

1. Basic:

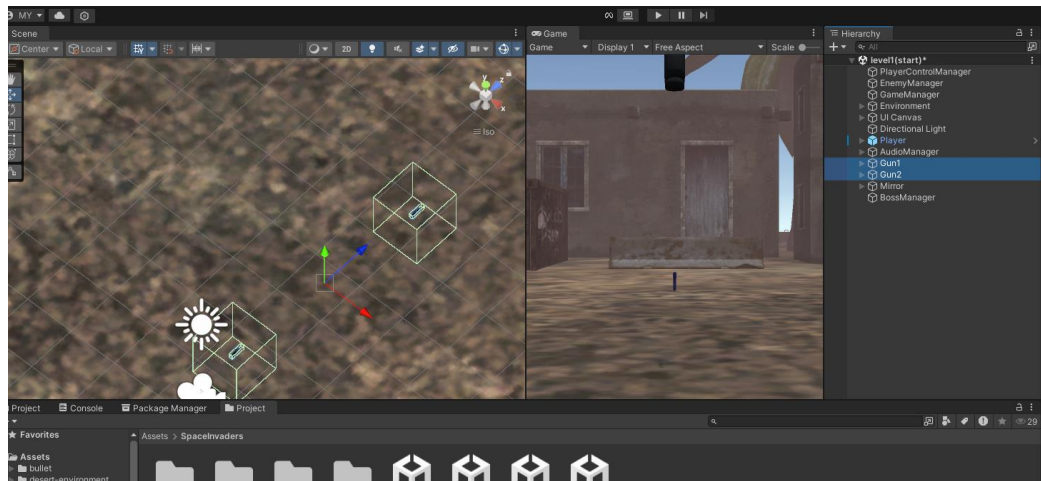
- (1). Design your own (visual/sound/particle) effect when an enemy being shot.

```
Assets > SpaceInvaders > Scripts > EnemyController.cs > EnemyController > rangeV
115
116     1 個參考
117     public void KillEnemy()
118     {
119         // nothing will happen if already dead
120         if (currState == State.Dead) return;
121
122         // set the state to dead
123         currState = State.Dead;
124
125         //[[implement your own effect here]
126         gameObject.GetComponentInChildren<Renderer>().sharedMaterial = deadmaterial;
127         am.playSFX(am.enemydeath);
128
129         //[[Example]
130         Invoke("enemyfade", 0.2f);
131
132         //[[End of Example]
133
134         // decrease number of enemies
135         em.numEnemies--;
136
137         // check winning condition
138         gm.HandleEnemyDead();
139     }
```

敵人死亡會把 material 改成 deadmaterial(遊戲中為白色)並撥放死亡音效，接著才會消失

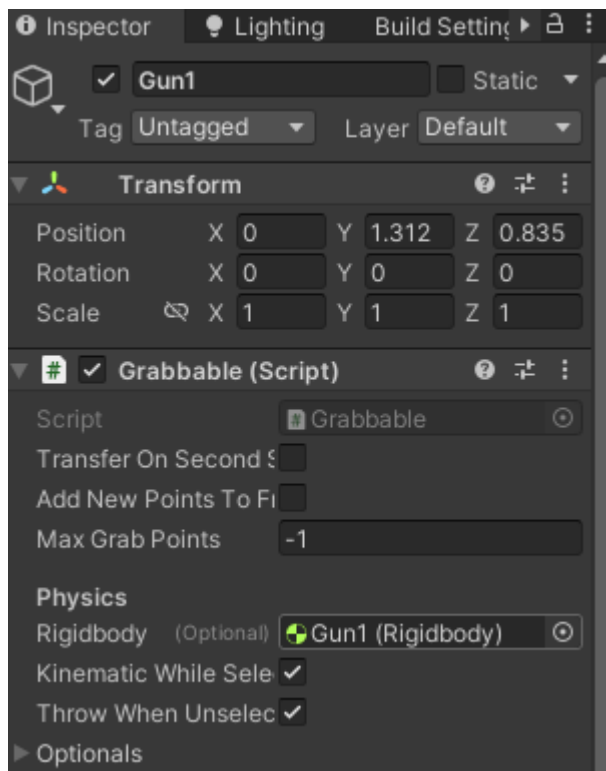


- (2). Add two weapons at two locations spaced by at least 5 meters.



(3). Allow grab and drop weapons

影片中有，由 gun 中的 Grabbable.cs 完成(template 本身提供)



(4). Add haptic feedback on controllers

當敵人死亡時，控制器會震動

```
Assets > SpaceInvaders > Scripts > BulletController.cs > BulletController > OnTriggerEnter
6 public class BulletController : MonoBehaviour
43 void OnTriggerEnter(Collider other)
45     // check if we hit an enemy
46     if(other.CompareTag("Enemy"))
47     {
48         other.gameObject.GetComponent<EnemyController>().KillEnemy();
49
50         // 開始震動控制器，頻率和強度可以自行調整
51         if(gd.IsBothGrab()==true)
52         {
53             OVRInput.SetControllerVibration(0.2f, 0.2f, OVRInput.Controller.LTouch);
54             OVRInput.SetControllerVibration(0.2f, 0.2f, OVRInput.Controller.RTouch);
55             // 在 0.5 秒後停止震動
56             Invoke("StopBothVibration", 0.2f);
57         }
58         else
59         {
60             grabbedController=gd.GetGrabbedController();
61             OVRInput.SetControllerVibration(0.2f, 0.2f, grabbedController);
62             // 在 0.5 秒後停止震動
63             Invoke("StopVibration", 0.2f);
64         }
65         Destroy(gameObject,0.2f);
66     }
```

並且用 Invoke 控制震動時長為 0.2 秒

(5). Joystick locomotion (in SimpleCapsuleWithJoystickMovement.cs)

```
public class SimpleCapsuleWithJoystickMovement : MonoBehaviour
void JoystickMovement()

    // Hint:
    // 1. Get the forward and right vectors of the camera. get the forward vector by using cameraTransform.
    forward = cameraTransform.forward;
    right = cameraTransform.right;

    // 2. Calculate the movement direction based on the thumbstick input and the "normalized" camera's forward.
    forward.y = 0; // We don't want to move vertically, so we set the y component to 0
    forward.Normalize(); // Normalize to ensure consistent movement speed regardless of camera tilt
    right.y = 0; // Ignore vertical movement
    right.Normalize();

    // 3. Multiply the movement direction by the Speed variable to control the speed of the player.
    moveDir = (forward * primaryAxis.y + right * primaryAxis.x) * Speed;

    // 4. Make sure to multiply the movement direction by Time.fixedDeltaTime to make the movement frame rate independent.
    moveDir *= Time.fixedDeltaTime;

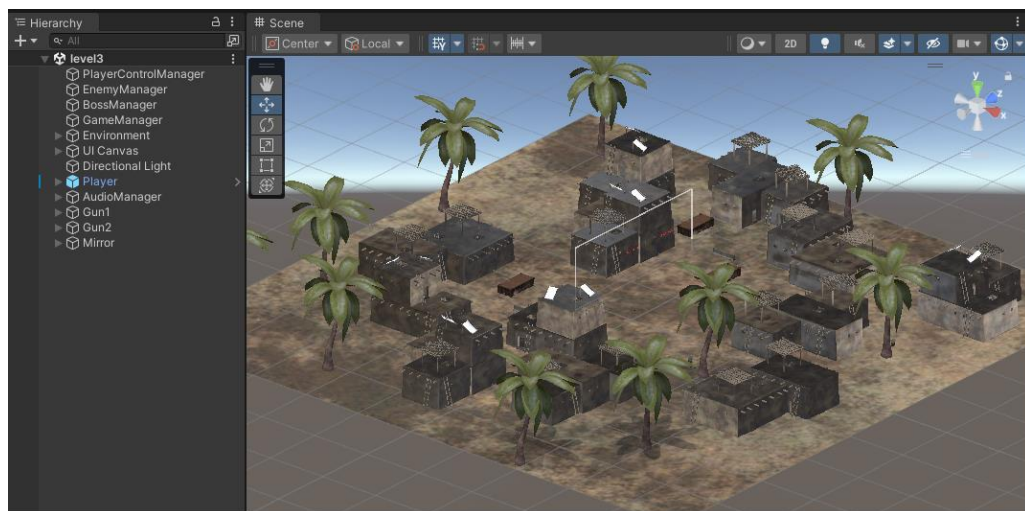
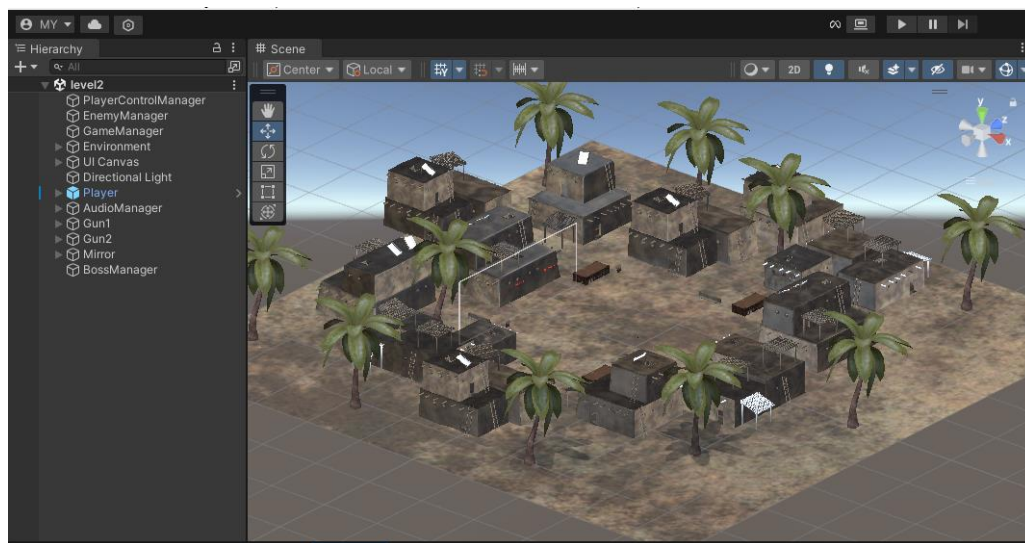
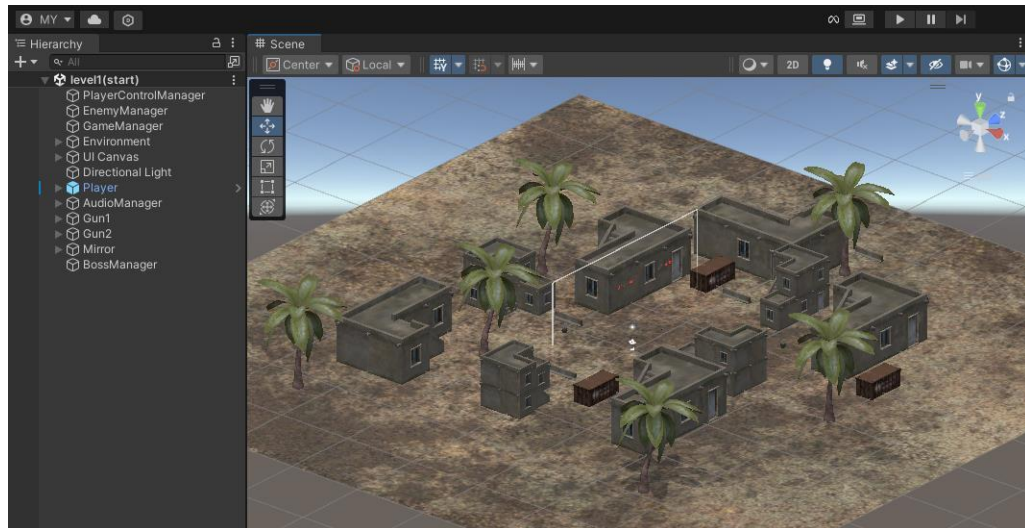
    // 5. Use the Rigidbody component to move the player by setting its velocity to the movement direction.
    _rigidbody.MovePosition(_rigidbody.position + moveDir);

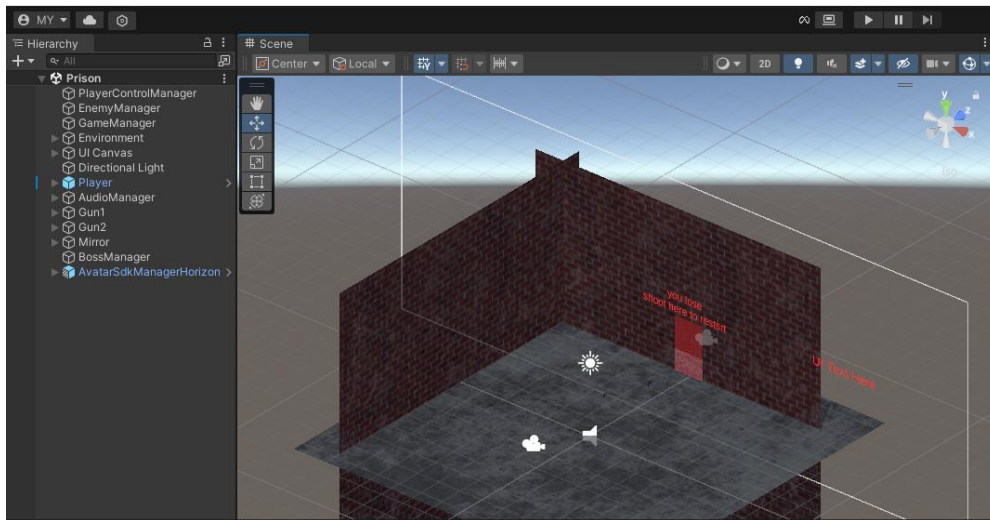
    // Your code here:
```

2. Advanced

(1). Multiple game levels:

共有四個場景，level1-3 和監獄，分別如下





每一關的敵人數量不一樣

如果戰鬥失敗會被送進監獄，再次射擊 UI 則會回到第一關重新開始。

切換方法為設定每個場景的 buildindex，過關射擊 canva 則+1，失敗就回到 index=0(監獄)。

```
Assets > SpacInvaders > Scripts > BulletController.cs > BulletController > OnTriggerEnter
6 public class BulletController : MonoBehaviour
43 void OnTriggerEnter(Collider other)
92 // check if we hit the graffiti
93 else if(other.CompareTag("Graffiti")) {
94     if(gm.nowstate=="NotStarted"){
95         gm.InitGame();
96         Destroy(gameObject);
97     }
98     else if(gm.nowstate=="WonGame"){
99         Destroy(gameObject);
100         //load next level
101         SceneManager.LoadScene(SceneManager.GetActiveScene().buildIndex+1);
102     }
103     else if(gm.nowstate=="GameOver"){
104         Destroy(gameObject);
105         //load next level
106         SceneManager.LoadScene(1);
107     }
108 }
109 }
110 }
111 }
```

```
Assets > SpacInvaders > Scripts > GameManager.cs > GameManager > RefreshUI
4 個參考
131 public void GameOver()
132 {
133     // do nothing if we were already on game over
134     if (currState == State.GameOver) return;
135
136     // set the state to game over
137     currState = State.GameOver;
138
139     am.switchbgm(am.losebgm);
140
141     // show text on the graffiti
142     RefreshUI();
143
144     // remove all enemies
145     enemyManager.KillAll();
146
147     //load to prison
148     SceneManager.LoadScene(0);
149 }
```

Inspector		Lighting	Build Settings	
Scenes In Build				
✓	SpacInvaders/Prison			0
✓	SpacInvaders/level1(start)			1
✓	SpacInvaders/level2			2
✓	SpacInvaders/level3			3

(2). Add a self-avatar and install some reflection (e.g., a mirror) in the scene

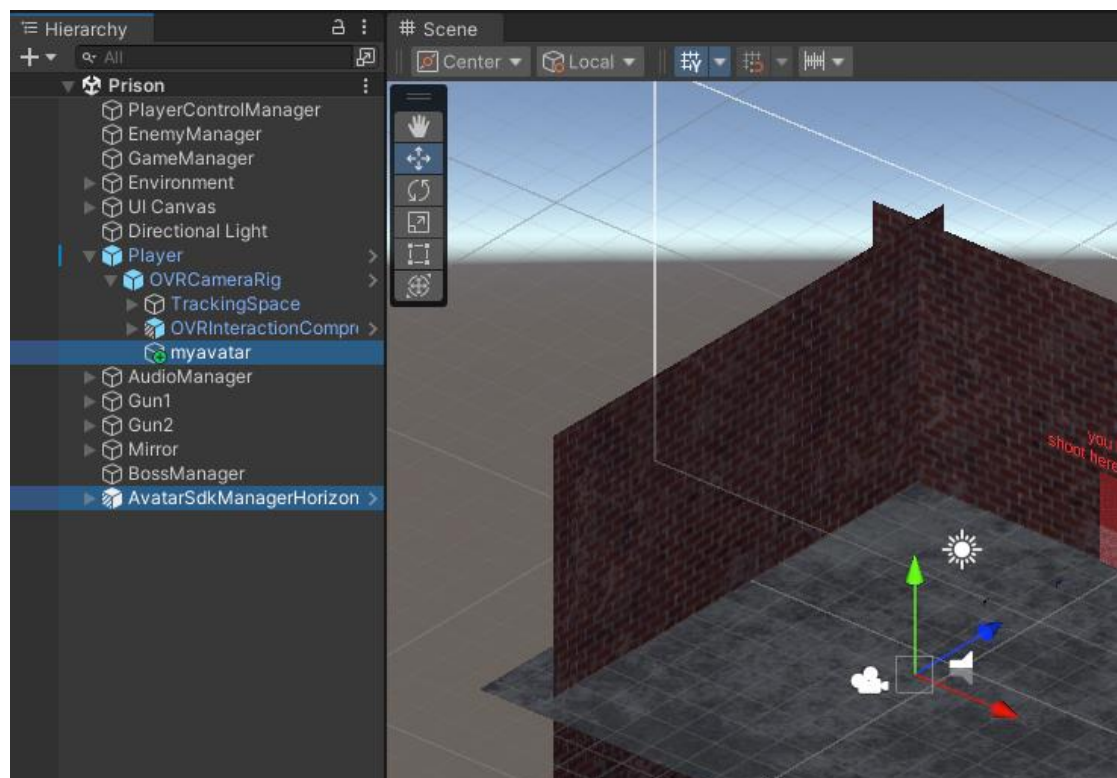
so at some points you will see your own avatar through the reflection:

在監獄的場景可以看到自己的角色，且有配置一面鏡子

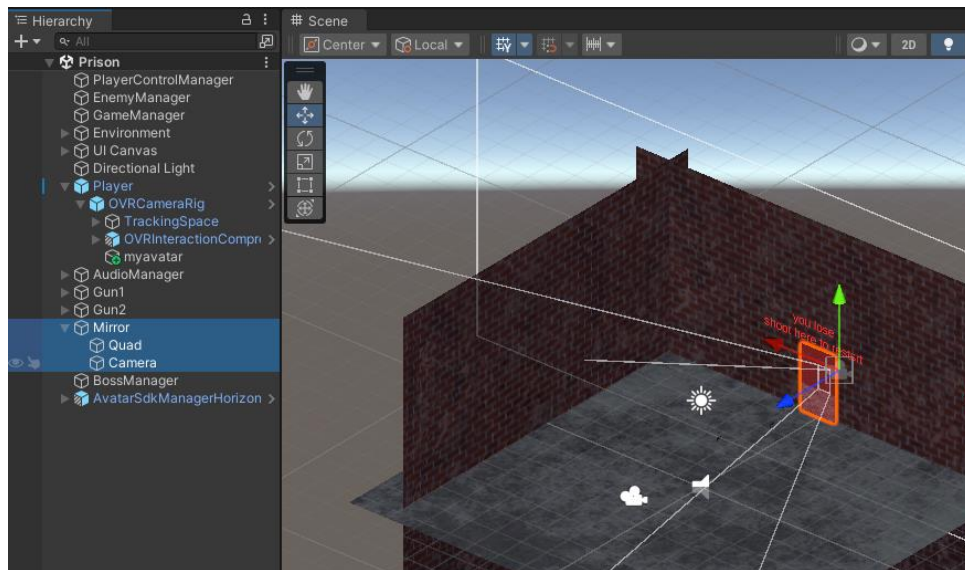


(鏡子用偏紅色的 material)

角色的部分用 MetaAvatarSDK



鏡子則是由一個 camera 和一個 quad 組成，將 camera 拍到的東西做成 render texture，再把 render texture 做成 mirror material 即可完成



(3). HP system:

新增一個 boss 比原本的敵人大數倍，且需要攻擊許多次才能被擊殺的 boss。



Boss 內有一個 health 的變數，bullet 打到 boss 會先扣掉 boss 一個血量，再去檢查是否=0，如果為 0 則 boss 死亡

```
Assets > SpaceInvaders > Scripts > BulletController.cs > BulletController > OnTriggerEnter
6 public class BulletController : MonoBehaviour
43 void OnTriggerEnter(Collider other)
67 // check if we hit Boss
68 else if(other.CompareTag("Boss"))
69 {
70     other.gameObject.GetComponent<BossController>().losehealth();
71     if(other.gameObject.GetComponent<BossController>().health==0){
72         other.gameObject.GetComponent<BossController>().KillBoss();
73     }
}
```

Boss 戰的觸發條件為目前在 level3 且小敵人都已經死亡。

```
Assets > SpaceInvaders > Scripts > GameManager.cs > GameManager > RefreshUI
176 enemyManager.KillAtt(),
177 }
178 else if(SceneManager.GetActiveScene().buildIndex==3){
179     //create boss
180     bm.CreateBossWave();
181     am.switchbgm(am.bosssbgm);
182 }
183
184 }
```

(4). Bullets count / shoot accuracy:

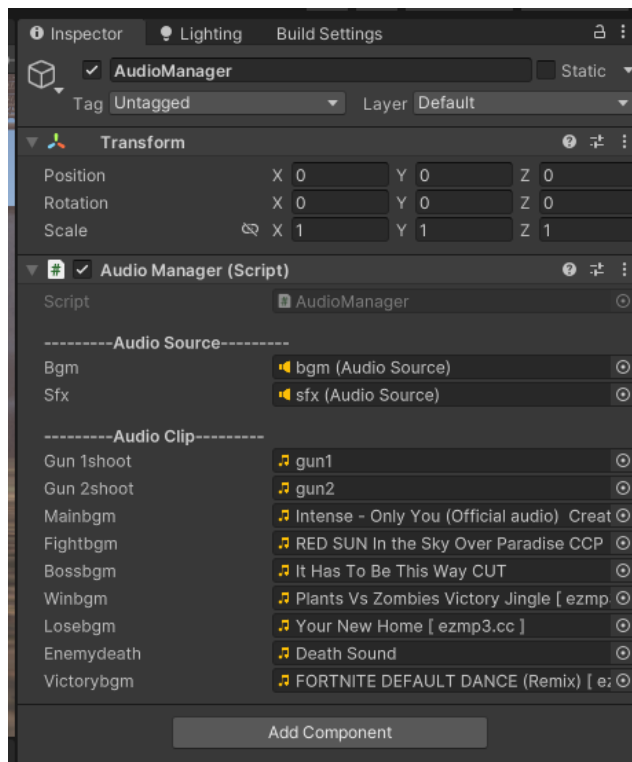
在原本的 UI 旁邊新增一個可以偵測目前射多少發子彈的計數器，並且在通關後顯示該關卡的準確率(擊殺數量/射出子彈數*100%)



```
Assets > SpaceInvaders > Scripts > GameManager.cs > GameManager > RefreshUI
71 void RefreshUI()
72 {
73     // act according to the state
74     switch(currState)
75     {
76     case State.NotStarted:
77         uiText.text = "Shoot here to begin";
78         nowstate="NotStarted";
79         break;
80
81     case State.Playing:
82         uiText.text = "Enemies left: " + enemyManager.numEnemies;
83         bulletcount.text = pc.numBullets + " bullets shoot";
84         nowstate="Playing";
85         break;
86
87     case State.GameOver:
88         acc=Math.Round((decimal)(enemyManager.totalenemiescount-enemyManager.numEnemies)/ pc.numBullets
89         accOutput=Decimal.ToInt32(acc);
90         uiText.text = "Game Over! Shoot here";
91         bulletcount.text = "Your accuracy is: " + accOutput + "%";
92         nowstate="GameOver";
93         break;
94
95     case State.WonGame:
96         acc=Math.Round((decimal)(enemyManager.totalenemiescount-enemyManager.numEnemies)/ pc.numBullets
97         accOutput=Decimal.ToInt32(acc);
98         if(SceneManager.GetActiveScene().buildIndex==3){
99             uiText.text = "YOU Complete the game!";
100         }
101         else{
102             uiText.text = "YOU WON! Shoot here to next level";
```

(5). Audio Manager:

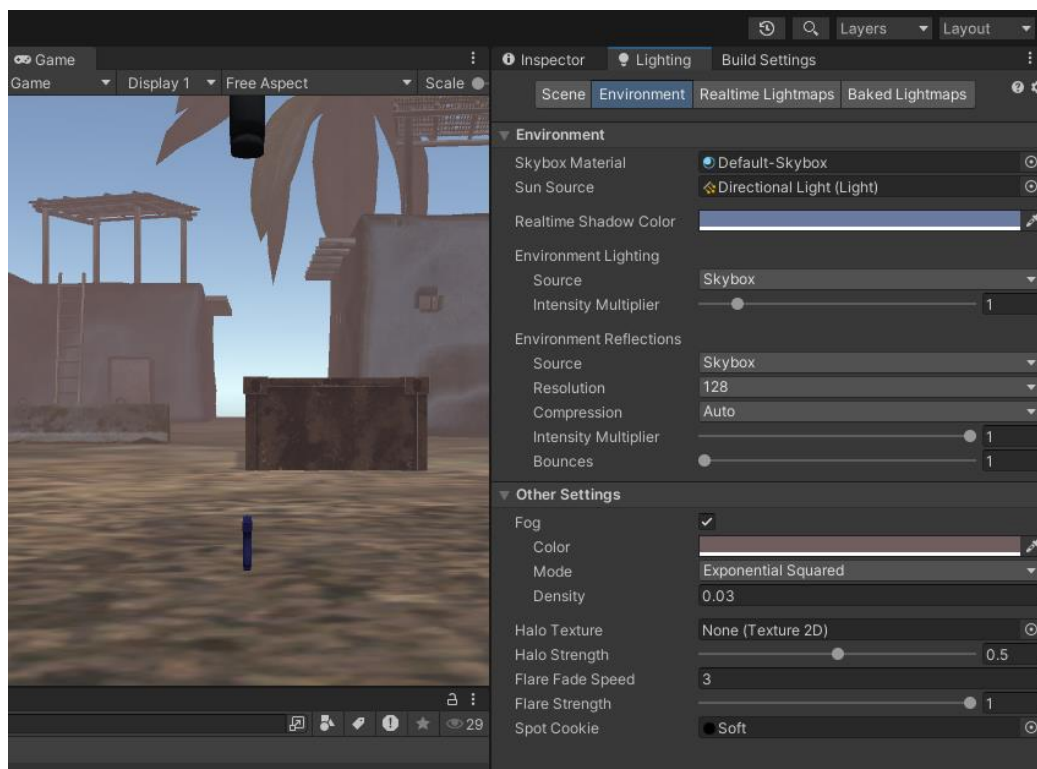
在每個遊戲階段都有不同 bgm，敵人死亡或是射出子彈也都有對應的音效



```
Assets > SpaceInvaders > Scripts > AudioManager.cs > AudioManager > fightbgm
8 public class AudioManager : MonoBehaviour
    2 個參考
20 public AudioClip losebgm;
    3 個參考
21 public AudioClip enemydeath;
    2 個參考
22 public AudioClip victorybgm;
23
    0 個參考
24 private void Start(){
25     if (SceneManager.GetActiveScene().buildIndex==0){
26         bgm.clip=losebgm;
27     }
28     else{
29         bgm.clip=mainbgm;
30     }
31     bgm.Play();
32 }
33
    5 個參考
34 public void playSFX(AudioClip clip){
35     sfx.PlayOneShot(clip);
36 }
37
    7 個參考
38 public void switchbgm(AudioClip music){
39     bgm.clip=music;
40     bgm.Play();
41 }
42
43
44 }
```

(6). 戰爭迷霧:

因為不想要讓玩家直接看穿場景過小，所以在設定中增加了 **fog**，並把顏色設成淺灰紅色，希望可以營造出在沙漠中戰鬥的感覺。



Link:

Demo English subtitles: <https://youtu.be/RLu5LBCINGI>

因為 demo 才 30 秒，剪得有點亂，如果要看完整，下方是沒有修剪過的原始影片：

Full gameplay: <https://youtu.be/sVvOTLxx0LI>