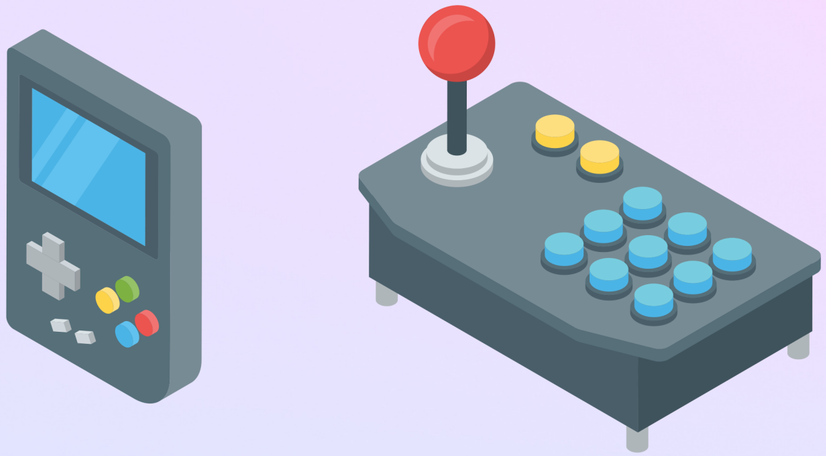


WOLVEDEN ACADEMY

NETWORKING AND MULTIPLAYER ONLINE GAMES

MULTIPLAYER NEW ERA

BY PONGSATHORN KIATTICHAROENPORN (MEW)

WEEK 12 : GAMEPLAY ADDITIONS 4

Gameplay Additions 4

Topic in this week

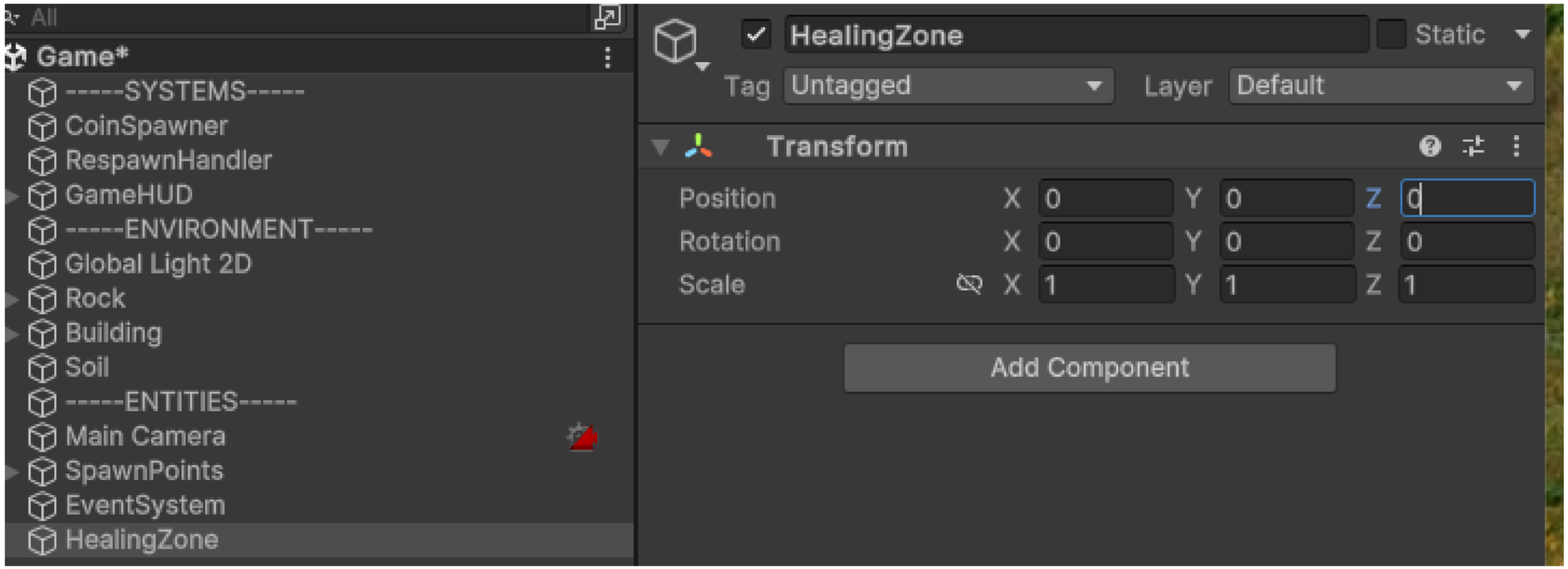
Workshop

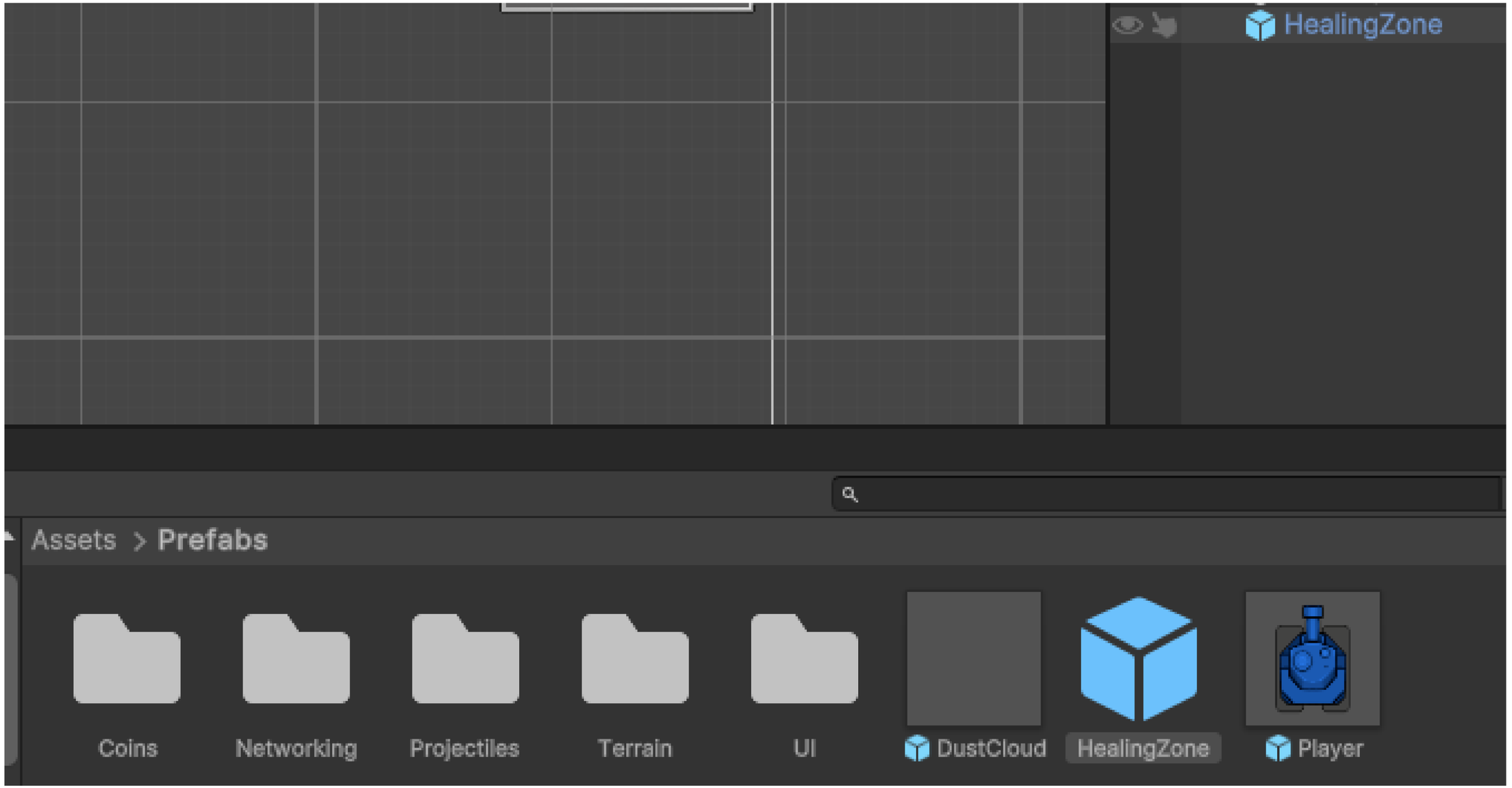
- Healing Zone Setup
- Restoring Health
- Mini Map
- Gameplay Polish
- Section Cleanup

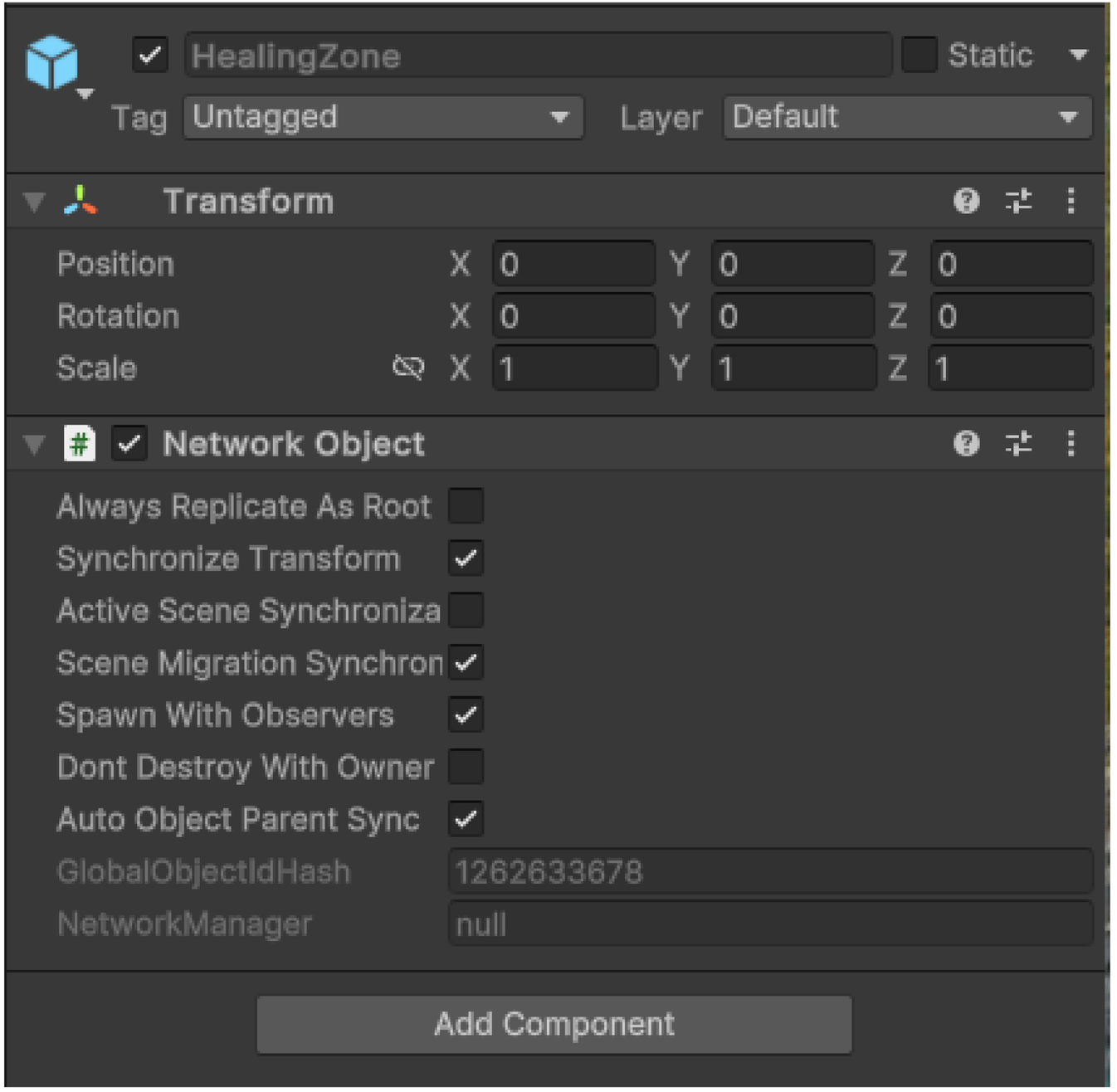
Healing Zone Setup

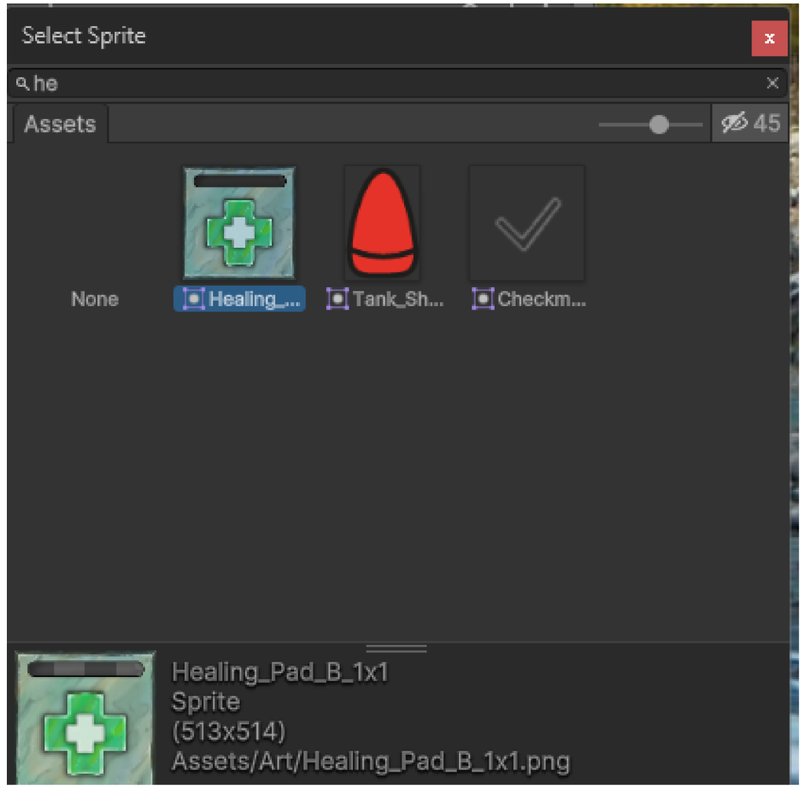

Create Empty

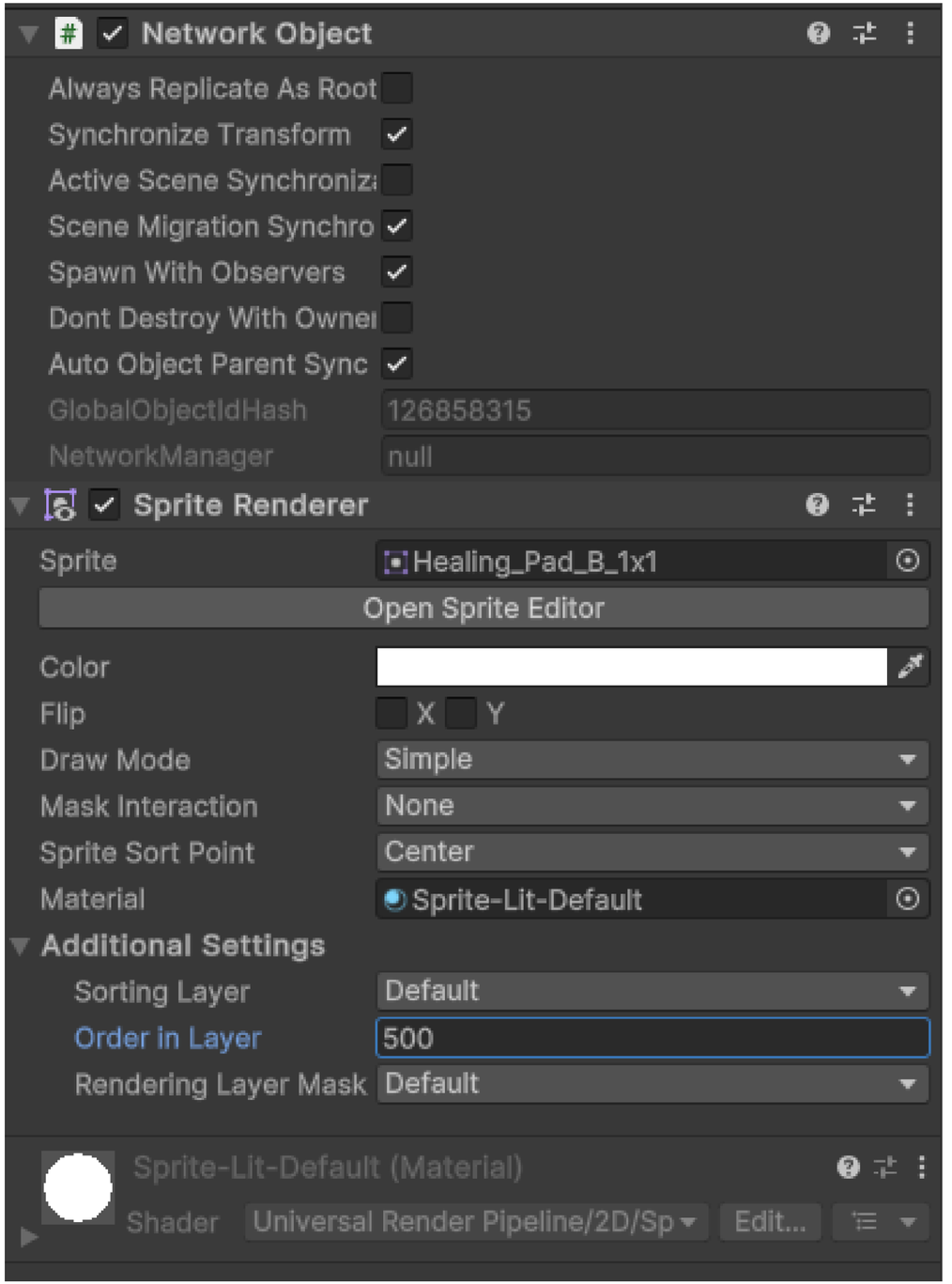

GameObject

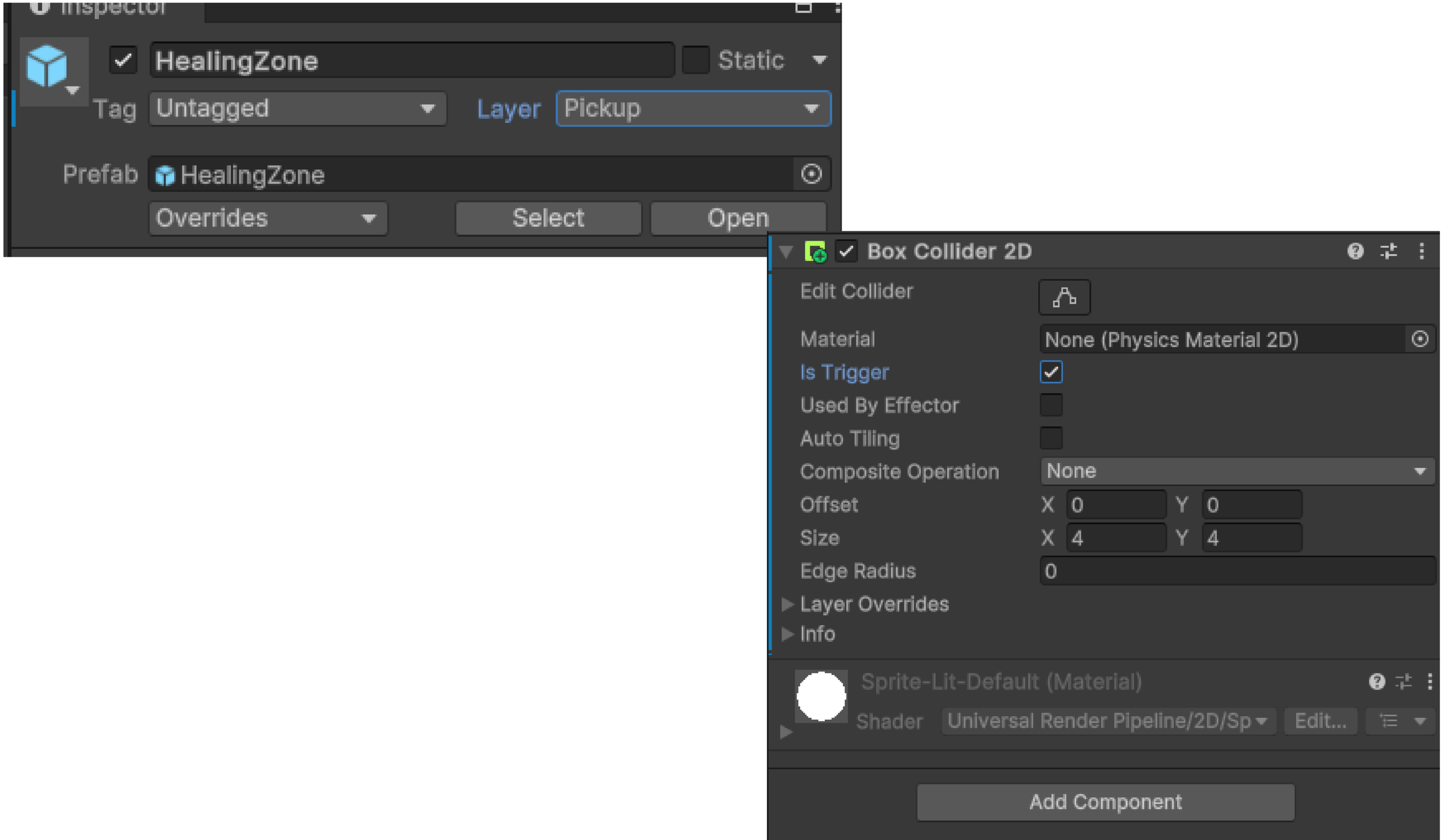

All
Game*
-----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Soil
-----ENTITIES-----
Main Camera
SpawnPoints
EventSystem
HealingZone
HealingZone
Static
Tag
Untagged
Layer
Default
Transform
Position
Rotation
Scale
X 0
Y 0
Z 0
X 0
Y 0
Z 0
X 1
Y 1
Z 1
Add Component

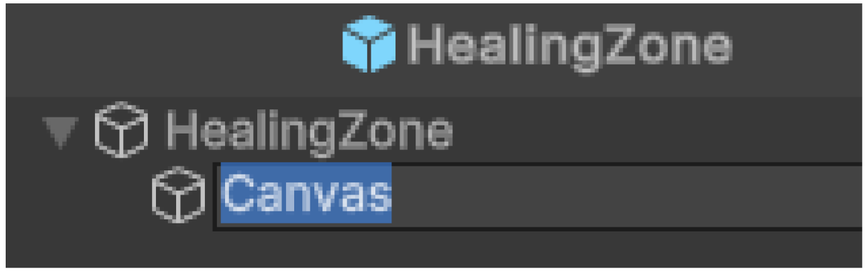

HealingZone
Assets > Prefabs
Coins
Networking
Projectiles
Terrain
UI
DustCloud
HealingZone
Player


HealingZone
Static
Tag
Untagged
Layer
Default
Transform
Position
X 0
Y 0
Z 0
Rotation
X 0
Y 0
Z 0
Scale
X 1
Y 1
Z 1
Network Object
Always Replicate As Root
Synchronize Transform
Active Scene Synchroniza
Scene Migration Synchron
Spawn With Observers
Dont Destroy With Owner
Auto Object Parent Sync
GlobalObjectIdHash
1262633678
NetworkManager
null
Add Component


Select Sprite
he
Assets
45
None
Healing_...
Tank_Sh...
Checkm...
Healing_Pad_B_1x1
Sprite
(513x514)
Assets/Art/Healing_Pad_B_1x1.png


Network Object
Always Replicate As Root
Synchronize Transform
Active Scene Synchroniz
Scene Migration Synchro
Spawn With Observers
Dont Destroy With Owner
Auto Object Parent Sync
GlobalObjectIdHash
126858315
NetworkManager
null
Sprite Renderer
Sprite
Healing_Pad_B_1x1
Open Sprite Editor
Color
Flip
X
Y
Draw Mode
Simple
Mask Interaction
None
Sprite Sort Point
Center
Material
Sprite-Lit-Default
Additional Settings
Sorting Layer
Default
Order in Layer
500
Rendering Layer Mask
Default
Sprite-Lit-Default (Material)
Shader
Universal Render Pipeline/2D/Sp
Edit...


Inspector
HealingZone
Static
Tag
Untagged
Layer
Pickup
Prefab
HealingZone
Overrides
Select
Open
Box Collider 2D
Edit Collider
Material
None (Physics Material 2D)
Is Trigger
Used By Effector
Auto Tiling
Composite Operation
None
Offset
X 0
Y 0
Size
X 4
Y 4
Edge Radius
0
Layer Overrides
Info
Sprite-Lit-Default (Material)
Shader
Universal Render Pipeline/2D/Sp
Edit...
Add Component



Canvas
Static
Tag Untagged
Layer Pickup

Rect Transform

	Pos X	Pos Y	Pos Z
	0	1.475	0
	Width	Height	
	3.3	0.5	

Anchors
Min X 0 Y 0
Max X 0 Y 0
Pivot X 0.5 Y 0.5

Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Canvas

Render Mode World Space
Event Camera None (Camera)

A World Space Canvas with no specified Event Camera may not register UI events correctly.

Sorting Layer Default
Order in Layer 0
Additional Shader Chann Nothing
Vertex Color Always In G

Add Component


HealingZone
HealingZone
Canvas
Image

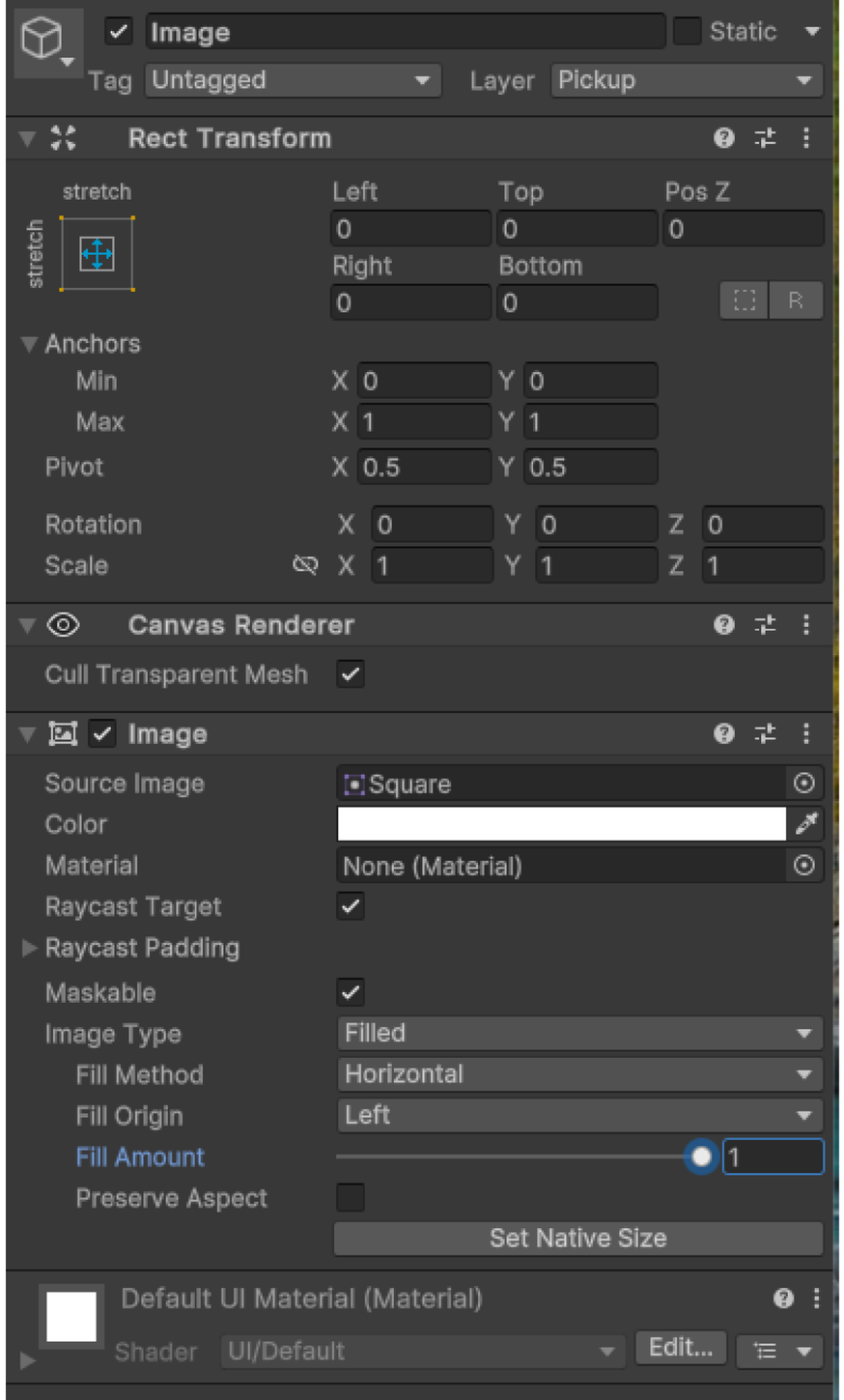
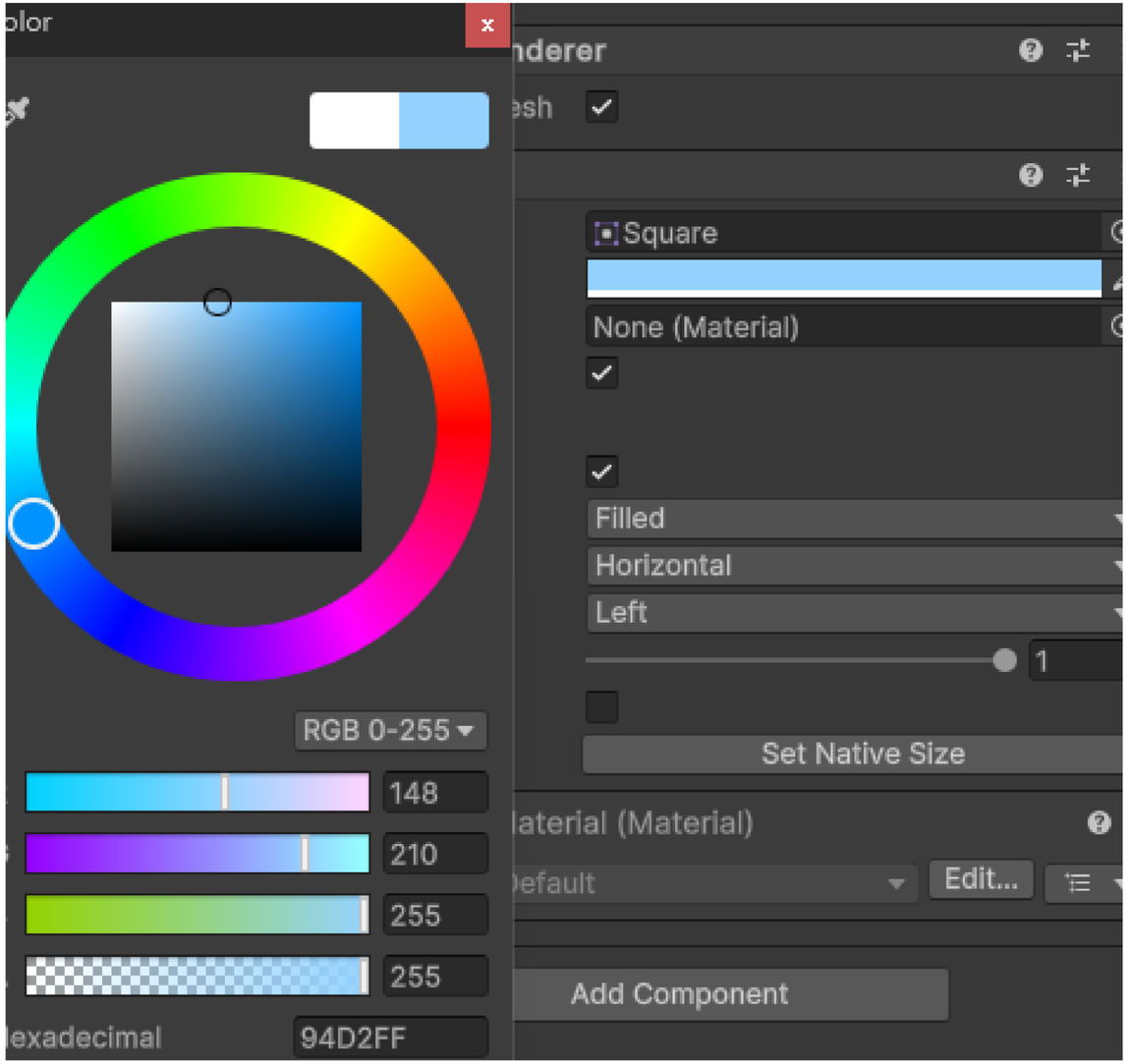
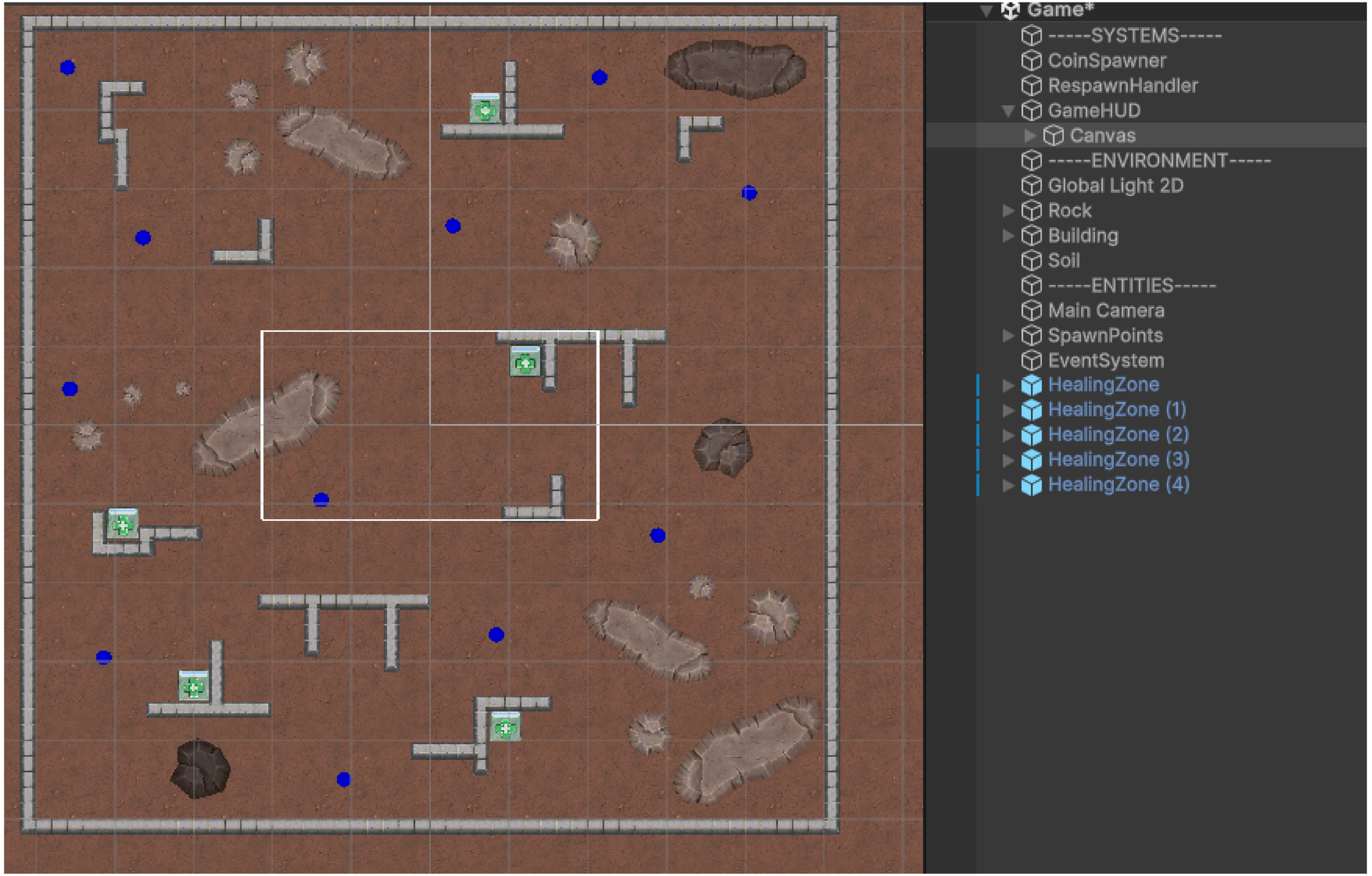


Image
Static
Tag
Untagged
Layer
Pickup
Rect Transform
stretch
stretch
Left
Top
Pos Z
0
0
0
Right
Bottom
0
0
R
Anchors
Min
X 0
Y 0
Max
X 1
Y 1
Pivot
X 0.5
Y 0.5
Rotation
X 0
Y 0
Z 0
Scale
X 1
Y 1
Z 1
Canvas Renderer
Cull Transparent Mesh
Image
Source Image
Square
Color
Material
None (Material)
Raycast Target
Raycast Padding
Maskable
Image Type
Filled
Fill Method
Horizontal
Fill Origin
Left
Fill Amount
1
Preserve Aspect
Set Native Size
Default UI Material (Material)
Shader
UI/Default
Edit...


olor
RGB 0-255
148
210
255
255
exadecimal
94D2FF
nderer
esh
Square
None (Material)
Filled
Horizontal
Left
1
Set Native Size
laterial (Material)
Default
Edit...
Add Component

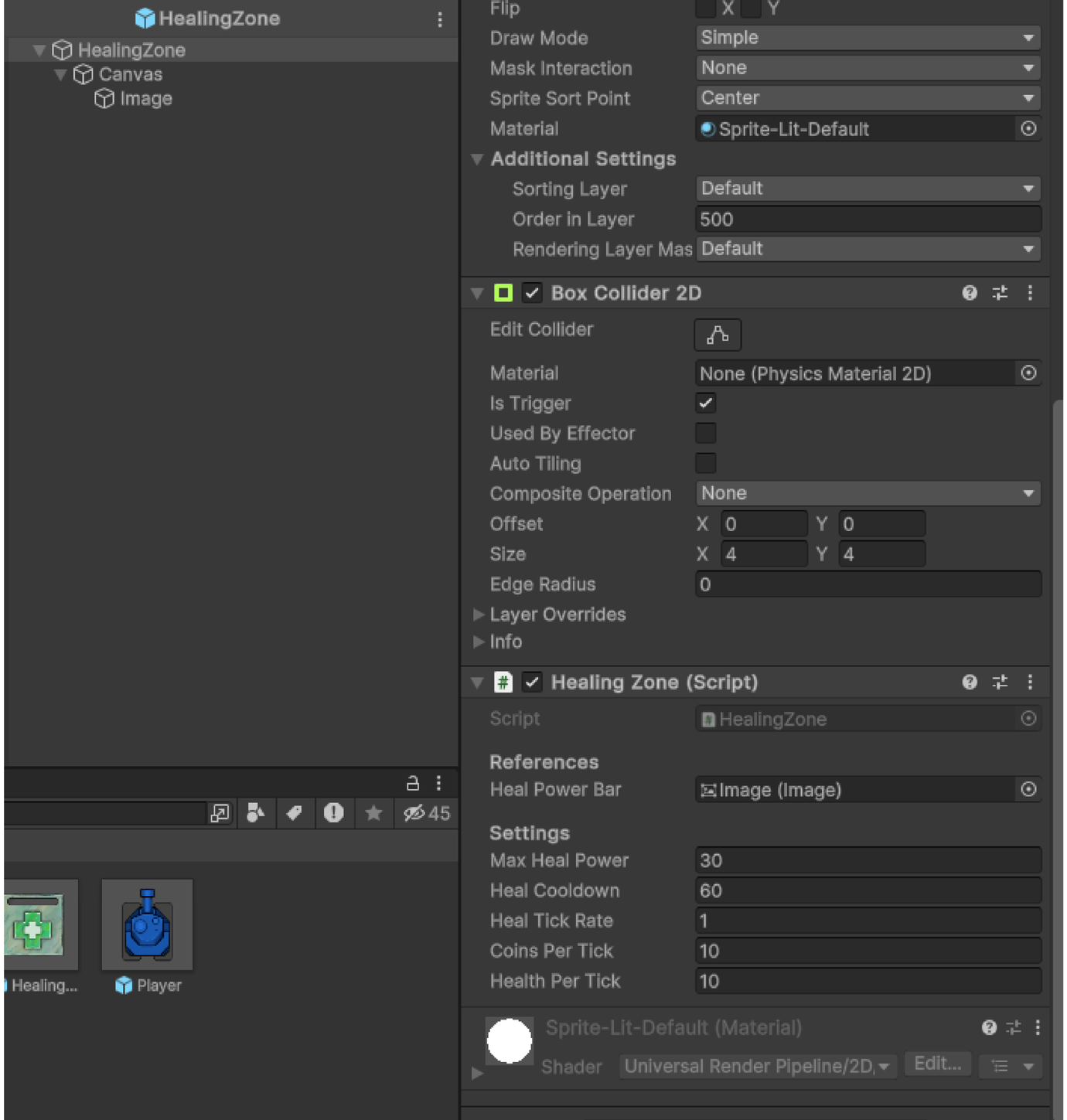

Game*
-----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
Canvas
-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Soil
-----ENTITIES-----
Main Camera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
HealingZone (3)
HealingZone (4)


```
1   using System.Collections;
2   using System.Collections.Generic;
3   using Unity.Netcode;
4   using UnityEngine;
5   using UnityEngine.UI;
6
        Unity Script | 0 references
7   public class HealingZone : NetworkBehaviour
8   {
9       [Header("References")]
10      [SerializeField] private Image healPowerBar;
11
12      [Header("Settings")]
13      [SerializeField] private int maxHealPower = 30;
14      [SerializeField] private float healCooldown = 60f;
15      [SerializeField] private float healTickRate = 1f;
16      [SerializeField] private int coinsPerTick = 10;
17      [SerializeField] private int healthPerTick = 10;
18  }
```

Players In Zone

- Create a list that will store the **playersInZone**
- Use **OnTriggerEnter2D** and **OnTriggerExit2D** to add/remove them from the list
- Make sure only the server handles these cases
- You will need to get the **TankPlayer** component from the collider that is detected in the zone

```
7  public class HealingZone : NetworkBehaviour
8  {
9      [Header("References")]
10     [SerializeField] private Image healPowerBar;
11
12     [Header("Settings")]
13     [SerializeField] private int maxHealPower = 30;
14     [SerializeField] private float healCooldown = 60f;
15     [SerializeField] private float healTickRate = 1f;
16     [SerializeField] private int coinsPerTick = 10;
17     [SerializeField] private int healthPerTick = 10;
18
19     private List<TankPlayer> playersInZone = new List<TankPlayer>();
20
       Unity Message | 0 references
21     private void OnTriggerEnter2D(Collider2D col)
22     {
23         if (!IsServer) { return; }
24         if(!col.attachedRigidbody.TryGetComponent<TankPlayer>(out TankPlayer player)) { return; }
25
26         playersInZone.Add(player);
27         Debug.Log($"Entered: {player.PlayerName.Value}");
28     }
29
       Unity Message | 0 references
30     private void OnTriggerExit2D(Collider2D col)
31     {
32         if(!IsServer) { return; }
33         if (!col.attachedRigidbody.TryGetComponent<TankPlayer>(out TankPlayer player)) { return; }
34
35         playersInZone.Remove(player);
36         Debug.Log($"Left: {player.PlayerName.Value}");
37     }
38 }
```


HealingZone
HealingZone
Canvas
Image
Flip
X
Y
Draw Mode
Simple
Mask Interaction
None
Sprite Sort Point
Center
Material
Sprite-Lit-Default
Additional Settings
Sorting Layer
Default
Order in Layer
500
Rendering Layer Mas
Default
Box Collider 2D
Edit Collider
Material
None (Physics Material 2D)
Is Trigger
Used By Effector
Auto Tiling
Composite Operation
None
Offset
X 0
Y 0
Size
X 4
Y 4
Edge Radius
0
Layer Overrides
Info
Healing Zone (Script)
Script
HealingZone
References
Heal Power Bar
Image (Image)
Settings
Max Heal Power
30
Heal Cooldown
60
Heal Tick Rate
1
Coins Per Tick
10
Health Per Tick
10
45
Healing...
Player
Sprite-Lit-Default (Material)
Shader
Universal Render Pipeline/2D,
Edit...

Project Console

Clear Collapse Error Pause Editor

[13:03:25] QosJob: took 361ms to process 15 servers
UnityEngine.Debug:Log (object)

[13:03:25] best region is asia-southeast1
UnityEngine.Debug:Log (object)

[13:03:26] QTQCCM
UnityEngine.Debug:Log (object)

[13:03:31] Entered: MewEditor
UnityEngine.Debug:Log (object)

Project Console

Clear Collapse Error Pause Editor

[13:03:25] best region is asia-southeast1
UnityEngine.Debug:Log (object)

[13:03:26] QTQCCM
UnityEngine.Debug:Log (object)

[13:03:31] Entered: MewEditor
UnityEngine.Debug:Log (object)

[13:03:52] Left: MewEditor
UnityEngine.Debug:Log (object)

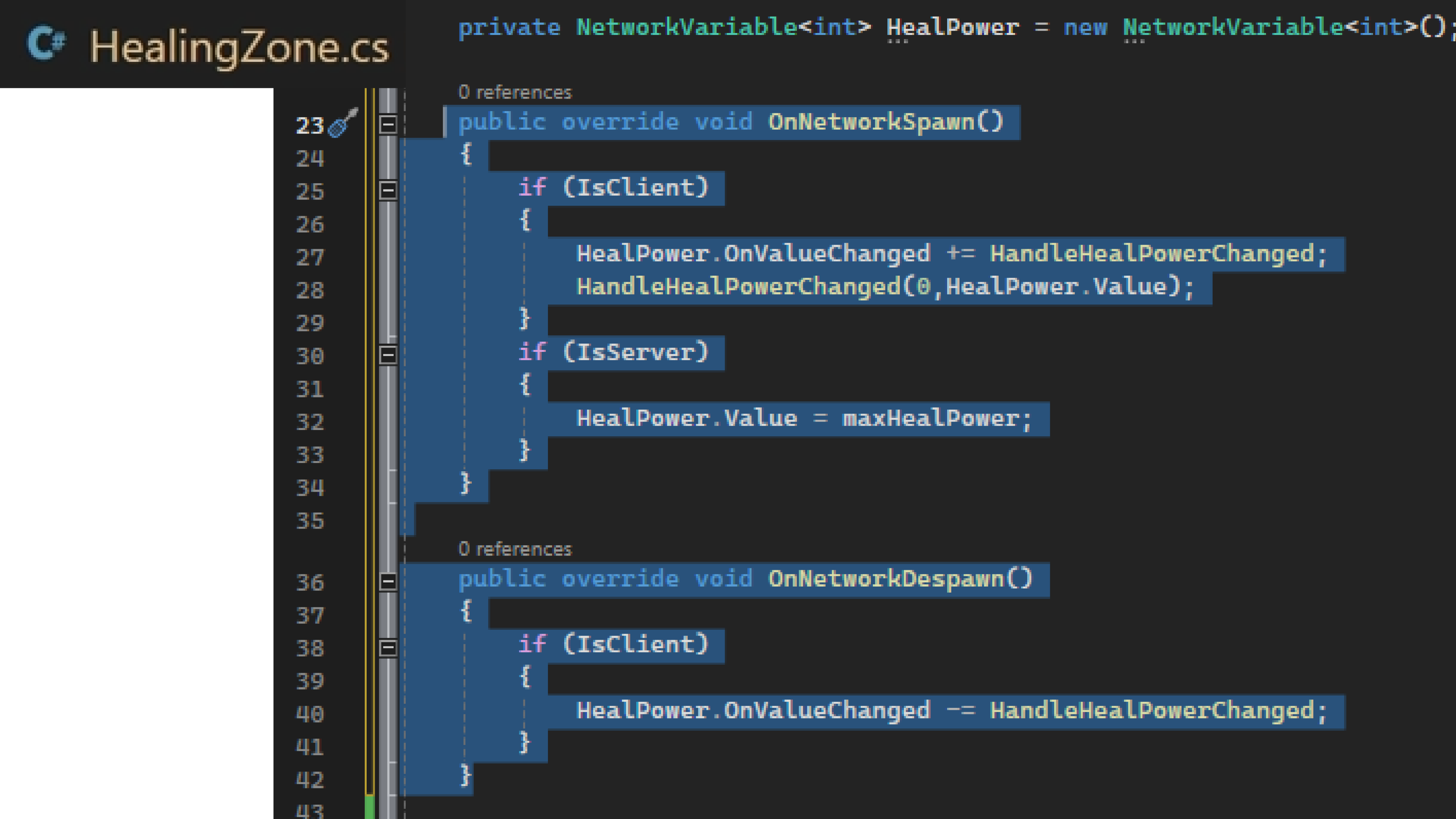
Restoring Health

HealingZone.cs

```
public class HealingZone : NetworkBehaviour
{
    [Header("References")]
    [SerializeField] private Image healPowerBar;

    [Header("Settings")]
    [SerializeField] private int maxHealPower = 30;
    [SerializeField] private float healCooldown = 60f;
    [SerializeField] private float healTickRate = 1f;
    [SerializeField] private int coinsPerTick = 10;
    [SerializeField] private int healthPerTick = 10;

    private List<TankPlayer> playersInZone = new List<TankPlayer>();

    private NetworkVariable<int> HealPower = new NetworkVariable<int>();

    0 references
    public override void OnNetworkSpawn()
    {

    }

    0 references
    public override void OnNetworkDespawn()
    {

    }
```

HealingZone.cs

```
Unity Message | 0 references
private void OnTriggerExit2D(Collider2D col)
{
    if(!IsServer) { return; }
    if (!col.attachedRigidbody.TryGetComponent<TankPlayer>(out TankPlayer player)) { return; }

    playersInZone.Remove(player);
    Debug.Log($"Left: {player.PlayerName.Value}");
}

0 references
private void HandleHealPowerChanged(int oldHealPower,int newHealPower)
{
    healPowerBar.fillAmount = (float)newHealPower / maxHealPower;
}
```


HealingZone.cs
private NetworkVariable<int> HealPower = new NetworkVariable<int>();
0 references
public override void OnNetworkSpawn()
{
if (IsClient)
{
HealPower.OnValueChanged += HandleHealPowerChanged;
HandleHealPowerChanged(0,HealPower.Value);
}
if (IsServer)
{
HealPower.Value = maxHealPower;
}
}
0 references
public override void OnNetworkDespawn()
{
if (IsClient)
{
HealPower.OnValueChanged -= HandleHealPowerChanged;
}
}

HealingZone.cs

```
Unity Script (1 asset reference) | 0 references
public class HealingZone : NetworkBehaviour
{
    [Header("References")]
    [SerializeField] private Image healPowerBar;

    [Header("Settings")]
    [SerializeField] private int maxHealPower = 30;
    [SerializeField] private float healCooldown = 60f;
    [SerializeField] private float healTickRate = 1f;
    [SerializeField] private int coinsPerTick = 10;
    [SerializeField] private int healthPerTick = 10;

    private float remainingCooldown;
    private float tickTimer;

    private List<TankPlayer> playersInZone = new List<TankPlayer>();

    private NetworkVariable<int> HealPower = new NetworkVariable<int>();
```

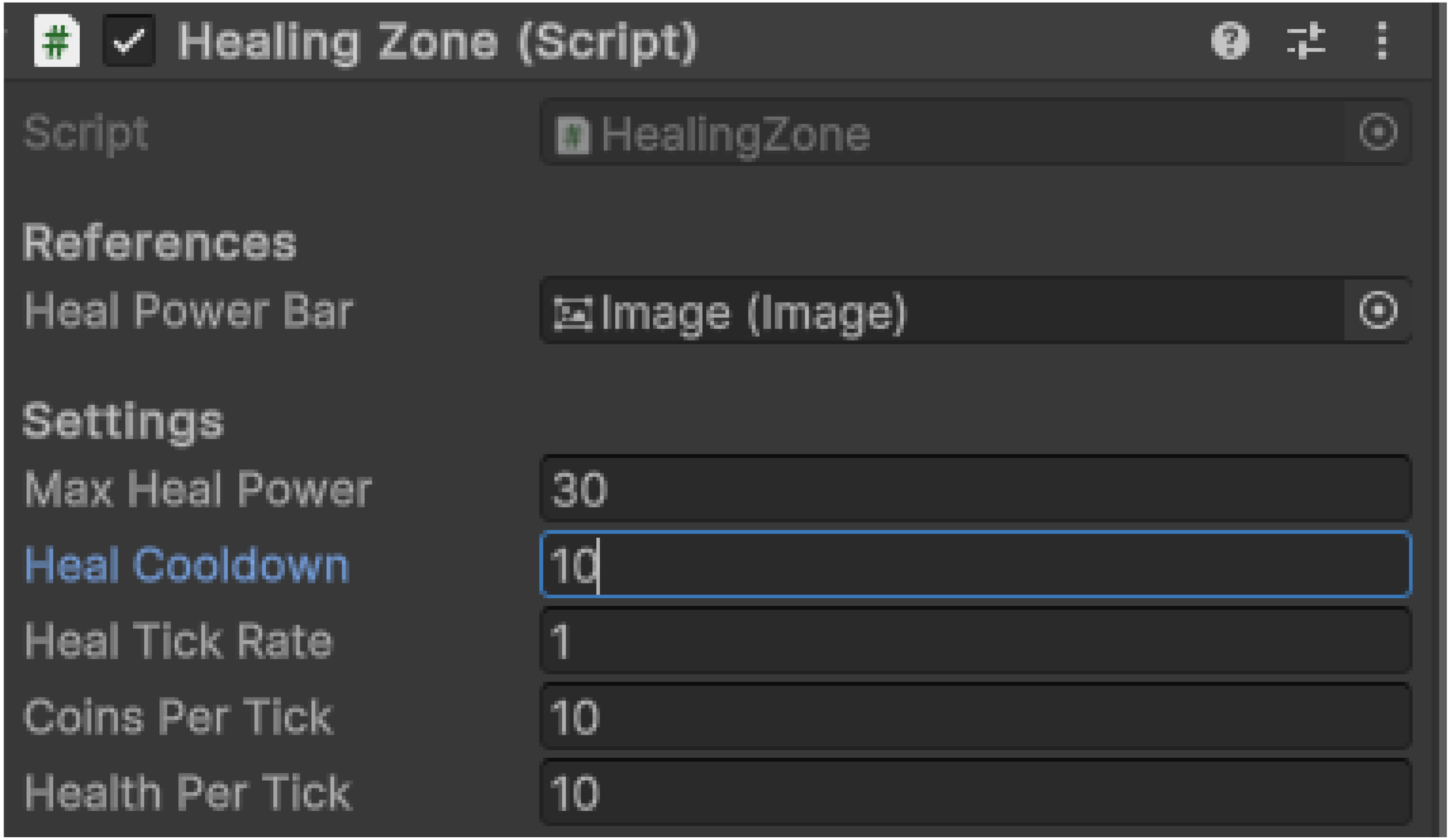
HealingZone.cs

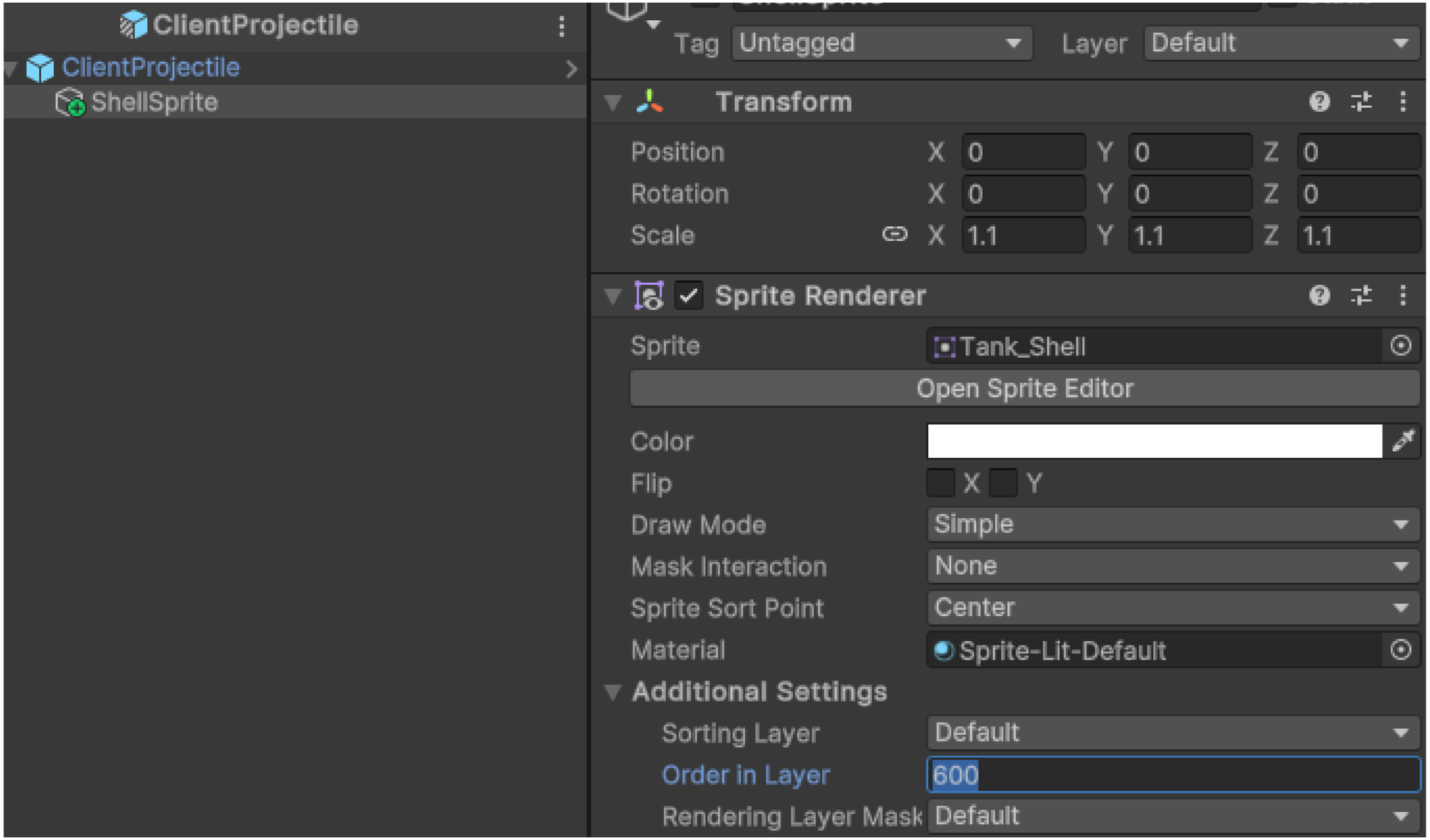
```
Unity Message | 0 references
private void OnTriggerExit2D(Collider2D col)
{
    if(!IsServer) { return; }
    if (!col.attachedRigidbody.TryGetComponent<TankPlayer>(out TankPlayer player)) { return; }

    playersInZone.Remove(player);
    Debug.Log($"Left: {player.PlayerName.Value}");
}
Unity Message | 0 references
private void Update()
{
    if(!IsServer) { return; }
}
3 references
private void HandleHealPowerChanged(int oldHealPower,int newHealPower)
{
    healPowerBar.fillAmount = (float)newHealPower / maxHealPower;
}
```

Healing Zone Cooldown

- If the zone is still on cooldown then reduce the **remainingCooldown**
- If the zone is now off of cooldown, then restore the **HealPower**
- If the zone is still on cooldown, **return** here

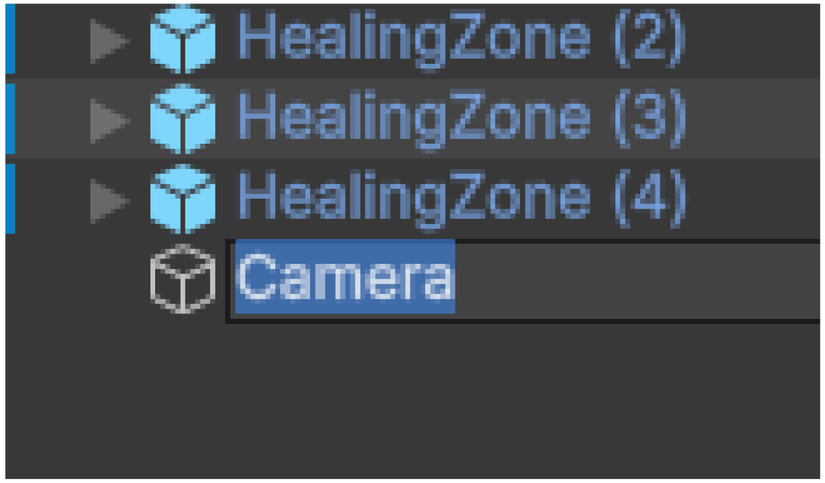
```
    private void Update()
    {
        if(!IsServer) { return; }

        if (remainingCooldown > 0f)
        {
            remainingCooldown -= Time.deltaTime;

            if (remainingCooldown <= 0f)
            {
                HealPower.Value = maxHealPower;
            }
            else
            {
                return;
            }
        }

        tickTimer += Time.deltaTime;
        if (tickTimer >= 1/healTickRate)
        {
            foreach(TankPlayer player in playersInZone)
            {
                if(HealPower.Value == 0) { break; }
                if (player.Health.CurrentHealth.Value == player.Health.MaxHealth) { continue; }
                if (player.Wallet.TotalCoins.Value < coinsPerTick) { continue; }
                player.Wallet.SpendCoin(coinsPerTick);
                player.Health.RestoreHealth(healthPerTick);

                HealPower.Value -= 1;
                if(HealPower.Value == 0)
                {
                    remainingCooldown = healCooldown;
                }
            }

            tickTimer = tickTimer % (1/healTickRate);
        }
    }
```


Healing Zone (Script)
Script
HealingZone
References
Heal Power Bar
Image (Image)
Settings
Max Heal Power
30
Heal Cooldown
10
Heal Tick Rate
1
Coins Per Tick
10
Health Per Tick
10

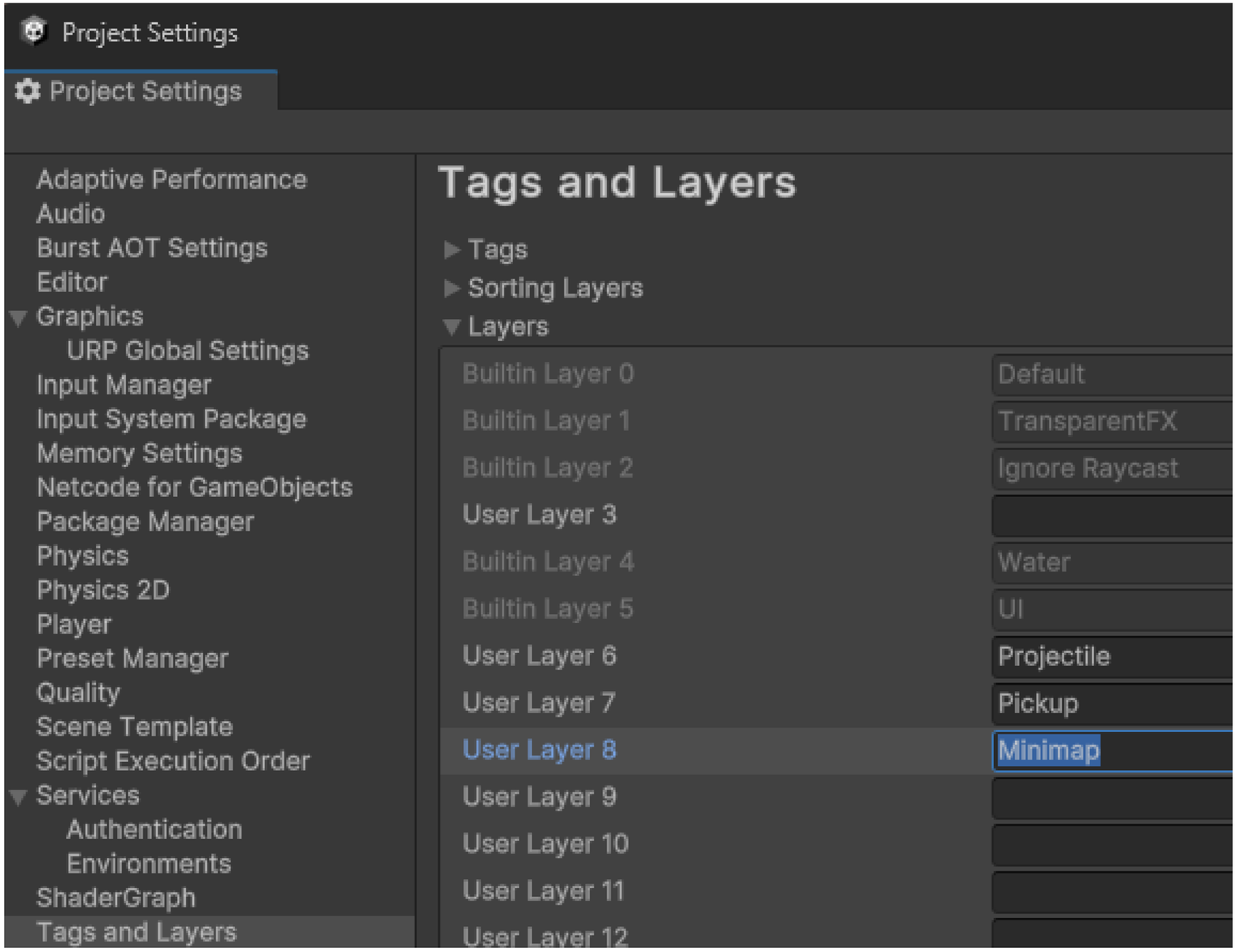

ClientProjectile
ClientProjectile
ShellSprite
Tag
Untagged
Layer
Default
Transform
Position
X 0
Y 0
Z 0
Rotation
X 0
Y 0
Z 0
Scale
X 1.1
Y 1.1
Z 1.1
Sprite Renderer
Sprite
Tank_Shell
Open Sprite Editor
Color
Flip
X
Y
Draw Mode
Simple
Mask Interaction
None
Sprite Sort Point
Center
Material
Sprite-Lit-Default
Additional Settings
Sorting Layer
Default
Order in Layer
600
Rendering Layer Mask
Default

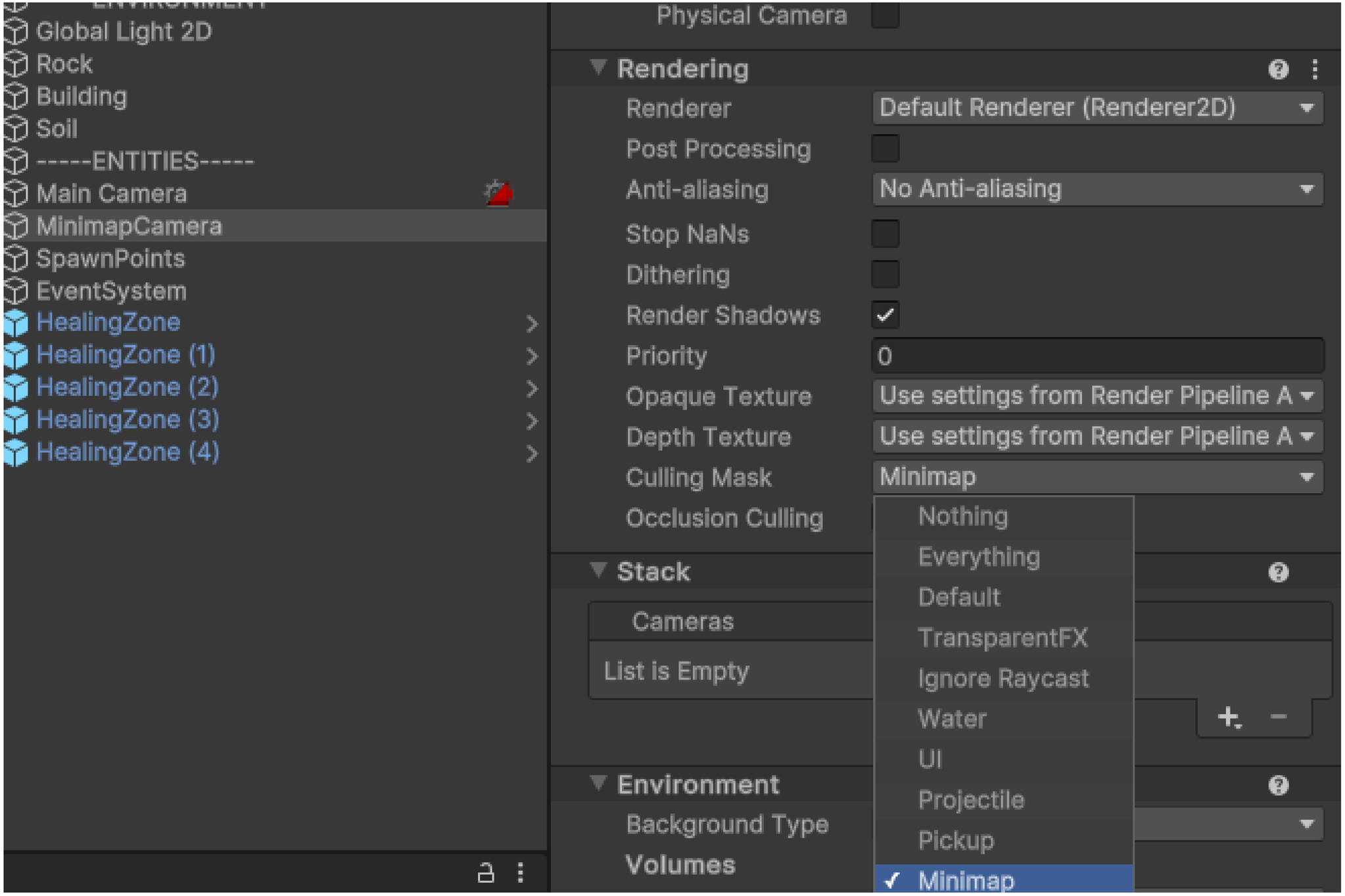

1. MewEditor (95)
2. MewBuild (5)
MewEditor
MewBuild
MewBuild
MewEditor
1. MewEditor (95)
2. MewBuild (5)

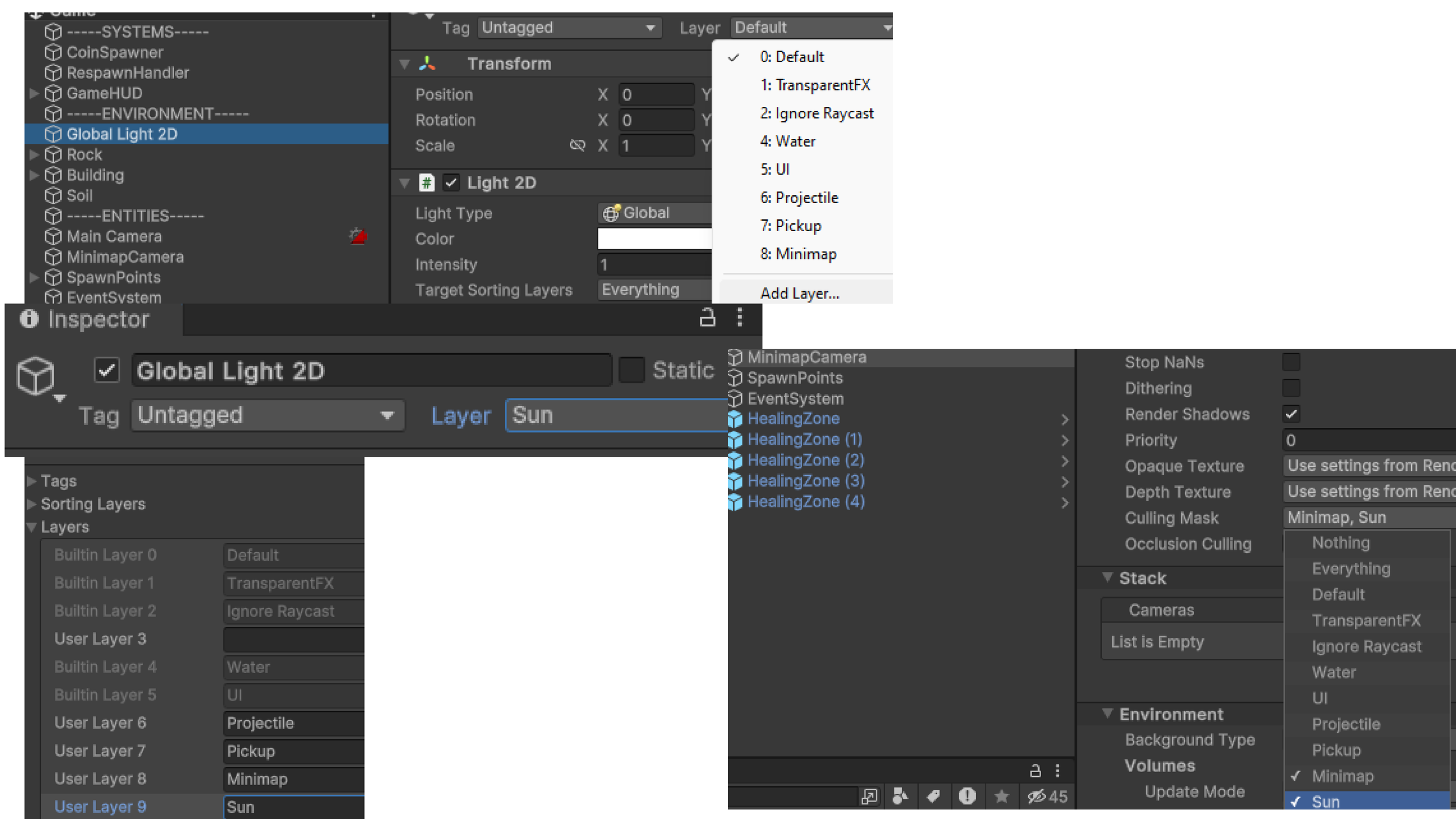
Mini Map

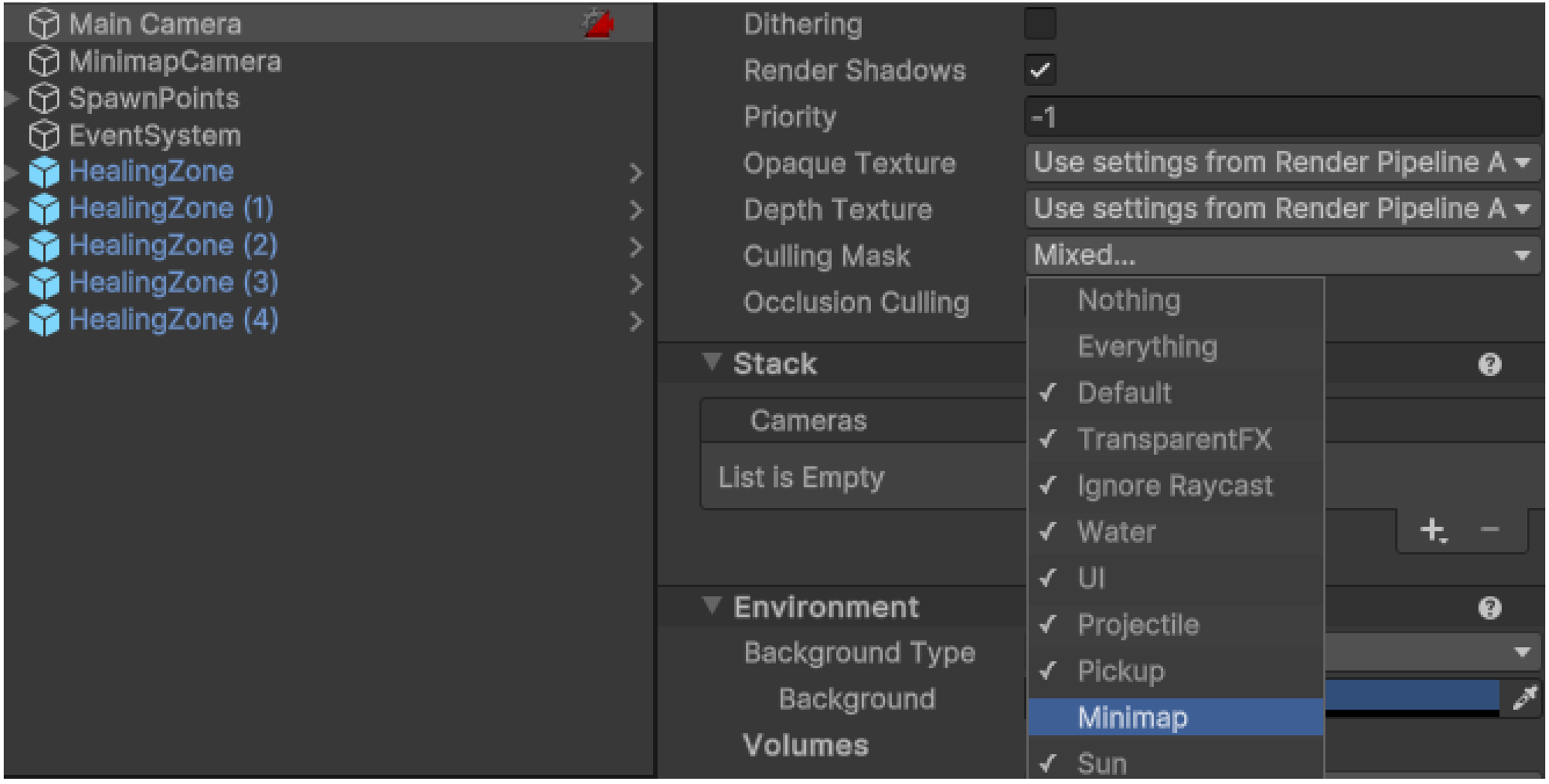

HealingZone (2)
HealingZone (3)
HealingZone (4)
Camera

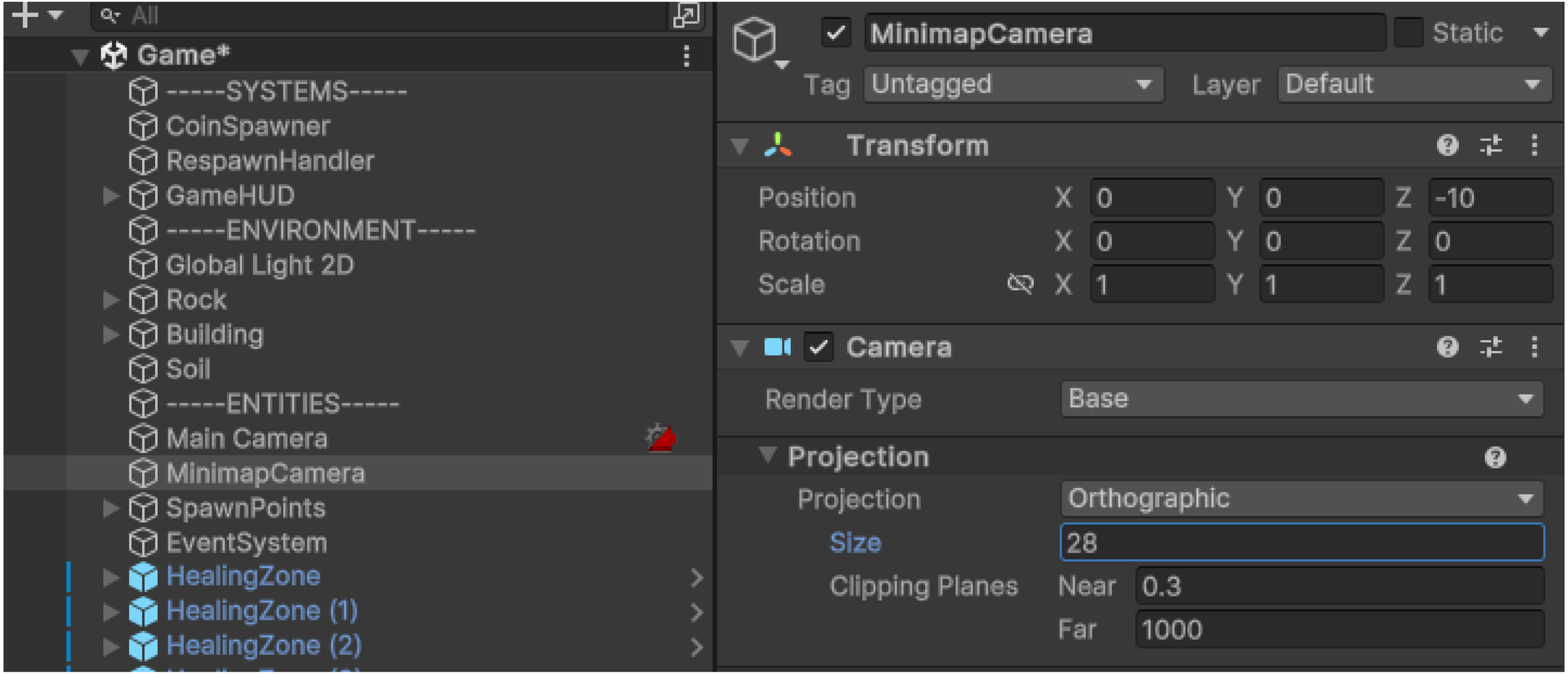

Main Camera
MinimapCamera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
HealingZone (3)
HealingZone (4)


Project Settings
Project Settings
Adaptive Performance
Audio
Burst AOT Settings
Editor
Graphics
URP Global Settings
Input Manager
Input System Package
Memory Settings
Netcode for GameObjects
Package Manager
Physics
Physics 2D
Player
Preset Manager
Quality
Scene Template
Script Execution Order
Services
Authentication
Environments
ShaderGraph
Tags and Layers
Tags and Layers
Tags
Sorting Layers
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
Projectile
User Layer 7
Pickup
User Layer 8
Minimap
User Layer 9
User Layer 10
User Layer 11
User Layer 12

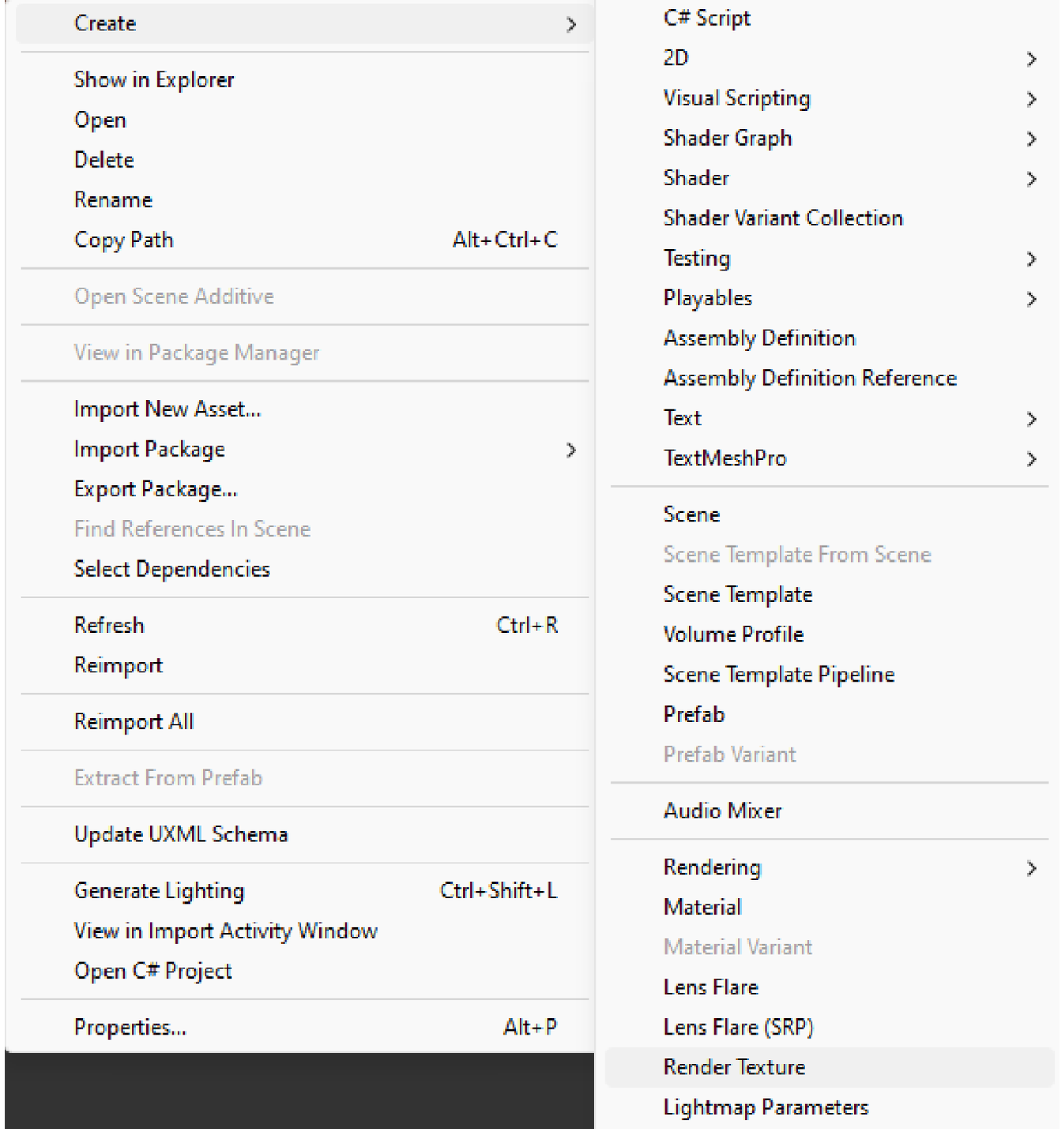

Global Light 2D
Rock
Building
Soil
-----ENTITIES-----
Main Camera
MinimapCamera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
HealingZone (3)
HealingZone (4)
Physical Camera
Rendering
Renderer
Default Renderer (Renderer2D)
Post Processing
Anti-aliasing
No Anti-aliasing
Stop NaNs
Dithering
Render Shadows
Priority
0
Opaque Texture
Use settings from Render Pipeline A
Depth Texture
Use settings from Render Pipeline A
Culling Mask
Minimap
Occlusion Culling
Nothing
Everything
Default
TransparentFX
Ignore Raycast
Water
UI
Projectile
Pickup
Minimap
Stack
Cameras
List is Empty
Environment
Background Type
Volumes

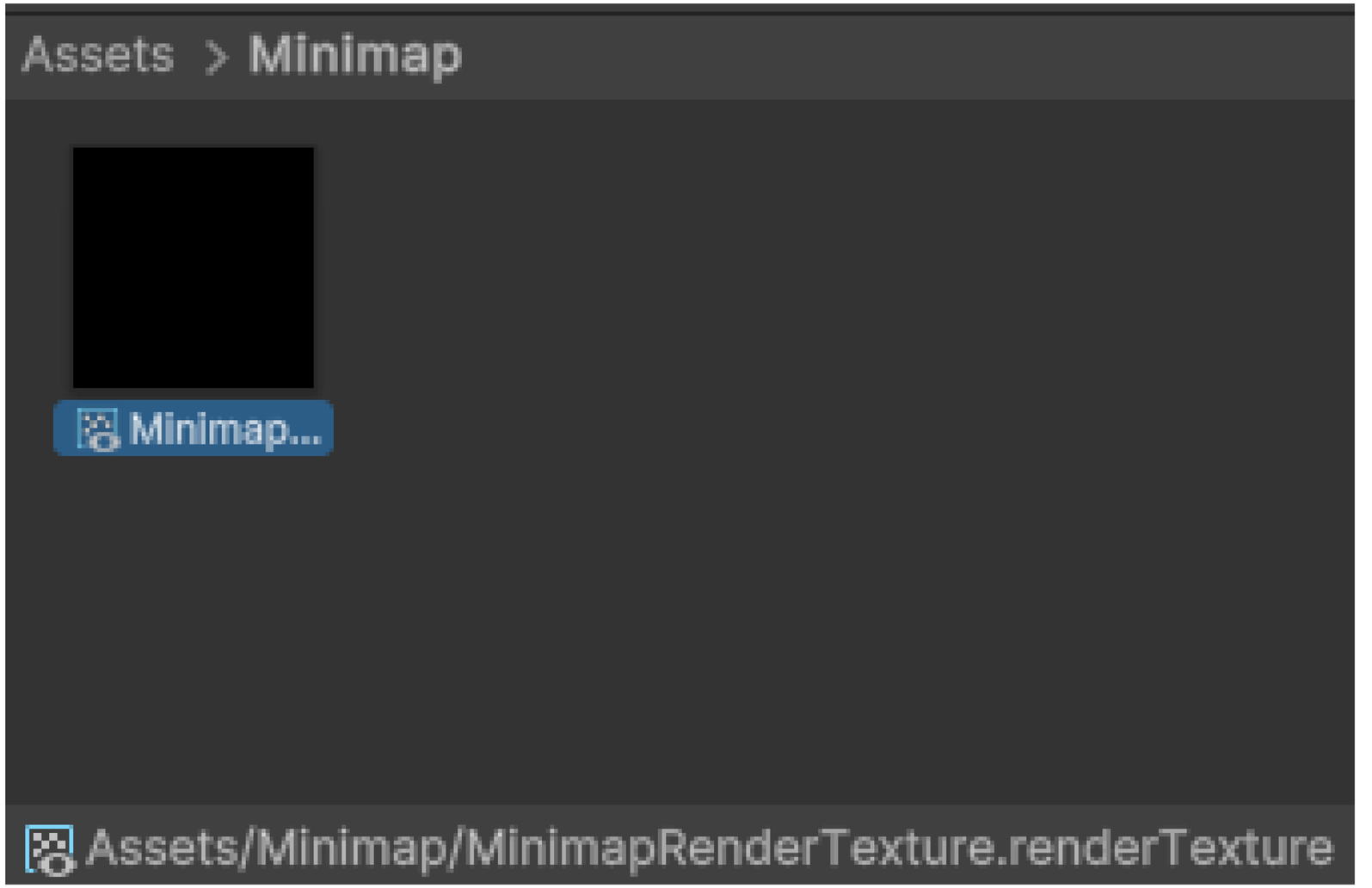

-----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Soil
-----ENTITIES-----
Main Camera
MinimapCamera
SpawnPoints
EventSystem
Tag Untagged
Layer Default
Transform
Position X 0
Rotation X 0
Scale X 1
Light 2D
Light Type Global
Color
Intensity 1
Target Sorting Layers Everything
0: Default
1: TransparentFX
2: Ignore Raycast
4: Water
5: UI
6: Projectile
7: Pickup
8: Minimap
Add Layer...
Inspector
Global Light 2D
Static
Tag Untagged
Layer Sun
Tags
Sorting Layers
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 Projectile
User Layer 7 Pickup
User Layer 8 Minimap
User Layer 9 Sun
MinimapCamera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
HealingZone (3)
HealingZone (4)
45
Stop NaNs
Dithering
Render Shadows
Priority 0
Opaque Texture Use settings from Rend
Depth Texture Use settings from Rend
Culling Mask Minimap, Sun
Occlusion Culling
Stack
Cameras
List is Empty
Environment
Background Type
Volumes
Update Mode
Nothing
Everything
Default
TransparentFX
Ignore Raycast
Water
UI
Projectile
Pickup
Minimap
Sun

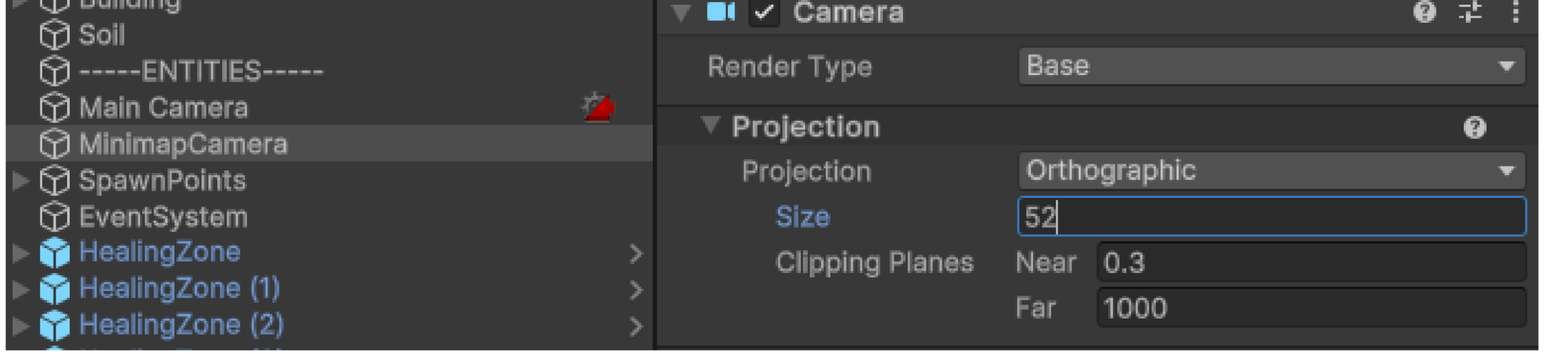

Main Camera
MinimapCamera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
HealingZone (3)
HealingZone (4)
Dithering
Render Shadows
Priority
-1
Opaque Texture
Use settings from Render Pipeline A
Depth Texture
Use settings from Render Pipeline A
Culling Mask
Mixed...
Occlusion Culling
Nothing
Everything
Default
TransparentFX
Ignore Raycast
Water
UI
Projectile
Pickup
Minimap
Sun
Stack
Cameras
List is Empty
Environment
Background Type
Background
Volumes

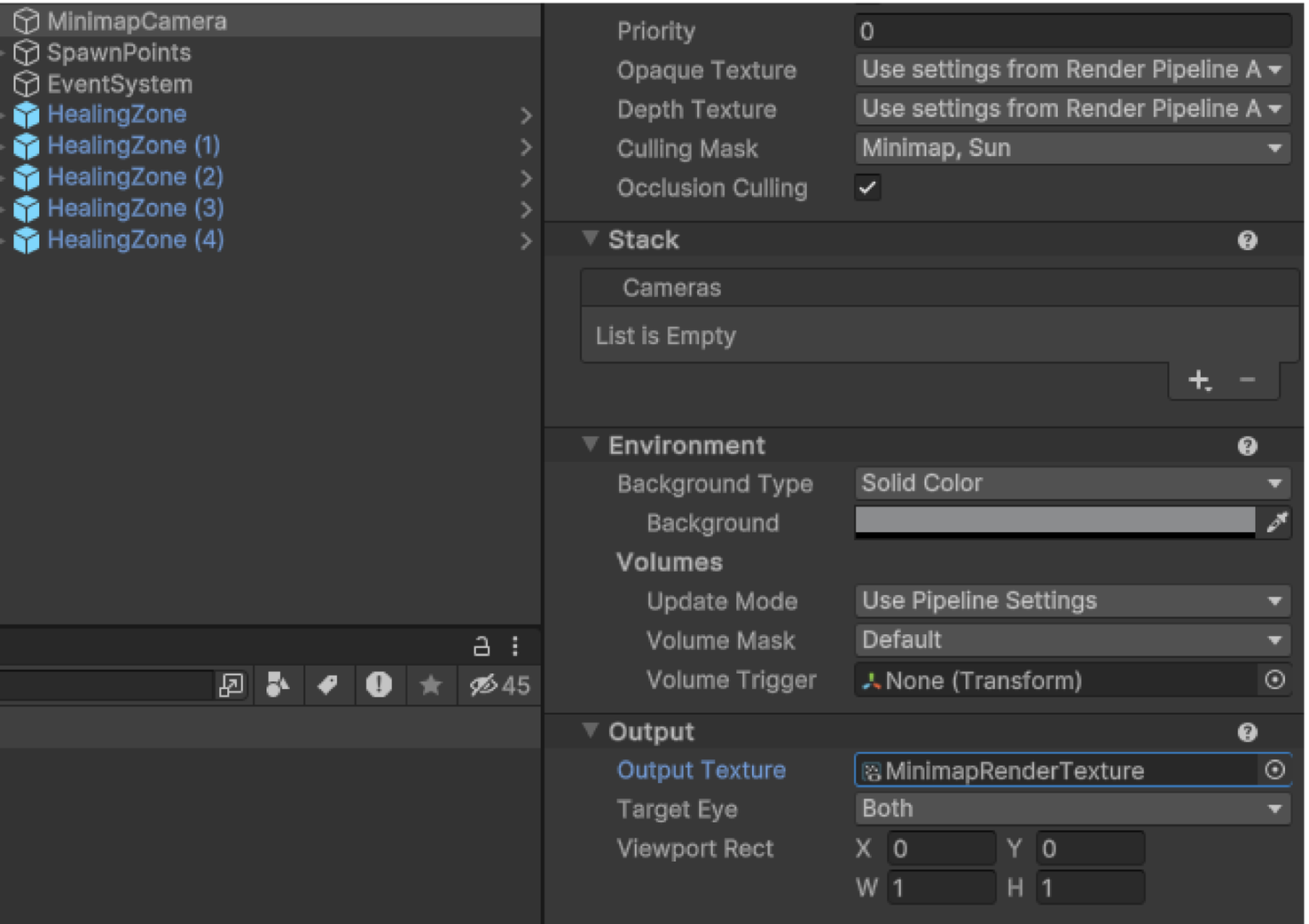

All
Game*
-----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Soil
-----ENTITIES-----
Main Camera
MinimapCamera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
MinimapCamera
Static
Tag
Untagged
Layer
Default
Transform
Position
X 0
Y 0
Z -10
Rotation
X 0
Y 0
Z 0
Scale
X 1
Y 1
Z 1
Camera
Render Type
Base
Projection
Projection
Orthographic
Size
28
Clipping Planes
Near 0.3
Far 1000


Assets
Art
Editor
Input
Minimap

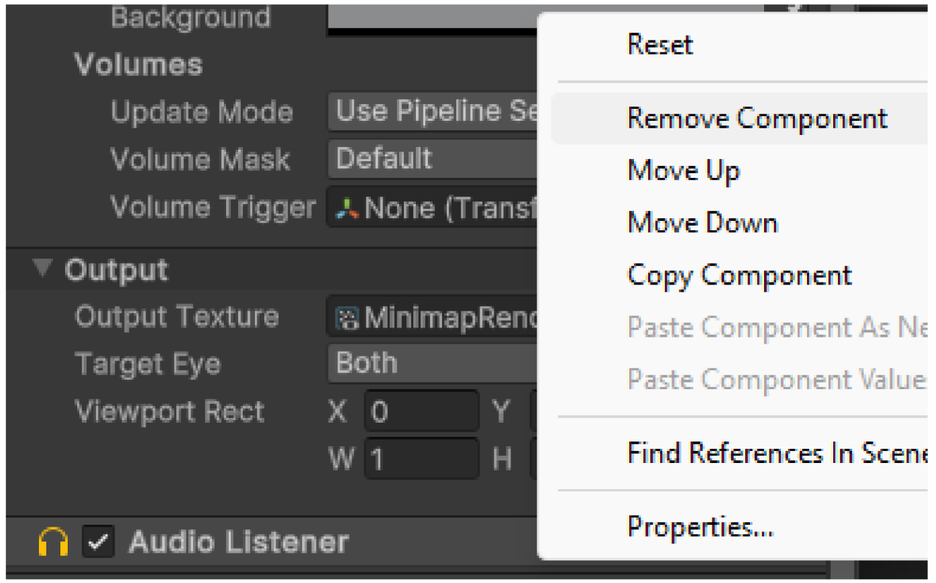

Create
Show in Explorer
Open
Delete
Rename
Copy Path Alt+Ctrl+C
Open Scene Additive
View in Package Manager
Import New Asset...
Import Package
Export Package...
Find References In Scene
Select Dependencies
Refresh Ctrl+R
Reimport
Reimport All
Extract From Prefab
Update UXML Schema
Generate Lighting Ctrl+Shift+L
View in Import Activity Window
Open C# Project
Properties... Alt+P
C# Script
2D
Visual Scripting
Shader Graph
Shader
Shader Variant Collection
Testing
Playables
Assembly Definition
Assembly Definition Reference
Text
TextMeshPro
Scene
Scene Template From Scene
Scene Template
Volume Profile
Scene Template Pipeline
Prefab
Prefab Variant
Audio Mixer
Rendering
Material
Material Variant
Lens Flare
Lens Flare (SRP)
Render Texture
Lightmap Parameters

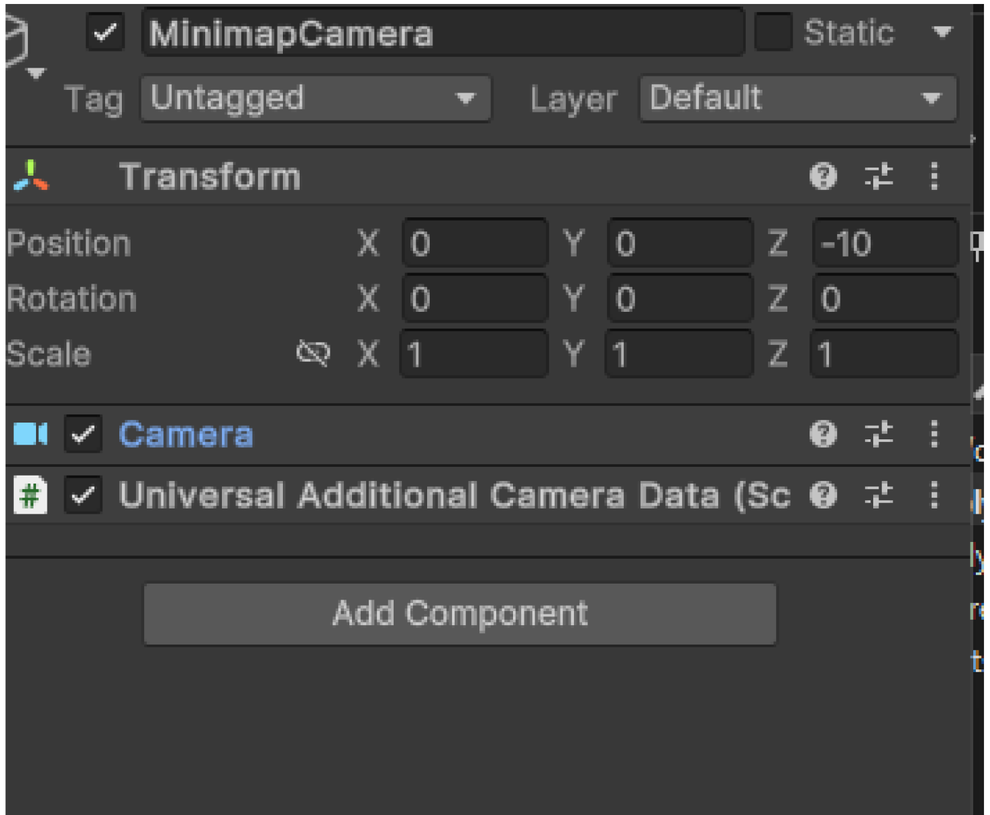

Assets > Minimap
Minimap...
Assets/Minimap/MinimapRenderTexture.renderTexture

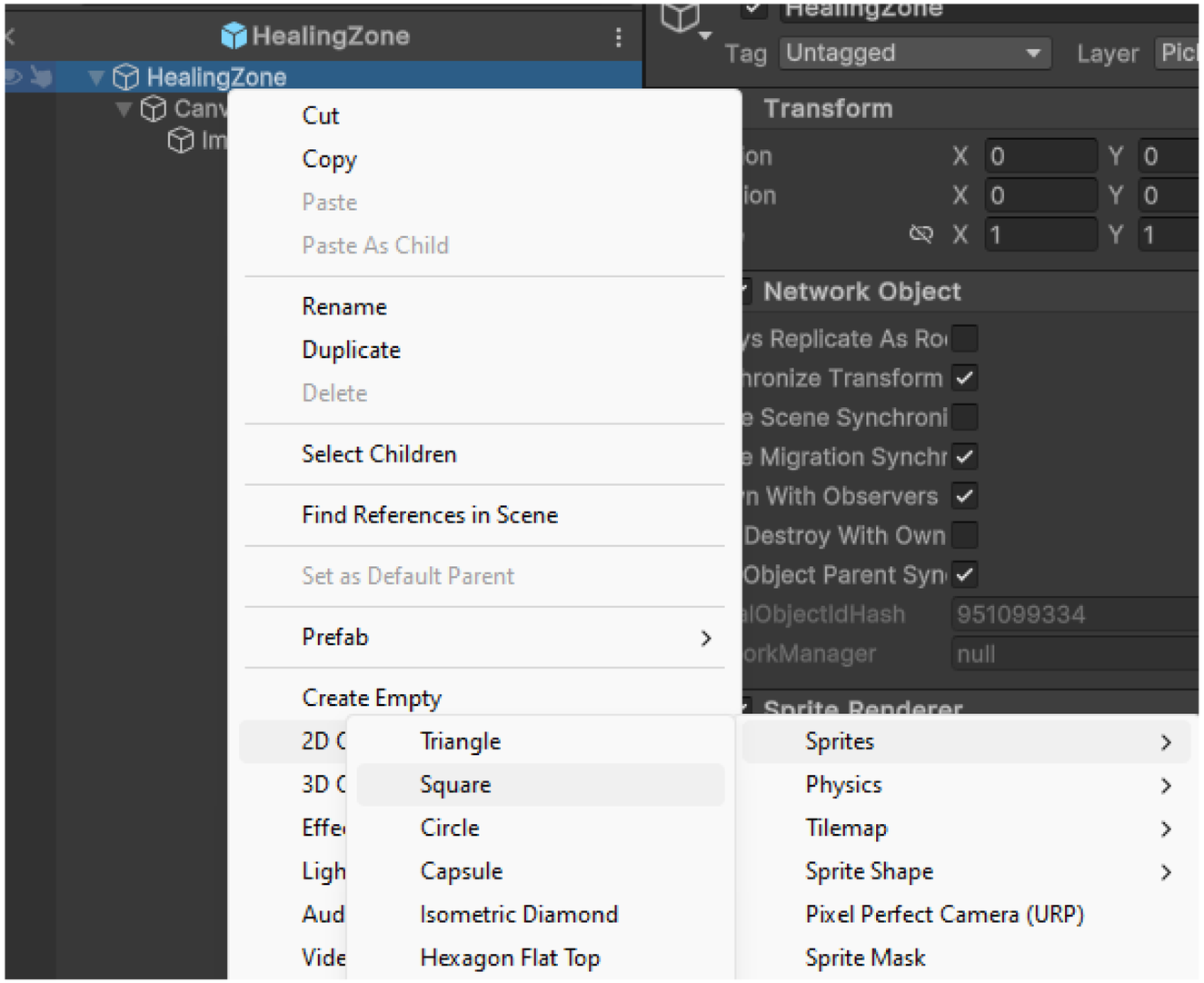

Soil
-----ENTITIES-----
Main Camera
MinimapCamera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
Camera
Render Type
Base
Projection
Projection
Orthographic
Size
52
Clipping Planes
Near
0.3
Far
1000


MinimapCamera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
HealingZone (3)
HealingZone (4)
45
Priority
0
Opaque Texture
Use settings from Render Pipeline A
Depth Texture
Use settings from Render Pipeline A
Culling Mask
Minimap, Sun
Occlusion Culling
Stack
Cameras
List is Empty
Environment
Background Type
Solid Color
Background
Volumes
Update Mode
Use Pipeline Settings
Volume Mask
Default
Volume Trigger
None (Transform)
Output
Output Texture
MinimapRenderTexture
Target Eye
Both
Viewport Rect
X
0
Y
0
W
1
H
1

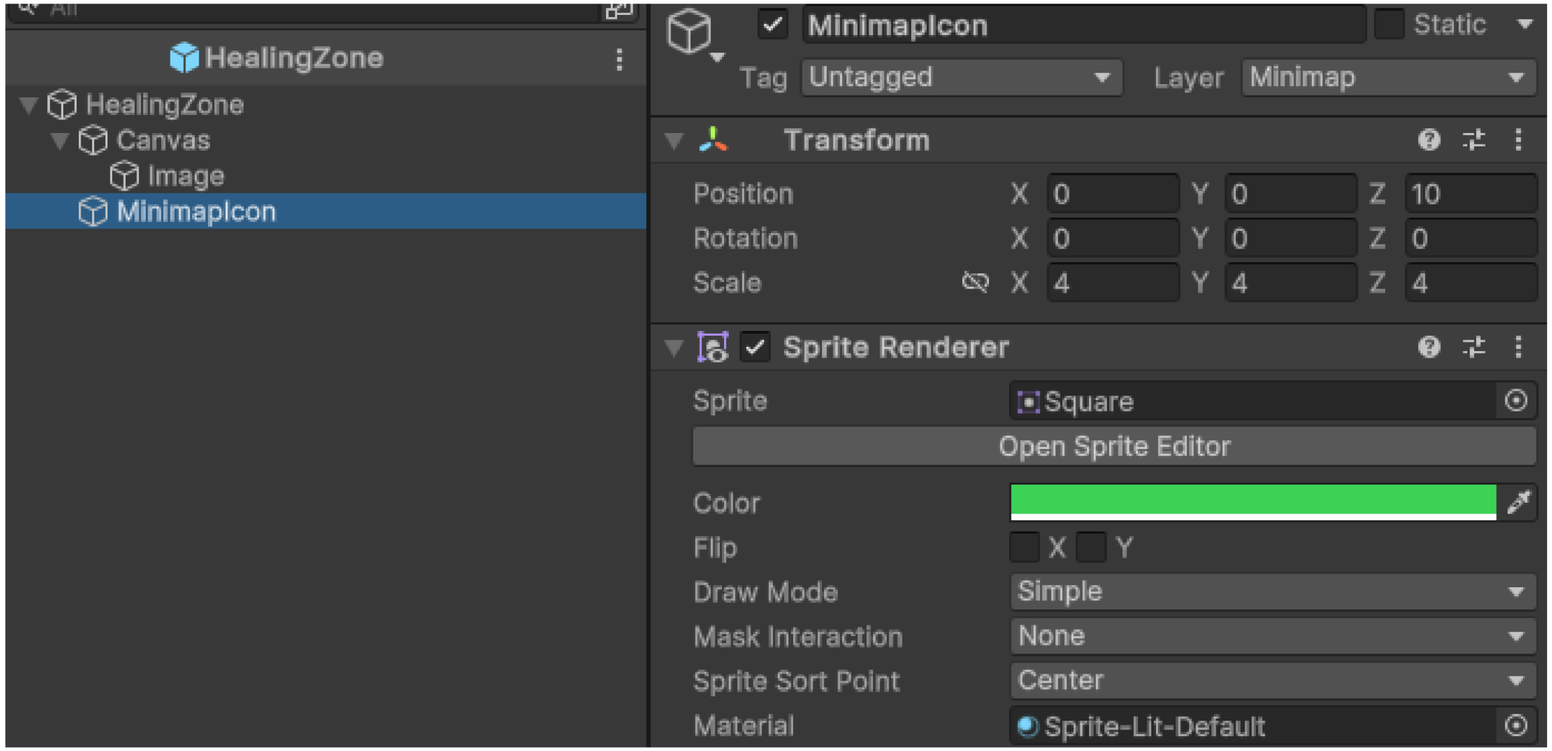

MinimapCame

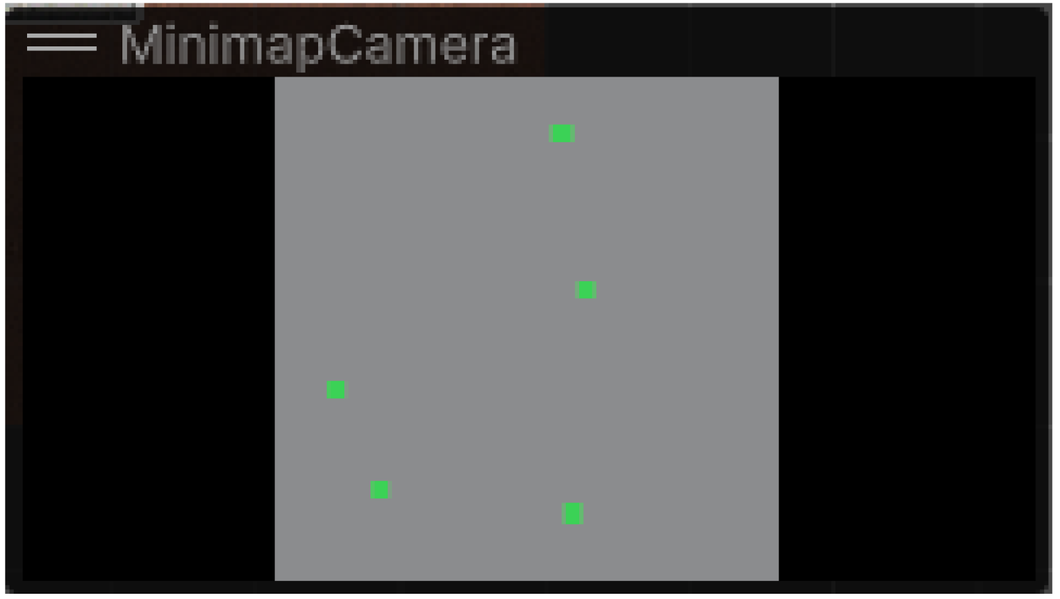

Background
Volumes
Update Mode
Use Pipeline Se
Volume Mask
Default
Volume Trigger
None (Transf
Output
Output Texture
MinimapRend
Target Eye
Both
Viewport Rect
X 0
Y
W 1
H
Audio Listener
Reset
Remove Component
Move Up
Move Down
Copy Component
Paste Component As Ne
Paste Component Value
Find References In Scene
Properties...


MinimapCamera
Static
Tag
Untagged
Layer
Default
Transform
Position
X 0
Y 0
Z -10
Rotation
X 0
Y 0
Z 0
Scale
X 1
Y 1
Z 1
Camera
Universal Additional Camera Data (Sc
Add Component


HealingZone
HealingZone
Tag
Untagged
Layer
Transform
X 0
Y 0
X 0
Y 0
X 1
Y 1
Network Object
951099334
null
Cut
Copy
Paste
Paste As Child
Rename
Duplicate
Delete
Select Children
Find References in Scene
Set as Default Parent
Prefab
Create Empty
Triangle
Square
Circle
Capsule
Isometric Diamond
Hexagon Flat Top
Sprites
Physics
Tilemap
Sprite Shape
Pixel Perfect Camera (URP)
Sprite Mask

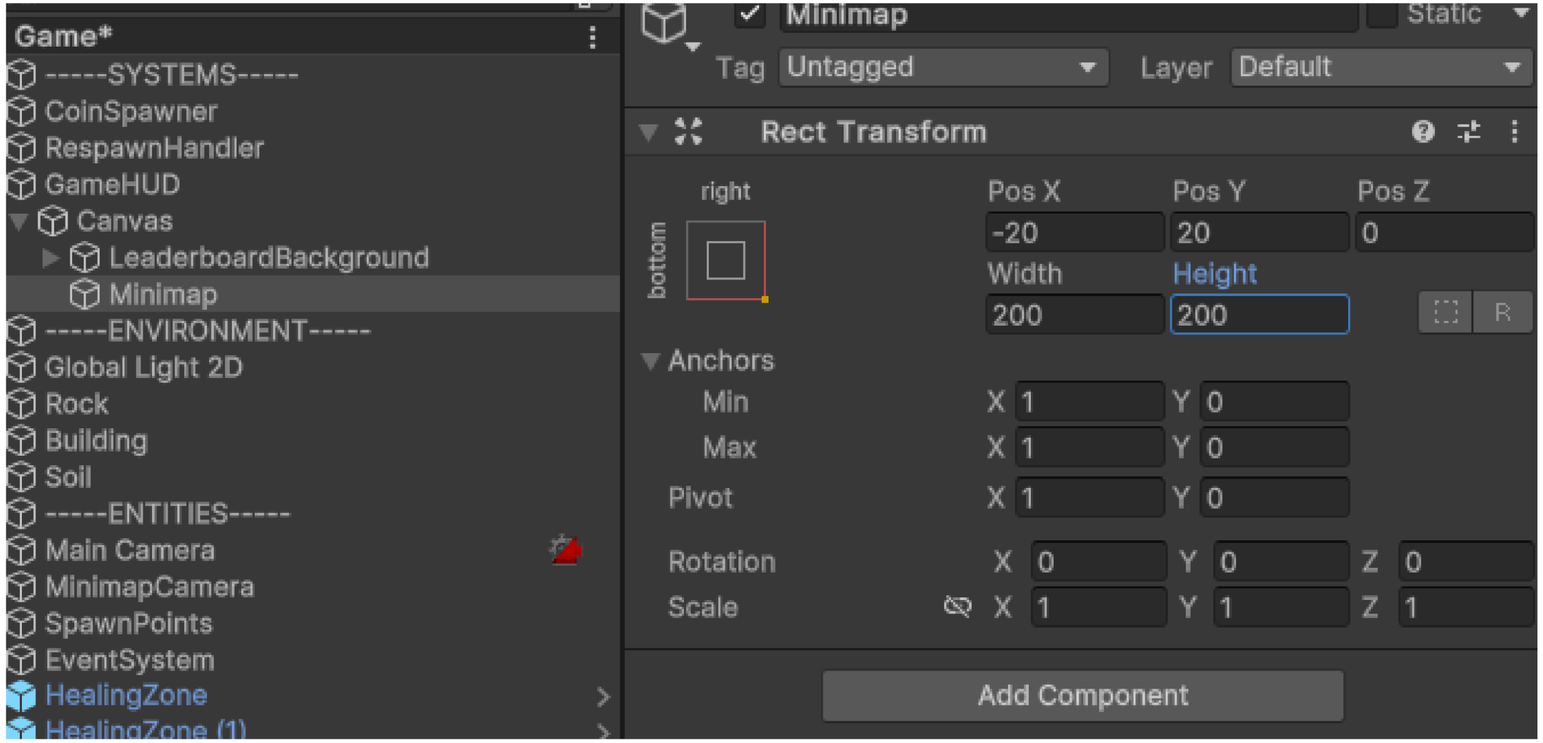

HealingZone
HealingZone
Canvas
Image
Square

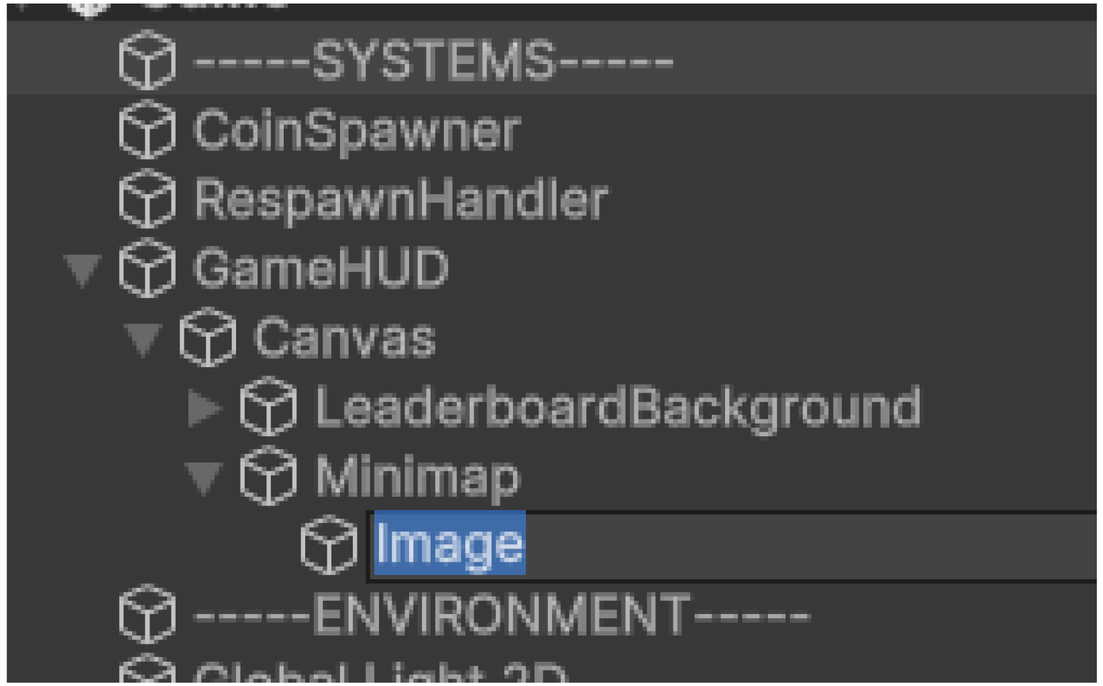

HealingZone
HealingZone
Canvas
Image
MinimapIcon
MinimapIcon
Static
Tag
Untagged
Layer
Minimap
Transform
Position
X 0
Y 0
Z 10
Rotation
X 0
Y 0
Z 0
Scale
X 4
Y 4
Z 4
Sprite Renderer
Sprite
Square
Open Sprite Editor
Color
Flip
X
Y
Draw Mode
Simple
Mask Interaction
None
Sprite Sort Point
Center
Material
Sprite-Lit-Default

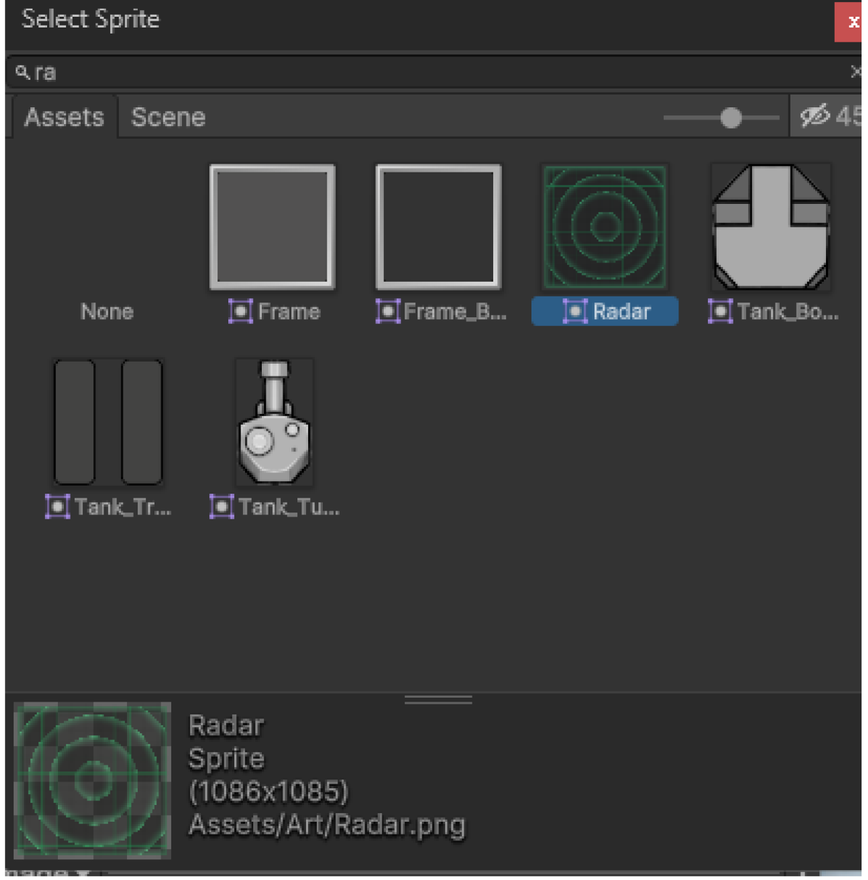

MinimapCamera

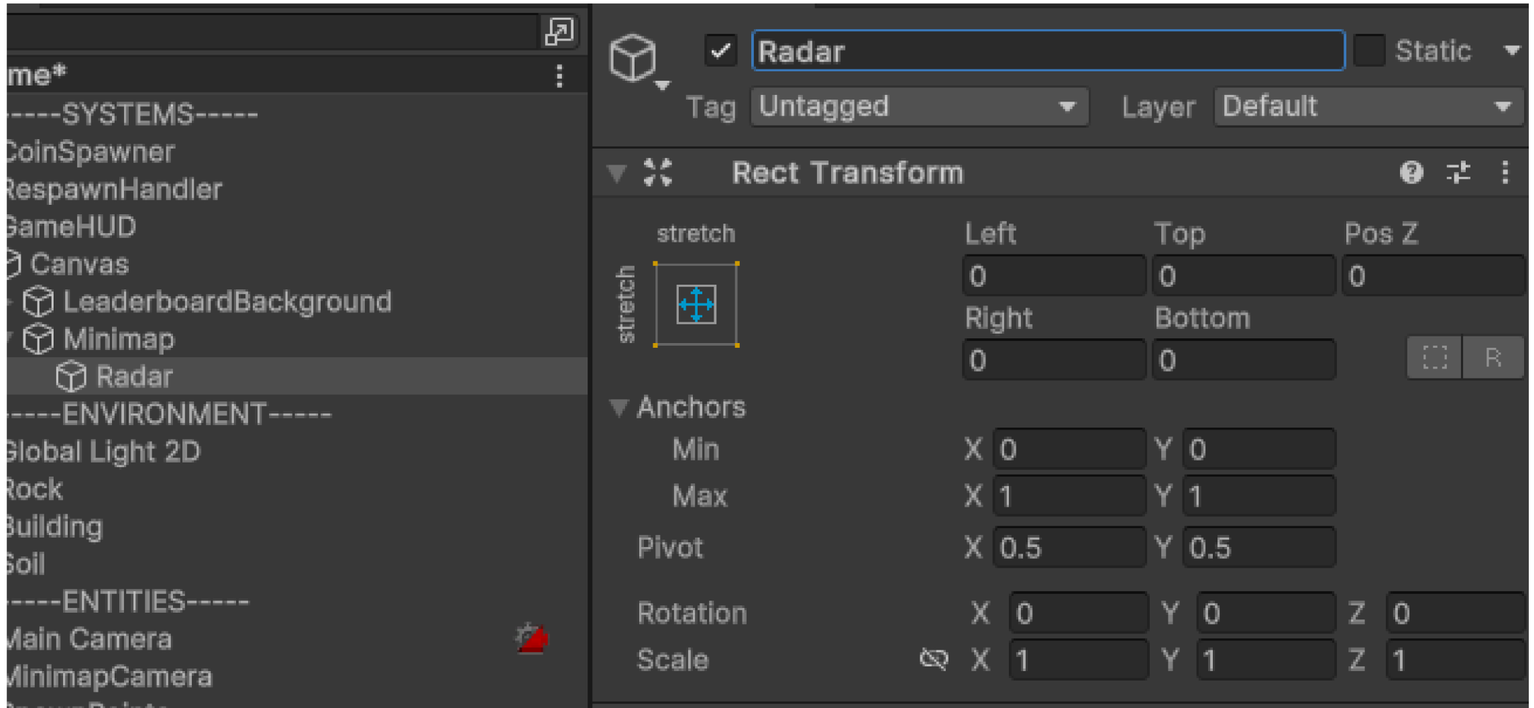

GameHUD
Canvas
GameObject


Canvas
Minimap


Game*
-----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
Canvas
LeaderboardBackground
Minimap
-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Soil
-----ENTITIES-----
Main Camera
MinimapCamera
SpawnPoints
EventSystem
HealingZone
Minimap
Static
Tag
Untagged
Layer
Default
Rect Transform
right
bottom
Pos X
Pos Y
Pos Z
-20
20
0
Width
Height
200
200
Anchors
Min
Max
Pivot
Rotation
Scale
Add Component


-----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
Canvas
LeaderboardBackground
Minimap
Image
-----ENVIRONMENT-----


Select Sprite
ra
Assets
Scene
None
Frame
Frame_B...
Radar
Tank_Bo...
Tank_Tr...
Tank_Tu...
Radar
Sprite
(1086x1085)
Assets/Art/Radar.png


me*
----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
Canvas
LeaderboardBackground
Minimap
Radar
----ENVIRONMENT-----
Global Light 2D
Rock
Building
Soil
----ENTITIES-----
Main Camera
MinimapCamera
Radar
Static
Tag
Untagged
Layer
Default
Rect Transform
stretch
stretch
Left
Top
Pos Z
0
0
0
Right
Bottom
0
0
R
Anchors
Min
X 0
Y 0
Max
X 1
Y 1
Pivot
X 0.5
Y 0.5
Rotation
X 0
Y 0
Z 0
Scale
X 1
Y 1
Z 1


GameHUD
Canvas
LeaderboardBackground
Minimap
Radar
Image

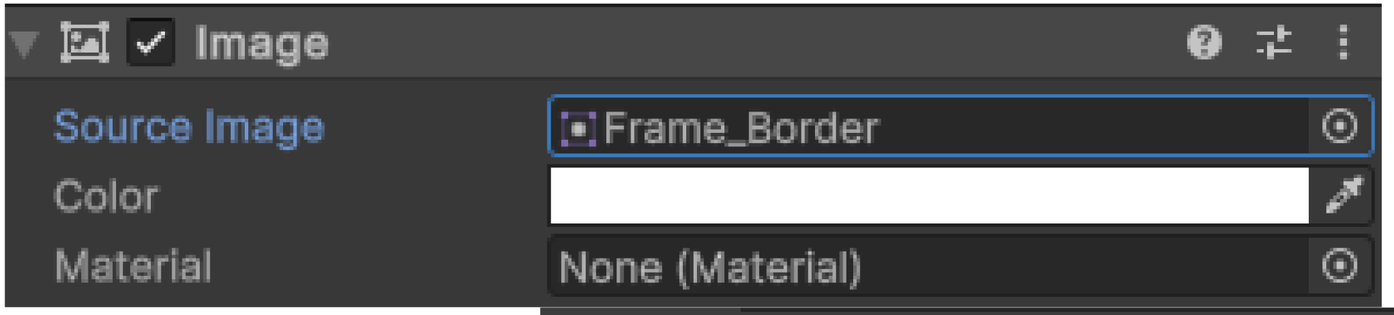
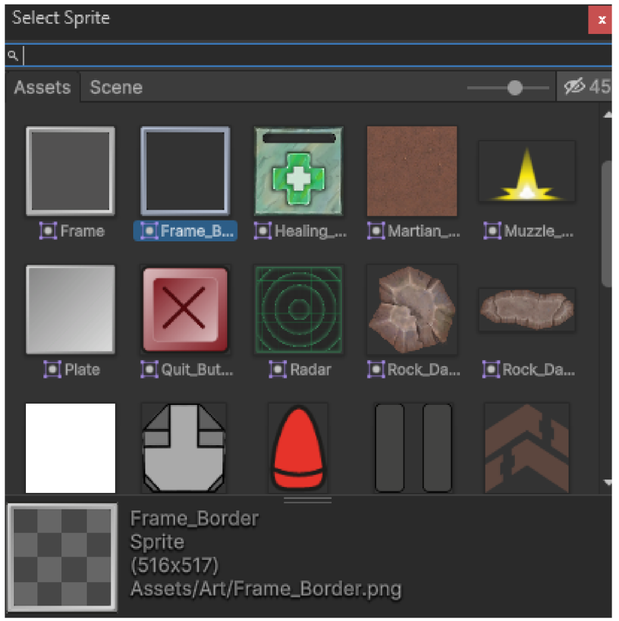
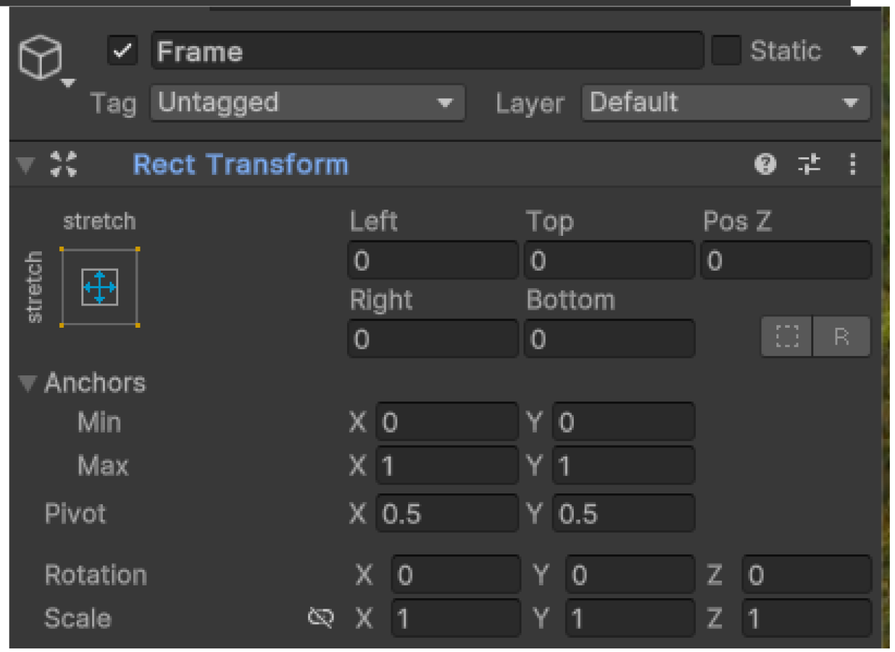
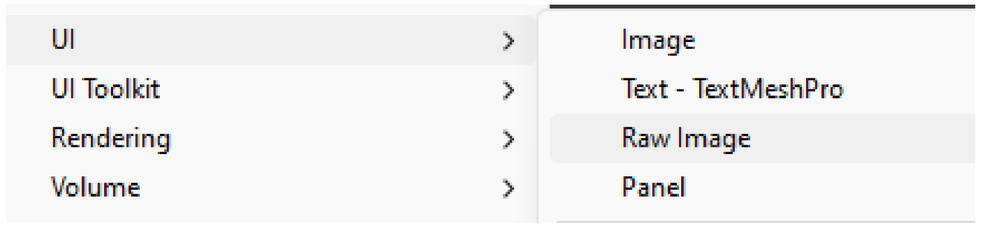


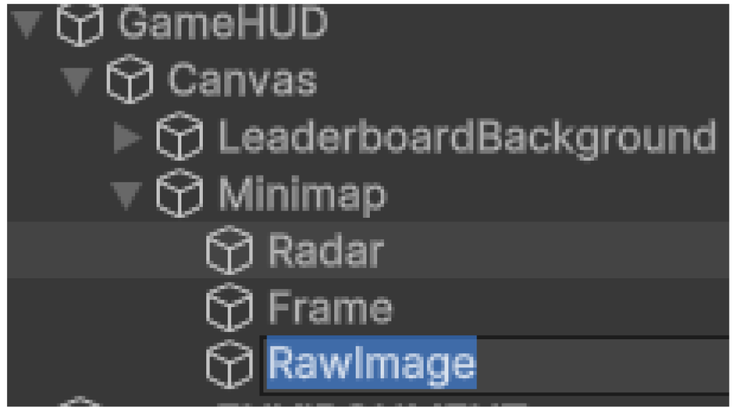
Image
Source Image
Frame_Border
Color
Material
None (Material)

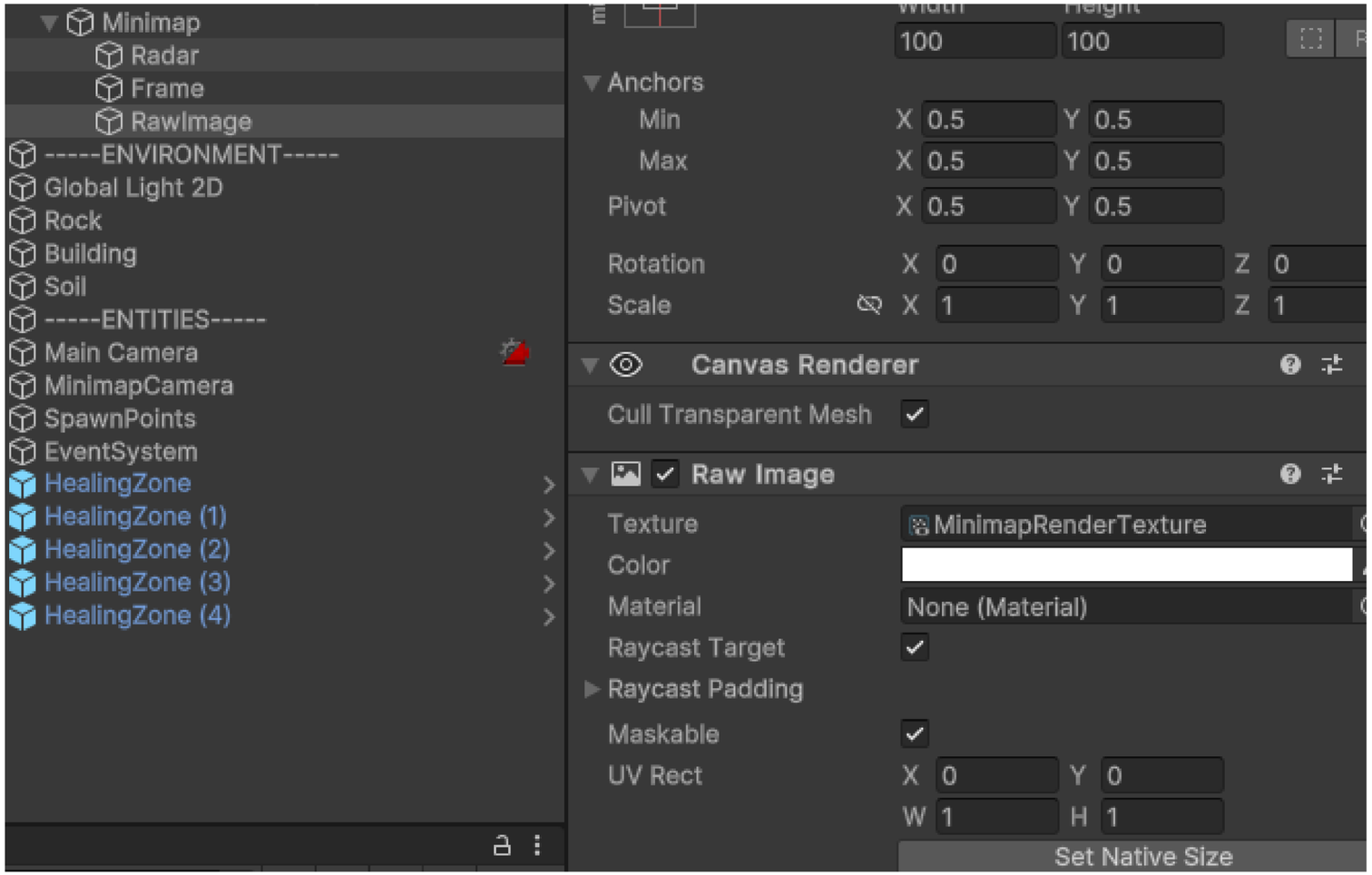

GameHUD
Canvas
LeaderboardBackground
Minimap
Radar
Frame

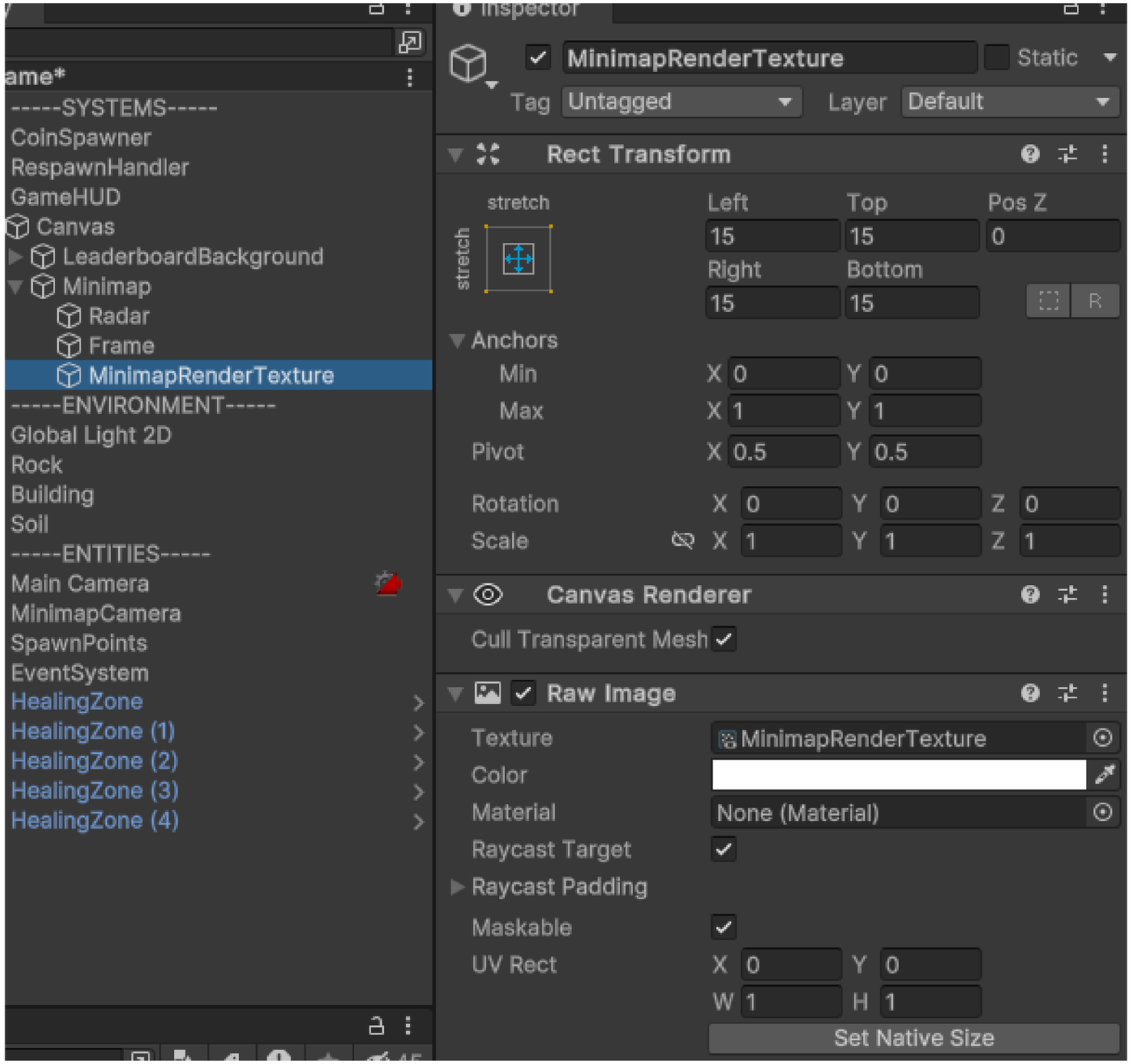

Select Sprite
Assets
Scene
Frame
Frame_B...
Healing_...
Martian_...
Muzzle_...
Plate
Quit_But...
Radar
Rock_Da...
Rock_Da...
Frame_Border
Sprite
(516x517)
Assets/Art/Frame_Border.png

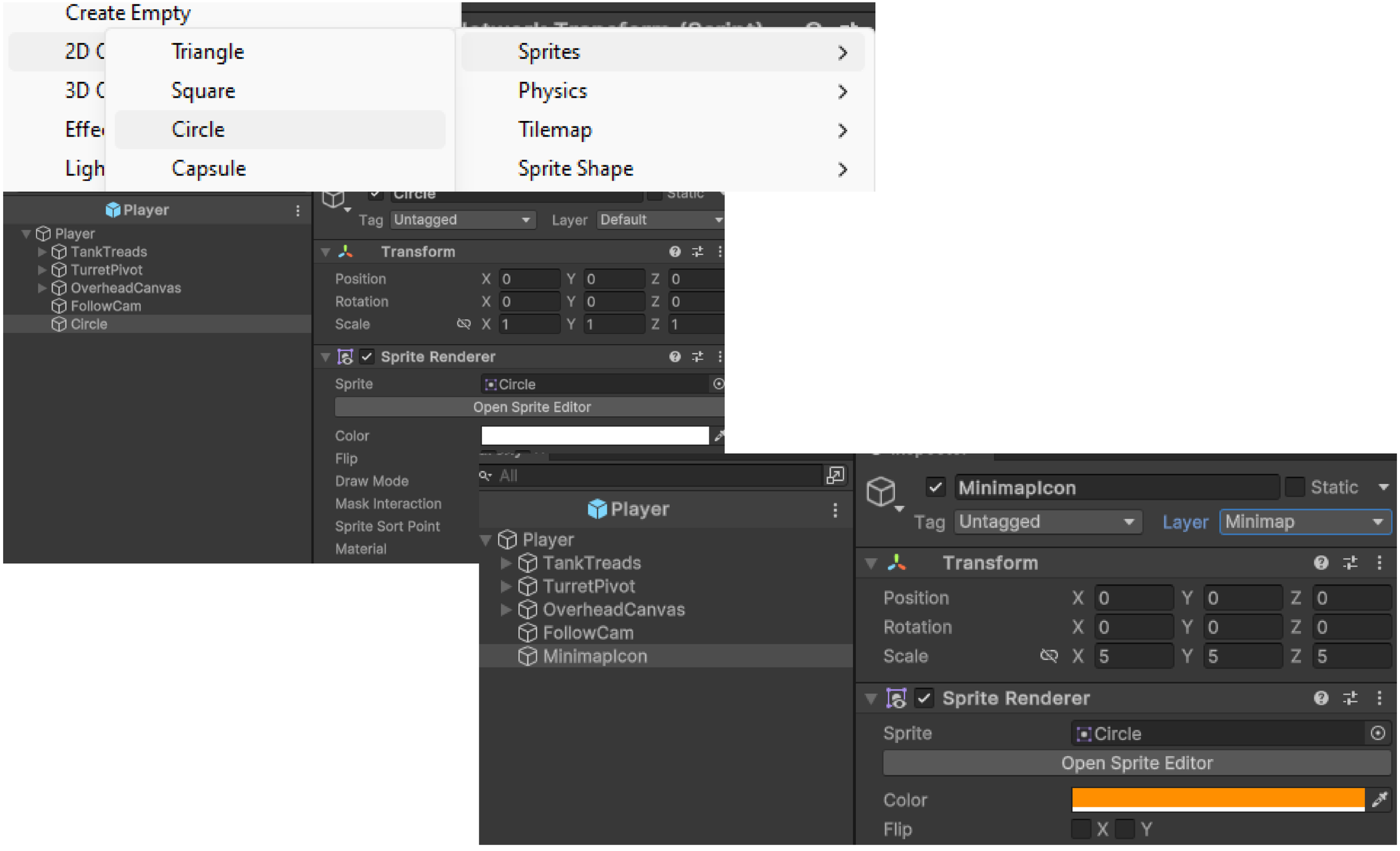

Frame
Static
Tag
Untagged
Layer
Default
Rect Transform
stretch
Left
Top
Pos Z
Right
Bottom
Anchors
Min
Max
Pivot
Rotation
Scale

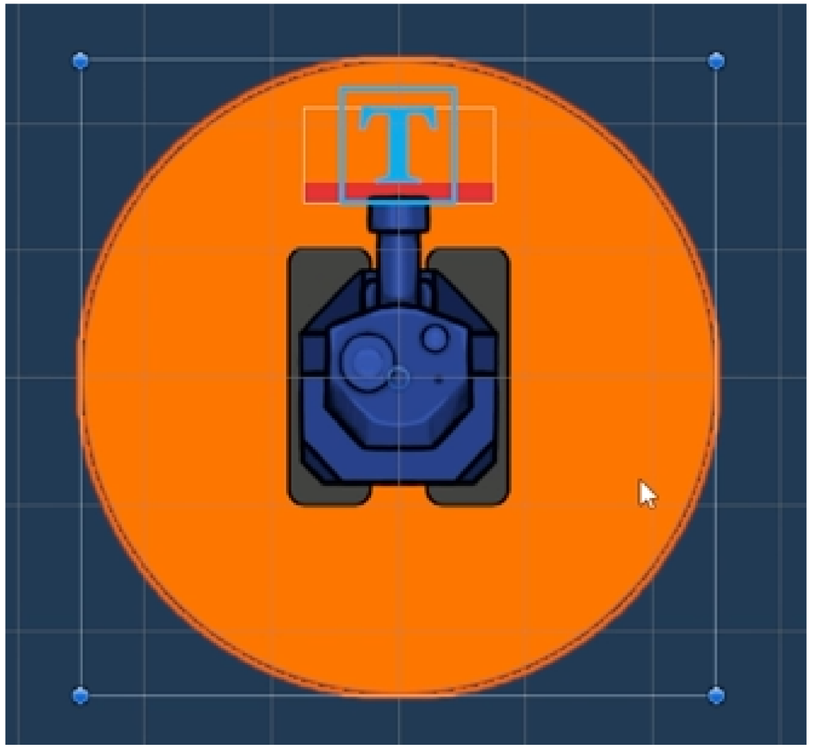

UI
UI Toolkit
Rendering
Volume
Image
Text - TextMeshPro
Raw Image
Panel


GameHUD
Canvas
LeaderboardBackground
Minimap
Radar
Frame
RawImage


Minimap
Radar
Frame
RawImage
-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Soil
-----ENTITIES-----
Main Camera
MinimapCamera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
HealingZone (3)
HealingZone (4)
100
100
Anchors
Min X 0.5 Y 0.5
Max X 0.5 Y 0.5
Pivot X 0.5 Y 0.5
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1
Canvas Renderer
Cull Transparent Mesh
Raw Image
Texture MinimapRenderTexture
Color
Material None (Material)
Raycast Target
Raycast Padding
Maskable
UV Rect X 0 Y 0
W 1 H 1
Set Native Size

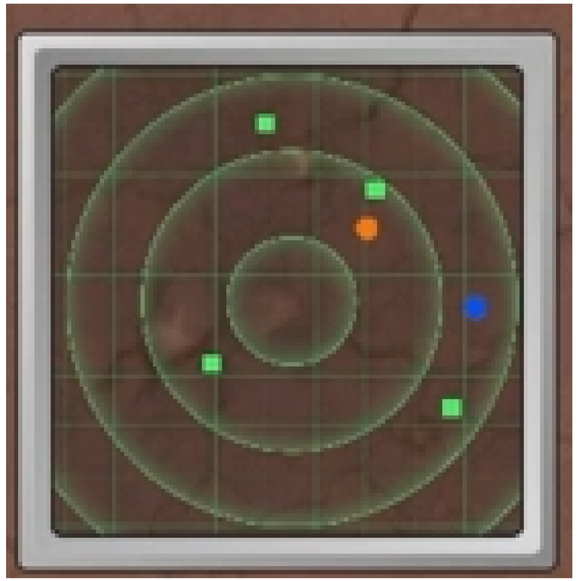

ame*
-----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
Canvas
LeaderboardBackground
Minimap
Radar
Frame
MinimapRenderTexture
-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Soil
-----ENTITIES-----
Main Camera
MinimapCamera
SpawnPoints
EventSystem
HealingZone
HealingZone (1)
HealingZone (2)
HealingZone (3)
HealingZone (4)
Inspector
MinimapRenderTexture
Static
Tag
Untagged
Layer
Default
Rect Transform
stretch
stretch
Left
Top
Pos Z
15
15
0
Right
Bottom
15
15
R
Anchors
Min
X 0
Y 0
Max
X 1
Y 1
Pivot
X 0.5
Y 0.5
Rotation
X 0
Y 0
Z 0
Scale
X 1
Y 1
Z 1
Canvas Renderer
Cull Transparent Mesh
Raw Image
Texture
MinimapRenderTexture
Color
Material
None (Material)
Raycast Target
Raycast Padding
Maskable
UV Rect
X 0
Y 0
W 1
H 1
Set Native Size

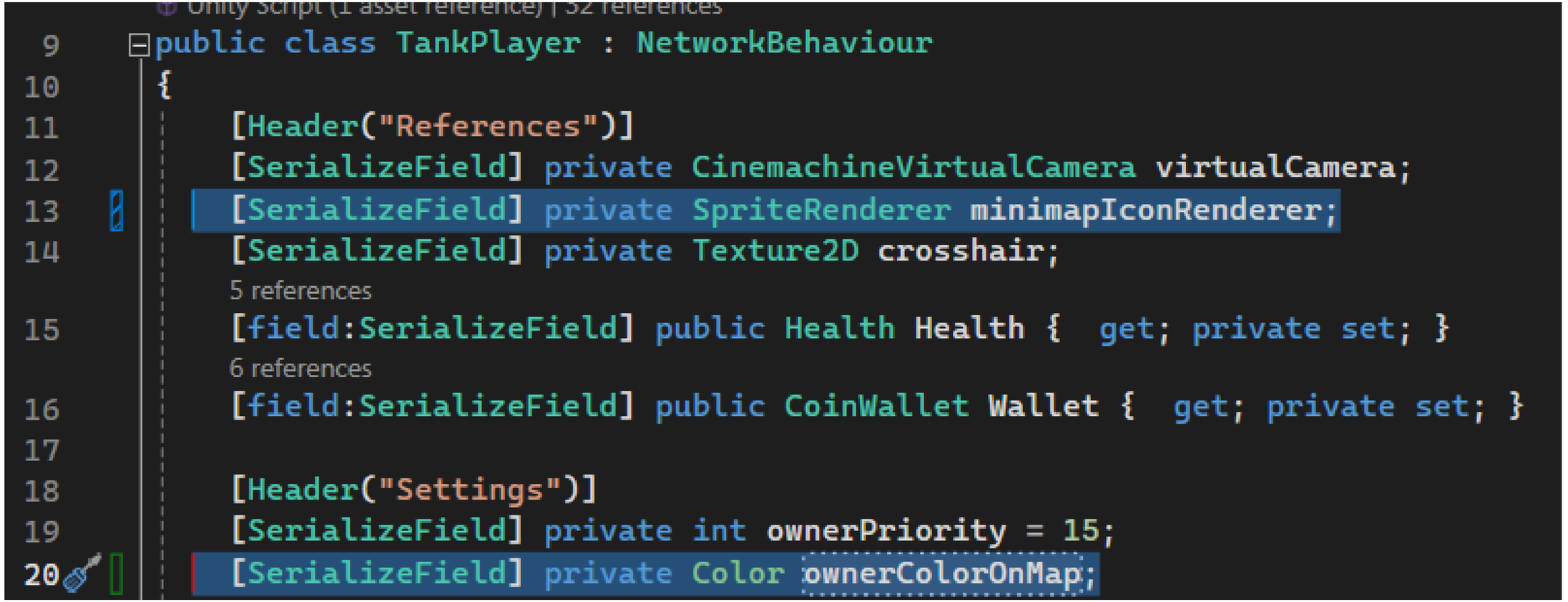

Create Empty
2D
3D
Effe
Ligh
Triangle
Square
Circle
Capsule
Sprites
Physics
Tilemap
Sprite Shape
Player
Player
TankTreads
TurretPivot
OverheadCanvas
FollowCam
Circle
Tag Untagged
Layer Default
Transform
Position X 0 Y 0 Z 0
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1
Sprite Renderer
Sprite Circle
Open Sprite Editor
Color
Flip
Draw Mode
Mask Interaction
Sprite Sort Point
Material
All
Player
Player
TankTreads
TurretPivot
OverheadCanvas
FollowCam
MinimapIcon
MinimapIcon
Static
Tag Untagged
Layer Minimap
Transform
Position X 0 Y 0 Z 0
Rotation X 0 Y 0 Z 0
Scale X 5 Y 5 Z 5
Sprite Renderer
Sprite Circle
Open Sprite Editor
Color
Flip X Y


T

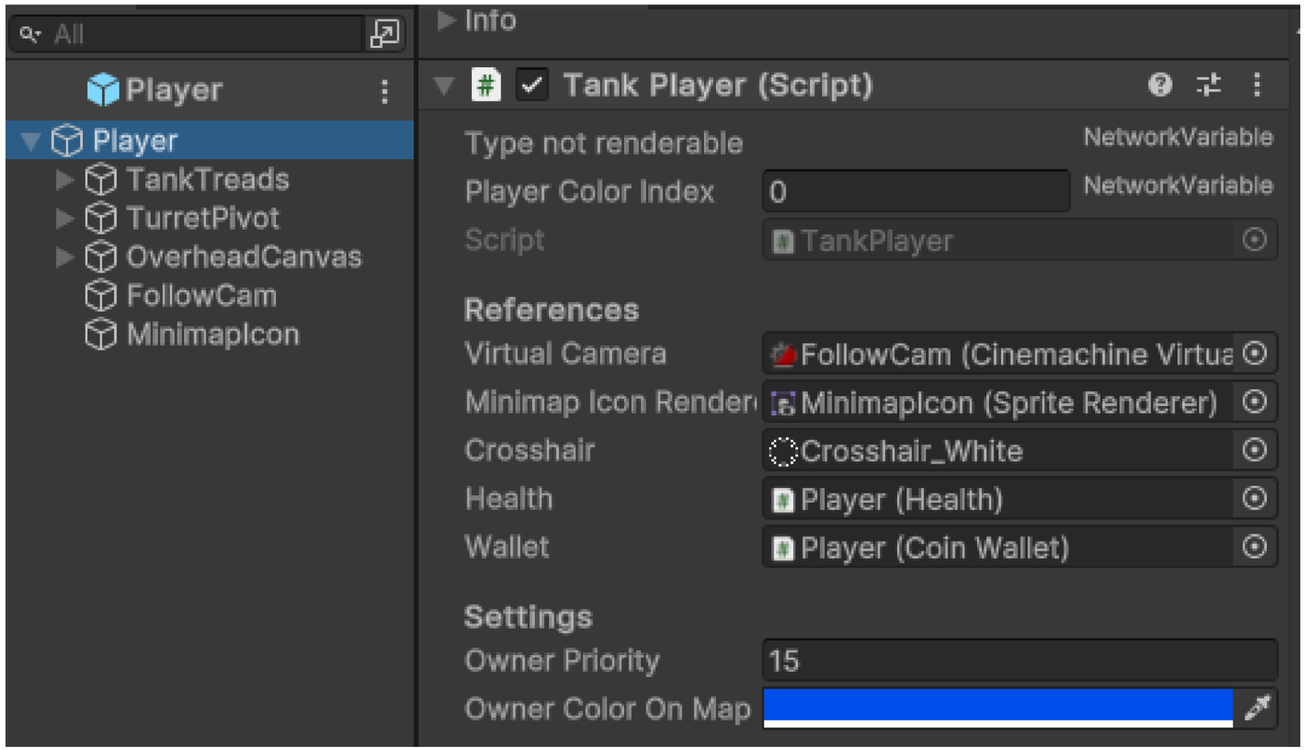
Owner Color

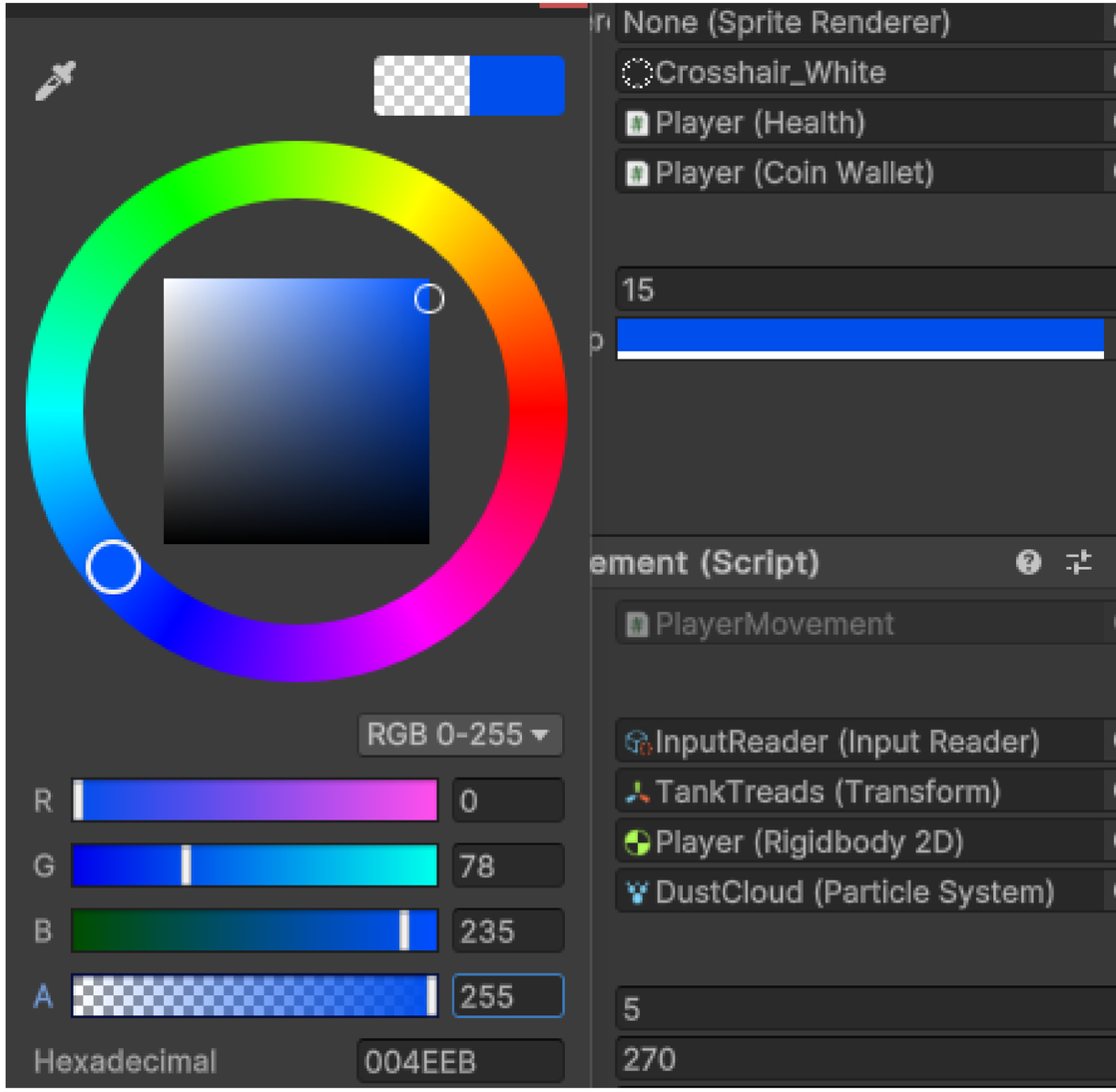
- Expose a reference to the minimap icon **SpriteRenderer**
- Expose a **Color** to let us pick what color our own player is shown as on the minimap
- Set the minimap icon **SpriteRenderer** color if we are the owner of this player




Unity Script (1 asset reference) | 32 references
public class TankPlayer : NetworkBehaviour
{
[Header("References")]
[SerializeField] private CinemachineVirtualCamera virtualCamera;
[SerializeField] private SpriteRenderer minimapIconRenderer;
[SerializeField] private Texture2D crosshair;
5 references
[field:SerializeField] public Health Health { get; private set; }
6 references
[field:SerializeField] public CoinWallet Wallet { get; private set; }
[Header("Settings")]
[SerializeField] private int ownerPriority = 15;
[SerializeField] private Color ownerColorOnMap;

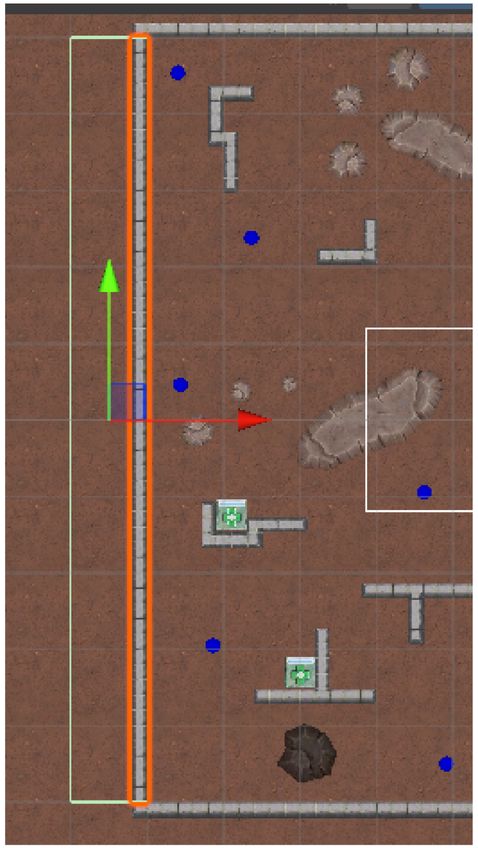
```
public override void OnNetworkSpawn()
{
    if (IsServer)
    {
        UserData userData =
            HostSingleton.Instance.GameManager.NetworkServer.GetUserDataByClientId(OwnerClientId);

        PlayerName.Value = userData.userName;
        PlayerColorIndex.Value = userData.userColorIndex;

        OnPlayerSpawned?.Invoke(this);
    }

    if (IsOwner)
    {
        virtualCamera.Priority = ownerPriority;

        minimapIconRenderer.color = ownerColorOnMap;

        Cursor.SetCursor(crosshair,new Vector2(crosshair.width/2, crosshair.height/2),CursorMode.Auto);
    }
}
```

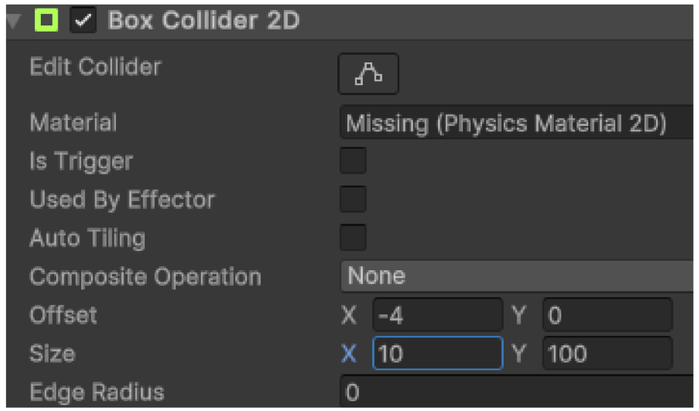

All
Player
Player
TankTreads
TurretPivot
OverheadCanvas
FollowCam
MinimapIcon
Info
Tank Player (Script)
Type not renderable
NetworkVariable
Player Color Index
0
NetworkVariable
Script
TankPlayer
References
Virtual Camera
FollowCam (Cinemachine Virtua
Minimap Icon Render
MinimapIcon (Sprite Renderer)
Crosshair
Crosshair_White
Health
Player (Health)
Wallet
Player (Coin Wallet)
Settings
Owner Priority
15
Owner Color On Map


None (Sprite Renderer)
Crosshair_White
Player (Health)
Player (Coin Wallet)
15
ement (Script)
PlayerMovement
RGB 0-255
R
0
G
78
B
235
A
255
Hexadecimal
004EEB
InputReader (Input Reader)
TankTreads (Transform)
Player (Rigidbody 2D)
DustCloud (Particle System)
5
270

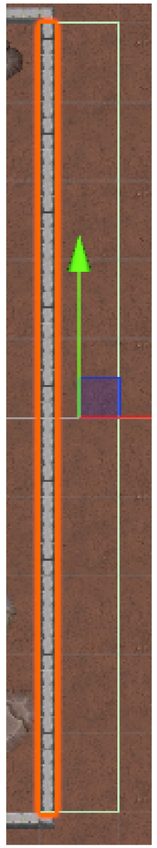

2. MewEditor (0)
MewBuild
MewEditor
For educational use only

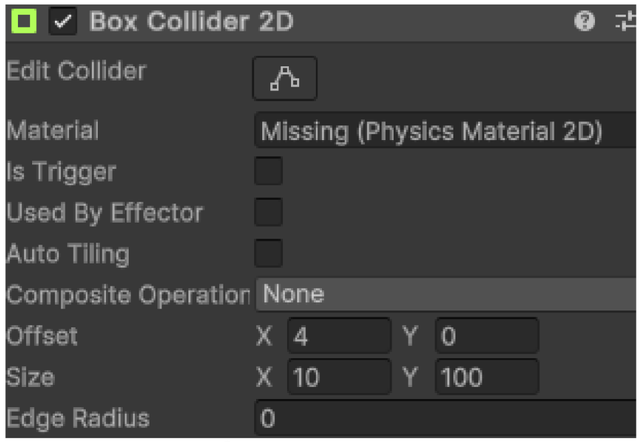
Gameplay Polish





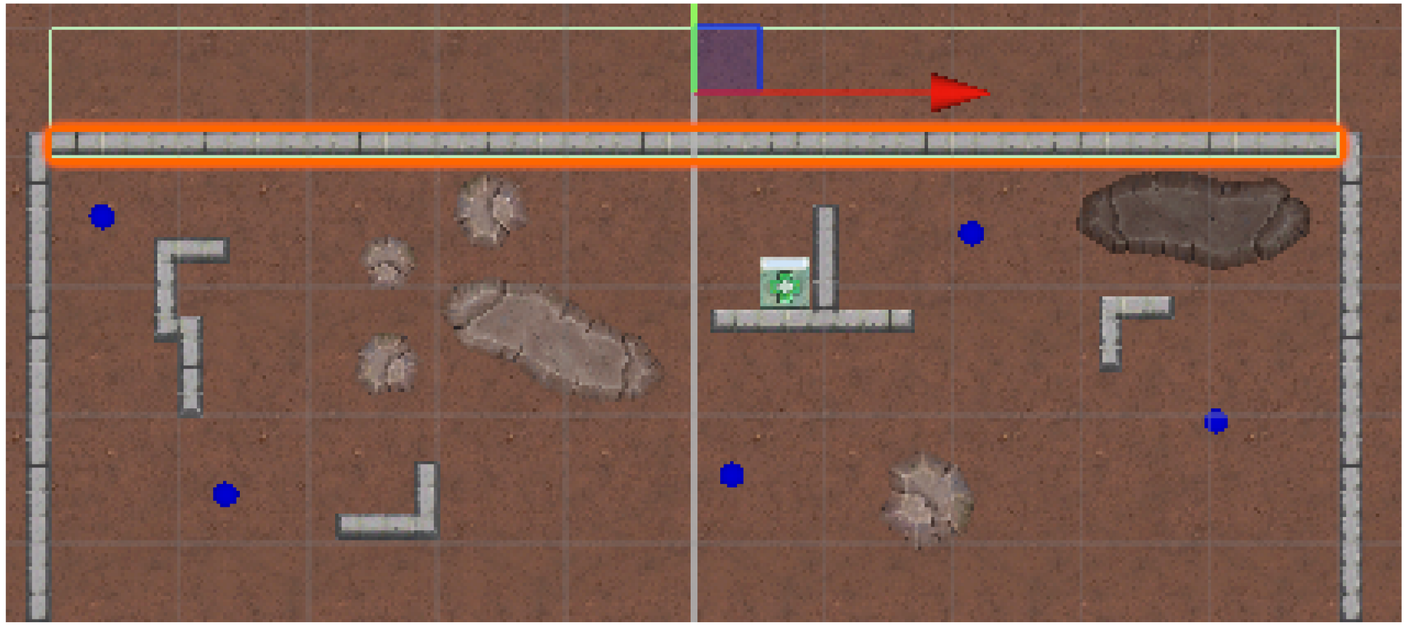
กำแพงซ้าย

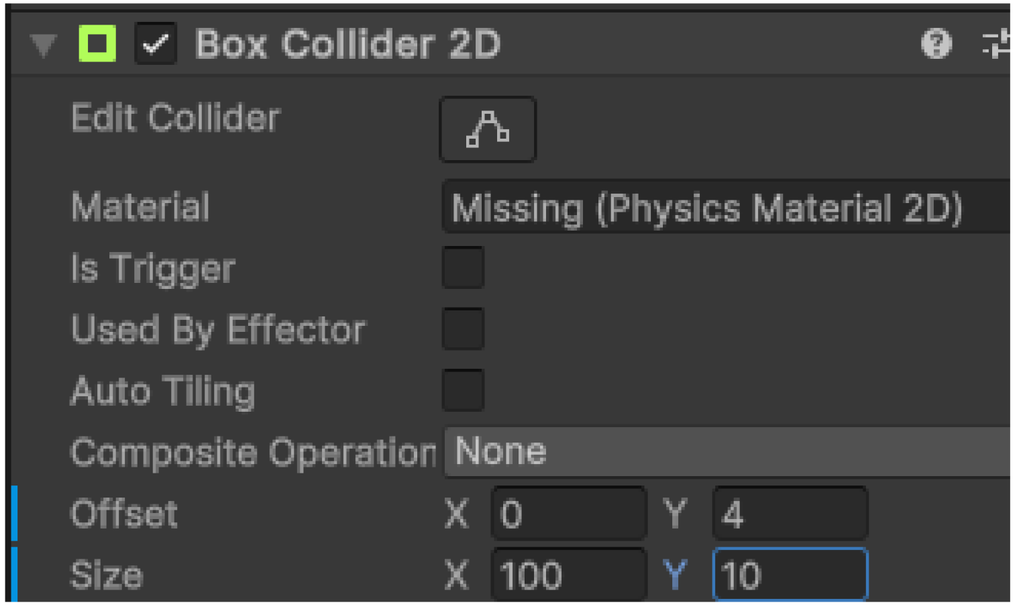


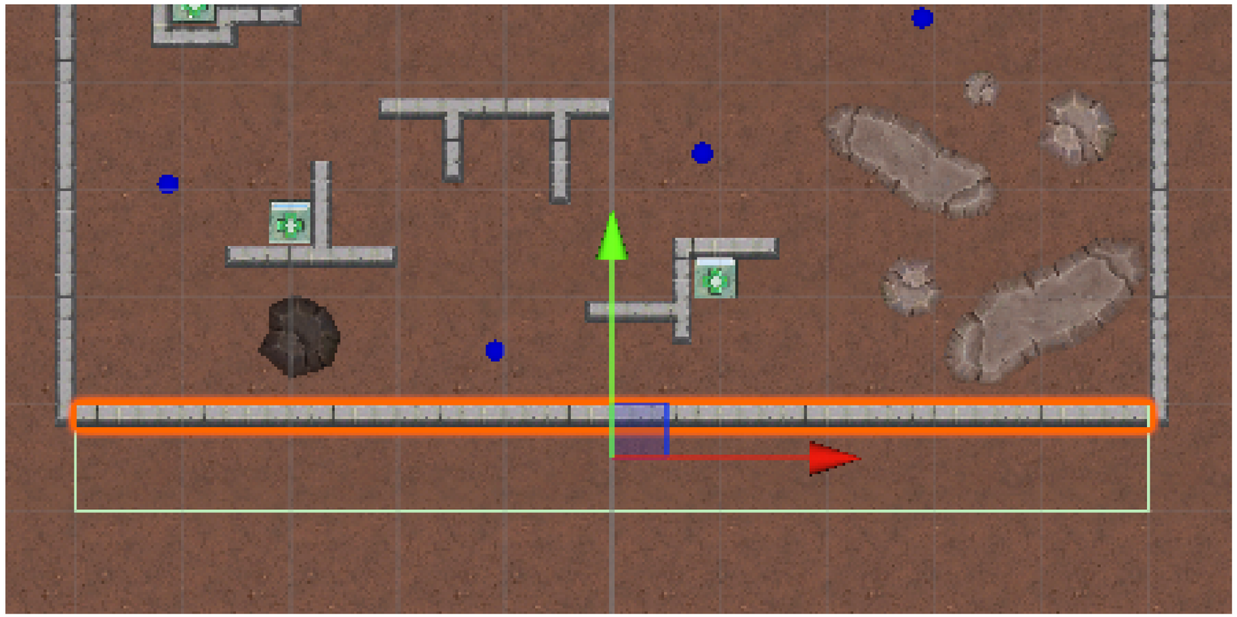


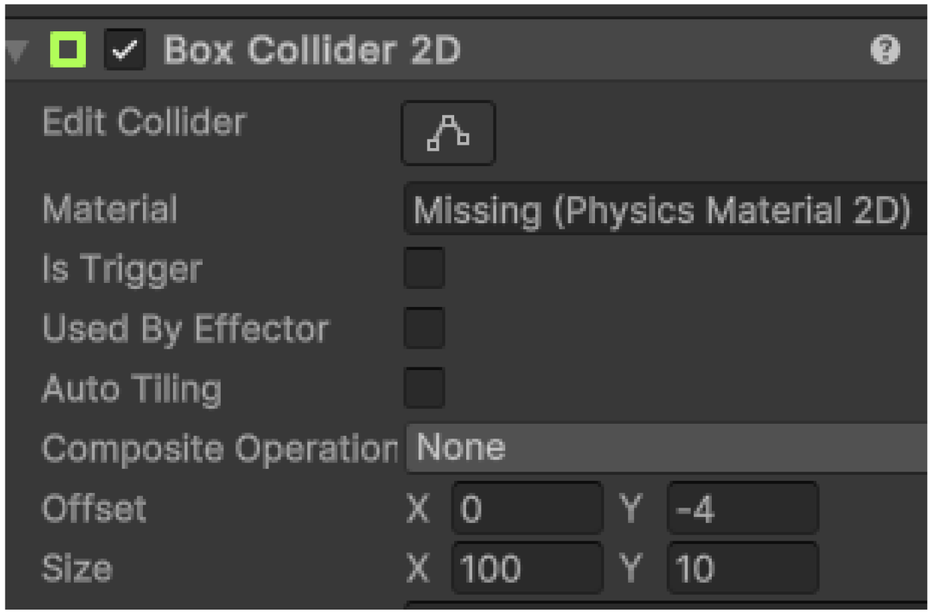
กำแพงขวา

กำแพงบน



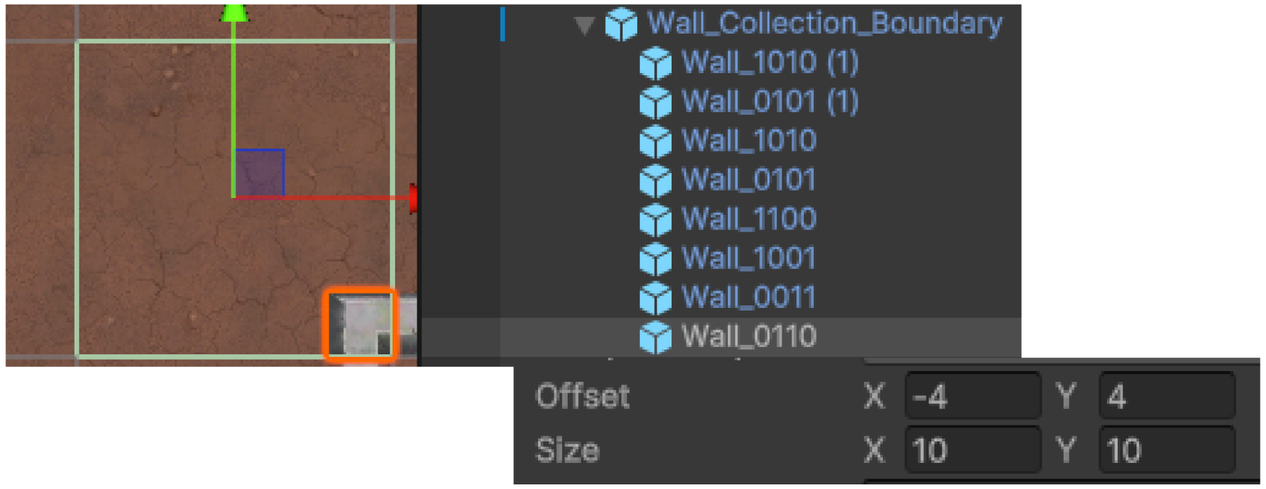




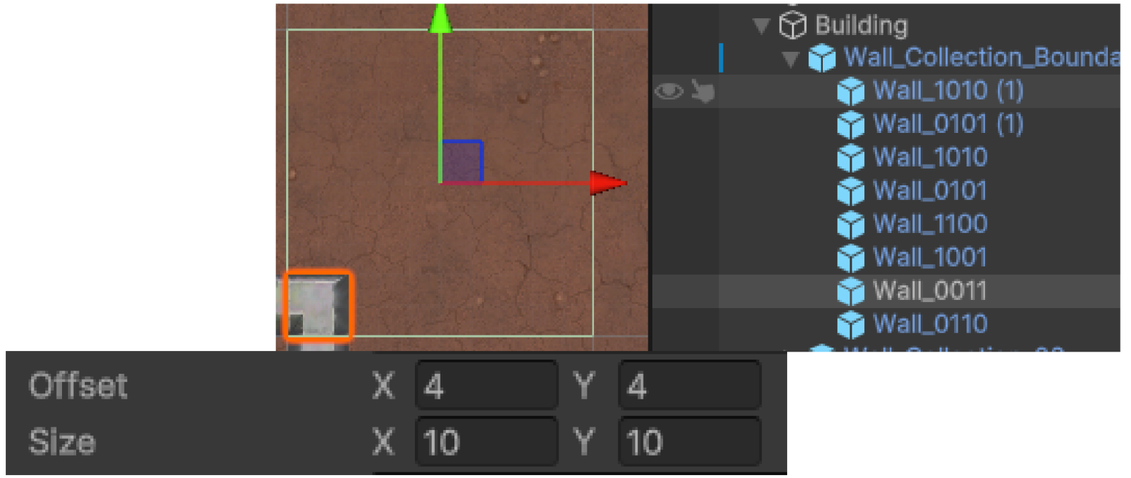


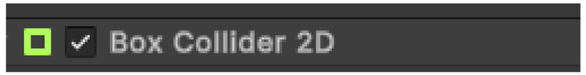
กำแพงล่าง

กำแพงซ้ายบน

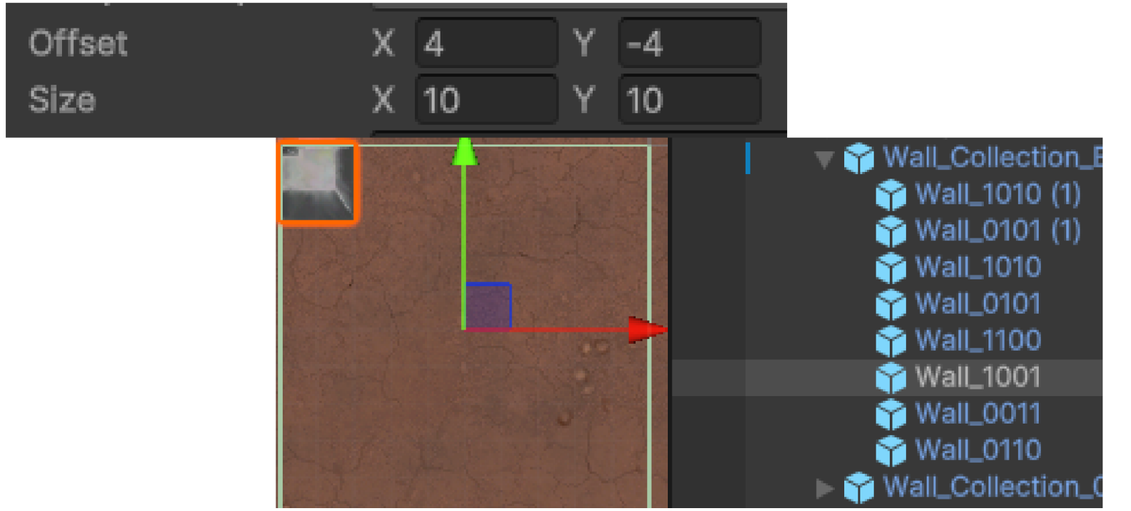


กำแพงขวาบน

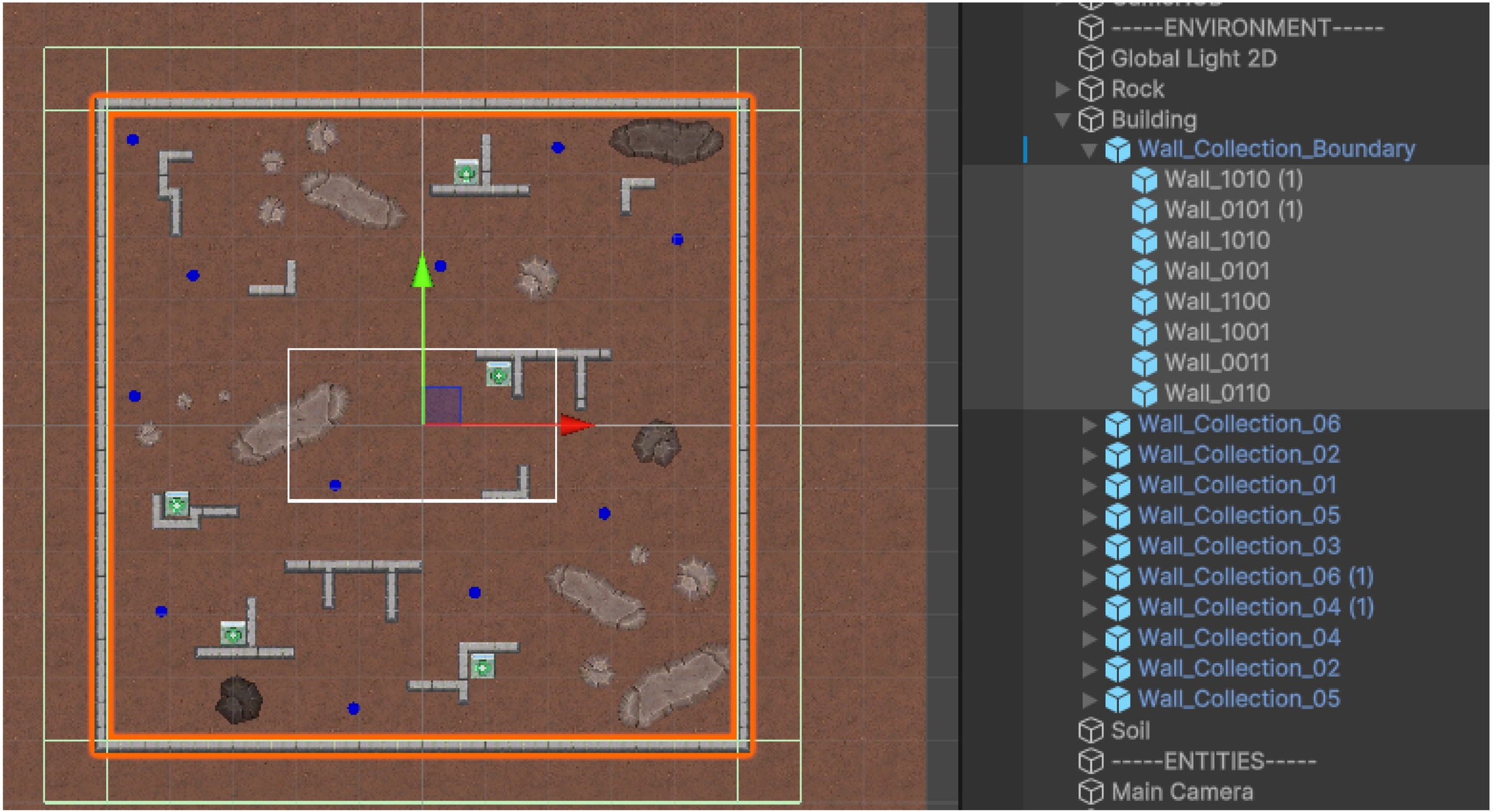




กำแพงซ้ายล่าง



กำแพงขวาล่าง


-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Wall_Collection_Boundary
Wall_1010 (1)
Wall_0101 (1)
Wall_1010
Wall_0101
Wall_1100
Wall_1001
Wall_0011
Wall_0110
Wall_Collection_06
Wall_Collection_02
Wall_Collection_01
Wall_Collection_05
Wall_Collection_03
Wall_Collection_06 (1)
Wall_Collection_04 (1)
Wall_Collection_04
Wall_Collection_02
Wall_Collection_05
Soil
-----ENTITIES-----
Main Camera


GameHUD
Canvas
LeaderboardBackground
Minimap
Button

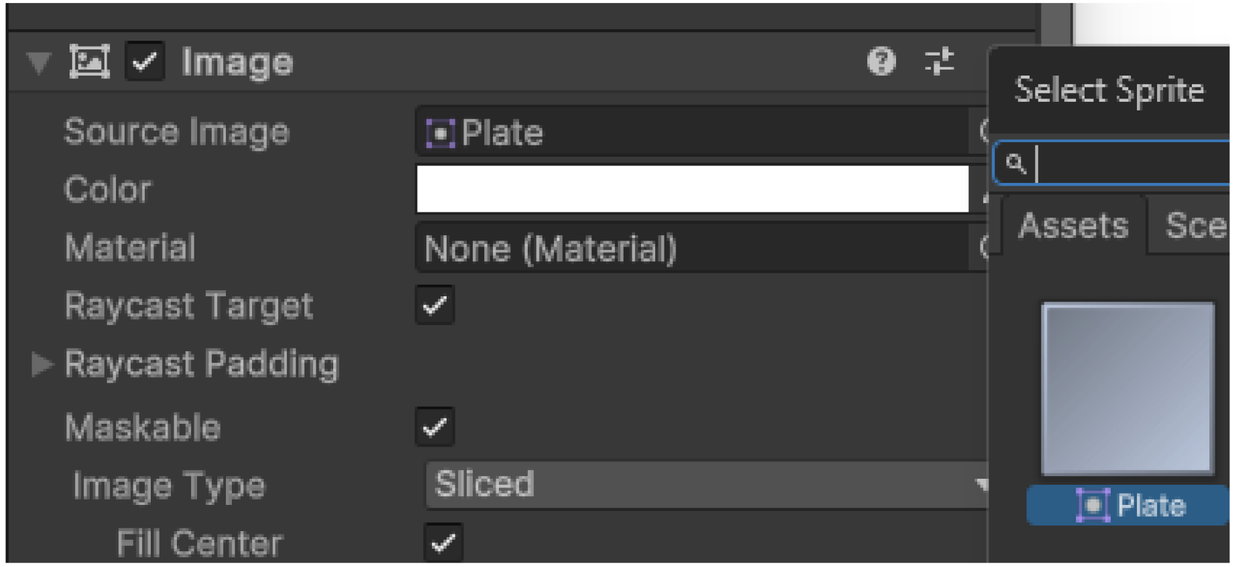
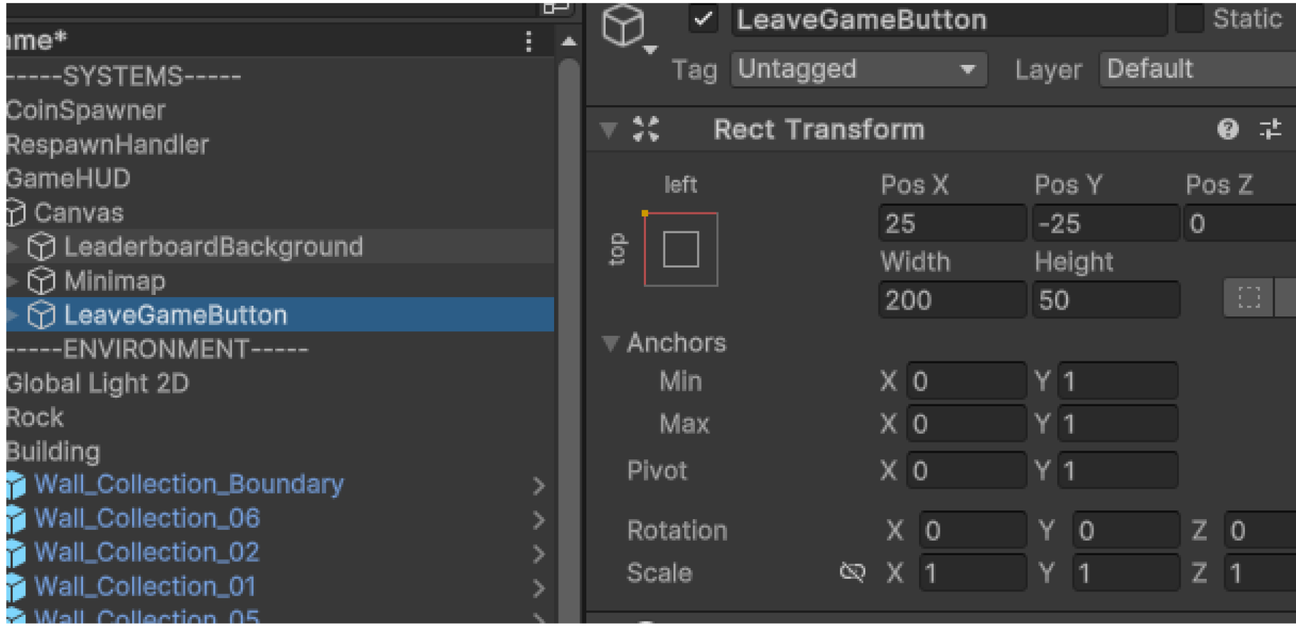
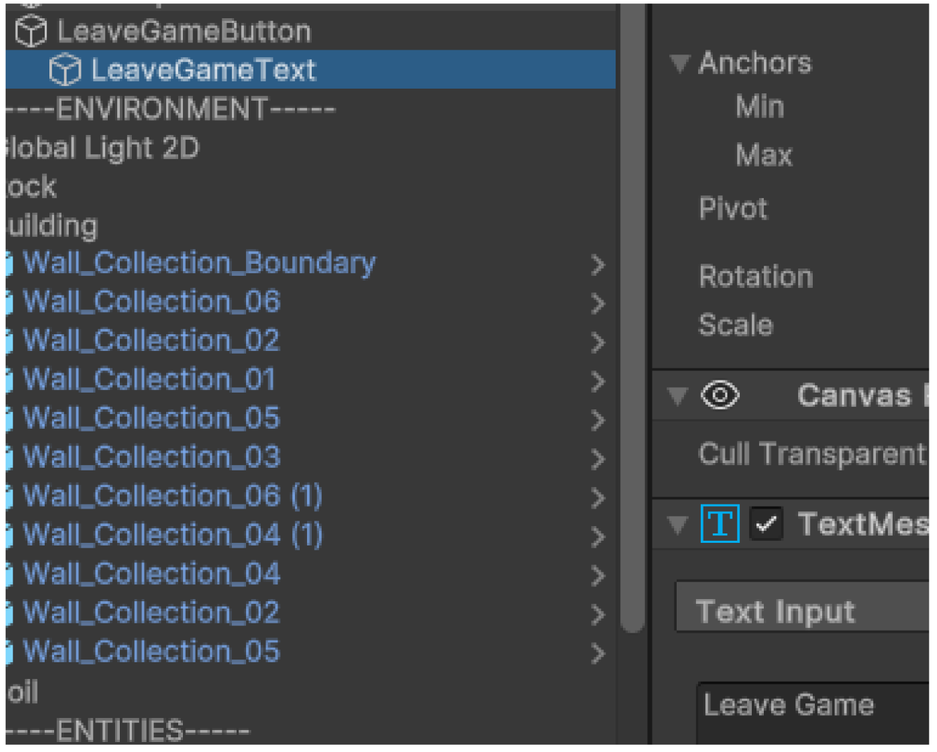


Image
Source Image
Plate
Color
Material
None (Material)
Raycast Target
Raycast Padding
Maskable
Image Type
Sliced
Fill Center
Select Sprite
Assets
Plate

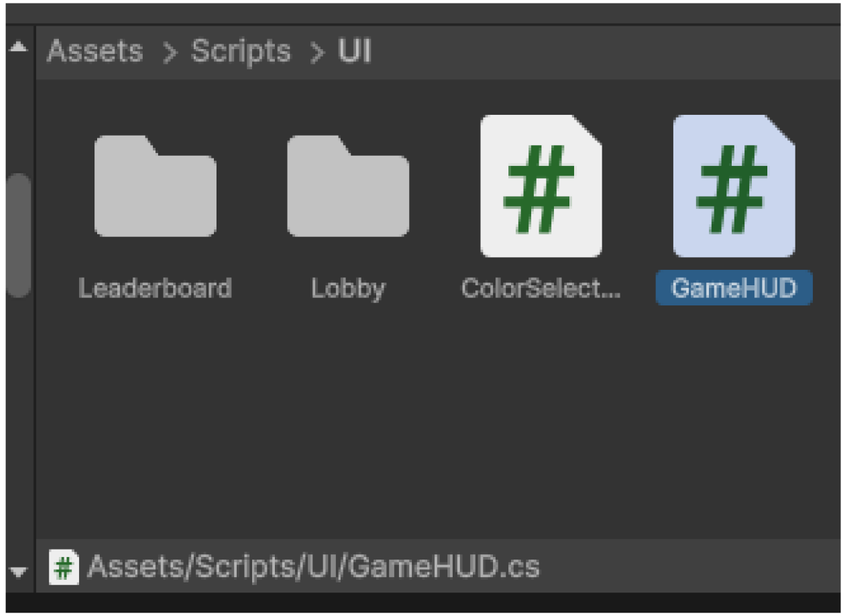

-----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
Canvas
LeaderboardBackground
Minimap
LeaveGameButton
-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Wall_Collection_Boundary
Wall_Collection_06
Wall_Collection_02
Wall_Collection_01
LeaveGameButton
Static
Tag
Untagged
Layer
Default
Rect Transform
left
top
Pos X
Pos Y
Pos Z
25
-25
0
Width
Height
200
50
Anchors
Min
Max
Pivot
Rotation
Scale


LeaveGameButton
LeaveGameText
----ENVIRONMENT-----
Wall_Collection_Boundary
Wall_Collection_06
Wall_Collection_02
Wall_Collection_01
Wall_Collection_05
Wall_Collection_03
Wall_Collection_06 (1)
Wall_Collection_04 (1)
Wall_Collection_04
Wall_Collection_02
Wall_Collection_05
----ENTITIES-----
Anchors
Min
Max
Pivot
Rotation
Scale
Cull Transparent
Text Input
Leave Game


Leave Game


Leave Game

GameHUD.cs




```
1   using System.Collections;
2   using System.Collections.Generic;
3   using Unity.Netcode;
4   using UnityEngine;
5
        Unity Script | 0 references
6   public class GameHUD : MonoBehaviour
7   {
            0 references
8       public void LeaveGame()
9       {
10          if (NetworkManager.Singleton.IsHost)
11          {
12              HostSingleton.Instance.GameManager.Shutdown();
13          }
14      }
15  }
16
```

HostGameManager.cs

```
public void Dispose()
{
    Shutdown();
}
2 references
public async void Shutdown()
{
    HostSingleton.Instance.StopCoroutine(nameof(HeartbeatLobby));
    if (!string.IsNullOrEmpty(lobbyId))
    {
        try
        {
            await Lobbies.Instance.DeleteLobbyAsync(lobbyId);
        }
        catch (LobbyServiceException e)
        {
            Debug.Log(e);
        }

        lobbyId = string.Empty;
    }
    NetworkServer?.Dispose();
}
```

NetworkServer.cs

```
 7    public class NetworkServer : IDisposable
 8    {
 9        private NetworkManager networkManager;
10
11        public Action<string> OnClientLeft;
12
```

```
private void OnClientDisconnect(ulong clientId)
{
    if(clientIdToAuth.TryGetValue(clientId,out string authId))
    {
        clientIdToAuth.Remove(clientId);
        authIdToUserData.Remove(authId);
        OnClientLeft?.Invoke(authId);
    }
}
```

HostGameManager.cs

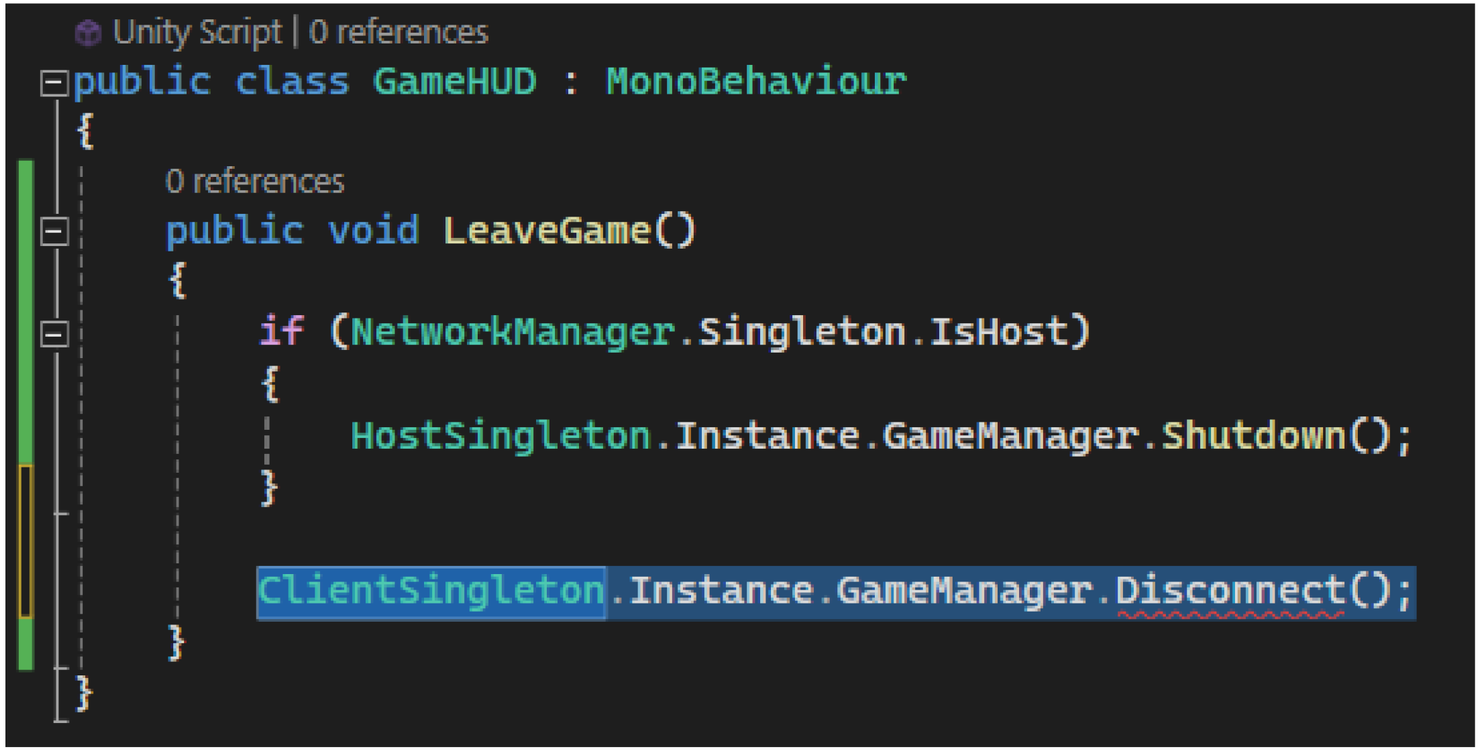
```
92
93          NetworkManager.Singleton.NetworkConfig.ConnectionData = payloadBytes;
94
95          NetworkManager.Singleton.StartHost();
96
97          NetworkServer.OnClientLeft += HandleClientLeft;
98
99          NetworkManager.Singleton.SceneManager.LoadScene(GameSceneName, LoadSceneMode.Single);
100     }
101
```

```
public async void Shutdown()
{
    HostSingleton.Instance.StopCoroutine(nameof(HeartbeatLobby));
    if (!string.IsNullOrEmpty(lobbyId))
    {
        try
        {
            await Lobbies.Instance.DeleteLobbyAsync(lobbyId);
        }
        catch (LobbyServiceException e)
        {
            Debug.Log(e);
        }

        lobbyId = string.Empty;
    }

    NetworkServer.OnClientLeft -= HandleClientLeft;

    NetworkServer?.Dispose();
}
```

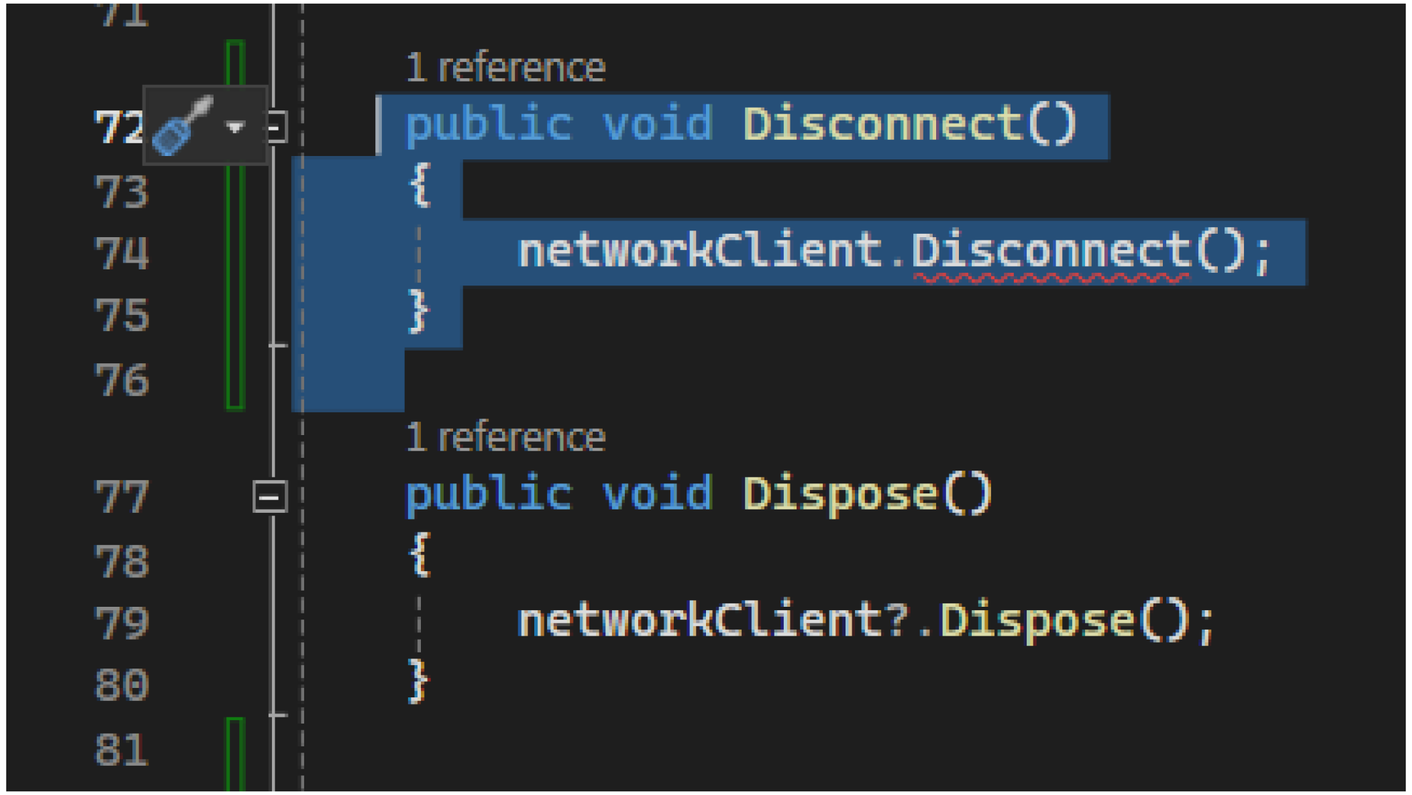
HostGameManager.cs

```
2 references
private async void HandleClientLeft(string authId)
{
    try
    {
        await LobbyService.Instance.RemovePlayerAsync(lobbyId, authId);
    }
    catch (LobbyServiceException e)
    {
        Debug.Log(e);
    }
}
```

GameHUD.cs

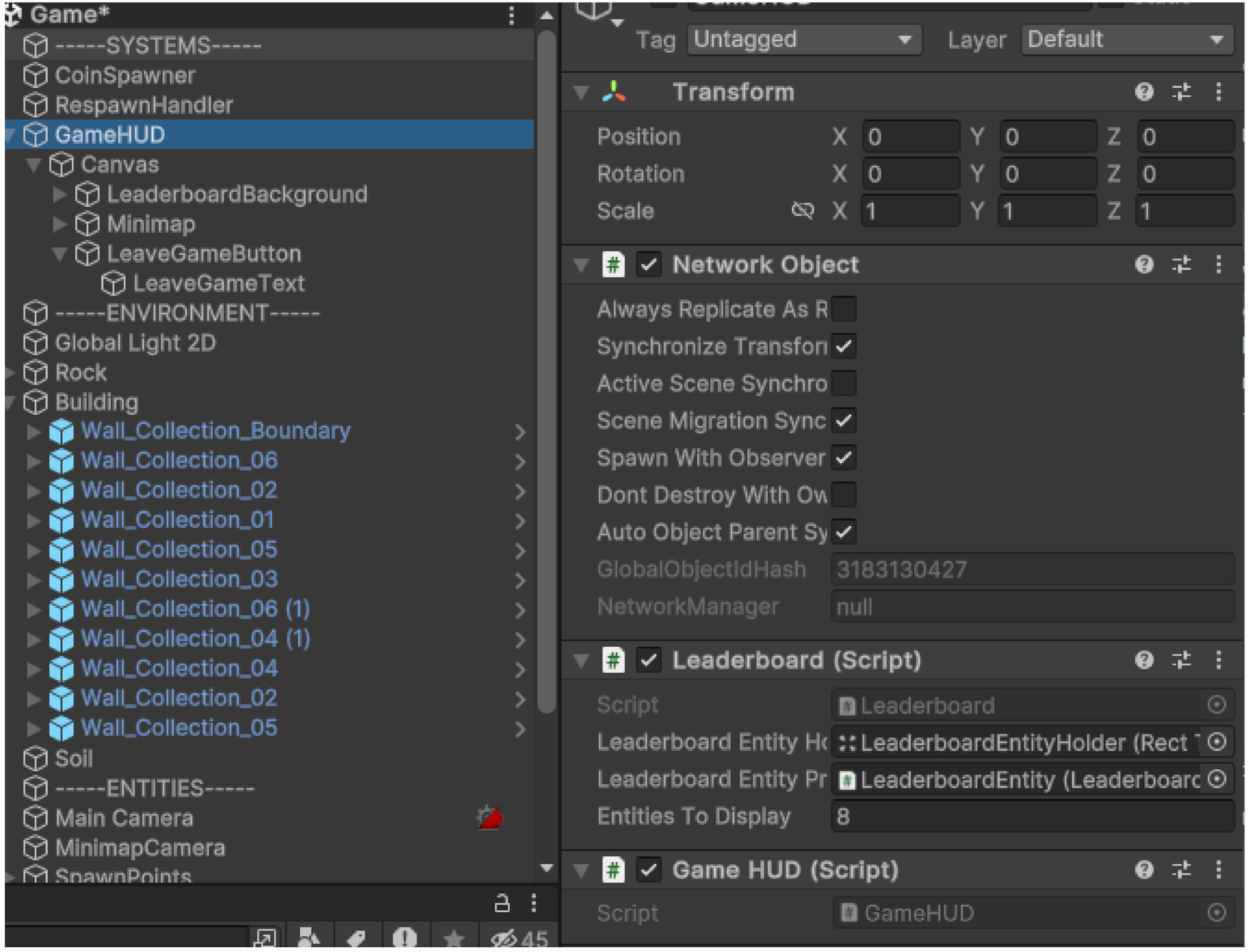

Unity Script | 0 references
public class GameHUD : MonoBehaviour
{
0 references
public void LeaveGame()
{
if (NetworkManager.Singleton.IsHost)
{
HostSingleton.Instance.GameManager.Shutdown();
}
ClientSingleton.Instance.GameManager.Disconnect();
}
}

ClientGameManager.cs

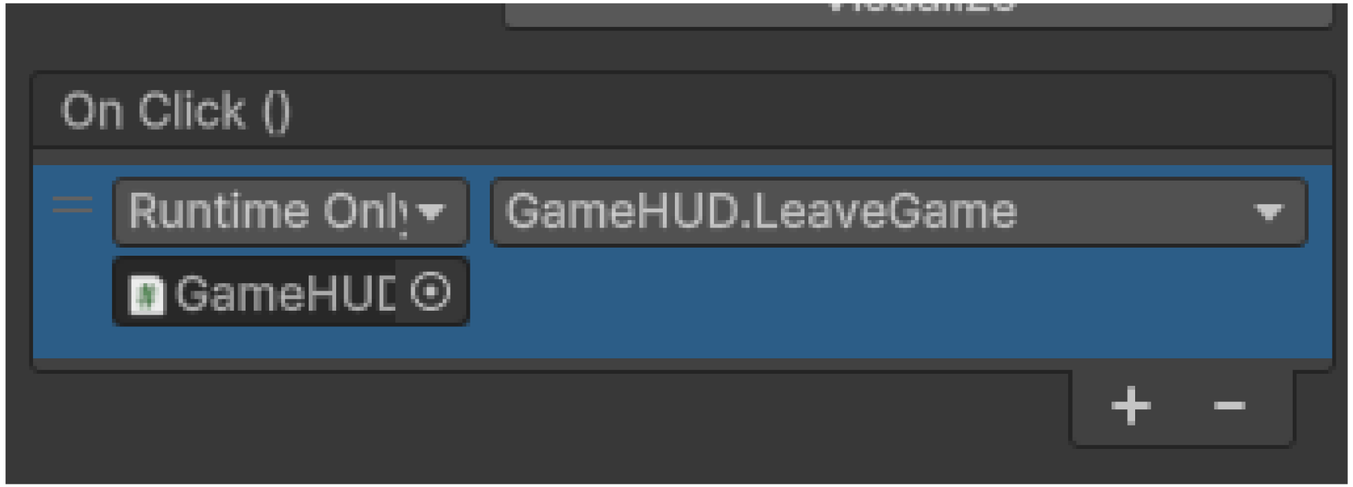


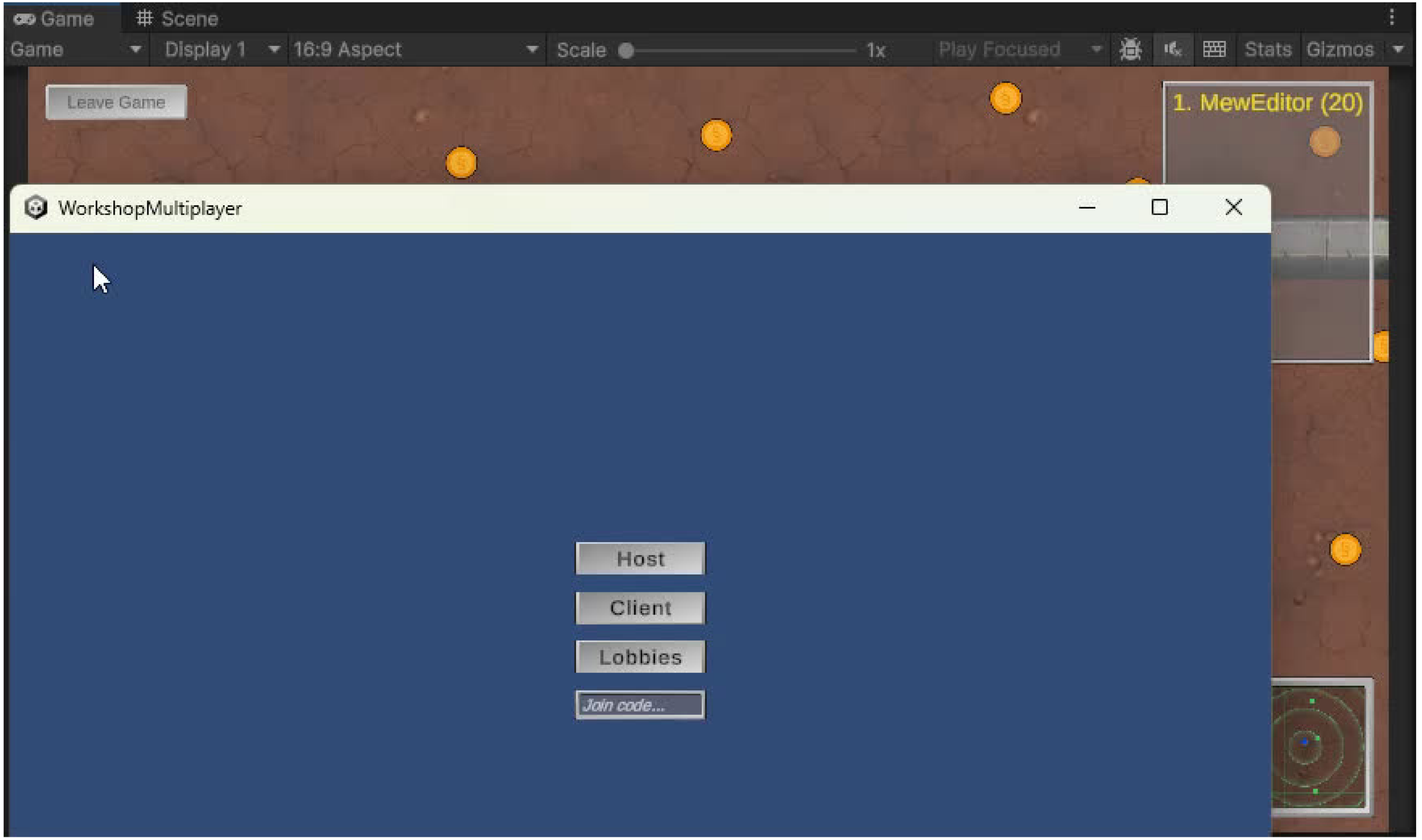
NetworkClient.cs

```
2 references
private void OnClientDisconnect(ulong clientId)
{
    if(clientId != 0 && clientId != networkManager.LocalClientId) { return; }

    Disconnect();
}
2 references
public void Disconnect()
{
    if (SceneManager.GetActiveScene().name != MenuSceneName)
    {
        SceneManager.LoadScene(MenuSceneName);
    }

    if (networkManager.IsConnectedClient)
    {
        networkManager.Shutdown();
    }
}
```

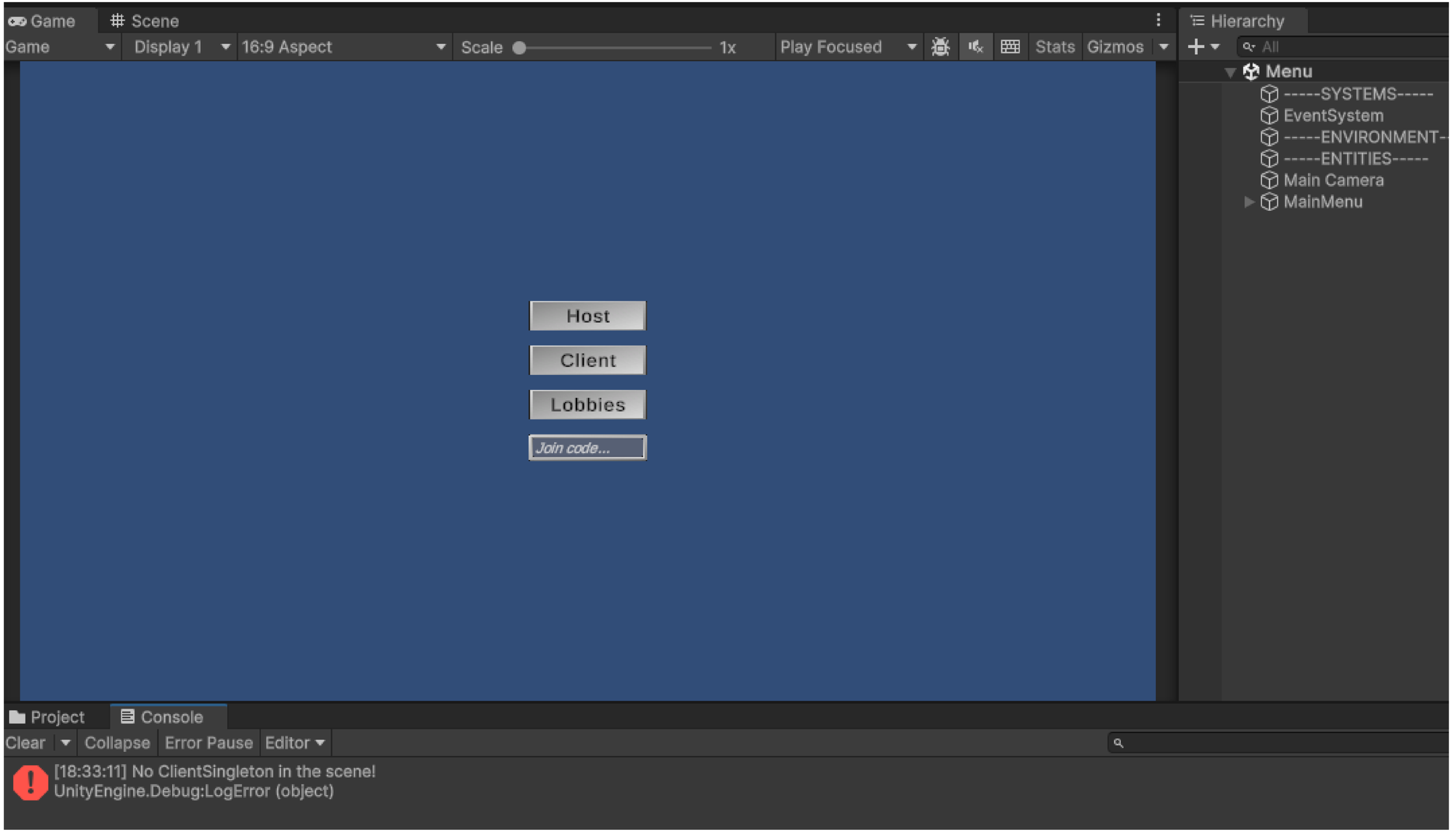

Game*
-----SYSTEMS-----
CoinSpawner
RespawnHandler
GameHUD
Canvas
LeaderboardBackground
Minimap
LeaveGameButton
LeaveGameText
-----ENVIRONMENT-----
Global Light 2D
Rock
Building
Wall_Collection_Boundary
Wall_Collection_06
Wall_Collection_02
Wall_Collection_01
Wall_Collection_05
Wall_Collection_03
Wall_Collection_06 (1)
Wall_Collection_04 (1)
Wall_Collection_04
Wall_Collection_02
Wall_Collection_05
Soil
-----ENTITIES-----
Main Camera
MinimapCamera
SpawnPoints
Tag Untagged
Layer Default
Transform
Position X 0 Y 0 Z 0
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1
Network Object
Always Replicate As R
Synchronize Transfori
Active Scene Synchro
Scene Migration Sync
Spawn With Observer
Dont Destroy With Ow
Auto Object Parent Sy
GlobalObjectIdHash 3183130427
NetworkManager null
Leaderboard (Script)
Script Leaderboard
Leaderboard Entity Ho LeaderboardEntityHolder (Rect
Leaderboard Entity Pr LeaderboardEntity (Leaderboarc
Entities To Display 8
Game HUD (Script)
Script GameHUD


GameHUD
Canvas
LeaderboardBackgroun
Minimap
LeaveGameButton


On Click ()
Runtime Onl
GameHUD.LeaveGame
GameHUD


Game
Scene
Game
Display 1
16:9 Aspect
Scale
1x
Play Focused
Stats
Gizmos
Leave Game
1. MewEditor (20)
WorkshopMultiplayer
Host
Client
Lobbies
Join code...

Section Cleanup


Game
Scene
Game
Display 1
16:9 Aspect
Scale
1x
Play Focused
Stats
Gizmos
Host
Client
Lobbies
Join code...
Hierarchy
All
Menu
-----SYSTEMS-----
EventSystem
-----ENVIRONMENT-
-----ENTITIES-----
Main Camera
MainMenu
Project
Console
Clear
Collapse
Error Pause
Editor
[18:33:11] No ClientSingleton in the scene!
UnityEngine.Debug:LogError (object)

ClientSingleton.cs

```
Unity Script (1 asset reference) | 9 references
public class ClientSingleton : MonoBehaviour
{
    private static ClientSingleton instance;
    7 references
    public ClientGameManager GameManager {  get; private set; }

    4 references
    public static ClientSingleton Instance
    {
        get
        {
            if(instance != null) { return instance; }
            instance = FindFirstObjectByType<ClientSingleton>();

            if(instance == null)
            {
                //Debug.LogError("No ClientSingleton in the scene!");
                return null;
            }
            return instance;
        }

    }
```

HostSingleton.cs

```
public class HostSingleton : MonoBehaviour
{
    private static HostSingleton instance;

    5 references
    public HostGameManager GameManager { get; private set; }

    5 references
    public static HostSingleton Instance
    {
        get
        {
            if(instance != null) { return instance; }
            instance = FindFirstObjectByType<HostSingleton>();

            if(instance == null)
            {
                //Debug.LogError("No HostSingleton in the scene!");
                return null;
            }
            return instance;
        }

    }
```

SpawnOnDestroy.cs

```
1   using System.Collections;
2   using System.Collections.Generic;
3   using UnityEngine;
4
        Unity Script (1 asset reference) | 0 references
5   public class SpawnOnDestroy : MonoBehaviour
6   {
7       [SerializeField] private GameObject prefab;
8
            Unity Message | 0 references
9       private void OnDestroy()
10      {
11          if(!gameObject.scene.isLoaded) { return; }
12          Instantiate(prefab,transform.position,Quaternion.identity);
13      }
14  }
15
```

Leaderboard.cs

```
3 references
61  private void HandleLeaderboardEntitiesChanged(NetworkListEvent<LeaderboardEntityState> changeEvent)
62  {
63      if (!gameObject.scene.isLoaded) { return; }
64
65      switch (changeEvent.Type)
66      {
67          case NetworkListEvent<LeaderboardEntityState>.EventType.Add:
68              if(!entityDisplays.Any(x=>x.ClientId == changeEvent.Value.ClientId))
69              {
70                  LeaderboardEntityDisplay leaderboardEntity =
71                      Instantiate(leaderboardEntityPrefab, leaderboardEntityHolder);
72                  leaderboardEntity.Initialise(
73                      changeEvent.Value.ClientId,
74                      changeEvent.Value.PlayerName,
75                      changeEvent.Value.Coins);
76                  entityDisplays.Add(leaderboardEntity);
77              }
78              break;
79          case NetworkListEvent<LeaderboardEntityState>.EventType.Remove:
80              LeaderboardEntityDisplay displayToRemove =
81                  entityDisplays.FirstOrDefault(x => x.ClientId == changeEvent.Value.ClientId);
```

No issues found

Leaderboard.cs

```
2 references
private void HandlePlayerDespawned(TankPlayer player)
{
    if(NetworkManager.ShutdownInProgress) { return; }
    foreach (LeaderboardEntityState entity in leaderboardEntities)
    {
        if(entity.ClientId != player.OwnerClientId) { continue; }
        leaderboardEntities.Remove(entity);
        break;
    }
    player.Wallet.TotalCoins.OnValueChanged -= (oldCoins, newCoins) =>
        HandleCoinsChanged(player.OwnerClientId, newCoins);
}
```

ProjectileLauncher.cs

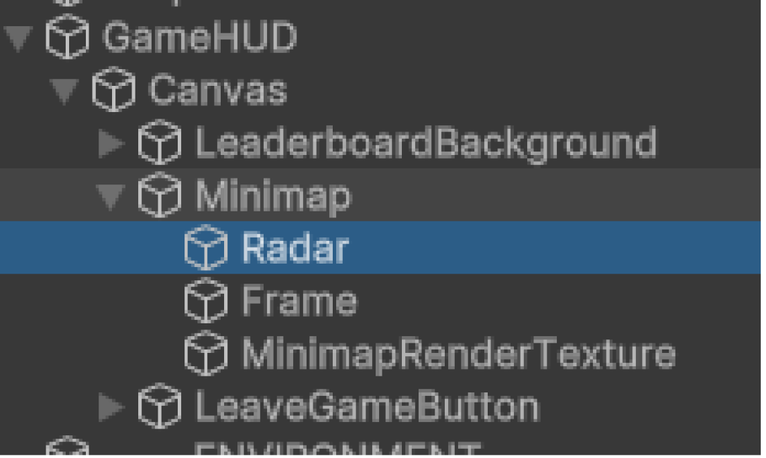
```
1   using System.Collections;
2   using System.Collections.Generic;
3   using Unity.Netcode;
4   using UnityEngine;
5   using UnityEngine.EventSystems;
6
    Unity Script (1 asset reference) | 0 references
7   public class ProjectileLauncher :
```

```
    Unity Script (1 asset reference) | 0 references
6   public class ProjectileLauncher : NetworkBehaviour
7   {
8       [Header("References")]
9       [SerializeField] private InputReader inputReader;
10      [SerializeField] private CoinWallet wallet;
11      [SerializeField] private Transform projectileSpawnPoint;
12      [SerializeField] private GameObject serverProjectilePrefab
13      [SerializeField] private GameObject clientProjectilePrefab
14      [SerializeField] private GameObject muzzleFlash;
15      [SerializeField] private Collider2D playerCollider;
16
17      [Header("Settings")]
18      [SerializeField] private float projectileSpeed;
19      [SerializeField] private float fireRate;
20      [SerializeField] private float muzzleFlashDuration;
21      [SerializeField] private int costToFire;
22
23      private bool isPointerOverUI;
24      private bool shouldFire;
25      private float timer;
26      private float muzzleFlashTimer;
27
```

ProjectileLauncher.cs

```
Unity Message | 0 references
void Update()
{
    if (muzzleFlashTimer > 0f)
    {
        muzzleFlashTimer -= Time.deltaTime;

        if (muzzleFlashTimer <= 0f)
        {
            muzzleFlash.SetActive(false);
        }
    }

    if(!IsOwner) { return; }
    isPointerOverUI = EventSystem.current.IsPointerOverGameObject();

    if(timer > 0)
    {
        timer -= Time.deltaTime;
    }
    if(!shouldFire) { return; }
    if(timer > 0){ return; }

    if(wallet.TotalCoins.Value < costToFire) { return ; }

    PrimaryFireServerRpc(projectileSpawnPoint.position, projectileSpawnPoint.up);
    SpawnDummyProjectile(projectileSpawnPoint.position, projectileSpawnPoint.up);

    timer = 1 / fireRate;
}
```

```
2 references
private void HandlePrimaryFire(bool shouldFire)
{
    if (shouldFire)
    {
        if (isPointerOverUI){ return; }
    }
    this.shouldFire = shouldFire;
}
```


GameHUD
Canvas
LeaderboardBackground
Minimap
Radar
Frame
MinimapRenderTexture
LeaveGameButton

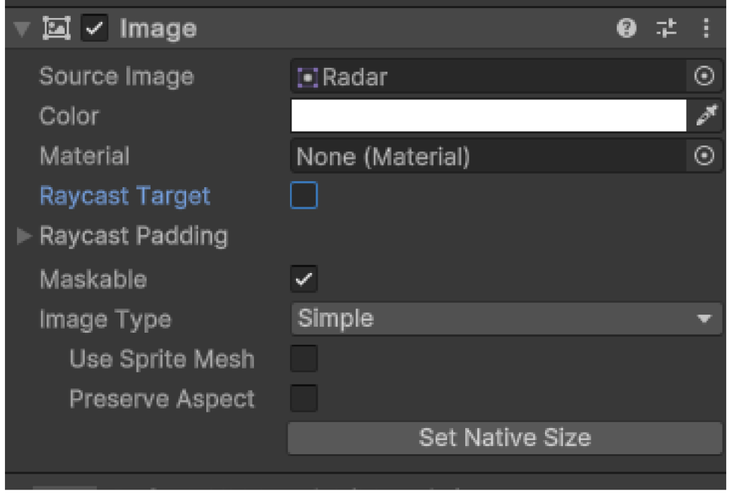


Image
Source Image
Radar
Color
Material
None (Material)
Raycast Target
Raycast Padding
Maskable
Image Type
Simple
Use Sprite Mesh
Preserve Aspect
Set Native Size


Minimap
Radar
Frame
MinimapRenderTexture

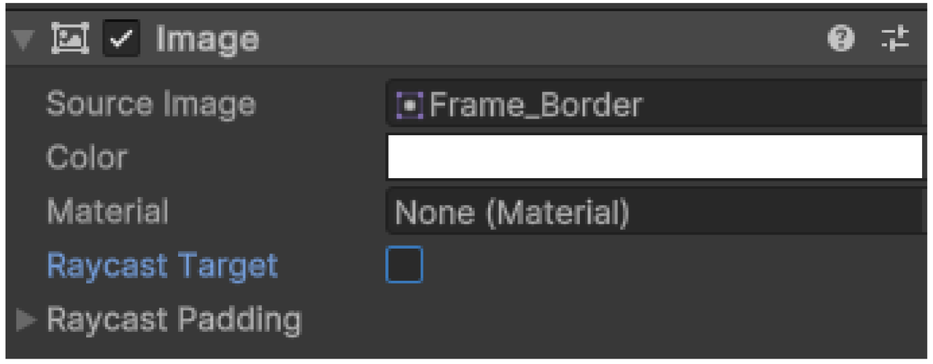
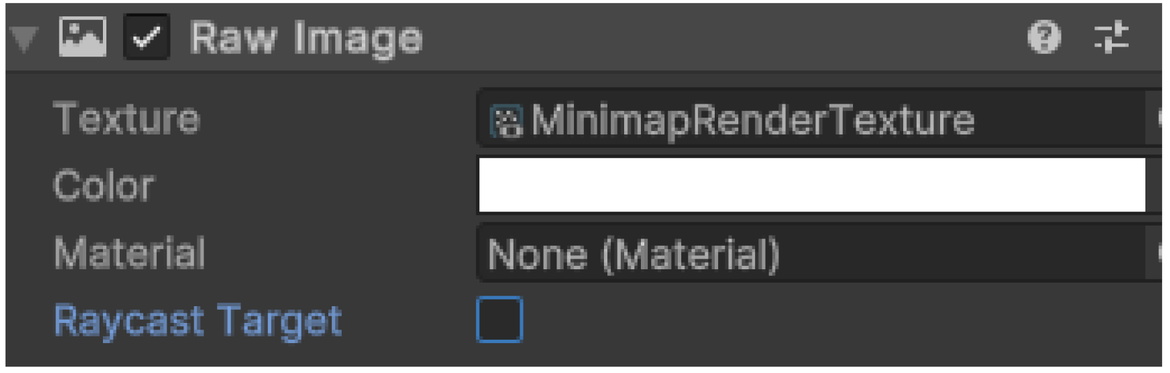


Image
Source Image
Frame_Border
Color
Material
None (Material)
Raycast Target
Raycast Padding


Minimap
Radar
Frame
MinimapRenderTexture


Raw Image
Texture
MinimapRenderTexture
Color
Material
None (Material)
Raycast Target


GameHUD
Canvas
LeaderboardBackground
Minimap
LeaveGameButton

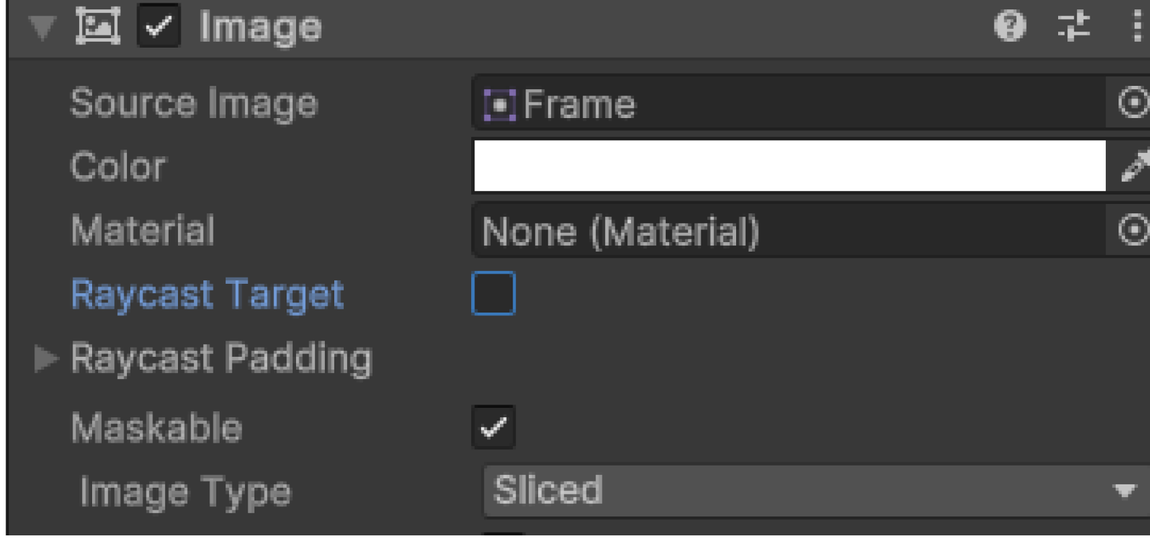
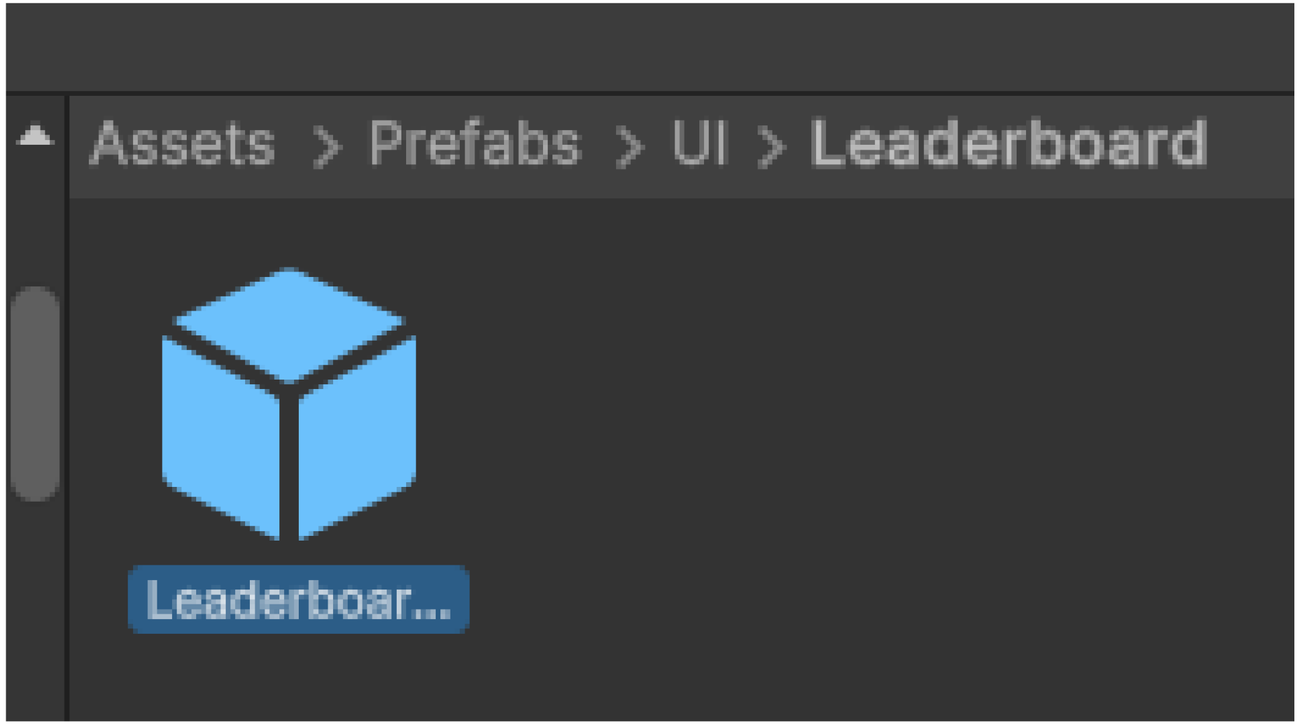
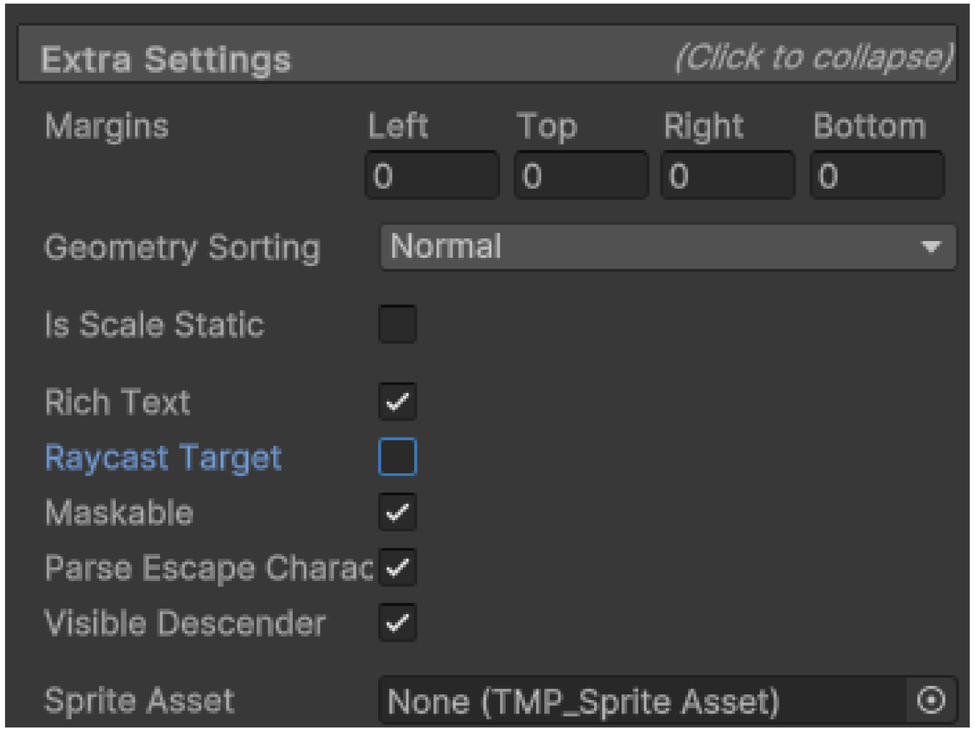


Image
Source Image
Frame
Color
Material
None (Material)
Raycast Target
Raycast Padding
Maskable
Image Type
Sliced


Assets > Prefabs > UI > Leaderboard
Leaderboar...


Extra Settings
(Click to collapse)
Margins
Left
Top
Right
Bottom
0
0
0
0
Geometry Sorting
Normal
Is Scale Static
Rich Text
Raycast Target
Maskable
Parse Escape Charac
Visible Descender
Sprite Asset
None (TMP_Sprite Asset)

Assignment

ให้ทำการถ่ายคลิปผลลัพธ์ของการทำ Workshop ตามเนื้อหา Workshop ในแต่ละหัวข้อนี้พร้อมอธิบายประกอบ

- Healing Zone Setup
- Restoring Health
- Mini Map
- Gameplay Polish
- Section Cleanup

เสริม สำหรับใครที่ต้องการ JoinCode มาแสดงใน Text UI ในฉาก

```
18  public class HostGameManager : IDisposable
19  {
20      private Allocation allocation;
        3 references
21      public string JoinCode { private set; get; }
22      private string lobbyId;
23
        3 references
24      public NetworkServer NetworkServer { get; private set; }
25
26      private const int MaxConnections = 20;
27      private const string GameSceneName = "Game";
        1 reference
28      public async Task StartHostAsync()
29      {
30          try
31          {
32              allocation = await Relay.Instance.CreateAllocationAsync(MaxConnections);
33          }
34          catch(Exception e)
35          {
36              Debug.Log(e);
37              return;
38          }
39
40          try
41          {
42              JoinCode = await Relay.Instance.GetJoinCodeAsync(allocation.AllocationId);
43              Debug.Log(JoinCode);
44          }
```

```
try
{
    CreateLobbyOptions lobbyOptions = new CreateLobbyOptions();
    lobbyOptions.IsPrivate = false;
    lobbyOptions.Data = new Dictionary<string, DataObject>()
    {
        {
            "JoinCode", new DataObject(
                visibility: DataObject.VisibilityOptions.Member,
            value: JoinCode
            )
        }
    };
    string playerName = PlayerPrefs.GetString(NameSelector.PlayerNameKey, "Unknown");
    Lobby lobby = await Lobbies.Instance.CreateLobbyAsync(
        $"{playerName}'s Lobby", MaxConnections, lobbyOptions);
    lobbyId = lobby.Id;

    HostSingleton.Instance.StartCoroutine(HeartbeatLobby(15));
}
catch (LobbyServiceException e)
{
    Debug.Log(e);
    return;
}
```

```
HostSingleton.Instance.GameManager.JoinCode;
```

https://discord.gg/24xmUFHfzR

WOLVEDEN ACADEMY

THANK YOU

facebook.com/GameDevMew