Kershaw County's Youth

VIDEO GAME Programmers

@ The Kershaw County Library - Camden Branch

TAUGHT BY:

CONOR X. ROM

CITADEL CLASS OF 2025 / TAX ACCOUNTANT / SCSG ADMIN OFFICER

FREE CLASSES

Jan 13th, 27th,

Feb 10th, & 24th

3:30-4:30pm

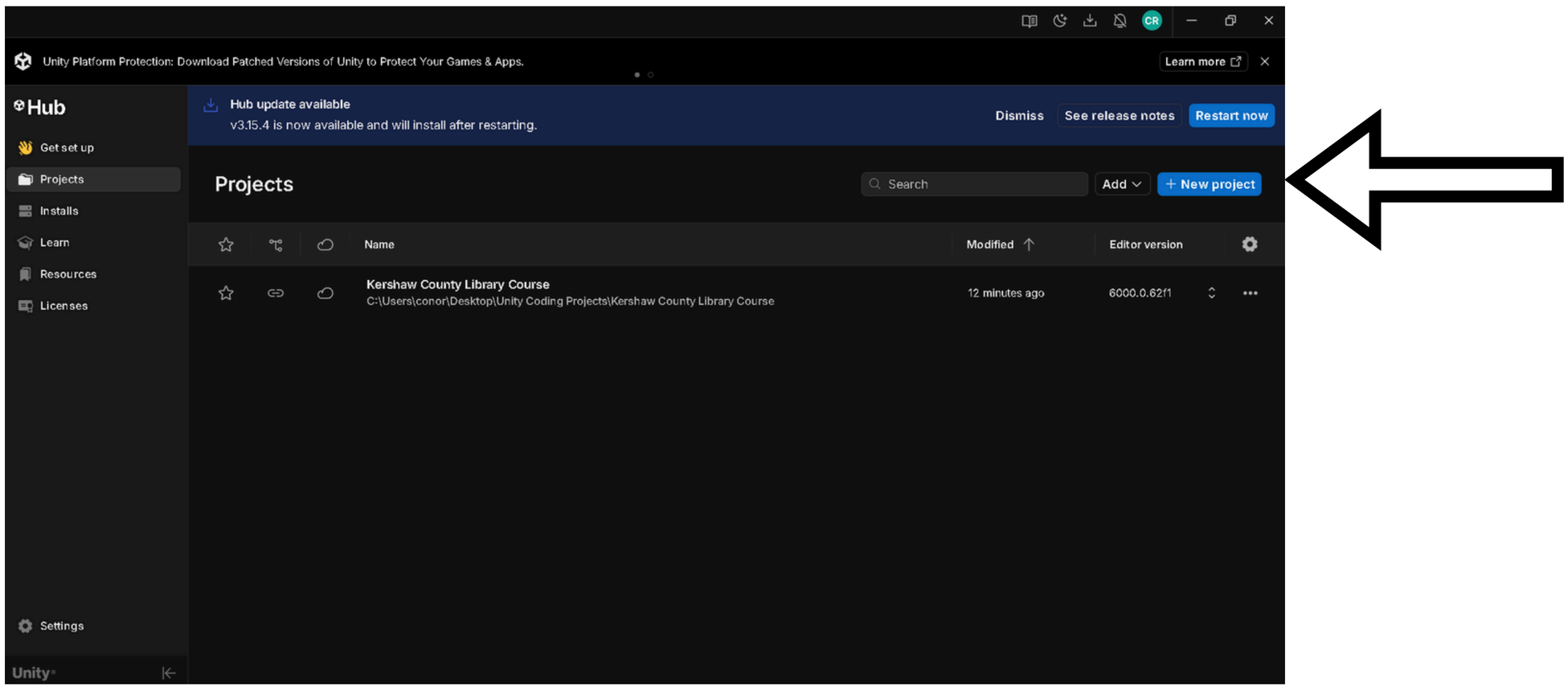
KERSHAW COUNTY VIDEO GAME PROGRAMMERS, DESIGNER, & ARTISTS SOUTH CAROLINA

Mana Rock Gaming

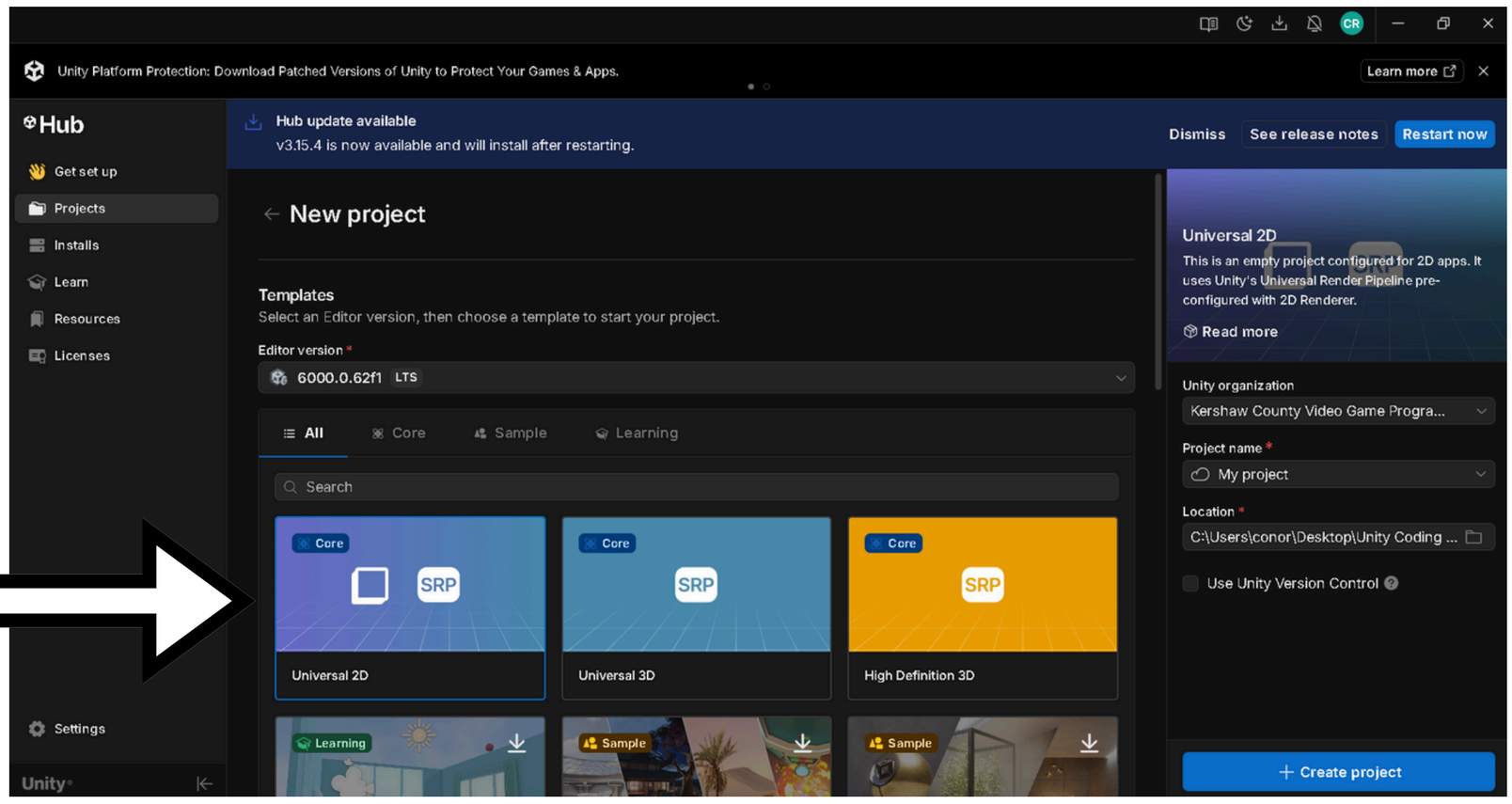
KCL | KERSHAW COUNTY LIBRARY

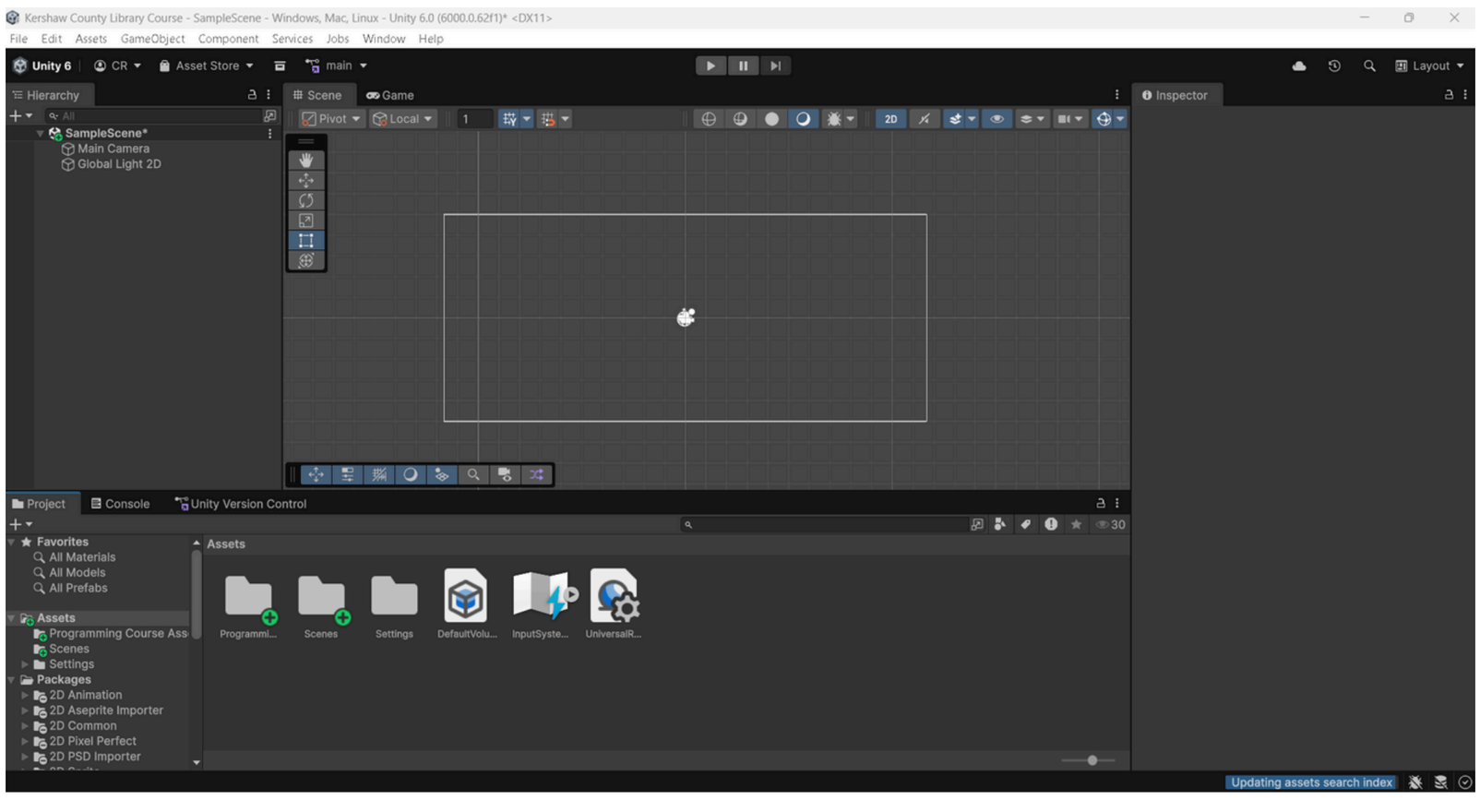
LESSON 1: BASIC MOVEMENT

STARTING A NEW 2D GAME



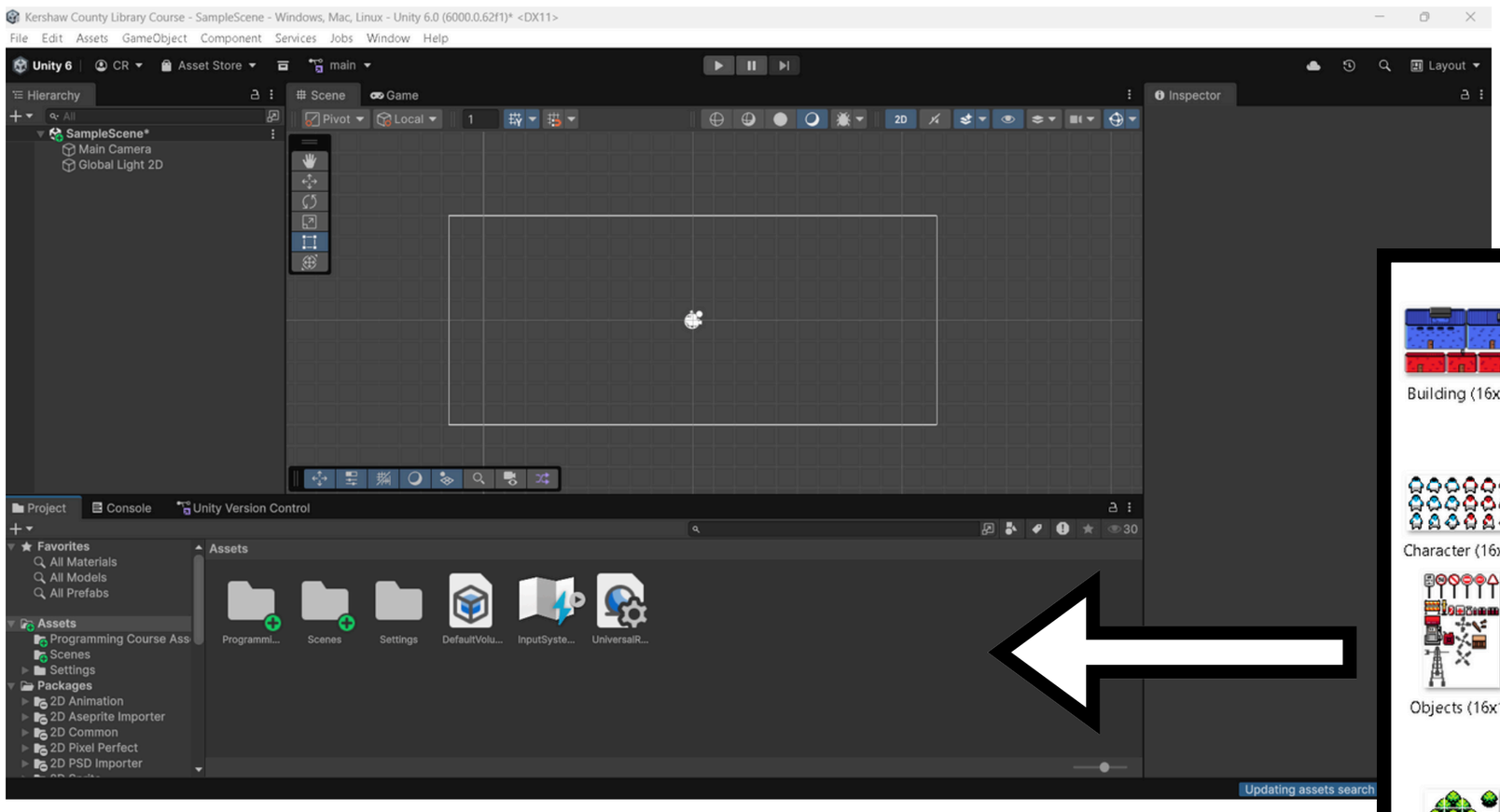
SET AS 2D



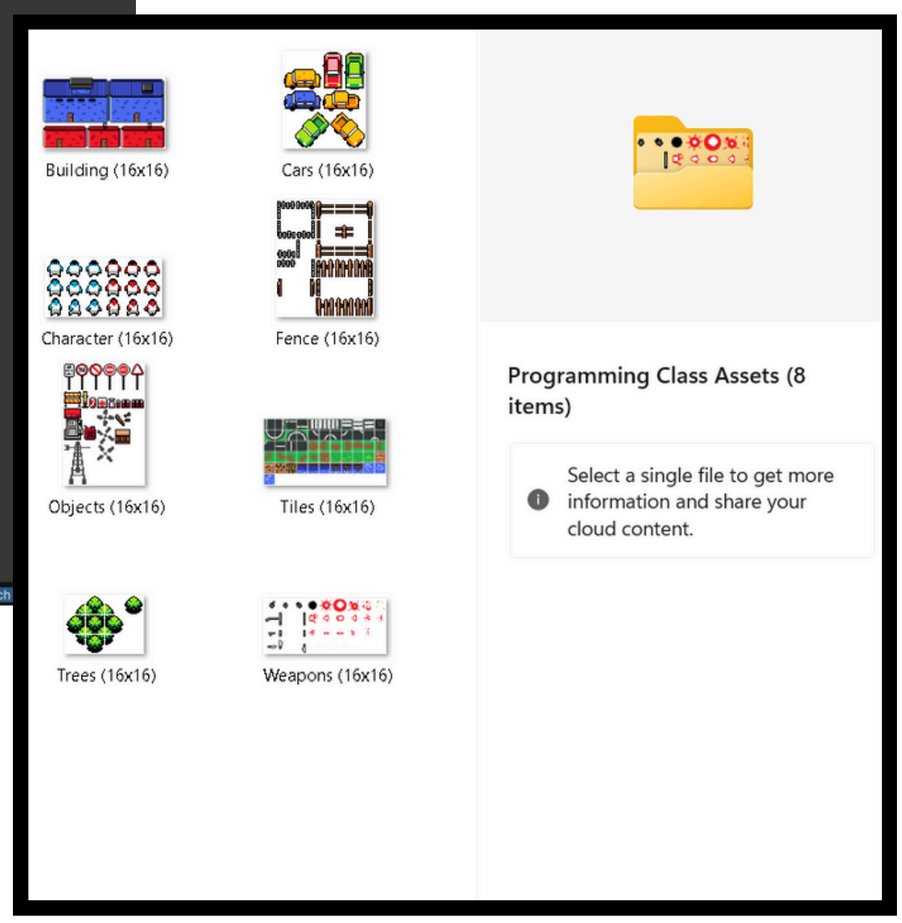


THEN CREATE

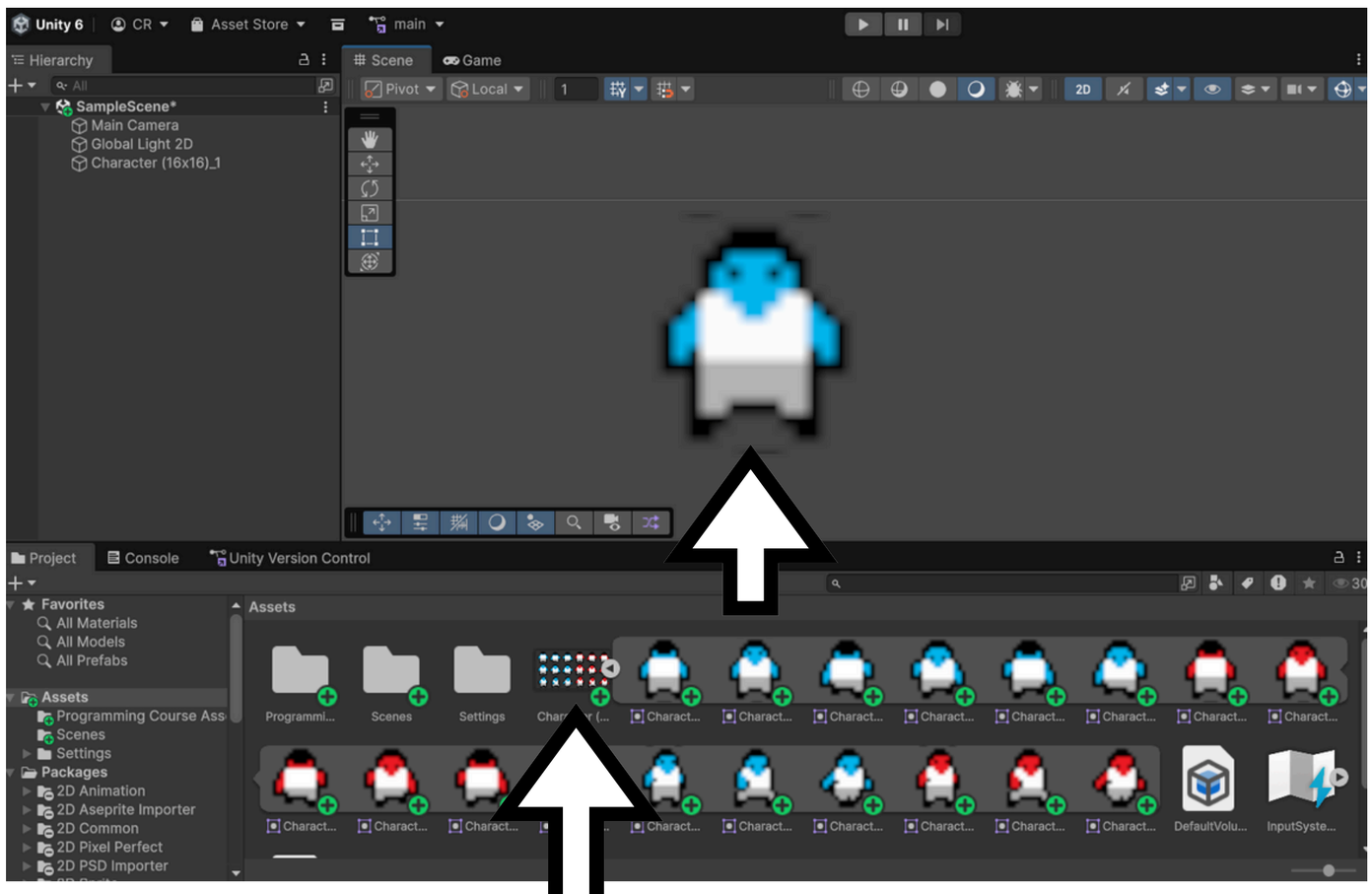
ADDING A 2D SPRITE



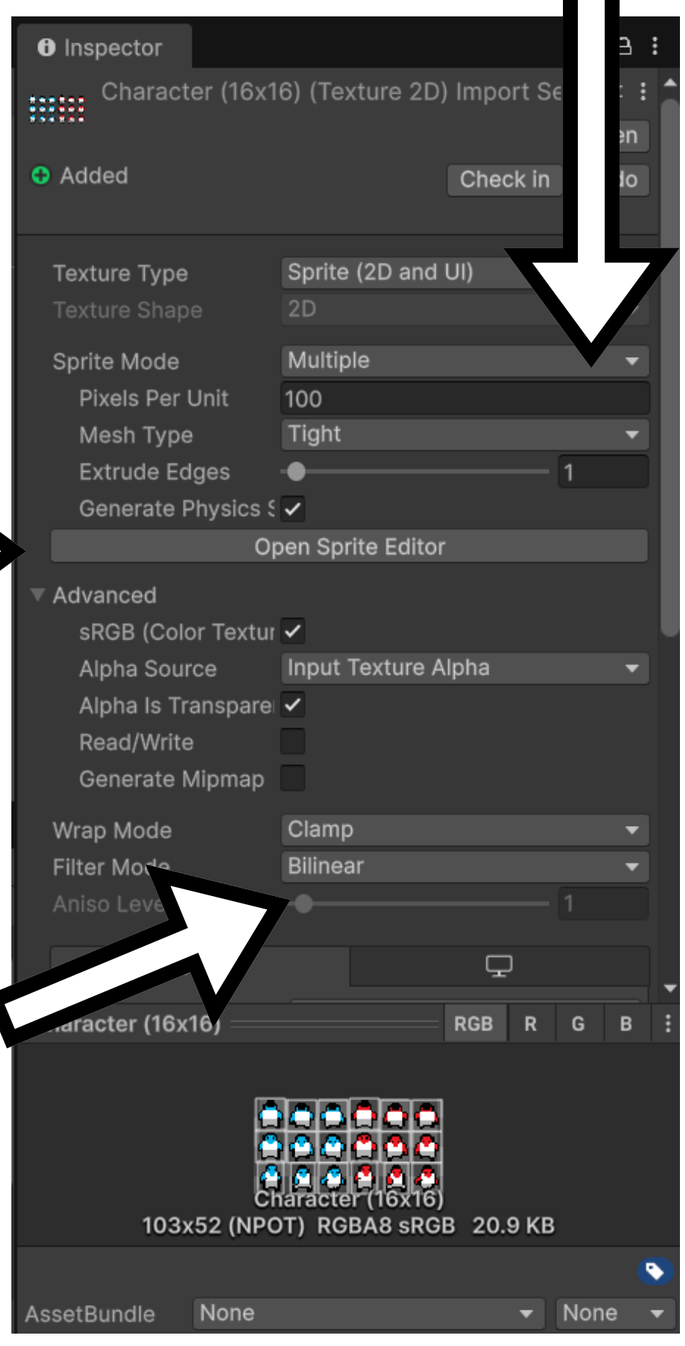
DRAG & DROP



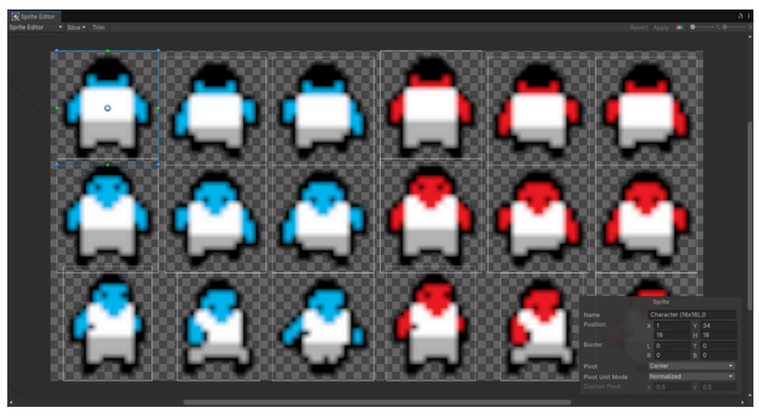
DRAG INTO SCENE



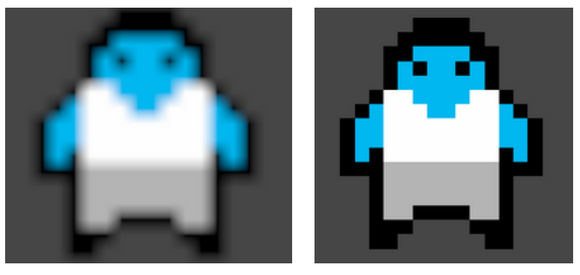
SWITCH TO PIXEL SIZE (16)



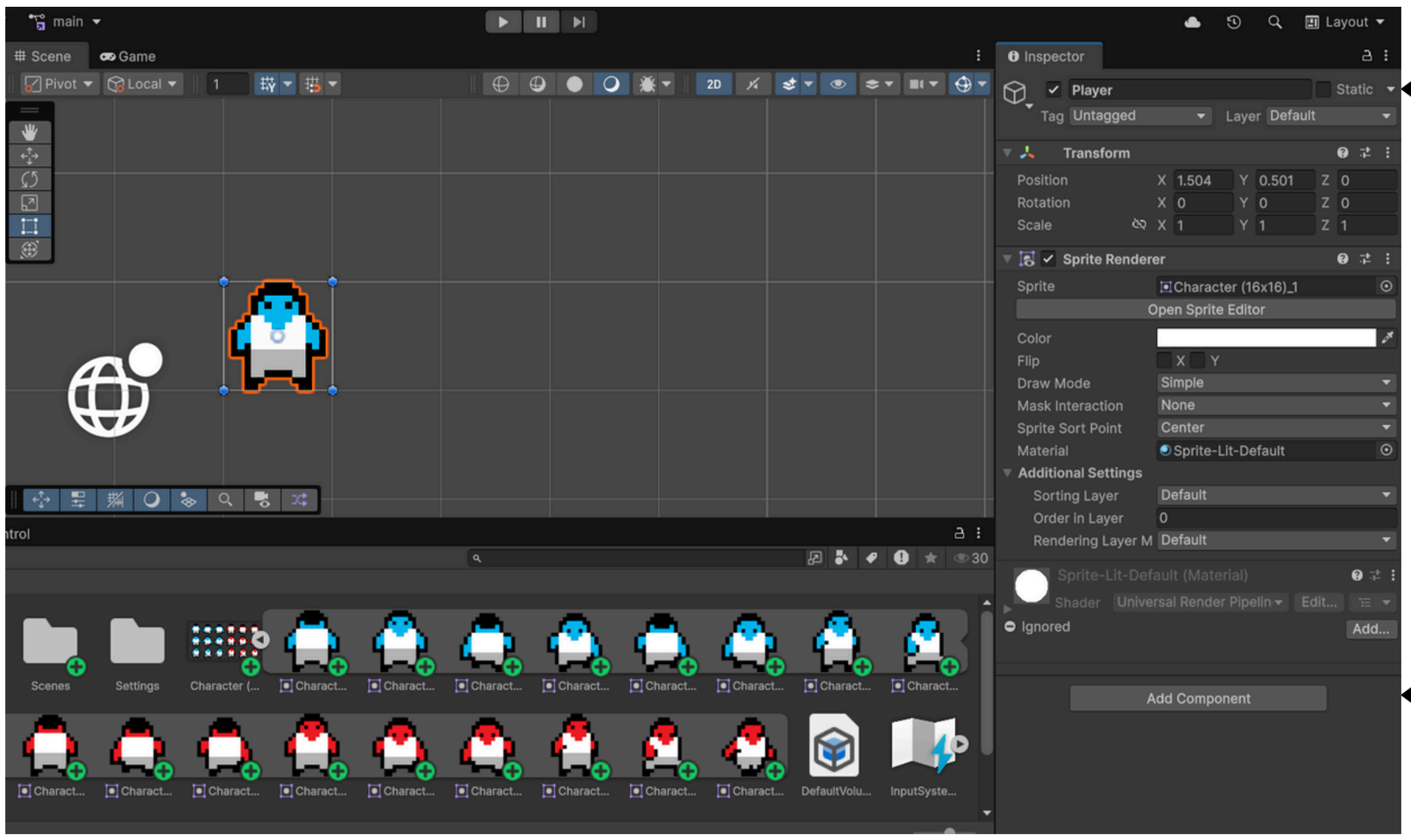
CLICK TO OPEN IN INSPECTOR



SWITCH TO POINT



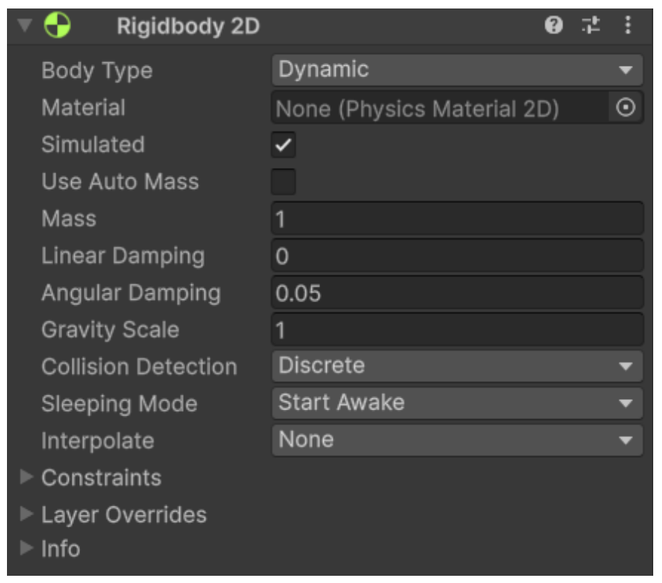
ADDING A 2D SPRITE

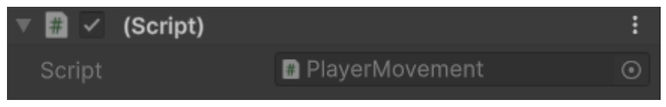


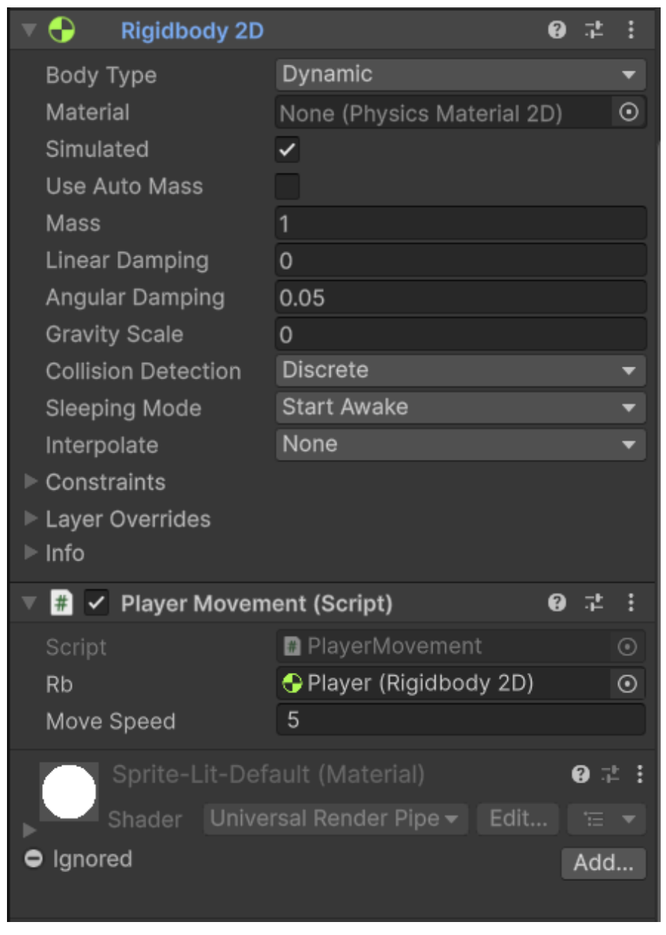
RENAME TO “PLAYER”

ADD COMPONENT(S)

```
PlayerMovement.cs   Settings
C: > Users > conor > Desktop > Unity Coding Projects > Kershaw County Library Course > Assets > PlayerMovement.cs > ...
1   using System.Collections;
2   using System.Collections.Generic;
3   using UnityEngine;
4
    0 references
5   public class PlayerMovement : MonoBehaviour
6   {
        2 references
7       public Rigidbody2D rb;
8
        1 reference
9       public float moveSpeed = 5f;
10
        3 references
11      Vector2 movement;
12
13      // Update is Called Once Per Frame
        0 references
14      void Update()
15      {
16          movement.x = Input.GetAxisRaw("Horizontal");
17          movement.y = Input.GetAxisRaw("Vertical");
18      }
19
20      // Fixed Updates are Called At A Fixed Frame Rate
        0 references
21      void FixedUpdate()
22      {
23          rb.MovePosition(rb.position + movement * moveSpeed * Time.fixedDeltaTime);
24      }
25  }
26
```



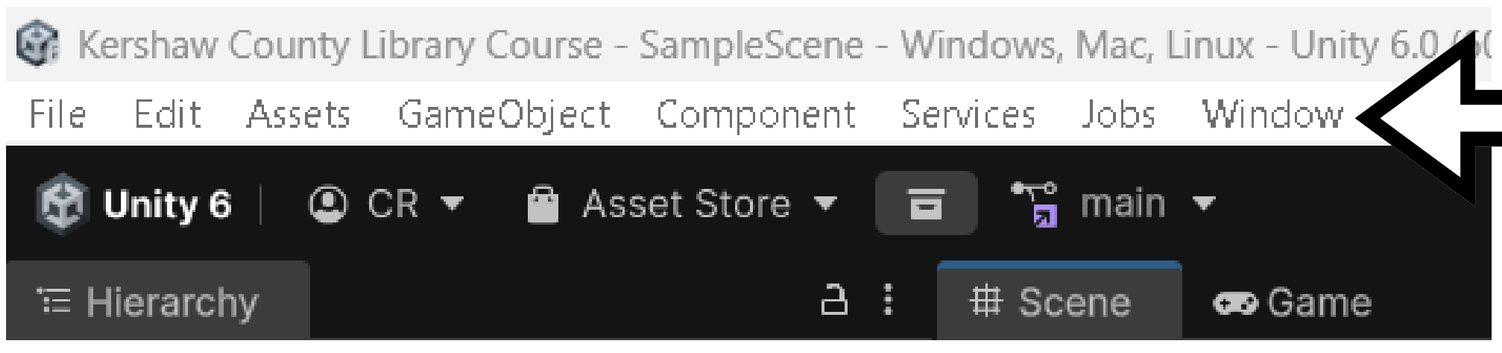




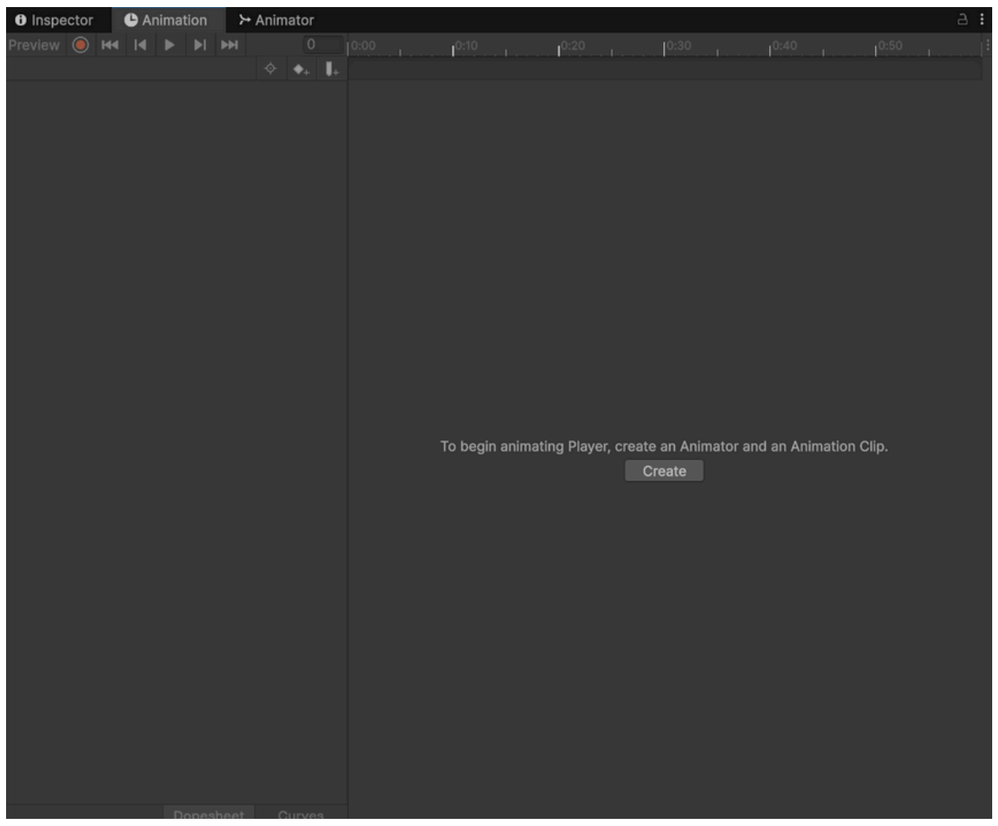
SET GRAVITY TO ZERO

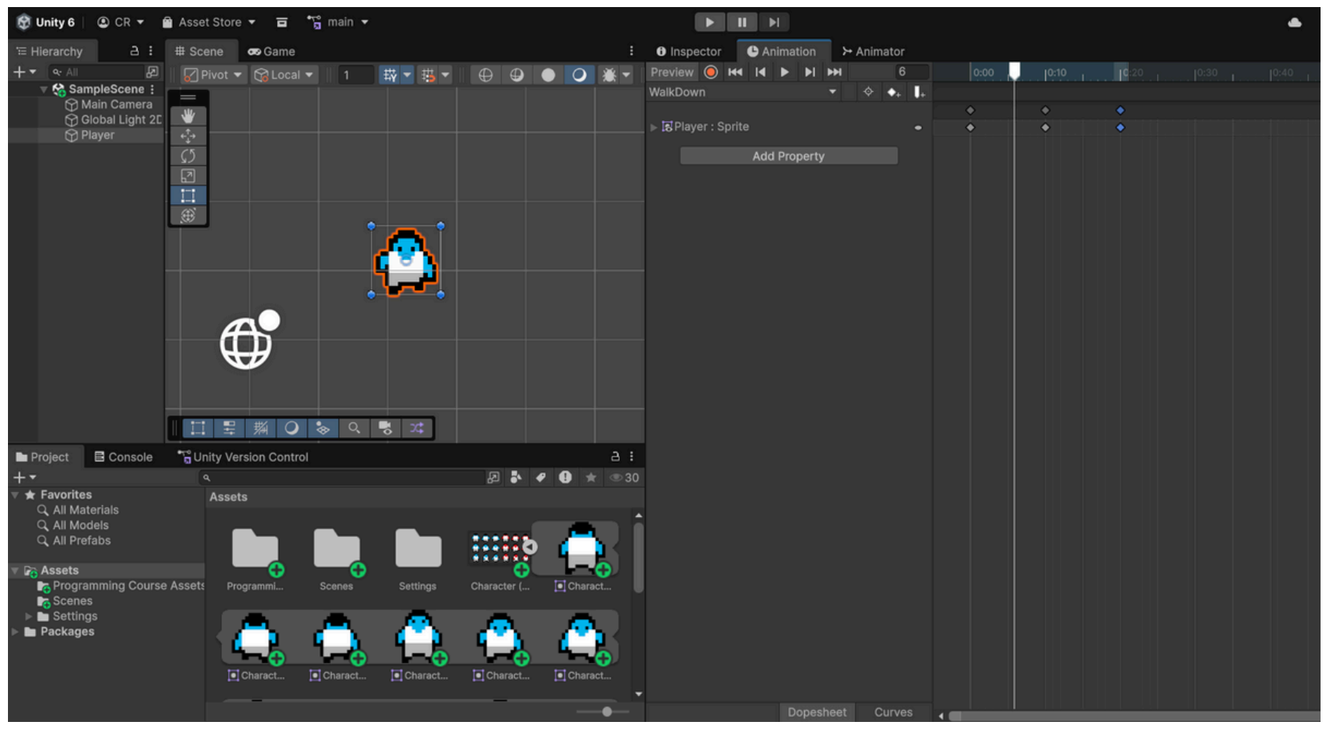
CONNECT RB TO SCRIPT

ADDING AN ANIMATION

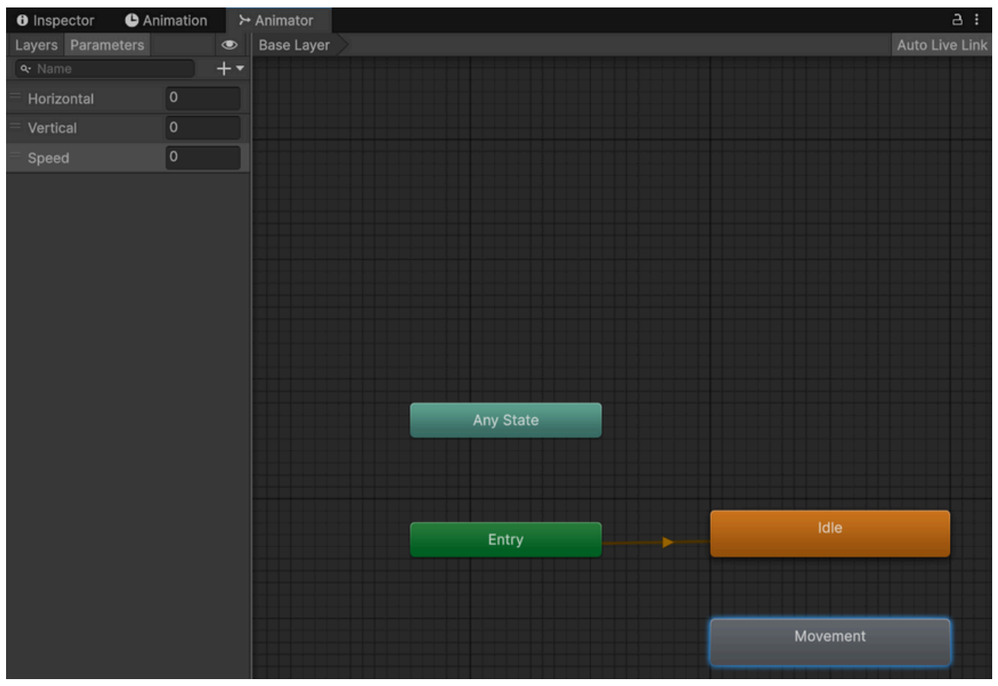


OPEN THE “ANIMATION” AND “ANIMATOR” WINDOW

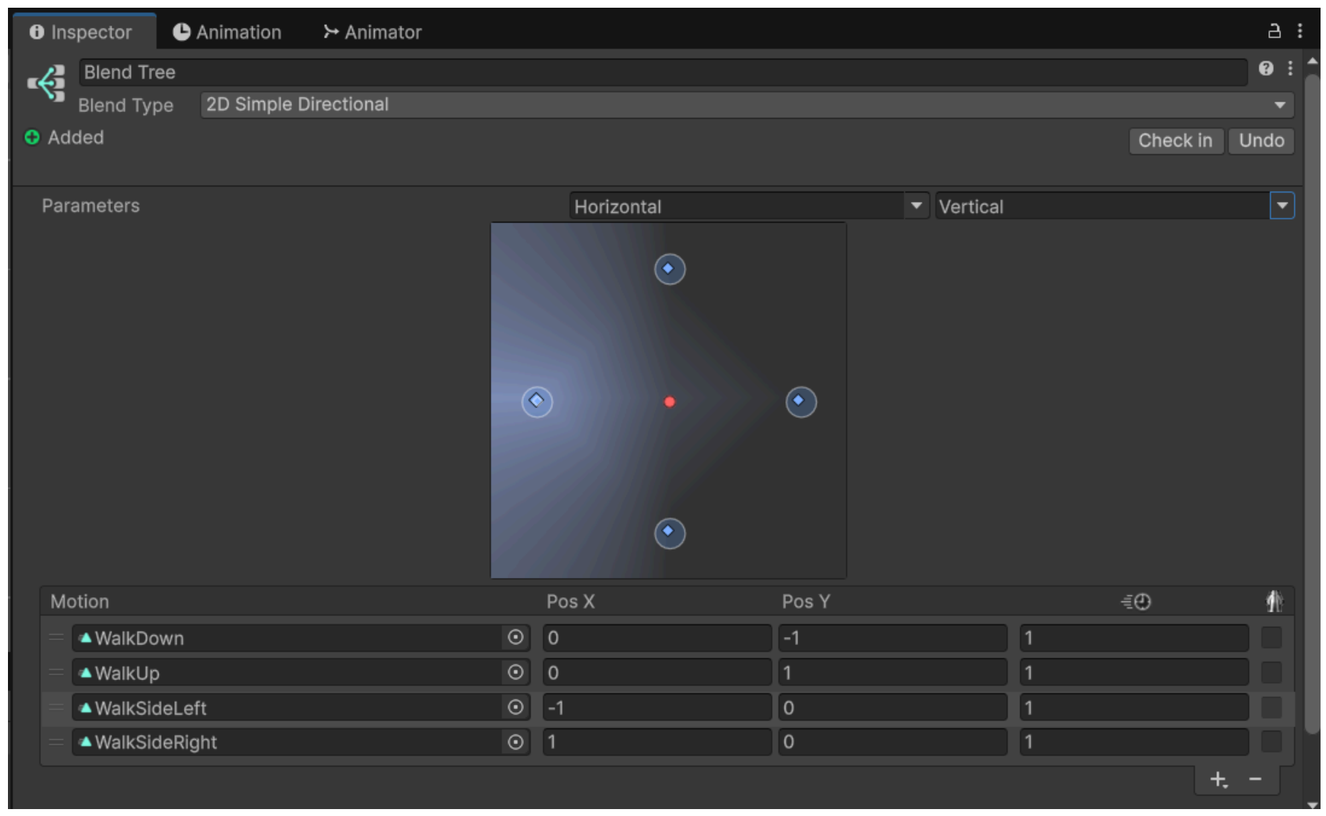




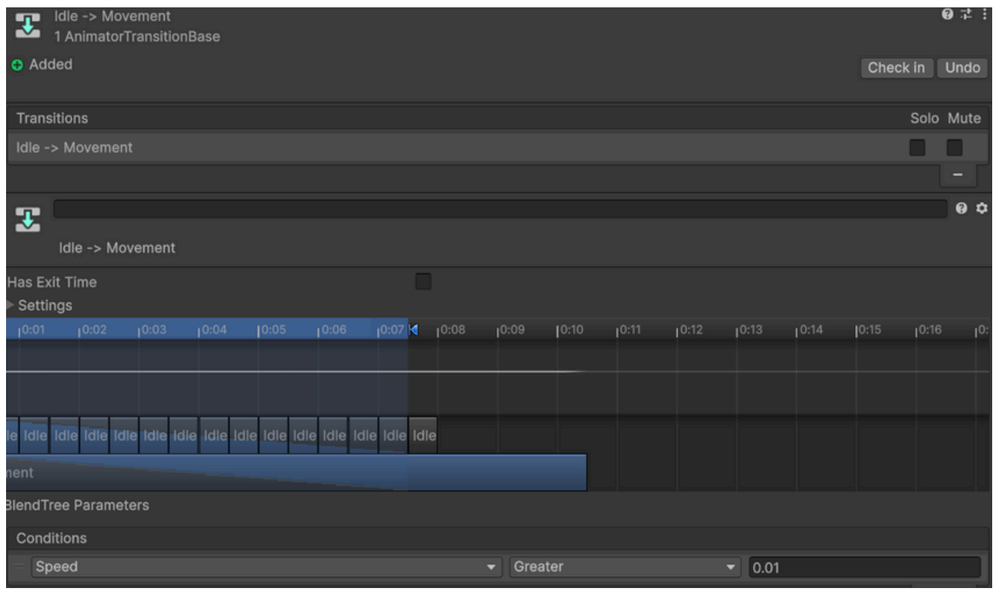
LETS START WITH A DOWN ANIMATION

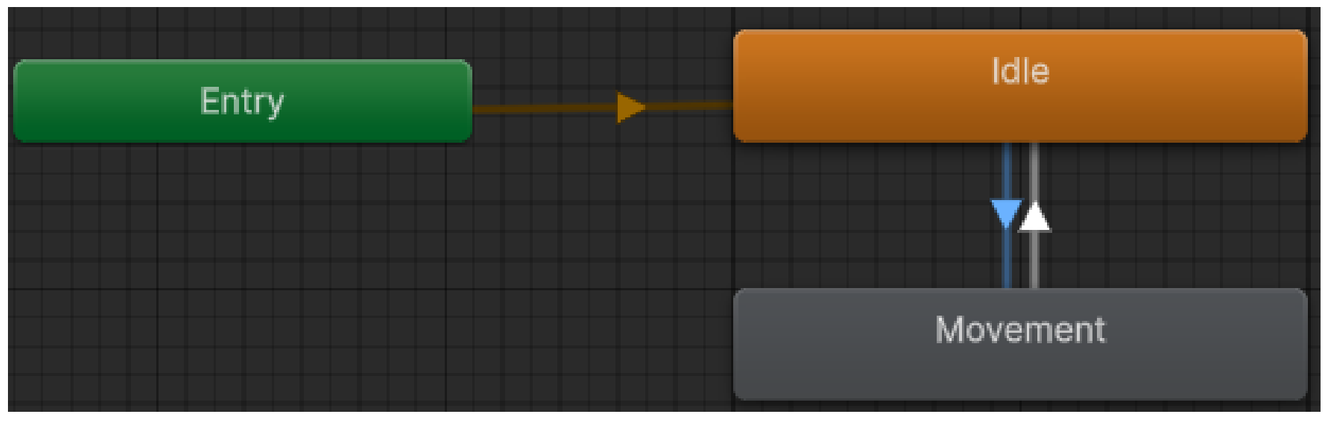


CREATE THREE FLOAT PARAMETERS



CREATE A BLEND TREE
CREATE FOUR MOTIONS
SET TYPE TO 2D SIMPLE DIRECTION



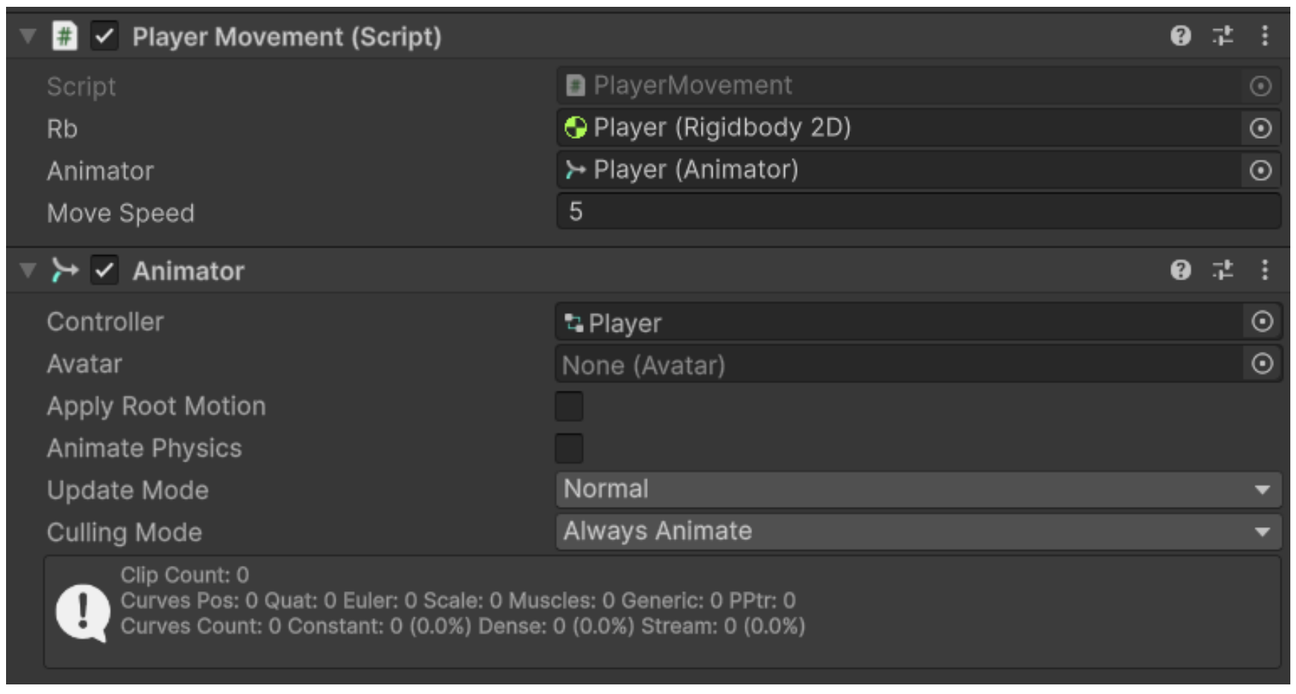


ANIMATION CONTINUED

PlayerMovement.cs | Settings

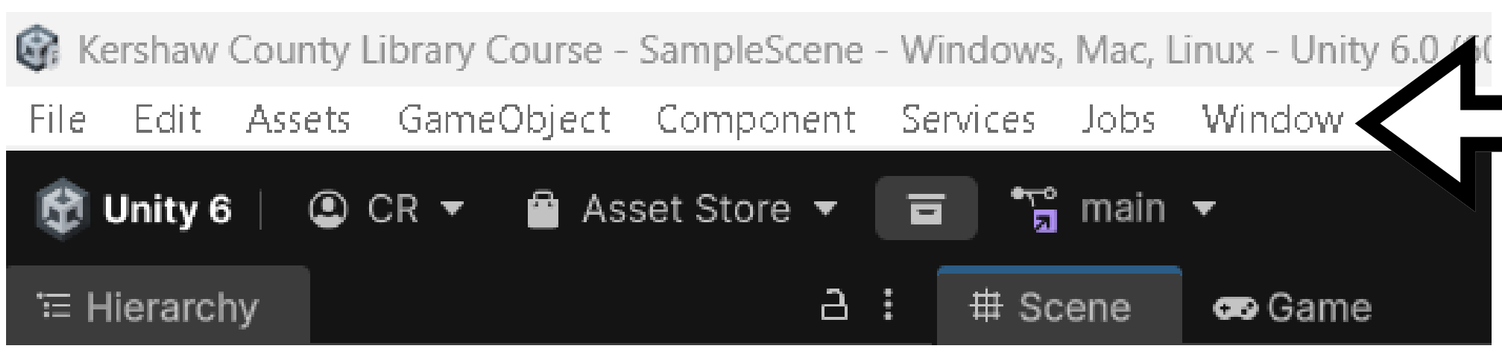
C: > Users > conor > Desktop > Unity Coding Projects > Kershaw County Library Course > Assets > PlayerMovement.cs > P

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

0 references
public class PlayerMovement : MonoBehaviour
{
    2 references
    public Rigidbody2D rb;
    3 references
    public Animator animator;

    1 reference
    public float moveSpeed = 5f;

    6 references
    Vector2 movement;

    // Update is Called Once Per Frame
    0 references
    void Update()
    {
        movement.x = Input.GetAxisRaw("Horizontal");
        movement.y = Input.GetAxisRaw("Vertical");

        animator.SetFloat("Horizontal", movement.x);
        animator.SetFloat("Vertical", movement.y);
        animator.SetFloat("Speed", movement.sqrMagnitude);
    }

    // Fixed Updates are Called At A Fixed Frame Rate
    0 references
    void FixedUpdate()
    {
        rb.MovePosition(rb.position + movement * moveSpeed * Time.fixedDeltaTime);
    }
}
```

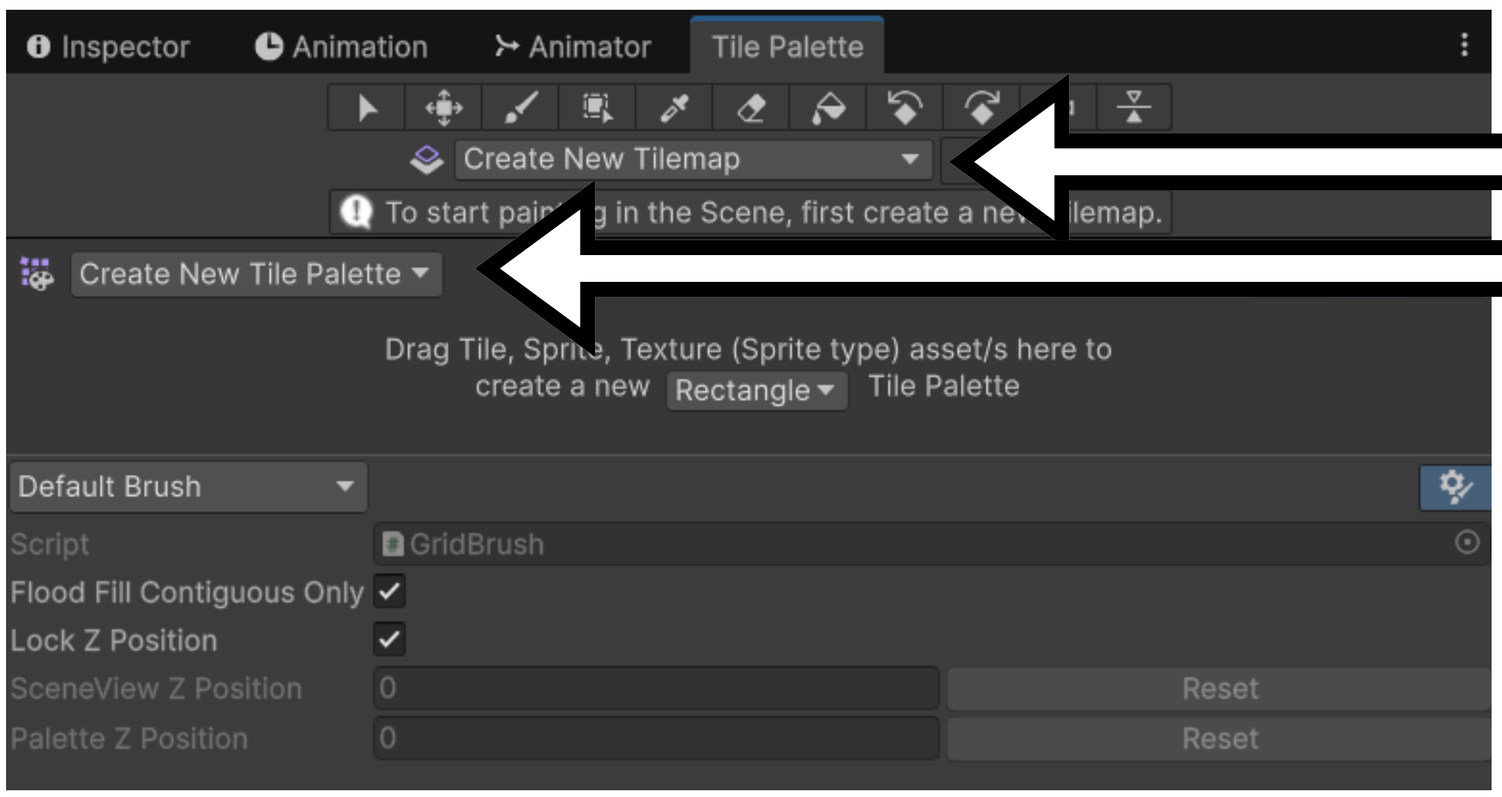


CONNECT ANIMATOR

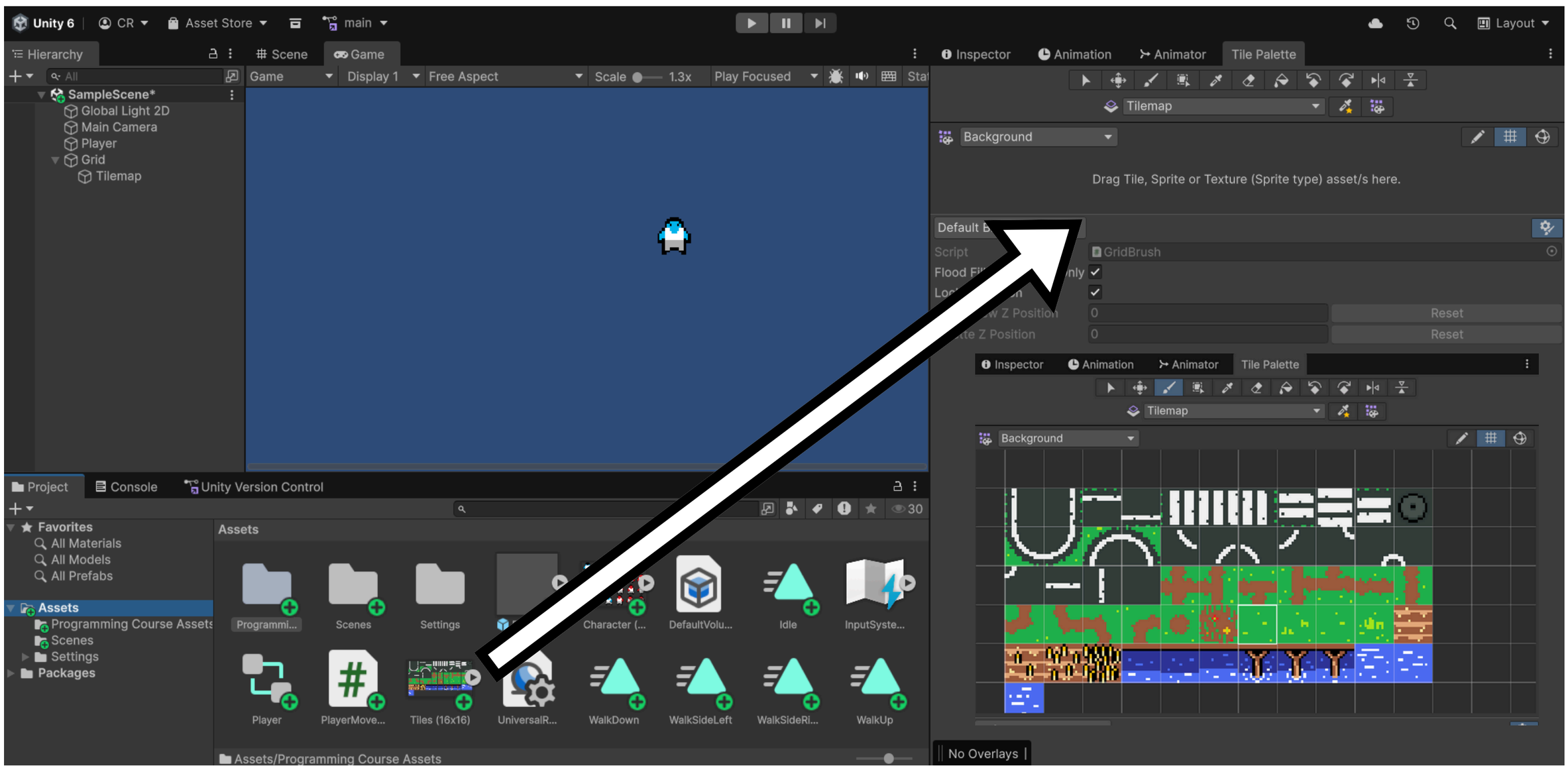
CREATE TILE BACKGROUND



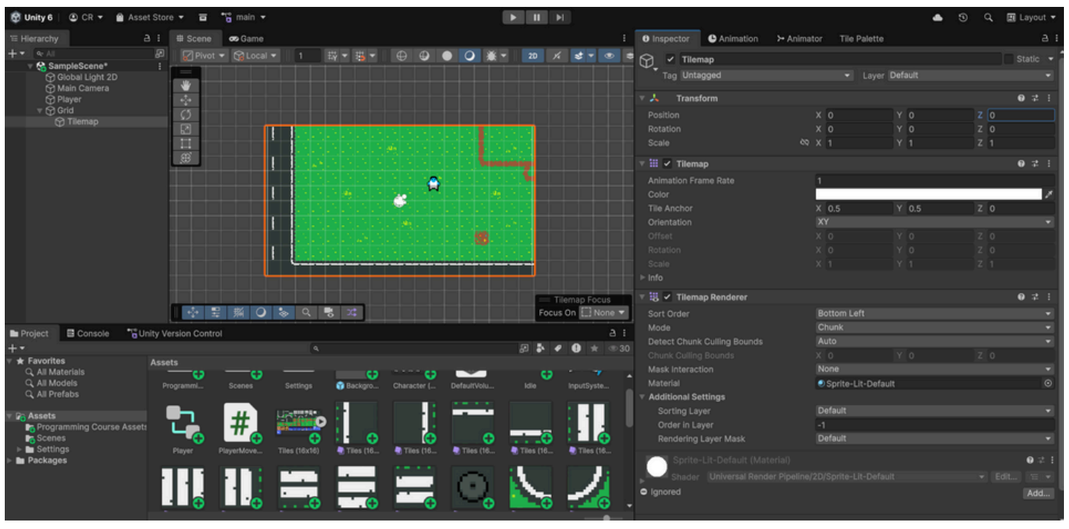
OPEN THE “2D - TILE PALETTE” WINDOW



CREATE A TILEMAP & TILE PALETTE



DRAG TILES INTO TILE PALETTE



PAINT YOUR WORLD THEN SET TILEMAP RENDER LAYER TO -1

CONCLUSION

Mana Rock Gaming

MANA ROCK GAMING WEBSITE

HTTPS://WWW.MANAROCKGAMING.COM/

KERSHAW COUNTY VIDEO GAME PROGRAMMERS, DESIGNERS, & ARTISTS

HTTPS://WWW.KERSHAWCOUNTYLIBRARY.ORG/EVENTS/PROGRAMMING-WITH-CONOR/

KCL | KERSHAW COUNTY LIBRARY

KERSHAW COUNTY EVENTS PAGE

HTTPS://WWW.KERSHAWCOUNTYLIBRARY.ORG/EVENTS/PROGRAMMING-WITH-CONOR/

YOUTUBE TUTORIAL

HTTPS://WWW.YOUTUBE.COM/WATCH?V=WHZOMFGJT50

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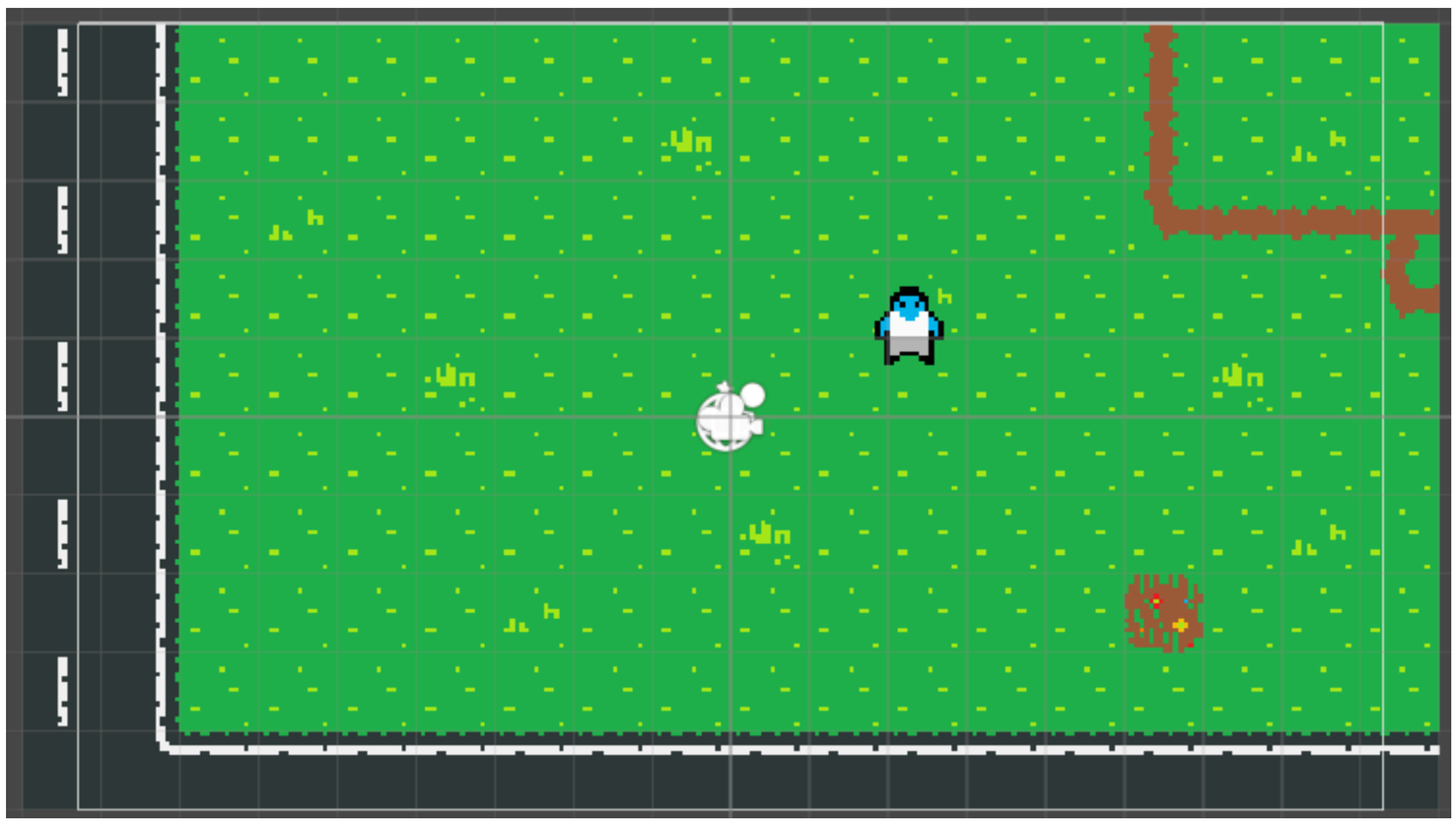
LESSON 2: COMBAT

ADDING SOME OBSTACLES



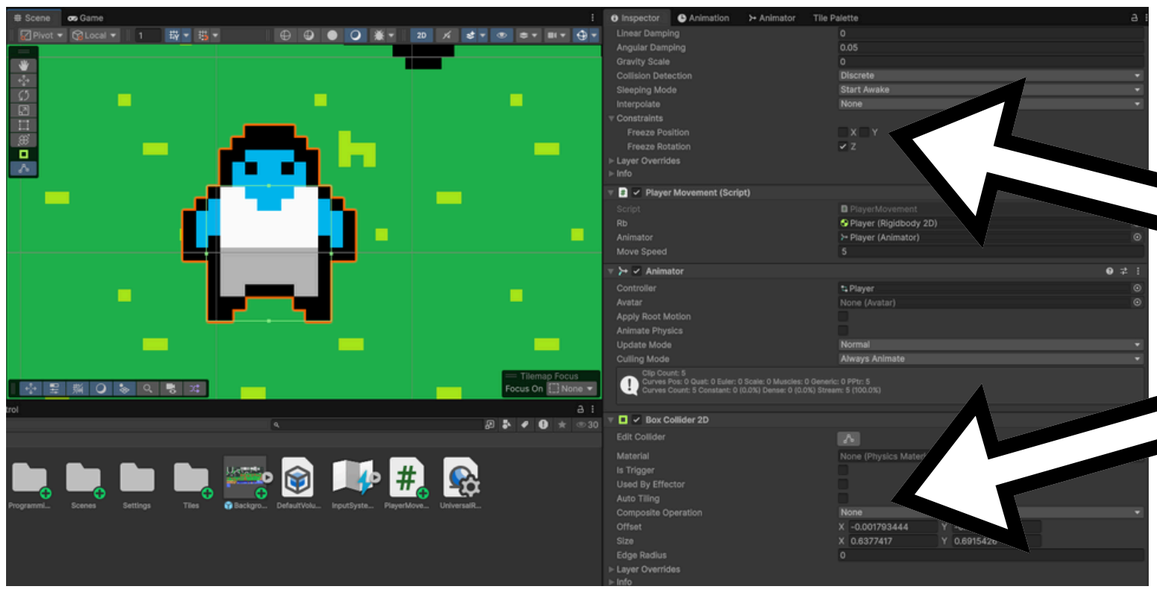
CHECK OUT LESSON #1: BASIC MOVEMENT AT MANAROCKGAMING.COM

THE GOAL OF THIS LESSON IS TO ADD SOME DETAILS TO OUR WORLD & ADD SOME BASIC COMBAT ABILITIES

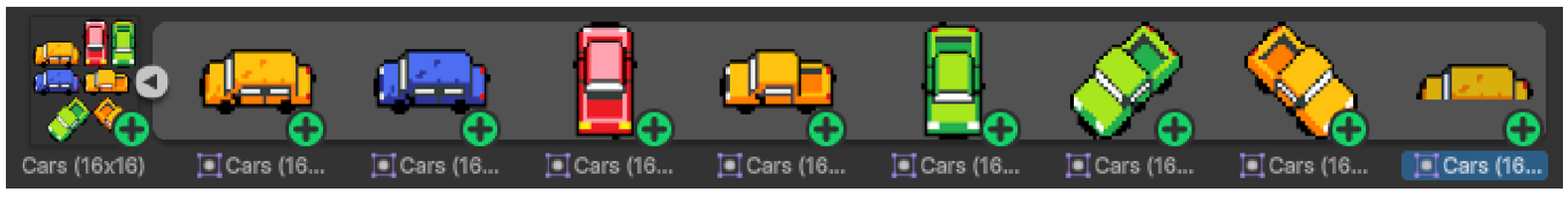
```
// Fixed Updates are Called At A Fixed Frame Rate
0 references
void FixedUpdate()
{
    Vector2 normalizedMovement = movement.normalized;
    rb.MovePosition(rb.position + normalizedMovement * moveSpeed * Time.fixedDeltaTime);
}
```

<u>BUG FIX FROM LESSON #1:</u>

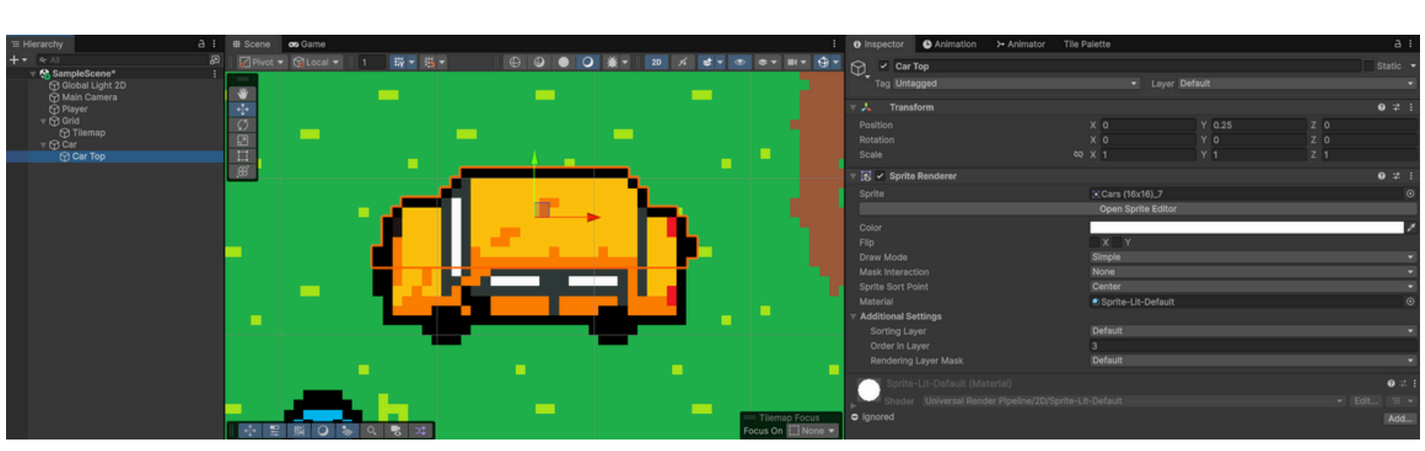
PLAYERMOVEMENT CODE CHANGE TO NORMALIZE DIAGNONAL MOVEMENT



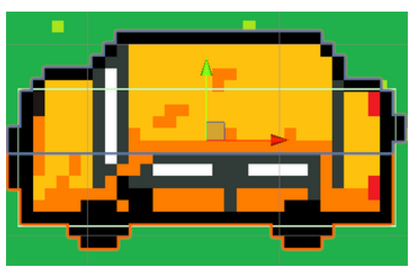
ADD/SHAPE A BOX COLLIDER 2D TO THE PLAYER & LOCK RIGIDBODY 2D CONSTRAINT ON Z ROTATION



CREATE A CAR TOP SPRITE

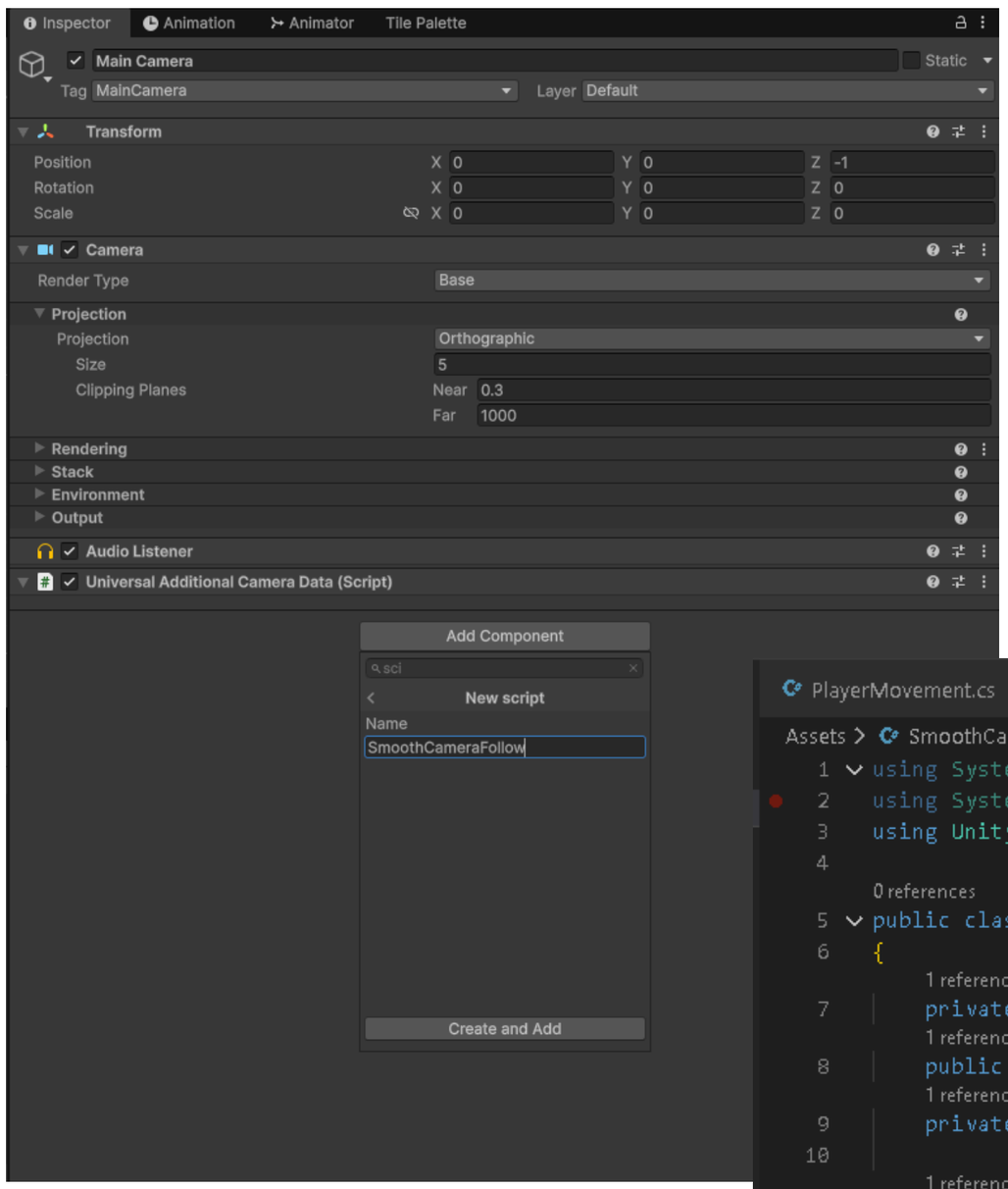


ADD CAR TO SCENE ADD CHILD OF CAR TOP WITH SPRITE LAYER 3



ADD BOX COLLIDER 2D TO LOWER HALF OF CAR

CAMERA FOLLOW

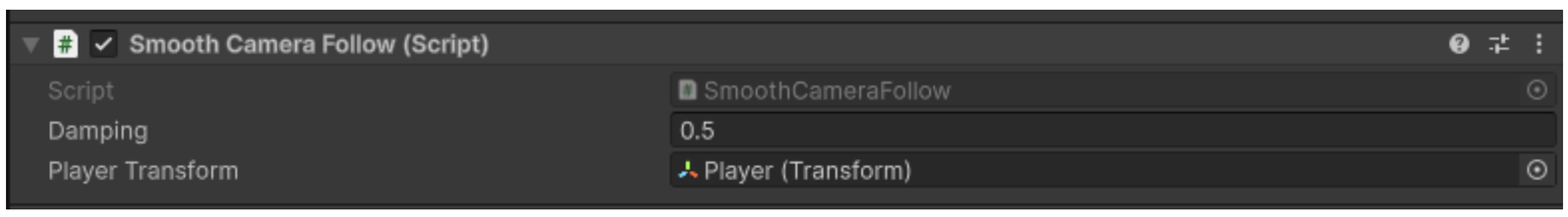


CREATE & ADD “SMOOTHCAMERAFOLLOW” SCRIPT TO MAIN CAMERA

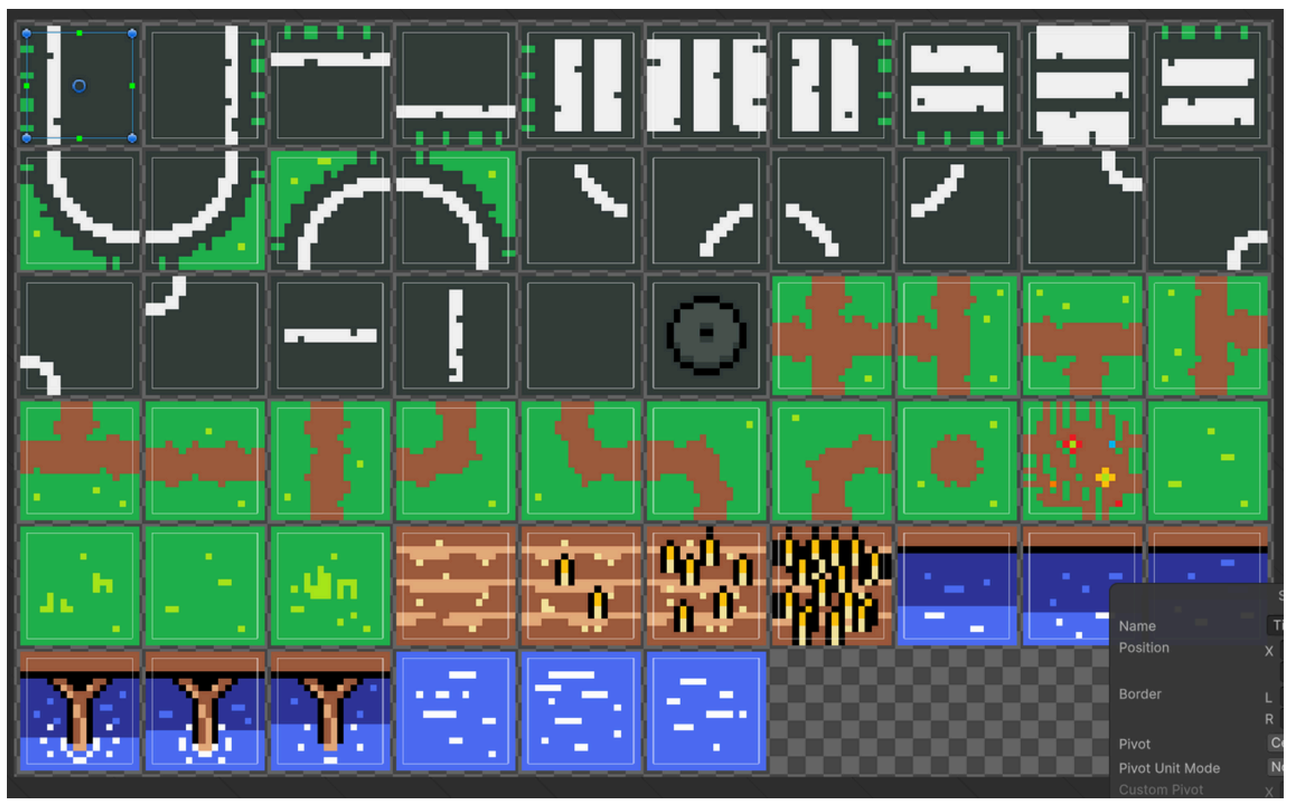
PlayerMovement.cs | SmoothCameraFollow.cs

Assets > SmoothCameraFollow.cs > SmoothCameraFollow > FixedUpdate

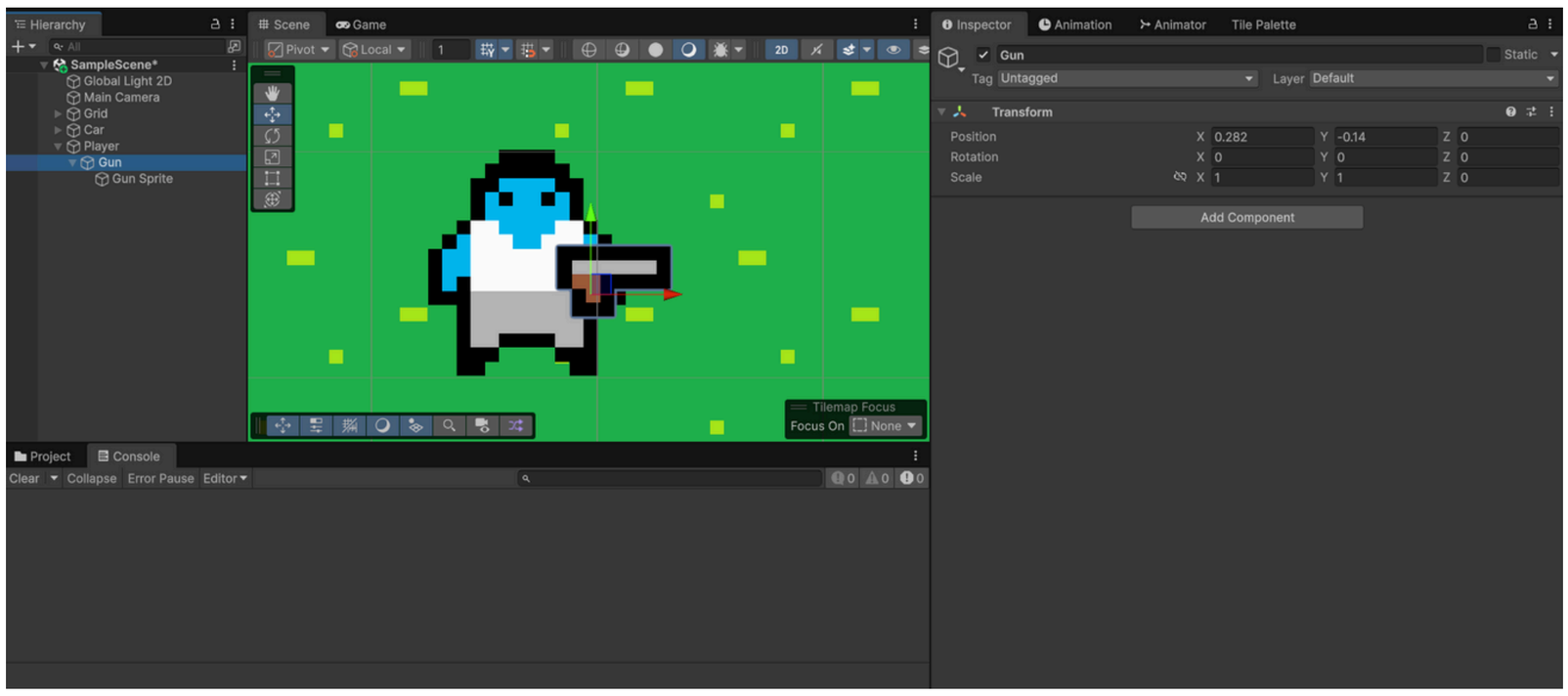
```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

0 references
public class SmoothCameraFollow : MonoBehaviour
{
    1 reference
    private Vector3 offset;
    1 reference
    public float damping;
    1 reference
    private Vector3 velocity = Vector3.zero;

    1 reference
    public Transform playerTransform;

    0 references
    void FixedUpdate()
    {
        Vector3 targetPosition = playerTransform.position + offset;
        targetPosition.z = transform.position.z;

        transform.position = Vector3.SmoothDamp(transform.position, targetPosition, ref velocity, damping);
    }
}
```

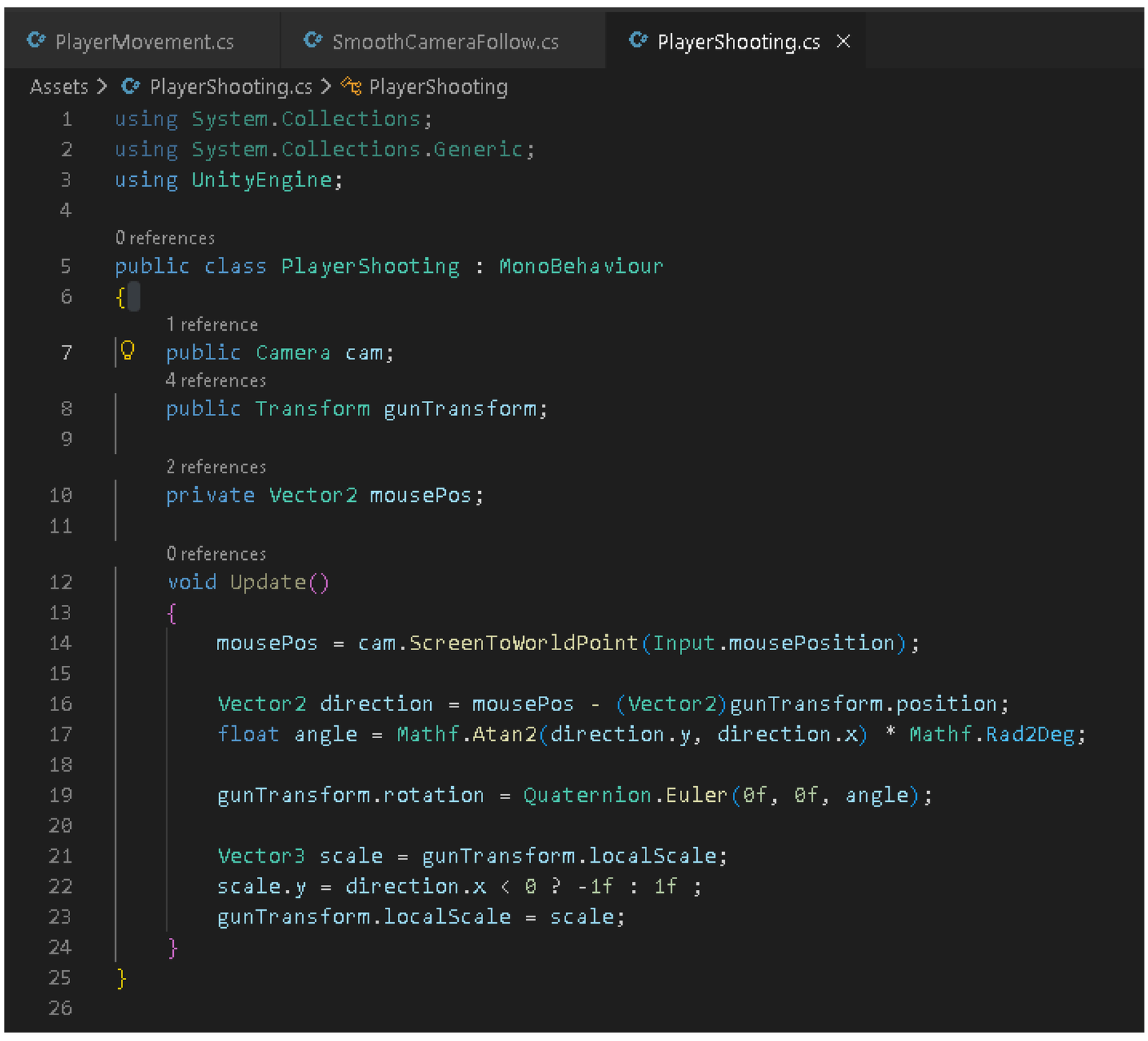


TO PREVENT GAPS APPEARING WHEN MOVING ON TILE SET ADD A BORDER TO EACH TILE (MAY HAVE TO USE AN EXTERNAL PIXEL ART EDITOR)



SHOOTING





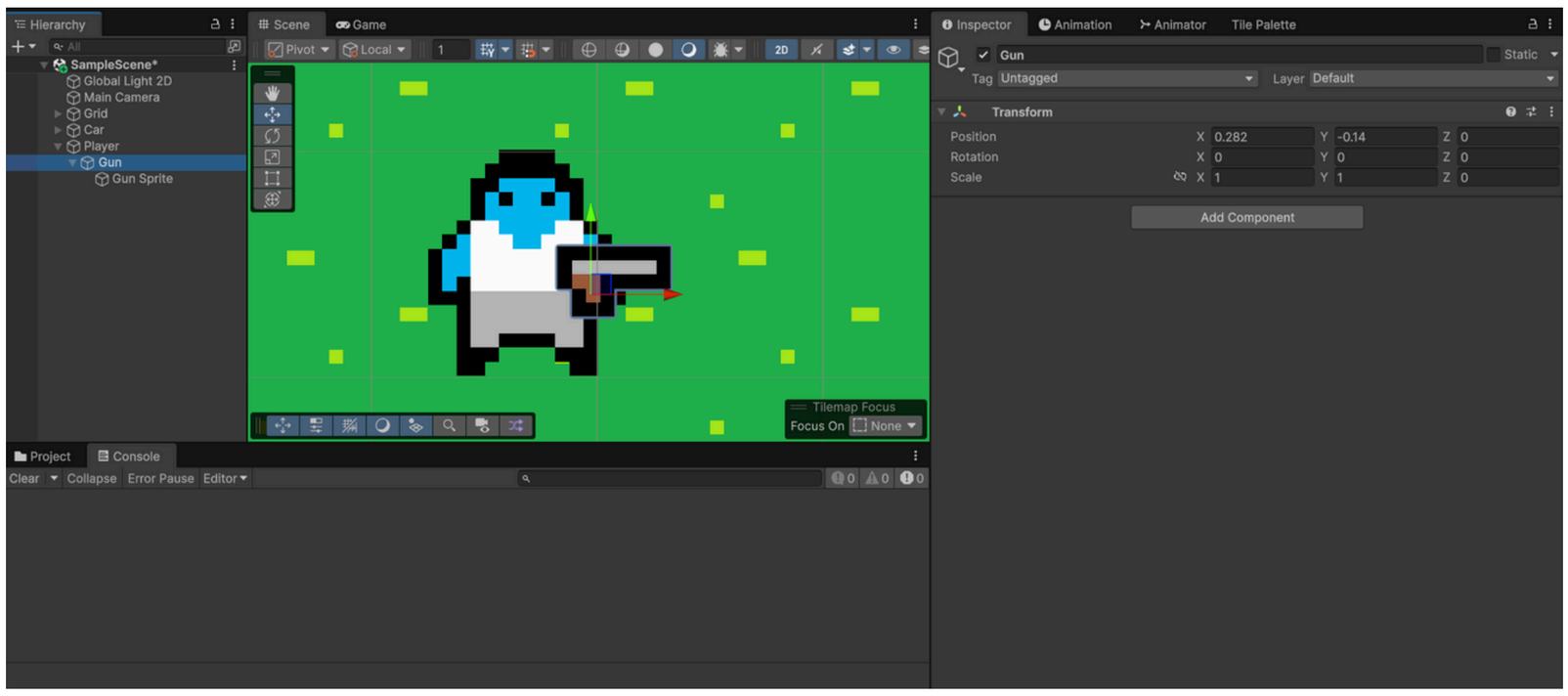
```
PlayerMovement.cs   SmoothCameraFollow.cs   PlayerShooting.cs
Assets > PlayerShooting.cs > PlayerShooting
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

0 references
public class PlayerShooting : MonoBehaviour
{
    1 reference
    public Camera cam;
    4 references
    public Transform gunTransform;

    2 references
    private Vector2 mousePos;

    0 references
    void Update()
    {
        mousePos = cam.ScreenToWorldPoint(Input.mousePosition);

        Vector2 direction = mousePos - (Vector2)gunTransform.position;
        float angle = Mathf.Atan2(direction.y, direction.x) * Mathf.Rad2Deg;

        gunTransform.rotation = Quaternion.Euler(0f, 0f, angle);

        Vector3 scale = gunTransform.localScale;
        scale.y = direction.x < 0 ? -1f : 1f ;
        gunTransform.localScale = scale;
    }
}
```

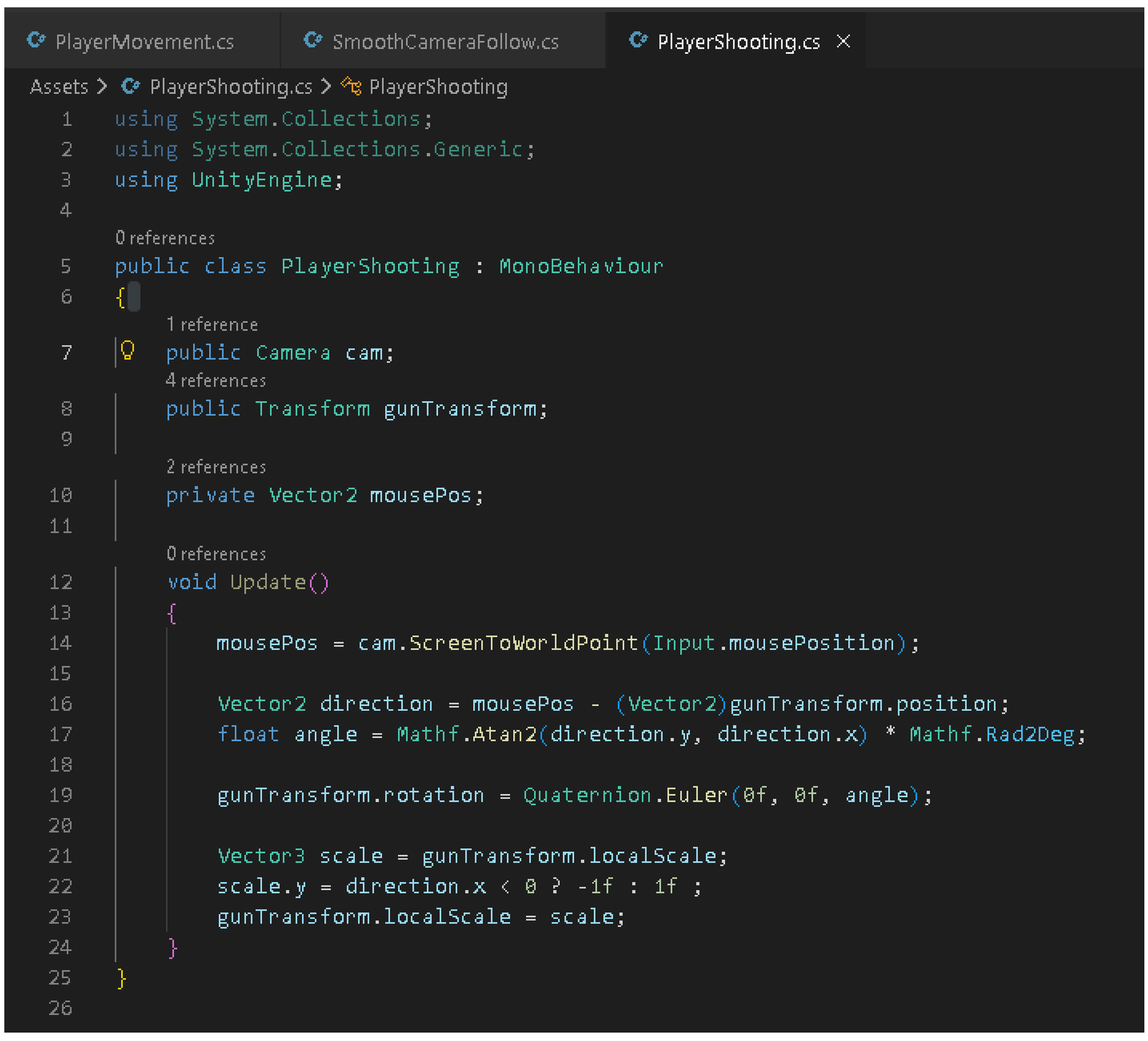
CREATE AN EMPTY OBJECT NAMED GUN WITH A GUN SPRITE AS A CHILD, CHILDREN THESE TO THE PLAYER

CREATE A SCRIPT NAMED “PLAYERSHOOTING” ON THE PLAYER

IN THE SCRIPT MAKE THE GUN FACE THE CAMERA

BULLETS





```
PlayerMovement.cs   SmoothCameraFollow.cs   PlayerShooting.cs
Assets > PlayerShooting.cs > PlayerShooting
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

0 references
public class PlayerShooting : MonoBehaviour
{
    1 reference
    public Camera cam;
    4 references
    public Transform gunTransform;

    2 references
    private Vector2 mousePos;

    0 references
    void Update()
    {
        mousePos = cam.ScreenToWorldPoint(Input.mousePosition);

        Vector2 direction = mousePos - (Vector2)gunTransform.position;
        float angle = Mathf.Atan2(direction.y, direction.x) * Mathf.Rad2Deg;

        gunTransform.rotation = Quaternion.Euler(0f, 0f, angle);

        Vector3 scale = gunTransform.localScale;
        scale.y = direction.x < 0 ? -1f : 1f ;
        gunTransform.localScale = scale;
    }
}
```

CREATE AN EMPTY OBJECT NAMED GUN WITH A GUN SPRITE AS A CHILD, CHILDREN THESE TO THE PLAYER

CREATE A SCRIPT NAMED “PLAYERSHOOTING” ON THE PLAYER

IN THE SCRIPT MAKE THE GUN FACE THE CAMERA

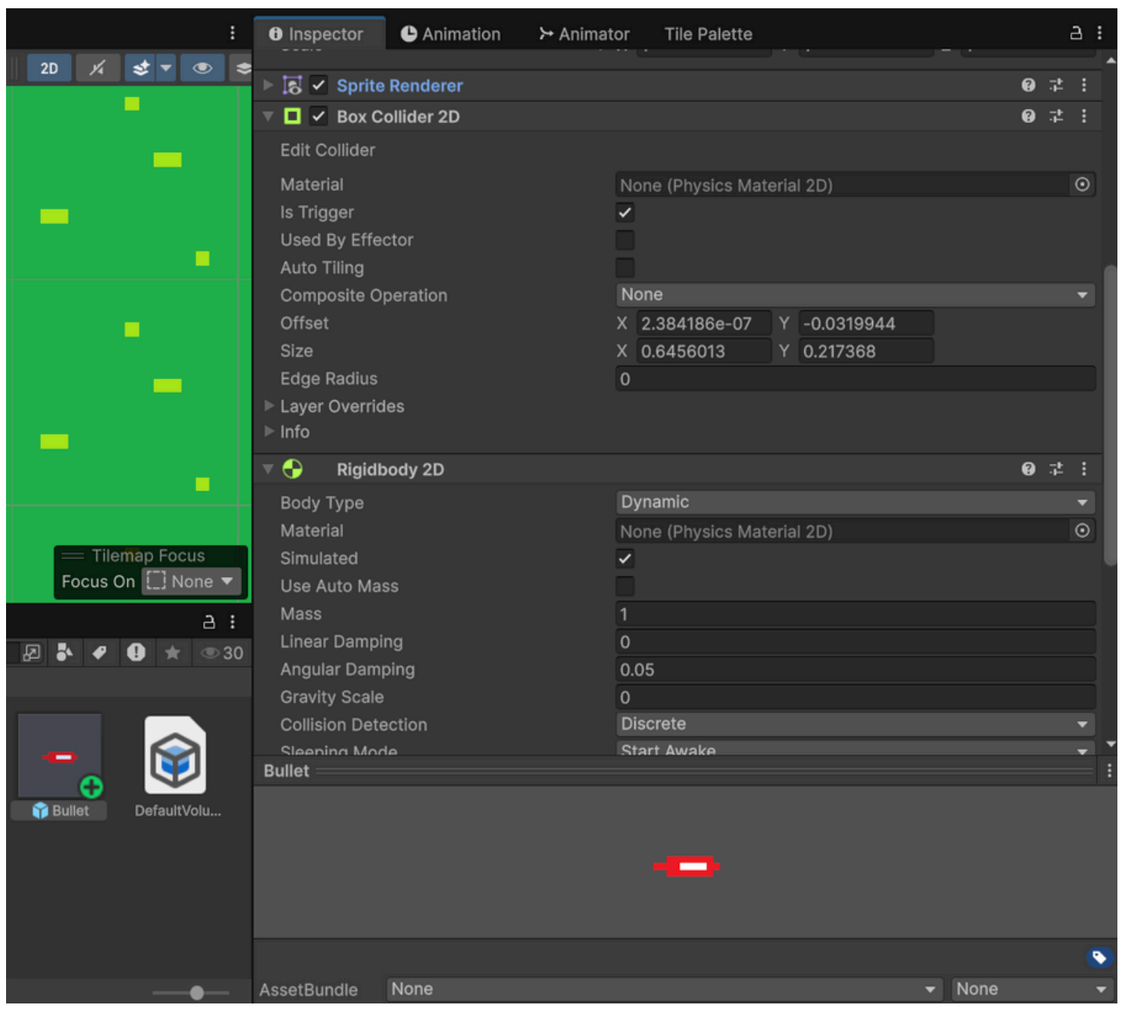
BULLETS

```
PlayerMovement.cs | SmoothCameraFollow.cs | PlayerShooting.cs
Assets > PlayerShooting.cs > PlayerShooting > Shoot
4
    0 references
5   public class PlayerShooting : MonoBehaviour
6   {
7       //Gun Movement
            1 reference
8       public Camera cam;
            4 references
9       public Transform gunTransform;
            2 references
10      private Vector2 mousePos;
11
12      //Shooting
            3 references
13      public Transform firePoint;
            1 reference
14      public GameObject bulletPrefab;
            1 reference
15      public float bulletForce = 20f;
16
            0 references
17      void Update()
18      {
19          mousePos = cam.ScreenToWorldPoint(Input.mousePosition);
20
21          Vector2 direction = mousePos - (Vector2)gunTransform.position;
22          float angle = Mathf.Atan2(direction.y, direction.x) * Mathf.Rad2Deg;
23
24          gunTransform.rotation = Quaternion.Euler(0f, 0f, angle);
25
26          Vector3 scale = gunTransform.localScale;
27          scale.y = direction.x < 0 ? -1f : 1f ;
28          gunTransform.localScale = scale;
29
30          if (Input.GetButtonDown("Fire1"))
31          {
32              Shoot();
33          }
34      }
35
            1 reference
36      void Shoot()
37      {
38          GameObject bullet = Instantiate(bulletPrefab, firePoint.position, firePoint.rotation);
39          Rigidbody2D bulletRB = bullet.GetComponent<Rigidbody2D>();
40          bulletRB.AddForce(firePoint.right * bulletForce, ForceMode2D.Impulse);
41      }
42  }
43
```

ADD AN EMPTY OBJECT NAMED BARREL TO THE GUN

CREATE A SCRIPT NAMED “PLAYERSHOOTING” ON THE PLAYER

SET PLAYER TAG TO PLAYER



CREATE A BULLET PREFAB WITH A 2D BOX COLLIDER & 2D RIGIDBODY

SET THE COLLIDER TO BE A TRIGGER, AND THE RIGIDBODY TO HAVE 0 GRAVITY

CREATE A SCRIPT NAMED “BULLET” AND ADD TO THE BULLET

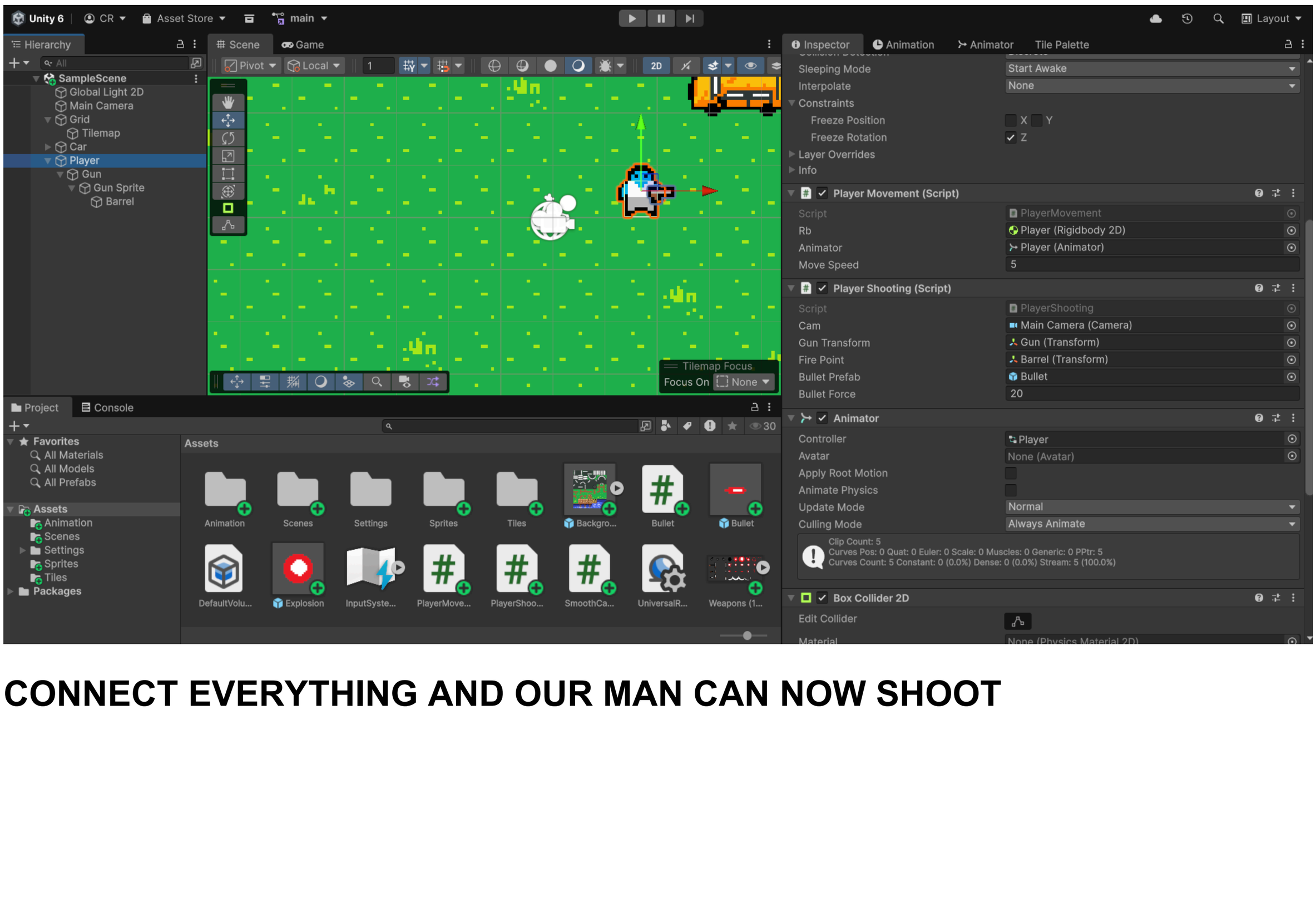
BULLETS #2

PlayerMovement.cs | SmoothCameraFollow.cs | PlayerShooting.cs | Bullet.cs

Assets > Bullet.cs > Bullet > OnCollisionEnter2D

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

0 references
public class Bullet : MonoBehaviour
{
    1 reference
    public GameObject hitEffect;
    1 reference
    public float effectTime = 5f;

    0 references
    void OnCollisionEnter2D(Collision2D collision)
    {
        if (collision.gameObject.CompareTag("Player"))
            return;

        GameObject effect = Instantiate(hitEffect, transform.position, Quaternion.identity);
        Destroy(effect, effectTime);
        Destroy(gameObject);
    }


}
```

CREATE AN EXPLOSION PREFAB IN THE EDITOR



CONNECT EVERYTHING AND OUR MAN CAN NOW SHOOT

CONCLUSION

Mana Rock Gaming

MANA ROCK GAMING WEBSITE

HTTPS://WWW.MANAROCKGAMING.COM/

KERSHAW COUNTY VIDEO GAME PROGRAMMERS, DESIGNERS, & ARTISTS

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