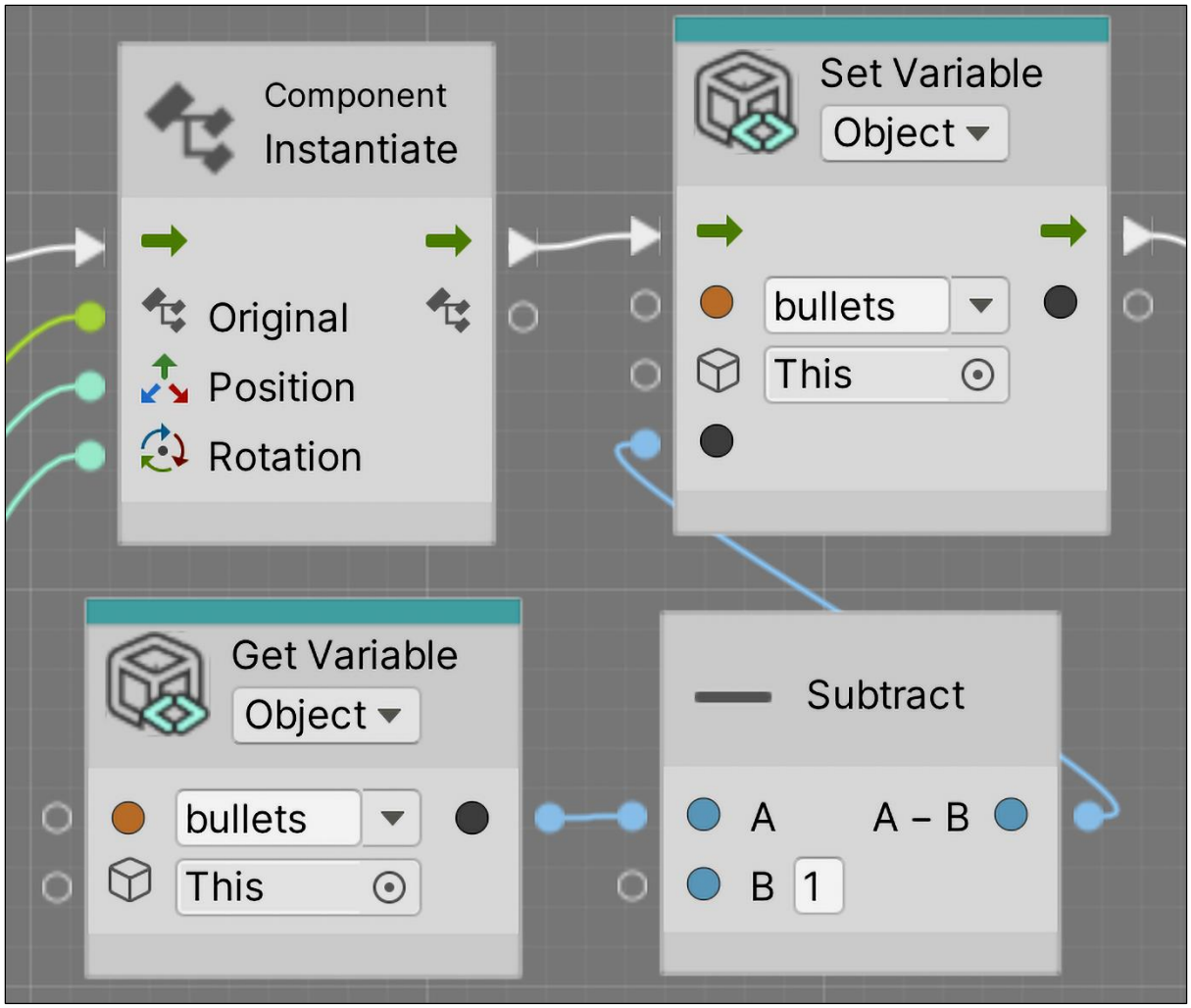
public void OnFire(InputValue value)
{
    if (value.isPressed && bulletsAmount > 0)
    {
        bulletsAmount--;

        GameObject clone = Instantiate(prefab);

        clone.transform.position = shootPoint.transform.position;
        clone.transform.rotation = shootPoint.transform.rotation;

        muzzleEffect.Play();
        shootSound.Play();
    }
}
```


On Input System Event Button
On Pressed
This
Input Action
Fire
If
True
False
Get Variable
Object
bullets
This
Greater
A
A > B
B
0
Component
Instantiate
Original
Position
Rotation
Set Variable
Object
bullets
This
Get Variable
Object
bulletPrefab
This
Get Variable
Object
bullets
This
Subtract
A
A – B
B
1
Transform
Get Position

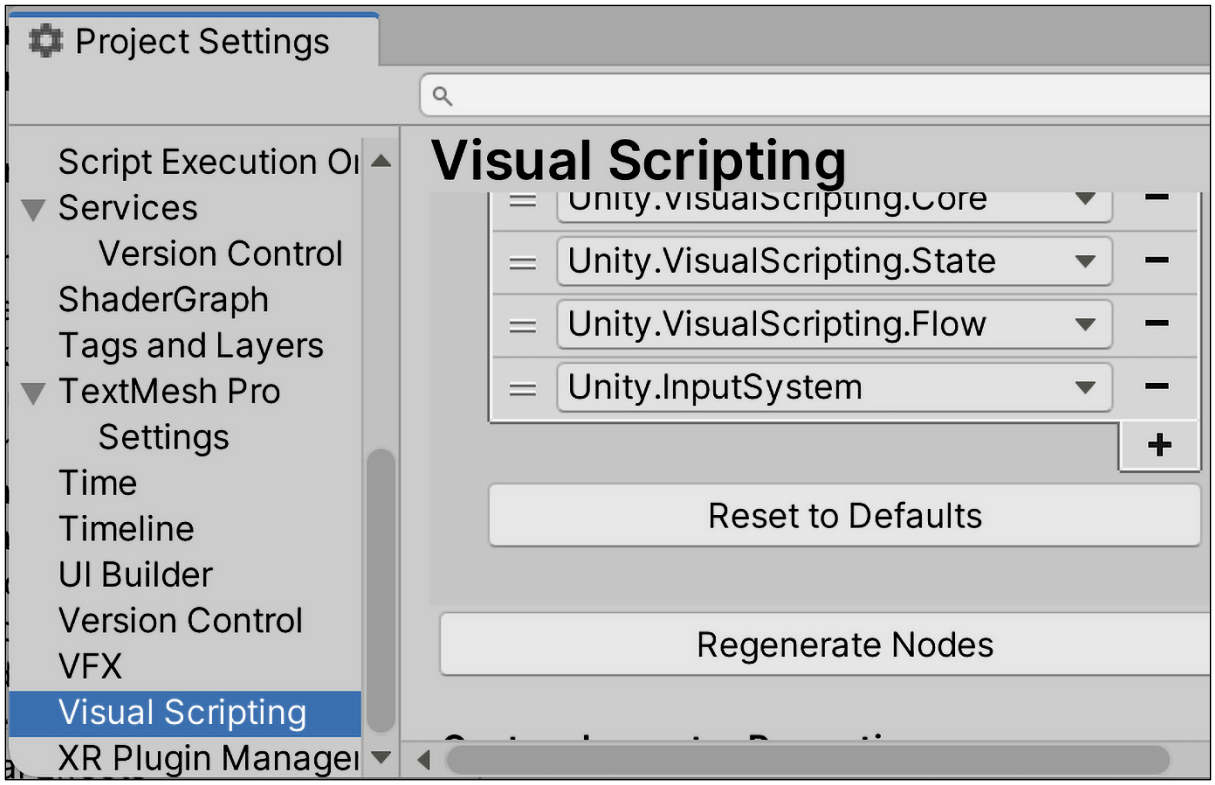

Component
Instantiate
Original
Position
Rotation
Set Variable
Object
bullets
This
Get Variable
Object
bullets
This
Subtract
A
A – B
B
1

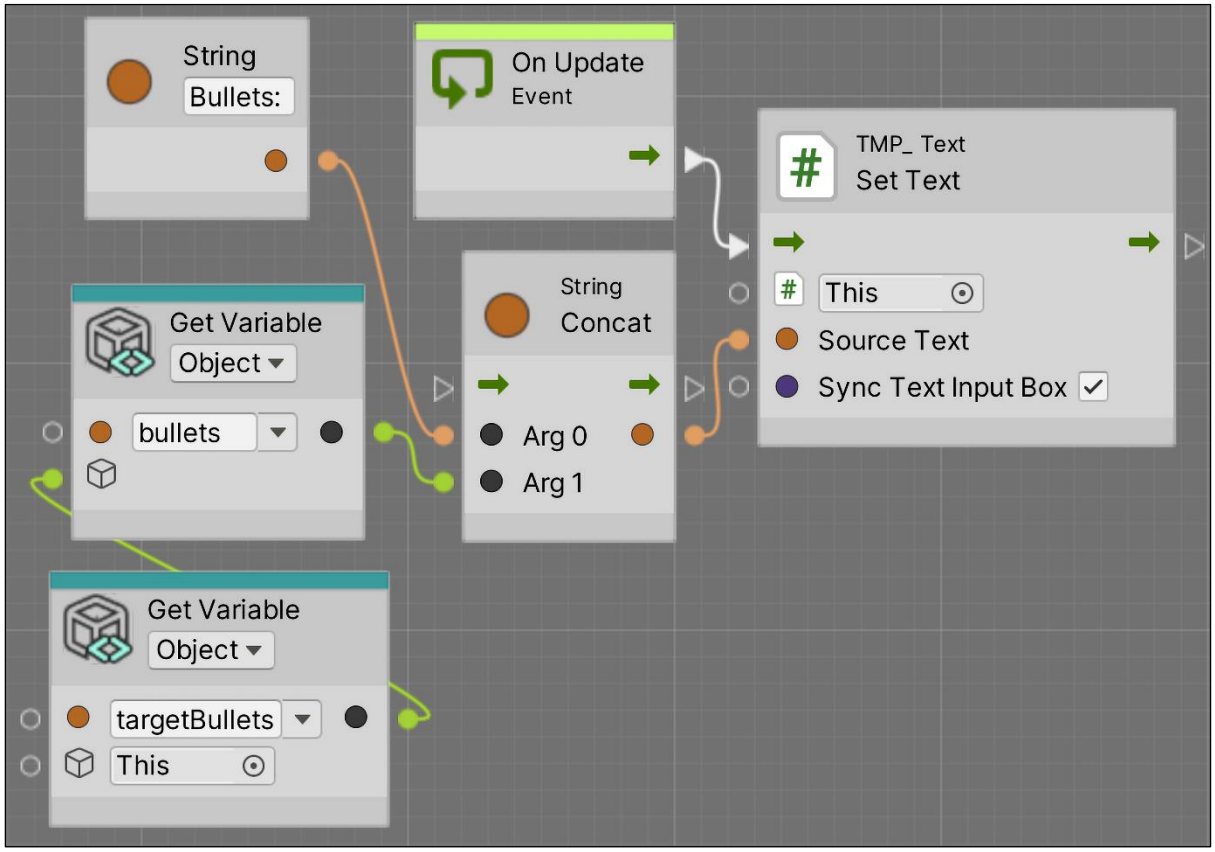
```
using TMPro;
using UnityEngine;

public class PlayerBulletsUI : MonoBehaviour
{
    TMP_Text text;

    void Awake()
    {
        text = GetComponent<TMP_Text>();
    }
}
```

```
void Update()
{
    text.text = "Bullets: " + targetShooting.bulletsAmount;
}
```


Project Settings
Script Execution Or
Services
Version Control
ShaderGraph
Tags and Layers
TextMesh Pro
Settings
Time
Timeline
UI Builder
Version Control
VFX
Visual Scripting
XR Plugin Manager
Visual Scripting
Unity.VisualScripting.Core
Unity.VisualScripting.State
Unity.VisualScripting.Flow
Unity.InputSystem
Reset to Defaults
Regenerate Nodes


String
Bullets:
On Update
Event
TMP_ Text
Set Text
This
Source Text
Sync Text Input Box
String
Concat
Arg 0
Arg 1
Get Variable
Object
bullets
Get Variable
Object
targetBullets
This

```
using TMPro;
using UnityEngine;

public class ScoreUI : MonoBehaviour
{
    TMP_Text text;

    void Awake()
    {
        text = GetComponent<TMP_Text>();
    }

    void Update()
    {
        text.text = "Score: " + ScoreManager.instance.amount;
    }
}
```

```
using TMPro;
using UnityEngine;

public class WavesUI : MonoBehaviour
{
    TMP_Text text;

    void Start()
    {
        text = GetComponent<TMP_Text>();
        WavesManager.instance.onChanged.AddListener(RefreshText);
    }

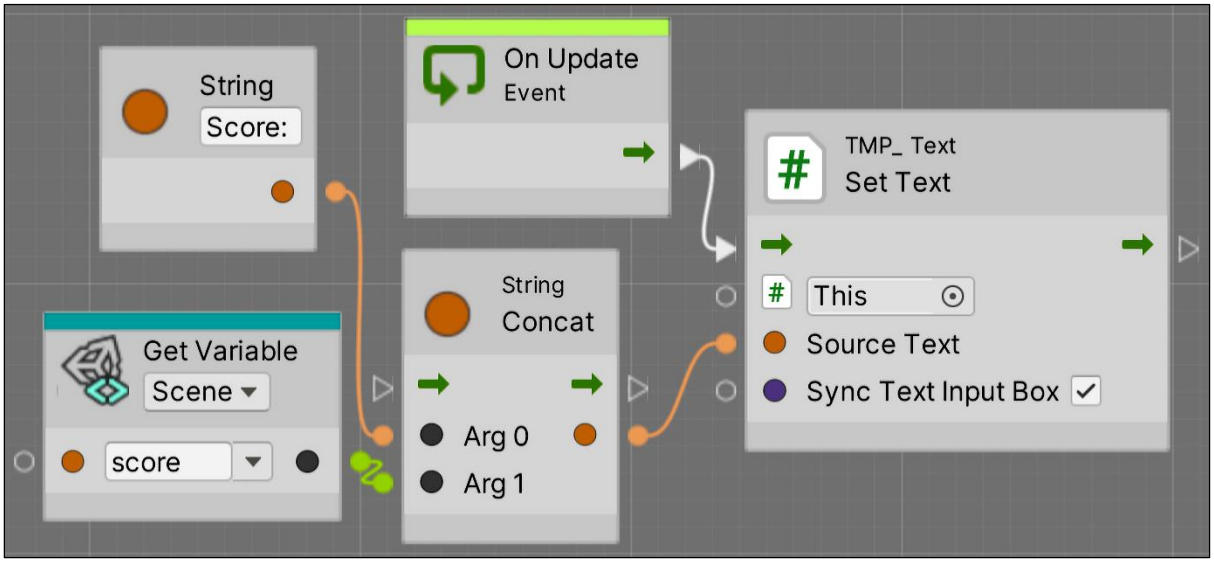
    void RefreshText()
    {
        text.text = "Remaining Waves: " + WavesManager.instance.waves.Count;
    }
}
```

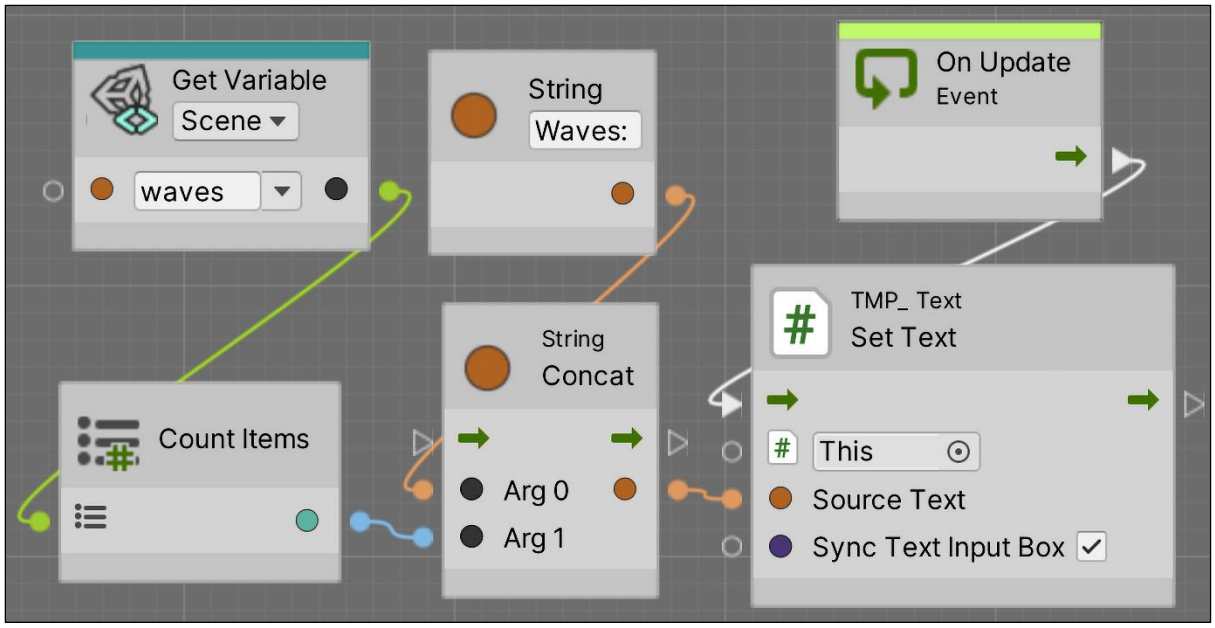
```
using TMPro;
using UnityEngine;

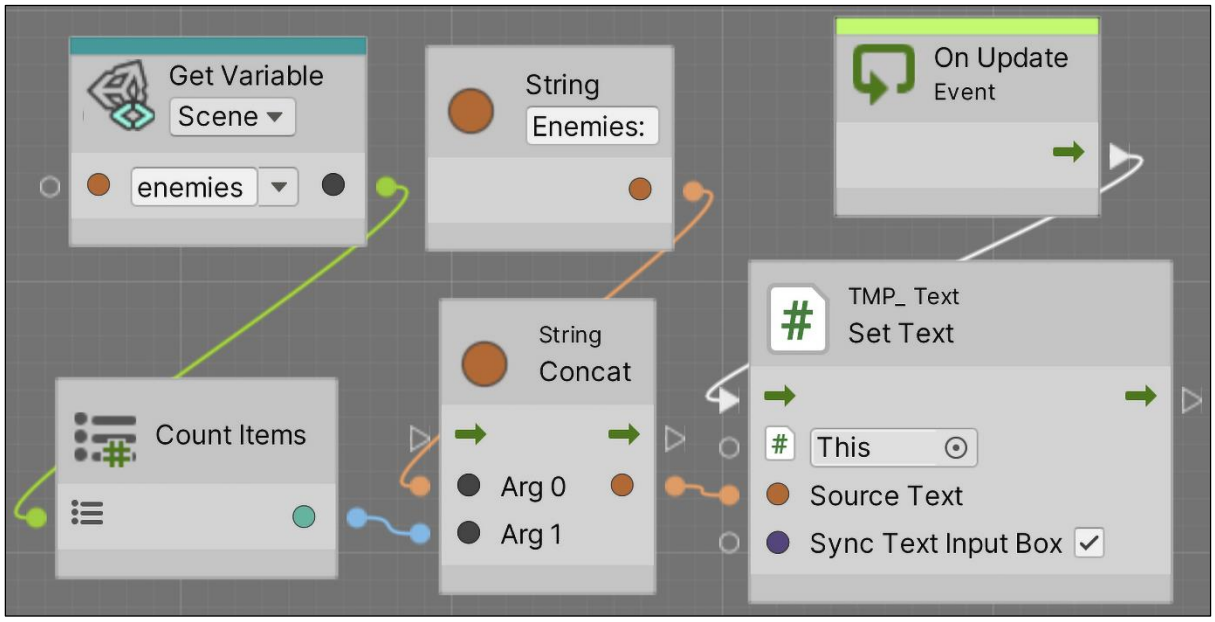
public class EnemiesUI : MonoBehaviour
{
    TMP_Text text;

    void Start()
    {
        text = GetComponent<TMP_Text>();
        EnemyManager.instance.onChanged.AddListener(RefreshText);
    }

    void RefreshText()
    {
        text.text = "Remaining Enemies: " + EnemyManager.instance.enemies.Count;
    }
}
```




Get Variable
Scene
waves
String
Waves:
On Update
Event
Count Items
String
Concat
Arg 0
Arg 1
TMP_ Text
Set Text
This
Source Text
Sync Text Input Box


Get Variable
Scene
enemies
String
Enemies:
On Update
Event
Count Items
String
Concat
Arg 0
Arg 1
TMP_ Text
Set Text
This
Source Text
Sync Text Input Box

```
using UnityEngine;
using UnityEngine.InputSystem;

public class Pause : MonoBehaviour
{
    void Update()
    {
        if (Keyboard.current.escapeKey.wasPressedThisFrame)
        {
            Time.timeScale = 0;
        }
    }
}
```

```
public void OnFire(InputValue value)
{
    if (value.isPressed && bulletsAmount > 0 && Time.timeScale > 0)
    {
        bulletsAmount--;
```

```
public GameObject pauseMenu;

void Awake()
{
    pauseMenu.SetActive(false);
}

void Update()
{
    if (Keyboard.current.escapeKey.wasPressedThisFrame)
    {
        pauseMenu.SetActive(true);
        Time.timeScale = 0;
    }
}
```

```
public GameObject pauseMenu;
public Button resumeButton;

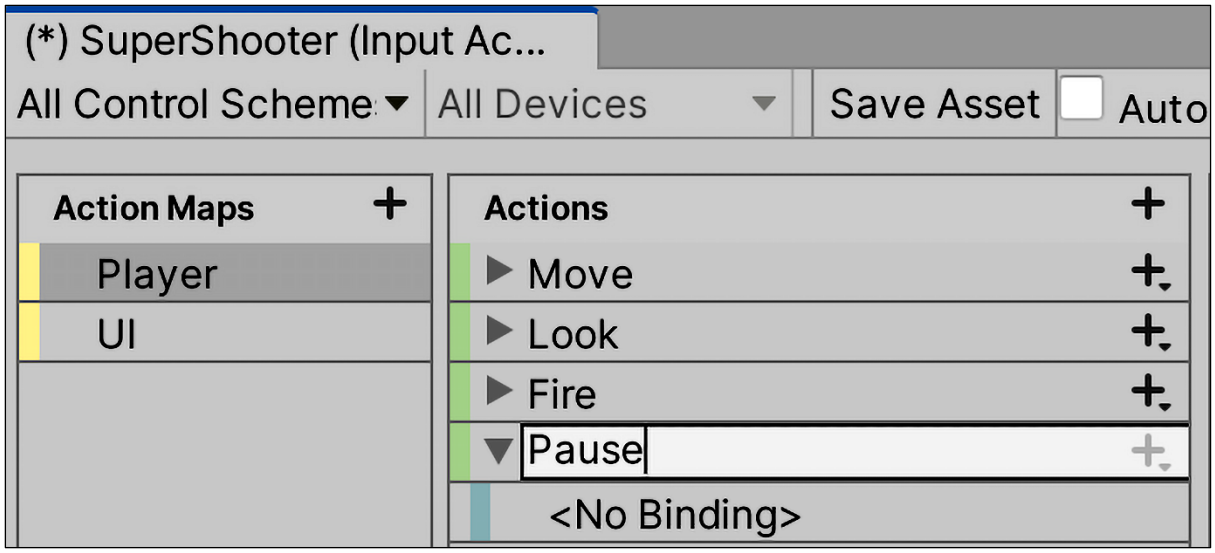
void Awake()
{
    pauseMenu.SetActive(false);
    resumeButton.onClick.AddListener(OnResumePressed);
}

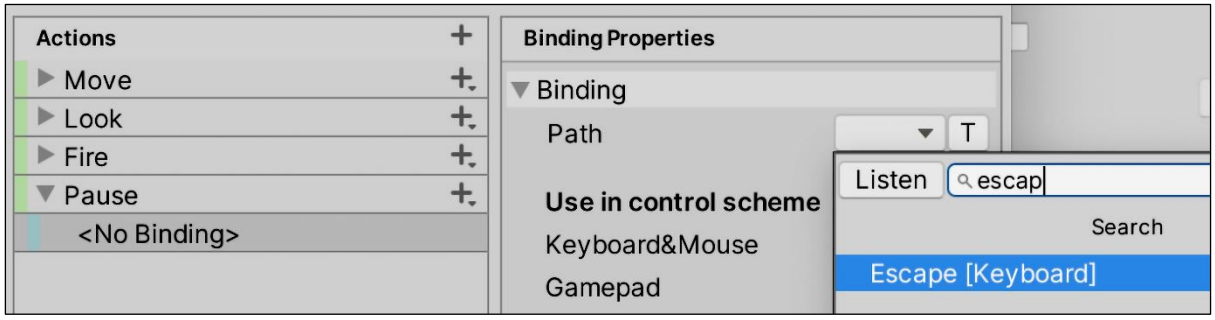
void OnResumePressed()
{
    pauseMenu.SetActive(false);
    Time.timeScale = 1;
}
```

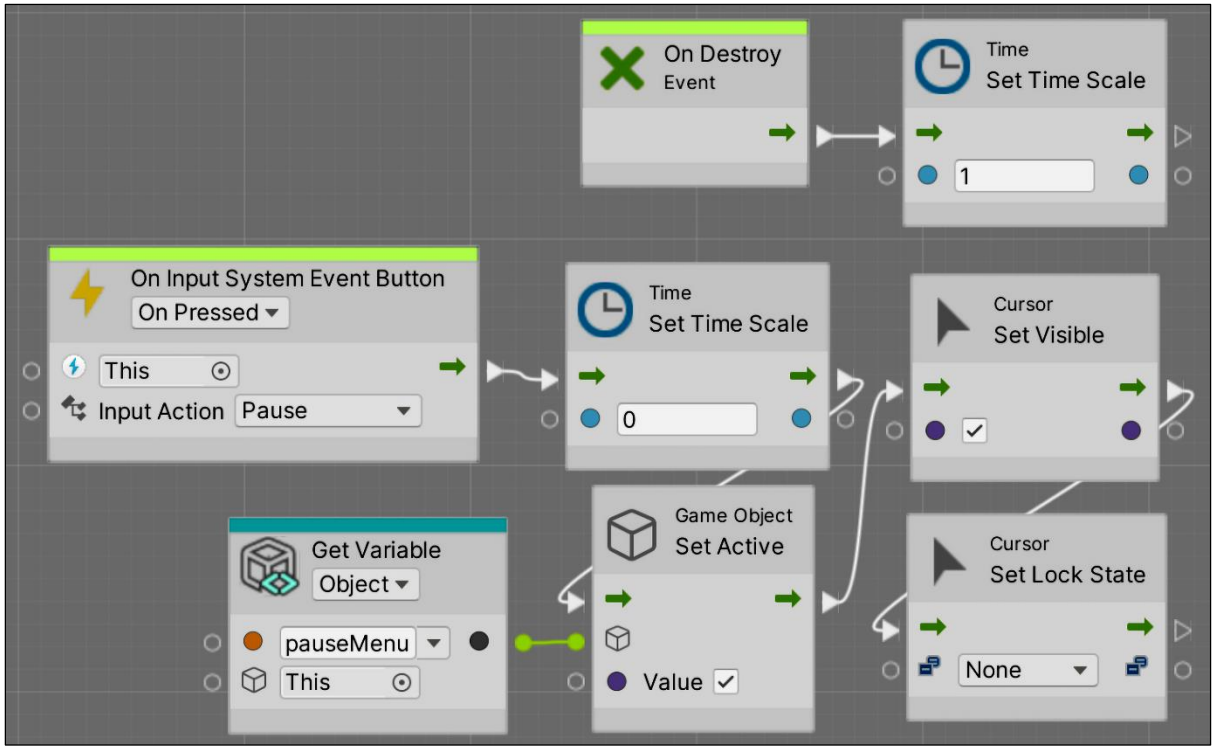
```
void OnResumePressed()
{
    pauseMenu.SetActive(false);
    Time.timeScale = 1;
    Cursor.visible = false;
    Cursor.lockState = CursorLockMode.Locked;
}

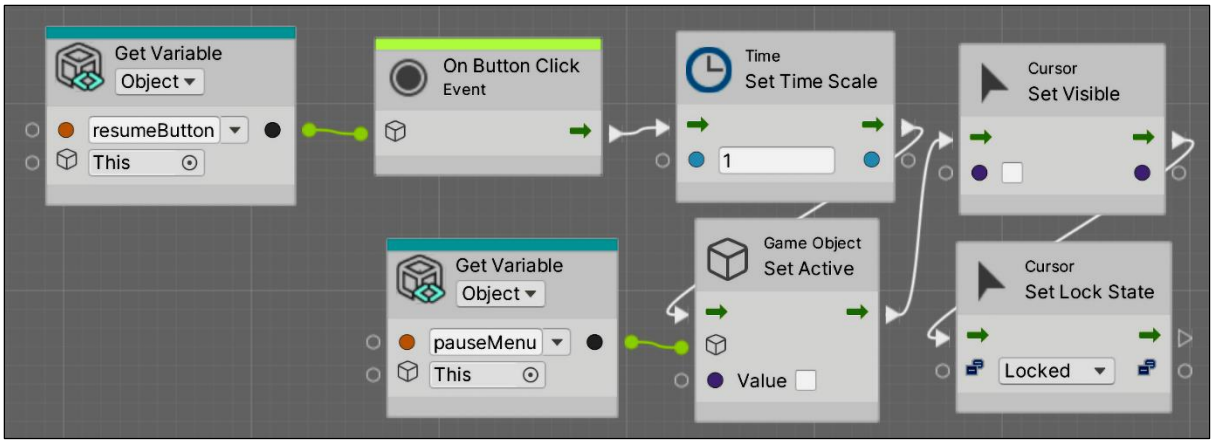
void Update()
{
    if (Keyboard.current.escapeKey.wasPressedThisFrame)
    {
        Cursor.visible = true;
        Cursor.lockState = CursorLockMode.None;
        pauseMenu.SetActive(true);
        Time.timeScale = 0;
    }
}
```

```
private void OnDestroy()
{
    Time.timeScale = 1;
}
```


(*) SuperShooter (Input Ac...
All Control Scheme
All Devices
Save Asset
Auto
Action Maps
Player
UI
Actions
Move
Look
Fire
Pause
<No Binding>


Actions
Move
Look
Fire
Pause
<No Binding>
Binding Properties
Binding
Path
T
Use in control scheme
Keyboard&Mouse
Gamepad
Listen
escap
Search
Escape [Keyboard]


On Destroy
Event
Time
Set Time Scale
1
On Input System Event Button
On Pressed
This
Input Action
Pause
Time
Set Time Scale
0
Cursor
Set Visible
Get Variable
Object
pauseMenu
This
Game Object
Set Active
Value
Cursor
Set Lock State
None

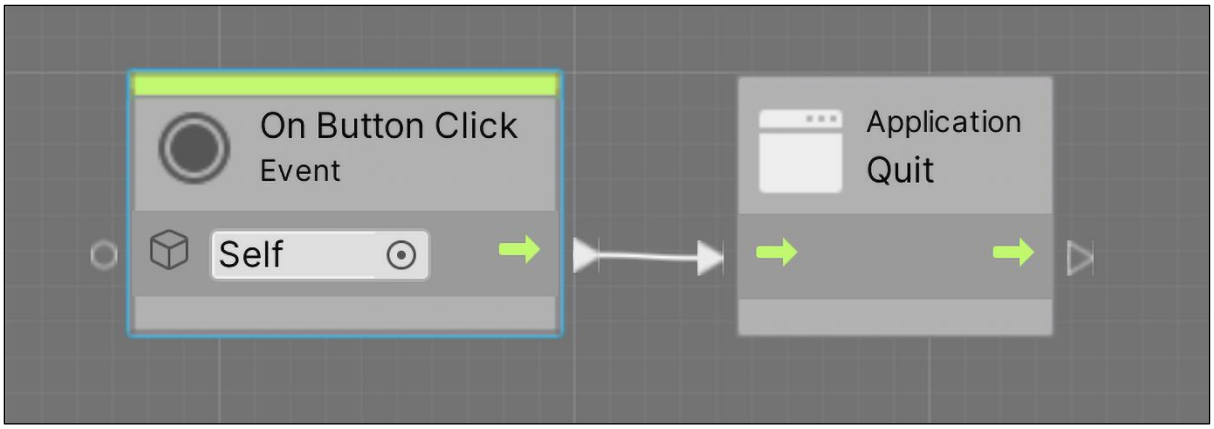

Get Variable
Object
resumeButton
This
On Button Click
Event
Time
Set Time Scale
1
Cursor
Set Visible
Get Variable
Object
pauseMenu
This
Game Object
Set Active
Value
Cursor
Set Lock State
Locked

```
using UnityEngine;
using UnityEngine.UI;

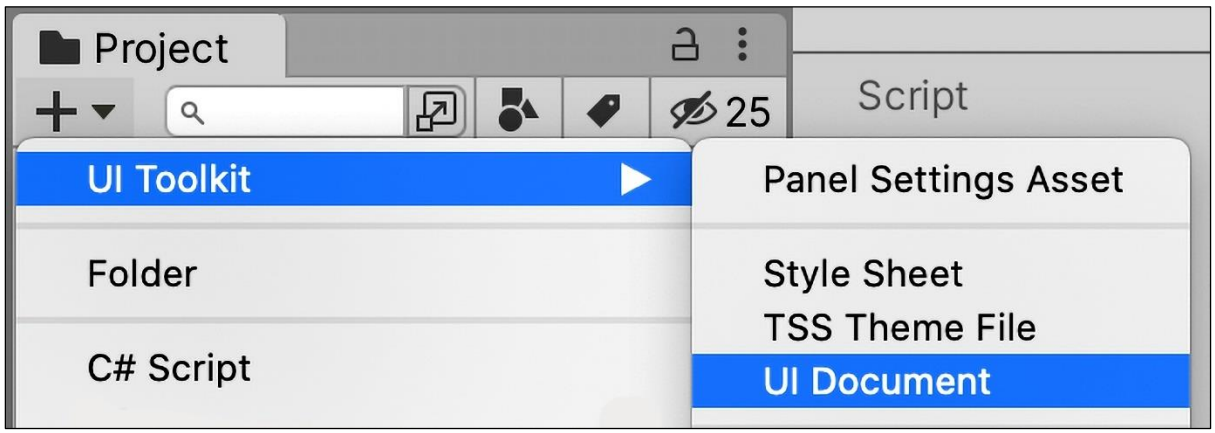
public class QuitButton : MonoBehaviour
{
    Button button;

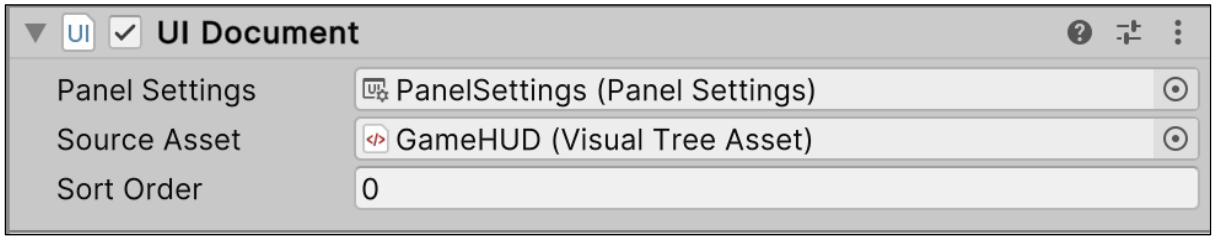
    void Awake()
    {
        button = GetComponent<Button>();
        button.onClick.AddListener(Quit);
    }

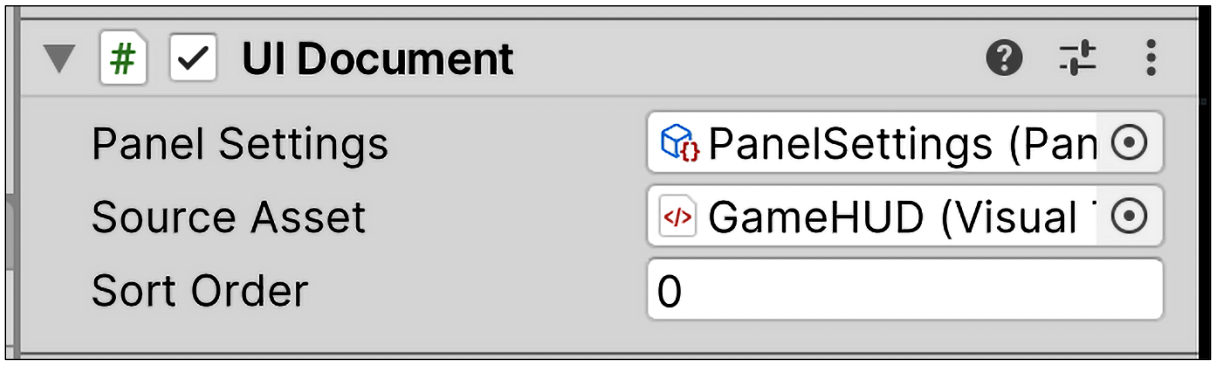
    void Quit()
    {
        print("Quitting");
        Application.Quit();
    }
}
```

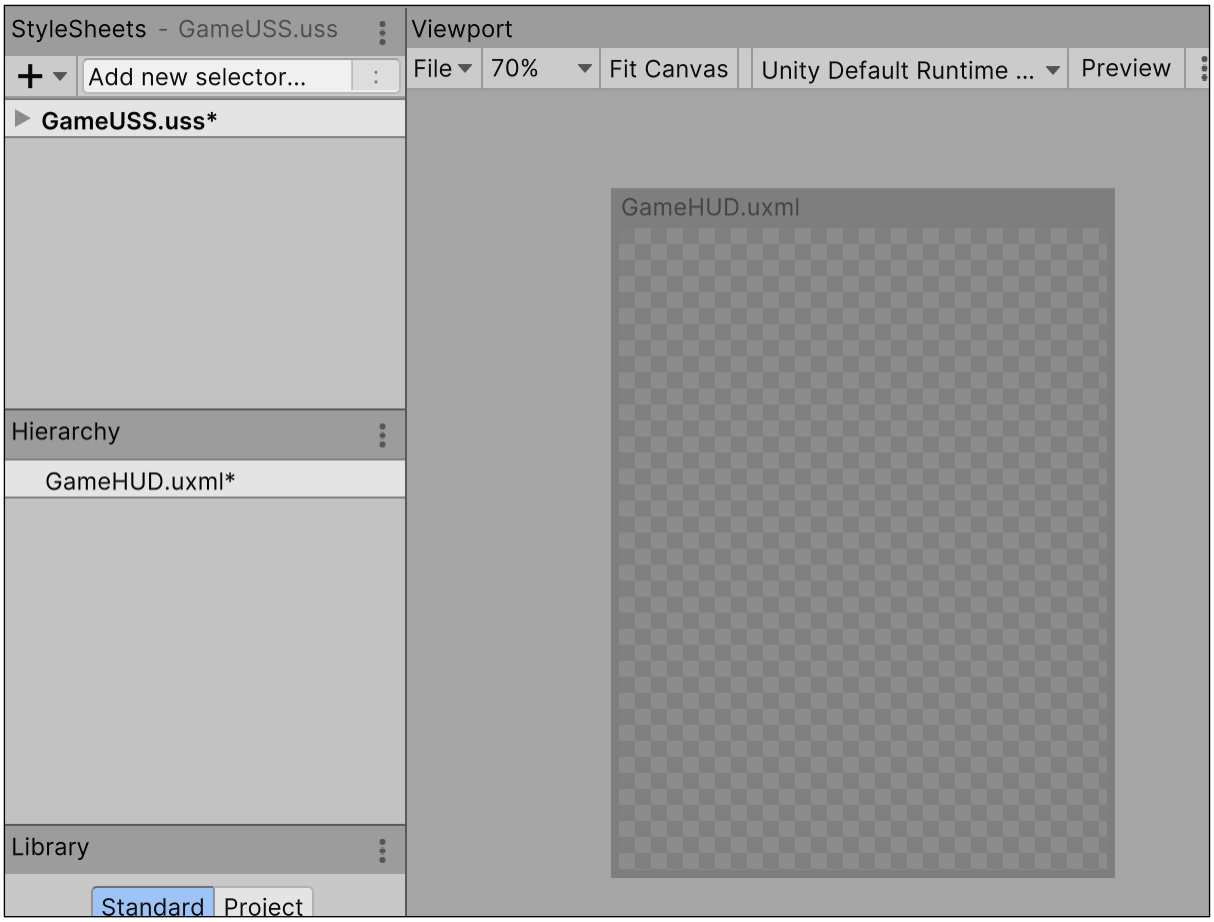

On Button Click
Event
Self
Application
Quit

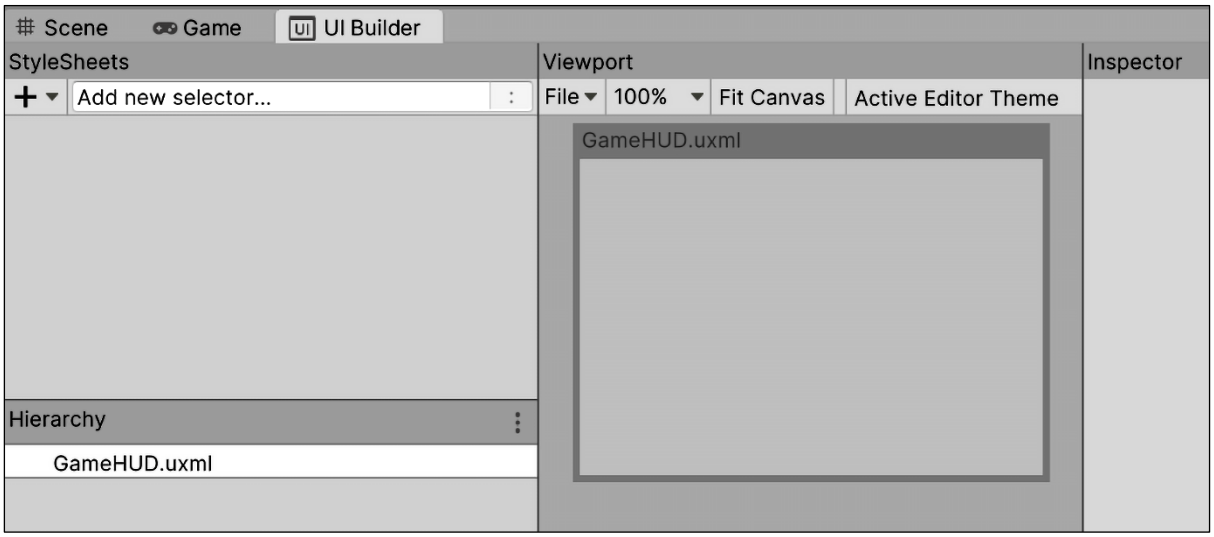
Chapter 16: Next-Gen UI: Creating Dynamic Interfaces with the UI Toolkit

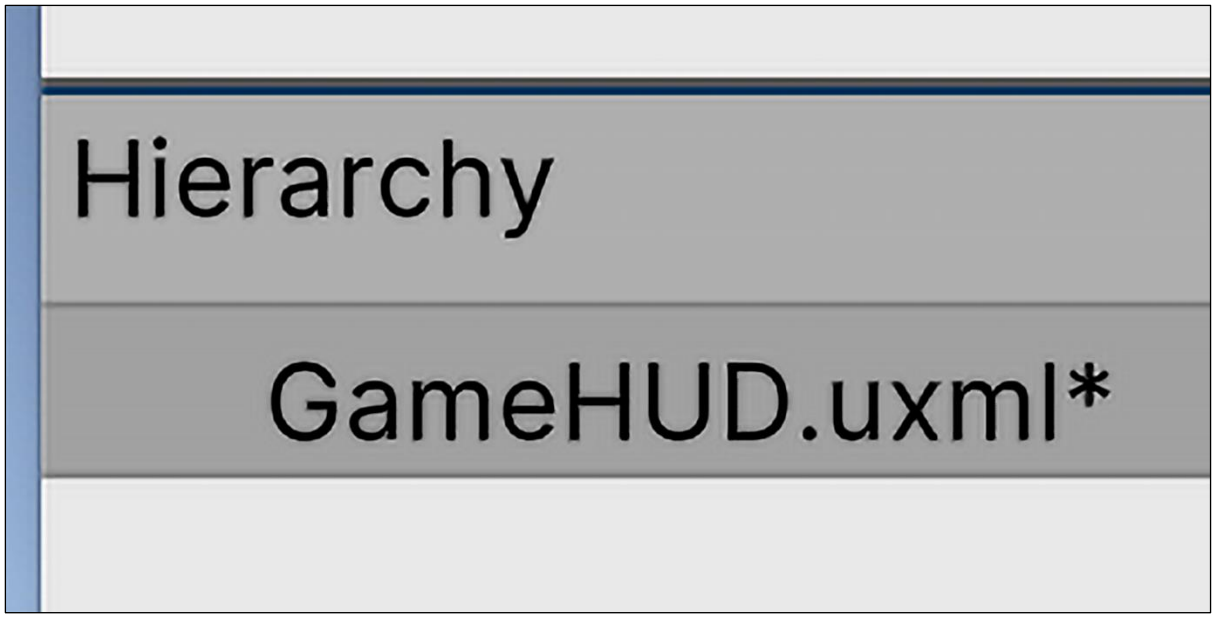


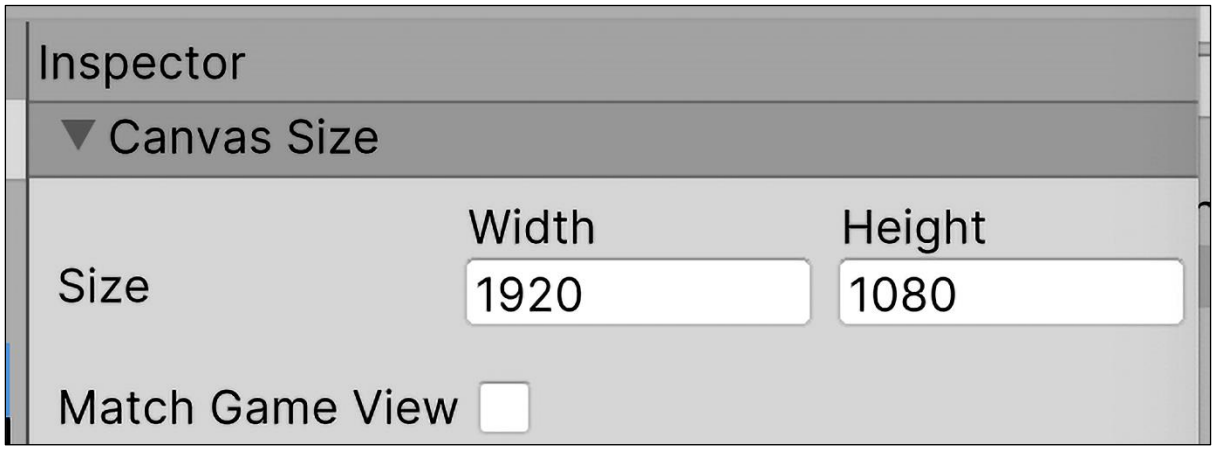


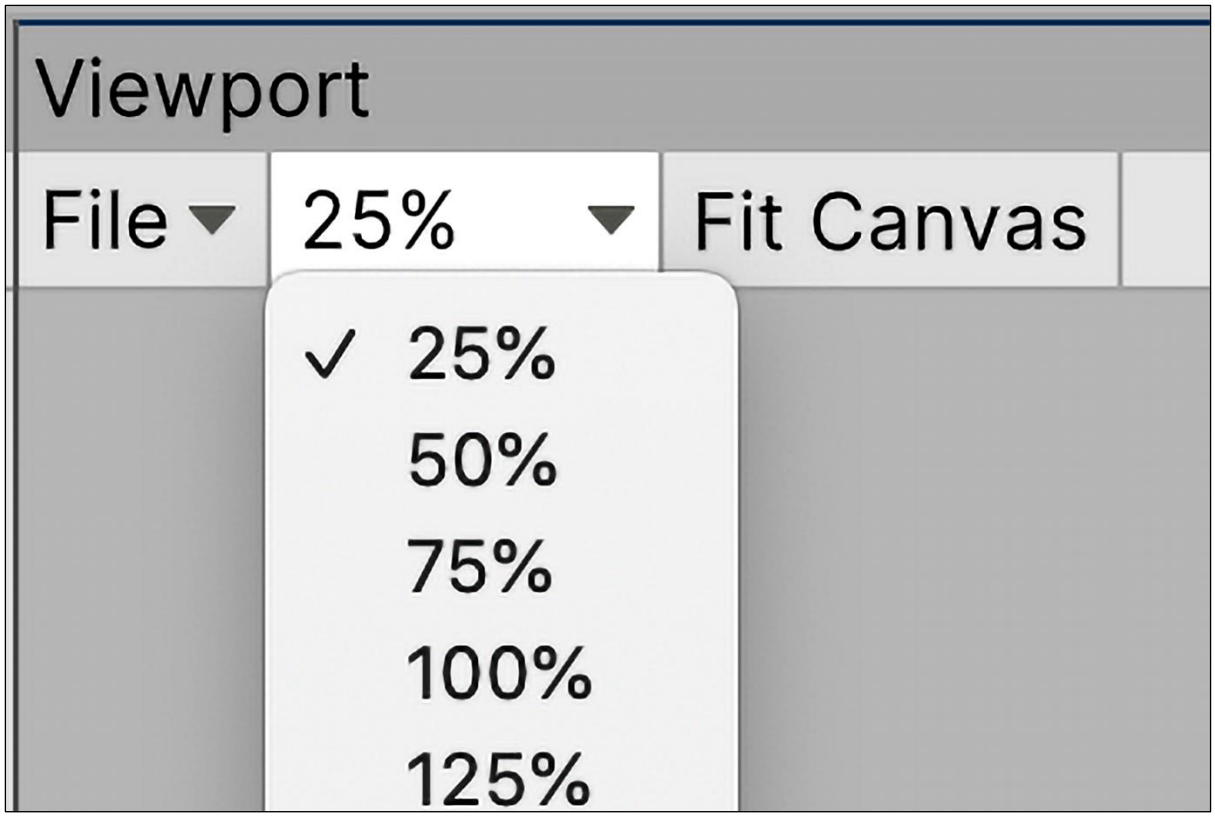


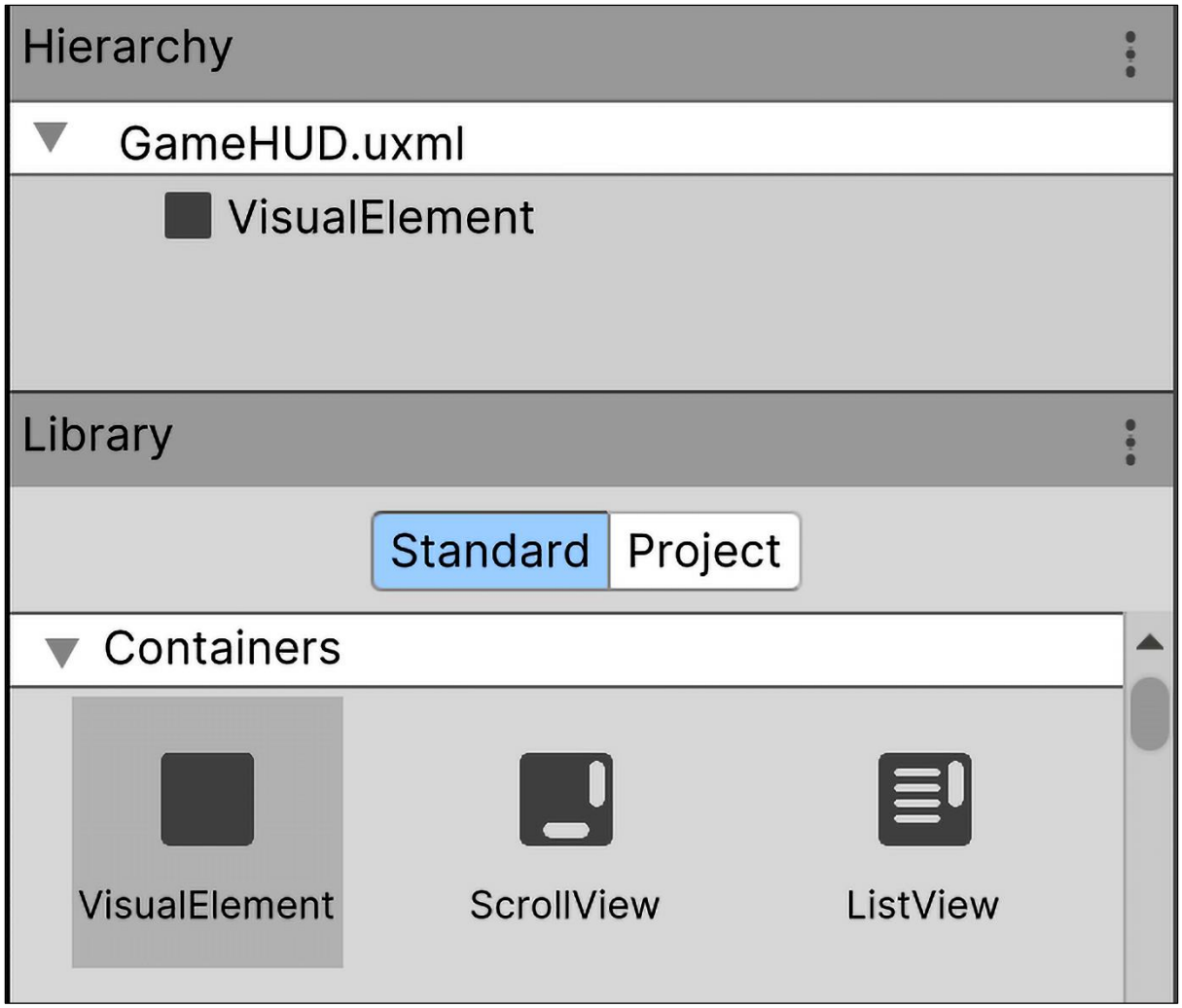

StyleSheets - GameUSS.uss
Add new selector...
GameUSS.uss*
Hierarchy
GameHUD.uxml*
Library
Standard
Project
Viewport
File
70%
Fit Canvas
Unity Default Runtime ...
Preview
GameHUD.uxml


Scene
Game
UI Builder
StyleSheets
Add new selector...
Hierarchy
GameHUD.uxml
Viewport
File
100%
Fit Canvas
Active Editor Theme
GameHUD.uxml
Inspector

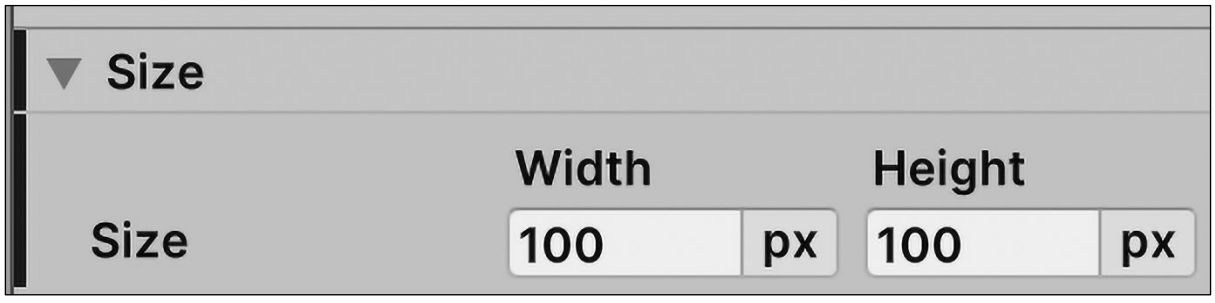

Hierarchy
GameHUD.uxml*

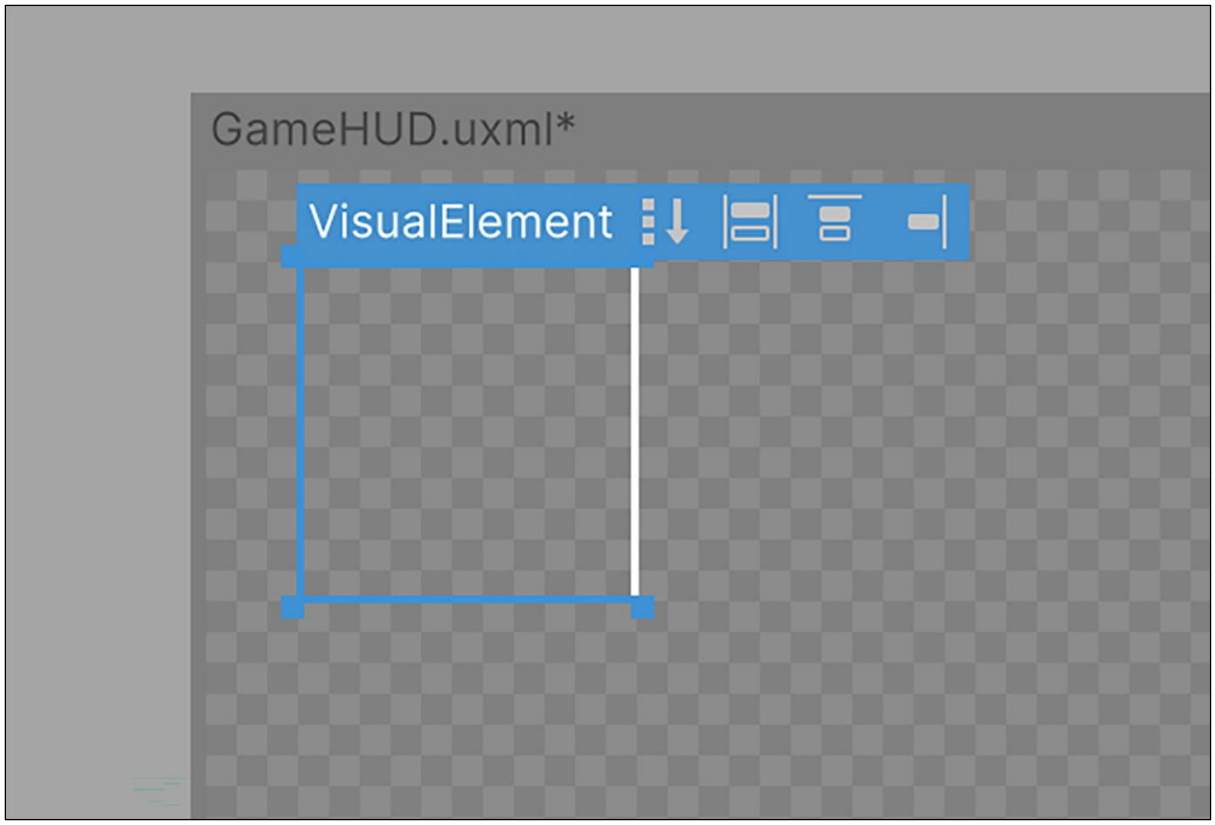

Inspector
Canvas Size
Width
Height
Size
1920
1080
Match Game View

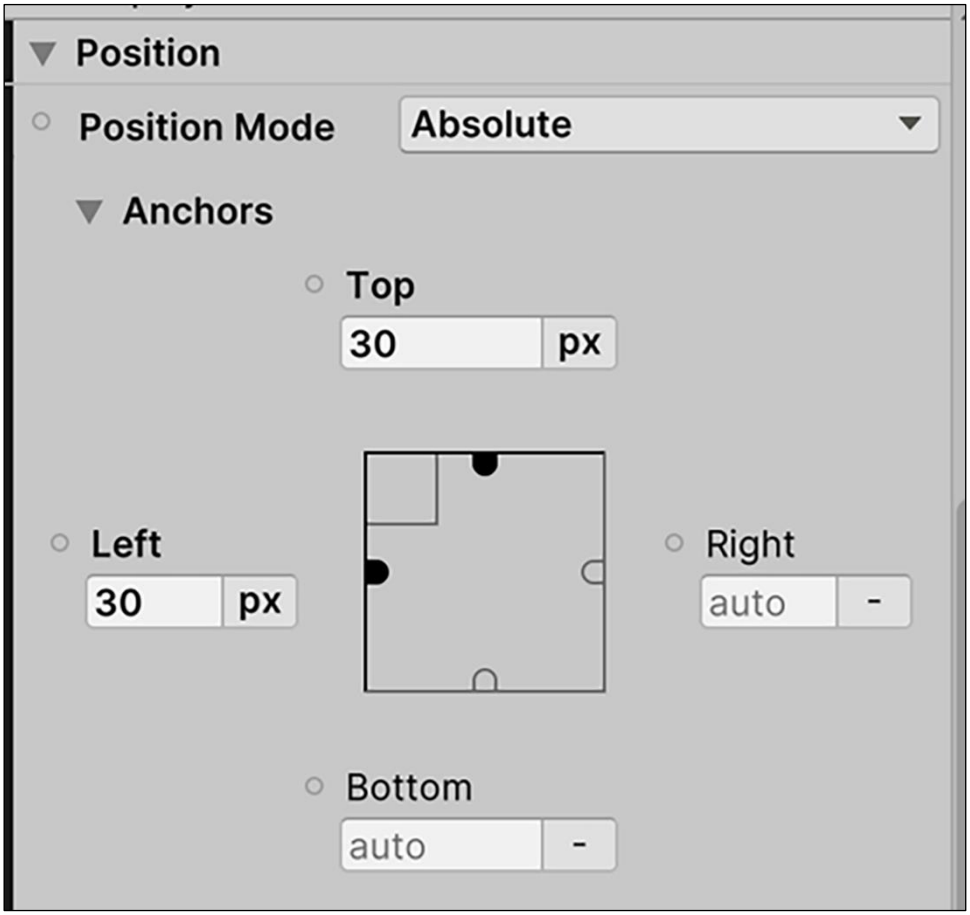

Viewport
File
25%
Fit Canvas
✓ 25%
50%
75%
100%
125%

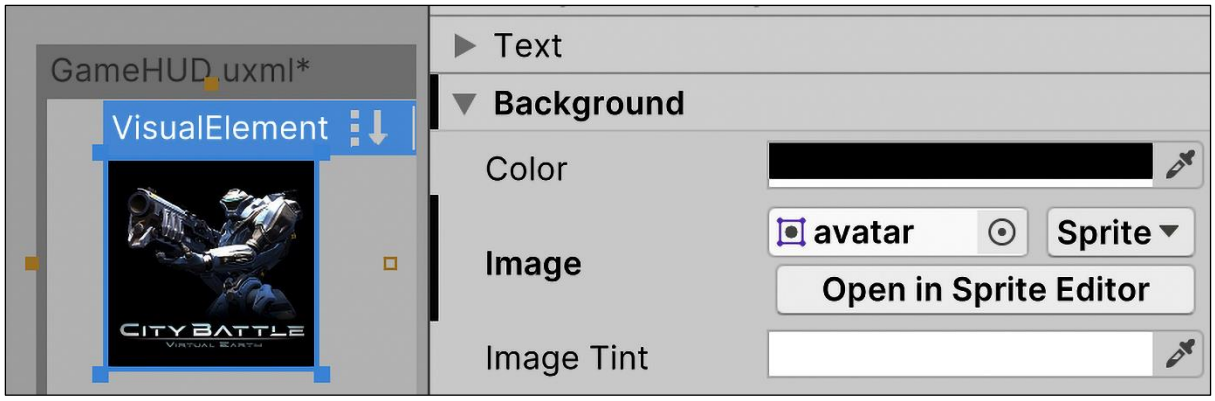

Hierarchy
GameHUD.uxml
VisualElement
Library
Standard
Project
Containers
VisualElement
ScrollView
ListView


Position
Position
Absolute

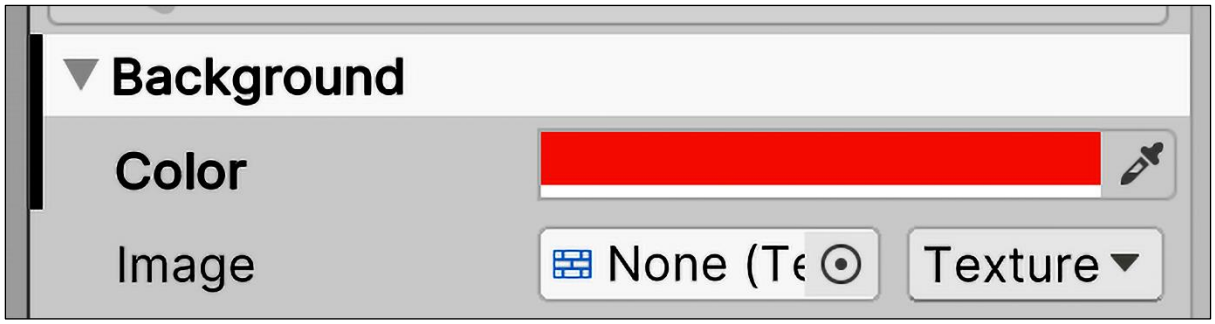

Size
Width
Height
Size
100
px
100
px

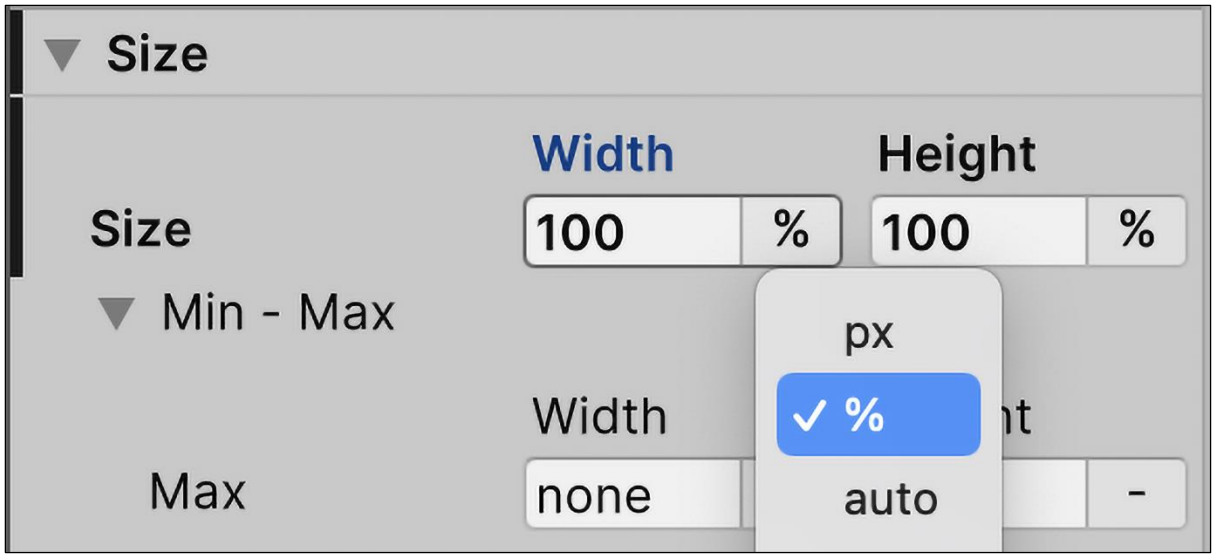

GameHUD.uxml*
VisualElement

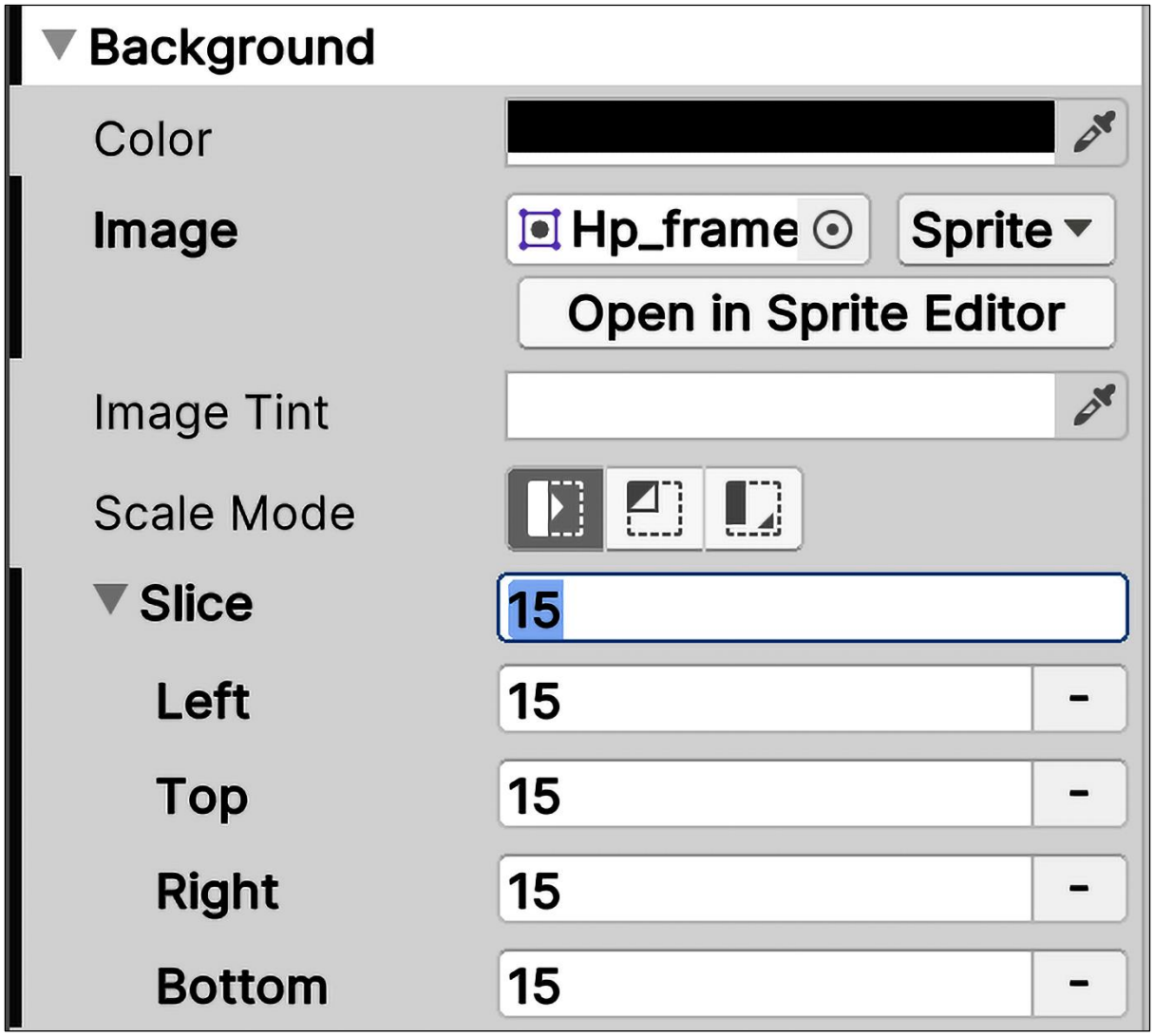

Position
Position Mode
Absolute
Anchors
Top
30
px
Left
30
px
Right
auto
-
Bottom
auto
-

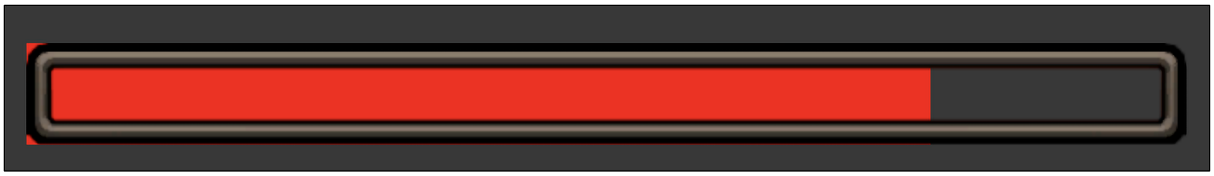

GameHUD.uxml*
VisualElement
CITY BATTLE
Text
Background
Color
Image
avatar
Sprite
Open in Sprite Editor
Image Tint

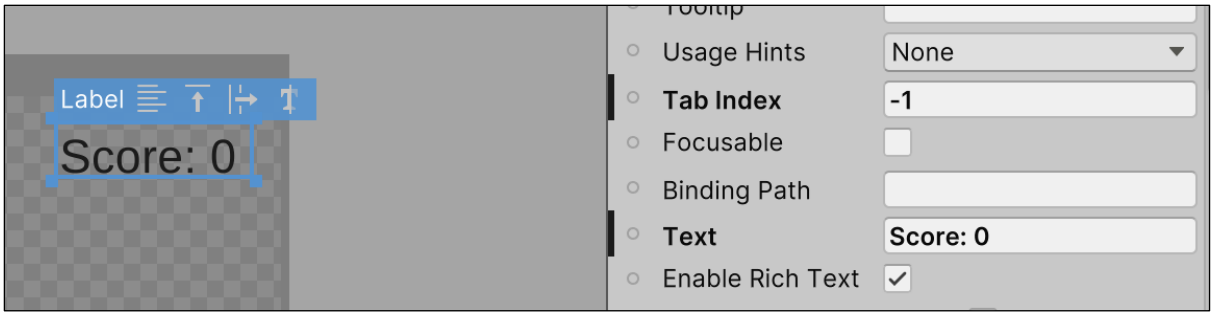

#PlayerHealth
#Filling

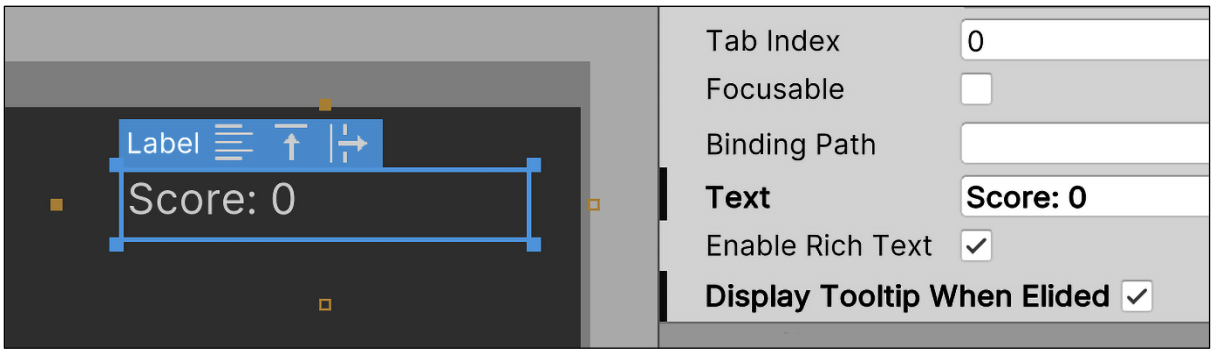

Background
Color
Image
None (Te
Texture


Size
Width
Height
Size
100
%
100
%
Min - Max
px
%
auto
Width
Max
none
-


Background
Color
Image
Hp_frame
Sprite
Open in Sprite Editor
Image Tint
Scale Mode
Slice
15
Left
15
-
Top
15
-
Right
15
-
Bottom
15
-

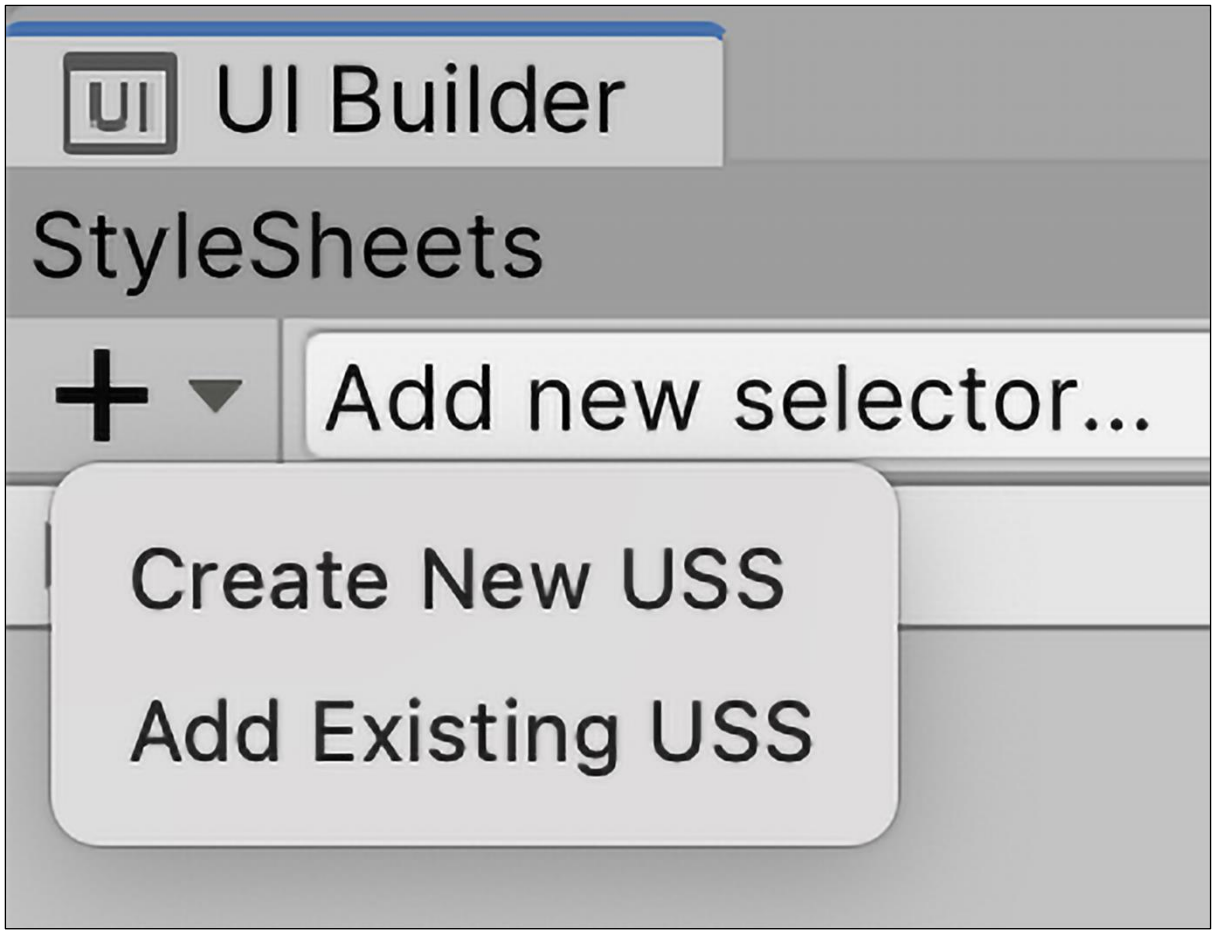


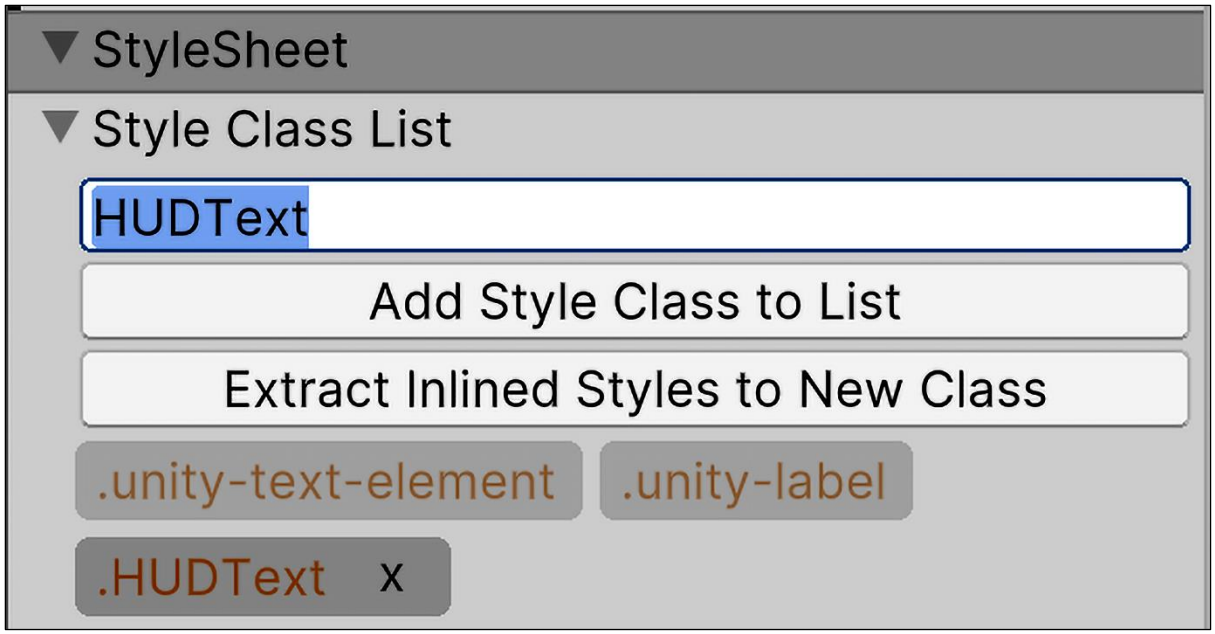

Label
Score: 0
Usage Hints
None
Tab Index
-1
Focusable
Binding Path
Text
Score: 0
Enable Rich Text

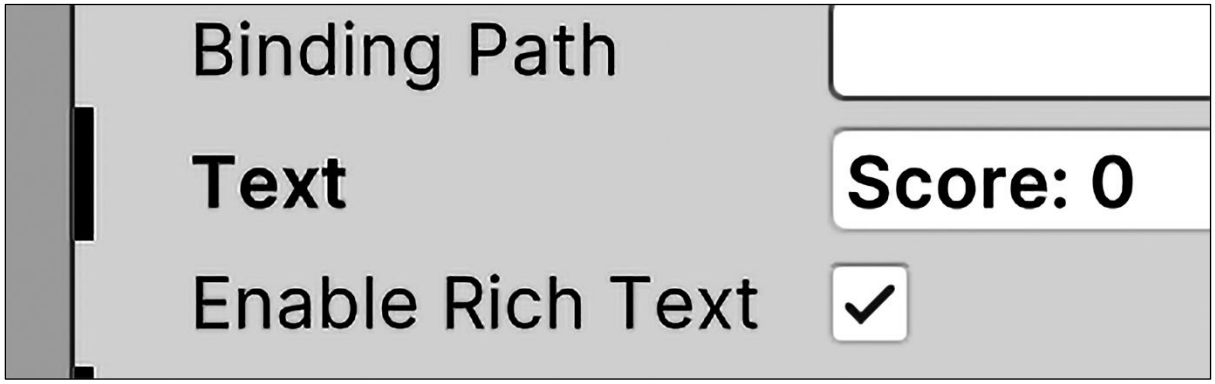

Label
Score: 0
Tab Index
0
Focusable
Binding Path
Text
Score: 0
Enable Rich Text
Display Tooltip When Elided

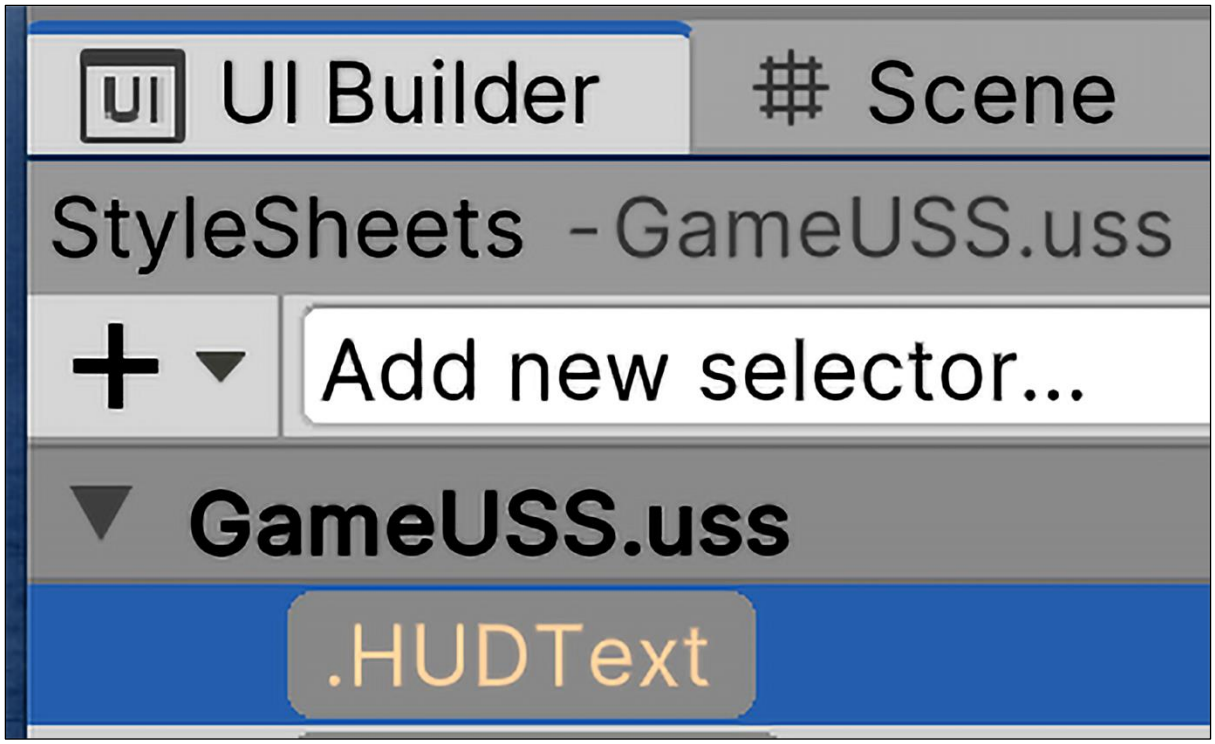

Text
Font
milit
Font Asset
Font Style
B
I
Size
76
px

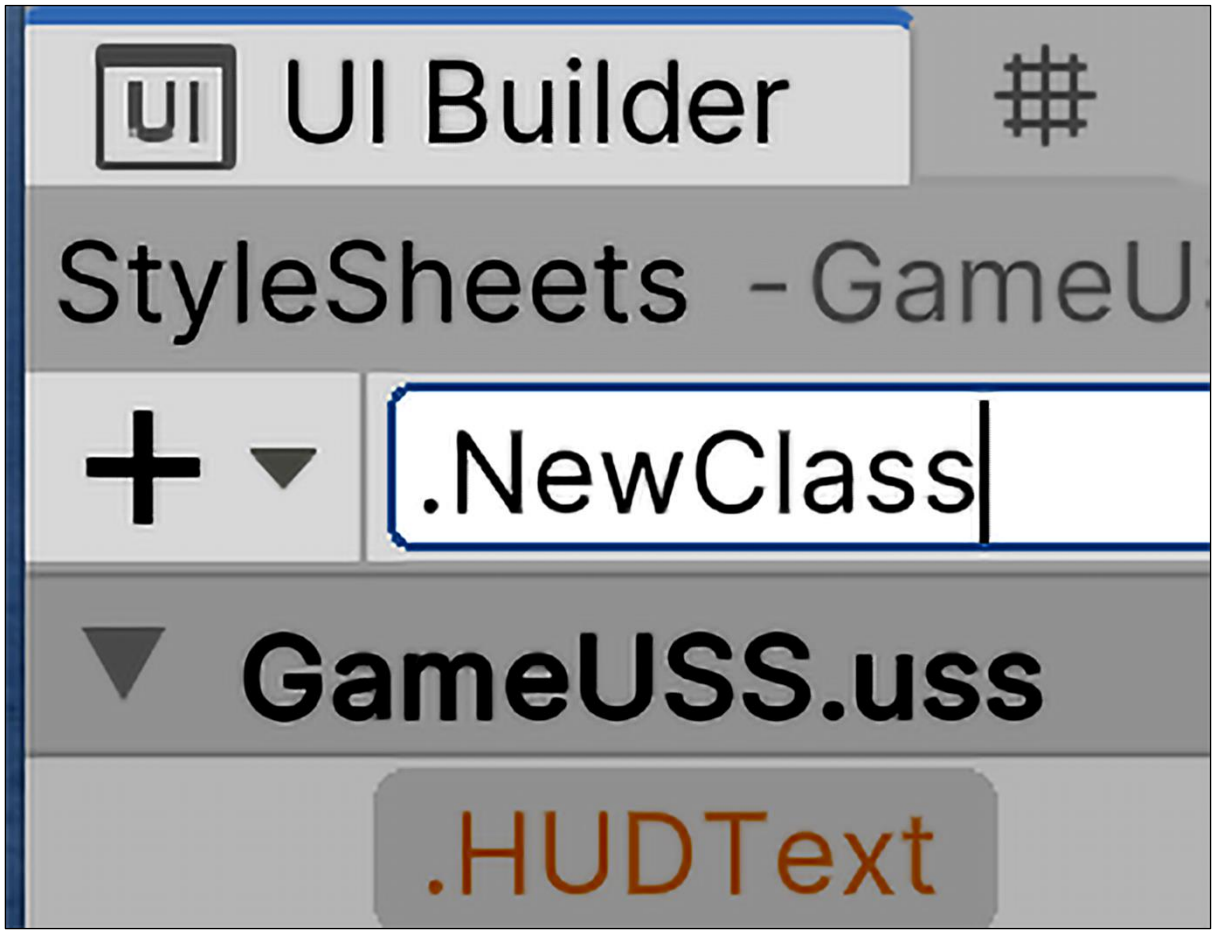

Text
Font
Aa militech_r_2019-04-
Font Style
B
I
Size
20
px

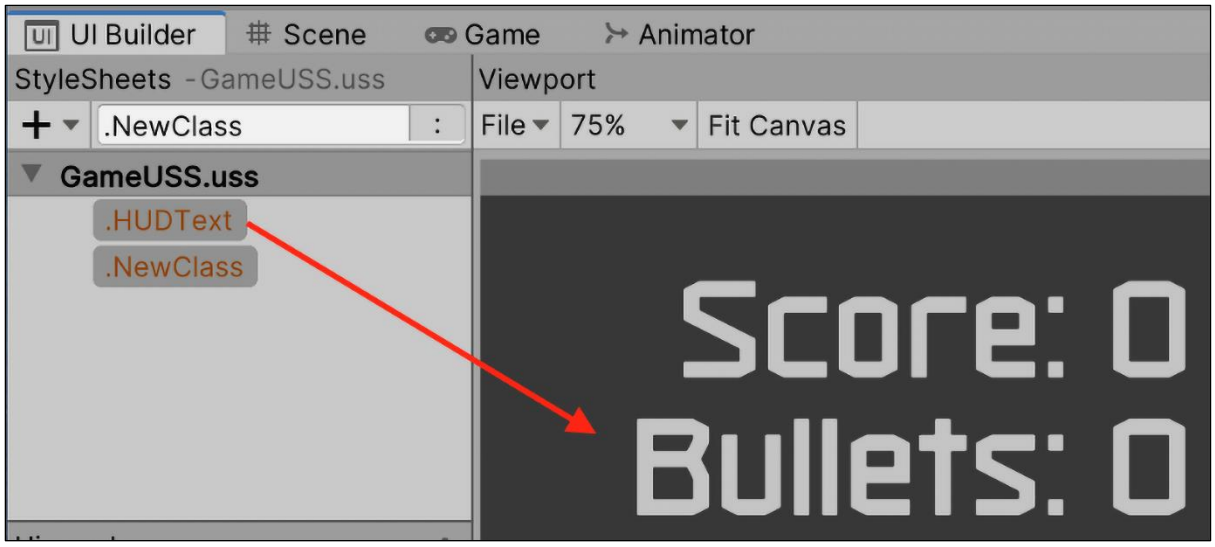

UI Builder
StyleSheets
Add new selector...
Create New USS
Add Existing USS

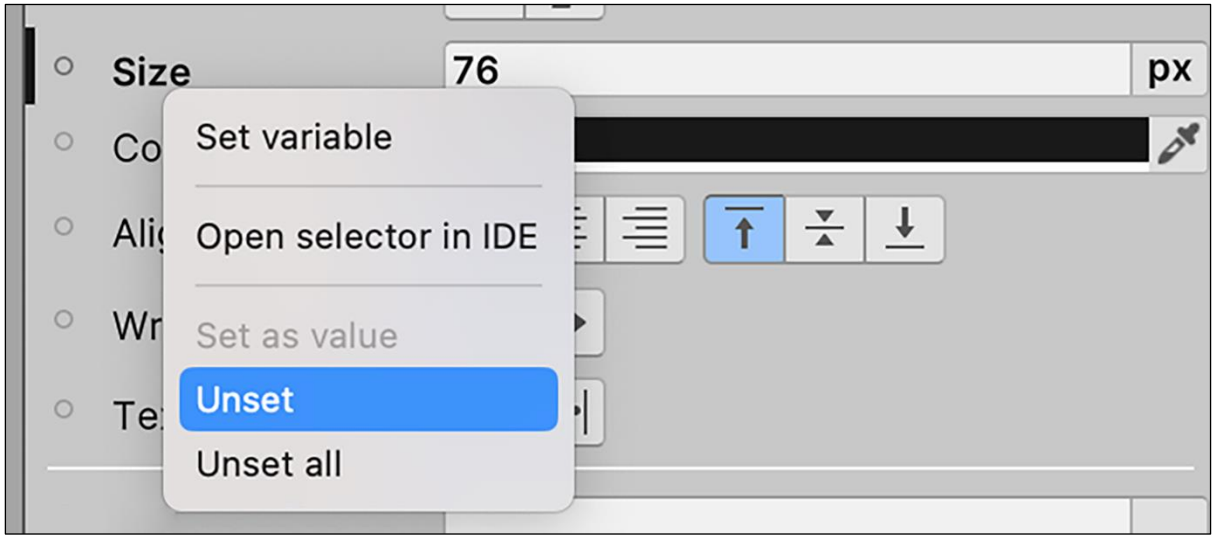

StyleSheet
Style Class List
HUDText
Add Style Class to List
Extract Inlined Styles to New Class
.unity-text-element
.unity-label
.HUDText
x

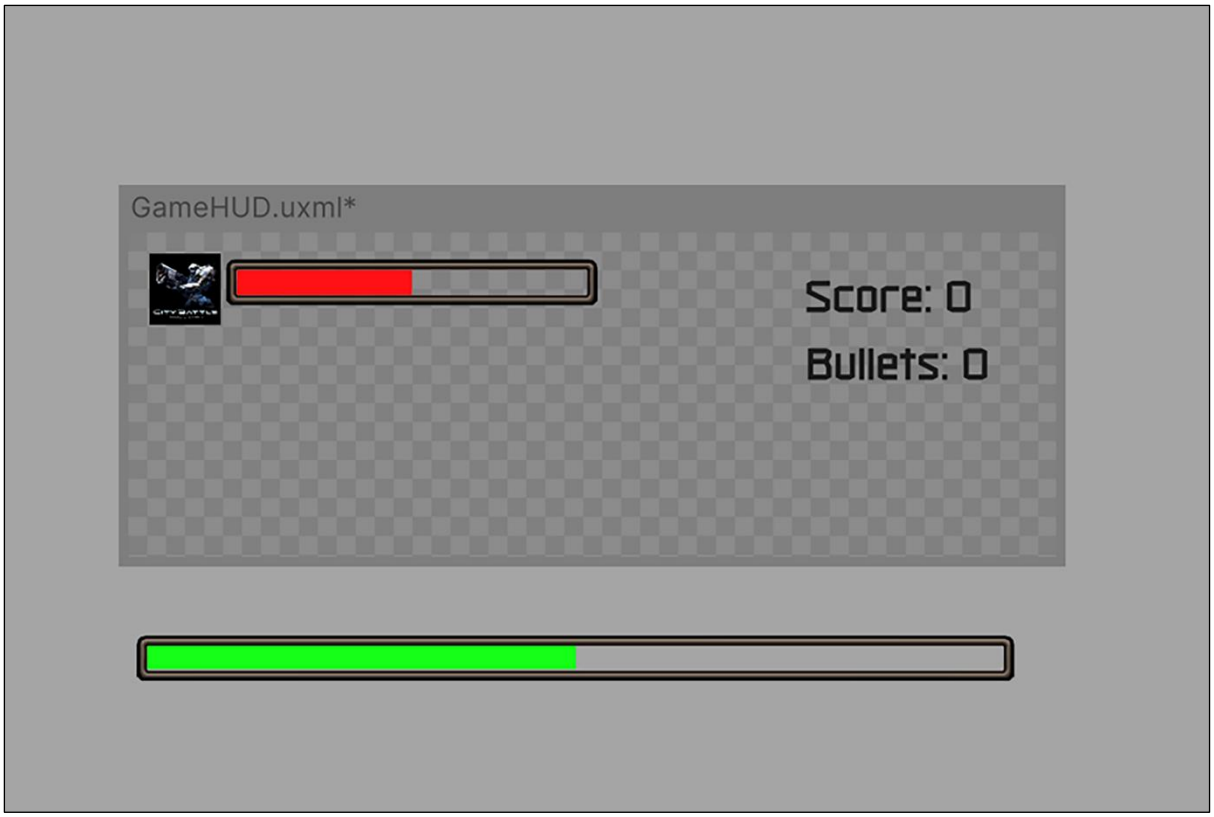

Binding Path
Text
Score: 0
Enable Rich Text

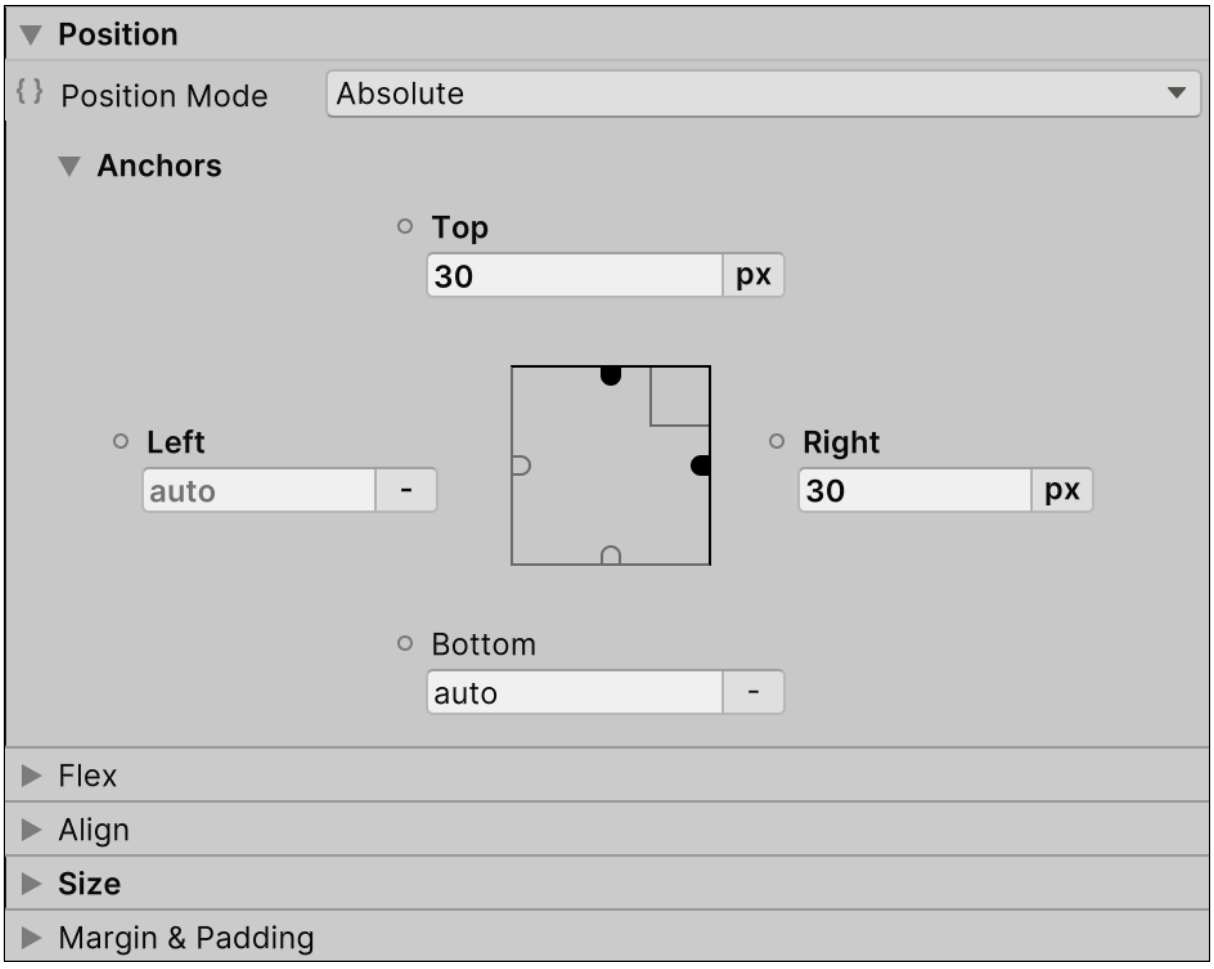

UI Builder
Scene
StyleSheets - GameUSS.uss
Add new selector...
GameUSS.uss
.HUDText


UI Builder
StyleSheets - GameU
.NewClass
GameUSS.uss
.HUDText

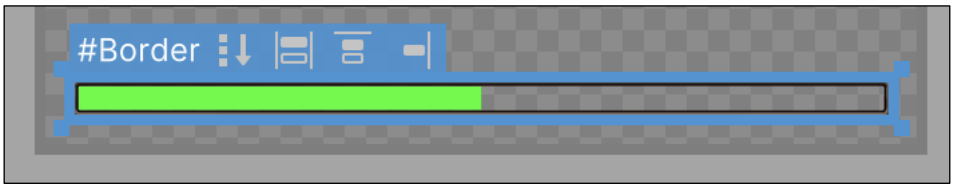

UI Builder
Scene
Game
Animator
StyleSheets - GameUSS.uss
Viewport
.NewClass
File
75%
Fit Canvas
GameUSS.uss
.HUDText
.NewClass
Score: 0
Bullets: 0

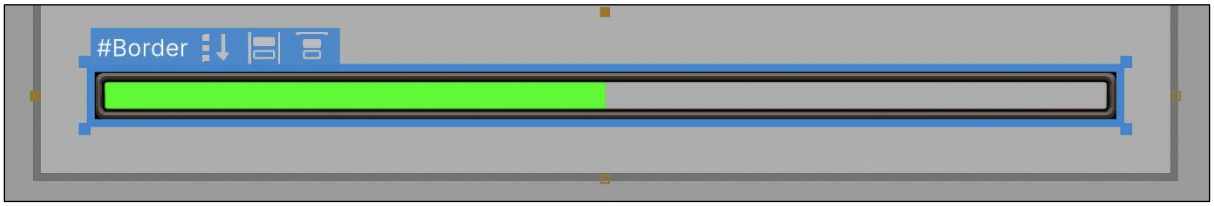

Size
76
px
Set variable
Open selector in IDE
Set as value
Unset
Unset all


GameHUD.uxml*
Score: 0
Bullets: 0

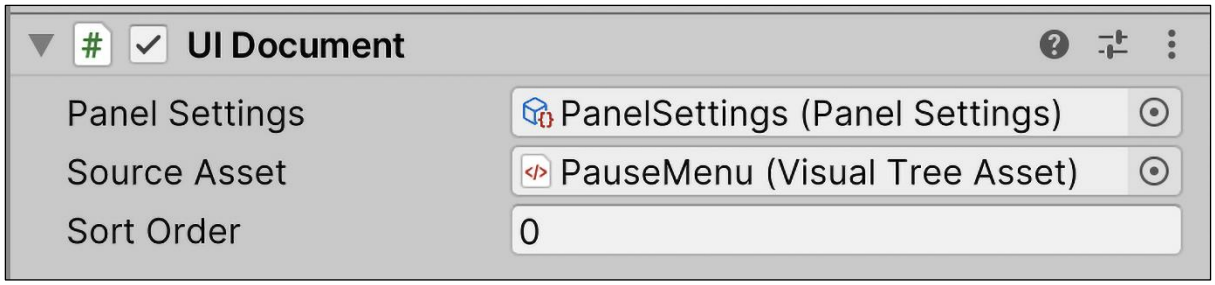

Position
Position Mode
Absolute
Anchors
Top
30
px
Left
auto
-
Right
30
px
Bottom
auto
-
Flex
Align
Size
Margin & Padding

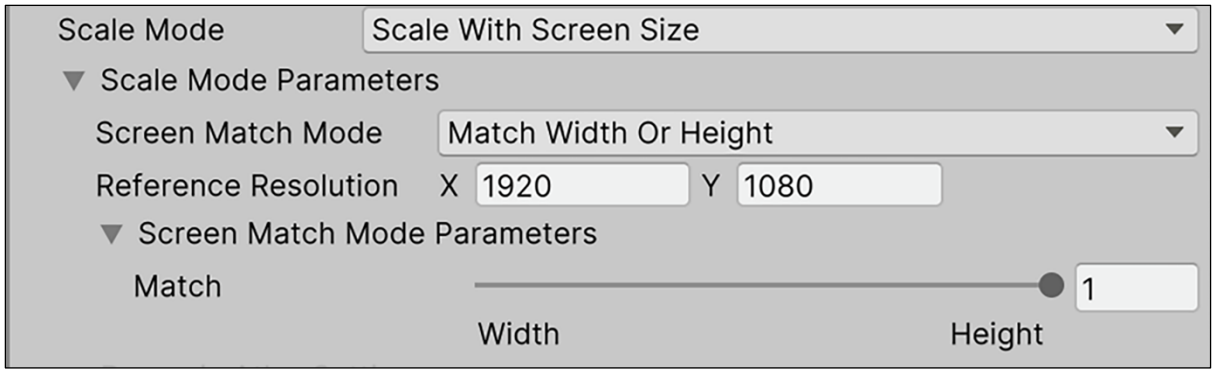

Label
Score: 0

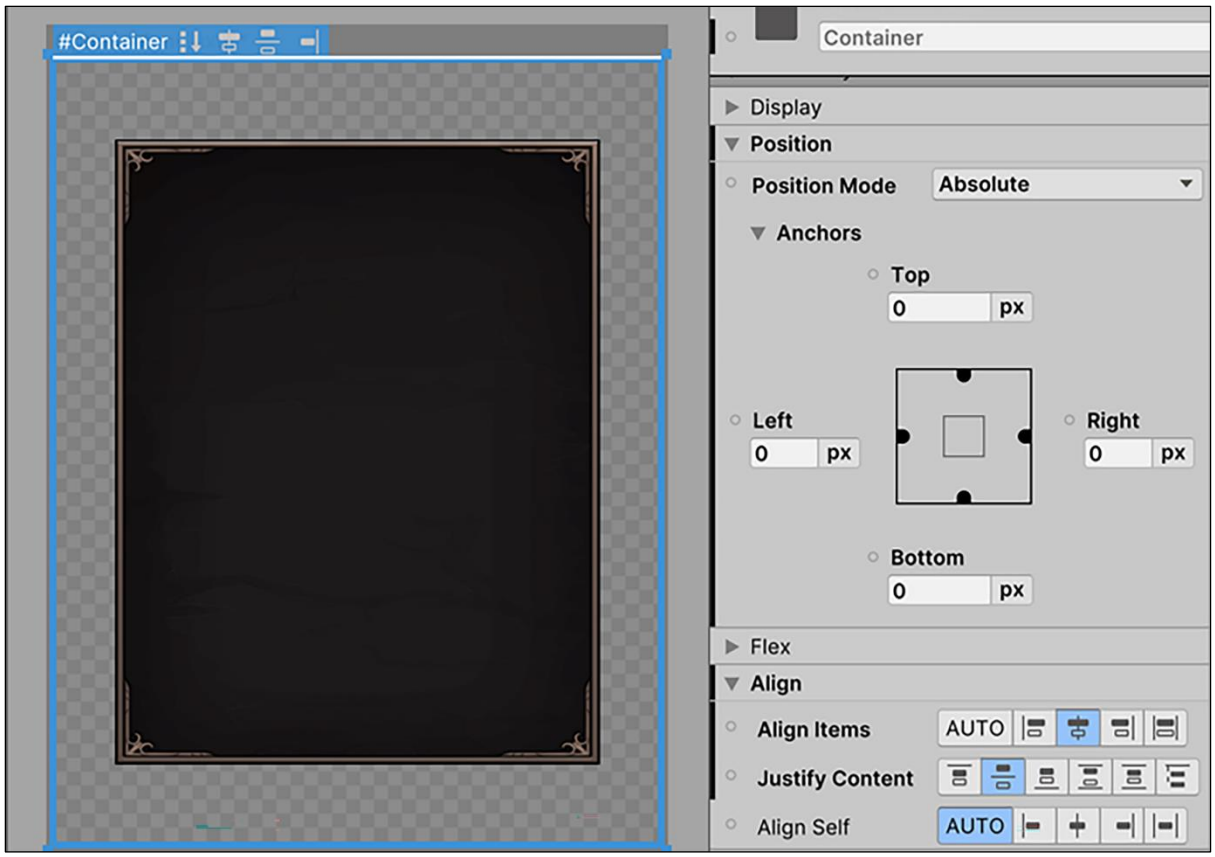

#Border

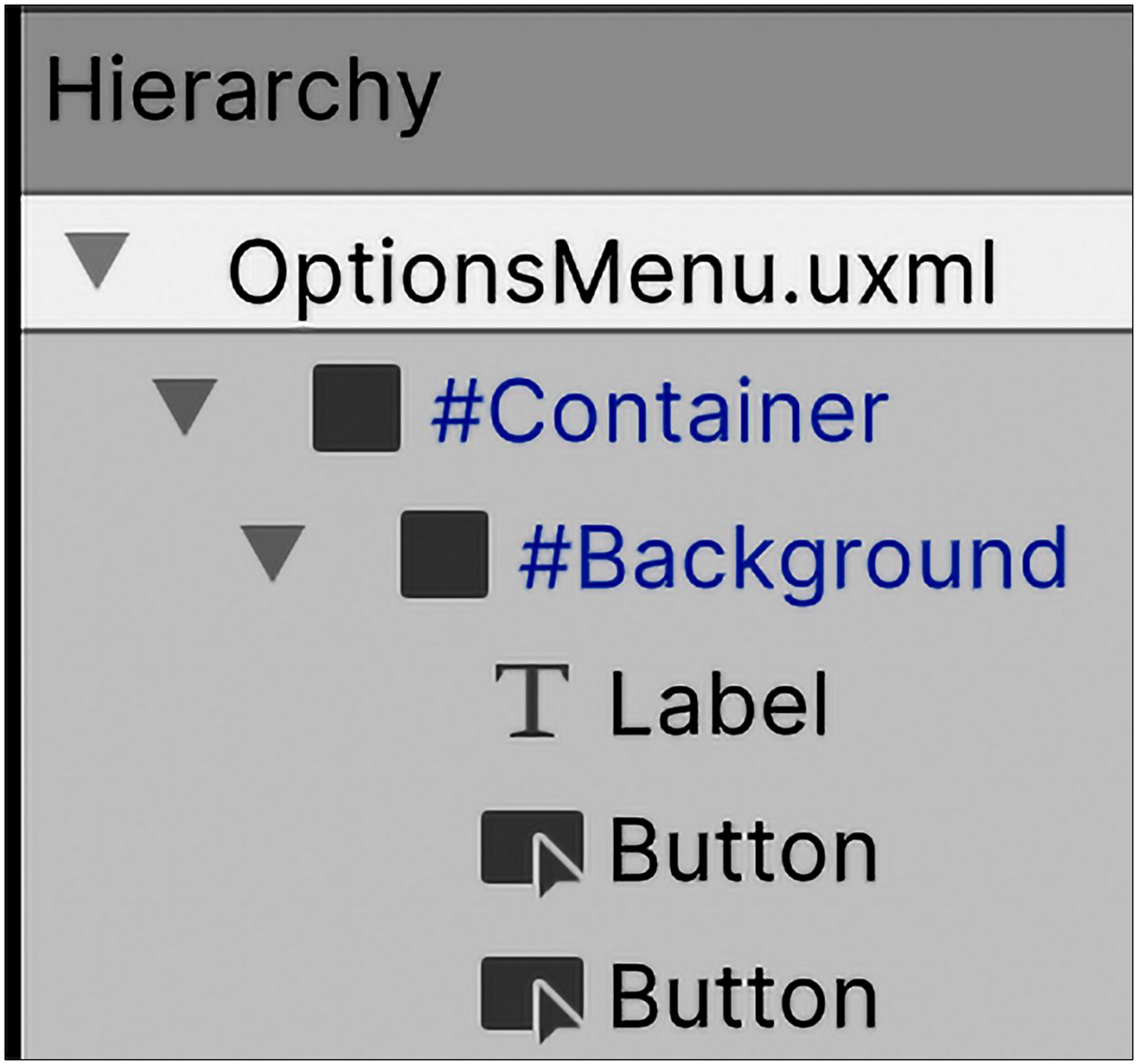

#Border

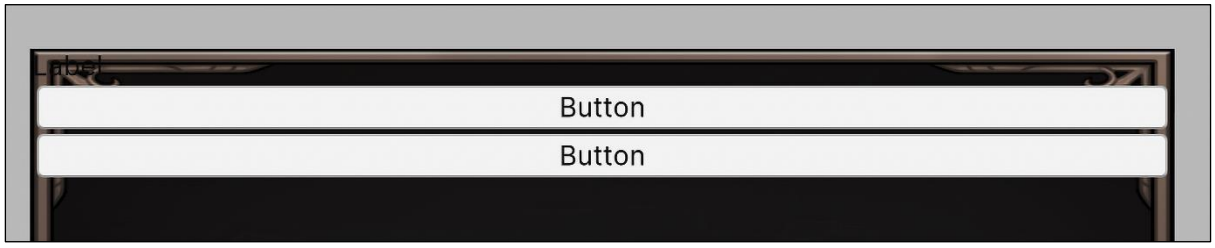

GameHUD.uxml
#Border
Score: 0
Bullets: 0
Position
Position Mode
Absolute
Anchors
Top
-15
px
Left
-15
px
Right
-15
px
Bottom
-15
px


UI Document
Panel Settings
PanelSettings (Panel Settings)
Source Asset
PauseMenu (Visual Tree Asset)
Sort Order
0

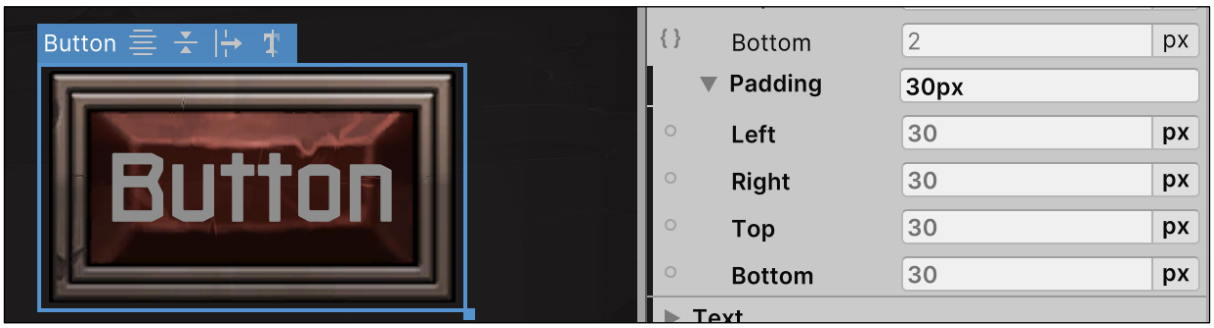

Scale Mode
Scale With Screen Size
Scale Mode Parameters
Screen Match Mode
Match Width Or Height
Reference Resolution
X 1920
Y 1080
Screen Match Mode Parameters
Match
1
Width
Height

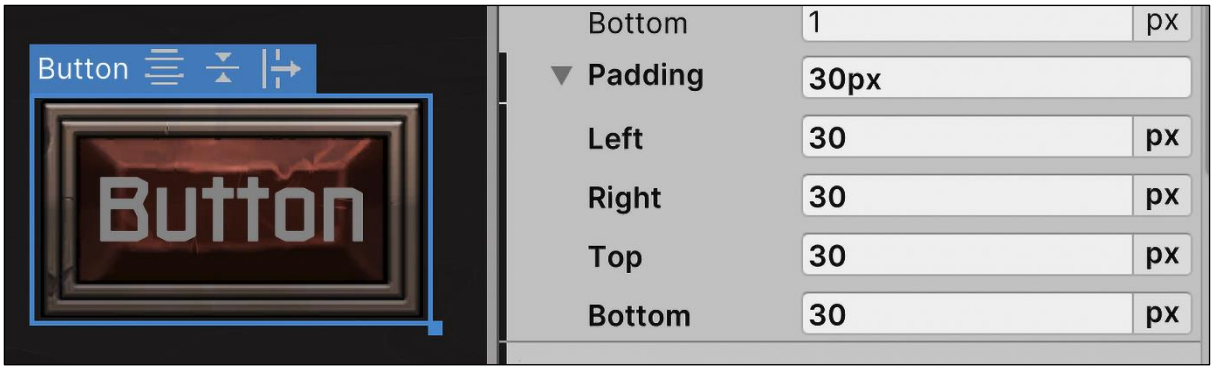

#Container
Container
Display
Position
Position Mode
Absolute
Anchors
Top
0
px
Left
0
px
Right
0
px
Bottom
0
px
Flex
Align
Align Items
AUTO
Justify Content
Align Self
AUTO

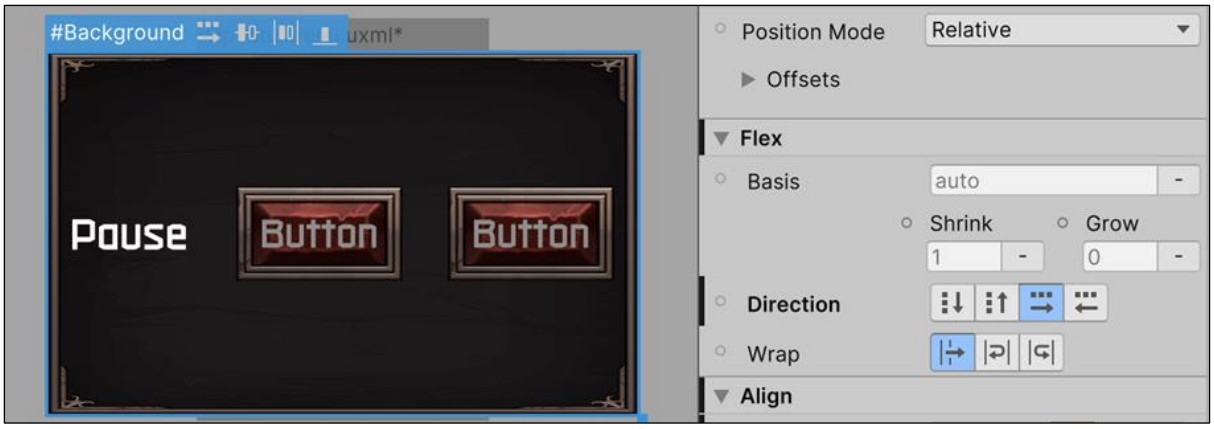

Hierarchy
OptionsMenu.uxml
#Container
#Background
Label
Button
Button

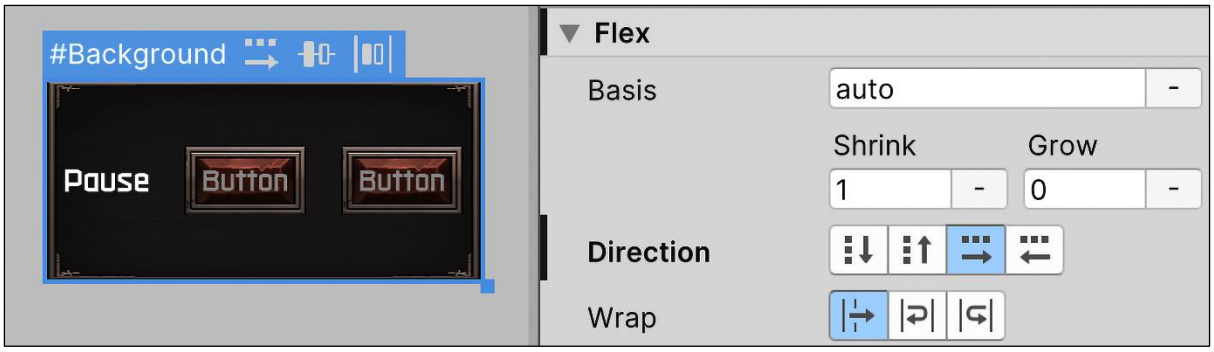

Label
Button
Button


#Background
Label
Button
Button


Button
Button
Bottom
2
px
Padding
30px
Left
30
px
Right
30
px
Top
30
px
Bottom
30
px

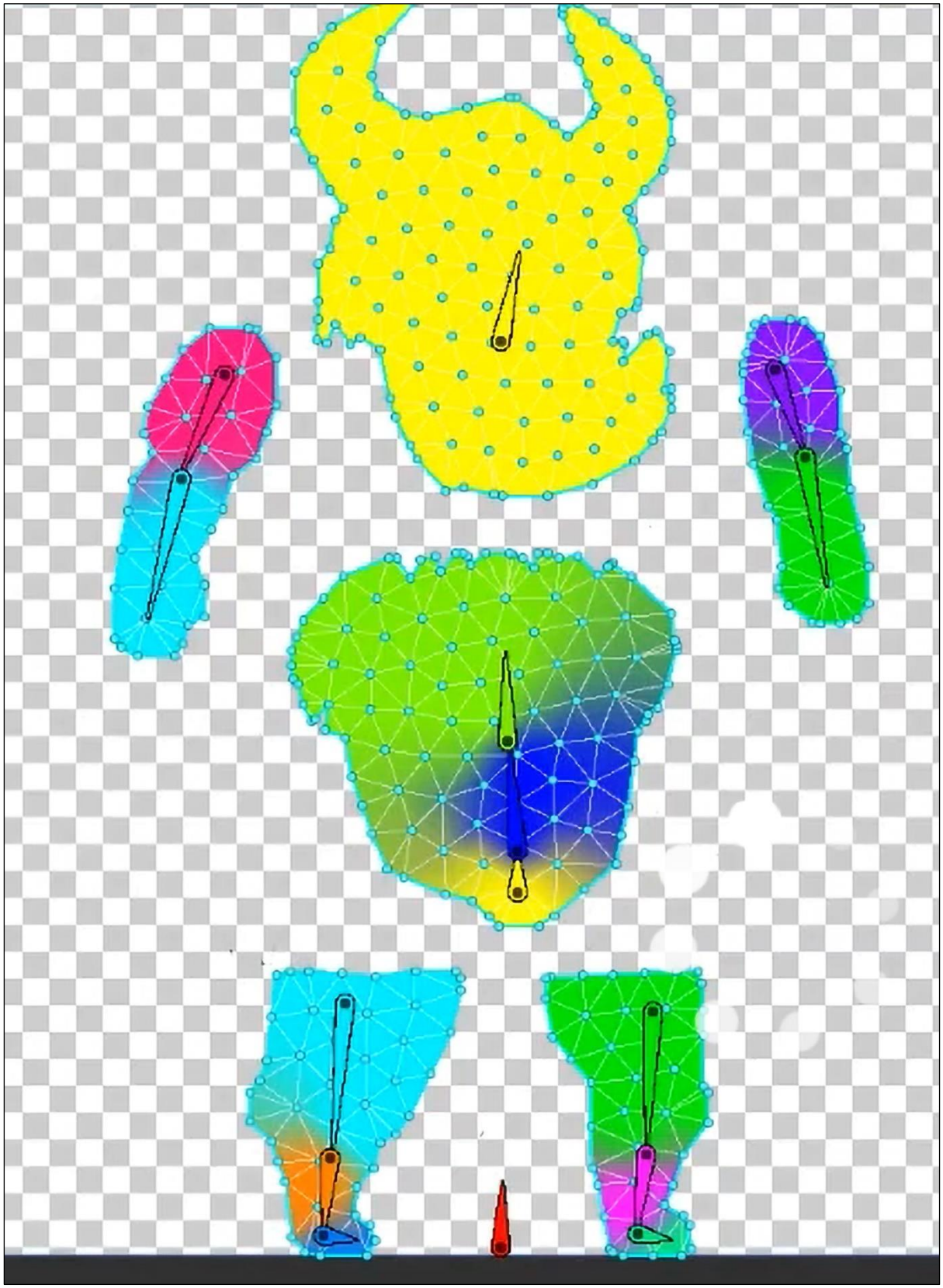

Button
Button
Bottom
1
px
Padding
30px
Left
30
px
Right
30
px
Top
30
px
Bottom
30
px

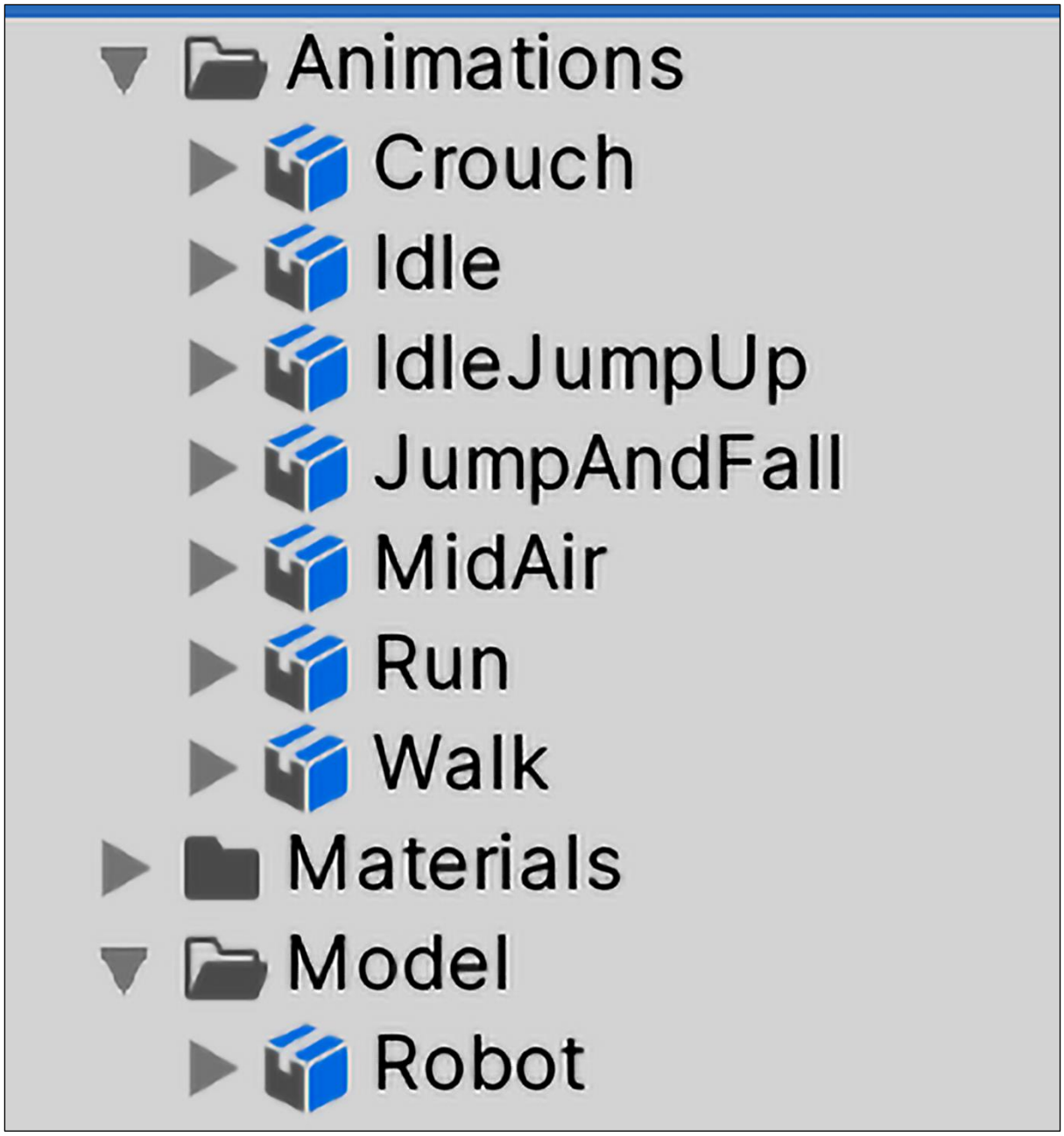

#Background
uxml*
Pause
Button
Button
Position Mode
Relative
Offsets
Flex
Basis
auto
Shrink
Grow
1
0
Direction
Wrap
Align

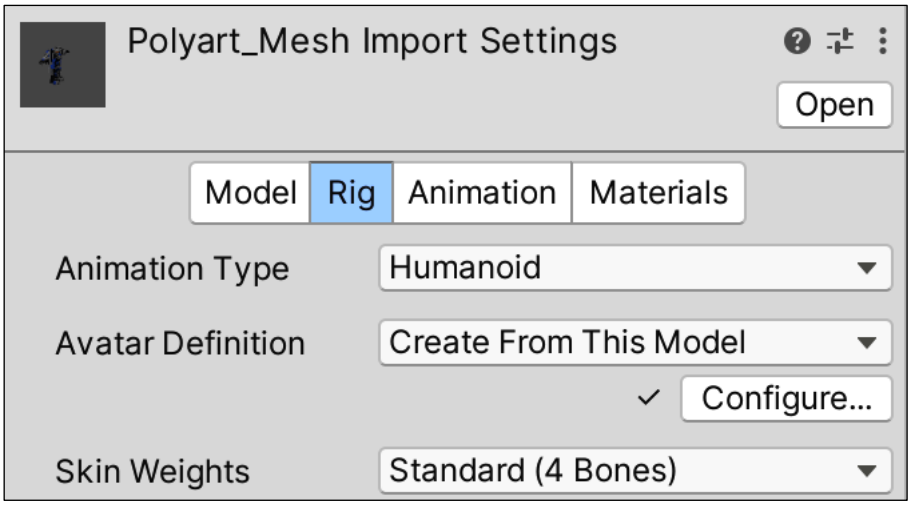

#Background
Pause
Button
Button
Flex
Basis
auto
Shrink
Grow
1
0
Direction
Wrap

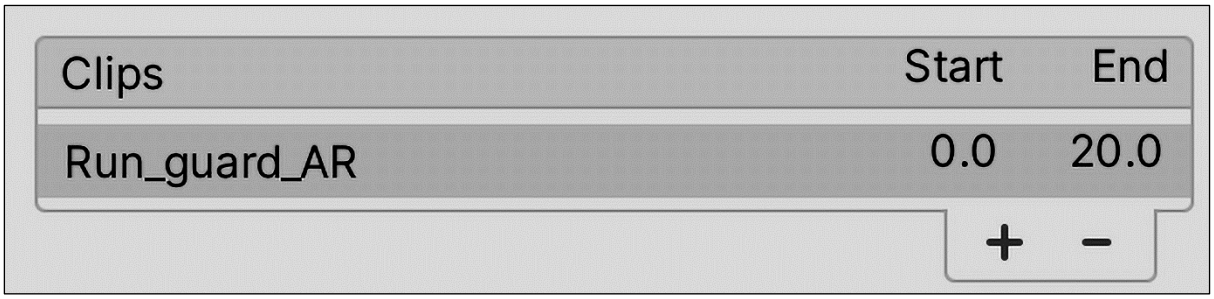
Chapter 17: Animated Realities: Crafting Animations with Animator

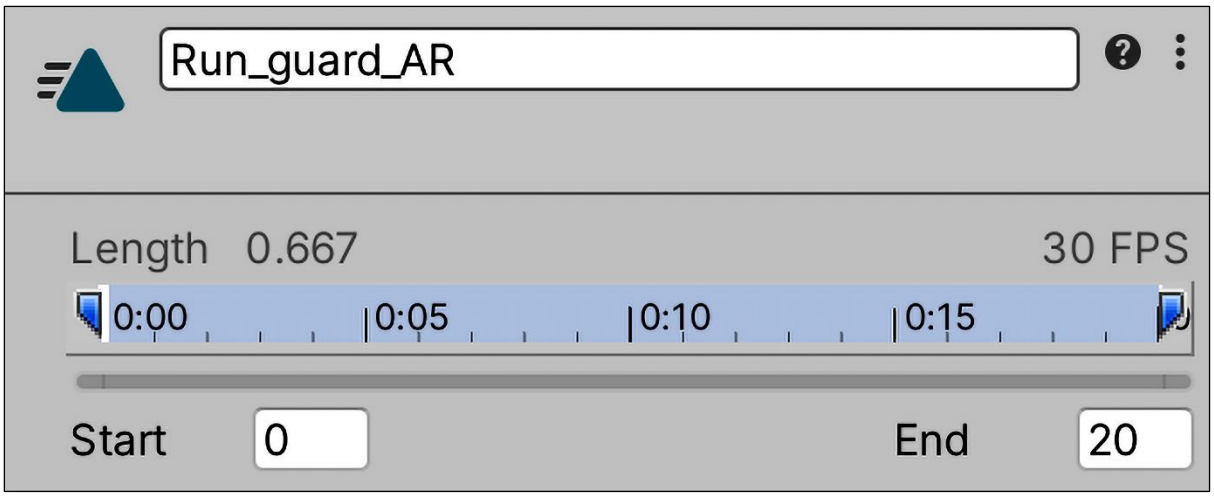


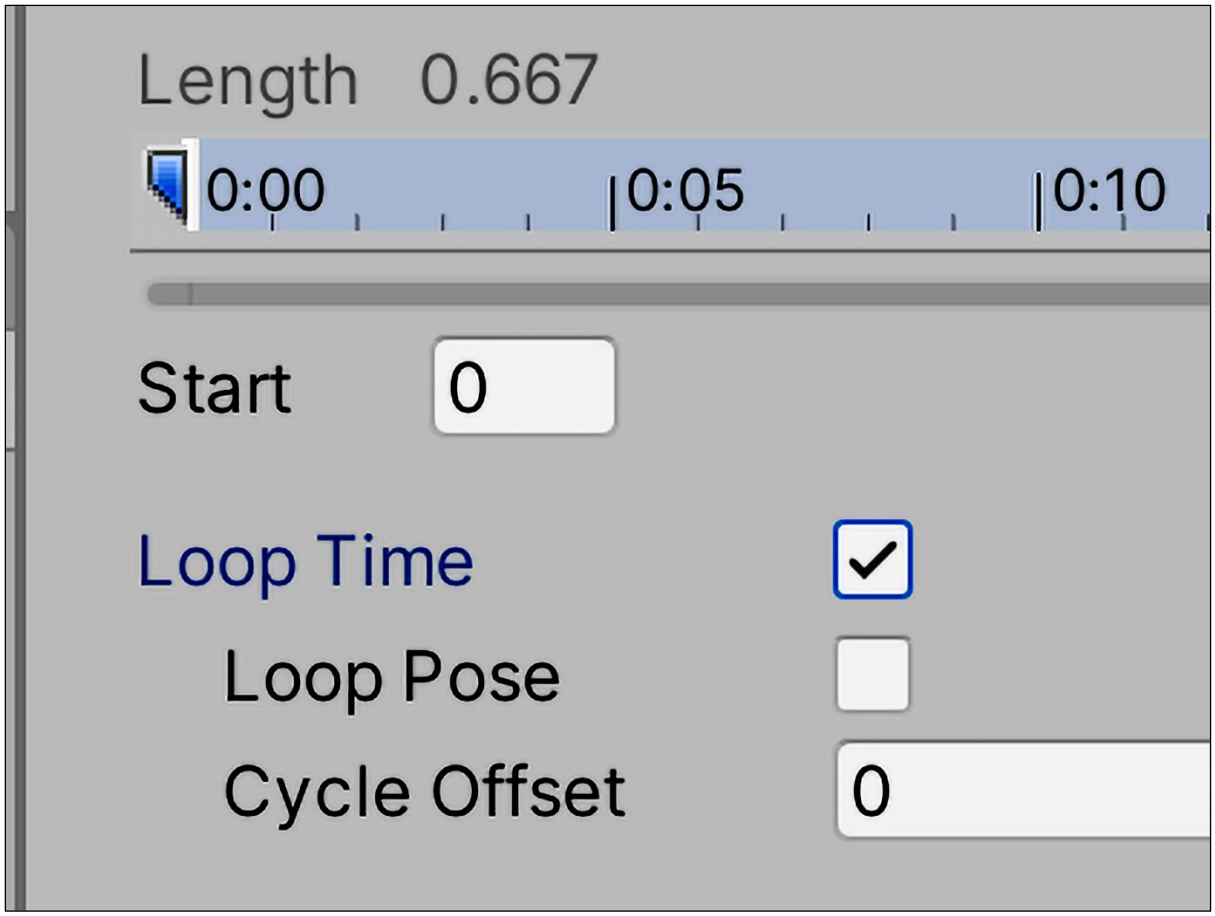


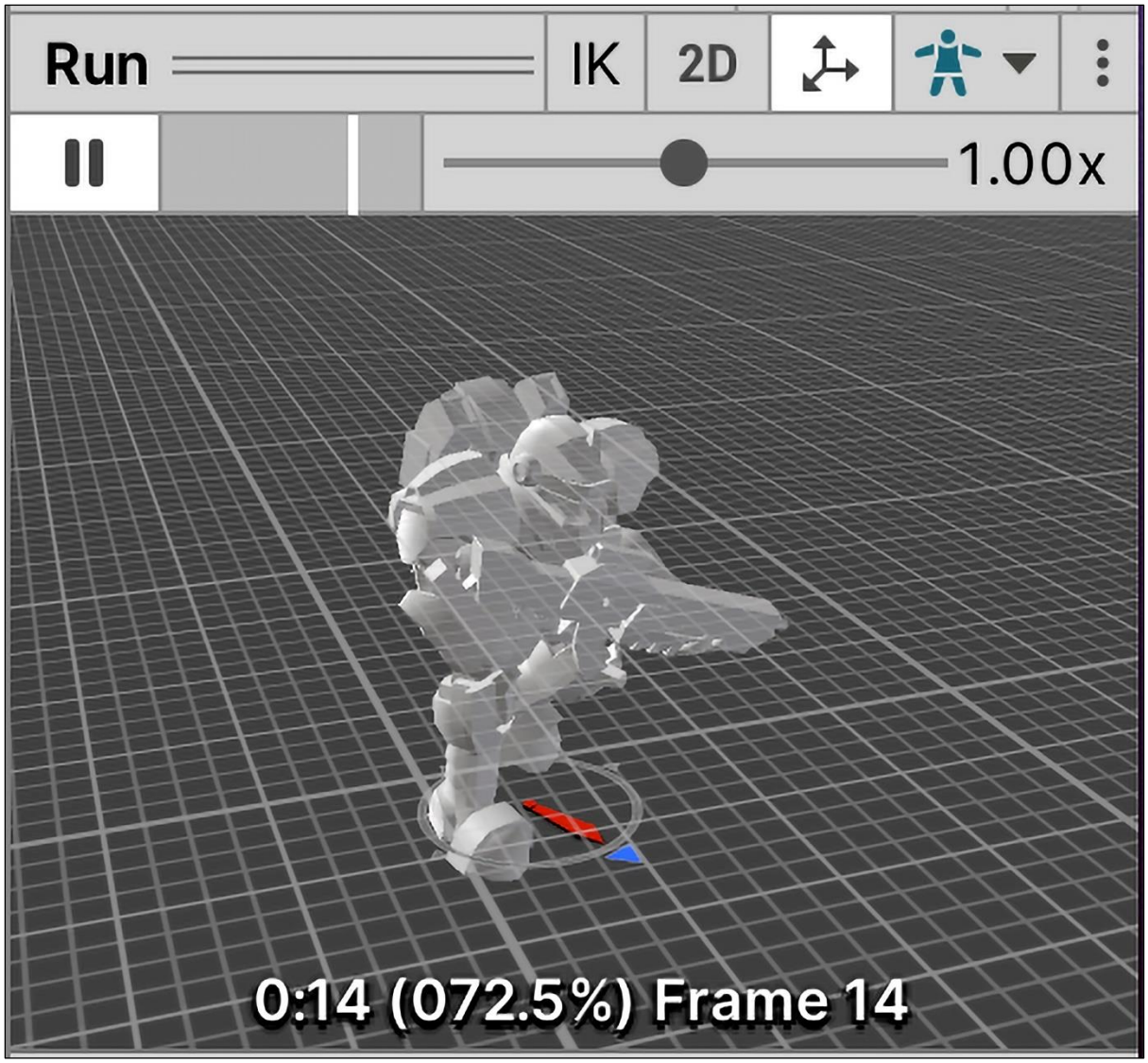

Animations
Crouch
Idle
IdleJumpUp
JumpAndFall
MidAir
Run
Walk
Materials
Model
Robot

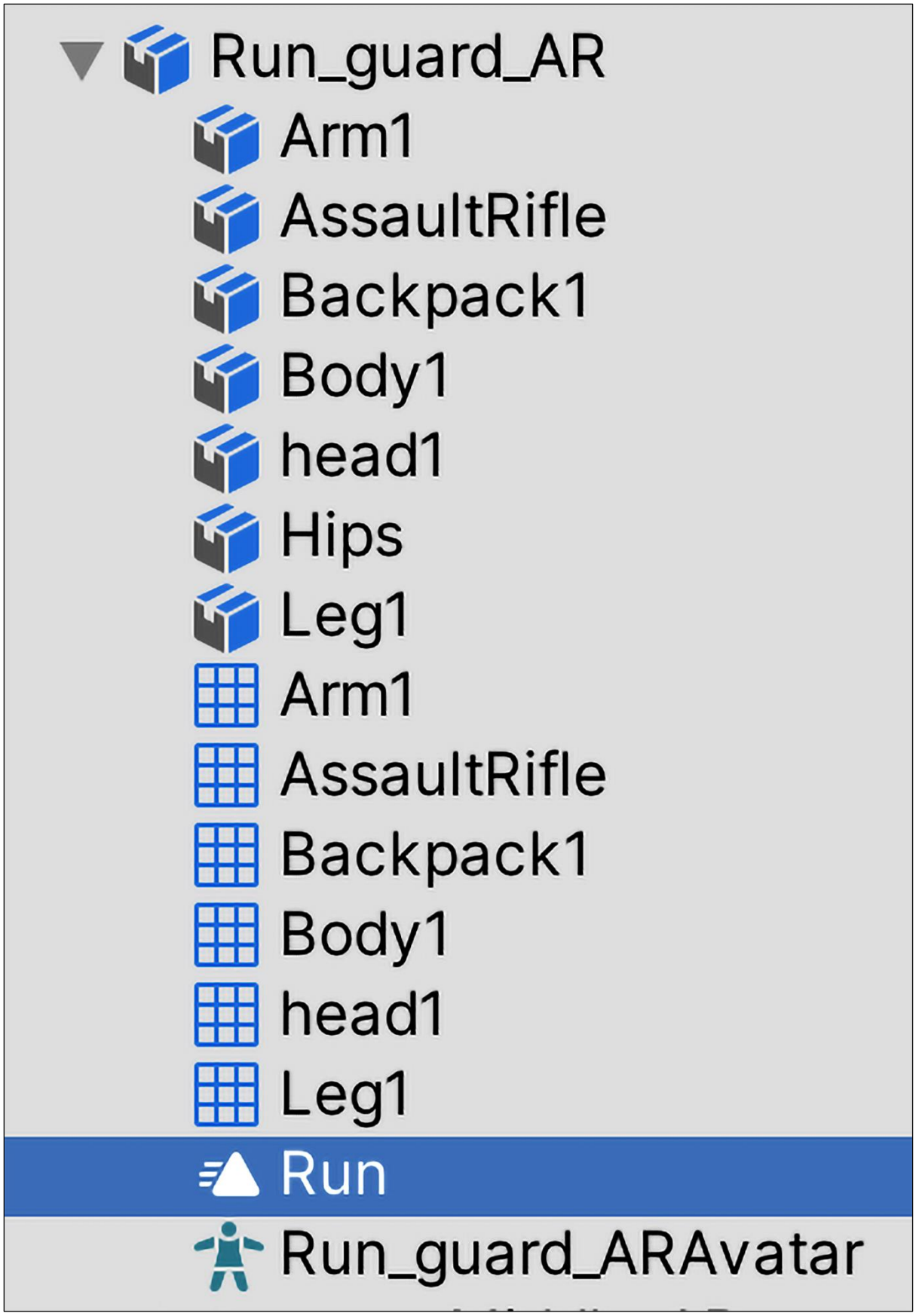

Polyart_Mesh Import Settings
Open
Model
Rig
Animation
Materials
Animation Type
Humanoid
Avatar Definition
Create From This Model
Configure...
Skin Weights
Standard (4 Bones)

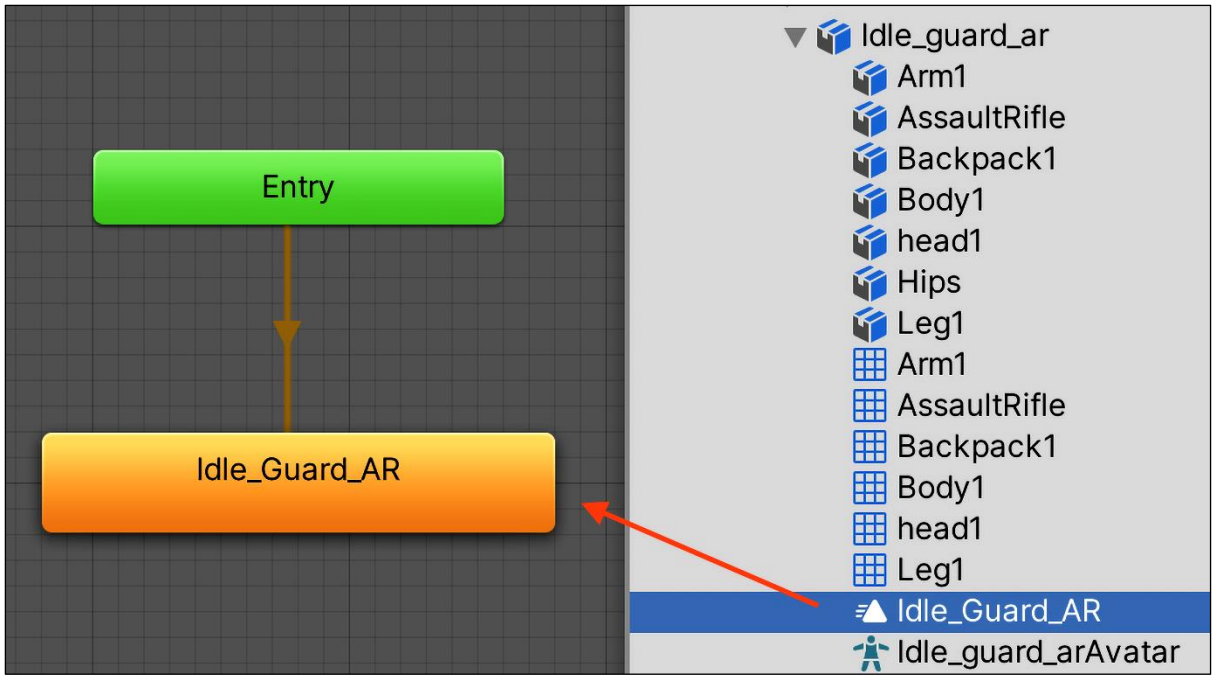

Clips
Start
End
Run_guard_AR
0.0
20.0

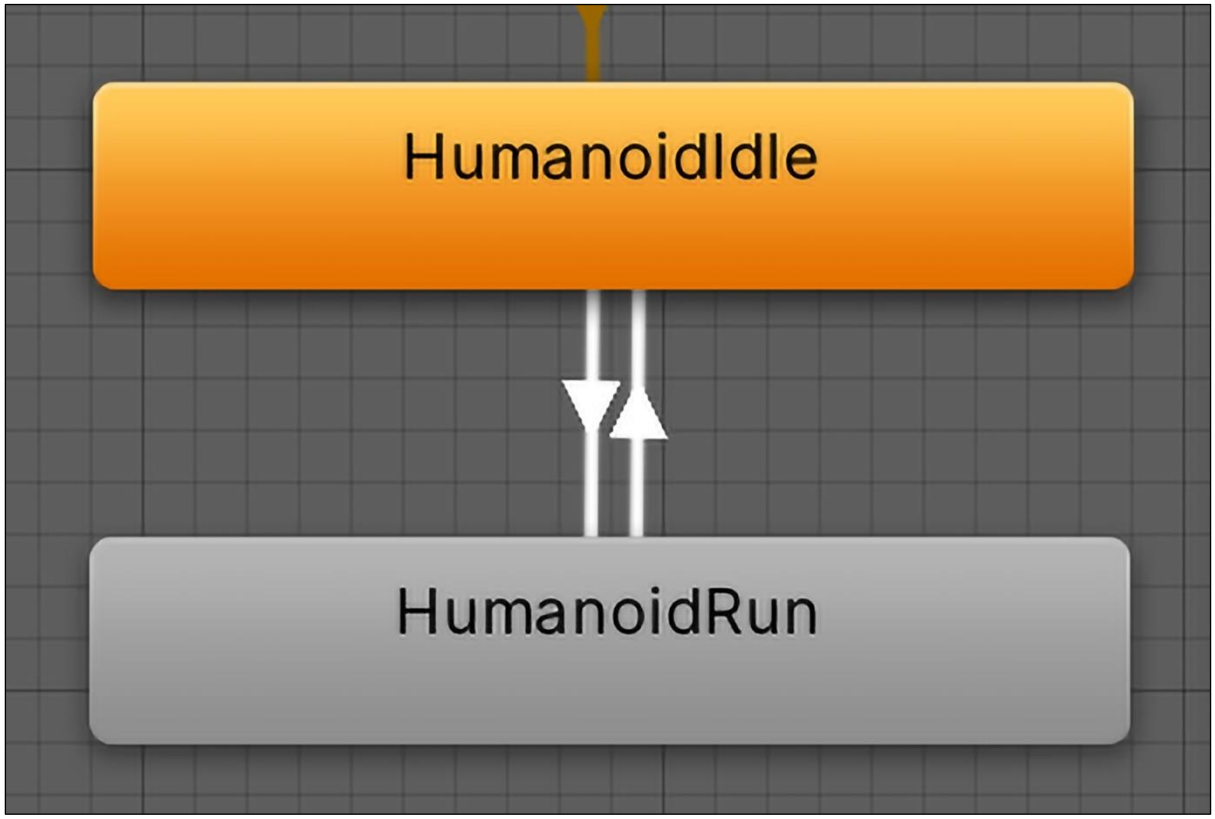

Run_guard_AR
Length 0.667
30 FPS
0:00
0:05
0:10
0:15
Start
0
End
20

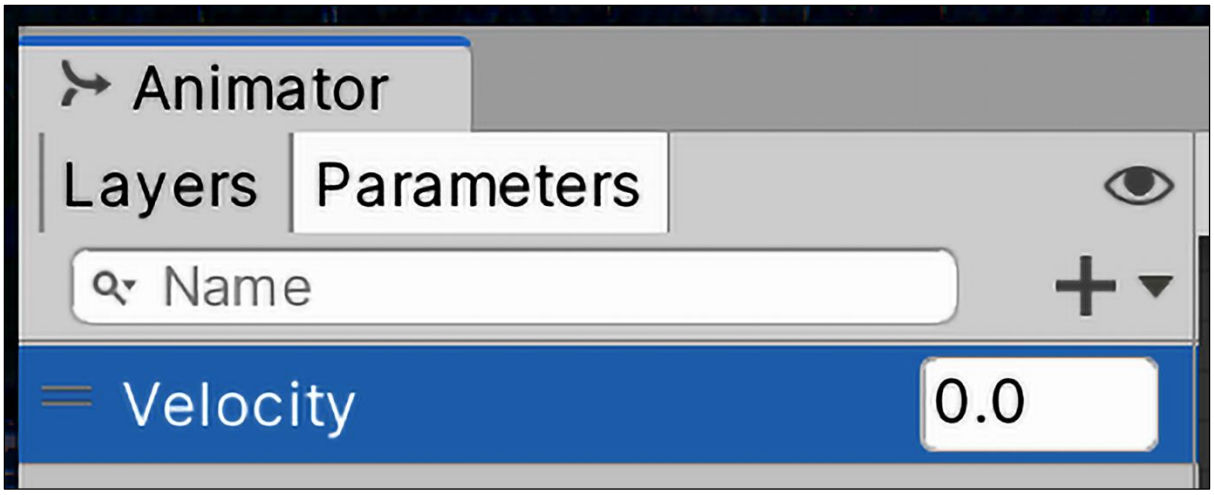

Length 0.667
0:00
0:05
0:10
Start
0
Loop Time
Loop Pose
Cycle Offset
0

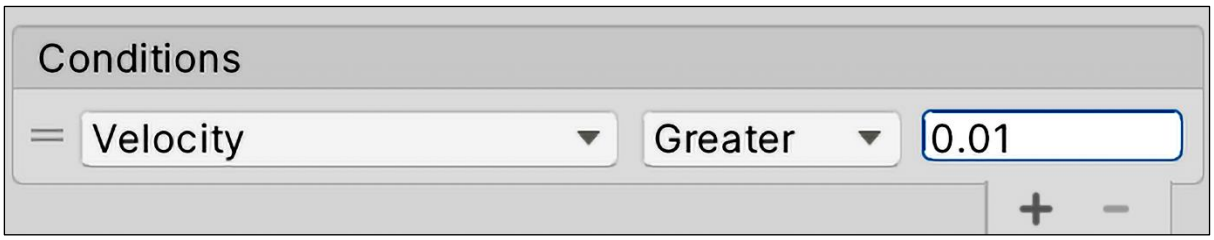

Run
IK
2D
1.00x
0:14 (072.5%) Frame 14

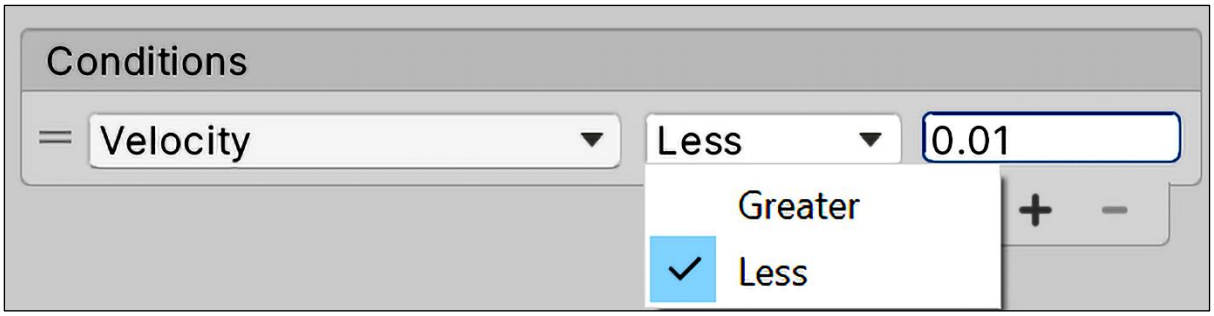

Run_guard_AR
Arm1
AssaultRifle
Backpack1
Body1
head1
Hips
Leg1
Arm1
AssaultRifle
Backpack1
Body1
head1
Leg1
Run
Run_guard_ARAvatar

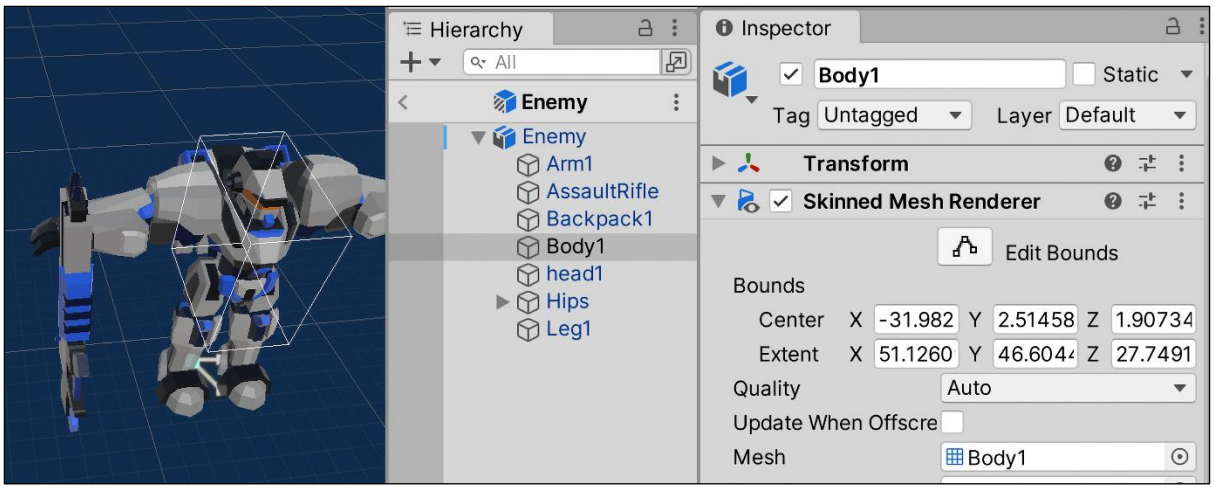

Entry
Idle_Guard_AR
Idle_guard_ar
Arm1
AssaultRifle
Backpack1
Body1
head1
Hips
Leg1
Arm1
AssaultRifle
Backpack1
Body1
head1
Leg1
Idle_Guard_AR
Idle_guard_arAvatar

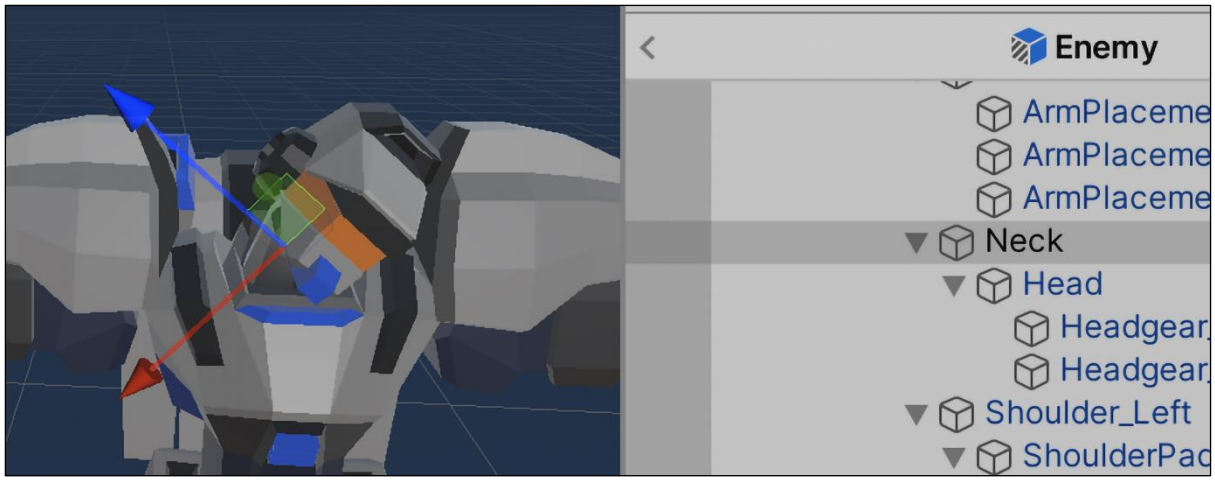

HumanoidIdle
HumanoidRun

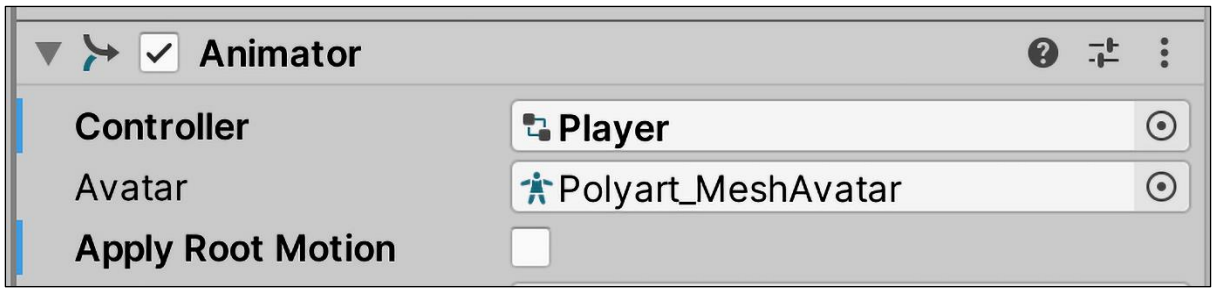

Animator
Layers
Parameters
Name
Velocity
0.0

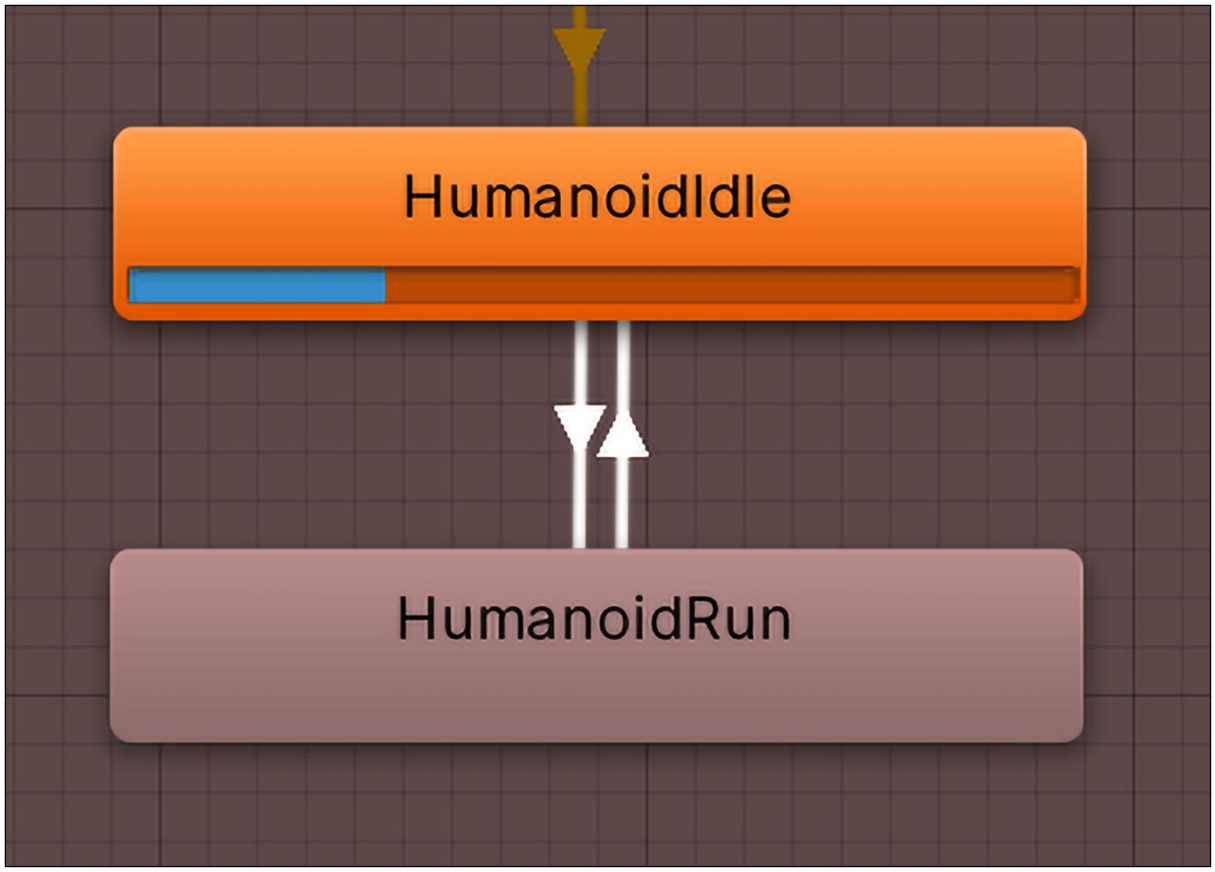

Conditions
Velocity
Greater
0.01

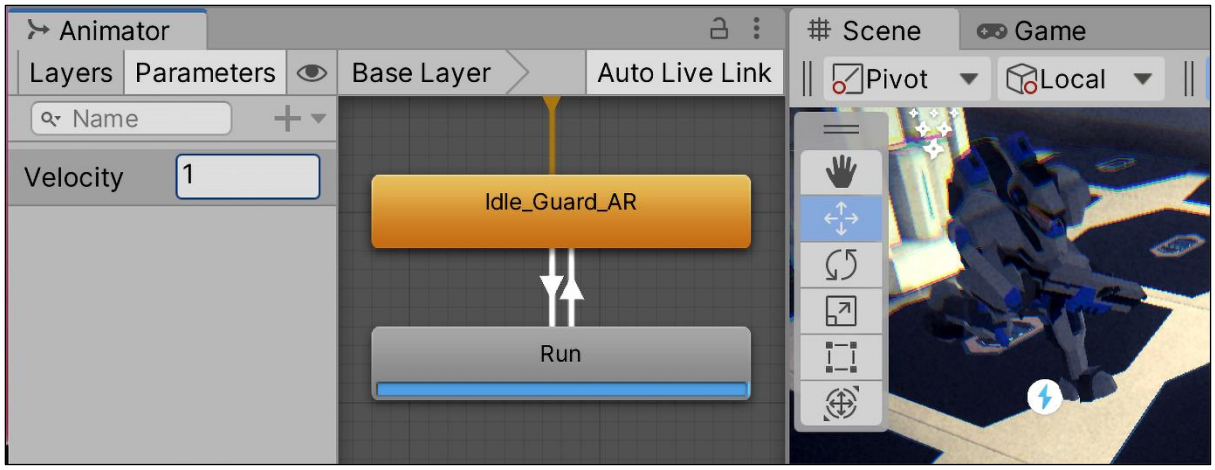

Conditions
Velocity
Less
0.01
Greater
Less

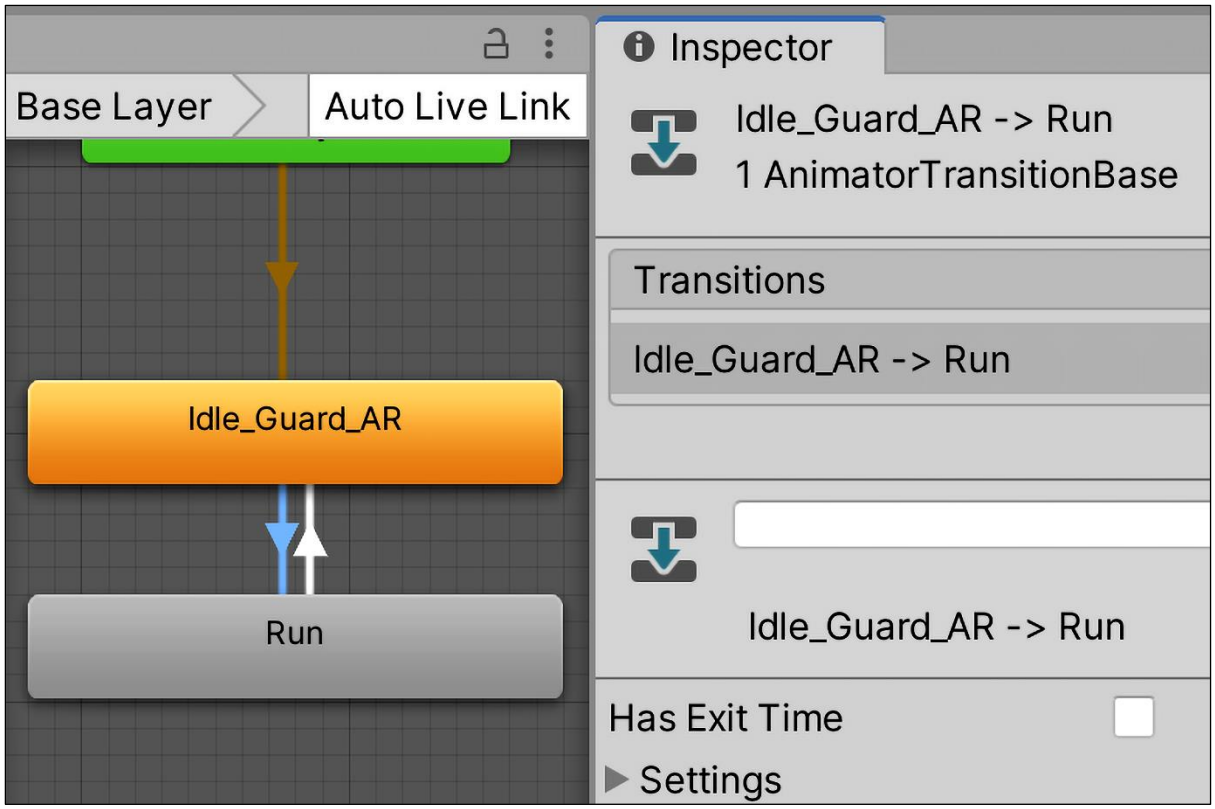

Hierarchy
All
Enemy
Enemy
Arm1
AssaultRifle
Backpack1
Body1
head1
Hips
Leg1
Inspector
Body1
Static
Tag
Untagged
Layer
Default
Transform
Skinned Mesh Renderer
Edit Bounds
Bounds
Center X -31.982 Y 2.51458 Z 1.90734
Extent X 51.1260 Y 46.6044 Z 27.7491
Quality
Auto
Update When Offscre
Mesh
Body1

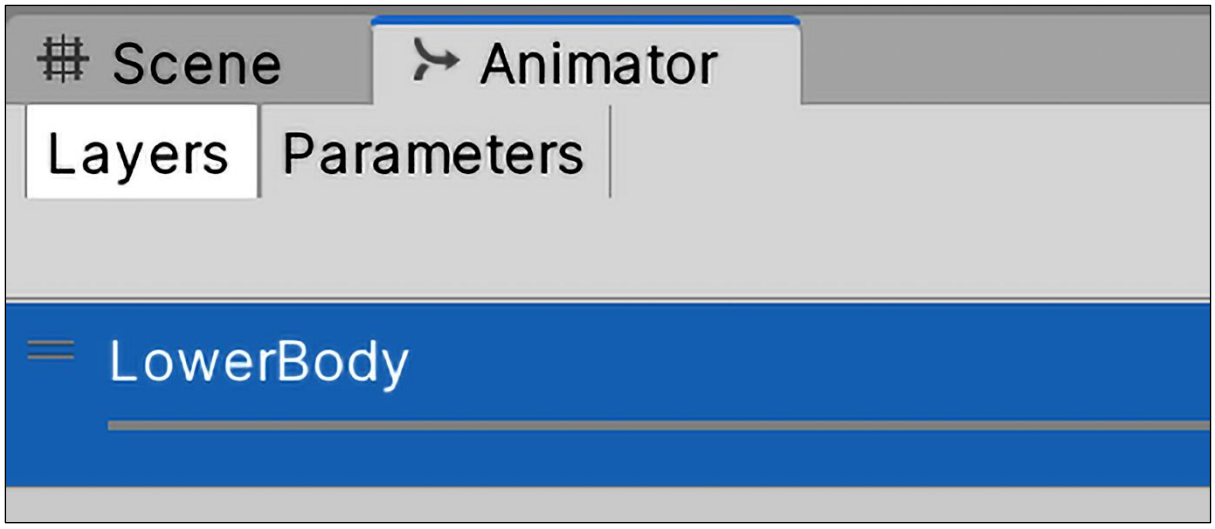

Enemy
ArmPlaceme
ArmPlaceme
ArmPlaceme
Neck
Head
Headgear
Headgear
Shoulder_Left
ShoulderPad

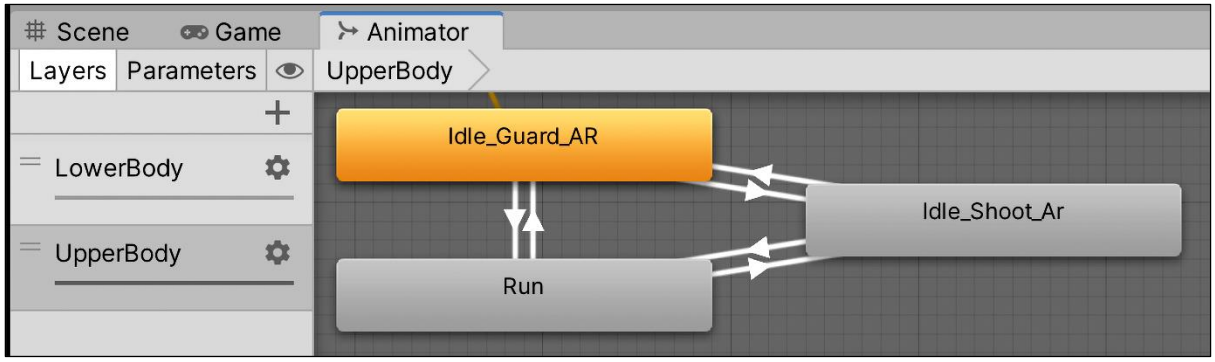

Animator
Controller
Player
Avatar
Polyart_MeshAvatar
Apply Root Motion

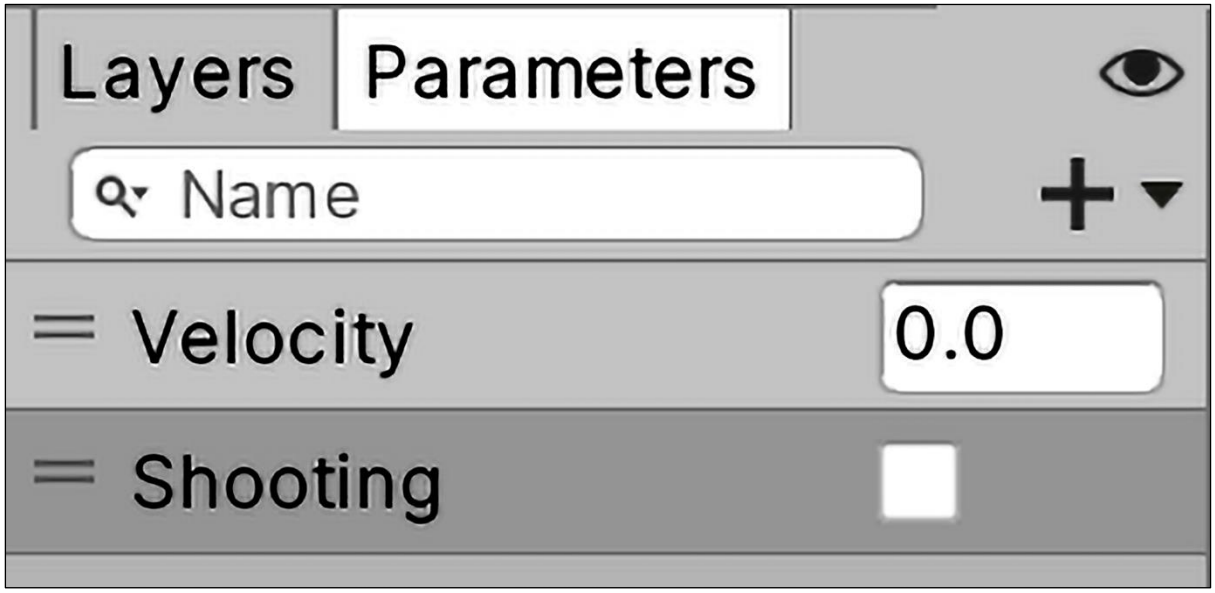

HumanoidIdle
HumanoidRun

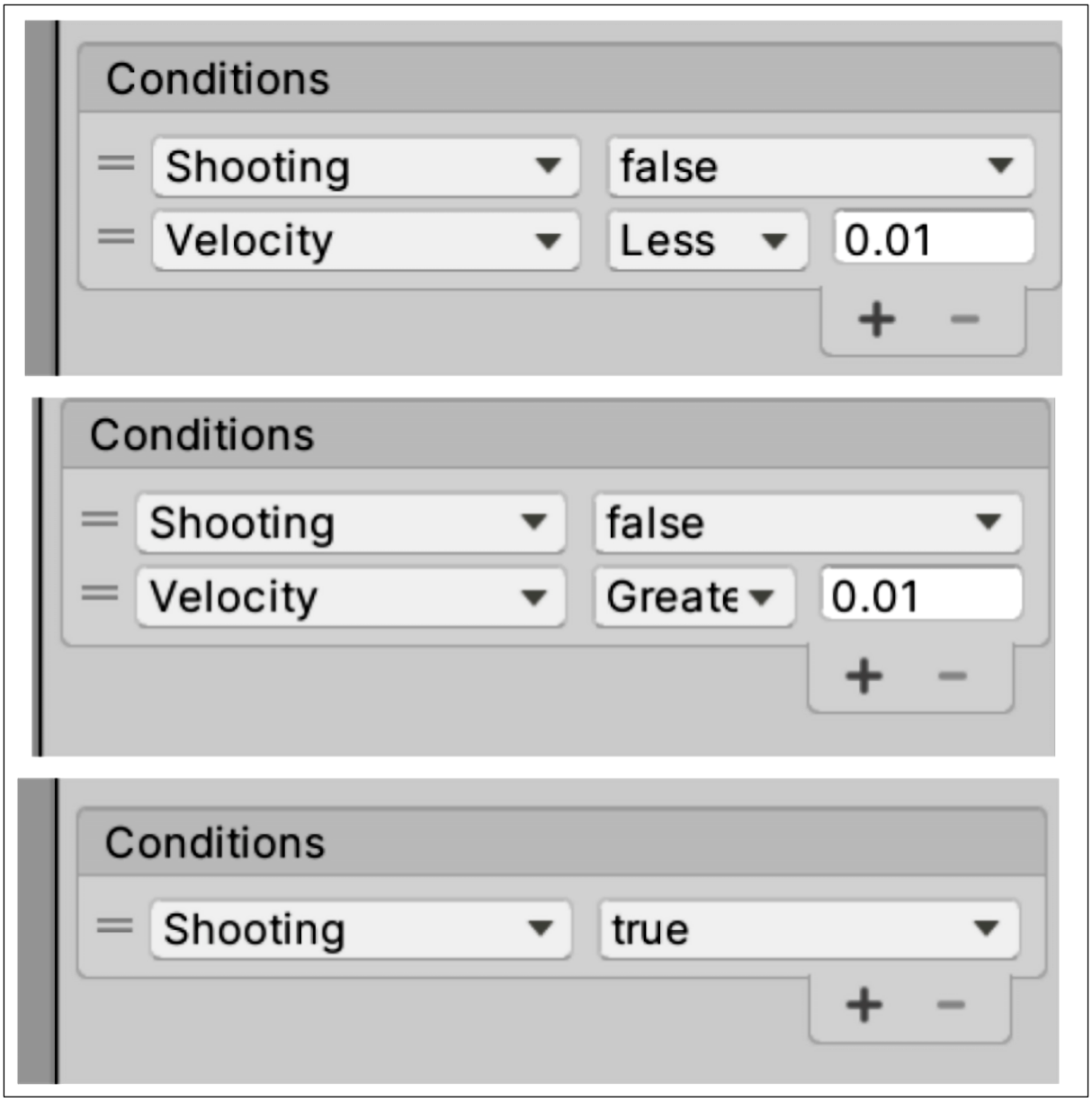

Animator
Layers
Parameters
Base Layer
Auto Live Link
Name
Velocity
1
Idle_Guard_AR
Run
Scene
Game
Pivot
Local

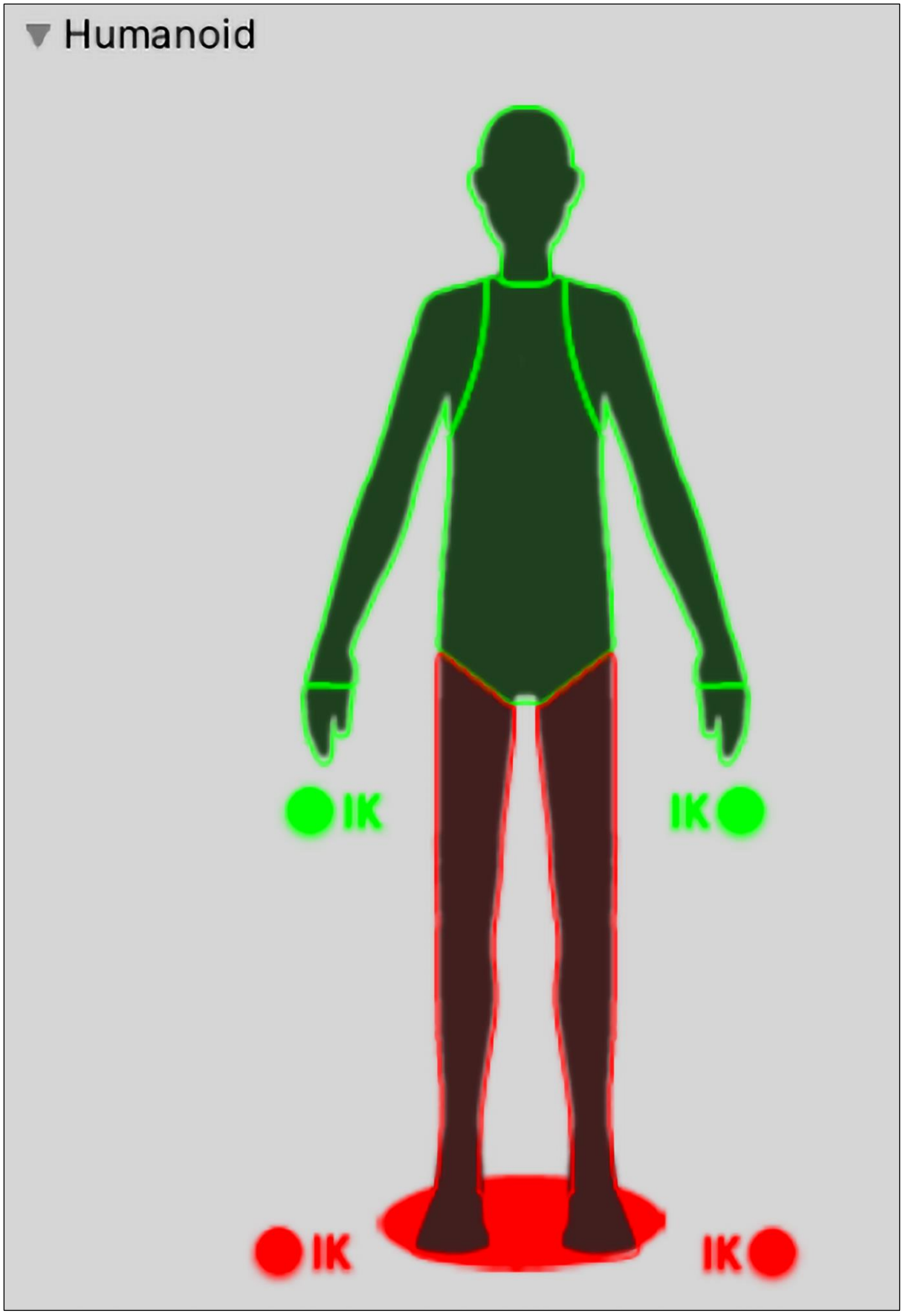

Base Layer
Auto Live Link
Idle_Guard_AR
Run
Inspector
Idle_Guard_AR -> Run
1 AnimatorTransitionBase
Transitions
Idle_Guard_AR -> Run
Idle_Guard_AR -> Run
Has Exit Time
Settings

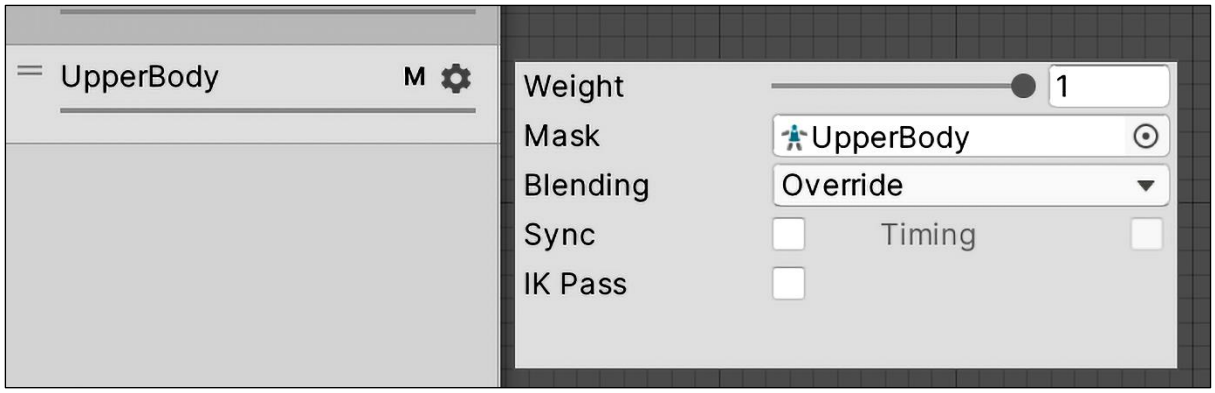

Scene
Animator
Layers
Parameters
LowerBody

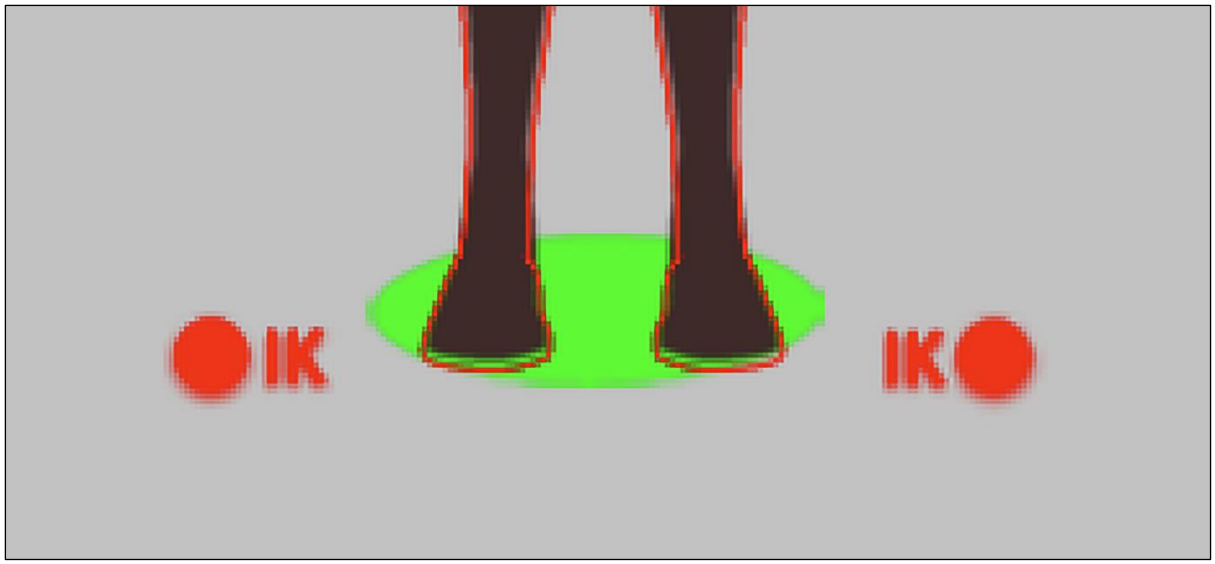

Scene
Game
Animator
Layers
Parameters
UpperBody
LowerBody
UpperBody
Idle_Guard_AR
Idle_Shoot_Ar
Run


Layers
Parameters
Name
Velocity
0.0
Shooting


Conditions
Shooting
false
Velocity
Less
0.01
Conditions
Shooting
false
Velocity
Greate
0.01
Conditions
Shooting
true


Humanoid
IK
IK
IK
IK


UpperBody
M
Weight
1
Mask
UpperBody
Blending
Override
Sync
Timing
IK Pass


IK
IK



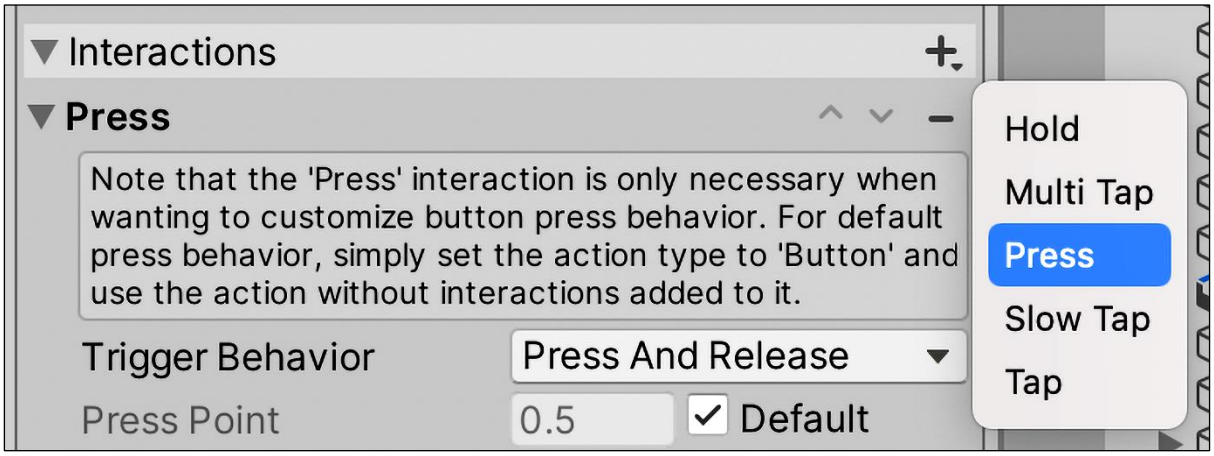

```
public void OnFire(InputValue value)
{
    if (value.isPressed)
    {
        InvokeRepeating("Shoot", fireRate, fireRate);
    }
    else
    {
        CancelInvoke();
    }
}
```

```
private void Shoot()
{
    if (bulletsAmount > 0 && Time.timeScale > 0)
    {
        bulletsAmount--;

        GameObject clone = Instantiate(prefab);

        clone.transform.position = shootPoint.transform.position;
        clone.transform.rotation = shootPoint.transform.rotation;

        muzzleEffect.Play();
        shootSound.Play();
    }
}
```

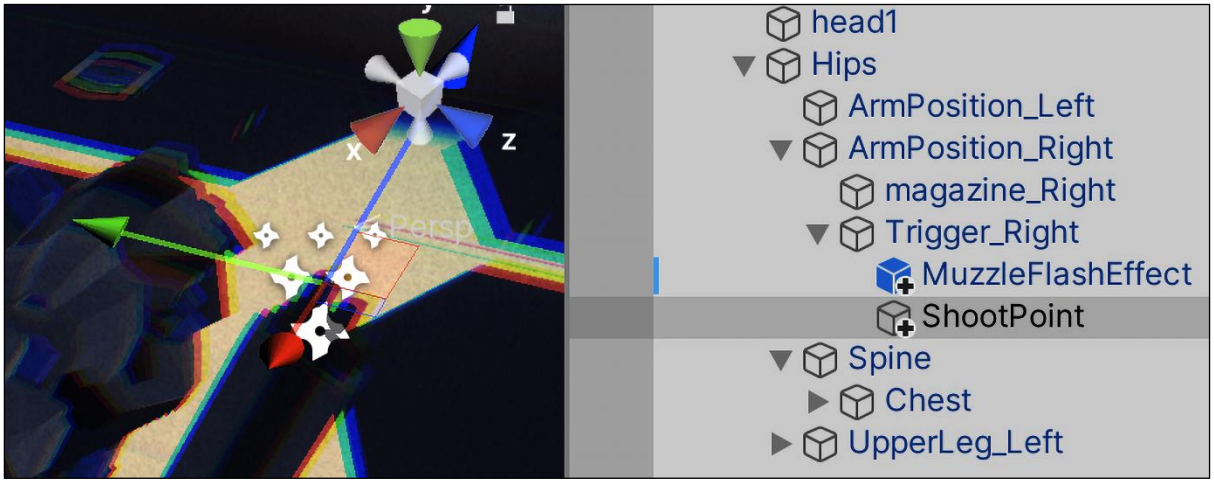


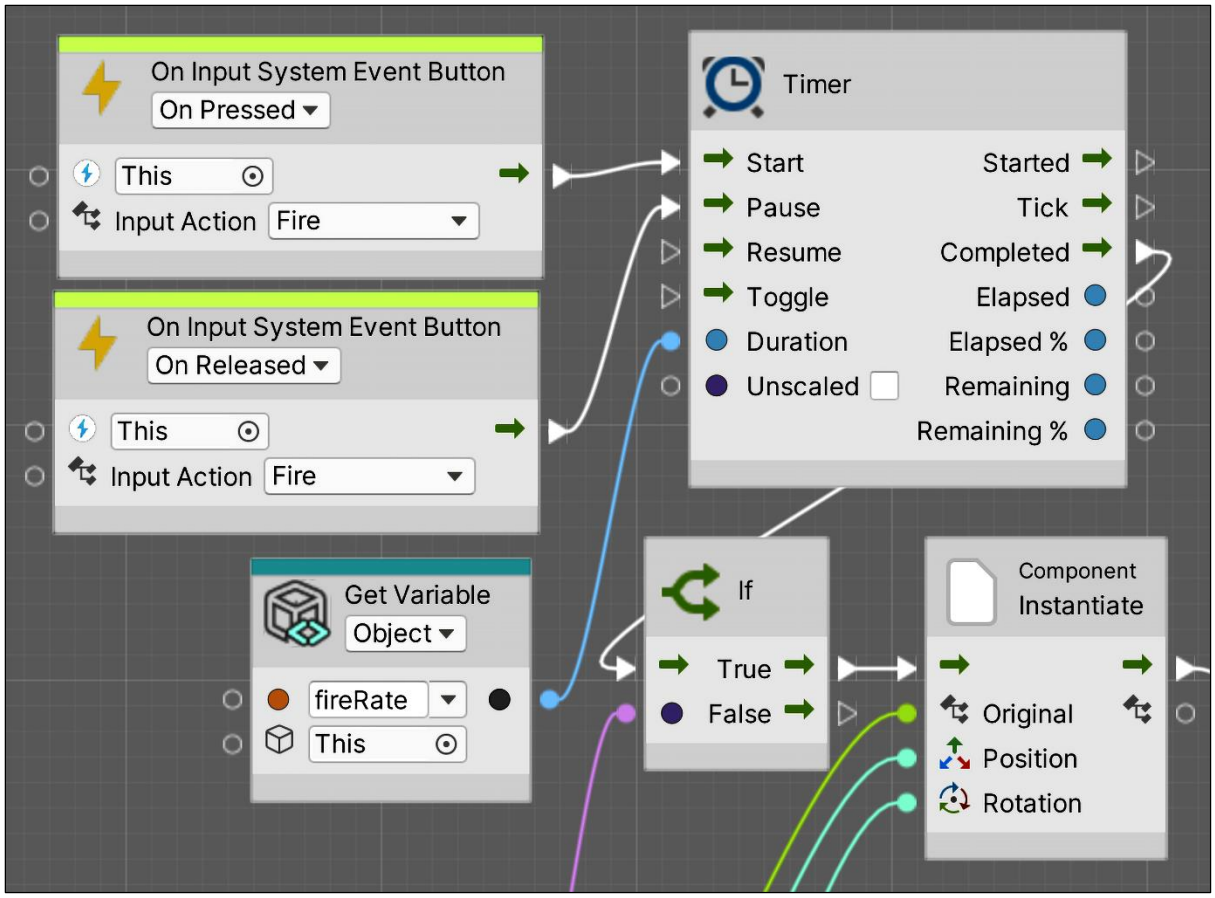
```
Animator animator;

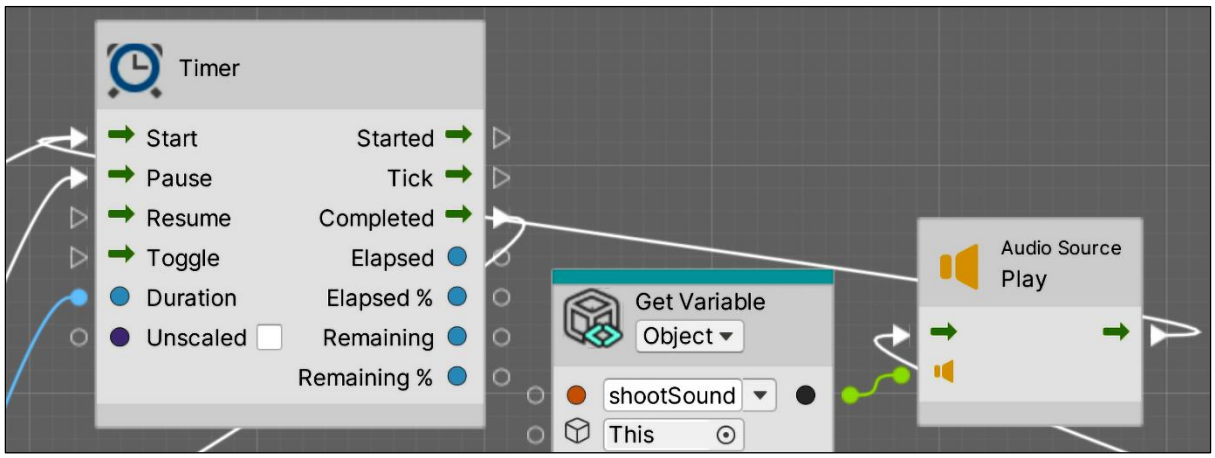

private void Awake()
{
    animator = GetComponent<Animator>();
}
```

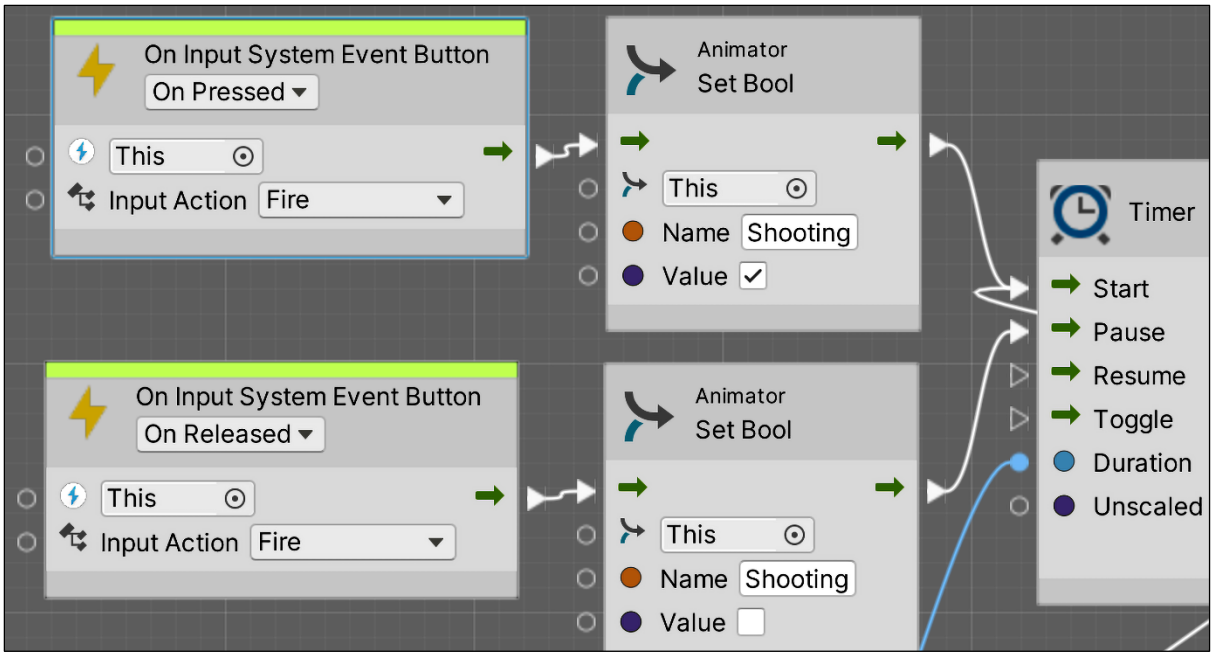
```
public void OnFire(InputValue value)
{
    animator.SetBool("Shooting", value.isPressed);

    if (value.isPressed)
    {
```




On Input System Event Button
On Pressed
This
Input Action
Fire
On Input System Event Button
On Released
This
Input Action
Fire
Timer
Start
Pause
Resume
Toggle
Duration
Unscaled
Started
Tick
Completed
Elapsed
Elapsed %
Remaining
Remaining %
Get Variable
Object
fireRate
This
If
True
False
Component
Instantiate
Original
Position
Rotation


Timer
Start
Pause
Resume
Toggle
Duration
Unscaled
Started
Tick
Completed
Elapsed
Elapsed %
Remaining
Remaining %
Get Variable
Object
shootSound
This
Audio Source
Play




```
Animator animator;

void Awake()
{
    baseTransform = GameObject.Find("BaseDamagePoint").transform;
    agent = GetComponentInParent<NavMeshAgent>();
    animator = GetComponentInParent<Animator>();
}
```

```
void Shoot()
{
    animator.SetBool("Shooting", true);
```

```
void GoToBase()
{
    animator.SetBool("Shooting", false);
    agent.isStopped = false;

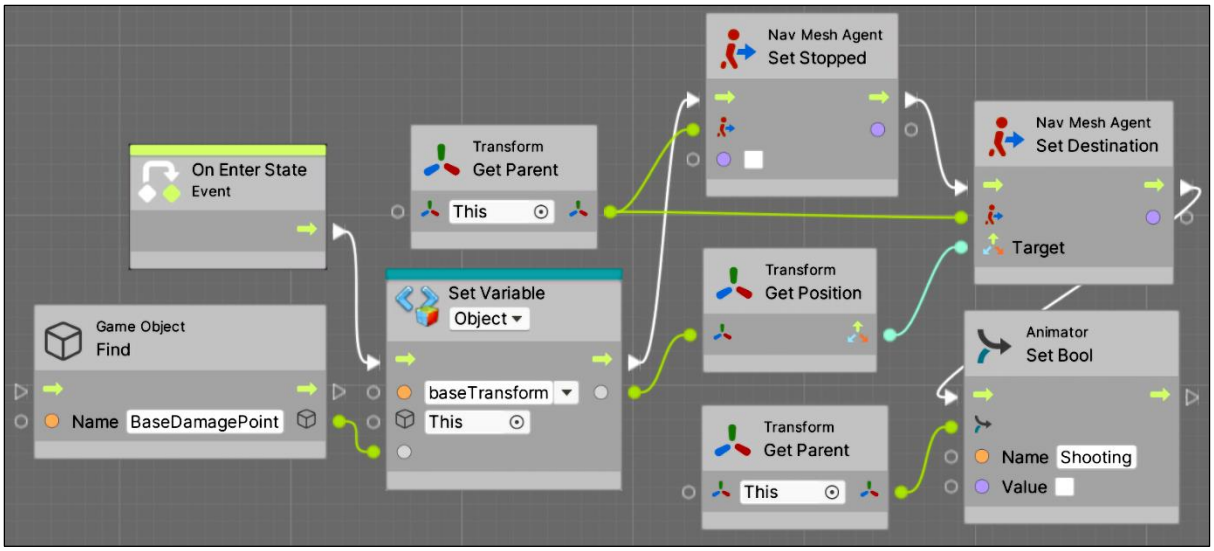
    agent.SetDestination(baseTransform.position);

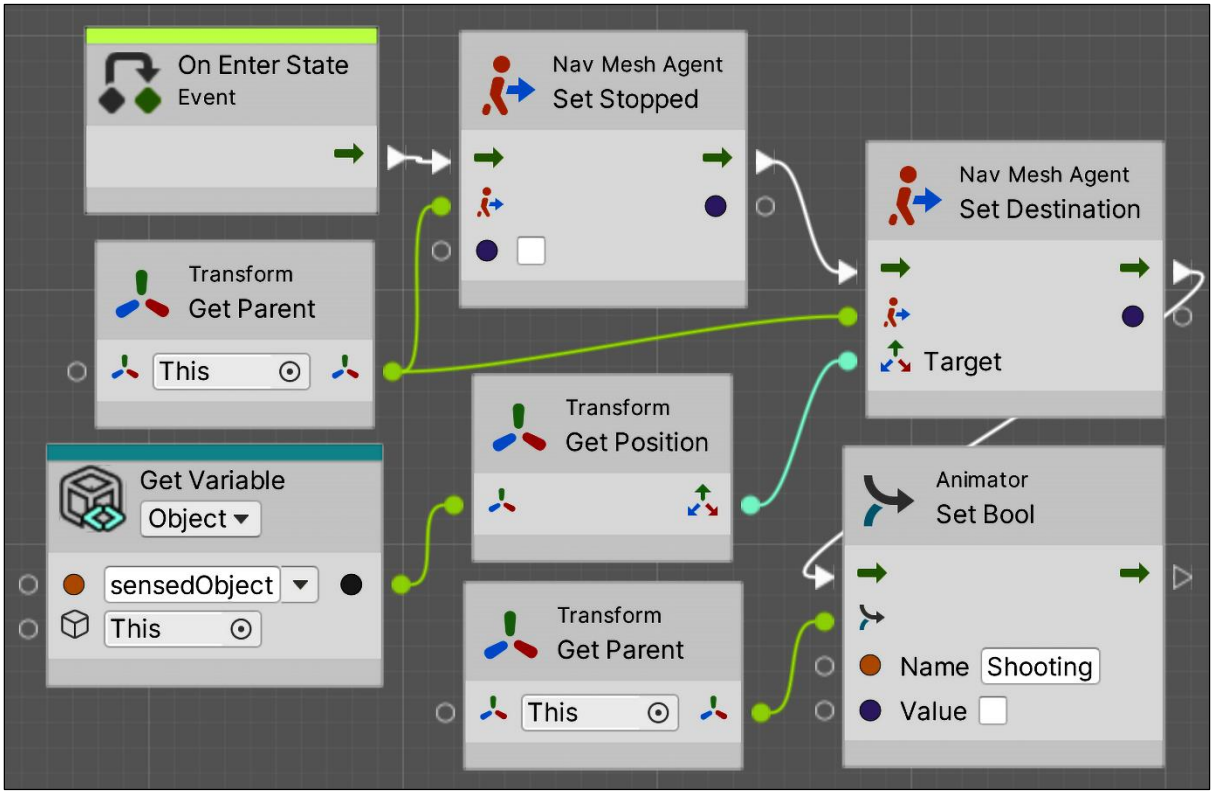
    if (sightSensor.detectedObject != null)
        currentState = EnemyState.ChasePlayer;

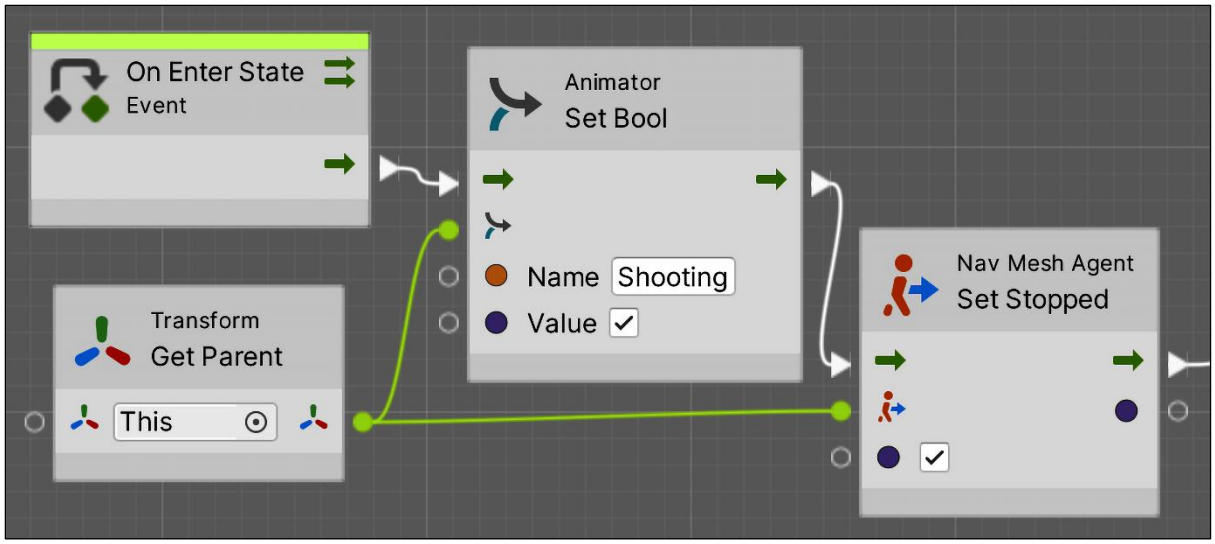
    float distanceToBase = Vector3.Distance(
        transform.position,
        baseTransform.position);

    if (distanceToBase <= baseAttackDistance)
        currentState = EnemyState.AttackBase;
}

void ChasePlayer()
{
    animator.SetBool("Shooting", false);
    agent.isStopped = false;
```


On Enter State
Event
Transform
Get Parent
This
Nav Mesh Agent
Set Stopped
Nav Mesh Agent
Set Destination
Target
Set Variable
Object
baseTransform
This
Transform
Get Position
Game Object
Find
Name BaseDamagePoint
Animator
Set Bool
Name Shooting
Value
Transform
Get Parent
This


On Enter State
Event
Nav Mesh Agent
Set Stopped
Nav Mesh Agent
Set Destination
Target
Transform
Get Parent
This
Transform
Get Position
Get Variable
Object
sensedObject
This
Animator
Set Bool
Transform
Get Parent
This
Name Shooting
Value

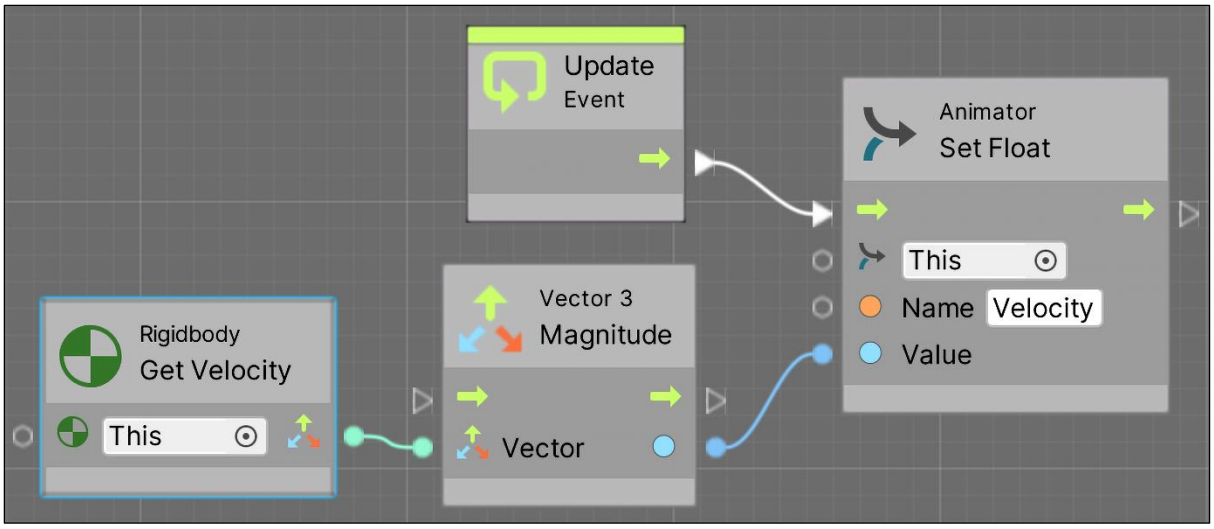



```
using UnityEngine;

public class VelocityAnimator : MonoBehaviour
{
    Rigidbody rb;
    Animator animator;

    void Awake()
    {
        rb = GetComponent<Rigidbody>();
        animator = GetComponent<Animator>();
    }

    void Update()
    {
        animator.SetFloat("Velocity", rb.velocity.magnitude);
    }
}
```

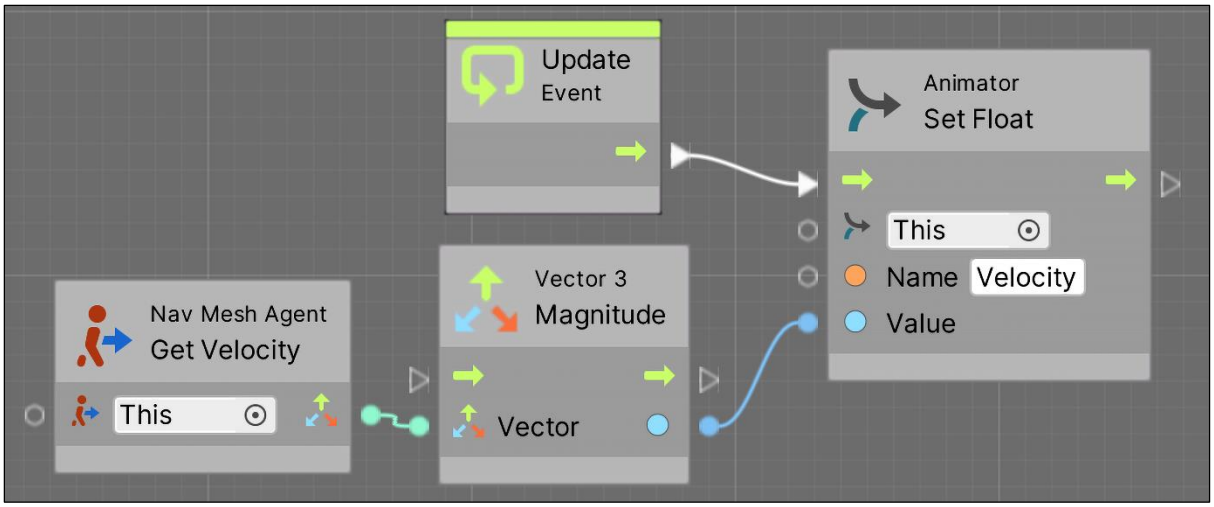


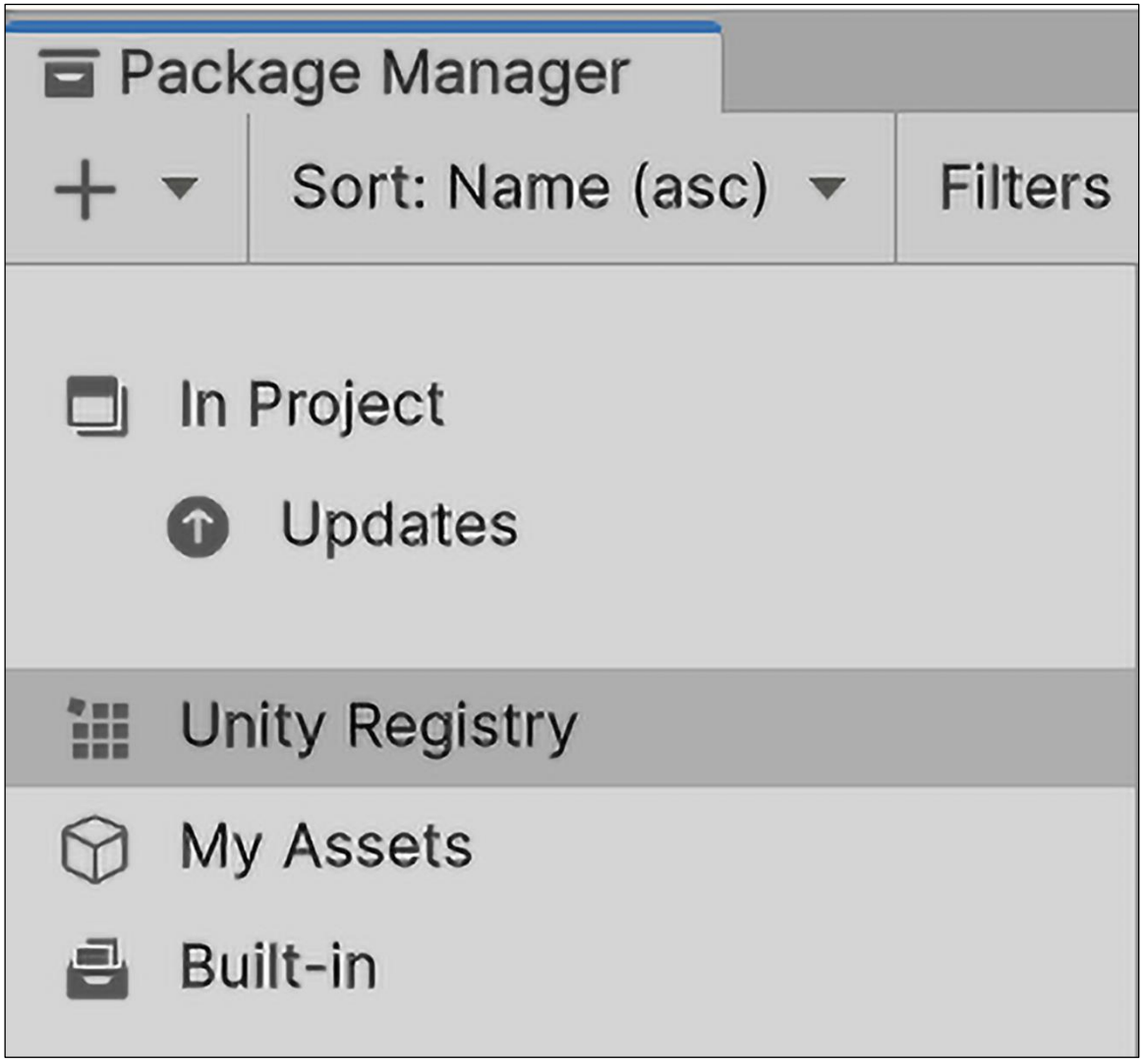

```
using UnityEngine;
using UnityEngine.AI;

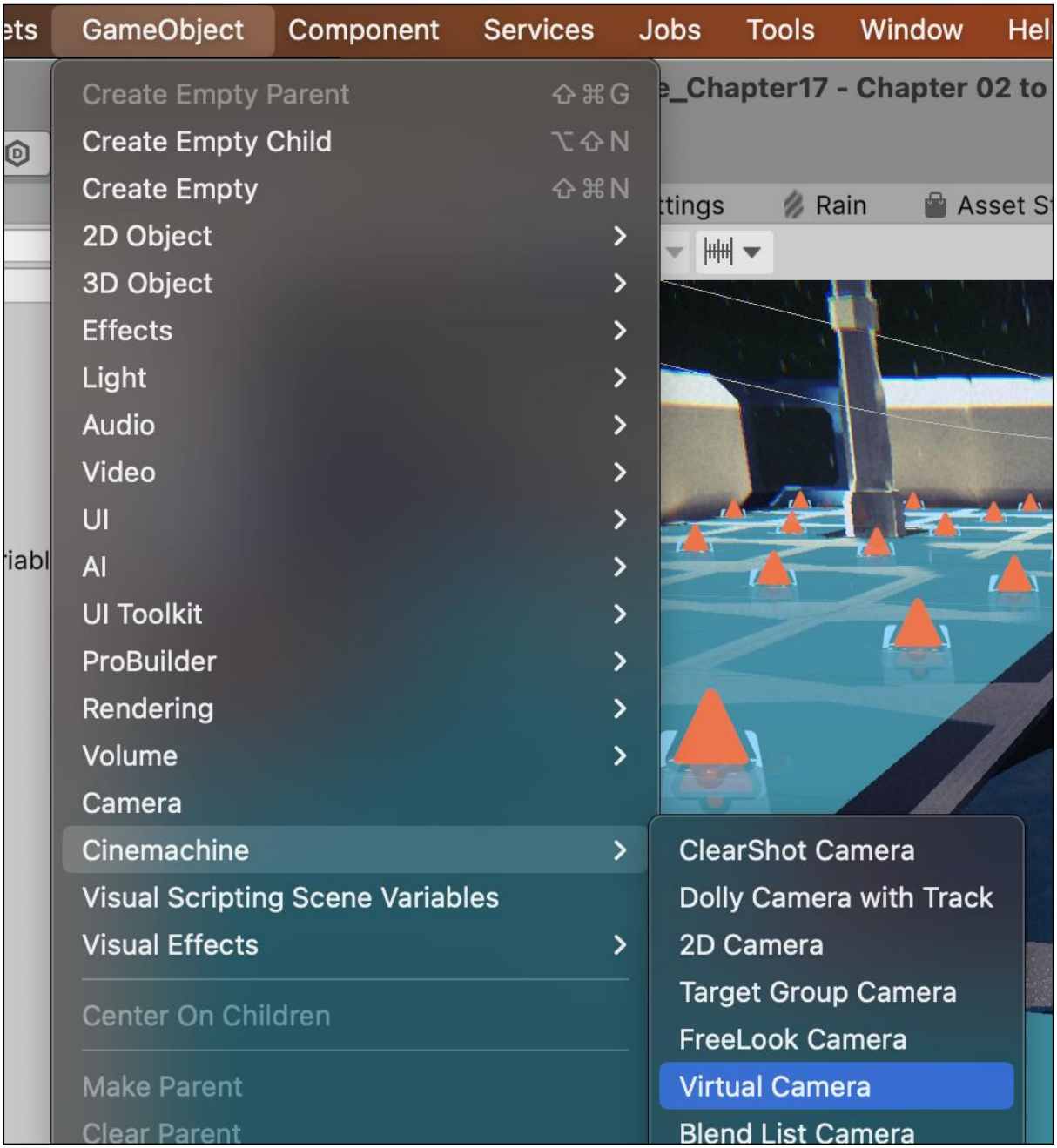
public class NavMeshAnimator : MonoBehaviour
{
    NavMeshAgent navMesh;
    Animator animator;

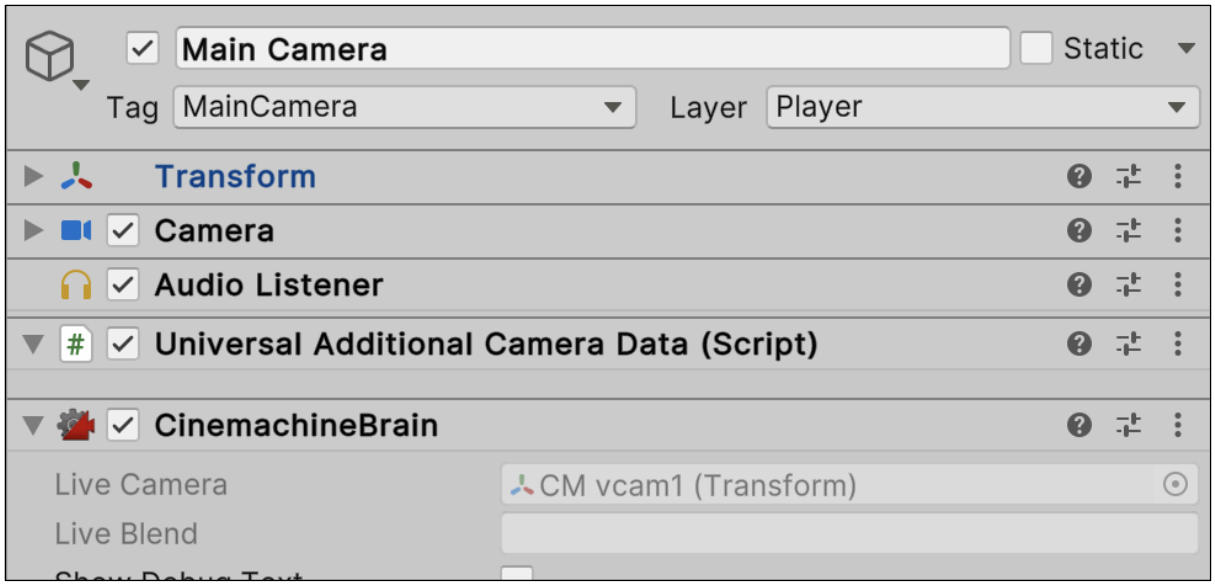
    void Awake()
    {
        navMesh = GetComponent<NavMeshAgent>();
        animator = GetComponent<Animator>();
    }

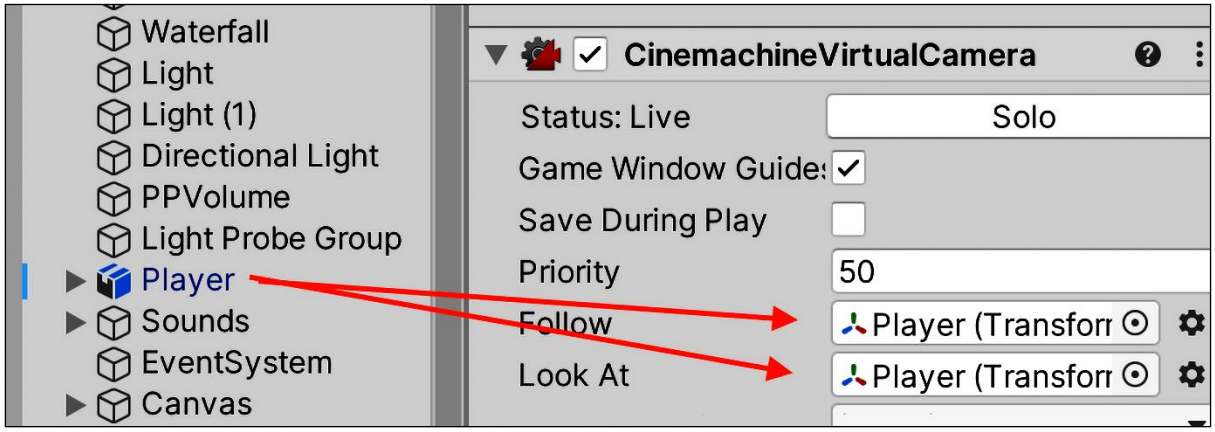
    void Update()
    {
        animator.SetFloat("Velocity", navMesh.velocity.magnitude);
    }
}
```

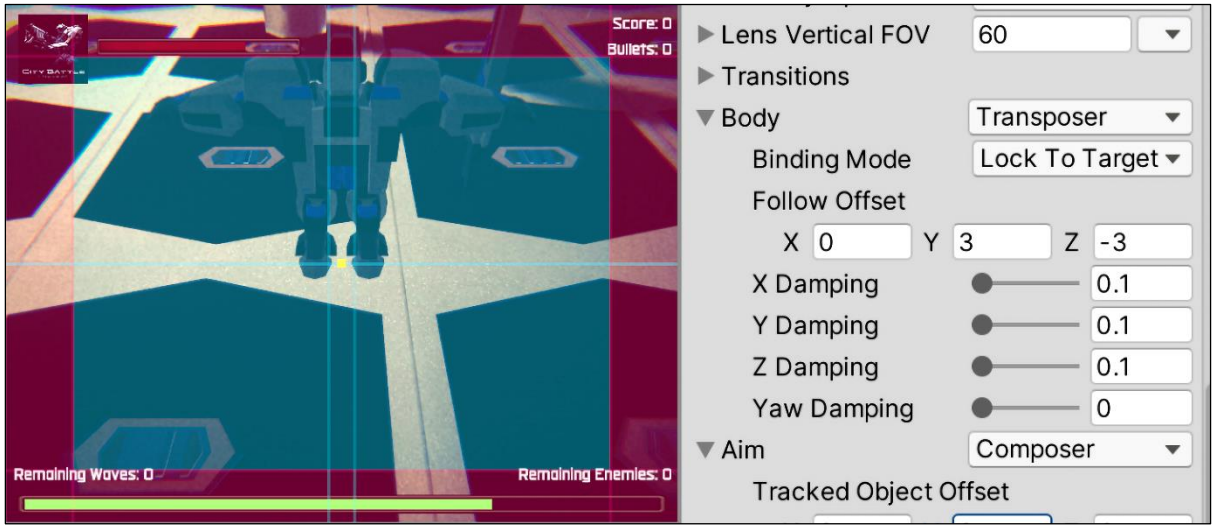

Update
Event
Animator
Set Float
This
Name
Velocity
Value
Vector 3
Magnitude
Vector
Nav Mesh Agent
Get Velocity
This

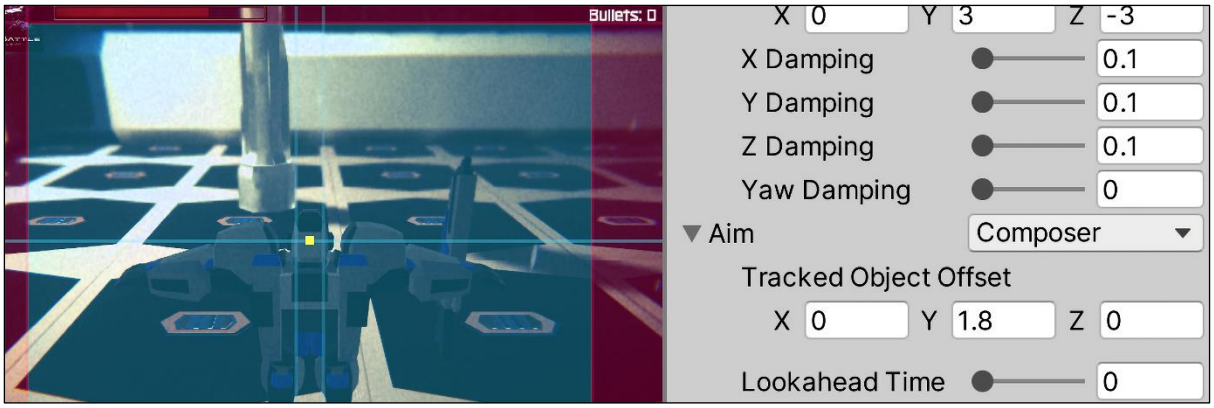

Package Manager
Sort: Name (asc)
Filters
In Project
Updates
Unity Registry
My Assets
Built-in

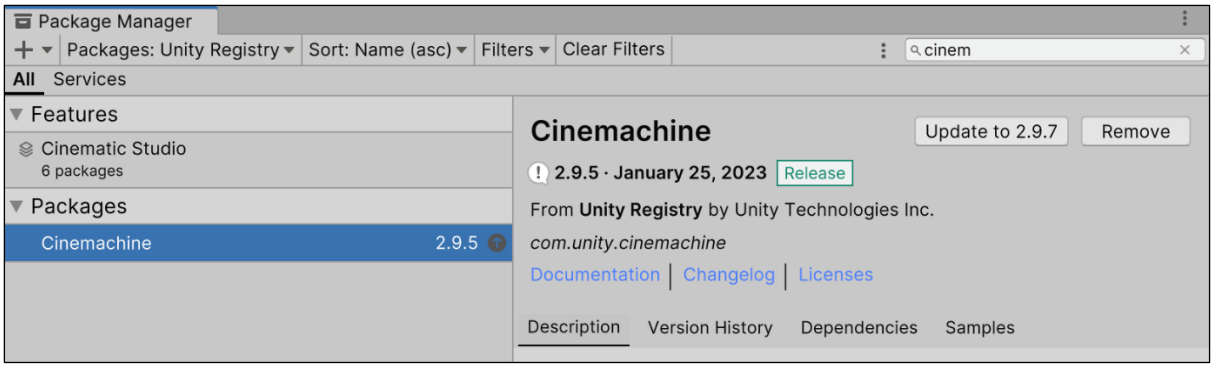

ets
GameObject
Component
Services
Jobs
Tools
Window
Hel
Create Empty Parent
Create Empty Child
Create Empty
2D Object
3D Object
Effects
Light
Audio
Video
UI
AI
UI Toolkit
ProBuilder
Rendering
Volume
Camera
Cinemachine
Visual Scripting Scene Variables
Visual Effects
Center On Children
Make Parent
Clear Parent
ClearShot Camera
Dolly Camera with Track
2D Camera
Target Group Camera
FreeLook Camera
Virtual Camera
Blend List Camera
_Chapter17 - Chapter 02 to
Rain

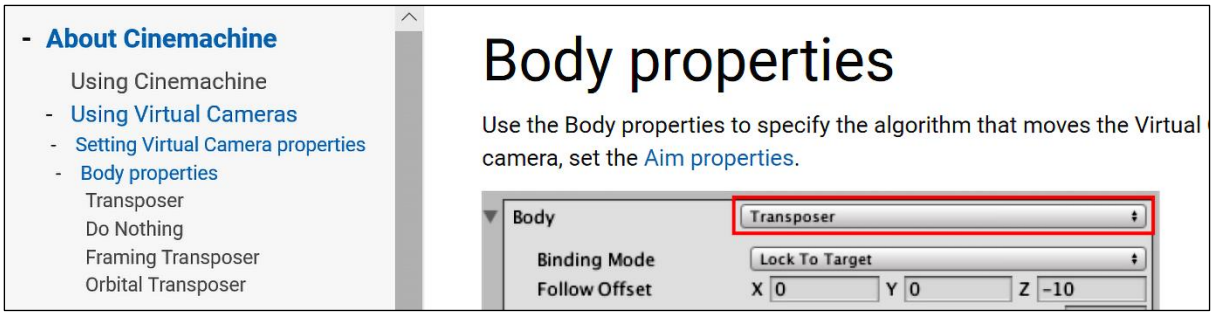

Main Camera
Static
Tag MainCamera
Layer Player
Transform
Camera
Audio Listener
Universal Additional Camera Data (Script)
CinemachineBrain
Live Camera
CM vcam1 (Transform)
Live Blend

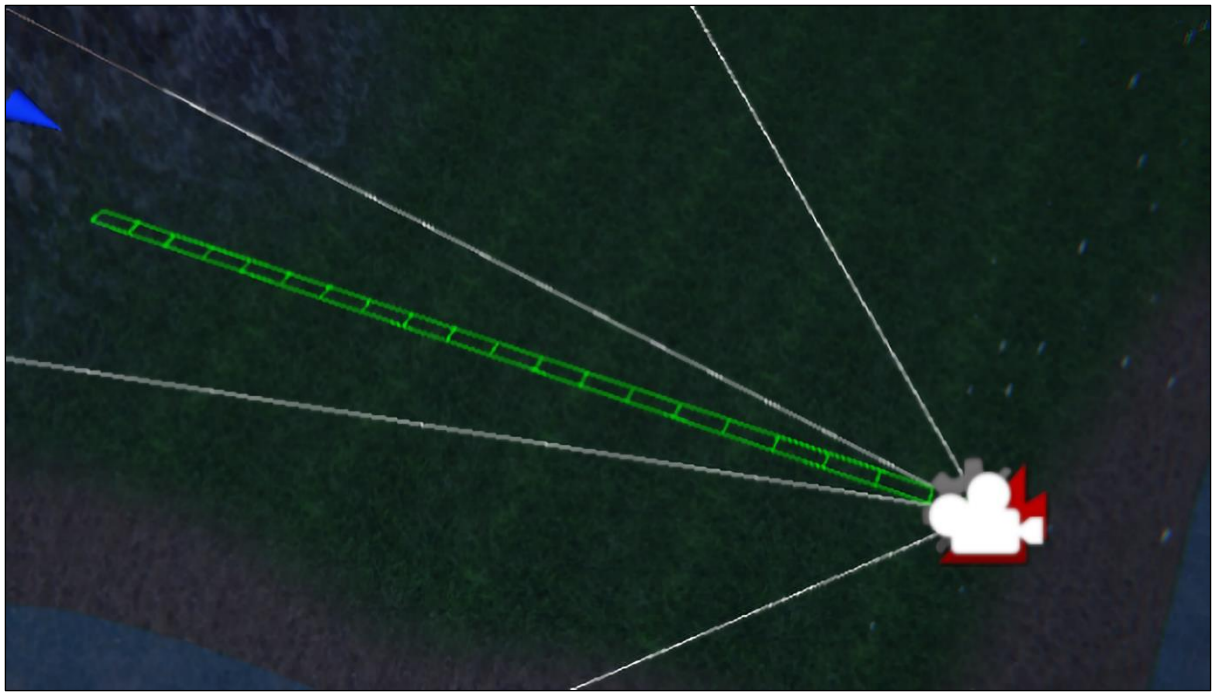

Waterfall
Light
Light (1)
Directional Light
PPVolume
Light Probe Group
Player
Sounds
EventSystem
Canvas
CinemachineVirtualCamera
Status: Live
Solo
Game Window Guide
Save During Play
Priority
50
Follow
Player (Transforr
Look At
Player (Transforr


Score: 0
Bullets: 0
Remaining Waves: 0
Remaining Enemies: 0
Lens Vertical FOV
60
Transitions
Body
Transposer
Binding Mode
Lock To Target
Follow Offset
X 0
Y 3
Z -3
X Damping
0.1
Y Damping
0.1
Z Damping
0.1
Yaw Damping
0
Aim
Composer
Tracked Object Offset


Bullets: 0
X 0
Y 3
Z -3
X Damping
0.1
Y Damping
0.1
Z Damping
0.1
Yaw Damping
0
Aim
Composer
Tracked Object Offset
X 0
Y 1.8
Z 0
Lookahead Time
0


Package Manager
Packages: Unity Registry
Sort: Name (asc)
Filters
Clear Filters
cinem
All
Services
Features
Cinematic Studio
6 packages
Packages
Cinemachine
2.9.5
Cinemachine
Update to 2.9.7
Remove
2.9.5 · January 25, 2023
Release
From Unity Registry by Unity Technologies Inc.
com.unity.cinemachine
Documentation
Changelog
Licenses
Description
Version History
Dependencies
Samples


- About Cinemachine
Using Cinemachine
- Using Virtual Cameras
- Setting Virtual Camera properties
- Body properties
Transposer
Do Nothing
Framing Transposer
Orbital Transposer
Body properties
Use the Body properties to specify the algorithm that moves the Virtual
camera, set the Aim properties.
Body
Transposer
Binding Mode
Lock To Target
Follow Offset
X 0
Y 0
Z -10

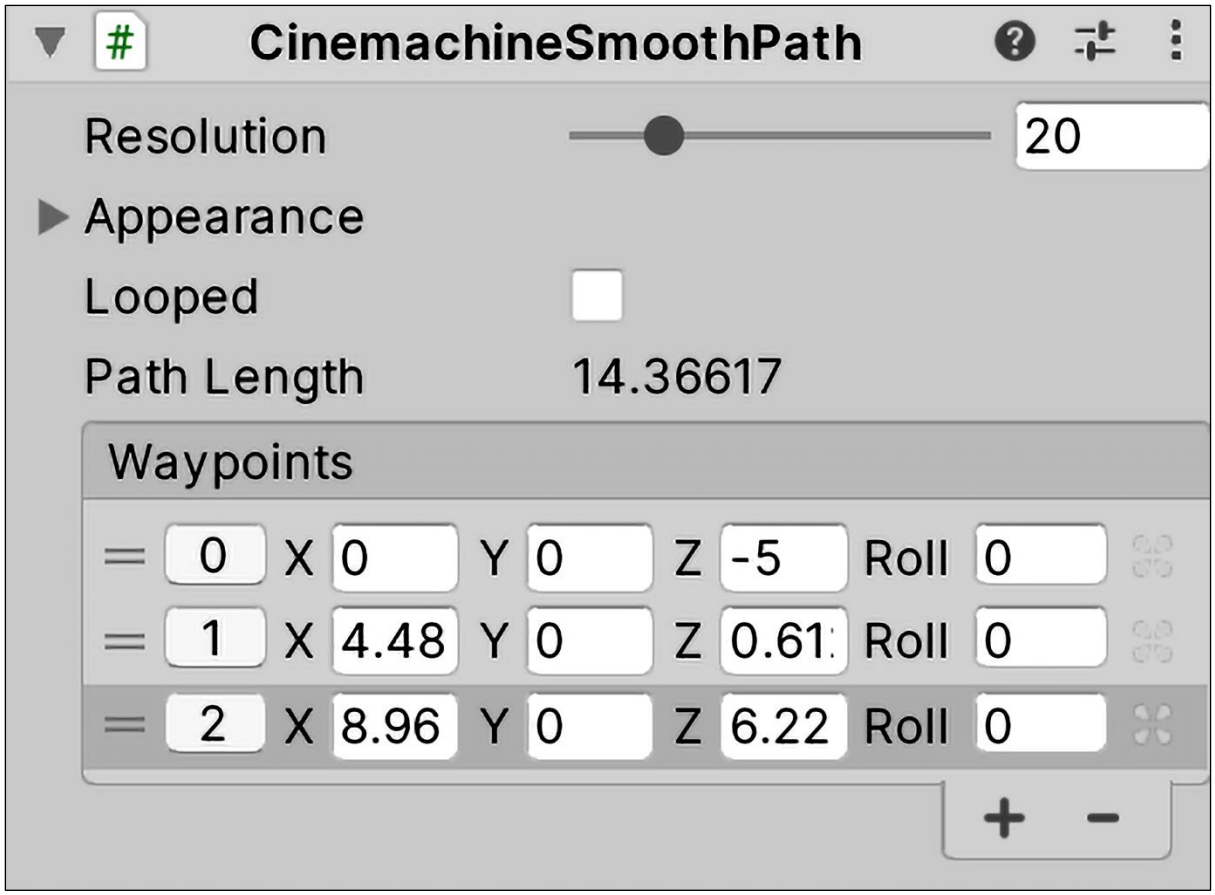


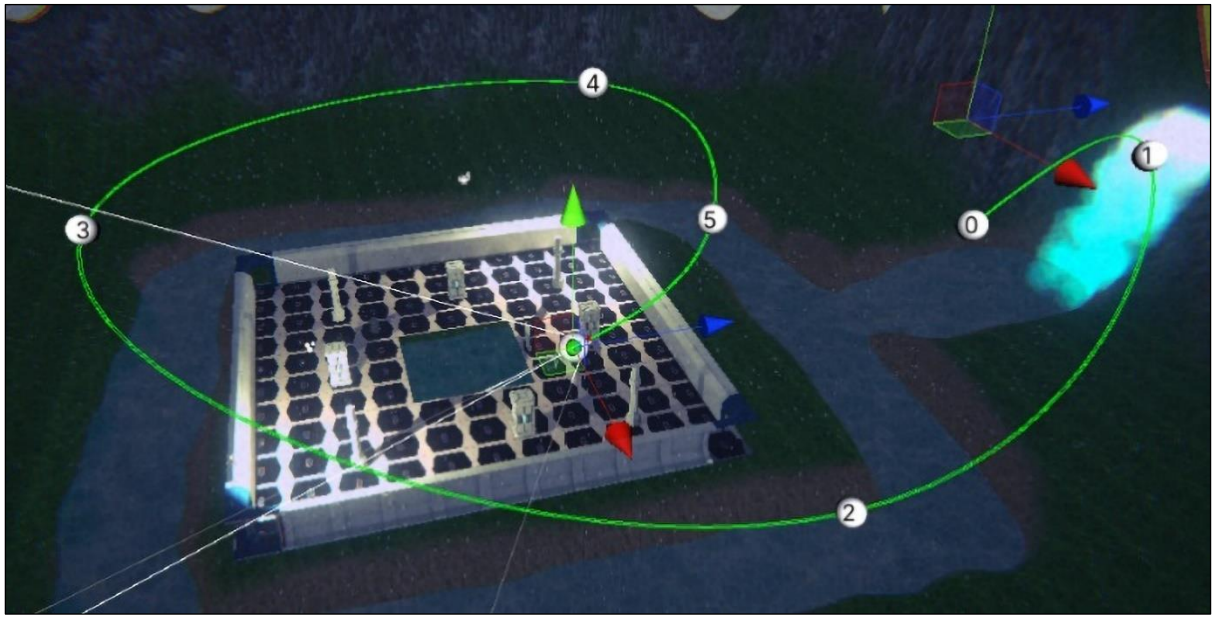
CinemachineSmoothPath

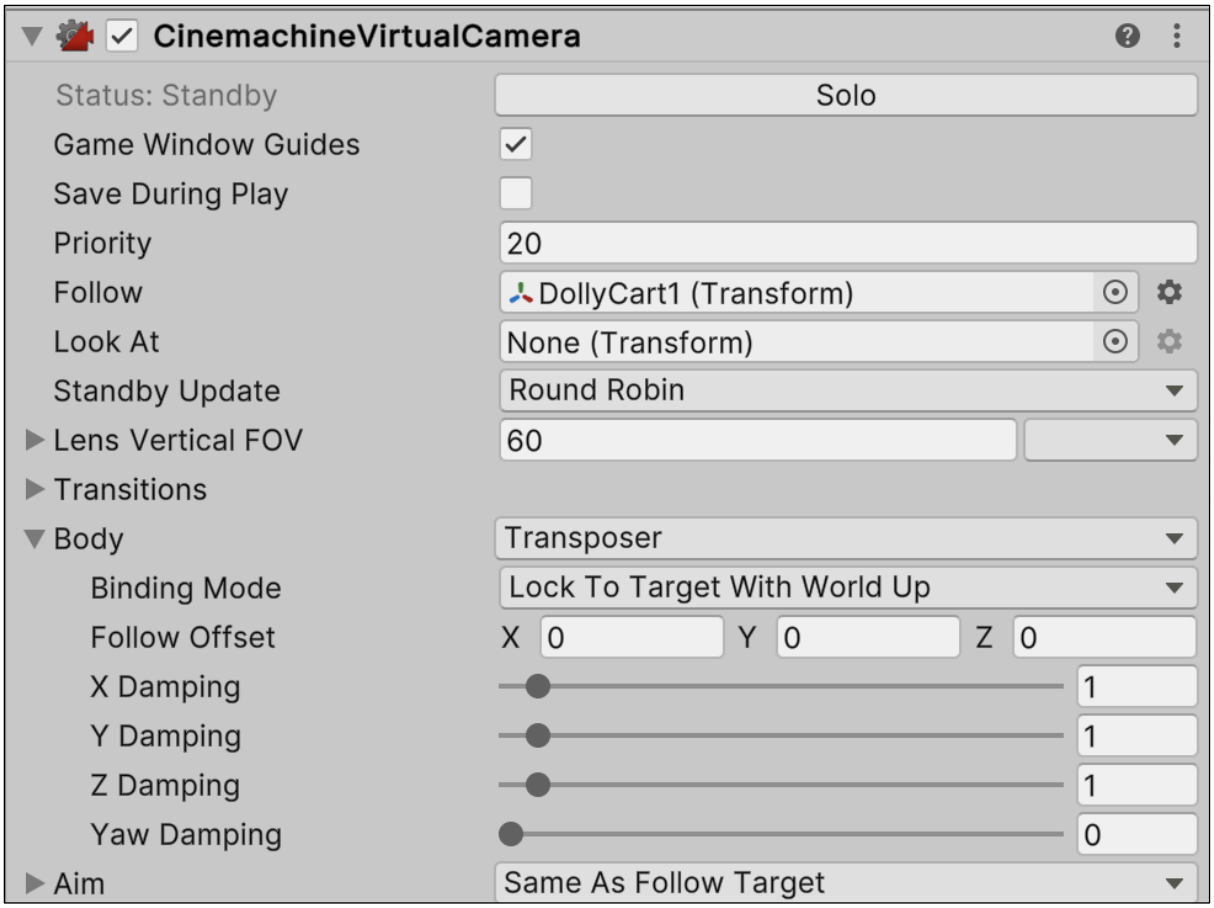
Resolution	20
Appearance	
Looped	
Path Length	253.4261

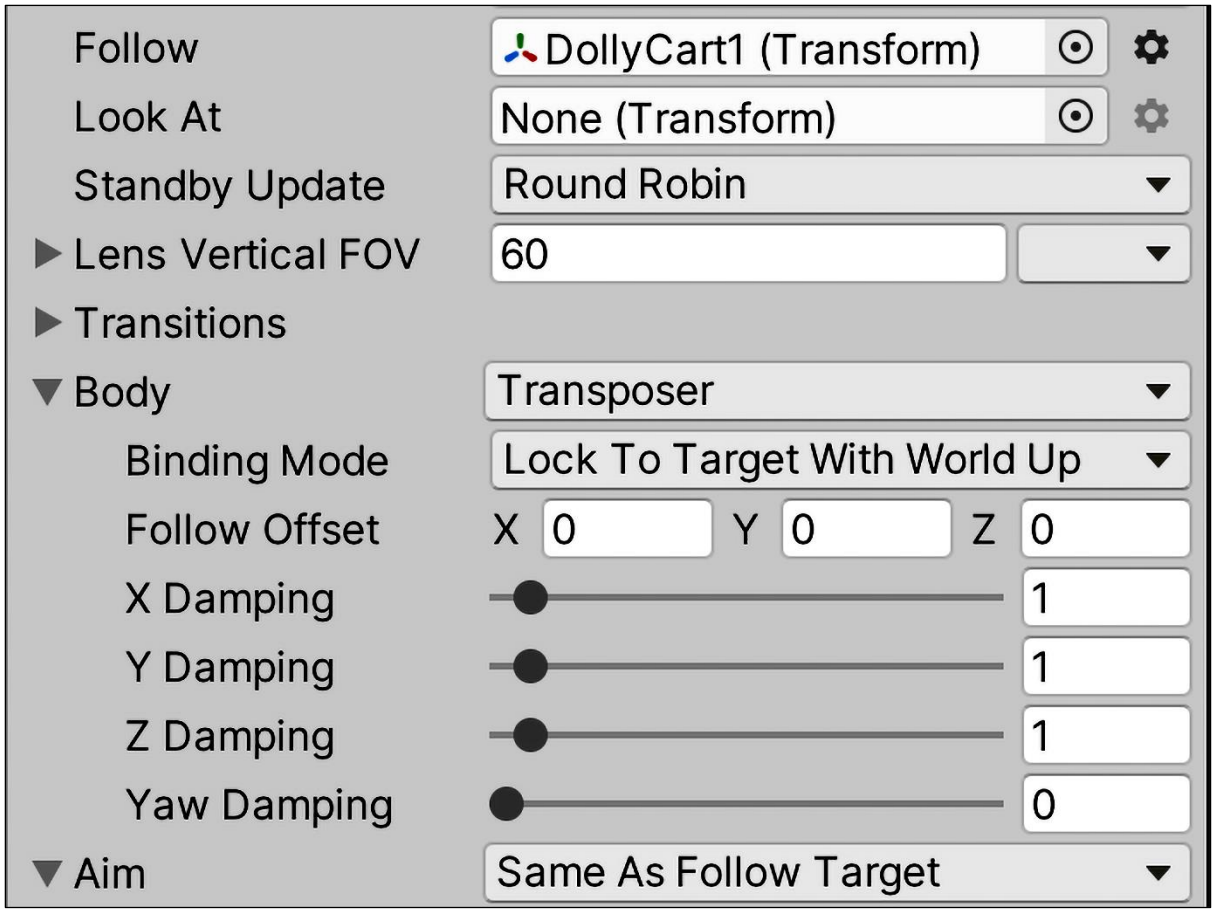
Waypoints

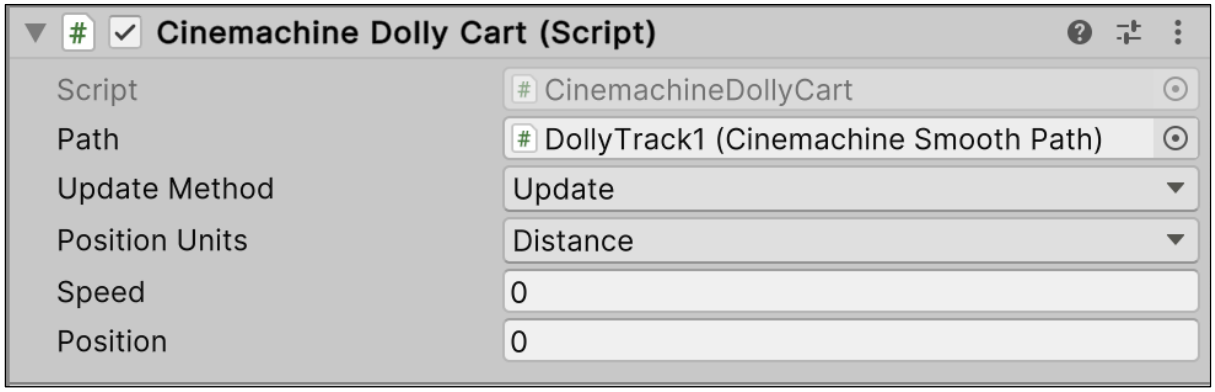
	X	Y	Z	Roll
0	-0.6651611	-22.65166	-6.24147	0
1	8.473961	-11.31552	16.13326	0
2	16.48662	-12.48783	-31.44033	0
3	1.865501	-16.76736	-72.94247	0
4	-34.41408	-3.824619	-30.87444	0
5	-5.350182	-10.58919	-26.04846	0
6	-11.82508	-18.58122	-52.54644	0

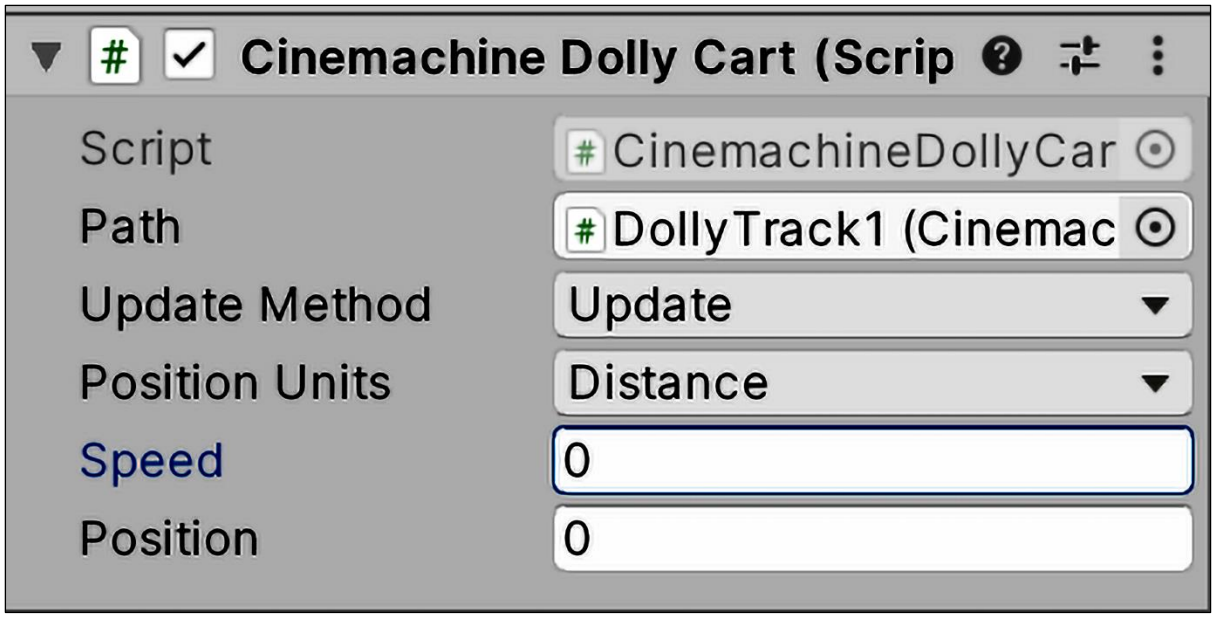

CinemachineSmoothPath
Resolution
20
Appearance
Looped
Path Length
14.36617
Waypoints
0 X 0 Y 0 Z -5 Roll 0
1 X 4.48 Y 0 Z 0.61 Roll 0
2 X 8.96 Y 0 Z 6.22 Roll 0

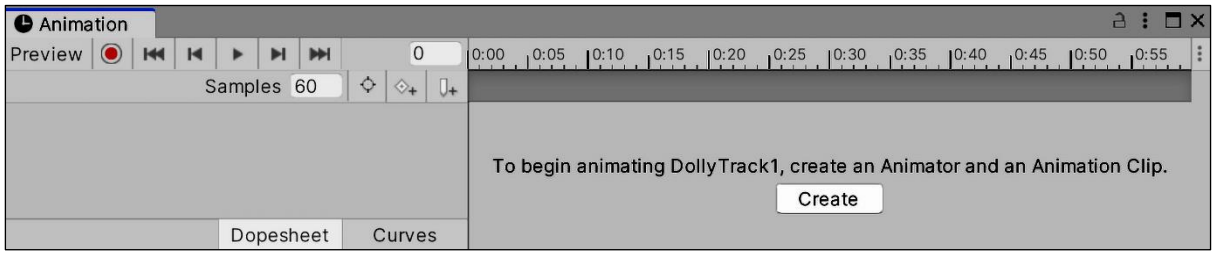

4
3
5
0
1
2


CinemachineVirtualCamera
Status: Standby
Solo
Game Window Guides
Save During Play
Priority
20
Follow
DollyCart1 (Transform)
Look At
None (Transform)
Standby Update
Round Robin
Lens Vertical FOV
60
Transitions
Body
Transposer
Binding Mode
Lock To Target With World Up
Follow Offset
X 0
Y 0
Z 0
X Damping
1
Y Damping
1
Z Damping
1
Yaw Damping
0
Aim
Same As Follow Target

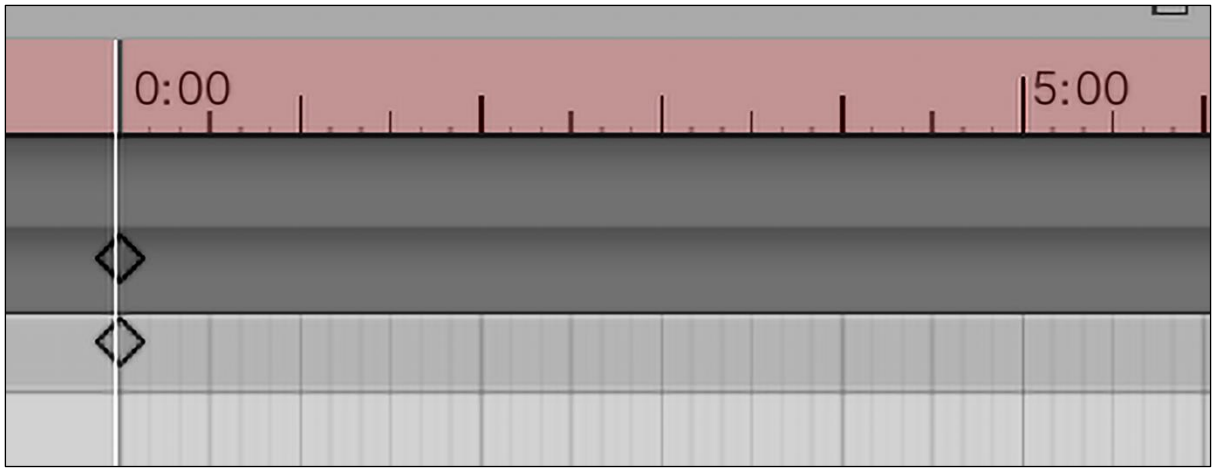

Follow
DollyCart1 (Transform)
Look At
None (Transform)
Standby Update
Round Robin
Lens Vertical FOV
60
Transitions
Body
Transposer
Binding Mode
Lock To Target With World Up
Follow Offset
X 0
Y 0
Z 0
X Damping
1
Y Damping
1
Z Damping
1
Yaw Damping
0
Aim
Same As Follow Target

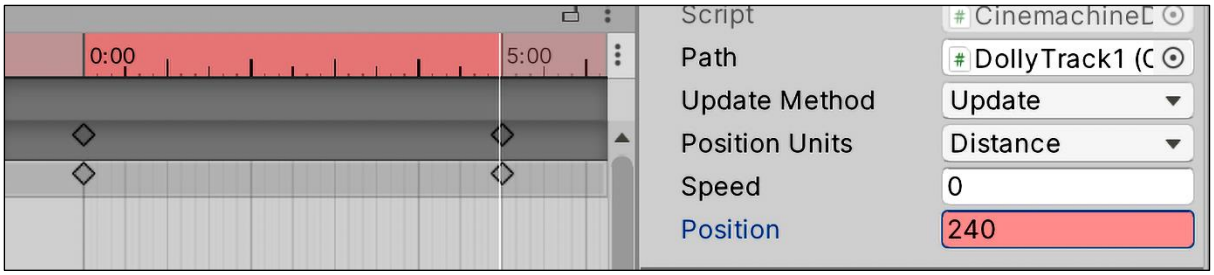

Cinemachine Dolly Cart (Script)
Script
CinemachineDollyCart
Path
DollyTrack1 (Cinemachine Smooth Path)
Update Method
Update
Position Units
Distance
Speed
0
Position
0

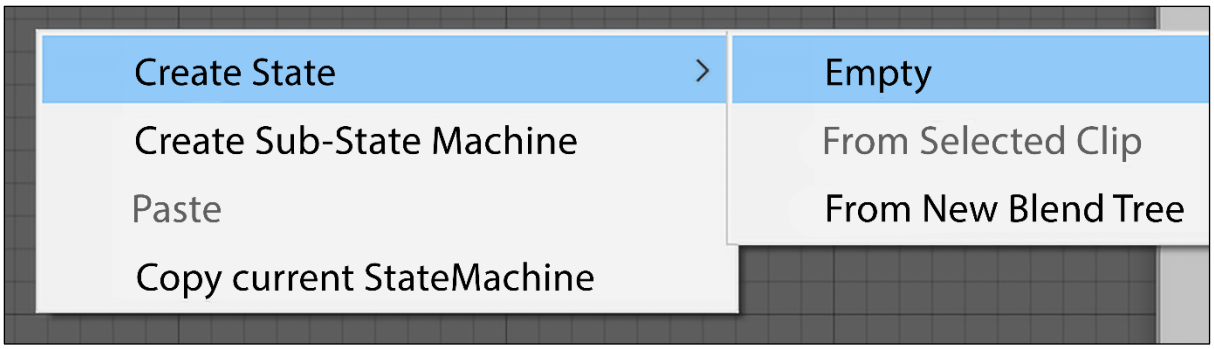

Cinemachine Dolly Cart (Scrip
Script
CinemachineDollyCar
Path
DollyTrack1 (Cinemac
Update Method
Update
Position Units
Distance
Speed
0
Position
0

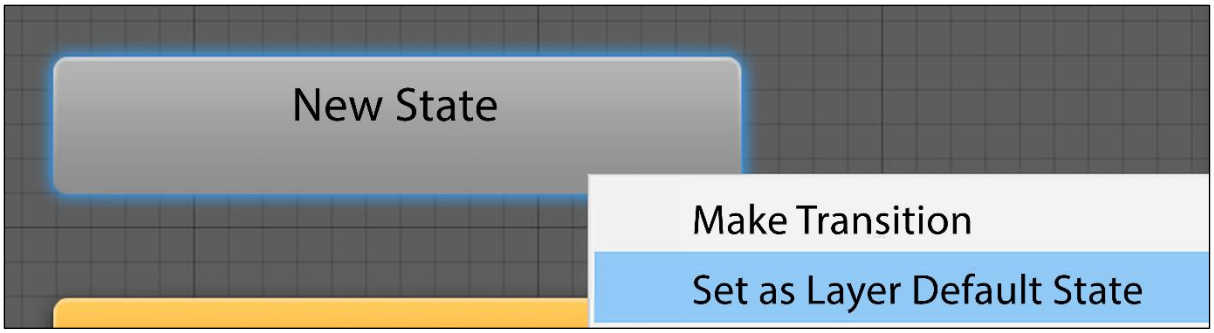

Animation
Preview
Samples 60
0:00 0:05 0:10 0:15 0:20 0:25 0:30 0:35 0:40 0:45 0:50 0:55
To begin animating DollyTrack1, create an Animator and an Animation Clip.
Create
Dopesheet
Curves

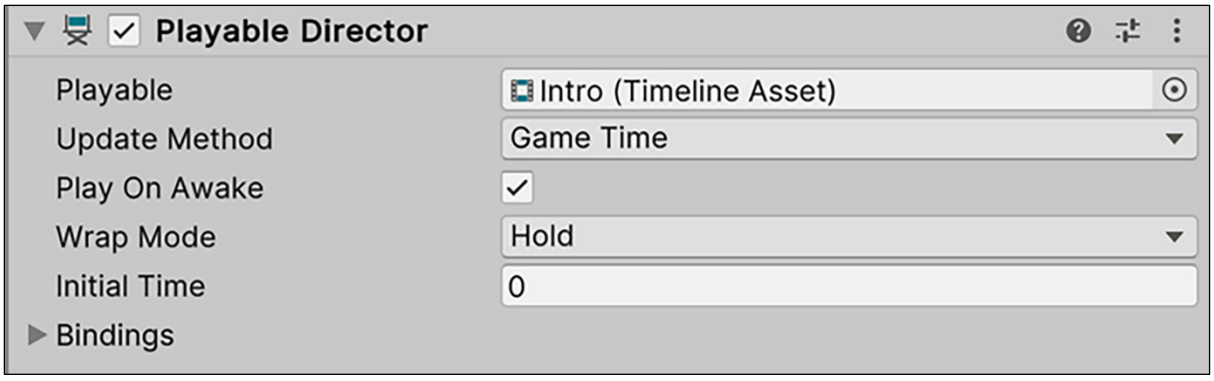

Animation
Timeline
Preview
IntroDollyTrack
Samples 60
0:00 0:01 0:02 0:03
DollyCart1 : Cinemachine Dc
Add Property
Script
Path
Update Method
Update
Position Units
Distance
Speed
0
Position
0

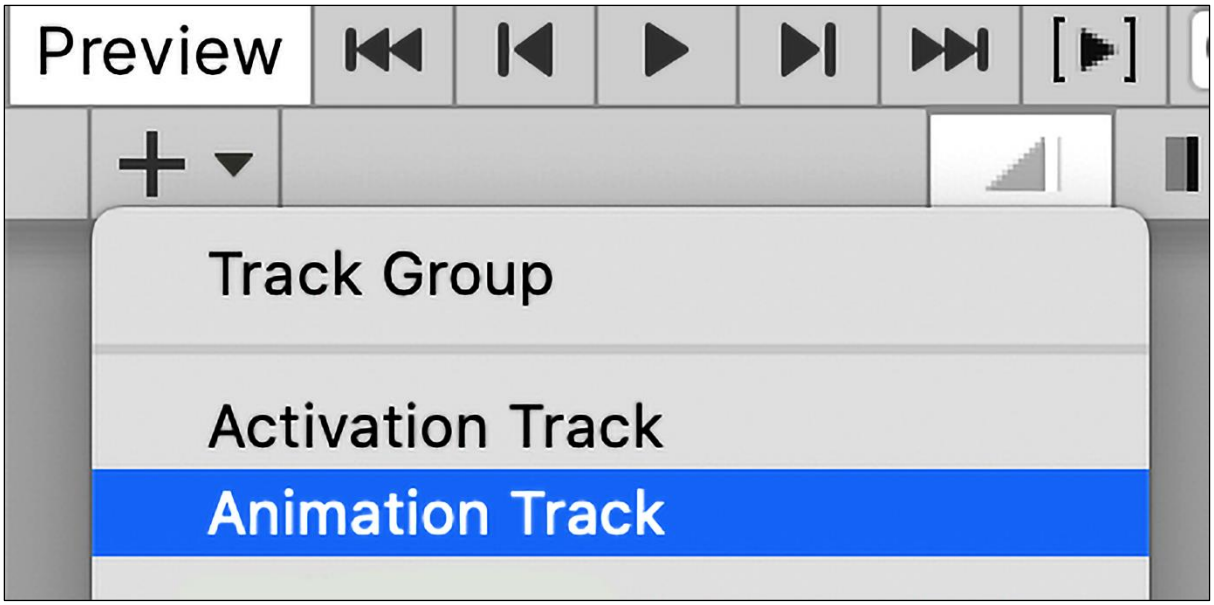

0:00
5:00


0:00
5:00
Script
CinemachineD
Path
DollyTrack1 (C
Update Method
Update
Position Units
Distance
Speed
0
Position
240

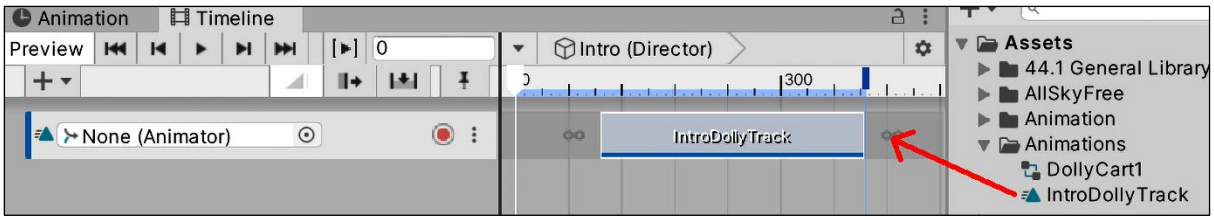

Create State
Create Sub-State Machine
Paste
Copy current StateMachine
Empty
From Selected Clip
From New Blend Tree


New State
Make Transition
Set as Layer Default State

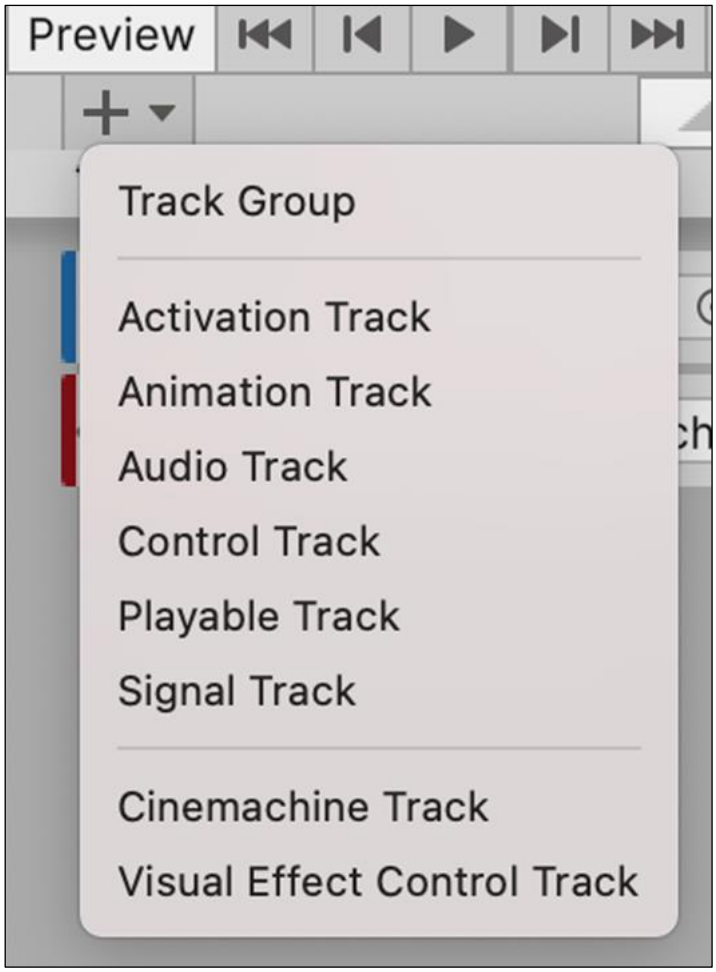

Playable Director
Playable
Intro (Timeline Asset)
Update Method
Game Time
Play On Awake
Wrap Mode
Hold
Initial Time
0
Bindings

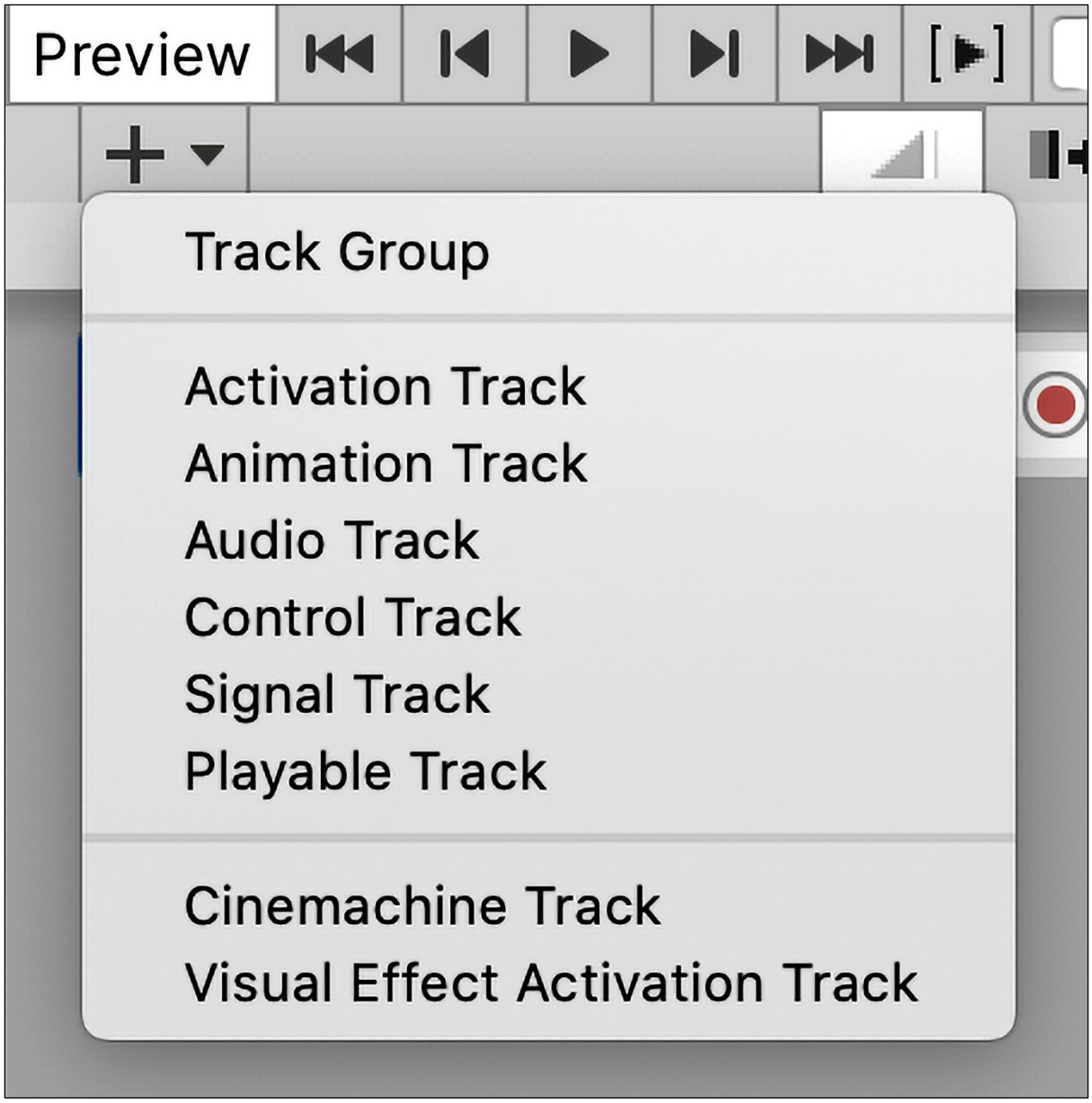

Preview
Track Group
Activation Track
Animation Track

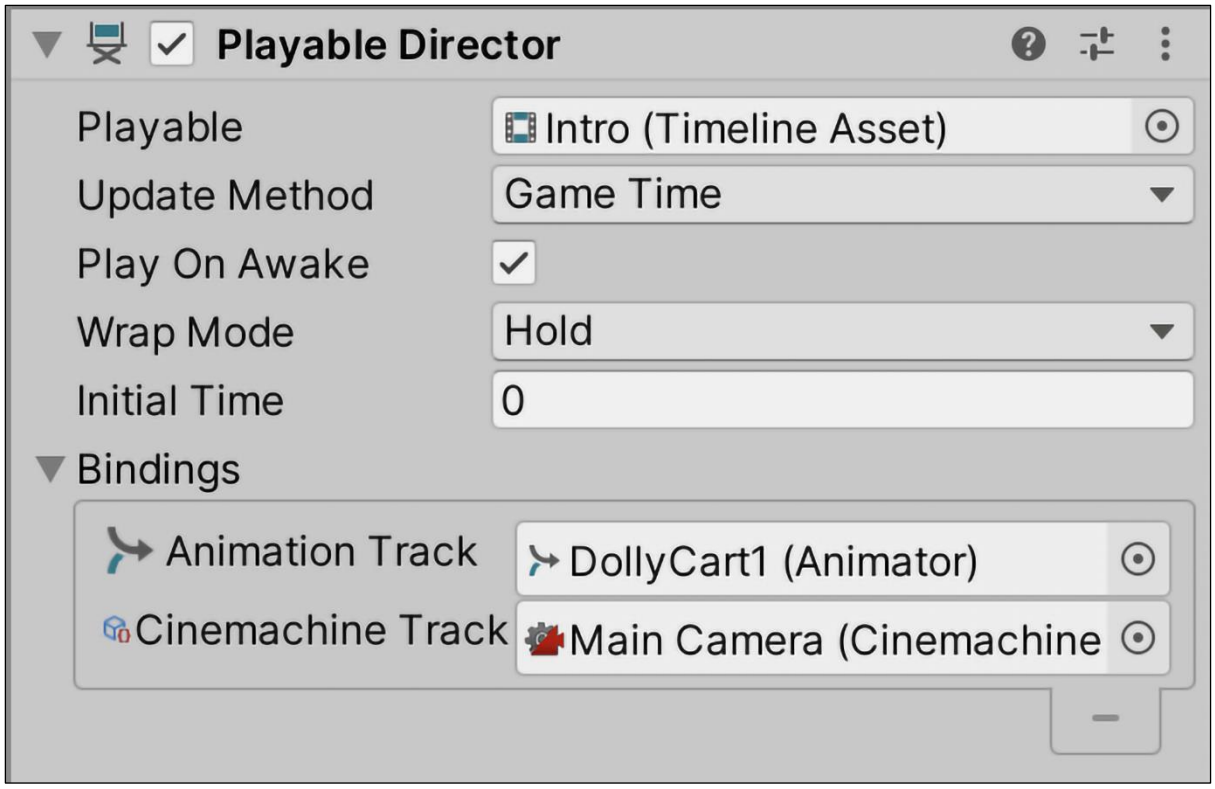

DollyCart1
Main Camera
Director
Bindings
Animation Track
DollyCart1 (Anima

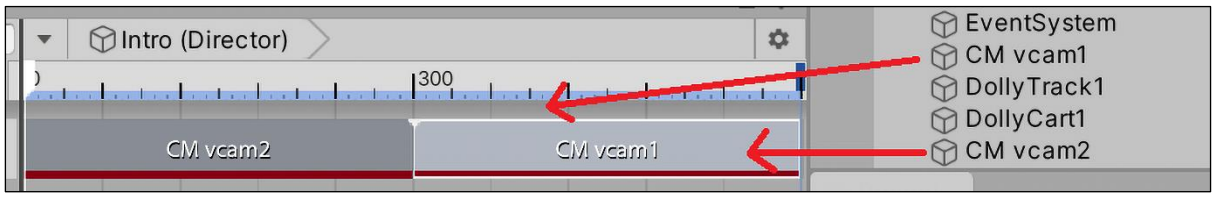

Animation
Timeline
Preview
0
Intro (Director)
300
None (Animator)
IntroDollyTrack
Assets
44.1 General Library
AllSkyFree
Animation
Animations
DollyCart1
IntroDollyTrack

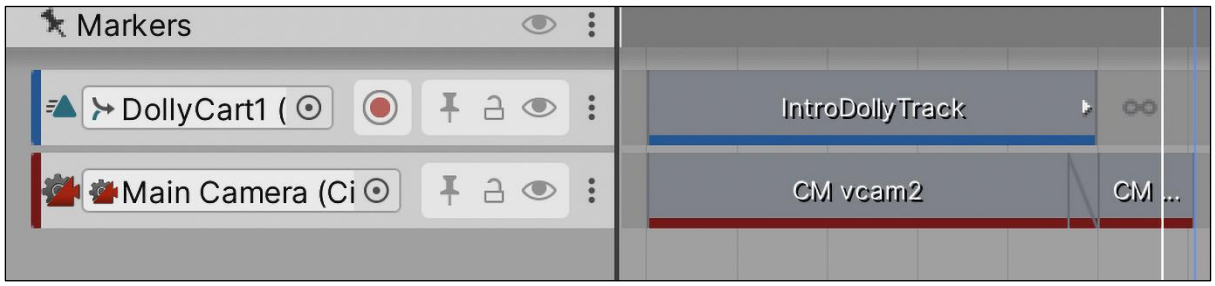

Animation
Timeline
Preview
173.3
Intro (Director)
0
30
None (Animator)
IntroDollyTrack

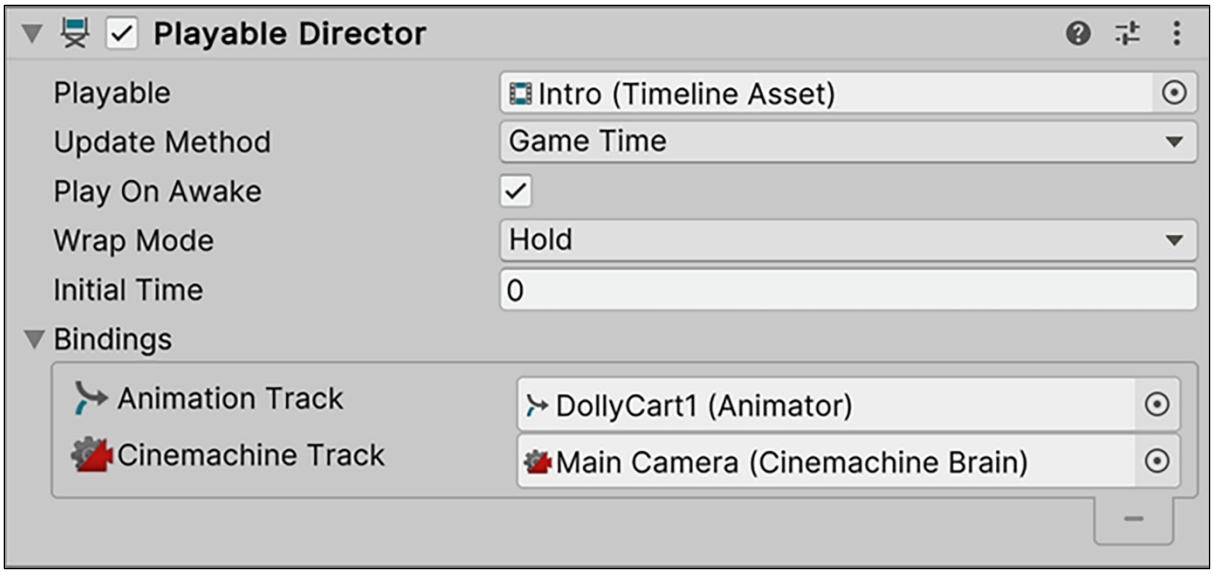

Preview
Track Group
Activation Track
Animation Track
Audio Track
Control Track
Playable Track
Signal Track
Cinemachine Track
Visual Effect Control Track


Preview
Track Group
Activation Track
Animation Track
Audio Track
Control Track
Signal Track
Playable Track
Cinemachine Track
Visual Effect Activation Track

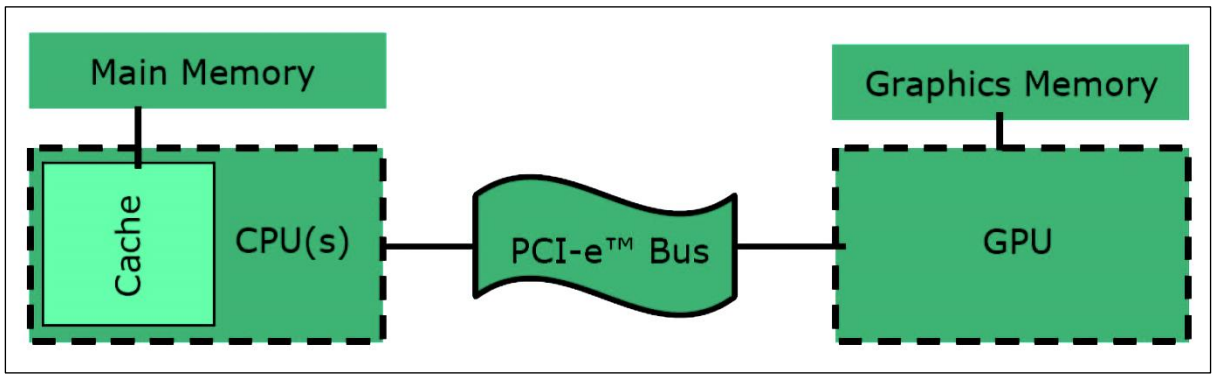

Playable Director
Playable
Intro (Timeline Asset)
Update Method
Game Time
Play On Awake
Wrap Mode
Hold
Initial Time
0
Bindings
Animation Track
DollyCart1 (Animator)
Cinemachine Track
Main Camera (Cinemachine

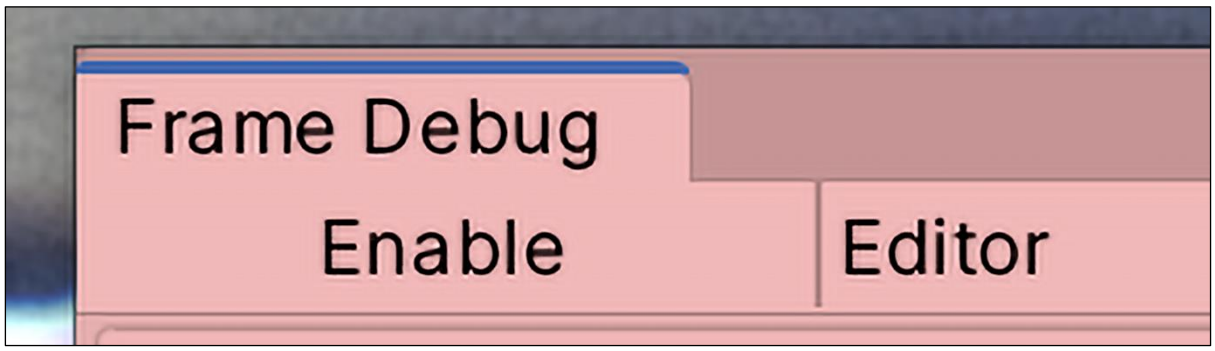

Intro (Director)
300
CM vcam2
CM vcam1
EventSystem
CM vcam1
DollyTrack1
DollyCart1
CM vcam2

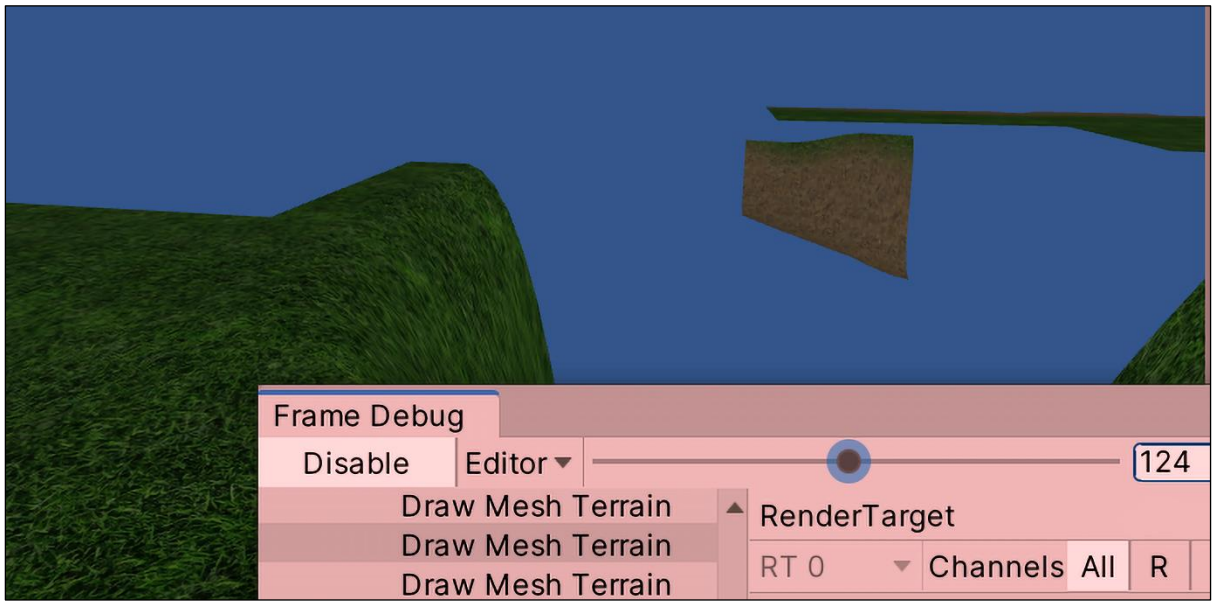

Markers
DollyCart1 (
Main Camera (Ci
IntroDollyTrack
CM vcam2
CM ...


Playable Director
Playable
Intro (Timeline Asset)
Update Method
Game Time
Play On Awake
Wrap Mode
Hold
Initial Time
0
Bindings
Animation Track
DollyCart1 (Animator)
Cinemachine Track
Main Camera (Cinemachine Brain)

Chapter 18: Performance Wizardry: Optimizing Your Game with Profiler Tools

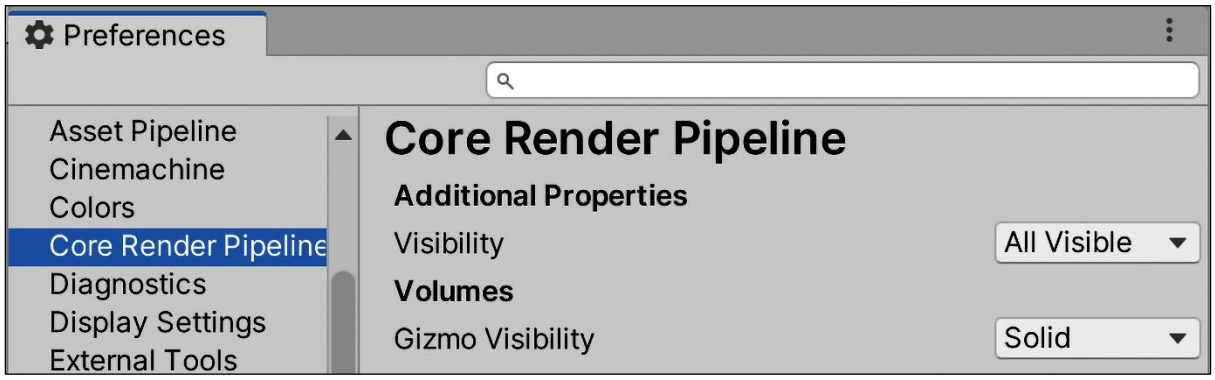


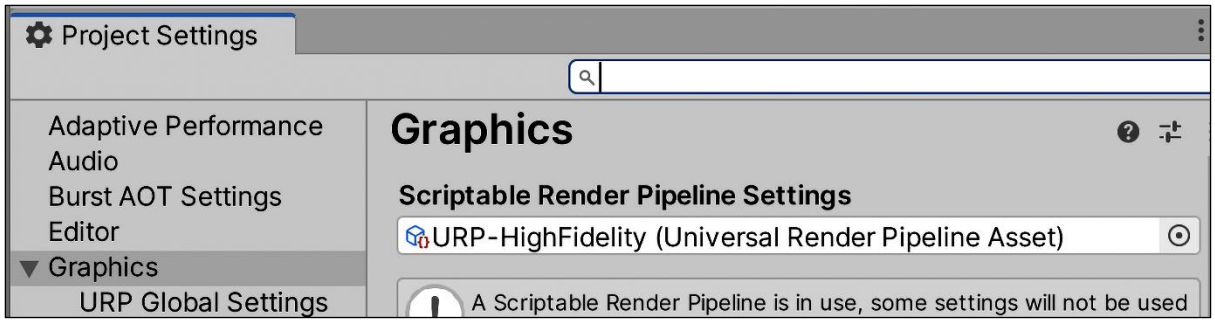


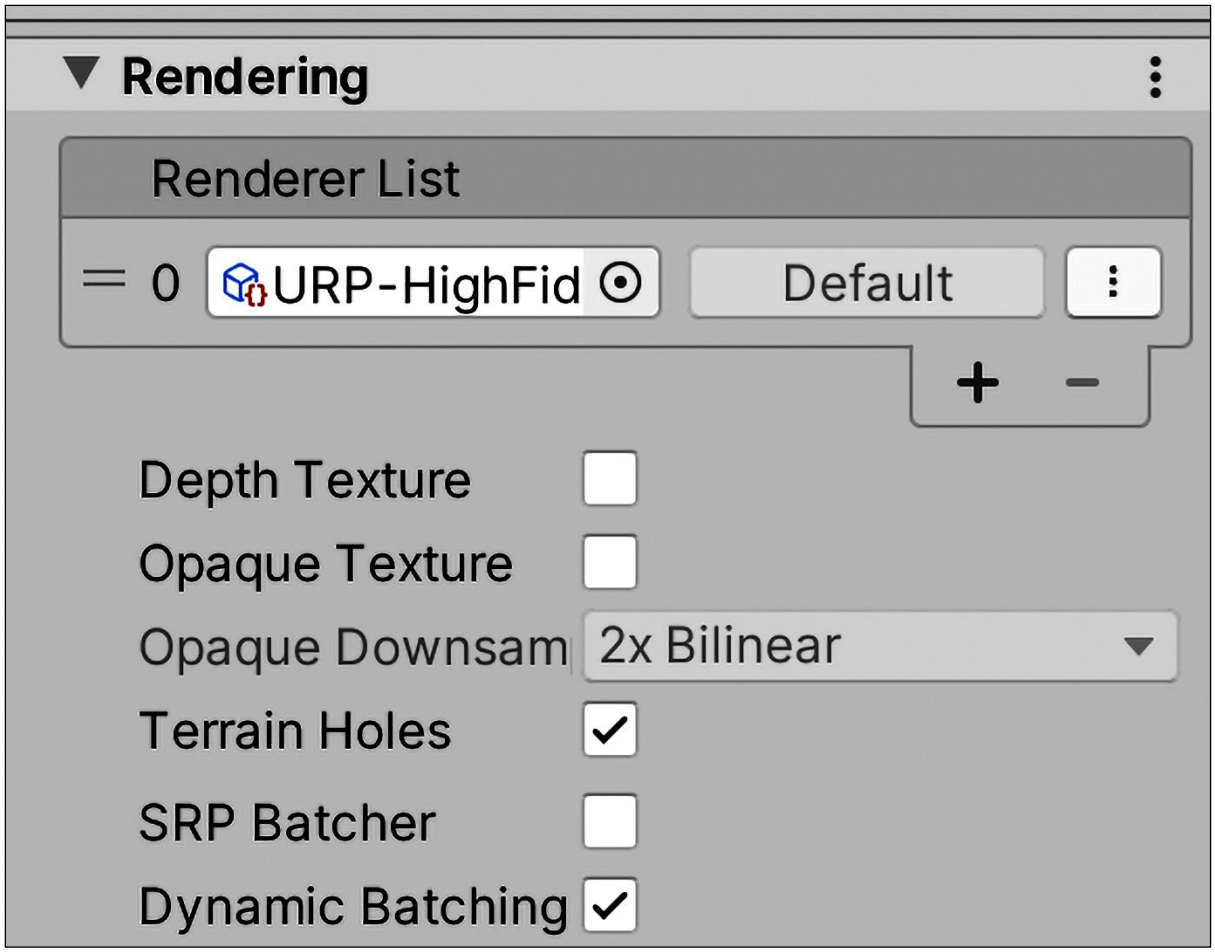


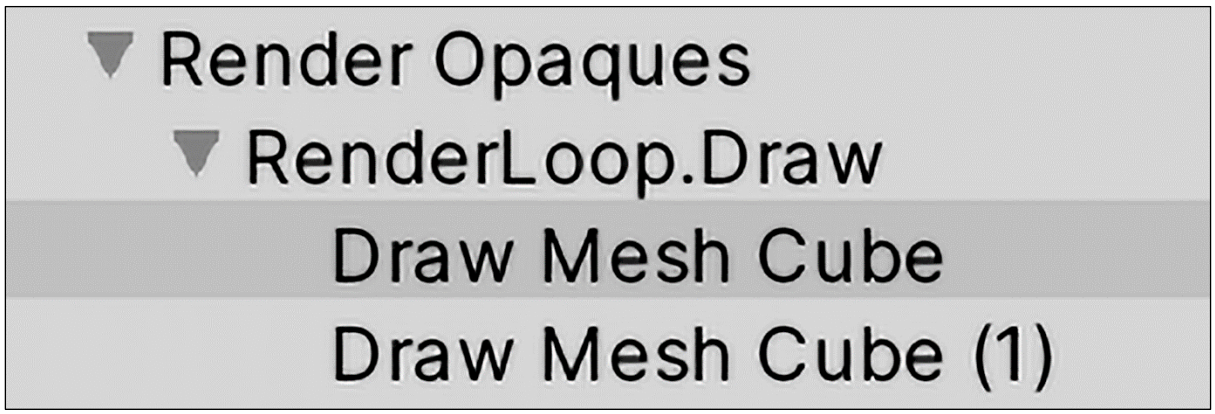

```
Batch cause
Objects have different materials.
```

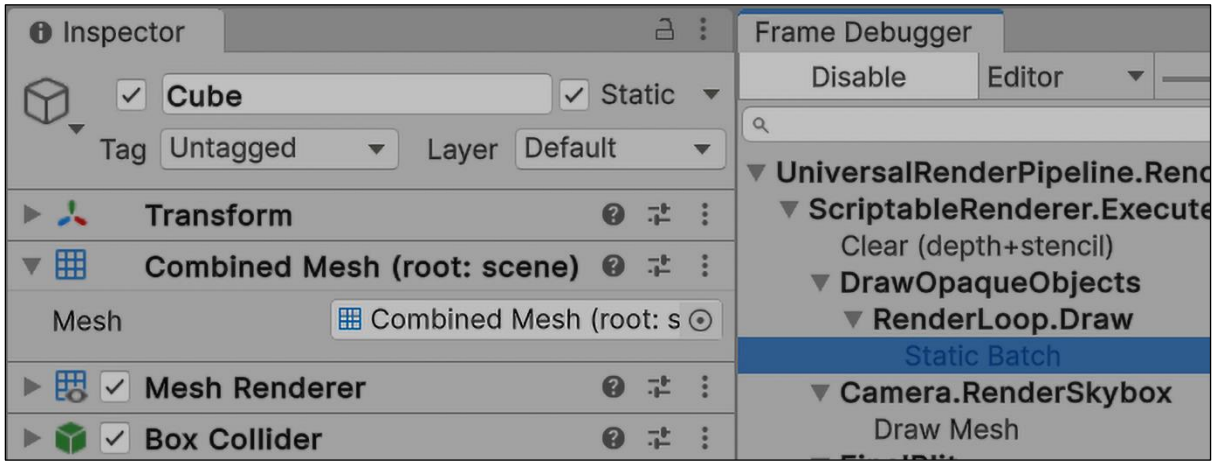


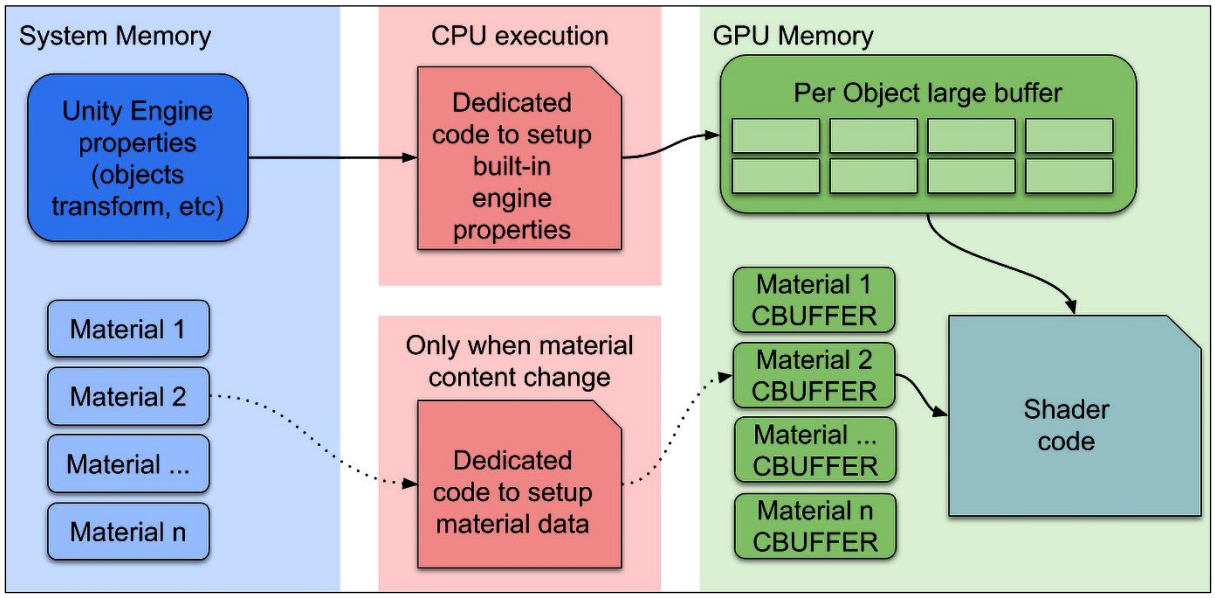

Preferences
Asset Pipeline
Cinemachine
Colors
Core Render Pipeline
Diagnostics
Display Settings
External Tools
Core Render Pipeline
Additional Properties
Visibility
All Visible
Volumes
Gizmo Visibility
Solid

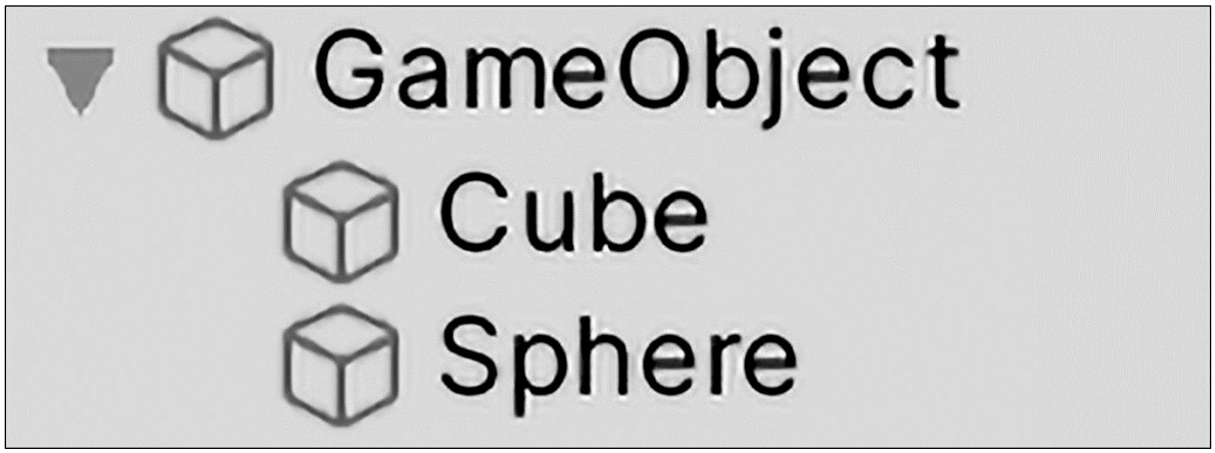

Project Settings
Adaptive Performance
Audio
Burst AOT Settings
Editor
Graphics
URP Global Settings
Graphics
Scriptable Render Pipeline Settings
URP-HighFidelity (Universal Render Pipeline Asset)
A Scriptable Render Pipeline is in use, some settings will not be used

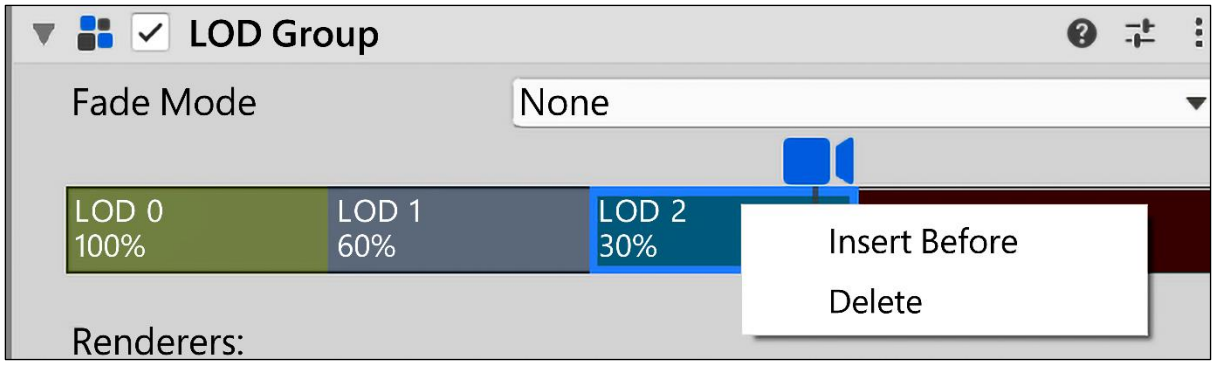

Rendering
Renderer List
0
URP-HighFid
Default
Depth Texture
Opaque Texture
Opaque Downsam
2x Bilinear
Terrain Holes
SRP Batcher
Dynamic Batching

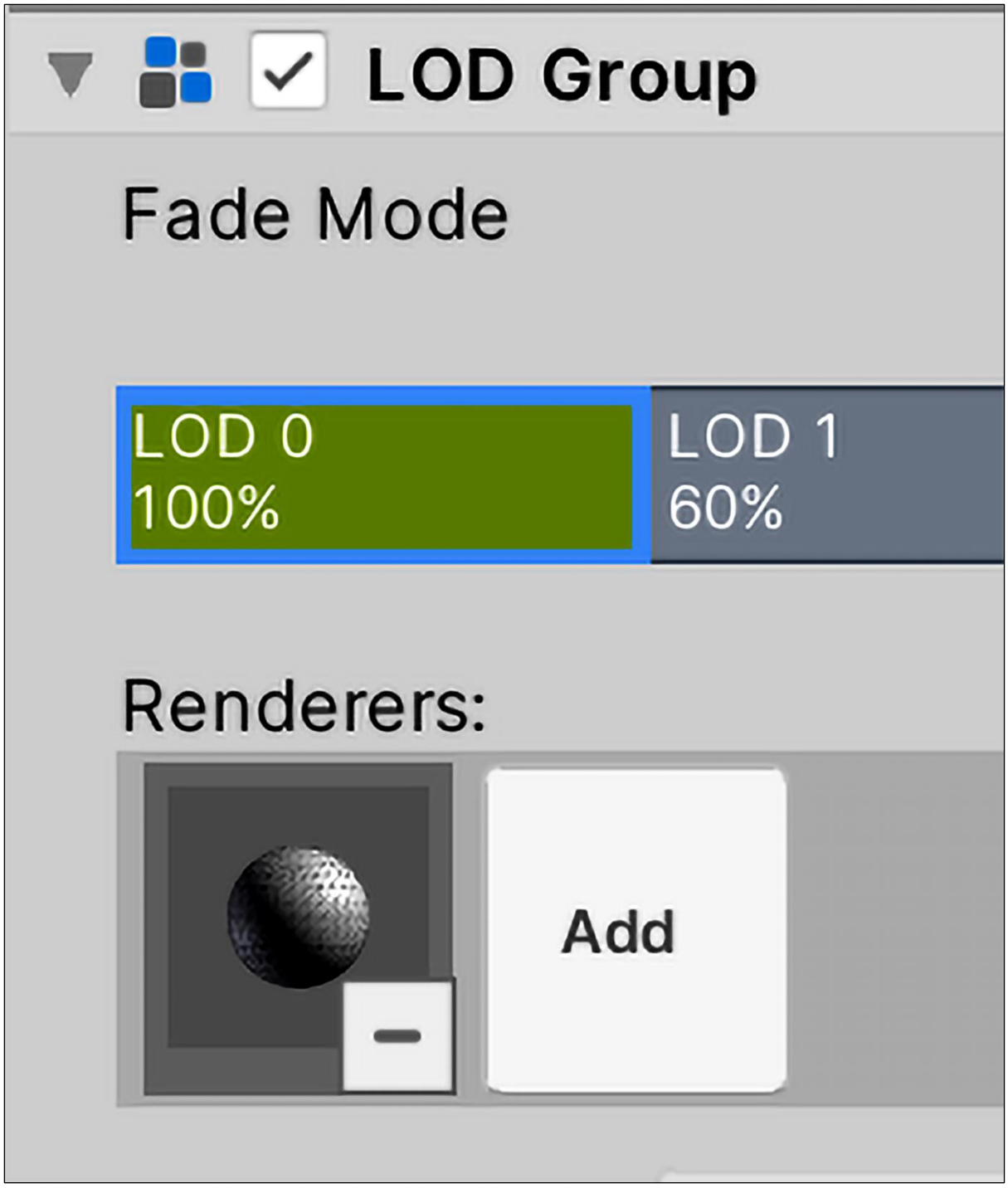

Render Opaques
RenderLoop.Draw
Draw Mesh Cube
Draw Mesh Cube (1)

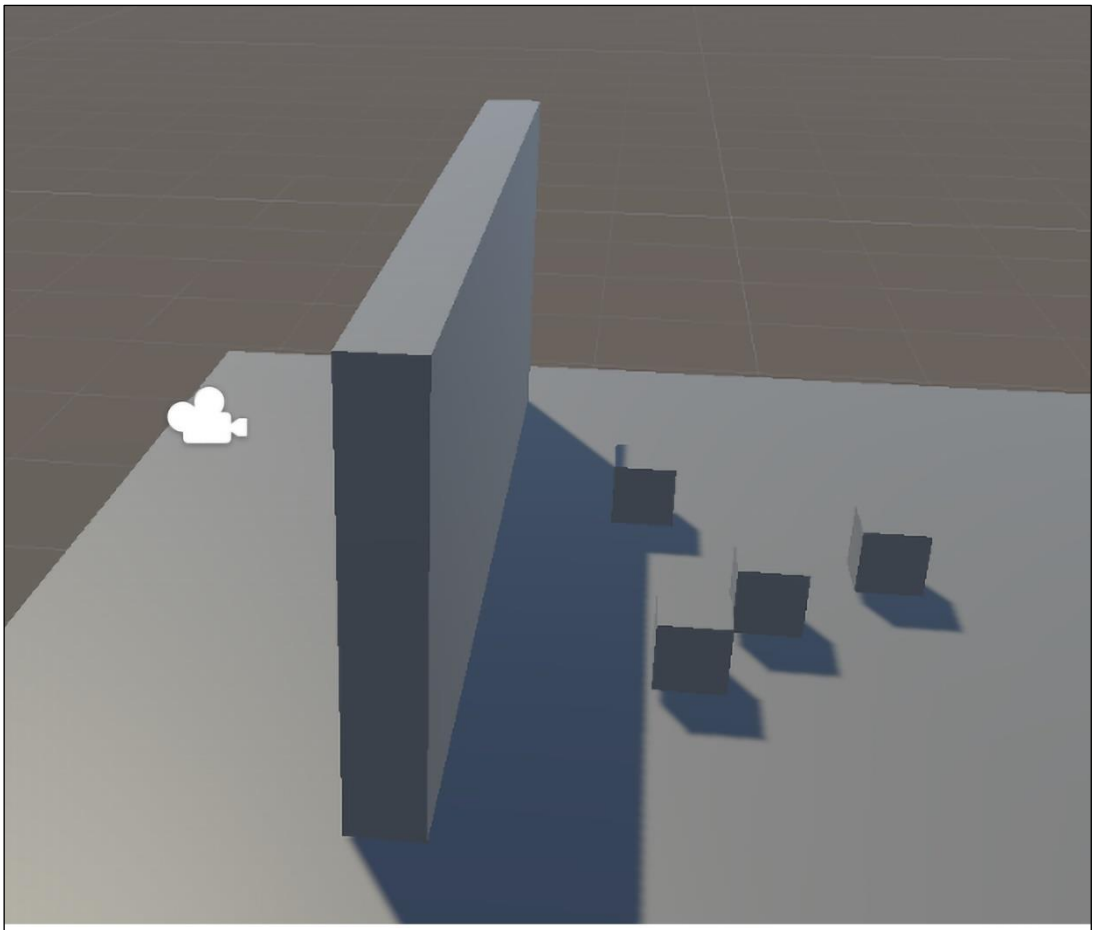

Inspector
Cube
Static
Tag
Untagged
Layer
Default
Transform
Combined Mesh (root: scene)
Mesh
Combined Mesh (root: s
Mesh Renderer
Box Collider
Frame Debugger
Disable
Editor
UniversalRenderPipeline.Renc
ScriptableRenderer.Execute
Clear (depth+stencil)
DrawOpaqueObjects
RenderLoop.Draw
Static Batch
Camera.RenderSkybox
Draw Mesh

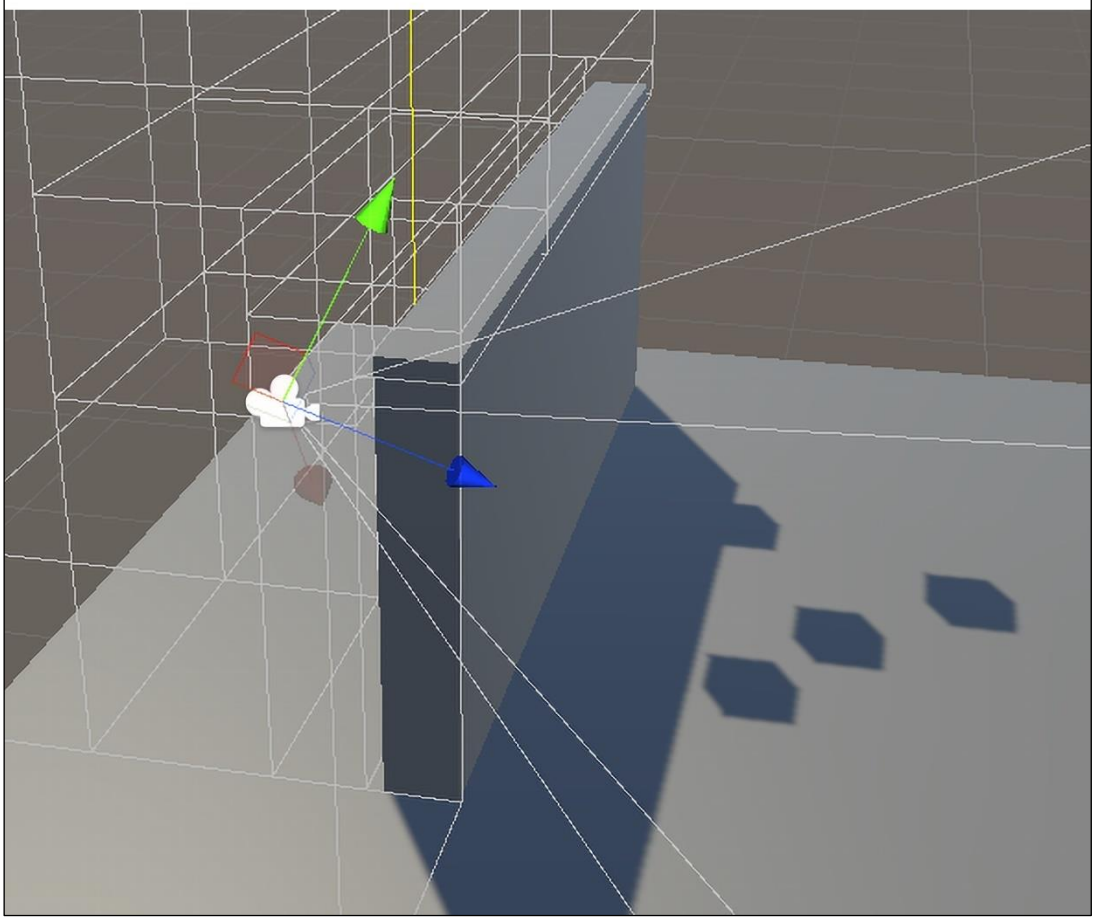

System Memory
CPU execution
GPU Memory
Unity Engine properties (objects transform, etc)
Dedicated code to setup built-in engine properties
Per Object large buffer
Material 1
Material 2
Material ...
Material n
Only when material content change
Dedicated code to setup material data
Material 1 CBUFFER
Material 2 CBUFFER
Material ... CBUFFER
Material n CBUFFER
Shader code

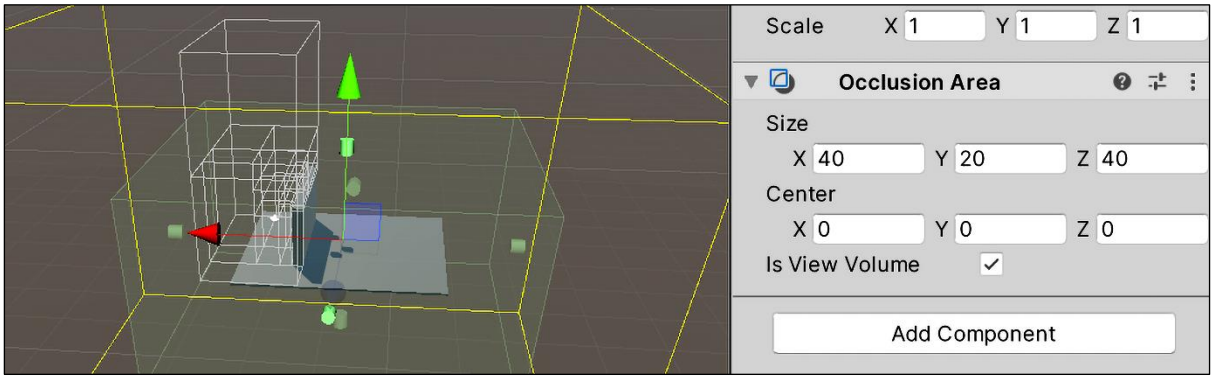

GameObject
Cube
Sphere

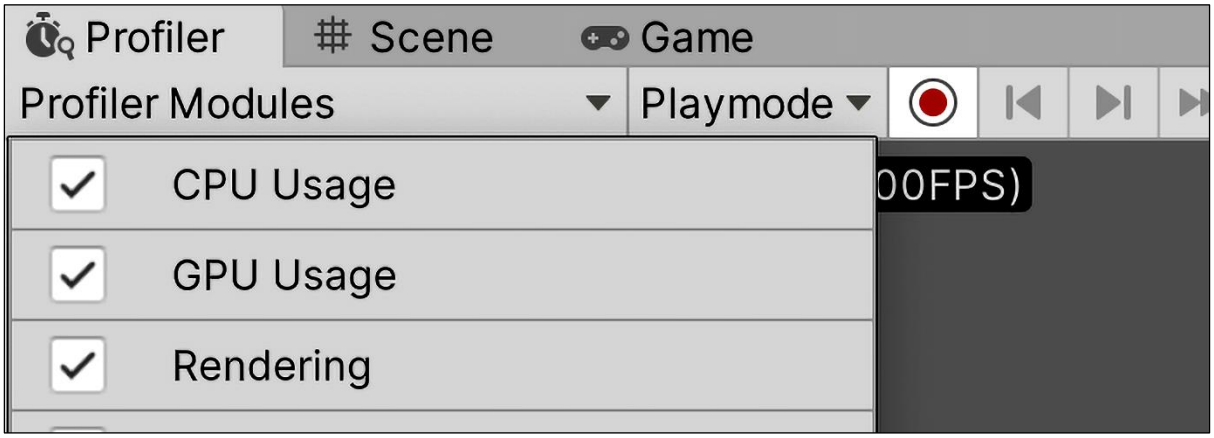

LOD Group
Fade Mode
None
LOD 0
100%
LOD 1
60%
LOD 2
30%
Insert Before
Delete
Renderers:


LOD Group
Fade Mode
LOD 0
100%
LOD 1
60%
Renderers:
Add

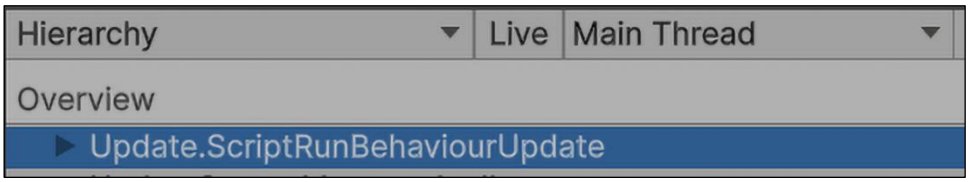


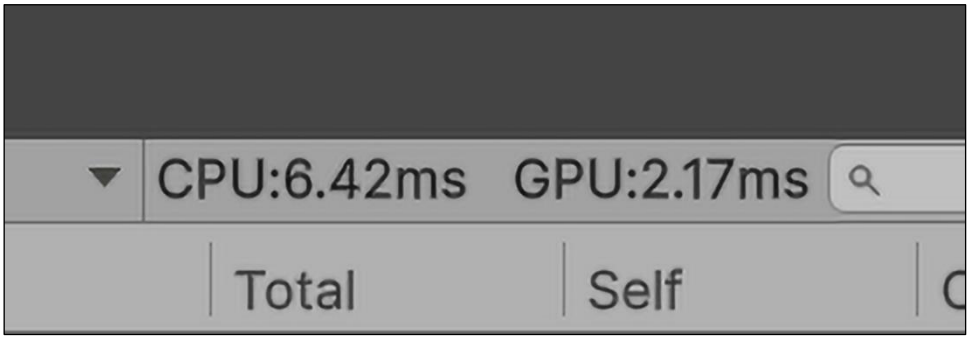


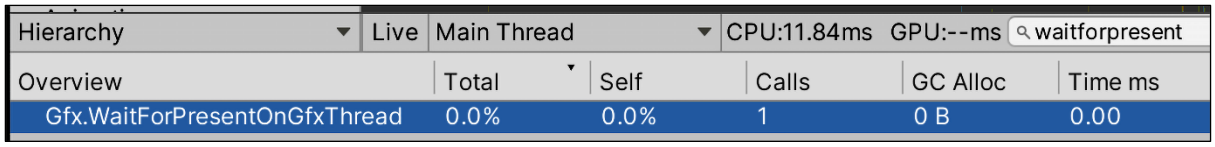

Scale X 1 Y 1 Z 1
Occlusion Area
Size
X 40 Y 20 Z 40
Center
X 0 Y 0 Z 0
Is View Volume
Add Component

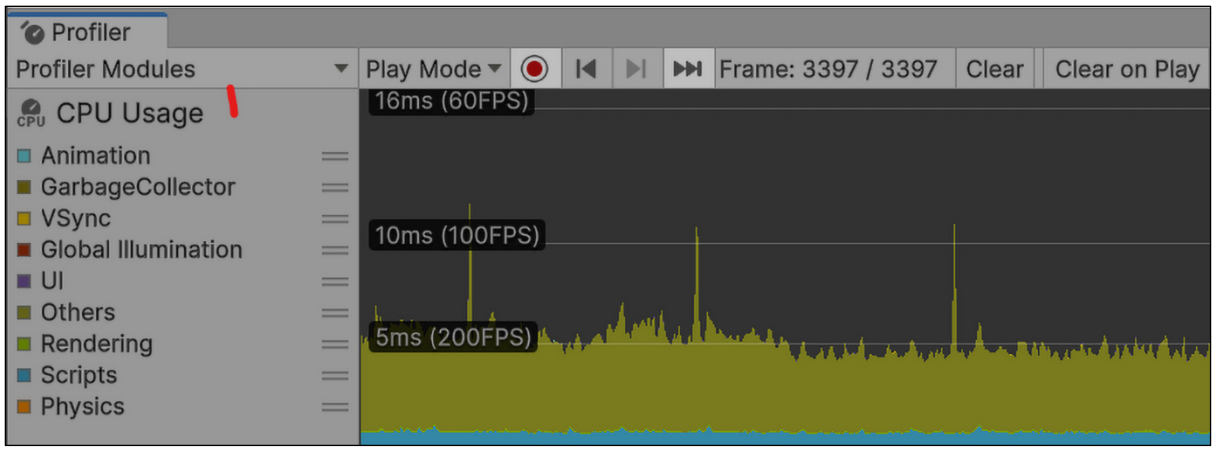

Profiler
Scene
Game
Profiler Modules
Playmode
CPU Usage
GPU Usage
Rendering
00FPS)

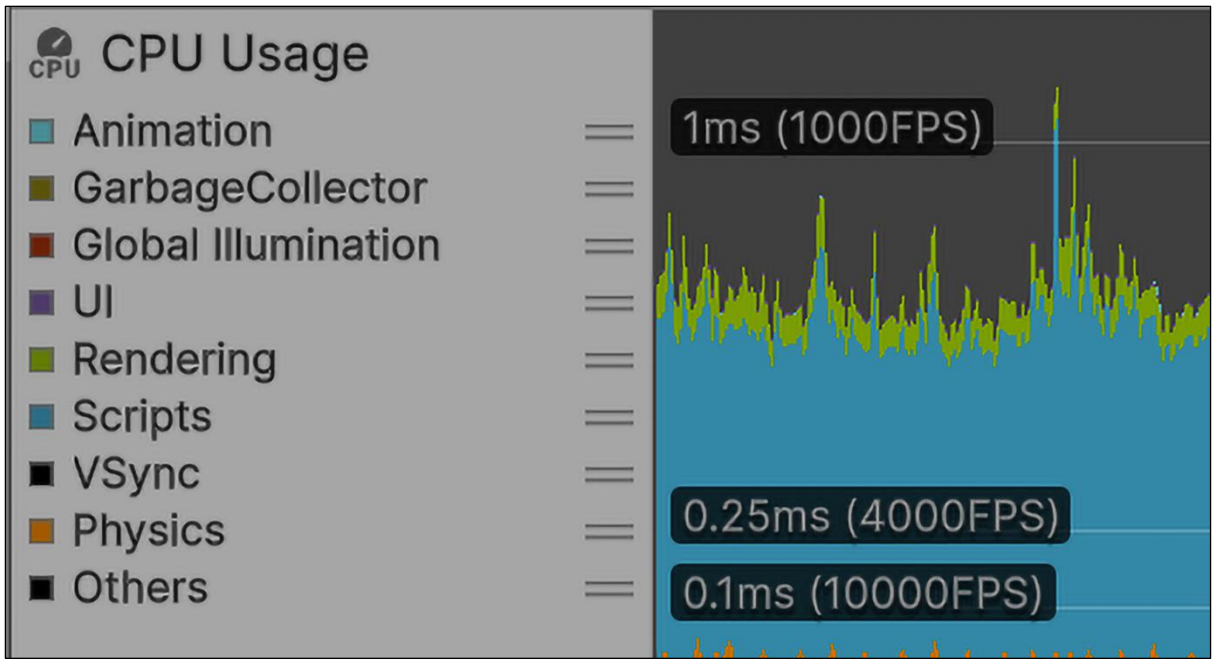

Profiler
Profiler Modules
Play Mode


Hierarchy
Live
Main Thread
Overview
Update.ScriptRunBehaviourUpdate

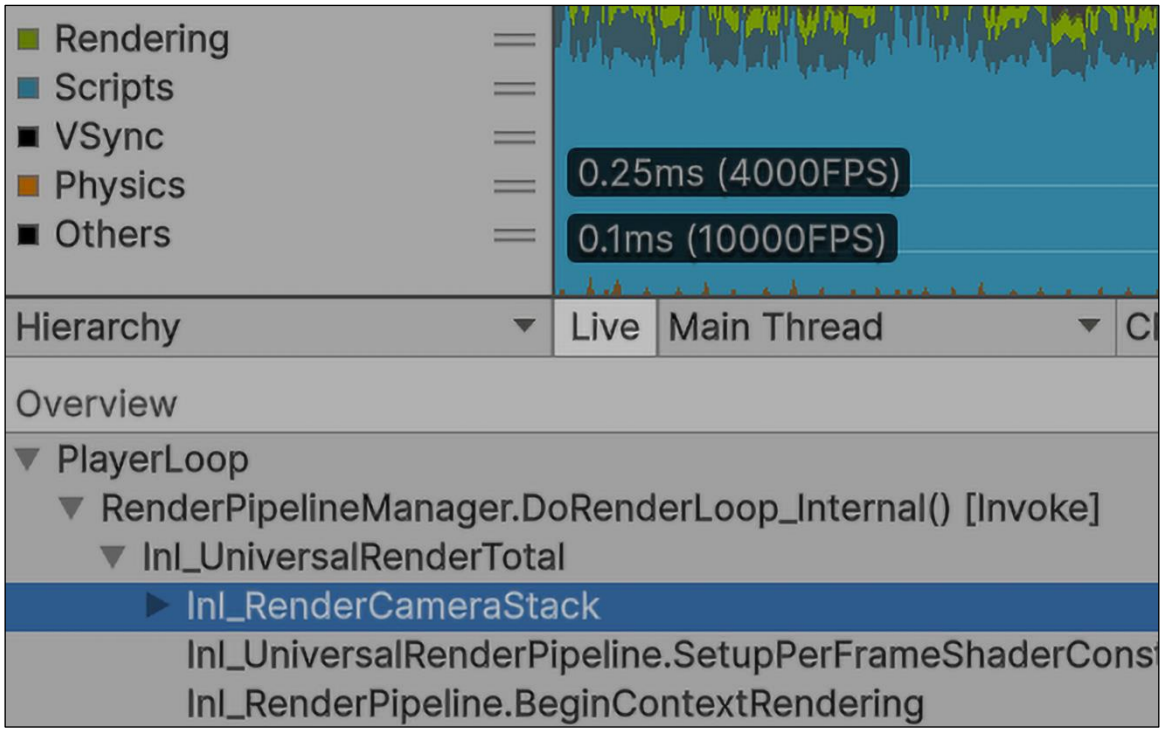

CPU:6.42ms GPU:2.17ms
Total
Self

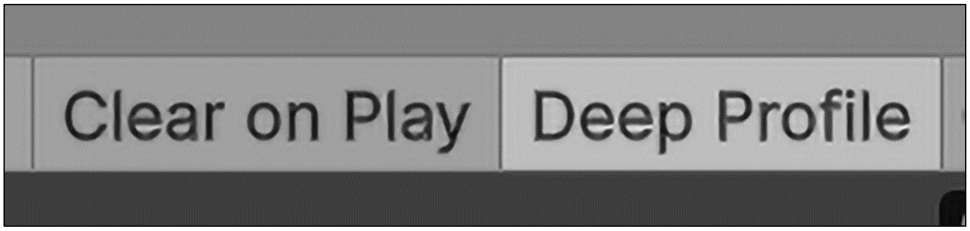


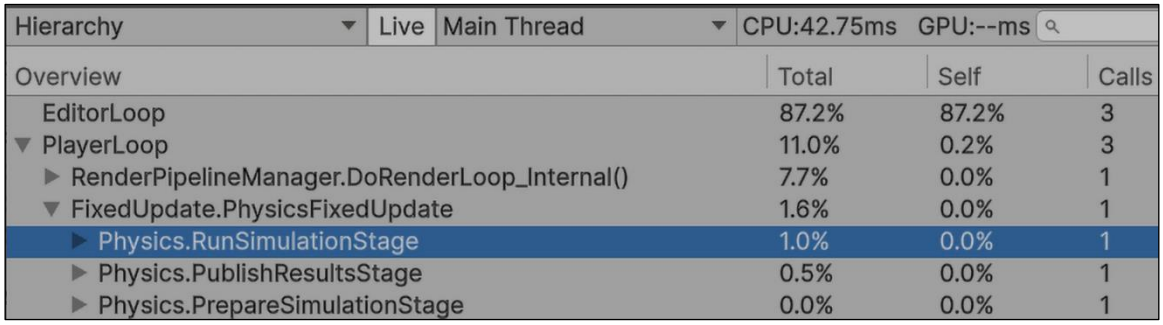


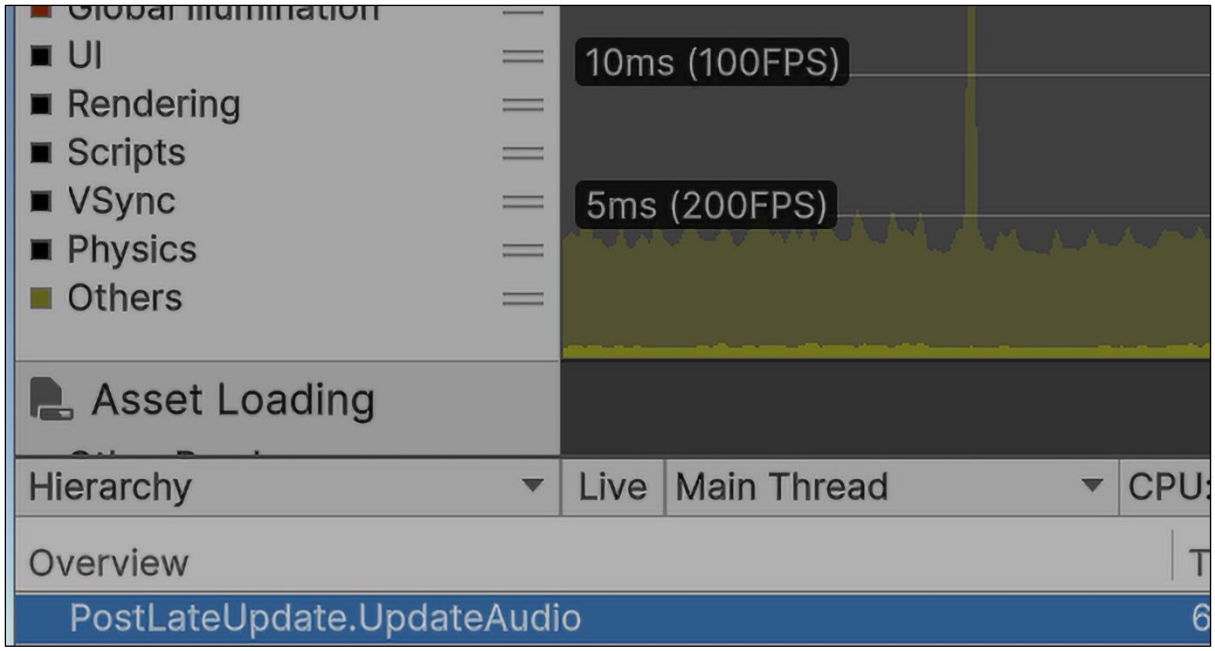


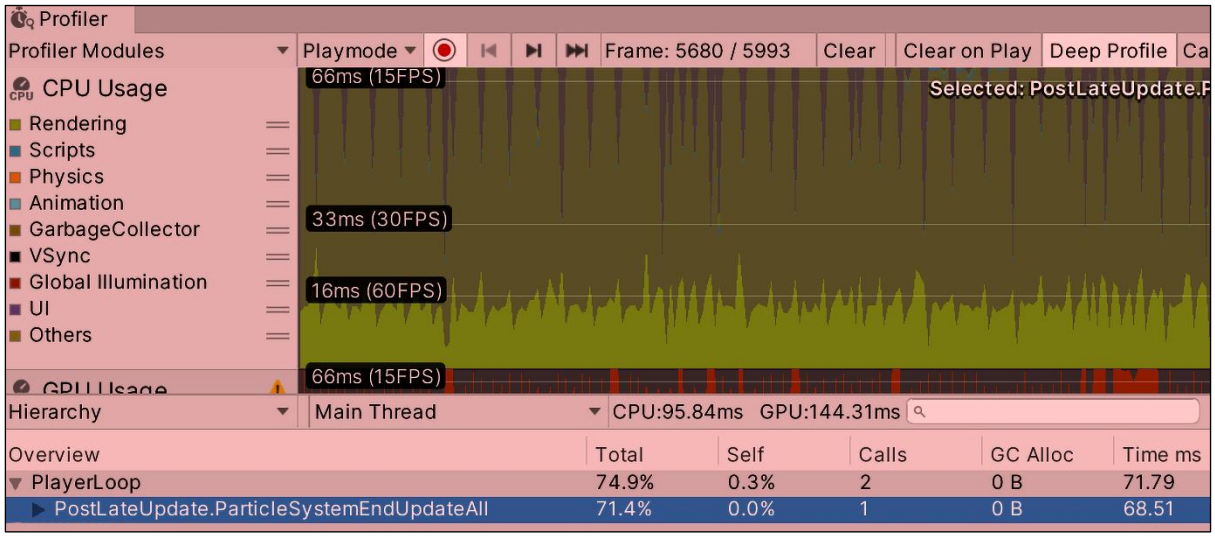
Overview	Total	Self	Calls	GC Alloc	Time ms
PlayerLoop	99.9%	0.1%	1	8.9 KB	41.87
Update.ScriptRunBehaviourUpdate	61.7%	0.0%	1	6.3 KB	25.86
PostLateUpdate.FinishFrameRendering	19.4%	0.3%	1	2.6 KB	8.15


Rendering
Scripts
VSync
Physics
Others
0.25ms (4000FPS)
0.1ms (10000FPS)
Hierarchy
Live
Main Thread
Overview
PlayerLoop
RenderPipelineManager.DoRenderLoop_Internal() [Invoke]
InI_UniversalRenderTotal
InI_RenderCameraStack
InI_UniversalRenderPipeline.SetupPerFrameShaderCons
InI_RenderPipeline.BeginContextRendering

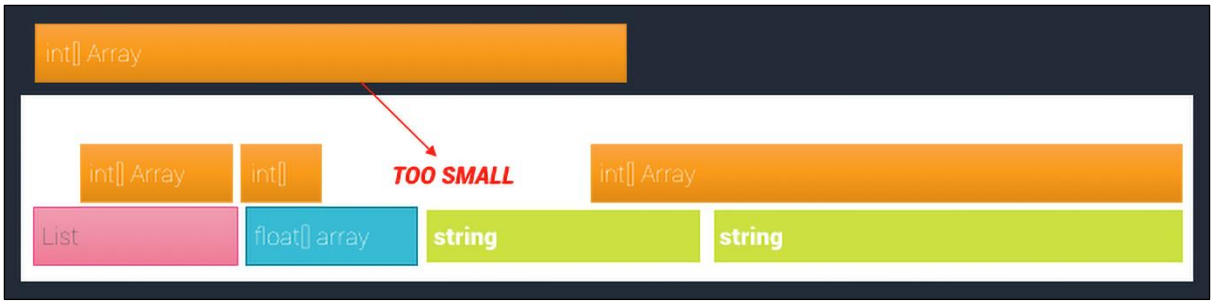

Clear on Play
Deep Profile


Hierarchy
Live
Main Thread
CPU:42.75ms
GPU:--ms
Overview
Total
Self
Calls
EditorLoop 87.2% 87.2% 3
PlayerLoop 11.0% 0.2% 3
RenderPipelineManager.DoRenderLoop_Internal() 7.7% 0.0% 1
FixedUpdate.PhysicsFixedUpdate 1.6% 0.0% 1
Physics.RunSimulationStage 1.0% 0.0% 1
Physics.PublishResultsStage 0.5% 0.0% 1
Physics.PrepareSimulationStage 0.0% 0.0% 1






```
#if UNITY_EDITOR || DEVELOPMENT_BUILD
print("Informative message");
#endif
```



Overview	Total	Self	Calls	GC Alloc
Update.ScriptRunBehaviourUpdate	6.4%	0.0%	1	2.3 KB
BehaviourUpdate	6.4%	1.2%	1	2.3 KB
Sight.Update()	2.0%	0.5%	69	2.2 KB
Physics.OverlapSphere	1.4%	1.4%	69	0 B
GC.Alloc	0.0%	0.0%	69	2.2 KB
Physics.Raycast	0.0%	0.0%	1	0 B

```
static Collider[] colliders = new Collider[100];

void Update()
{
    int detectedAmount = Physics.OverlapSphereNonAlloc(
        transform.position,
        distance,
        colliders,
        objectsLayers);

    detectedObject = null;
    for (int i = 0; i < detectedAmount; i++)
    {
        Collider collider = colliders[i];
```

```
string name = "John";
string score = "100";
string template = "{0} has won {1} points";

//both will print: John has won 100 points
print(string.Format(template, name, score));
print($"{name} has won {score} points.");

StringBuilder builder = new StringBuilder();
builder.Append("My ");
builder.Append("name ");
builder.Append("is ");
builder.Append("Neo.");

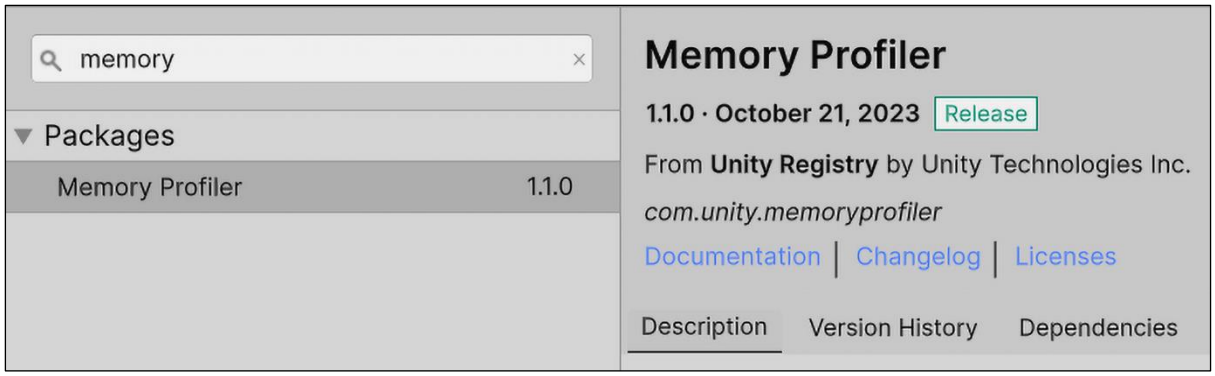
print(builder.ToString()); //My name is Neo.
```

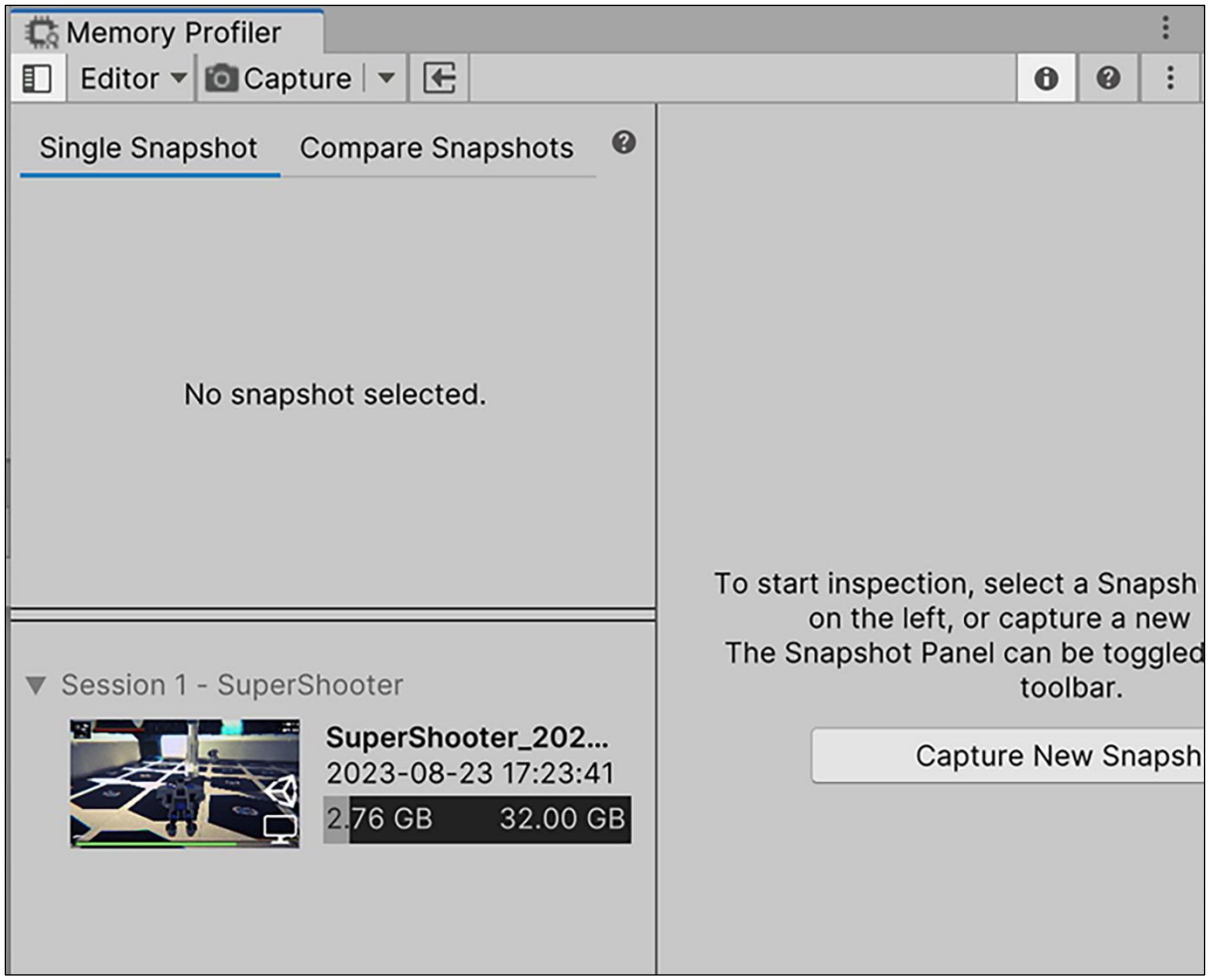
```
public class Pool : MonoBehaviour
{
    List<GameObject> storedObjects = new List<GameObject>();

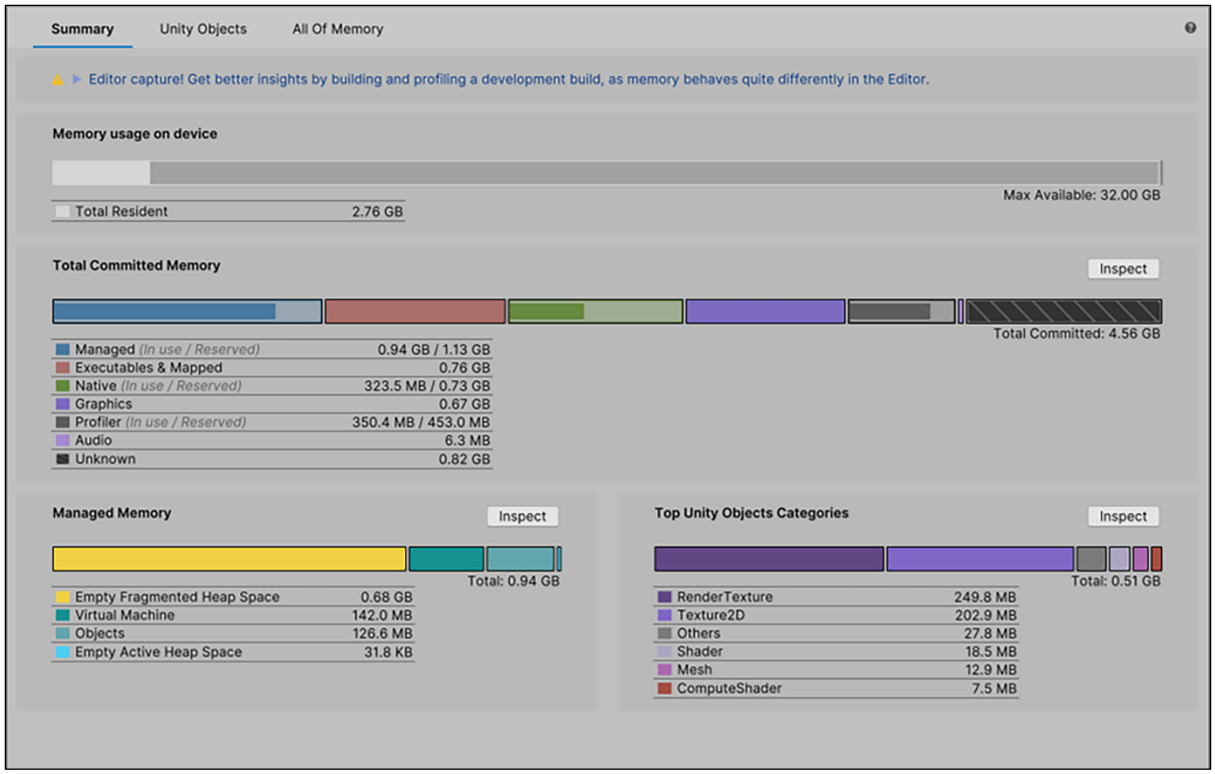
    [SerializeField] private GameObject prefab;

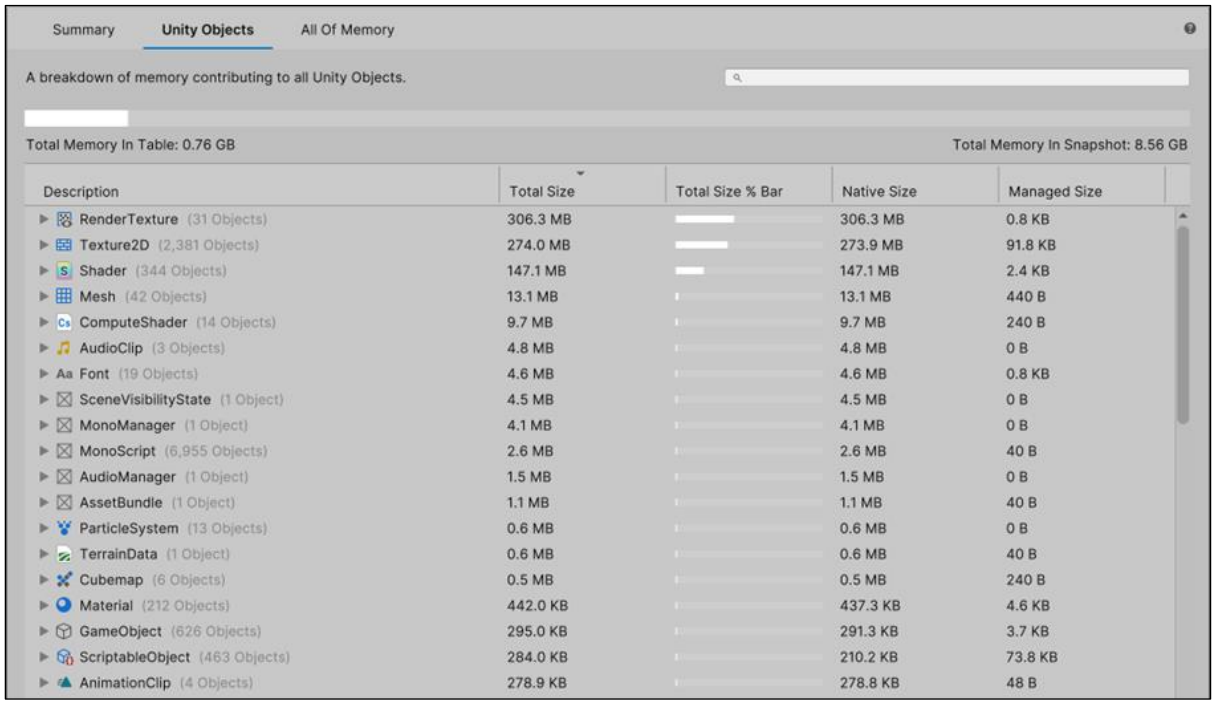
    public GameObject Get()
    {
        if (storedObjects.Count > 0)
        {
            var obj:GameObject = storedObjects[0];
            storedObjects.RemoveAt(0);
            obj.SetActive(true);
            return obj;
        }
        else
        {
            return Instantiate(prefab);
        }
    }

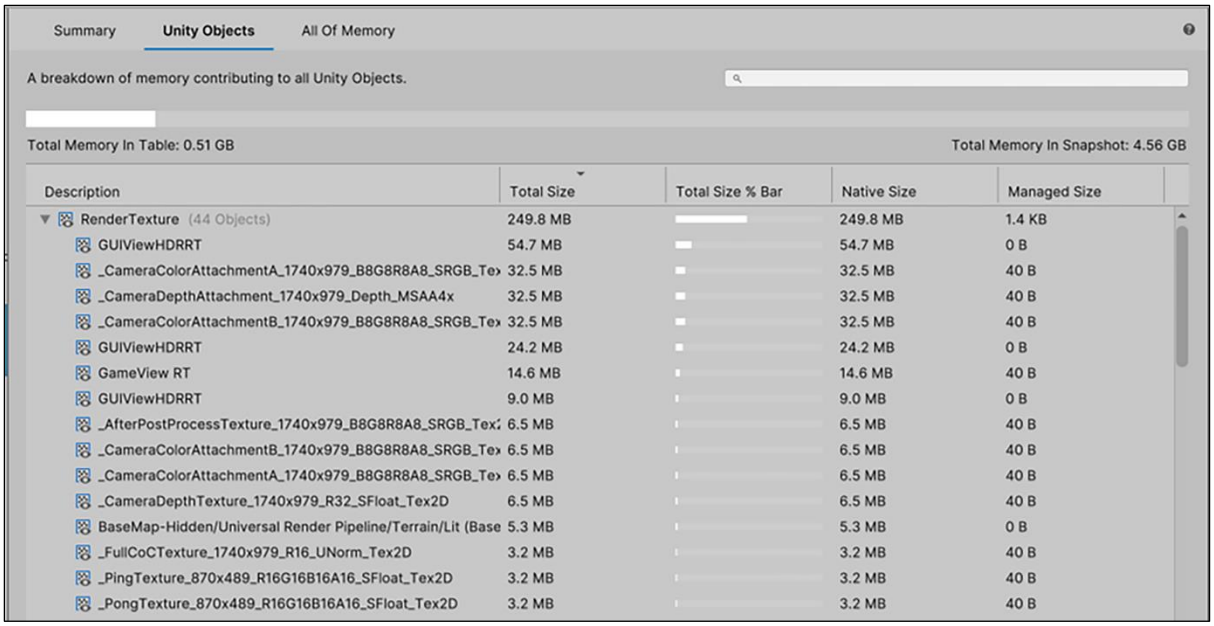
    public void Return(GameObject obj)
    {
        obj.SetActive(false);
        storedObjects.Add(obj);
    }
}
```

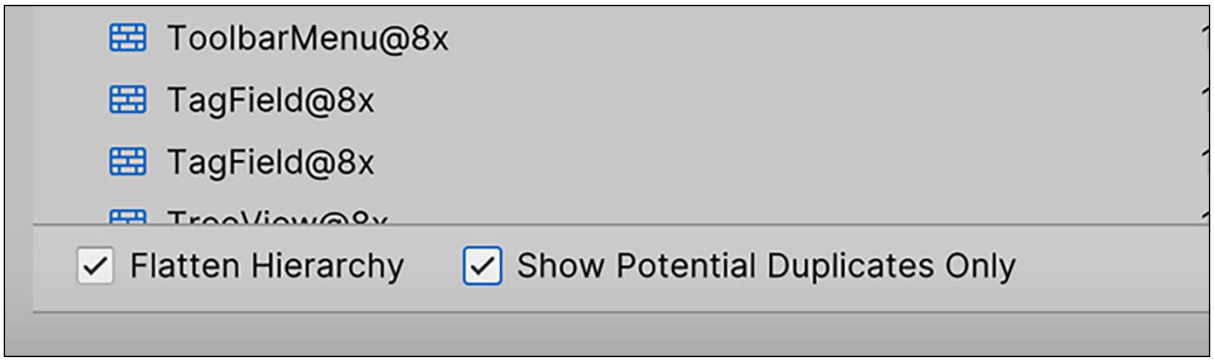

memory
Packages
Memory Profiler 1.1.0
Memory Profiler
1.1.0 · October 21, 2023 Release
From Unity Registry by Unity Technologies Inc.
com.unity.memoryprofiler
Documentation | Changelog | Licenses
Description Version History Dependencies


Memory Profiler
Editor Capture
Single Snapshot Compare Snapshots
No snapshot selected.
Session 1 - SuperShooter
SuperShooter_202...
2023-08-23 17:23:41
2.76 GB 32.00 GB
To start inspection, select a Snapsh
on the left, or capture a new
The Snapshot Panel can be toggled
toolbar.
Capture New Snapsh


Summary
Unity Objects
All Of Memory
Editor capture! Get better insights by building and profiling a development build, as memory behaves quite differently in the Editor.
Memory usage on device
Max Available: 32.00 GB
Total Resident 2.76 GB
Total Committed Memory
Inspect
Total Committed: 4.56 GB
Managed (In use / Reserved) 0.94 GB / 1.13 GB
Executables & Mapped 0.76 GB
Native (In use / Reserved) 323.5 MB / 0.73 GB
Graphics 0.67 GB
Profiler (In use / Reserved) 350.4 MB / 453.0 MB
Audio 6.3 MB
Unknown 0.82 GB
Managed Memory
Inspect
Total: 0.94 GB
Empty Fragmented Heap Space 0.68 GB
Virtual Machine 142.0 MB
Objects 126.6 MB
Empty Active Heap Space 31.8 KB
Top Unity Objects Categories
Inspect
Total: 0.51 GB
RenderTexture 249.8 MB
Texture2D 202.9 MB
Others 27.8 MB
Shader 18.5 MB
Mesh 12.9 MB
ComputeShader 7.5 MB

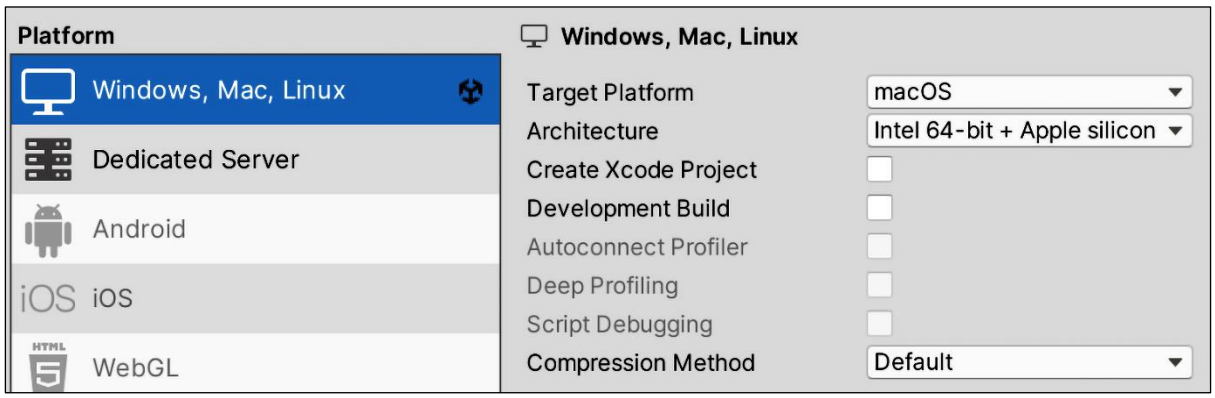

Summary
Unity Objects
All Of Memory
A breakdown of memory contributing to all Unity Objects.
Total Memory In Table: 0.76 GB
Total Memory In Snapshot: 8.56 GB
Description
Total Size
Total Size % Bar
Native Size
Managed Size
RenderTexture (31 Objects) 306.3 MB 306.3 MB 0.8 KB
Texture2D (2,381 Objects) 274.0 MB 273.9 MB 91.8 KB
Shader (344 Objects) 147.1 MB 147.1 MB 2.4 KB
Mesh (42 Objects) 13.1 MB 13.1 MB 440 B
ComputeShader (14 Objects) 9.7 MB 9.7 MB 240 B
AudioClip (3 Objects) 4.8 MB 4.8 MB 0 B
Font (19 Objects) 4.6 MB 4.6 MB 0.8 KB
SceneVisibilityState (1 Object) 4.5 MB 4.5 MB 0 B
MonoManager (1 Object) 4.1 MB 4.1 MB 0 B
MonoScript (6,955 Objects) 2.6 MB 2.6 MB 40 B
AudioManager (1 Object) 1.5 MB 1.5 MB 0 B
AssetBundle (1 Object) 1.1 MB 1.1 MB 40 B
ParticleSystem (13 Objects) 0.6 MB 0.6 MB 0 B
TerrainData (1 Object) 0.6 MB 0.6 MB 40 B
Cubemap (6 Objects) 0.5 MB 0.5 MB 240 B
Material (212 Objects) 442.0 KB 437.3 KB 4.6 KB
GameObject (626 Objects) 295.0 KB 291.3 KB 3.7 KB
ScriptableObject (463 Objects) 284.0 KB 210.2 KB 73.8 KB
AnimationClip (4 Objects) 278.9 KB 278.8 KB 48 B

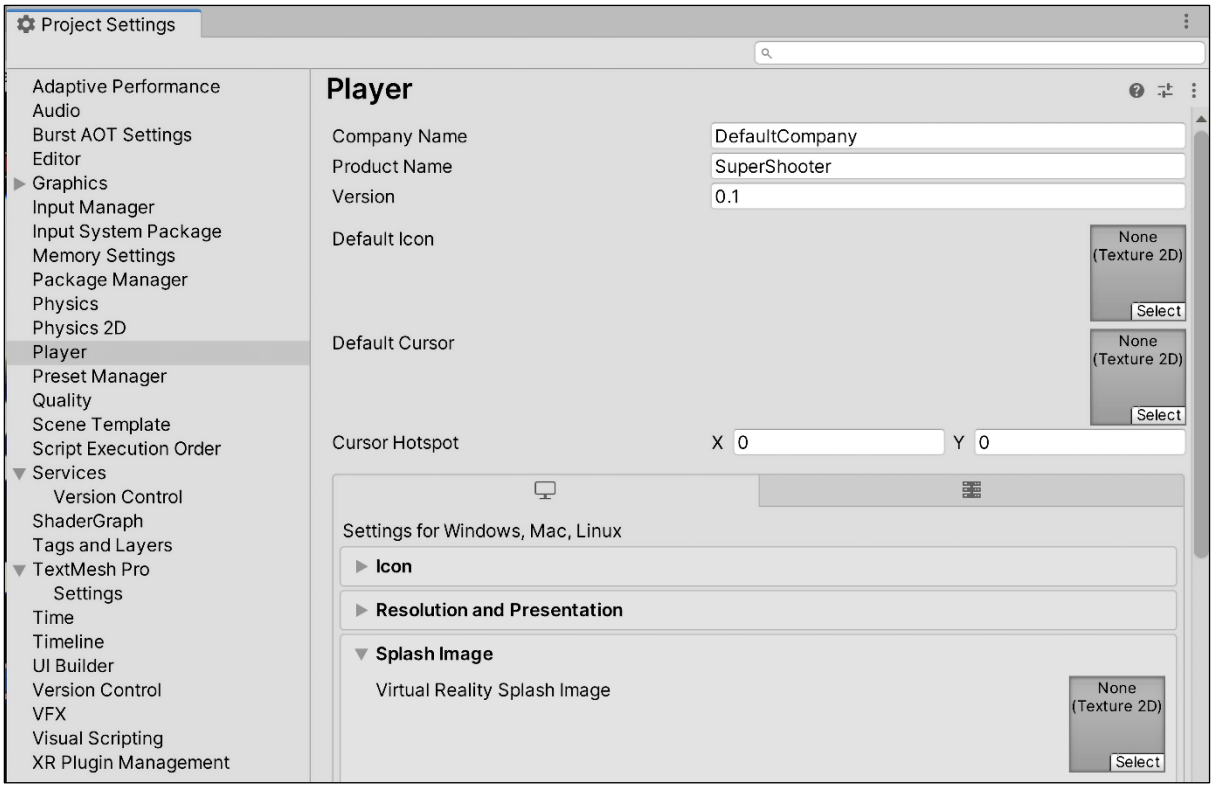

Summary
Unity Objects
All Of Memory
A breakdown of memory contributing to all Unity Objects.
Total Memory In Table: 0.51 GB
Total Memory In Snapshot: 4.56 GB
Description
Total Size
Total Size % Bar
Native Size
Managed Size
RenderTexture (44 Objects) 249.8 MB 249.8 MB 1.4 KB
GUIViewHDRRT 54.7 MB 54.7 MB 0 B
_CameraColorAttachmentA_1740x979_B8G8R8A8_SRGB_Te 32.5 MB 32.5 MB 40 B
_CameraDepthAttachment_1740x979_Depth_MSAA4x 32.5 MB 32.5 MB 40 B
_CameraColorAttachmentB_1740x979_B8G8R8A8_SRGB_Te 32.5 MB 32.5 MB 40 B
GUIViewHDRRT 24.2 MB 24.2 MB 0 B
GameView RT 14.6 MB 14.6 MB 40 B
GUIViewHDRRT 9.0 MB 9.0 MB 0 B
_AfterPostProcessTexture_1740x979_B8G8R8A8_SRGB_Tex 6.5 MB 6.5 MB 40 B
_CameraColorAttachmentB_1740x979_B8G8R8A8_SRGB_Te 6.5 MB 6.5 MB 40 B
_CameraColorAttachmentA_1740x979_B8G8R8A8_SRGB_Te 6.5 MB 6.5 MB 40 B
_CameraDepthTexture_1740x979_R32_SFloat_Tex2D 6.5 MB 6.5 MB 40 B
BaseMap-Hidden/Universal Render Pipeline/Terrain/Lit (Base 5.3 MB 5.3 MB 0 B
_FullCoCTexture_1740x979_R16_UNorm_Tex2D 3.2 MB 3.2 MB 40 B
_PingTexture_870x489_R16G16B16A16_SFloat_Tex2D 3.2 MB 3.2 MB 40 B
_PongTexture_870x489_R16G16B16A16_SFloat_Tex2D 3.2 MB 3.2 MB 40 B

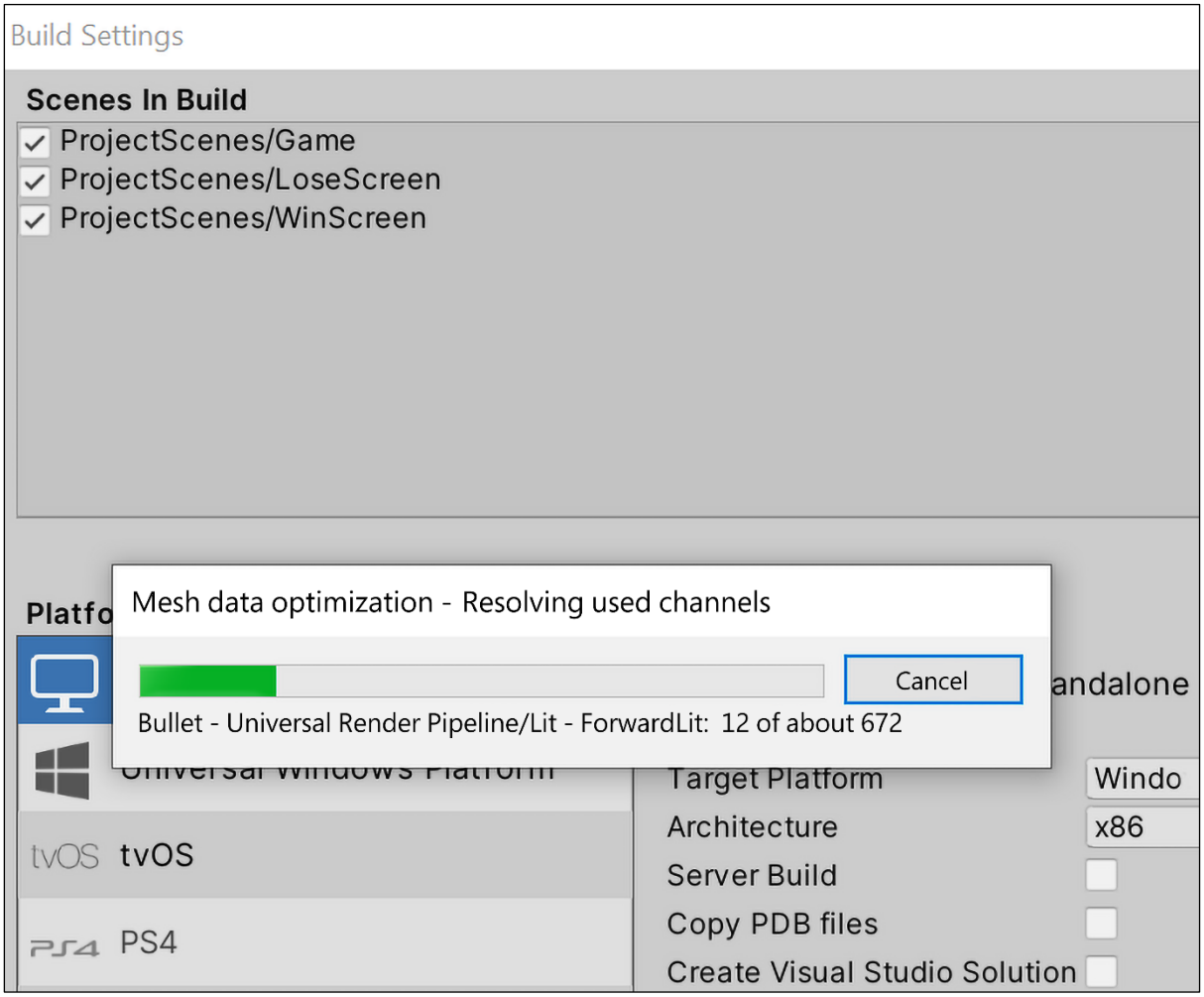

ToolbarMenu@8x
TagField@8x
TagField@8x
Flatten Hierarchy
Show Potential Duplicates Only

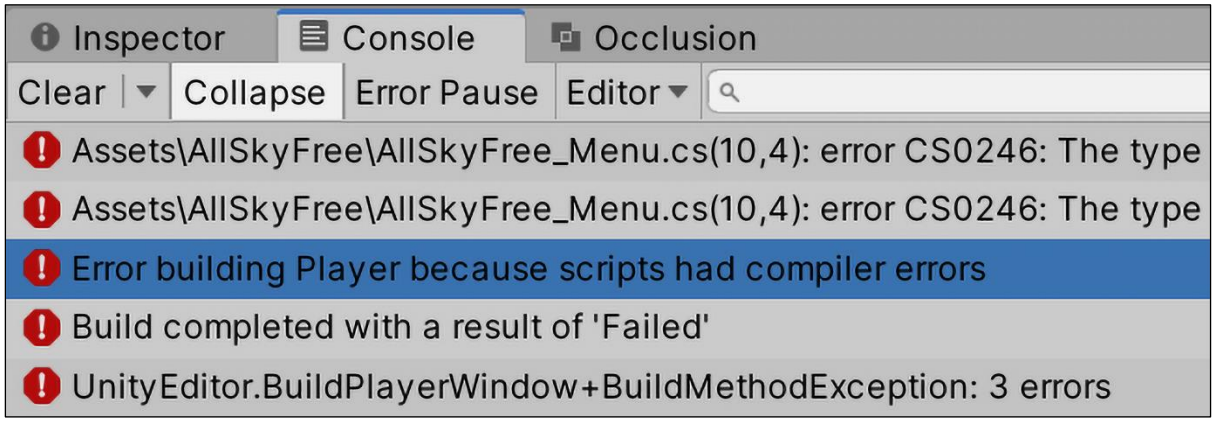
Chapter 19: From Prototype to Executable: Generating and Debugging Your Game



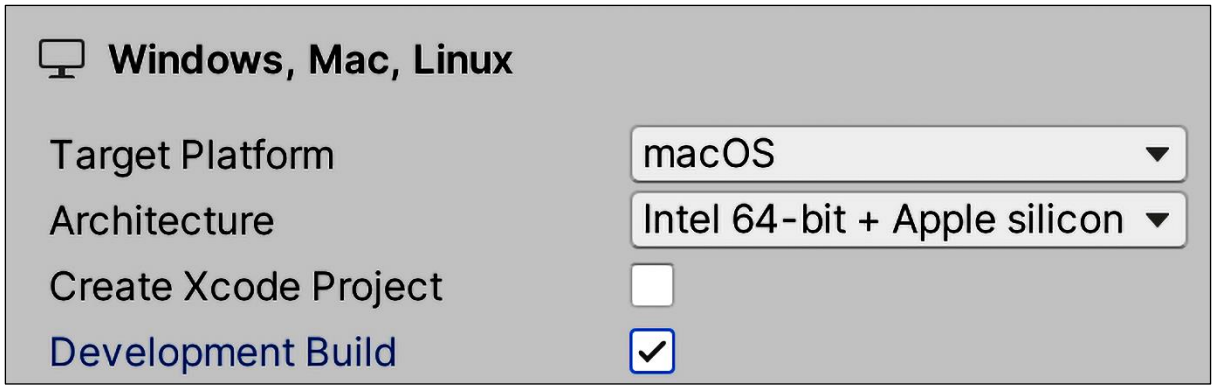



Project Settings
Adaptive Performance
Audio
Burst AOT Settings
Editor
Graphics
Input Manager
Input System Package
Memory Settings
Package Manager
Physics
Physics 2D
Player
Preset Manager
Quality
Scene Template
Script Execution Order
Services
Version Control
ShaderGraph
Tags and Layers
TextMesh Pro
Settings
Time
Timeline
UI Builder
Version Control
VFX
Visual Scripting
XR Plugin Management
Player
Company Name
DefaultCompany
Product Name
SuperShooter
Version
0.1
Default Icon
None (Texture 2D)
Select
Default Cursor
None (Texture 2D)
Select
Cursor Hotspot
X 0
Y 0
Settings for Windows, Mac, Linux
Icon
Resolution and Presentation
Splash Image
Virtual Reality Splash Image
None (Texture 2D)
Select


Build Settings
Scenes In Build
ProjectScenes/Game
ProjectScenes/LoseScreen
ProjectScenes/WinScreen
Platfo
Mesh data optimization - Resolving used channels
Cancel
Bullet - Universal Render Pipeline/Lit - ForwardLit: 12 of about 672
andalone
Universal Windows Platform
tvOS tvOS
PS4 PS4
Target Platform
Windo
Architecture
x86
Server Build
Copy PDB files
Create Visual Studio Solution

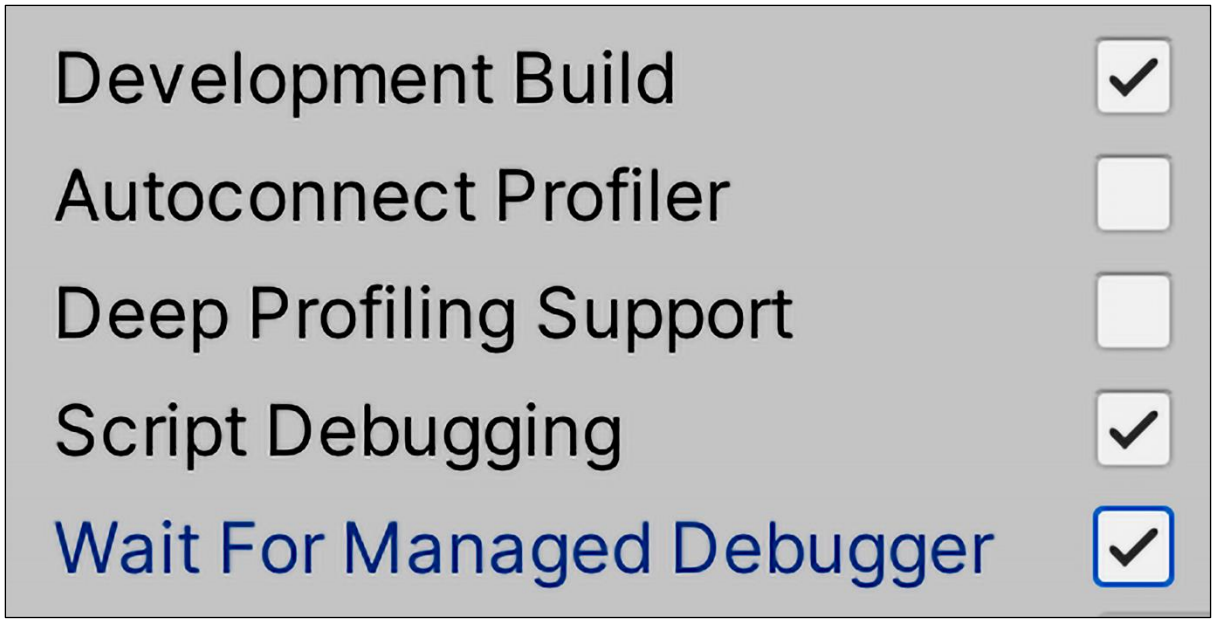

Inspector
Console
Occlusion
Clear
Collapse
Error Pause
Editor
Assets\AllSkyFree\AllSkyFree_Menu.cs(10,4): error CS0246: The type
Assets\AllSkyFree\AllSkyFree_Menu.cs(10,4): error CS0246: The type
Error building Player because scripts had compiler errors
Build completed with a result of 'Failed'
UnityEditor.BuildPlayerWindow+BuildMethodException: 3 errors

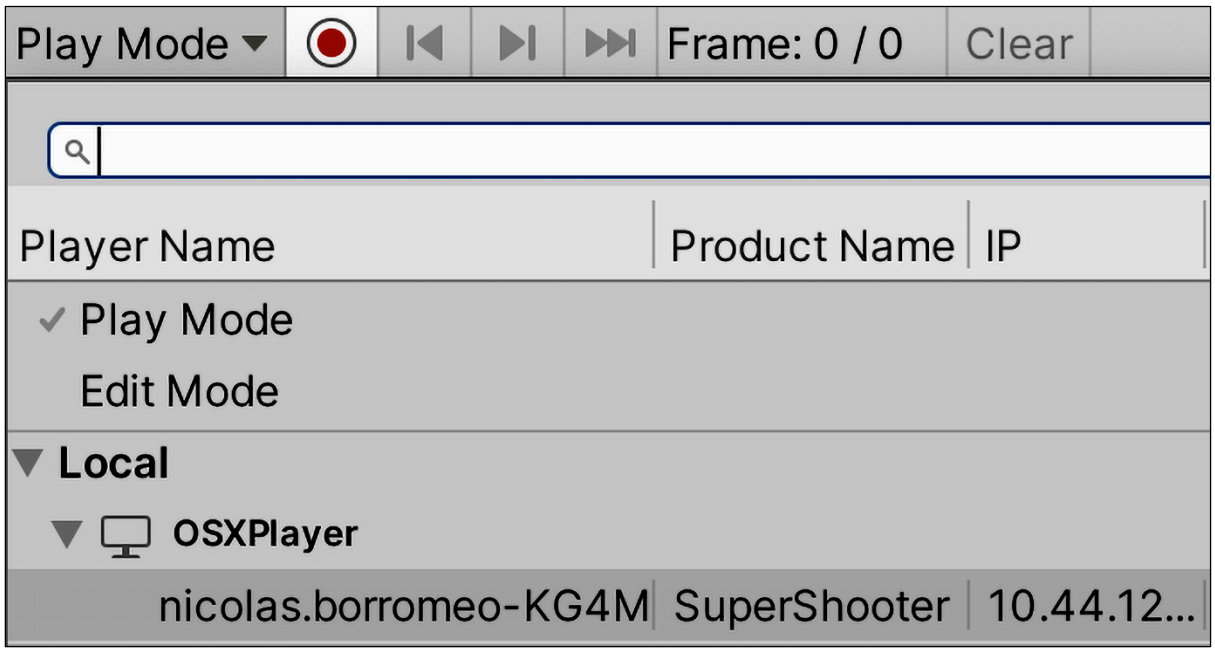

MonoBleedingEdge
SuperShooter_Data
SuperShooter
UnityCrashHandler32
UnityPlayer.dll

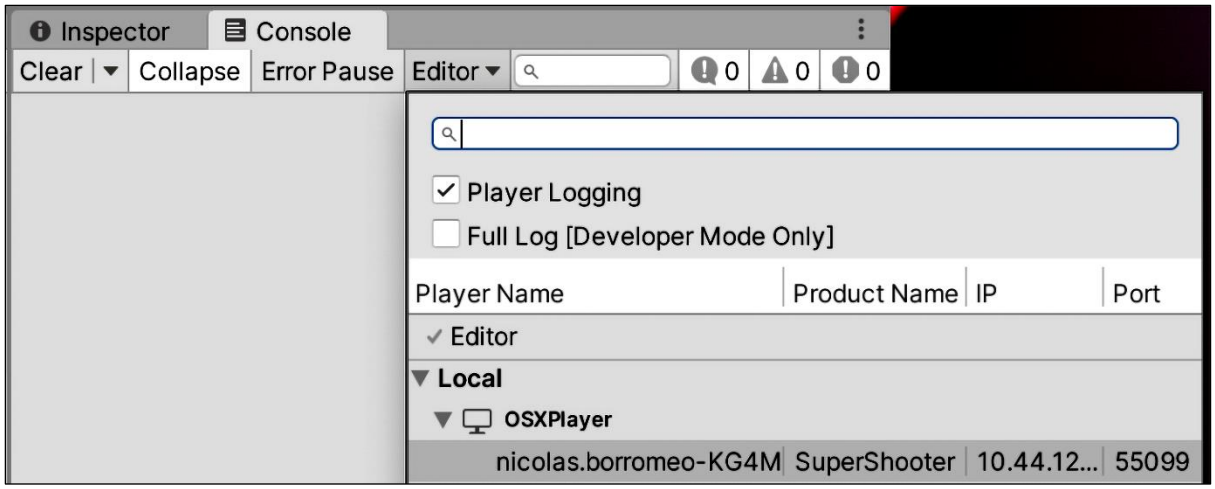


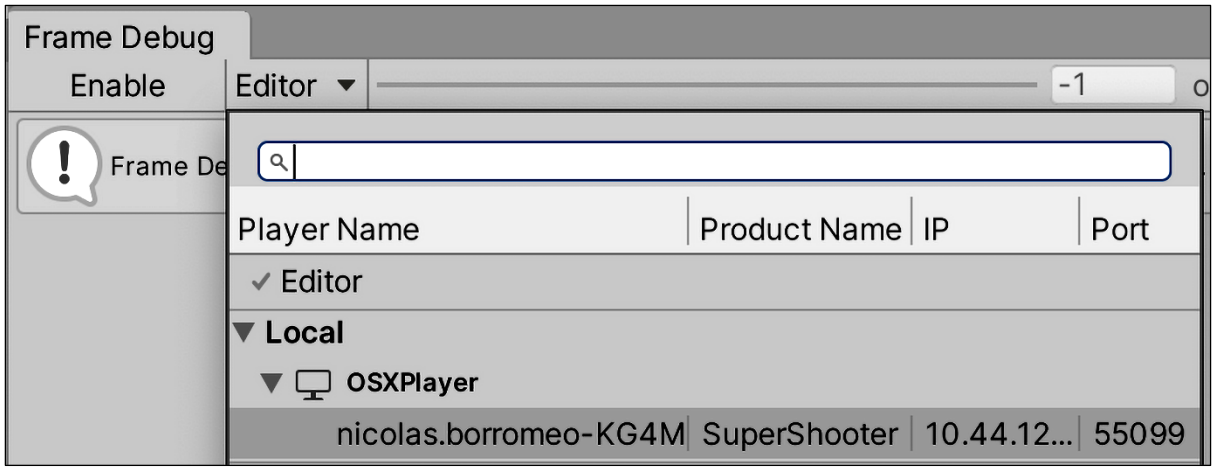

```
public class PlayerShooting : MonoBehaviour
{
    private void Start()
    {
        Debug.LogError("Testing Player Shooting Start");
    }
```

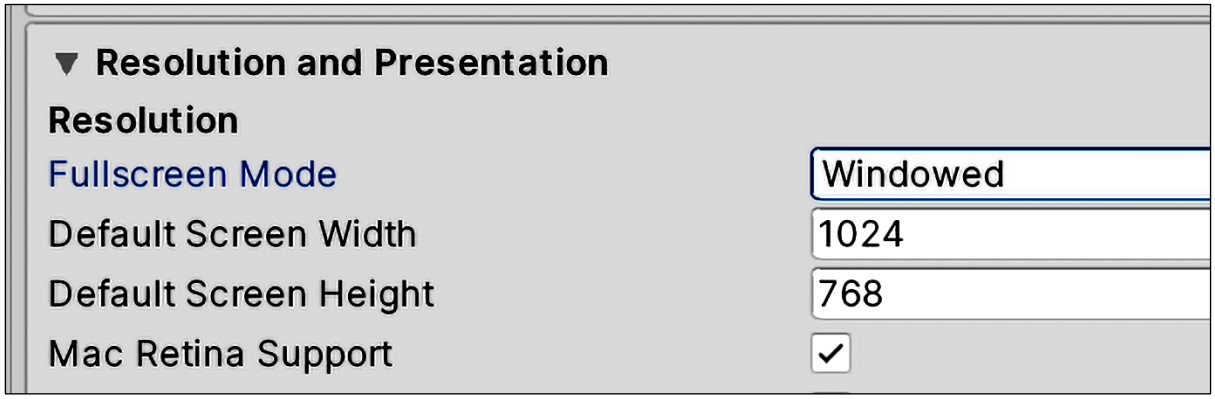


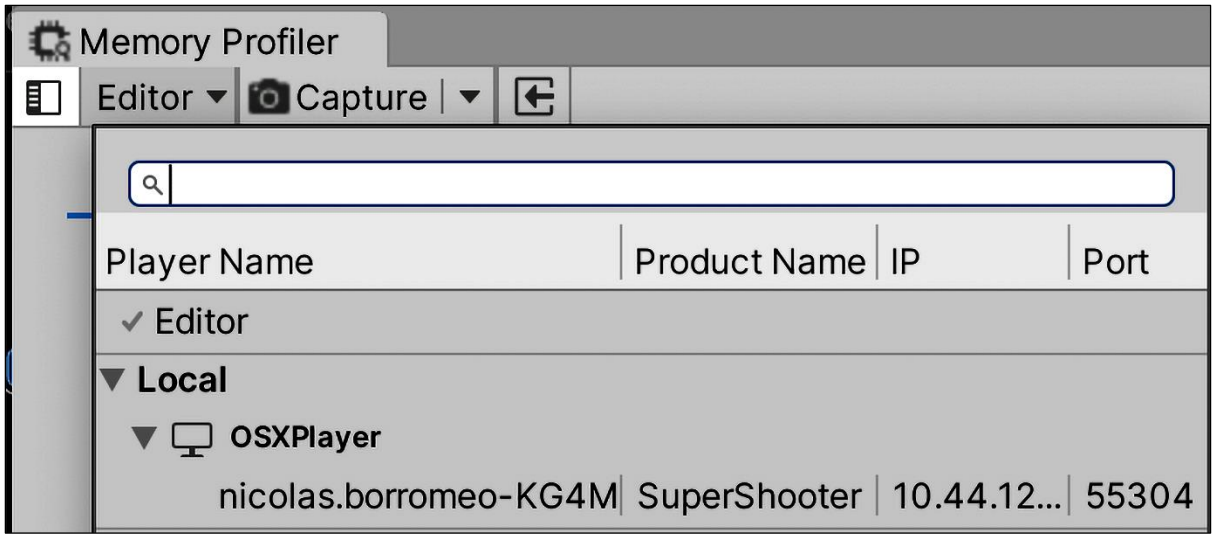

Development Build
Autoconnect Profiler
Deep Profiling Support
Script Debugging
Wait For Managed Debugger


Play Mode
Frame: 0 / 0
Clear
Player Name
Product Name
IP
Play Mode
Edit Mode
Local
OSXPlayer
nicolas.borromeo-KG4M
SuperShooter
10.44.12...

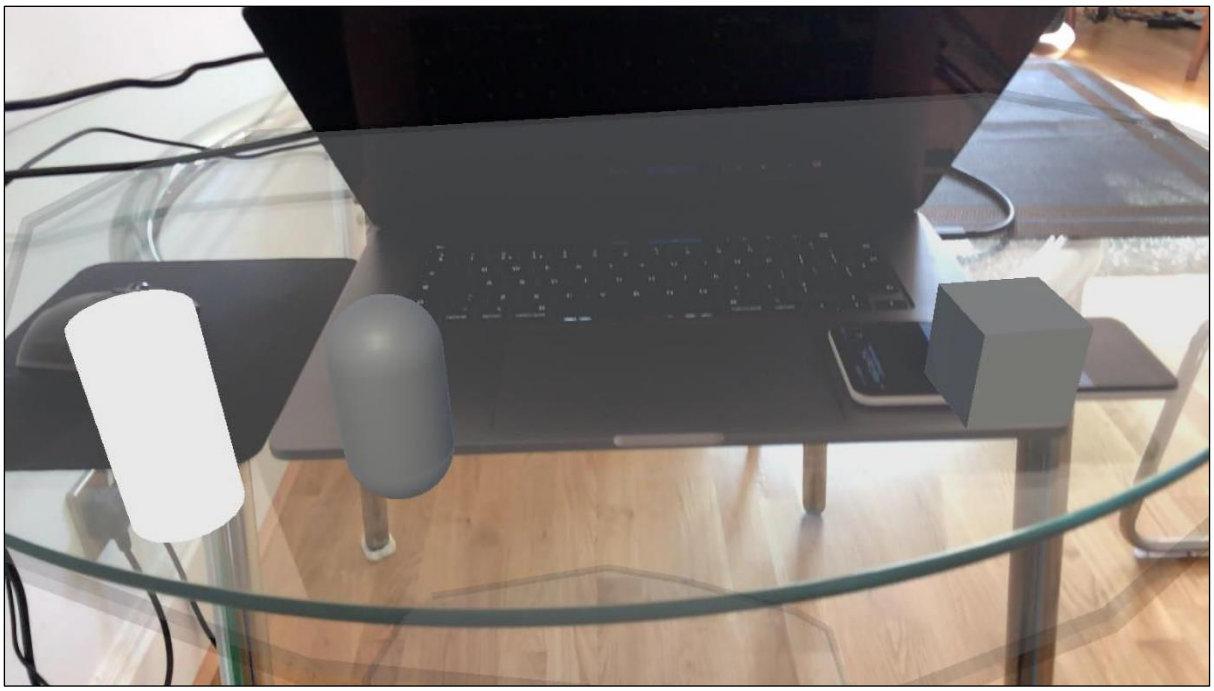

Inspector
Console
Clear
Collapse
Error Pause
Editor
0
0
0
Player Logging
Full Log [Developer Mode Only]
Player Name
Product Name
IP
Port
Editor
Local
OSXPlayer
nicolas.borromeo-KG4M
SuperShooter
10.44.12...
55099

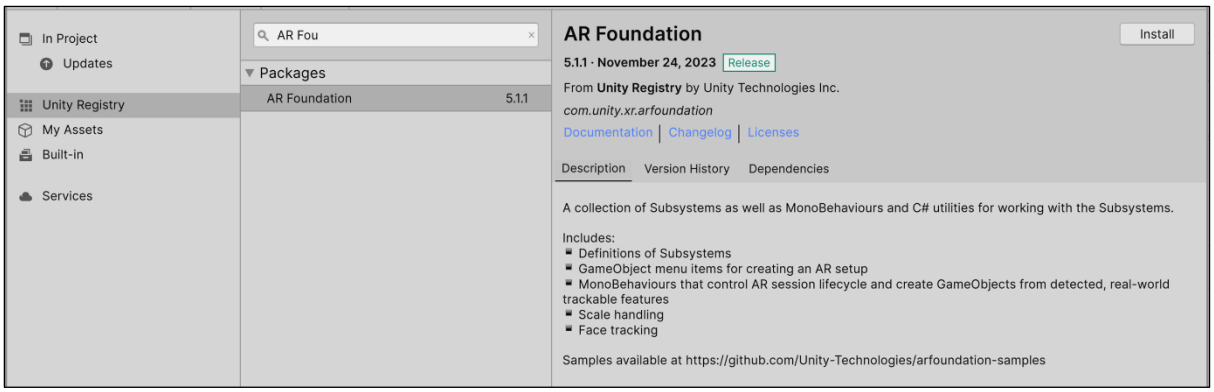

Frame Debug
Enable
Editor
-1
Player Name
Product Name
IP
Port
Editor
Local
OSXPlayer
nicolas.borromeo-KG4M
SuperShooter
10.44.12...
55099

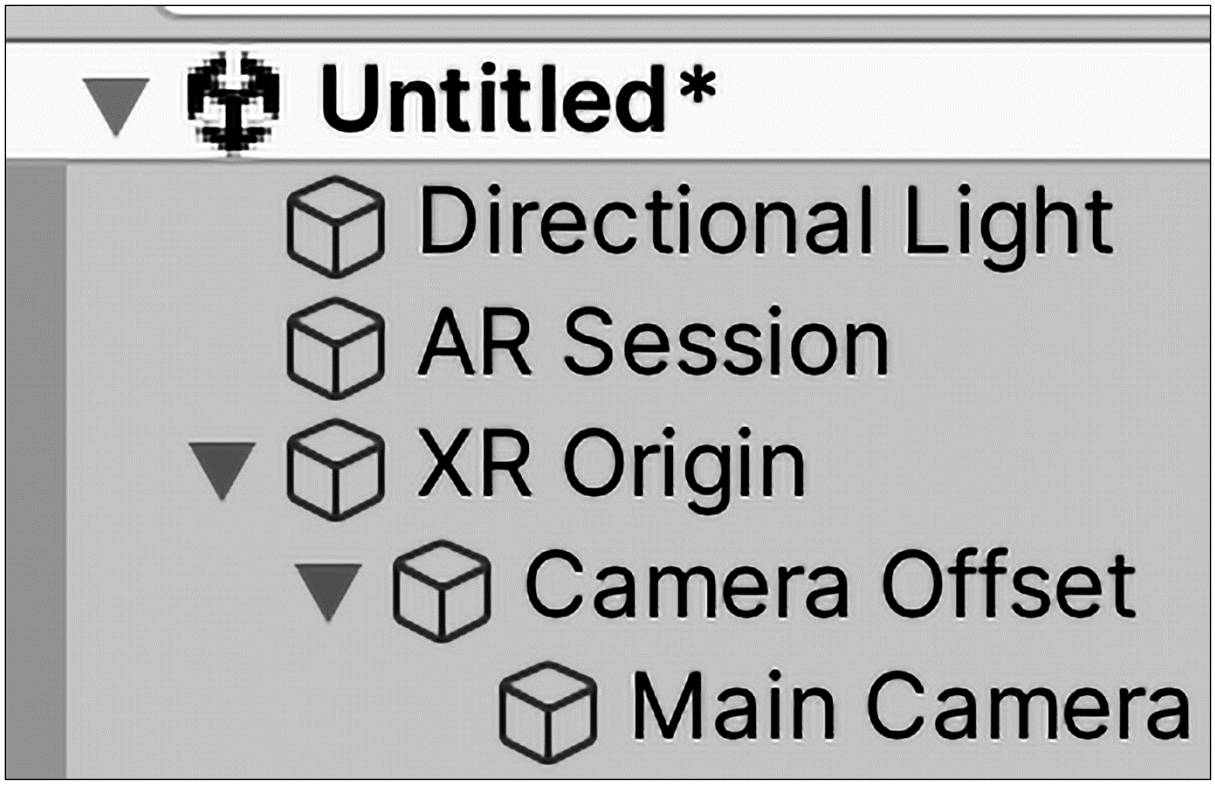

Resolution and Presentation
Resolution
Fullscreen Mode
Windowed
Default Screen Width
1024
Default Screen Height
768
Mac Retina Support

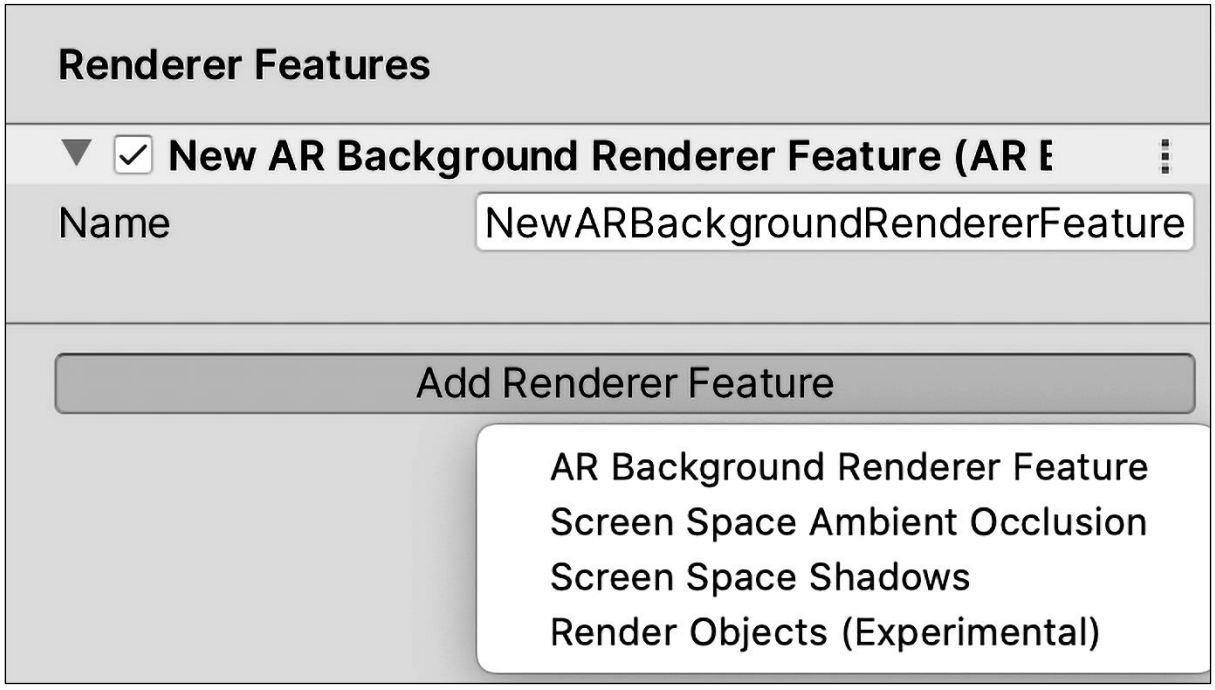

Memory Profiler
Editor
Capture
Player Name
Product Name
IP
Port
Editor
Local
OSXPlayer
nicolas.borromeo-KG4M
SuperShooter
10.44.12...
55304

Chapter 20: AR/VR

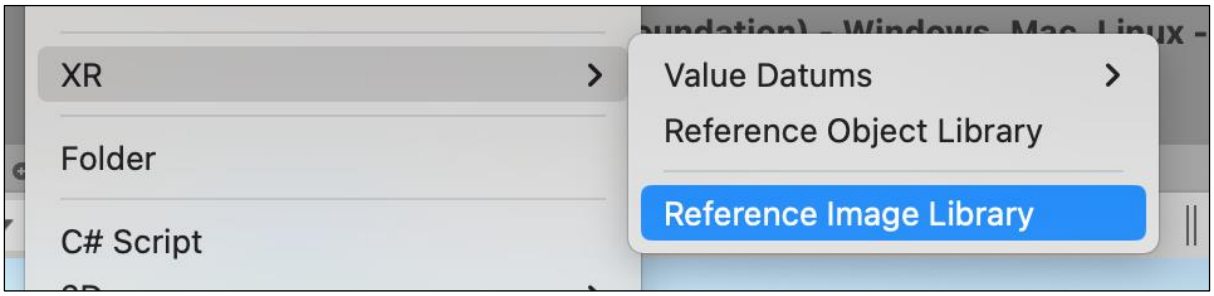


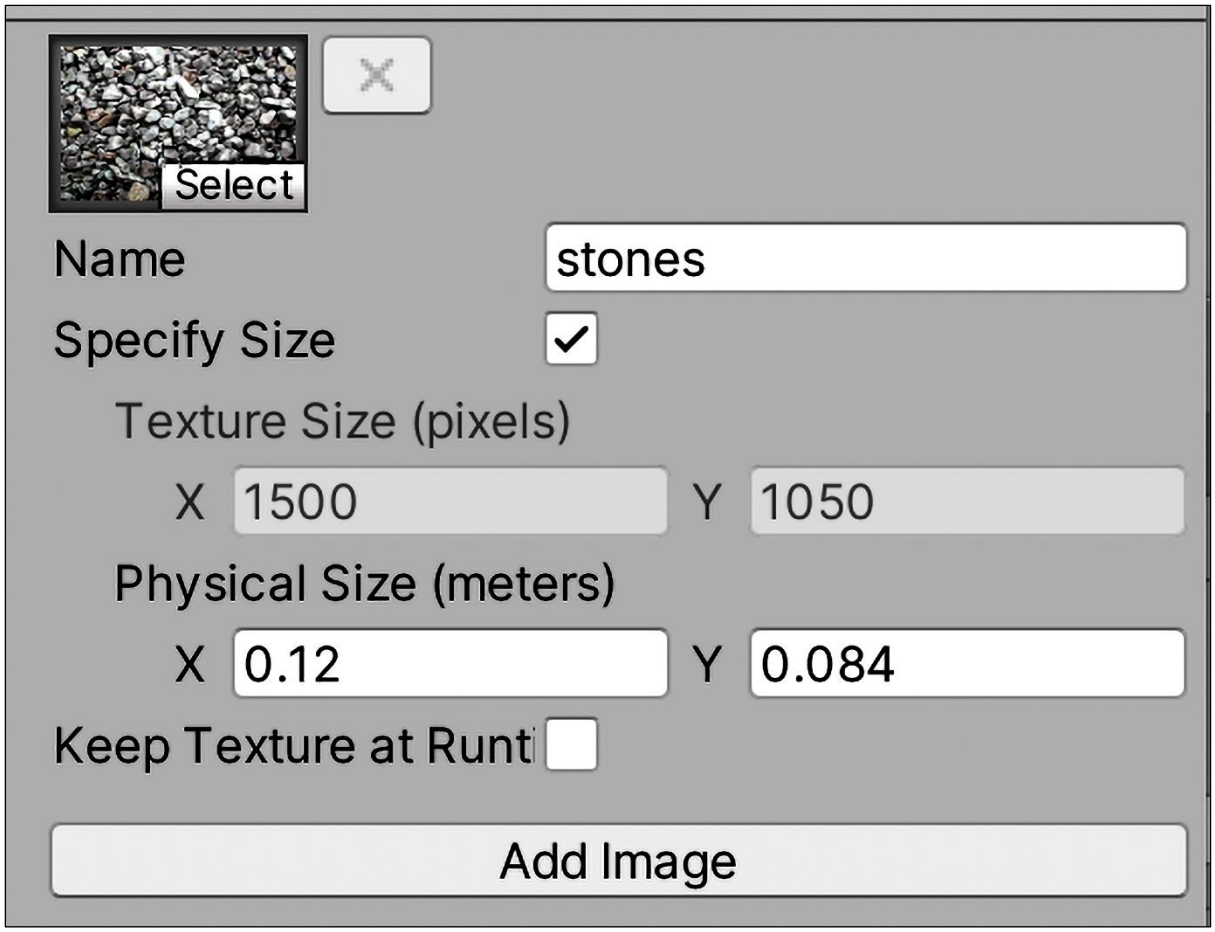


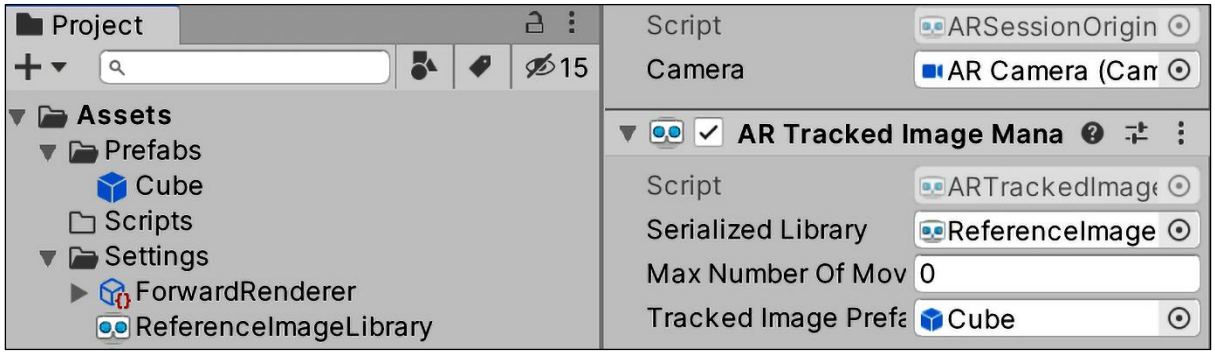

Untitled*
Directional Light
AR Session
XR Origin
Camera Offset
Main Camera

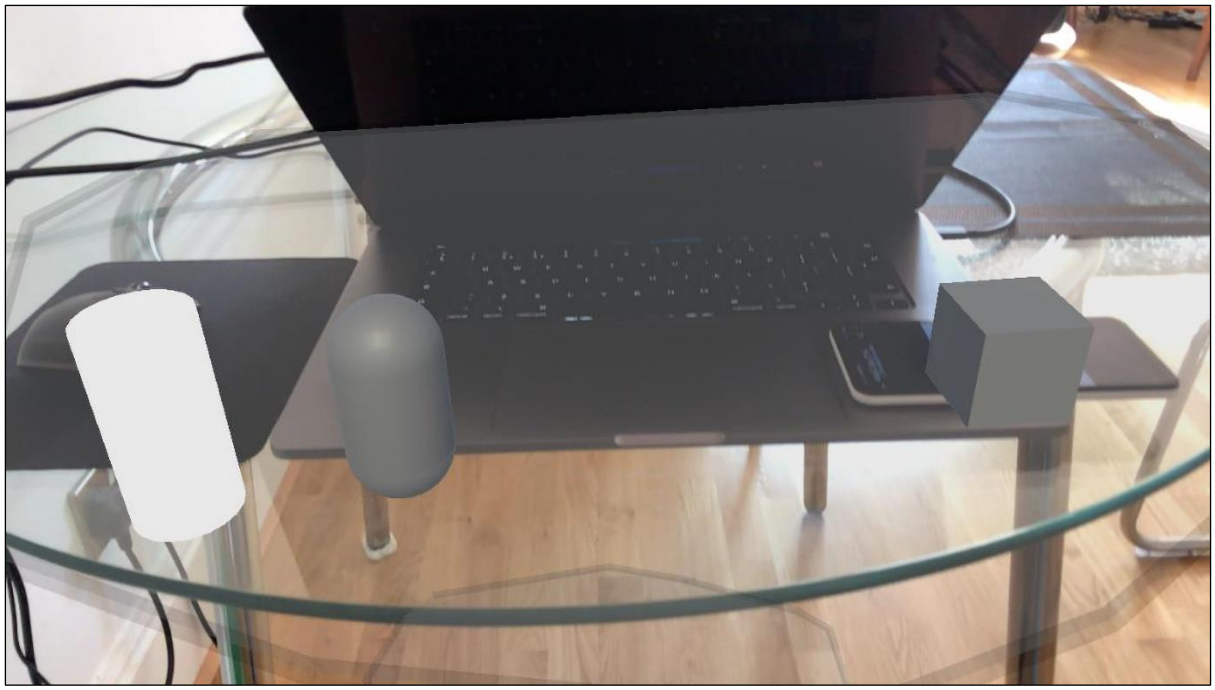

Renderer Features
New AR Background Renderer Feature (AR E
Name
NewARBackgroundRendererFeature
Add Renderer Feature
AR Background Renderer Feature
Screen Space Ambient Occlusion
Screen Space Shadows
Render Objects (Experimental)

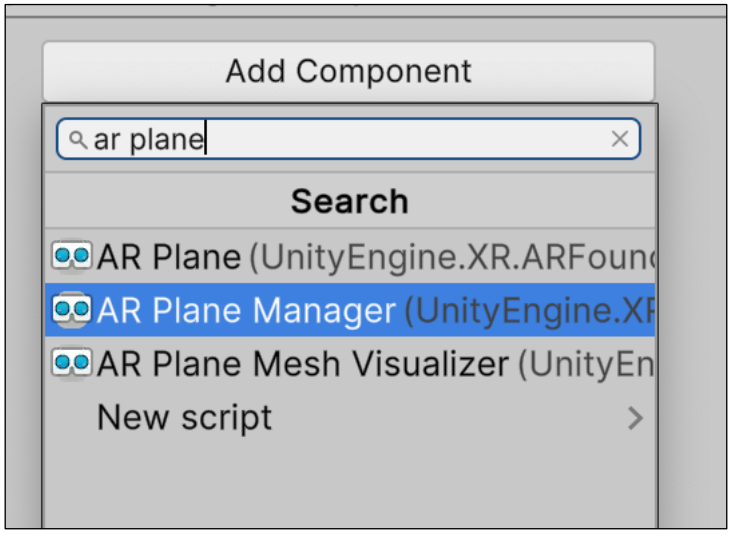


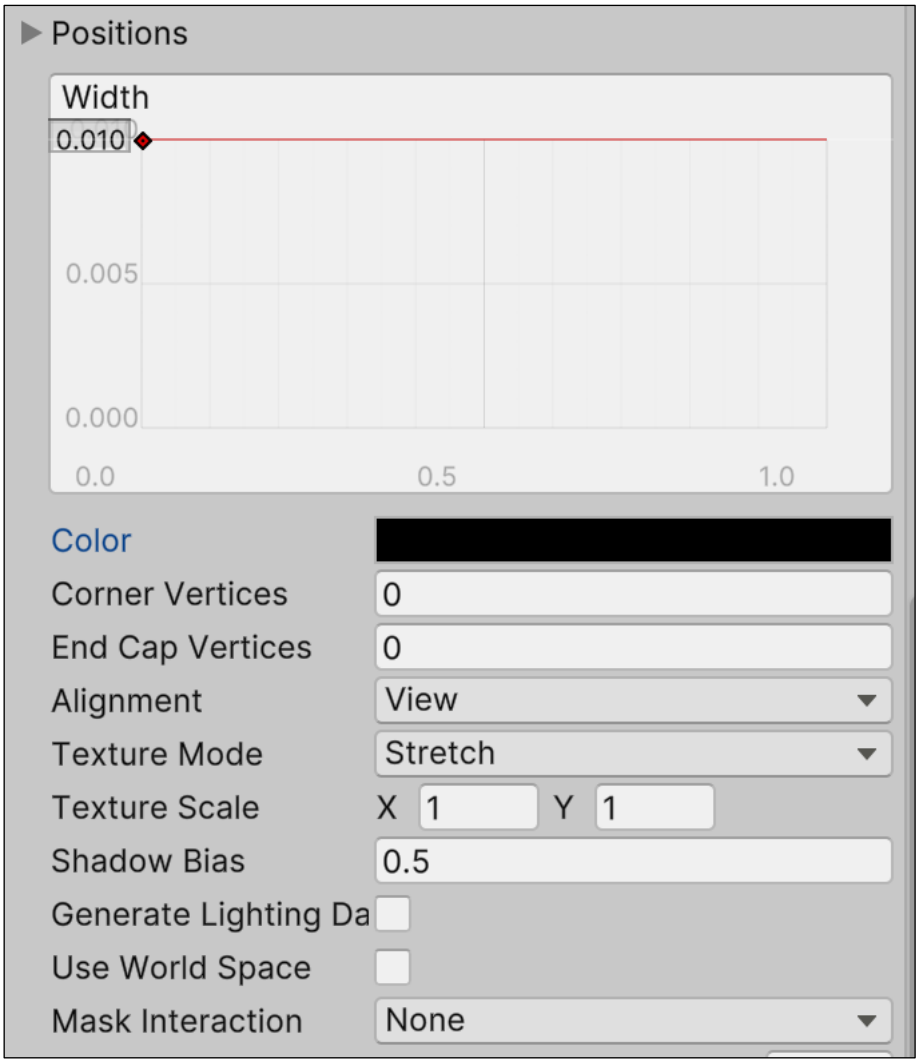

XR
Folder
C# Script
Value Datums
Reference Object Library
Reference Image Library

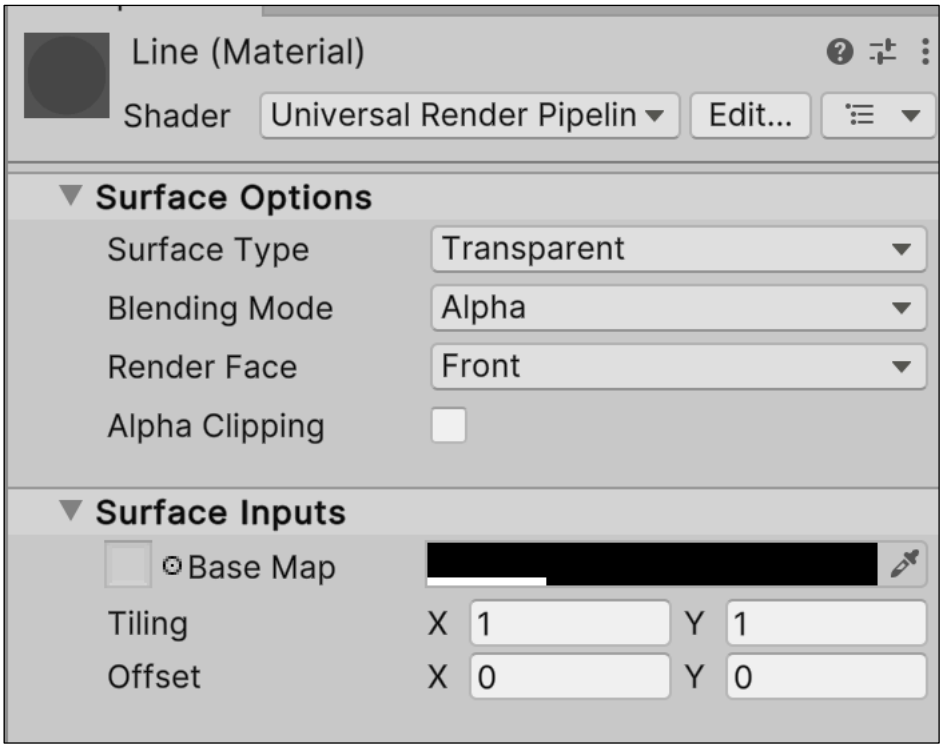

Select
Name
stones
Specify Size
Texture Size (pixels)
X 1500
Y 1050
Physical Size (meters)
X 0.12
Y 0.084
Keep Texture at Runt
Add Image

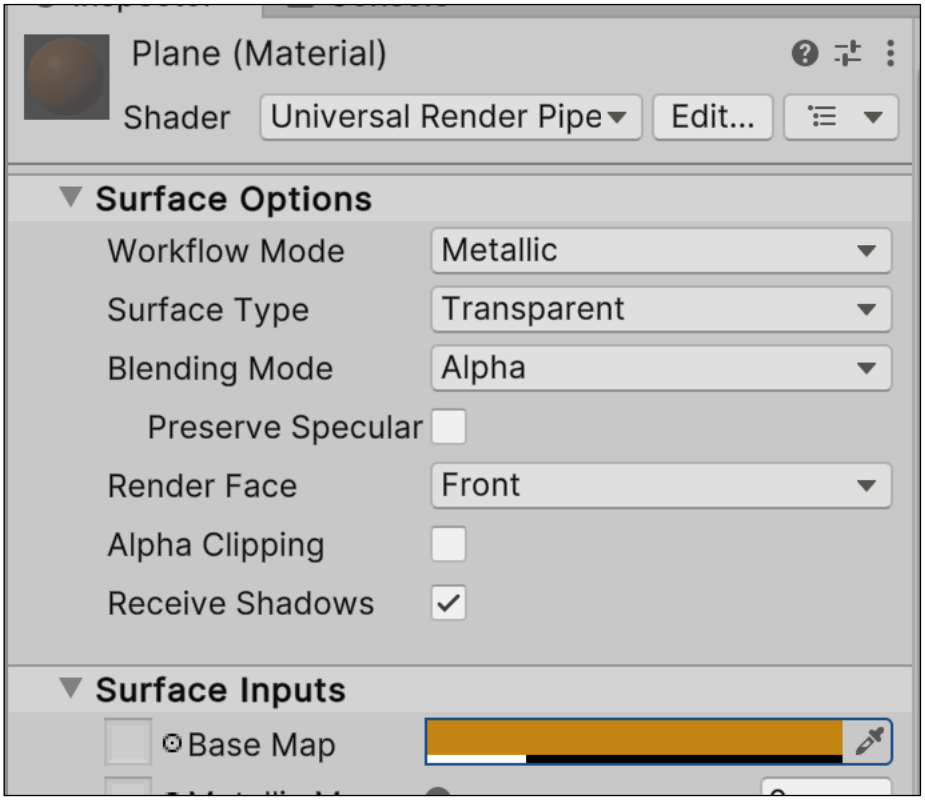

Project
15
Assets
Prefabs
Cube
Scripts
Settings
ForwardRenderer
ReferenceImageLibrary
Script
ARSessionOrigin
Camera
AR Camera (Cam
AR Tracked Image Mana
Script
ARTrackedImage
Serialized Library
ReferenceImage
Max Number Of Mov
0
Tracked Image Prefa
Cube

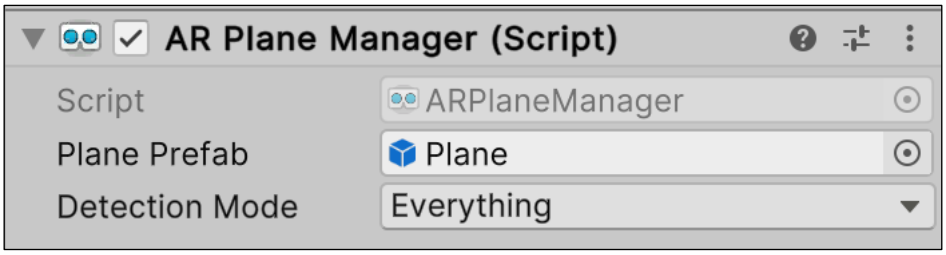



Add Component
ar plane
Search
AR Plane (UnityEngine.XR.ARFoun
AR Plane Manager (UnityEngine.XF
AR Plane Mesh Visualizer (UnityEn
New script


Positions
Width
0.010
0.005
0.000
0.0
0.5
1.0
Color
Corner Vertices
0
End Cap Vertices
0
Alignment
View
Texture Mode
Stretch
Texture Scale
X
1
Y
1
Shadow Bias
0.5
Generate Lighting Da
Use World Space
Mask Interaction
None


Line (Material)
Shader
Universal Render Pipelin
Edit...
Surface Options
Surface Type
Transparent
Blending Mode
Alpha
Render Face
Front
Alpha Clipping
Surface Inputs
Base Map
Tiling
X 1
Y 1
Offset
X 0
Y 0


Plane (Material)
Shader
Universal Render Pipe
Edit...
Surface Options
Workflow Mode
Metallic
Surface Type
Transparent
Blending Mode
Alpha
Preserve Specular
Render Face
Front
Alpha Clipping
Receive Shadows
Surface Inputs
Base Map




```
List<ARRaycastHit> hits = new List<ARRaycastHit>();
```

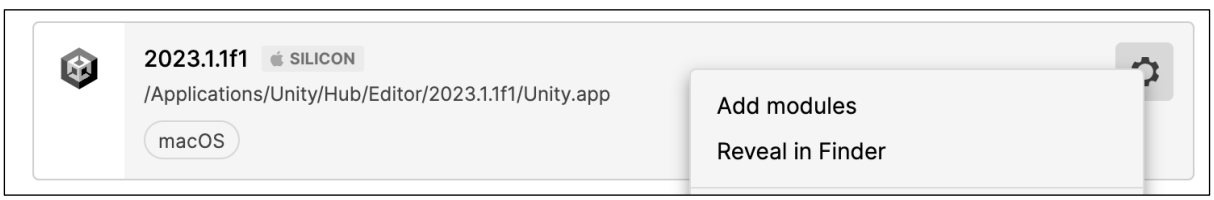
```
using UnityEngine;
using UnityEngine.XR.ARFoundation;
using System.Collections.Generic;
using UnityEngine.InputSystem;

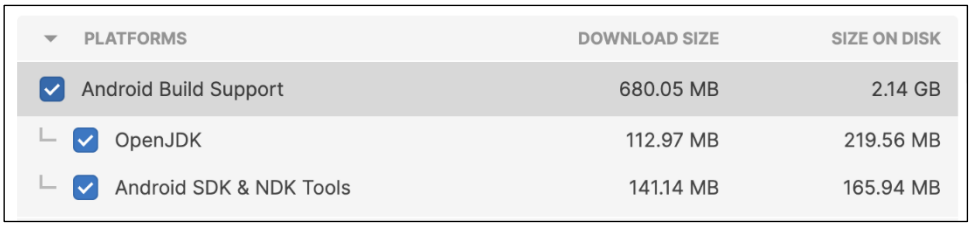
public class SpawnerPlacer : MonoBehaviour
{
    ARRaycastManager raycastManager;
    List<ARRaycastHit> hits = new List<ARRaycastHit>();
    public GameObject spawnerPrefab;

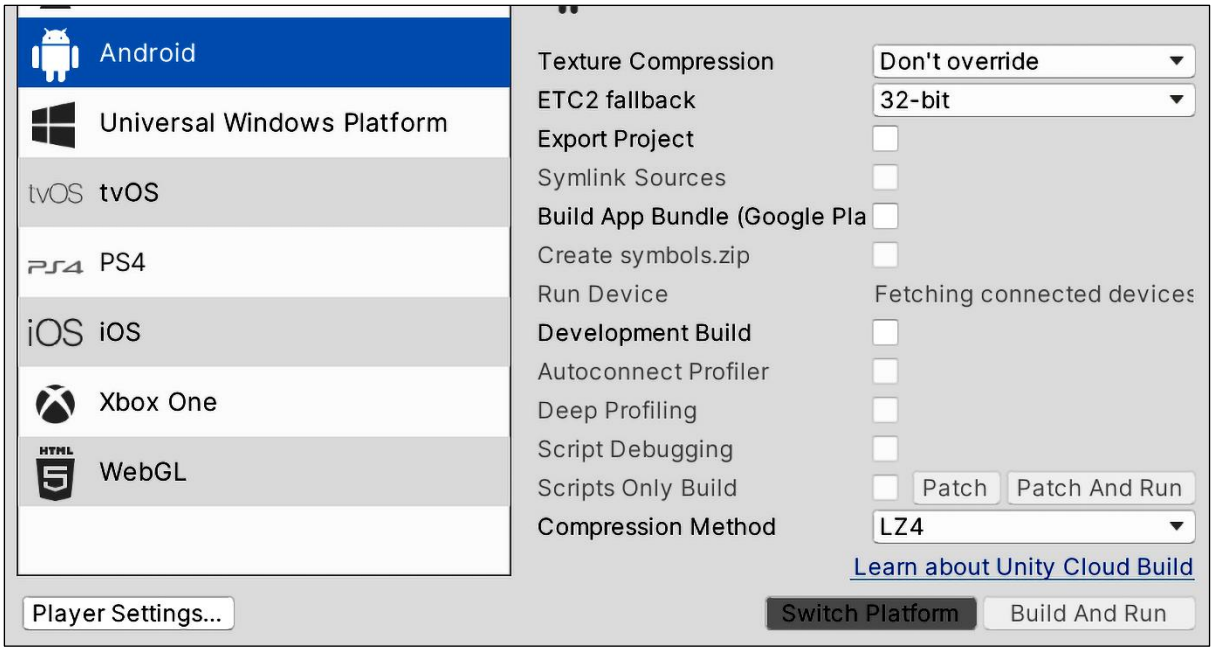
    private void Awake()
    {
        raycastManager = GetComponent<ARRaycastManager>();
    }

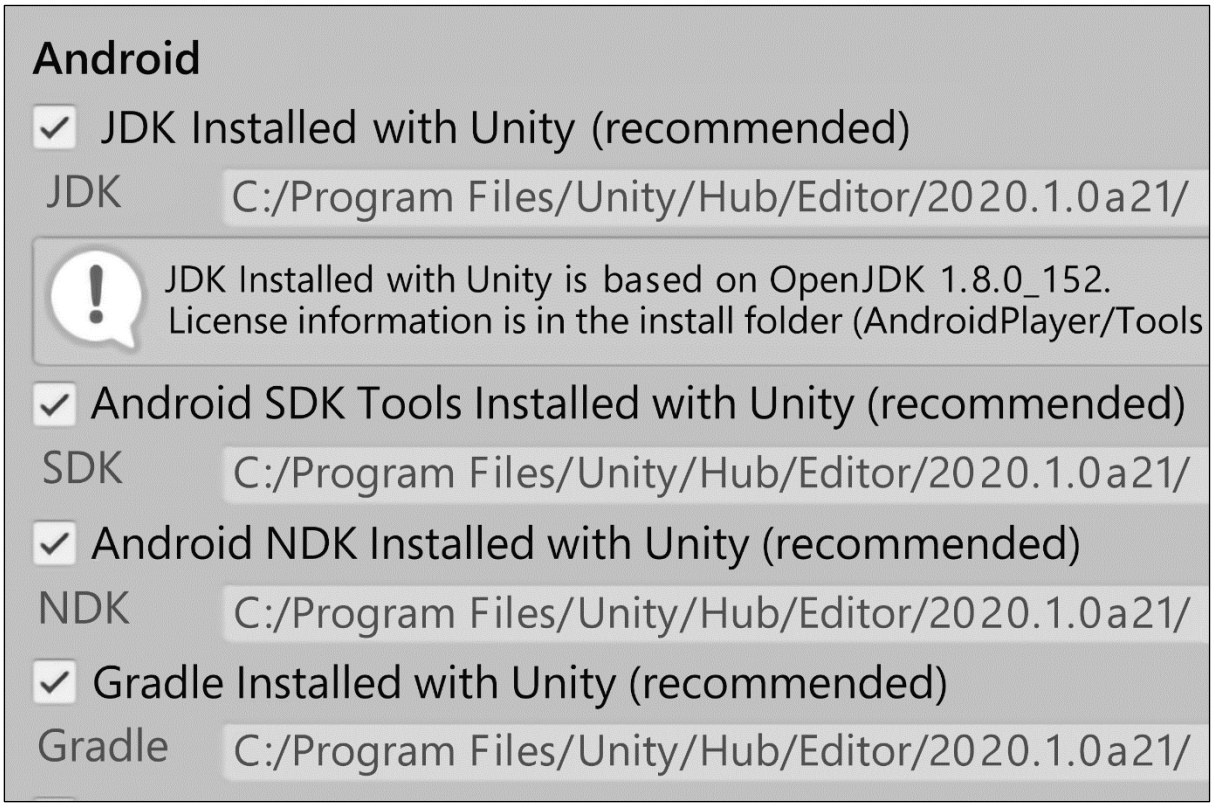
    void Update()
    {
        var touchPos :Vector2 =
            Touchscreen.current.primaryTouch.position.ReadValue();

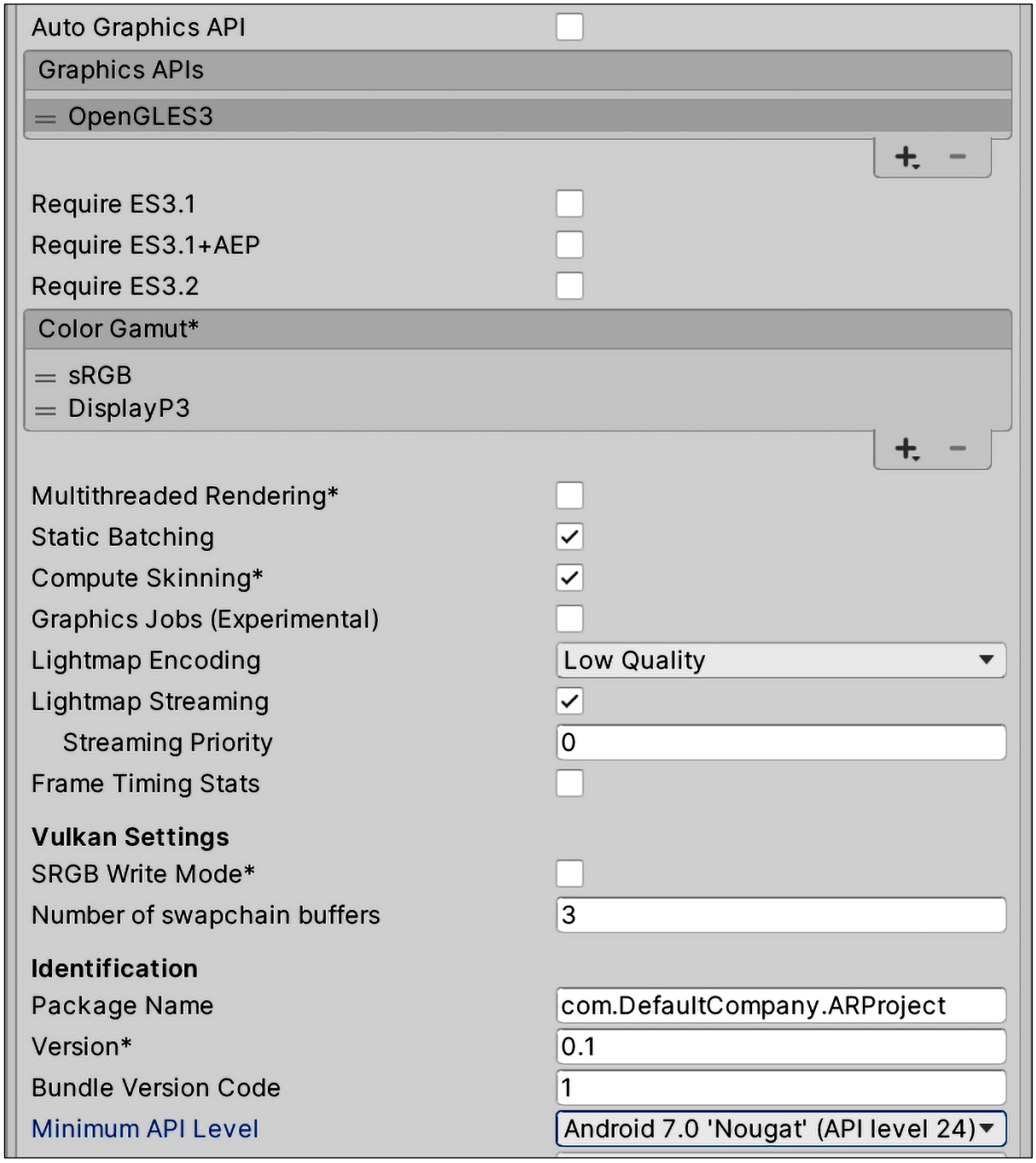
        if (Touchscreen.current.primaryTouch.press.wasPressedThisFrame &&
            raycastManager.Raycast(touchPos, hits))
        {
            Instantiate(spawnerPrefab,
                hits[0].pose.position,
                hits[0].pose.rotation);
        }
    }
}
```

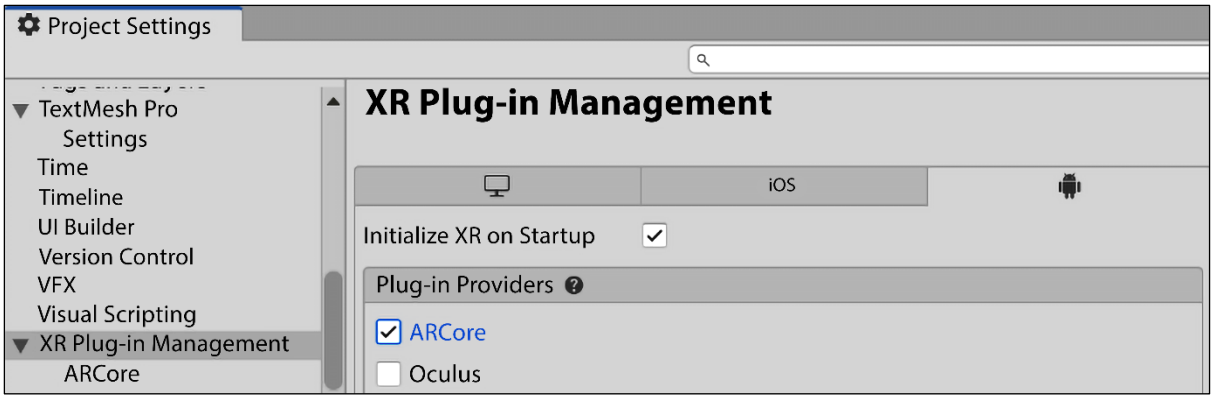


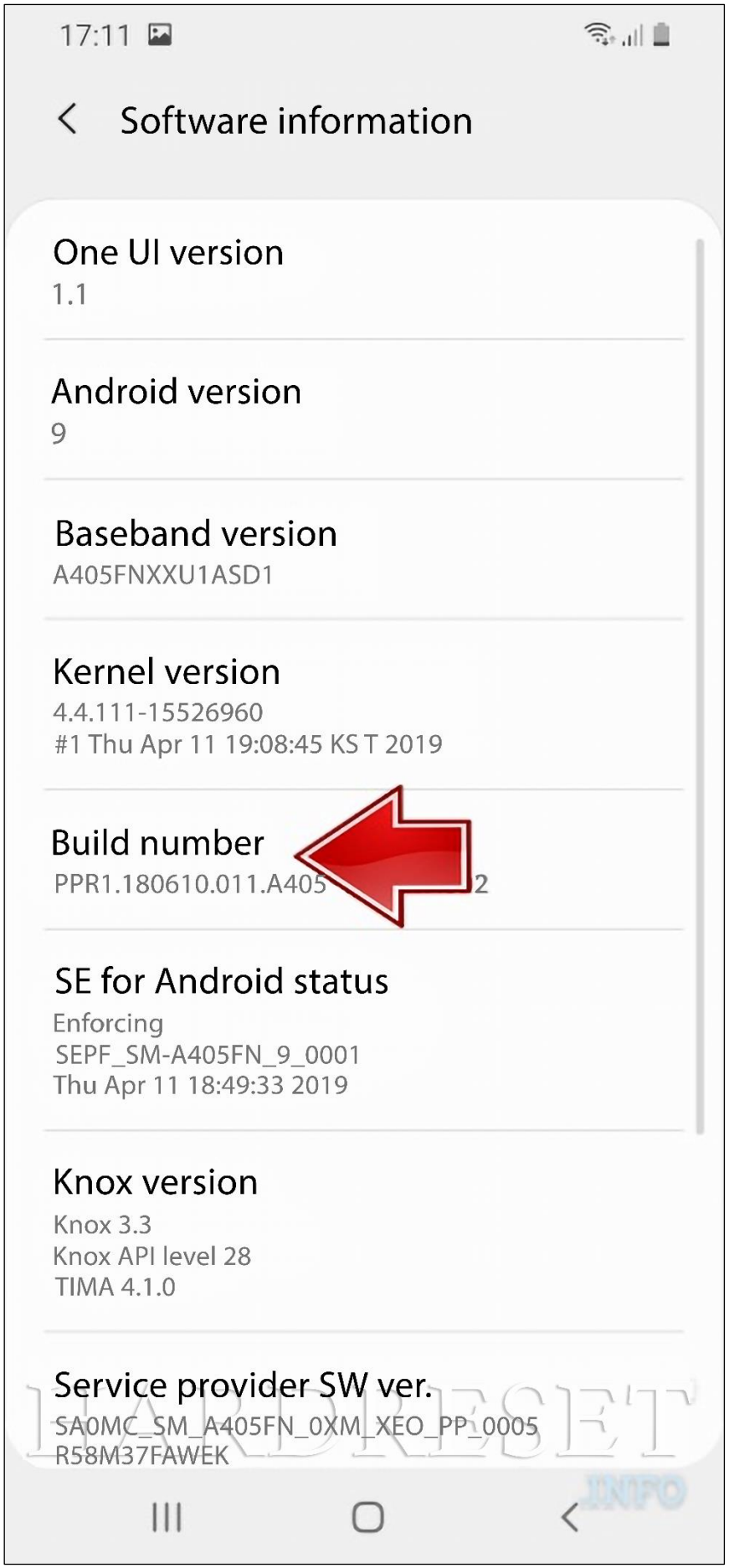

PLATFORMS
DOWNLOAD SIZE
SIZE ON DISK
Android Build Support
680.05 MB
2.14 GB
OpenJDK
112.97 MB
219.56 MB
Android SDK & NDK Tools
141.14 MB
165.94 MB

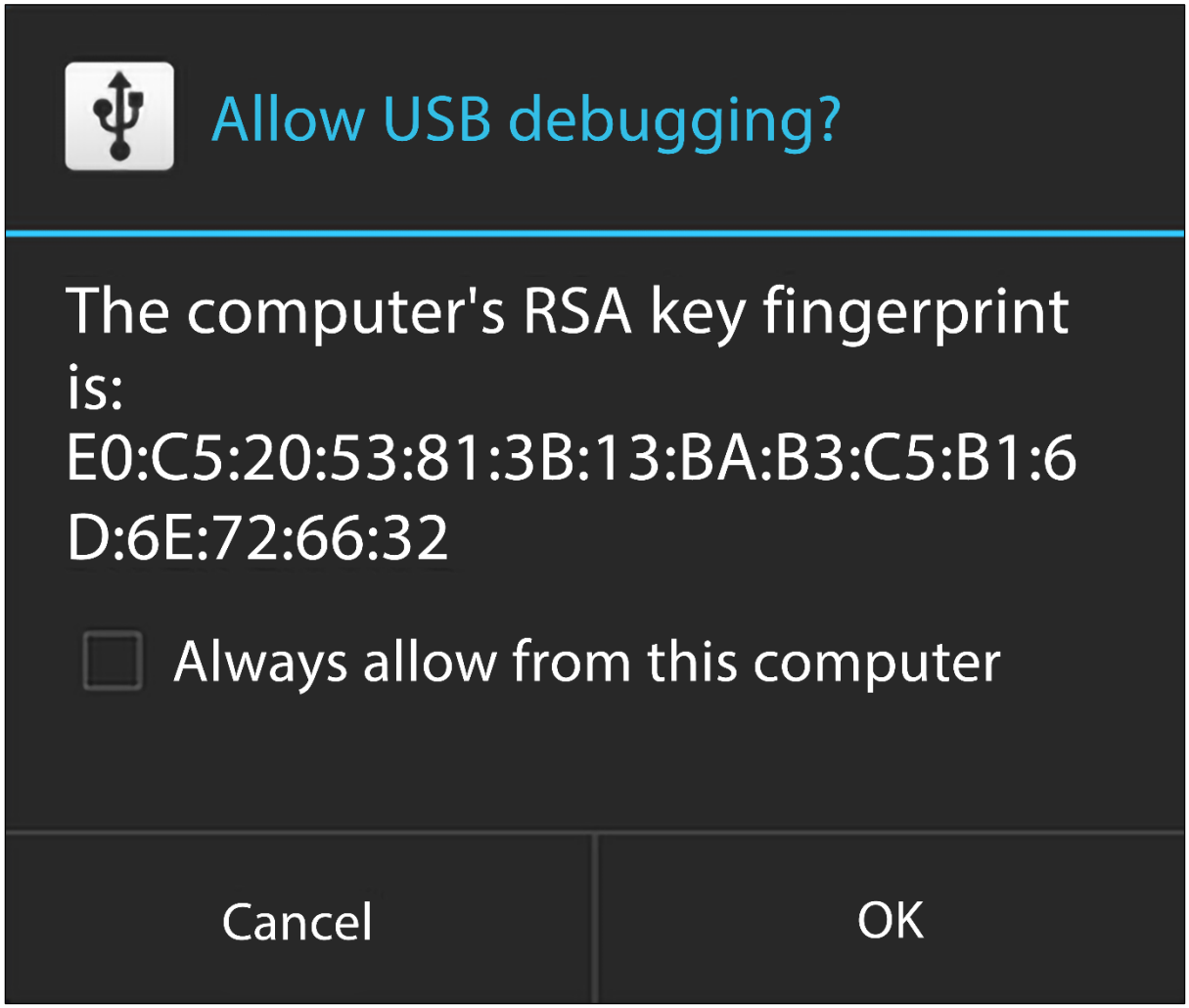

Android
Universal Windows Platform
tvOS
PS4
iOS
Xbox One
WebGL
Texture Compression
Don't override
ETC2 fallback
32-bit
Export Project
Symlink Sources
Build App Bundle (Google Pla
Create symbols.zip
Run Device
Fetching connected devices
Development Build
Autoconnect Profiler
Deep Profiling
Script Debugging
Scripts Only Build
Patch
Patch And Run
Compression Method
LZ4
Learn about Unity Cloud Build
Player Settings...
Switch Platform
Build And Run


Android
JDK Installed with Unity (recommended)
JDK
C:/Program Files/Unity/Hub/Editor/2020.1.0a21/
JDK Installed with Unity is based on OpenJDK 1.8.0_152.
License information is in the install folder (AndroidPlayer/Tools
Android SDK Tools Installed with Unity (recommended)
SDK
C:/Program Files/Unity/Hub/Editor/2020.1.0a21/
Android NDK Installed with Unity (recommended)
NDK
C:/Program Files/Unity/Hub/Editor/2020.1.0a21/
Gradle Installed with Unity (recommended)
Gradle
C:/Program Files/Unity/Hub/Editor/2020.1.0a21/


Auto Graphics API
Graphics APIs
OpenGLES3
Require ES3.1
Require ES3.1+AEP
Require ES3.2
Color Gamut*
sRGB
DisplayP3
Multithreaded Rendering*
Static Batching
Compute Skinning*
Graphics Jobs (Experimental)
Lightmap Encoding
Low Quality
Lightmap Streaming
Streaming Priority
0
Frame Timing Stats
Vulkan Settings
SRGB Write Mode*
Number of swapchain buffers
3
Identification
Package Name
com.DefaultCompany.ARProject
Version*
0.1
Bundle Version Code
1
Minimum API Level
Android 7.0 'Nougat' (API level 24)

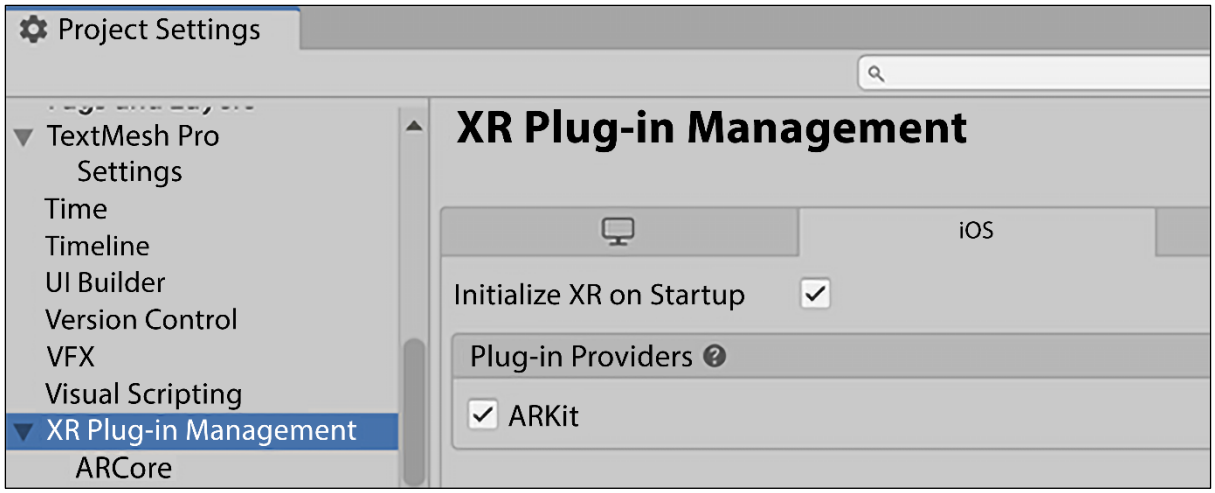

Project Settings
TextMesh Pro
Settings
Time
Timeline
UI Builder
Version Control
VFX
Visual Scripting
XR Plug-in Management
ARCore
XR Plug-in Management
iOS
Initialize XR on Startup
Plug-in Providers
ARCore
Oculus

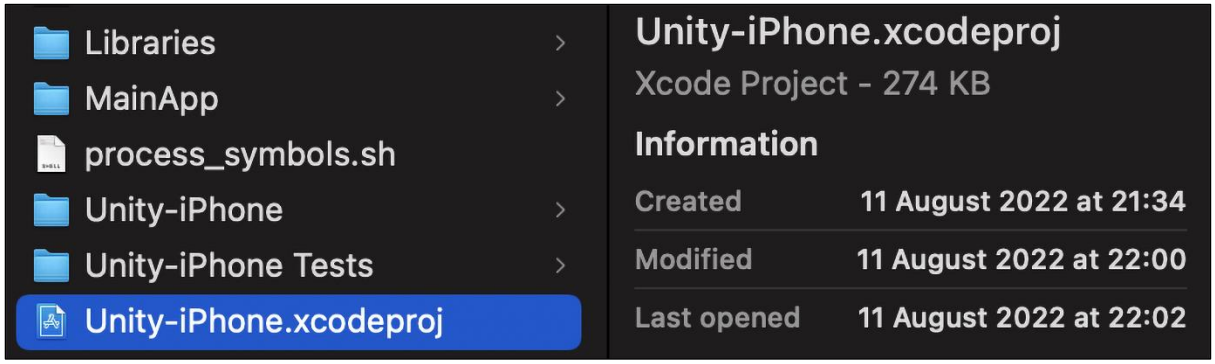

17:11
Software information
One UI version
1.1
Android version
9
Baseband version
A405FNXXU1ASD1
Kernel version
4.4.111-15526960
#1 Thu Apr 11 19:08:45 KST 2019
Build number
PPR1.180610.011.A405
2
SE for Android status
Enforcing
SEPF_SM-A405FN_9_0001
Thu Apr 11 18:49:33 2019
Knox version
Knox 3.3
Knox API level 28
TIMA 4.1.0
Service provider SW ver.
SA0MC_SM_A405FN_0XM_XEO_PP_0005
R58M37FAWEK
HARDRESET
.INFO

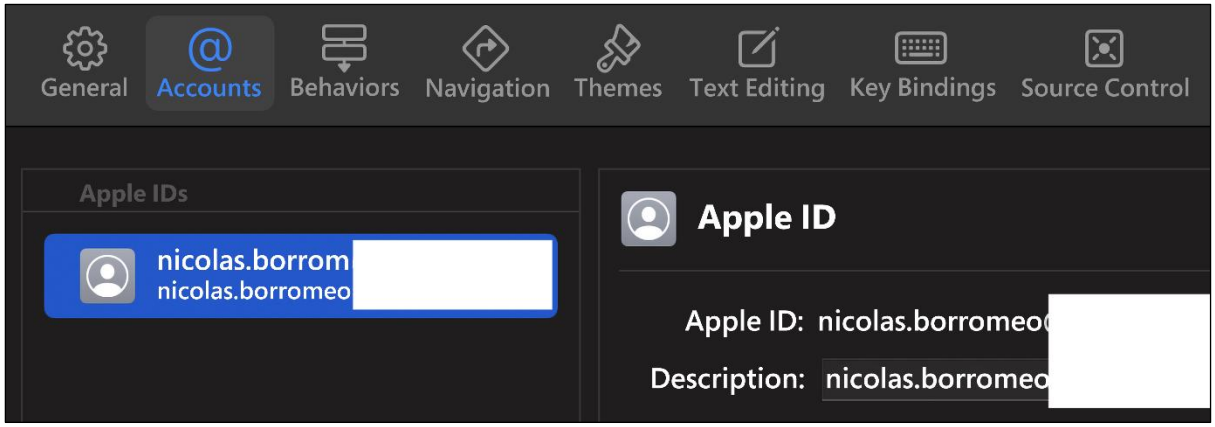




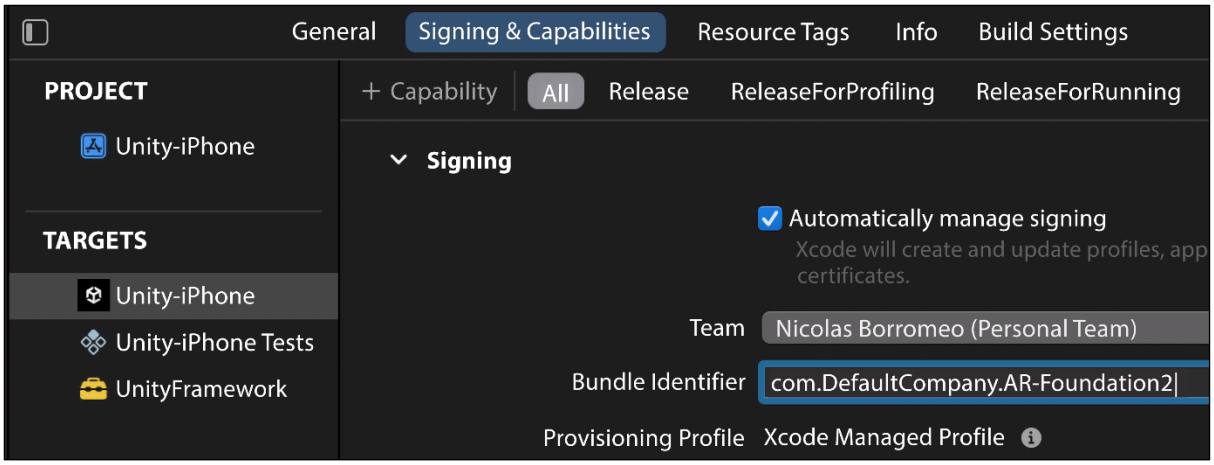
Allow downloads over HTTP*	Not allowed
Camera Usage Description*	AR

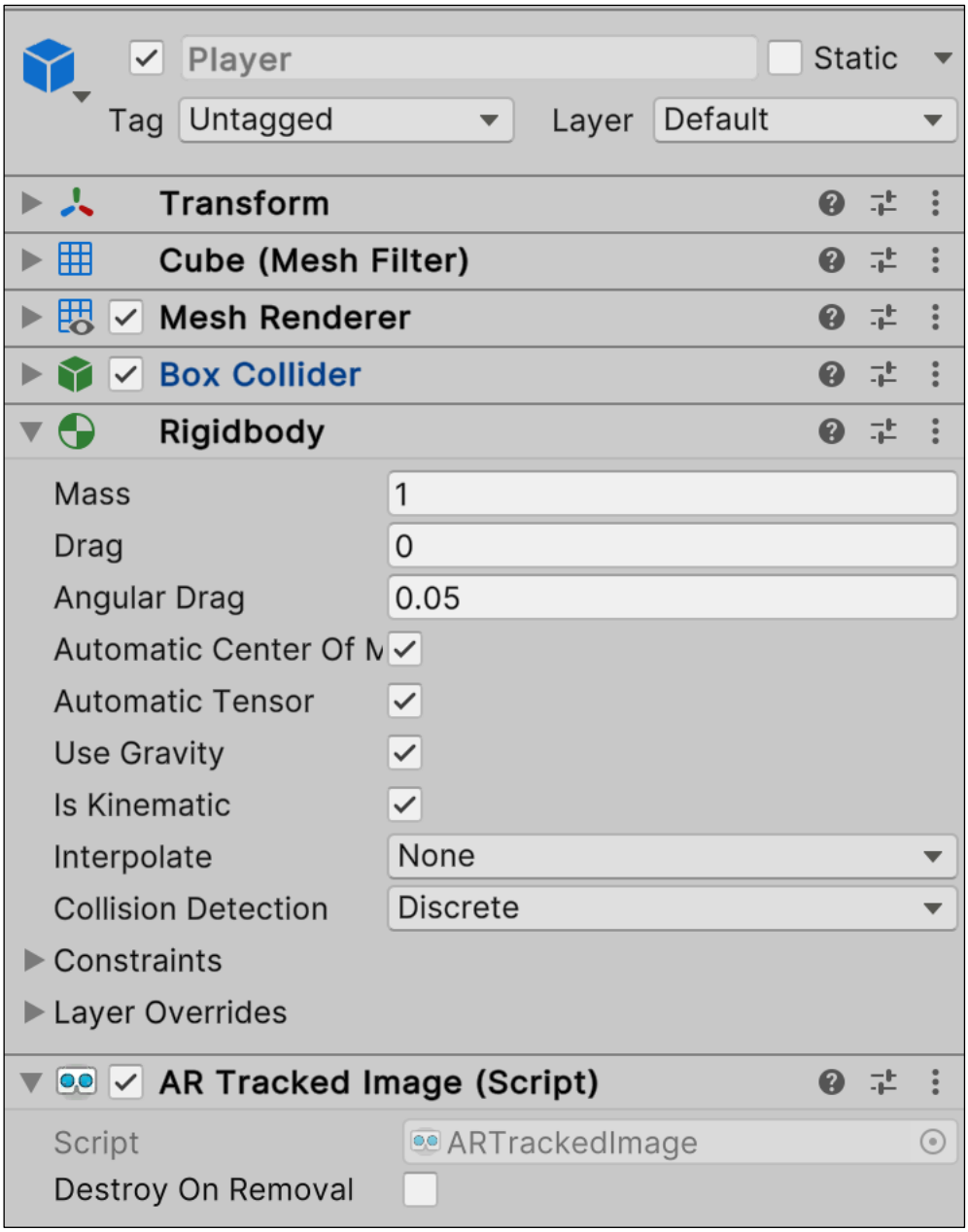

Project Settings
TextMesh Pro
Settings
Time
Timeline
UI Builder
Version Control
VFX
Visual Scripting
XR Plug-in Management
ARCore
XR Plug-in Management
iOS
Initialize XR on Startup
Plug-in Providers
ARKit


Libraries
MainApp
process_symbols.sh
Unity-iPhone
Unity-iPhone Tests
Unity-iPhone.xcodeproj
Unity-iPhone.xcodeproj
Xcode Project - 274 KB
Information
Created 11 August 2022 at 21:34
Modified 11 August 2022 at 22:00
Last opened 11 August 2022 at 22:02


General
Accounts
Behaviors
Navigation
Themes
Text Editing
Key Bindings
Source Control
Apple IDs
nicolas.borrom
nicolas.borromeo
Apple ID
Apple ID: nicolas.borromeo
Description: nicolas.borromeo


Unity-iPhone
main
Unity-iPhone
iPhone de Nicolas


General
Signing & Capabilities
Resource Tags
Info
Build Settings
PROJECT
Unity-iPhone
TARGETS
Unity-iPhone
Unity-iPhone Tests
UnityFramework
+ Capability
All
Release
ReleaseForProfiling
ReleaseForRunning
Signing
Automatically manage signing
Xcode will create and update profiles, app certificates.
Team
Nicolas Borromeo (Personal Team)
Bundle Identifier
com.DefaultCompany.AR-Foundation2
Provisioning Profile
Xcode Managed Profile


Player
Static
Tag
Untagged
Layer
Default
Transform
Cube (Mesh Filter)
Mesh Renderer
Box Collider
Rigidbody
Mass
1
Drag
0
Angular Drag
0.05
Automatic Center Of M
Automatic Tensor
Use Gravity
Is Kinematic
Interpolate
None
Collision Detection
Discrete
Constraints
Layer Overrides
AR Tracked Image (Script)
Script
ARTrackedImage
Destroy On Removal

```
using UnityEngine;

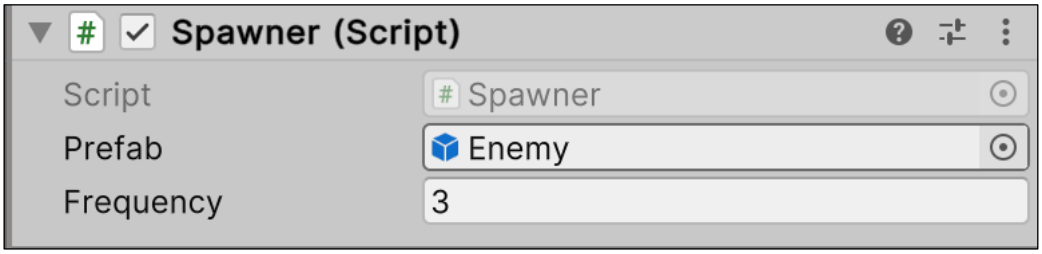
public class Spawner : MonoBehaviour
{
    public GameObject prefab;
    public float frequency;

    void Awake()
    {
        InvokeRepeating("Spawn", frequency, frequency);
    }

    void Spawn()
    {
        var obj :GameObject = Instantiate(prefab,
            transform.position,
            transform.rotation);

        var myCollider = GetComponentInChildren<Collider>();
        var spawnedCol = obj.GetComponentInChildren<Collider>();

        //Check if both objects have collider
        if (myCollider != null && spawnedCol != null)
        {
            Physics.IgnoreCollision(myCollider, spawnedCol);
        }
    }
}
```



```
using UnityEngine;

public class PlayerManager : MonoBehaviour
{
    public static PlayerManager instance;

    void Awake()
    {
        instance = this;
    }
}
```

```
using UnityEngine;

public class LookAtPlayer : MonoBehaviour
{
    void Update()
    {
        if(PlayerManager.instance == null) return;

        var playerPos :Vector3 = PlayerManager.instance.transform.position;
        transform.forward = playerPos - transform.position;
    }
}
```

```
using UnityEngine;

public class MoveForward : MonoBehaviour
{
    public float speed;

    void Update()
    {
        transform.Translate(0, 0, speed * Time.deltaTime);
    }
}
```

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

public class EnemyManager : MonoBehaviour
{
    public static EnemyManager instance;

    public List<Enemy> all = new List<Enemy>();

    void Awake()
    {
        instance = this;
    }
}
```

```
using UnityEngine;

public class Enemy : MonoBehaviour
{
    void OnEnable()
    {
        EnemyManager.instance.all.Add(this);
    }

    void OnDisable()
    {
        EnemyManager.instance.all.Remove(this);
    }
}
```

```
using UnityEngine;

public class LookAtNearestEnemy : MonoBehaviour
{
    void Update()
    {
        if(EnemyManager.instance.all.Count == 0) return;

        var nearestEnemy = EnemyManager.instance.all[0];

        for (var i = 1; i < EnemyManager.instance.all.Count; i++)
        {
            var enemy = EnemyManager.instance.all[i];
            var enemyPos :Vector3 = enemy.transform.position;
            var nearEnemyPos :Vector3 = nearestEnemy.transform.position;

            var distToNear :float = Vector3.Distance(nearEnemyPos, transform.position);
            var distToEnemy :float = Vector3.Distance(enemyPos, transform.position);

            if (distToEnemy < distToNear)
                nearestEnemy = enemy;
        }

        transform.forward = nearestEnemy.transform.position - transform.position;
    }
}
```

```
using UnityEngine;

public class Life : MonoBehaviour
{
    public int amount;

    public void Damage(int damageAmount)
    {
        amount -= damageAmount;
        if(amount <= 0)
            Destroy(gameObject);
    }
}
```

```
using UnityEngine;

public class Damager : MonoBehaviour
{
    public int amount;

    void OnTriggerEnter(Collider other)
    {
        other.GetComponent<Life>()?.Damage(amount);
        Destroy(gameObject);
    }
}
```

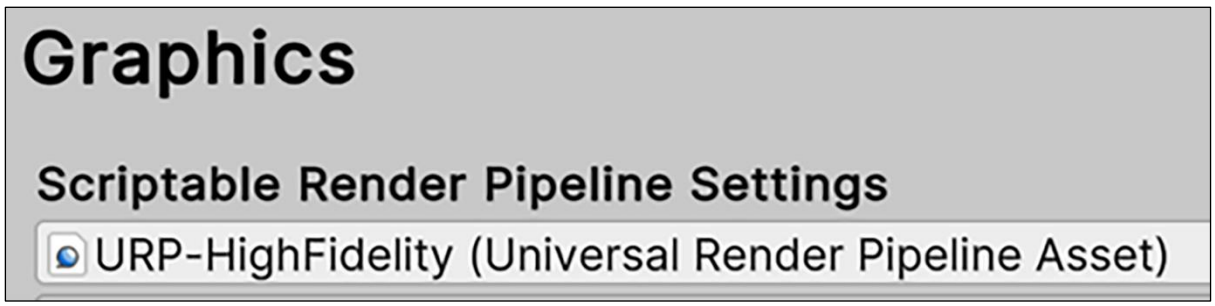
```
using UnityEngine;

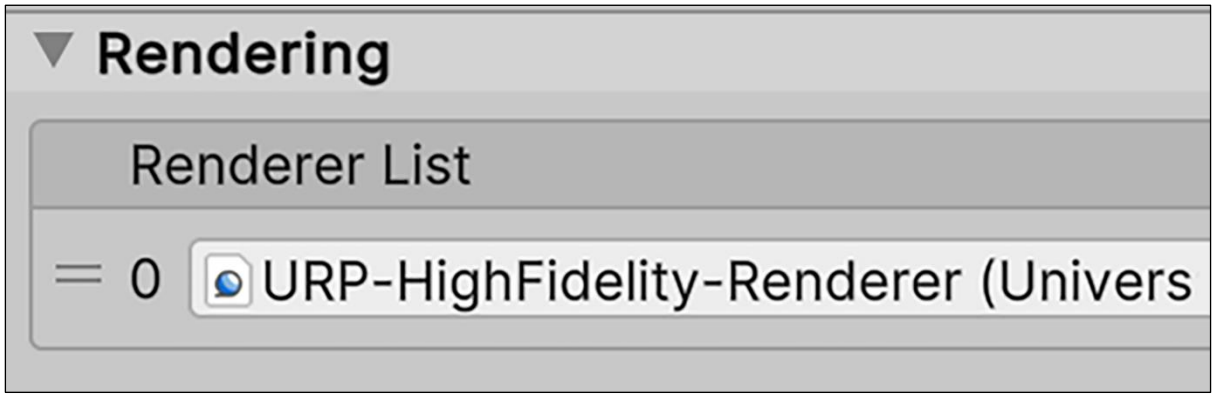
public class AutoDestroy : MonoBehaviour
{
    public float time;

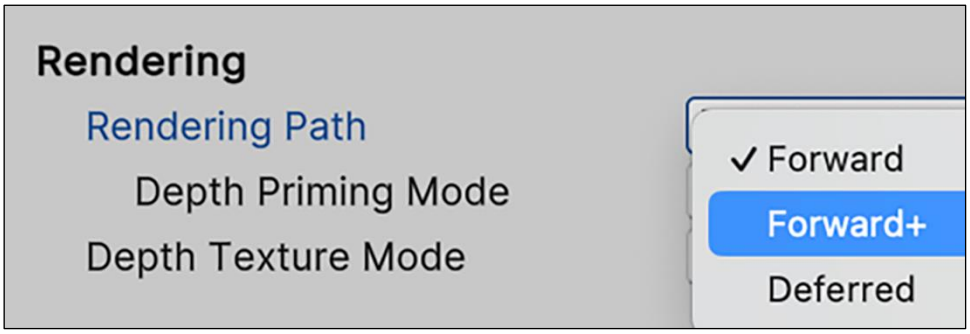
    void Awake()
    {
        Destroy(gameObject, time);
    }
}
```

Chapter 21: Massive Worlds: Introduction to DOTS

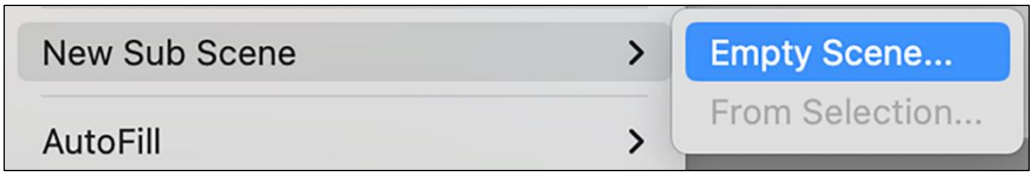


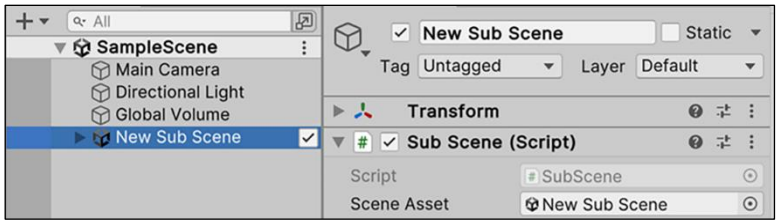


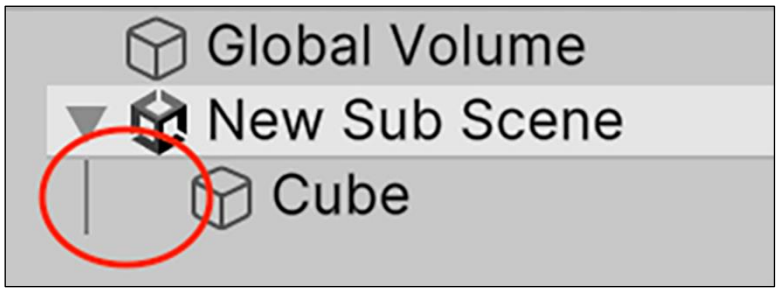


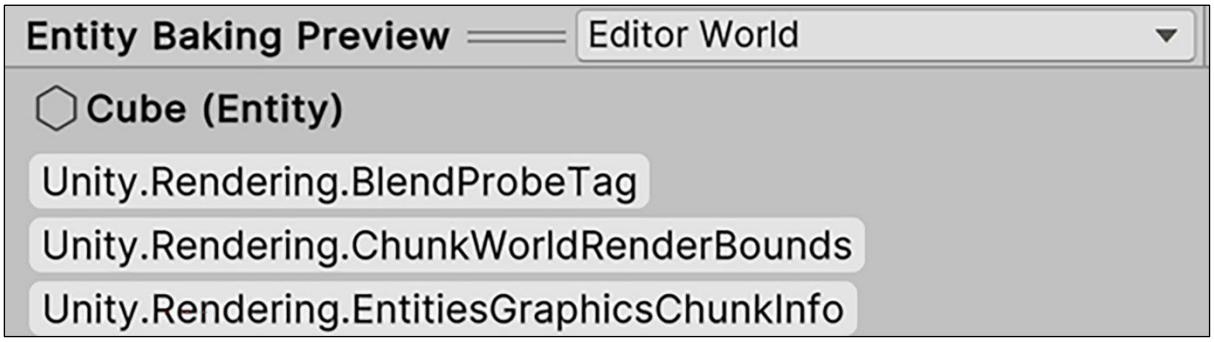



```
Entities.Graphics should be used with URP Forward+. Change Rendering Path on URP-
HighFidelity-Renderer for best compatibility.
UnityEngine.Debug:LogWarning (object)
```










```
using Unity.Entities;

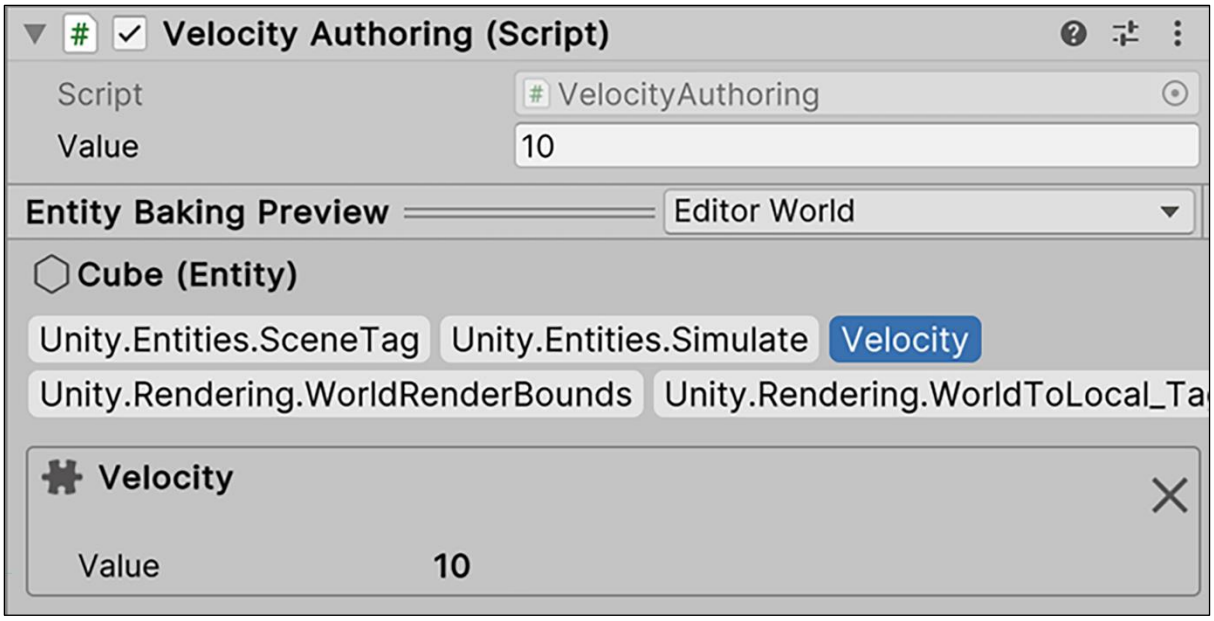

public struct Velocity : IComponentData
{
    public float Value;
}
```

```
using UnityEngine;

public class VelocityAuthoring : MonoBehaviour
{
    public float value;
}
```

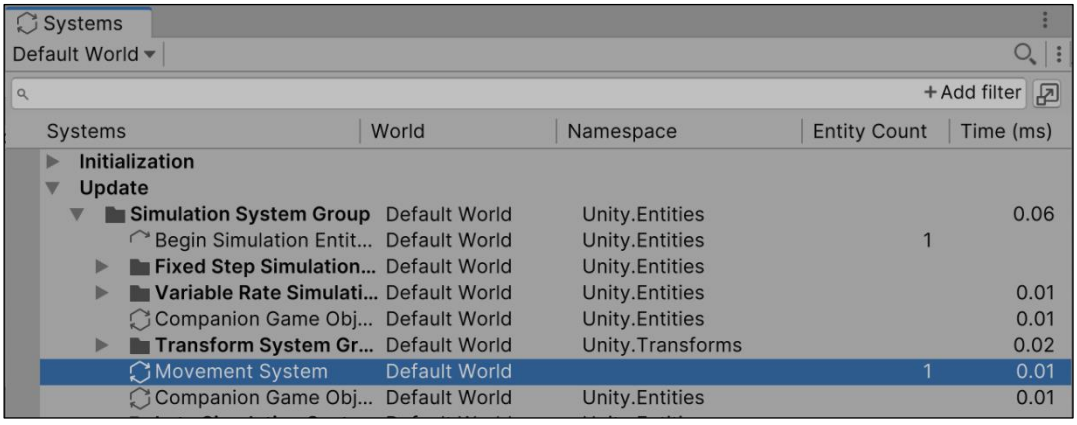
```
using Unity.Entities;

public class VelocityBaker : Baker<VelocityAuthoring>
{
    public override void Bake(VelocityAuthoring authoringComponent)
    {
        Entity entity = GetEntity(TransformUsageFlags.Dynamic);
        var runtimeComponent = new Velocity();
        runtimeComponent.Value = authoringComponent.value;
        AddComponent(entity, runtimeComponent);
    }
}
```




```
using Unity.Entities;

public partial struct MovementSystem : ISystem
{
    public void OnUpdate(ref SystemState state)
    {
    }
}
```



```
using Unity.Entities;
using Unity.Transforms;

public partial struct MoveJob : IJobEntity
{
    public float DeltaTime;

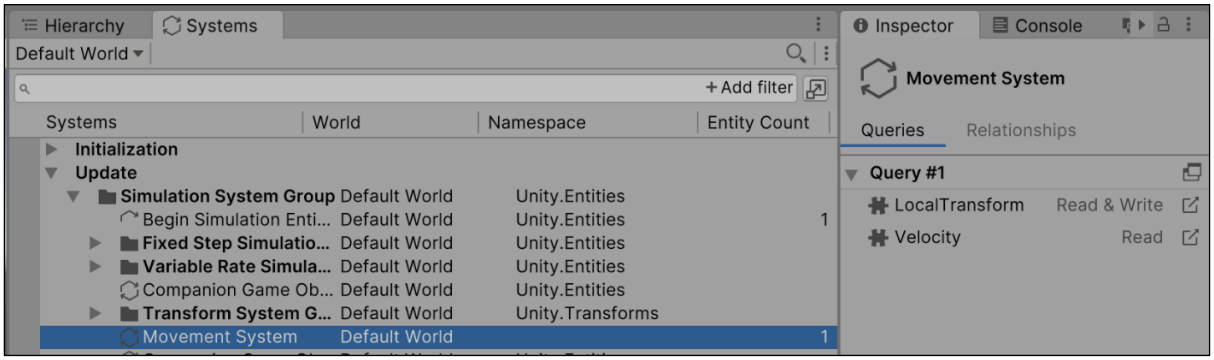
    void Execute(ref LocalTransform transform, in Velocity velocity)
    {
        transform.Position.z += velocity.Value * DeltaTime;
    }
}
```

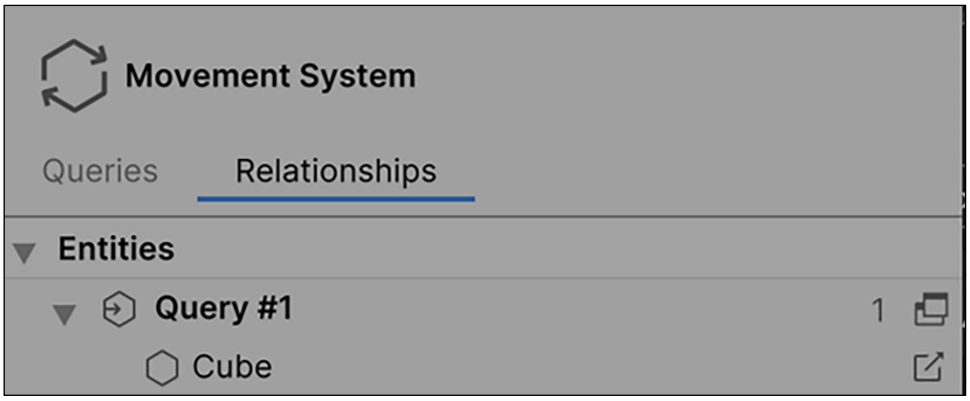
```
using Unity.Entities;

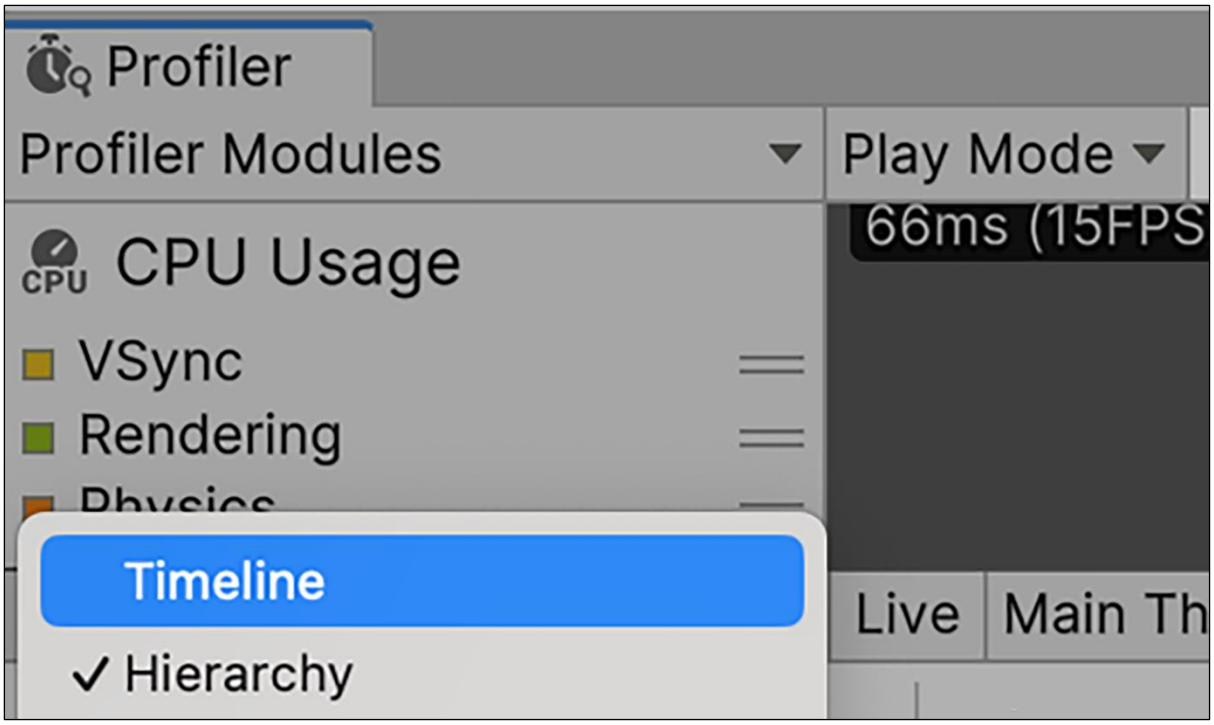
public partial struct MovementSystem : ISystem
{
    public void OnUpdate(ref SystemState state)
    {
        var job = new MoveJob();
        job.DeltaTime = SystemAPI.Time.DeltaTime;
        job.ScheduleParallel();
    }
}
```

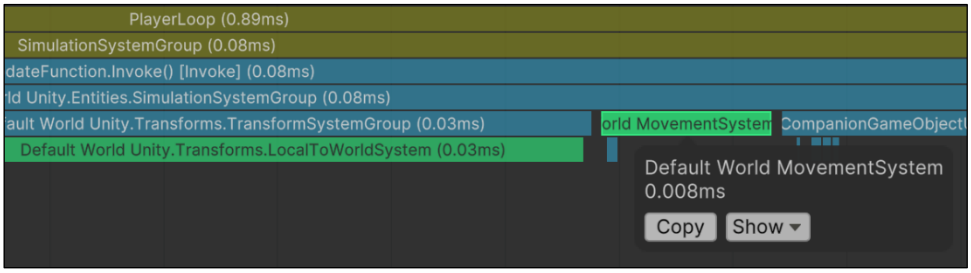
```
public partial struct MovementSystem : ISystem
{
    [BurstCompile]
    public void OnUpdate(ref SystemState state)
    {
        //...
    }
}

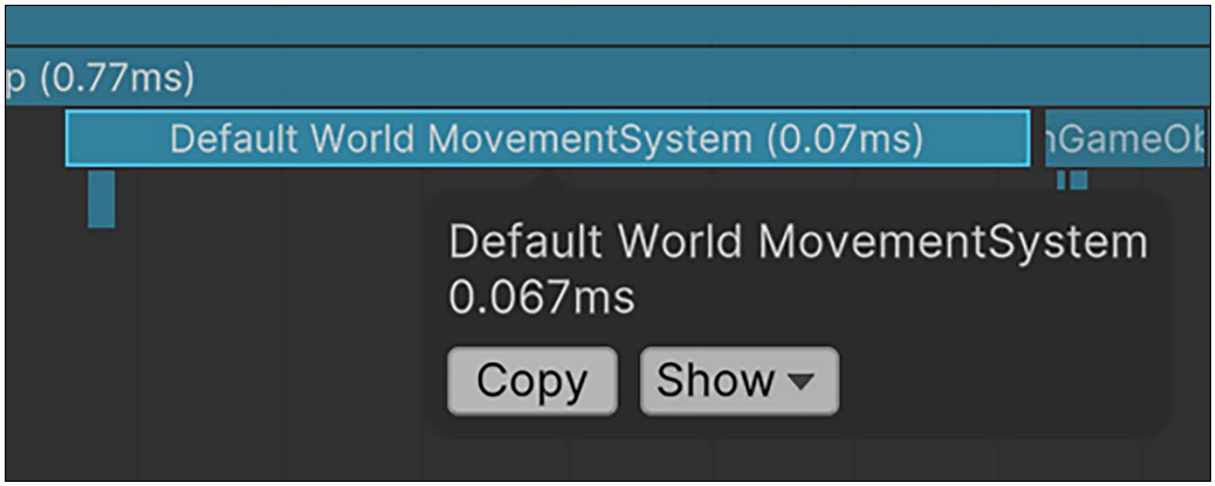
[BurstCompile]
public partial struct MoveJob : IJobEntity
{
    //...
}
```

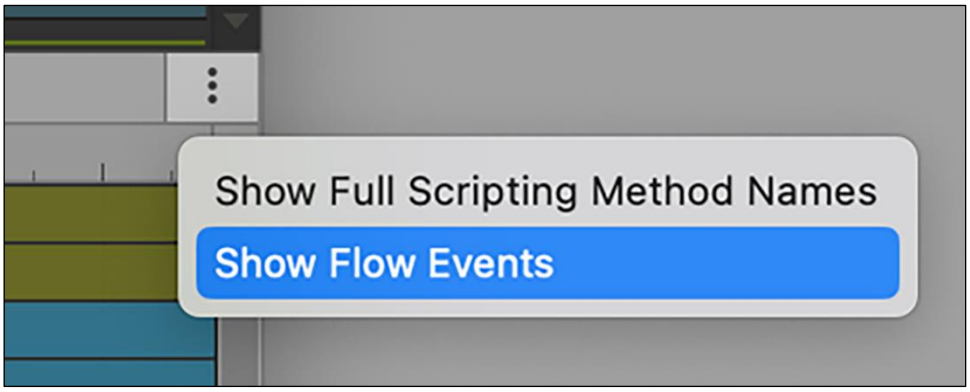


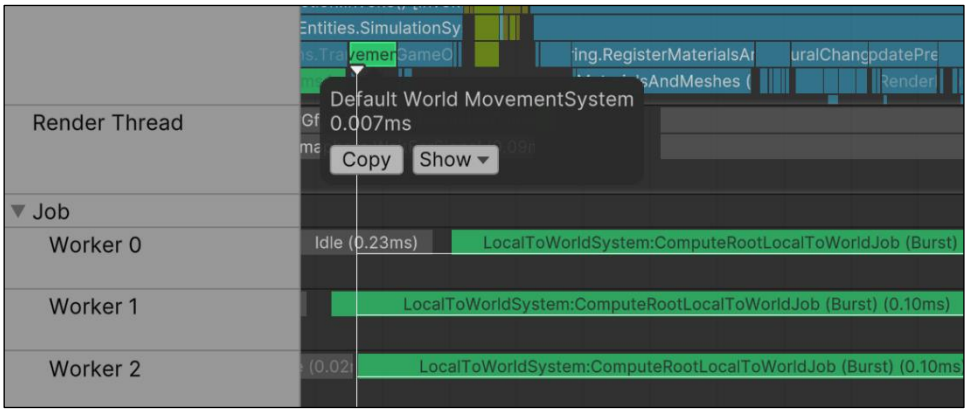

Movement System
Queries
Relationships
Entities
Query #1
1
Cube


Profiler
Profiler Modules
Play Mode
66ms (15FPS
CPU Usage
VSync
Rendering
Timeline
Hierarchy
Live
Main Th


PlayerLoop (0.89ms)
SimulationSystemGroup (0.08ms)
dateFunction.Invoke() [Invoke] (0.08ms)
ld Unity.Entities.SimulationSystemGroup (0.08ms)
ault World Unity.Transforms.TransformSystemGroup (0.03ms)
orld MovementSystem
CompanionGameObject
Default World Unity.Transforms.LocalToWorldSystem (0.03ms)
Default World MovementSystem
0.008ms
Copy
Show


p (0.77ms)
Default World MovementSystem (0.07ms)
Default World MovementSystem
0.067ms
Copy
Show


Show Full Scripting Method Names
Show Flow Events


Render Thread
Default World MovementSystem
0.007ms
Copy
Show
Job
Worker 0
Idle (0.23ms)
LocalToWorldSystem:ComputeRootLocalToWorldJob (Burst)
Worker 1
LocalToWorldSystem:ComputeRootLocalToWorldJob (Burst) (0.10ms)
Worker 2
LocalToWorldSystem:ComputeRootLocalToWorldJob (Burst) (0.10ms)

```
public float DeltaTime;
public float Horizontal;
public float Vertical;

void Execute(ref LocalTransform transform, in Velocity velocity)
{
    transform.Position += transform.Right() * velocity.Value * Horizontal * DeltaTime;
    transform.Position += transform.Forward() * velocity.Value * Vertical * DeltaTime;
}
```

```
[BurstCompile]
public void OnUpdate(ref SystemState state)
{
    var job = new MoveJob();
    job.DeltaTime = SystemAPI.Time.DeltaTime;
    job.Horizontal = Input.GetAxis("Horizontal");
    job.Vertical = Input.GetAxis("Vertical");
    job.ScheduleParallel();
}
```

```
public struct Player : IComponentData { }

public class PlayerAuthoring : MonoBehaviour { }

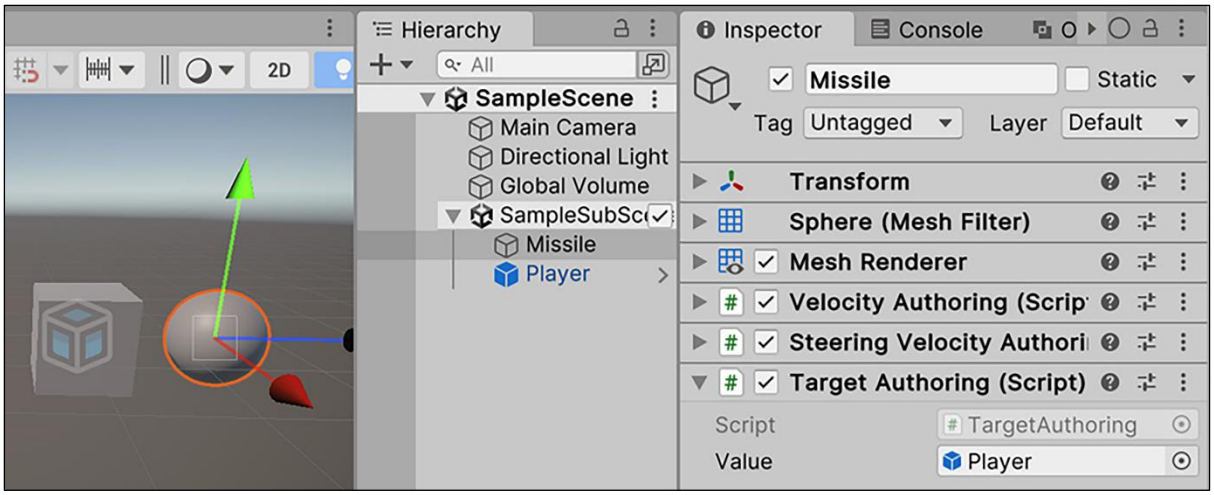
public class PlayerBaker : Baker<PlayerAuthoring>
{
    public override void Bake(PlayerAuthoring authoring)
    {
        var entity = GetEntity(TransformUsageFlags.Dynamic);
        AddComponent<Player>(entity);
    }
}
```

```
[BurstCompile, WithAll(typeof(Player))]
public partial struct MoveJob : IJobEntity
{
    public float DeltaTime;
    public float Horizontal;
    public float Vertical;
```

```
public struct Target : IComponentData
{
    public Entity Value;
}

public class TargetAuthoring : MonoBehaviour
{
    public GameObject Value;
}

public class TargetBaker : Baker<TargetAuthoring>
{
    public override void Bake(TargetAuthoring authoring)
    {
        var entity = GetEntity(TransformUsageFlags.Dynamic);
        var targetEntity = GetEntity(authoring.Value, TransformUsageFlags.Dynamic);
        AddComponent(entity, new Target {Value = targetEntity});
    }
}
```




```
using Unity.Burst;
using Unity.Collections;
using Unity.Entities;
using Unity.Mathematics;
using Unity.Transforms;

[BurstCompile]
public partial struct SteeringJob : IJobEntity
{
    [ReadOnly] public ComponentLookup<LocalToWorld> TransformLookup;
    public float DeltaTime;

    void Execute(ref LocalTransform transform, in Velocity velocity,
        in SteeringVelocity steeringVelocity, in Target target)
    {
        if(target.Value == Entity.Null)
            return;

        var targetTransform = TransformLookup[target.Value];
        var direction = targetTransform.Position - transform.Position;
        var rotation = quaternion.LookRotation(direction, transform.Up());

        transform.Rotation = math.nlerp(transform.Rotation, rotation,
            steeringVelocity.Value * DeltaTime);

        transform.Position += transform.Forward() * velocity.Value * DeltaTime;
    }
}
```

```
using Unity.Burst;
using Unity.Entities;
using Unity.Transforms;

public partial struct SteeringSystem : ISystem
{
    [BurstCompile]
    public void OnUpdate(ref SystemState state)
    {
        var job = new SteeringJob();
        job.DeltaTime = SystemAPI.Time.DeltaTime;
        job.TransformLookup = SystemAPI.GetComponentLookup<LocalToWorld>(true);
        job.ScheduleParallel();
    }
}
```

```
[BurstCompile]
public partial struct DestroyCloseTargetJob : IJobEntity
{
    private const float DestroyDistanceSqr = 0.7f * 0.7f;

    [ReadOnly] public ComponentLookup<LocalToWorld> TransformLookup;

    void Execute(ref LocalTransform transform, in Target target)
    {
        if (target.Value == Entity.Null)
            return;

        var targetTransform = TransformLookup[target.Value];
        var distSqr = math.lengthsq(targetTransform.Position - transform.Position);
        if (distSqr < DestroyDistanceSqr)
        {
            //TODO: Boom!
        }
    }
}
```

```
public EntityCommandBuffer.ParallelWriter ECB;

void Execute(ref LocalTransform transform, in Target target)
{
    //...
    if (distSqr < DestroyDistanceSqr)
    {
        ECB.DestroyEntity(0, target.Value);
    }
}
```

```
public partial struct DestroyCloseTargetSystem : ISystem
{
    [BurstCompile]
    public void OnUpdate(ref SystemState state)
    {
        var ecbSystem = SystemAPI.GetSingleton<EndSimulationEntityCommandBufferSystem.Singleton>();
        var ecb = ecbSystem.CreateCommandBuffer(state.WorldUnmanaged).AsParallelWriter();

        var job = new DestroyCloseTargetJob();
        job.TransformLookup = SystemAPI.GetComponentLookup<LocalToWorld>(true);
        job.ECB = ecb;
        job.ScheduleParallel();
    }
}
```

```
[20:37:49] System.ArgumentException: The entity does not exist.System.String Unity.Entities.EntityComponentS
This Exception was thrown from a job compiled with Burst, which has limited exception support.
System.ArgumentException: The entity does not exist.System.String
Unity.Entities.EntityComponentStore::AppendDestroyedEntityRecordError(Unity.Entities.Entity)
This Exception was thrown from a job compiled with Burst, which has limited exception support.
 #3 Unity.Entities.EntityComponentStore, Unity.Entities, Version=0.0.0.0, Culture=neutral,
PublicKeyToken=null.AssertEntityHasComponent(Unity.Entities.EntityComponentStore*, Unity.Entities,
Version=0.0.0.0, Culture=neutral, PublicKeyToken=null this, Unity.Entities.Entity, Unity.Entities, Version=0.0.0.0,
Culture=neutral, PublicKeyToken=null entity, Unity.Entities.TypeIndex, Unity.Entities, Version=0.0.0.0, Culture=neutral,
PublicKeyToken=null componentTypeIndex, Unity.Entities.LookupCache&, Unity.Entities, Version=0.0.0.0,
Culture=neutral, PublicKeyToken=null typeLookupCache) -> System.Void, mscorlib, Version=4.0.0.0, Culture=neutral,
```

```
 #4 Unity.Entities.ComponentLookup`1[[Unity.Transforms.LocalToWorld, Unity.Transforms,
PublicKeyToken=null.get_Item(Unity.Entities.ComponentLookup`1[[Unity.Transforms.LocalT
Unity.Entities, Version=0.0.0.0, Culture=neutral, PublicKeyToken=null entity) -> Unity.Transf
Culture=neutral, PublicKeyToken=null
 #5 DestroyCloseTargetJob, Assembly-CSharp, Version=0.0.0.0, Culture=neutral, PublicKey
```

```
if (target.Value == Entity.Null ||
    !TransformLookup.TryGetComponent(target.Value, out var targetTransform))
    return;

var direction = targetTransform.Position - transform.Position;
var rotation = quaternion.LookRotation(direction, transform.Up());
///...
```

```
if (target.Value == Entity.Null ||
    !TransformLookup.TryGetComponent(target.Value, out var targetTransform))
    return;

var distSqr = math.lengthsq(targetTransform.Position - transform.Position);
///...
```

```
public struct Spawner : IComponentData
{
    public Entity Prefab;
    public Entity Target;
    public int Amount;
    public float Frequency;
    public float LastSpawnTime;
}

public class SpawnerAuthoring : MonoBehaviour
{
    public GameObject prefab;
    public GameObject target;
    public float frequency;
    public int amount;
}

public class SpawnerBaker : Baker<SpawnerAuthoring>
{
    public override void Bake(SpawnerAuthoring authoring)
    {
        var entity = GetEntity(TransformUsageFlags.Dynamic);
        AddComponent(entity, new Spawner {
            Prefab = GetEntity(authoring.prefab, TransformUsageFlags.Dynamic),
            Target = GetEntity(authoring.target, TransformUsageFlags.Dynamic),
            Amount = authoring.amount,
            Frequency = authoring.frequency,
        });
    }
}
```

```
public EntityCommandBuffer.ParallelWriter ECB;
public float Time;

void Execute(ref Spawner spawner)
{
    var timeSinceLastSpawn = Time - spawner.LastSpawnTime;
    if (timeSinceLastSpawn < spawner.Frequency)
        return;

    spawner.LastSpawnTime = Time;
    var instances = new NativeArray<Entity>(spawner.Amount, Allocator.Temp);
    ECB.Instantiate(0, spawner.Prefab, instances);

    for (var i = 0; i < spawner.Amount; i++)
    {
        var instance = instances[i];
        var transform = LocalTransform.FromPosition(i * 5, 0, 10);
        ECB.SetComponent(0, instance, transform);
        ECB.SetComponent(0, instance, new Target {Value = spawner.Target});
    }
}
```

```
public partial struct SpawnerSystem : ISystem
{
    [BurstCompile]
    public void OnCreate(ref SystemState state)
    {
        state.RequireForUpdate<Player>();
    }

    [BurstCompile]
    public void OnUpdate(ref SystemState state)
    {
        var ecbSystem = SystemAPI.GetSingleton<EndSimulationEntityCommandBufferSystem.Singleton>();
        var ecb = ecbSystem.CreateCommandBuffer(state.WorldUnmanaged).AsParallelWriter();

        var job = new SpawnerJob();
        job.Time = (float) SystemAPI.Time.ElapsedTime;
        job.ECB = ecb;
        job.ScheduleParallel();
    }
}
```

```
public void OnUpdate(ref SystemState state)
{
    if (SystemAPI.TryGetSingletonEntity<Player>(out var playerEntity))
    {
        var playerTransform = SystemAPI.GetComponent<LocalToWorld>(playerEntity);
        Camera.main.transform.position = playerTransform.Position + new float3(0, 10, 0);
    }
}
```