

Red Challenge Teacher Guide

Brad Lance

Links

Finished Cat & Mouse Game:

<https://the-t-v1rus.github.io/NinjaChallenges/Build/index>

Unity Package:

https://the-t-v1rus.github.io/NinjaChallenges/UnityPackage/RedChallenge_Package.unitypackage

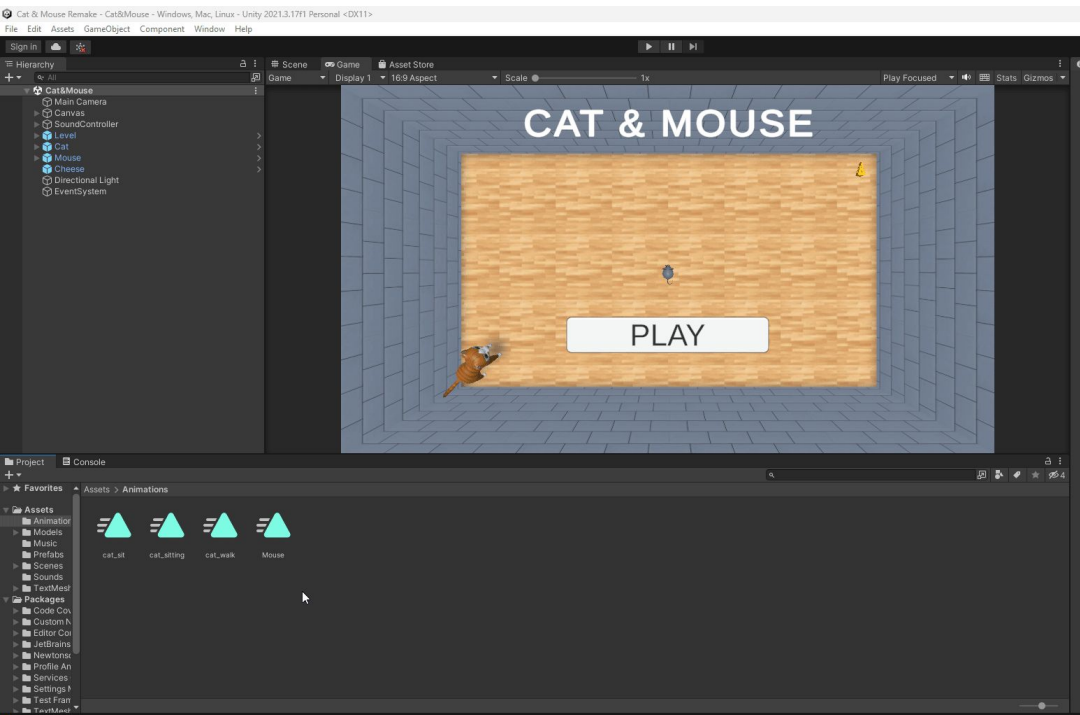
Student Guide:

<https://the-t-v1rus.github.io/NinjaChallenges/Guide/RedChallenge.pdf>

Teacher Guide:

ANIMATE THE MOUSE

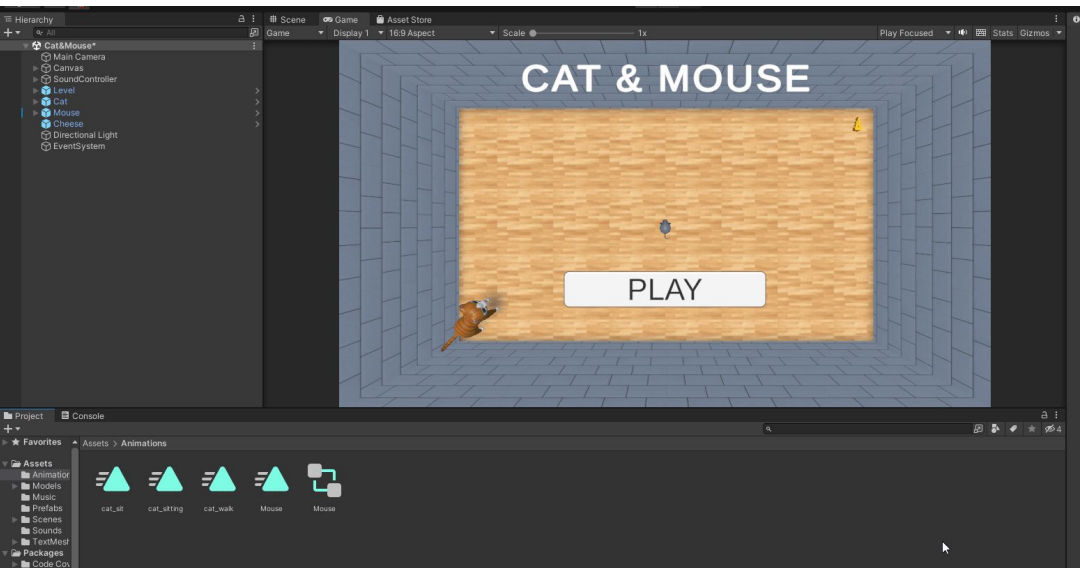
- 1) Open the “Animations” folder
- 2) Find the “Mouse” animation
- 3) Drag and drop the “Mouse” animation onto the “Mouse” game object in the Hierarchy



- 4) Play the game and make sure the mouse is not wagging its tail

MAKE THE CAT SIT

- 1) Open the “Animations” folder
- 2) Find the “cat_sitting” animation
- 3) Drag and drop the “cat_sitting” animation onto the “Cat” game object in the Hierarchy

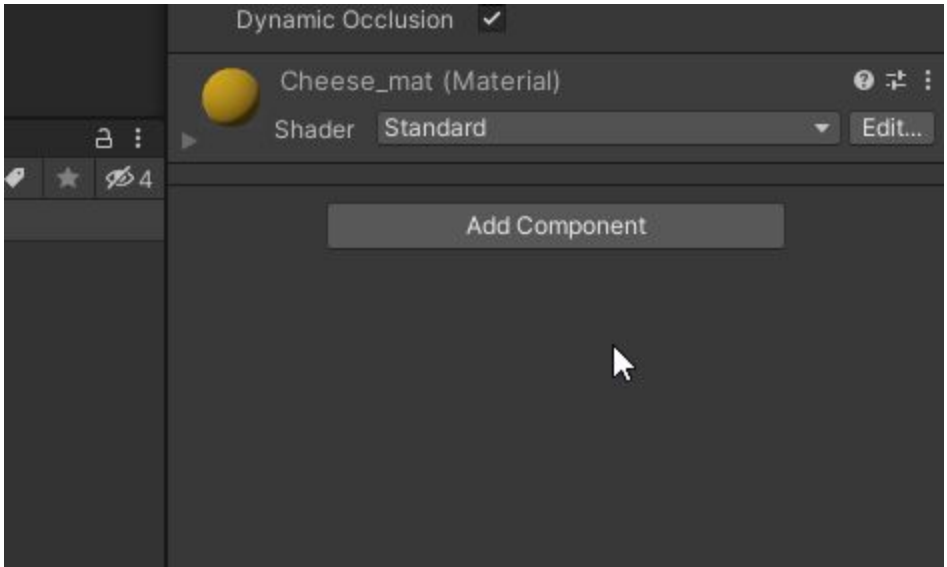


- 4) Play the game and make sure the cat is now sitting when you play the game

MAKE THE CHEESE ROTATE

NOTE: You can also make a custom animation and add that to the cheese. The method I used to make the cheese rotate was with code.

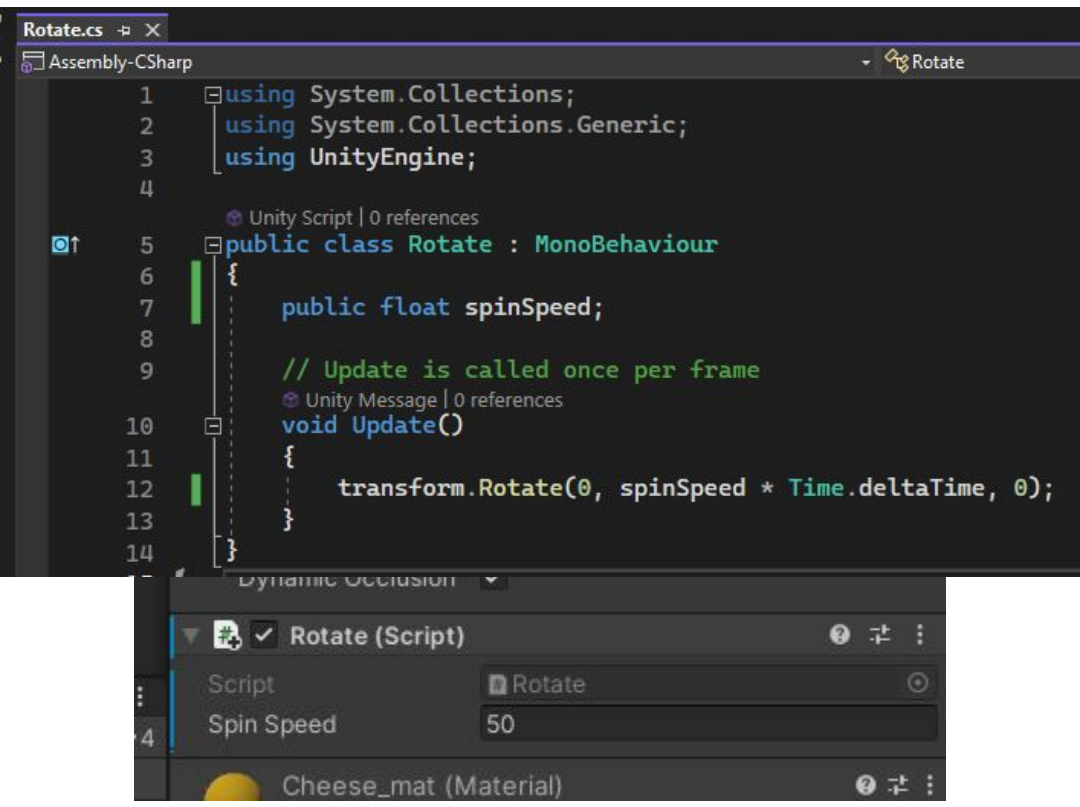
- 1) Click on the “Cheese” game object in the hierarchy
- 2) In the Inspector tab, choose “Add Component” and add a new script called “Rotate” to the game object.



- 3) Open the script in Visual Studio

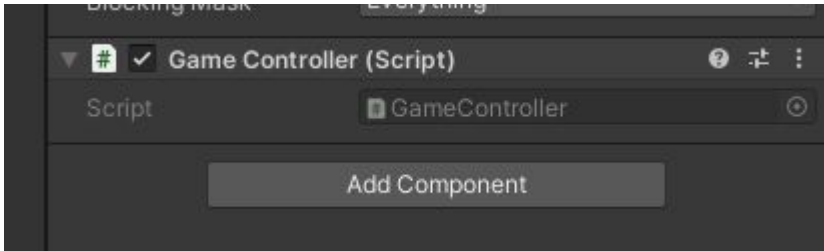
MAKE THE CHEESE ROTATE

- 4) Add a variable where we can change the rotation speed of the object
- 5) Add code in the update that makes the object spin in the Y axis based on the rotation speed. Make sure the multiply this by `Time.deltaTime` so it will spin at the same speed on all devices
- 6) Adjust the spin speed in the inspector tab until the cheese spins at a reasonable rate. **The cheese will not rotate until you adjust the spin speed in the inspector tab!**



START BUTTON

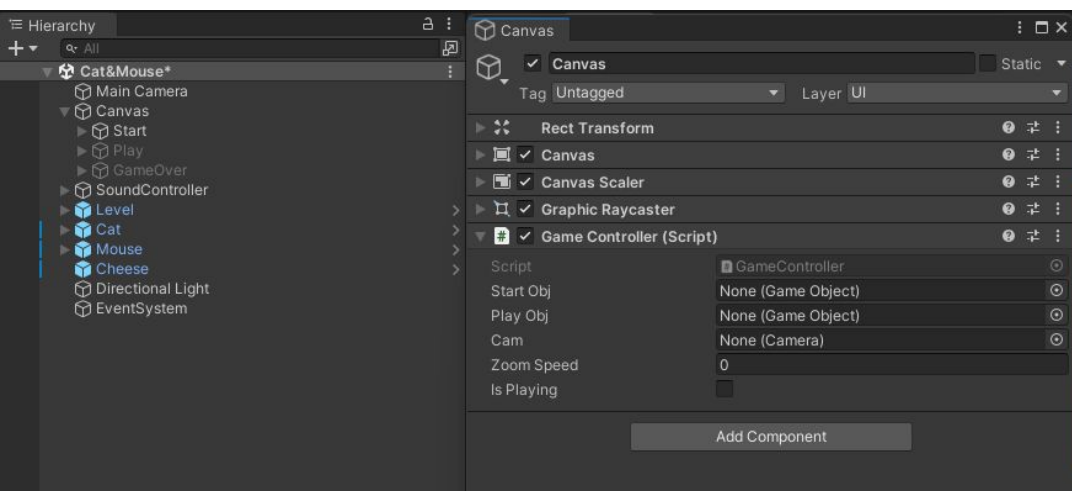
- 1) Add a new script to the “Canvas” game object called “GameController”.



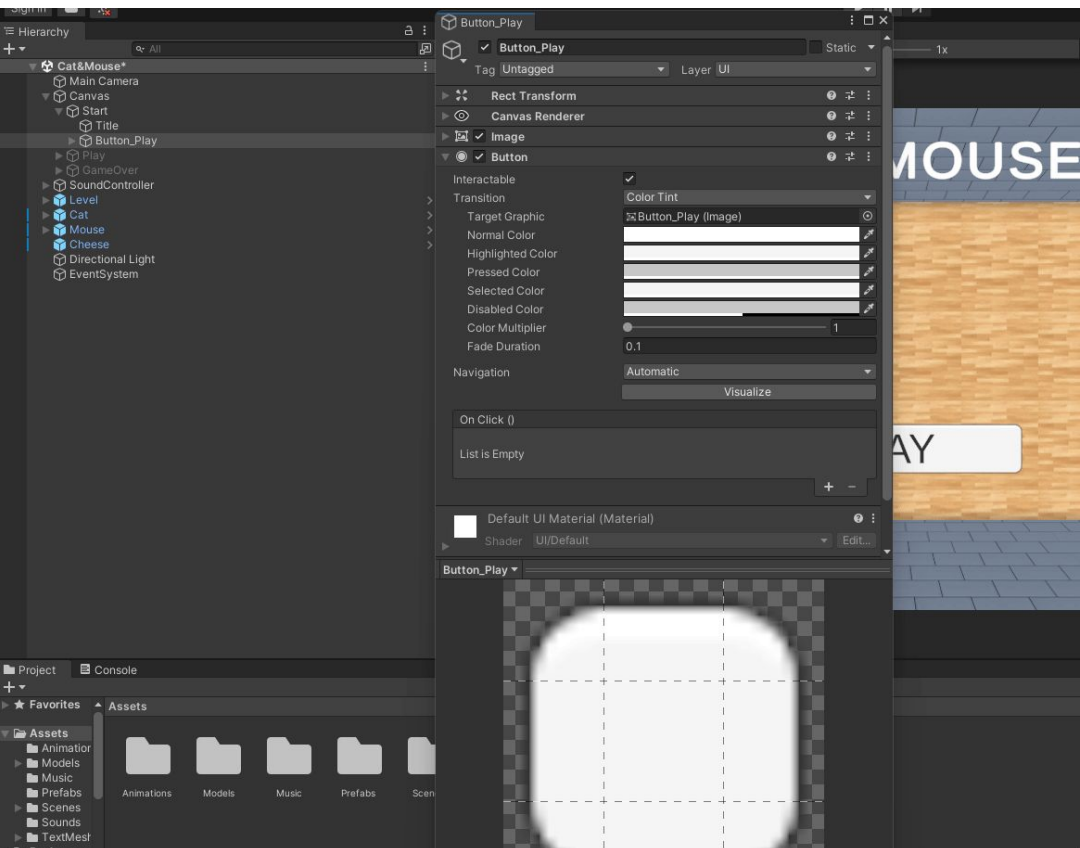
```
GameController.cs* [X]
Assembly-CSharp

1  using System.Collections;
2  using System.Collections.Generic;
3  using UnityEngine;
4
5  public class GameController : MonoBehaviour
6  {
7      public GameObject StartObj, PlayObj;
8      public Camera Cam;
9      public float zoomSpeed;
10     public bool isPlaying;
11
12     // Start is called before the first frame update
13     void Start()
14     {
15         Cam = Camera.main;
16     }
17
18     // Update is called once per frame
19     void Update()
20     {
21         if (isPlaying && Cam.fieldOfView > 45)
22         {
23             Cam.fieldOfView -= zoomSpeed * Time.deltaTime;
24         }
25     }
26
27     public void PressStartButton()
28     {
29         isPlaying = true;
30         StartObj.SetActive(false);
31         PlayObj.SetActive(true);
32     }
33 }
34
```

- 2) Right click the “Canvas” in the hierarchy and choose “properties”
- 3) Drag and drop the needed objects from the hierarchy to properties window to assign them
- 4) Adjust the zoomSpeed to 100
- 5) Close the “Canvas Properties” window

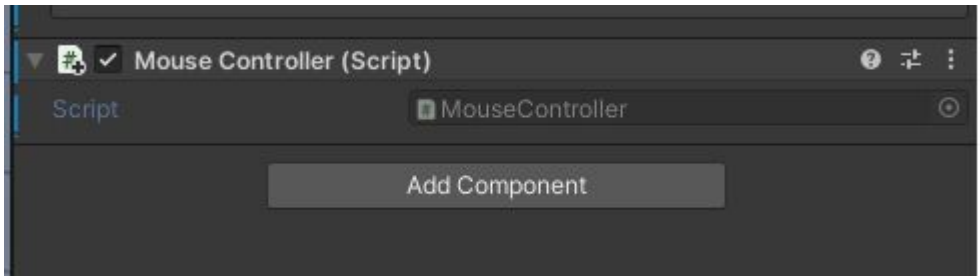


- 6) Select the Button_Play in the hierarchy, it is a child of the “Start” game object.
- 7) In the inspector window, find the “button” component. In the On Click() area, click the plus button.
- 8) Drag the “Canvas” object into the first box, then choose the “GameController” script from the drop down, selecting the “PressStartButton” function.



MOUSE FOLLOW CURSOR

- 1) Select the “Mouse” object in the hierarchy.
- 2) In the inspector, add a new script called “MouseController”



- 3) Add code to make the mouse look at and follow the mouse cursor

```
5 public class MouseController : MonoBehaviour
6 {
7     GameController gameController;
8     Camera cam;
9     Plane plane = new Plane(Vector3.up, 0);
10    Vector3 worldPosition;
11    public float speed = 75f;
12
13    // Start is called before the first frame update
14    void Start()
15    {
16        gameController = FindObjectOfType<GameController>();
17        cam = Camera.main;
18    }
19
20    // Update is called once per frame
21    void Update()
22    {
23        if (gameController.isPlaying)
24        {
25            float distance;
26            Ray ray = cam.ScreenPointToRay(Input.mousePosition);
27
28            if (plane.Raycast(ray, out distance))
29            {
30                worldPosition = ray.GetPoint(distance);
31            }
32            worldPosition.y = 0;
33            var step = speed * Time.deltaTime;
34            transform.position = Vector3.MoveTowards(transform.position, worldPosition, step);
35            transform.LookAt(worldPosition);
36        }
37    }
38 }
39
```

MOUSE FOLLOW CURSOR

Basically we are making a plane just like in scratch.

```
8 | ... camera.cam;  
9 | Plane plane = new Plane(Vector3.up, 0);  
10 | ...
```

With this plane created, we are casting a ray from the camera to the plane. We are then seeing how far from the center of the plane the mouse is (just like in scratch)

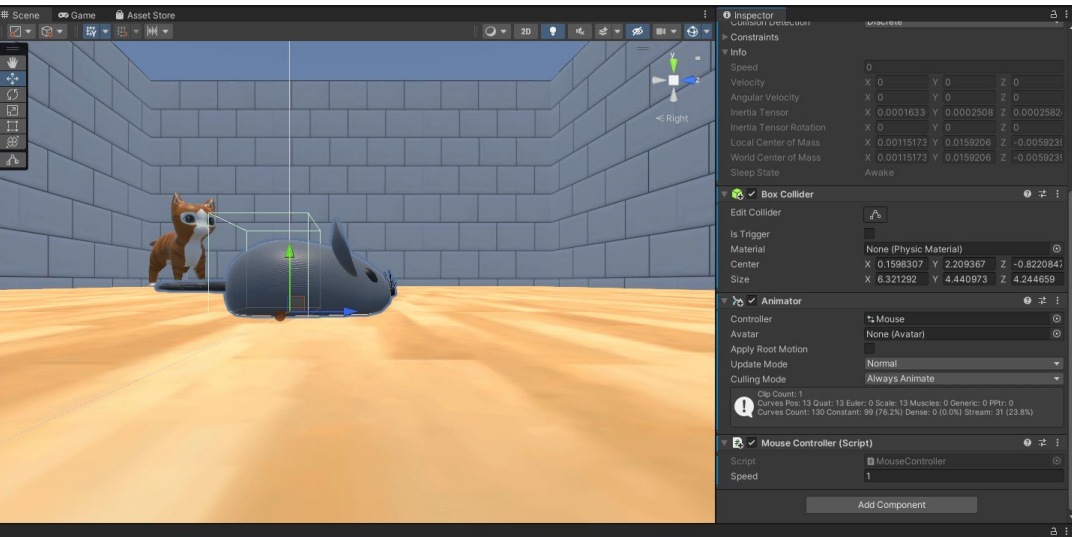
```
float distance;  
Ray ray = cam.ScreenPointToRay(Input.mousePosition);  
  
if(plane.Raycast(ray, out distance))  
{  
    worldPosition = ray.GetPoint(distance);  
}
```

Once we have this position, we can reset the Y value to zero so the position is not at the location of the camera and instead on the ground. Now that we have the position the mouse can **move towards** that point and make it **look at** that point.

```
worldPosition.y = 0;  
var step = speed * Time.deltaTime;  
transform.position = Vector3.MoveTowards(transform.position, worldPosition, step);  
transform.LookAt(worldPosition);
```

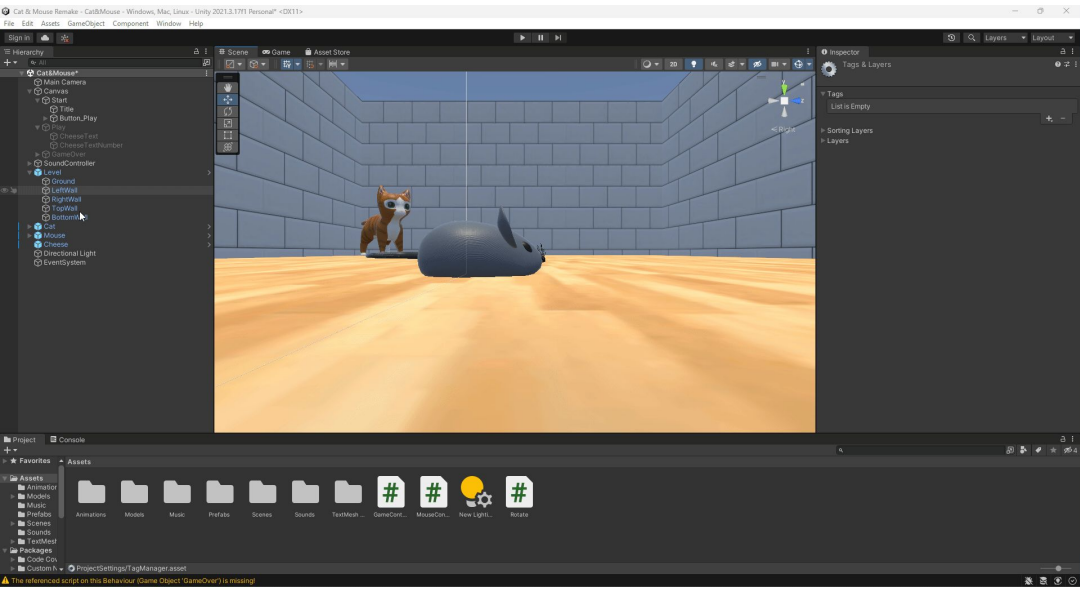
MOUSE COLLIDES WITH WALLS

- 1) Add a rigid body to the Mouse game object
- 2) Add a box collider to the Mouse game object
- 3) Use the edit collider button along with the ISO perspective to edit the box collider



COLLECT CHEESE

- 1) Add a tag to the Cheese game object called "Cheese"



- 2) Add a box collider to the cheese
- 3) Add a variable in the GameController script for counting the cheese

```
public class GameController : MonoBehaviour
{
    public GameObject StartObj, PlayObj;
    public Camera Cam;
    public float zoomSpeed;
    public bool isPlaying;

    public int cheeseEaten;

    // Start is called before the first frame update
    void Start()
    {
        cheeseEaten = 0;
        Cam = Camera.main;
    }
}
```

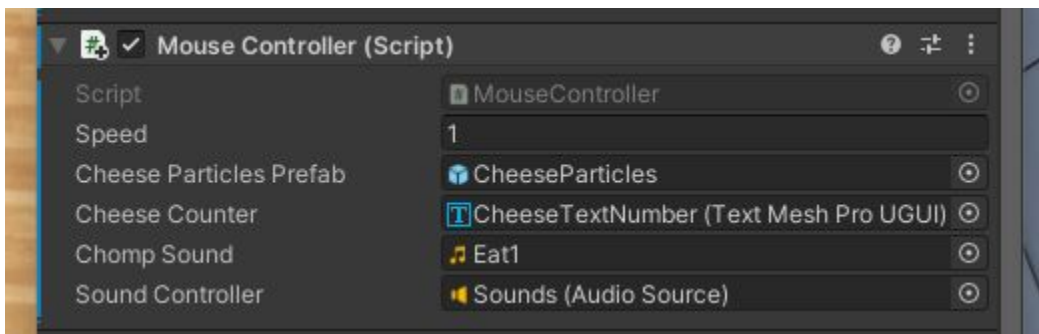
4) Add code to the MouseController. When the cheese is collided with

- a) Create cheese particles prefab at location of cheese
- b) Play the “chomp” sound
- c) Move the cheese to a new location
- d) Update the cheese counter

```
14 //Collecting Cheese
15 public GameObject cheeseParticlesPrefab;
16 public TextMeshProUGUI cheeseCounter;
17 public AudioClip chompSound;
18 public AudioSource soundController;
19
20 Unity Message | 0 references
21 private void OnCollisionEnter(Collision collision)
22 {
23     if (collision.transform.CompareTag("Cheese"))
24     {
25         //increase cheese counter
26         gameController.cheeseEaten += 1;
27         cheeseCounter.text = gameController.cheeseEaten.ToString();
28
29         //play chomp sound
30         soundController.PlayOneShot(chompSound);
31
32         //create particles
33         Instantiate(cheeseParticlesPrefab,
34             collision.transform.position,
35             Quaternion.identity);
36
37         //Move cheese to new location
38         collision.transform.position = new Vector3(
39             Random.Range(-0.8f, 0.8f),
40             collision.transform.position.y,
41             Random.Range(-0.4f, 0.4f));
42     }
43 }
```

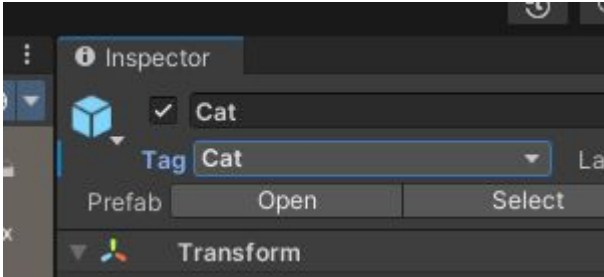
5) Make sure all of the references are added to the script

- a) Drag the CheeseParticles prefab from the “Prefabs” folder into the Cheese Particles Prefab slot
- b) Drag the CheeseTextNumber object from the hierarchy into the “Cheese Counter” slot
- c) Drag the Eat1 sound from the “Sounds” folder into the “Chomp Sound” slot
- d) Drag the “Sounds” game object from the hierarchy into the “Sound Controller” slot

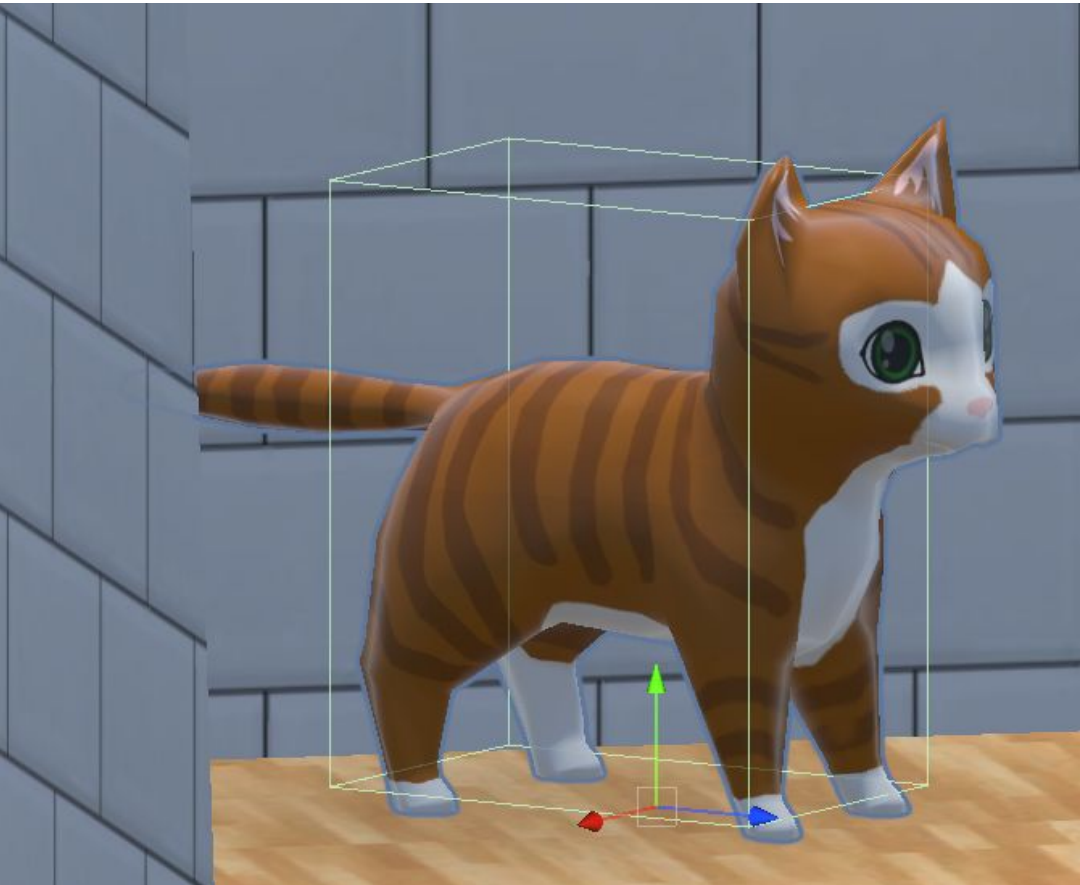


MOUSE TOUCHING CAT

- 1) Add a tag to the Cat game object called "Cat"



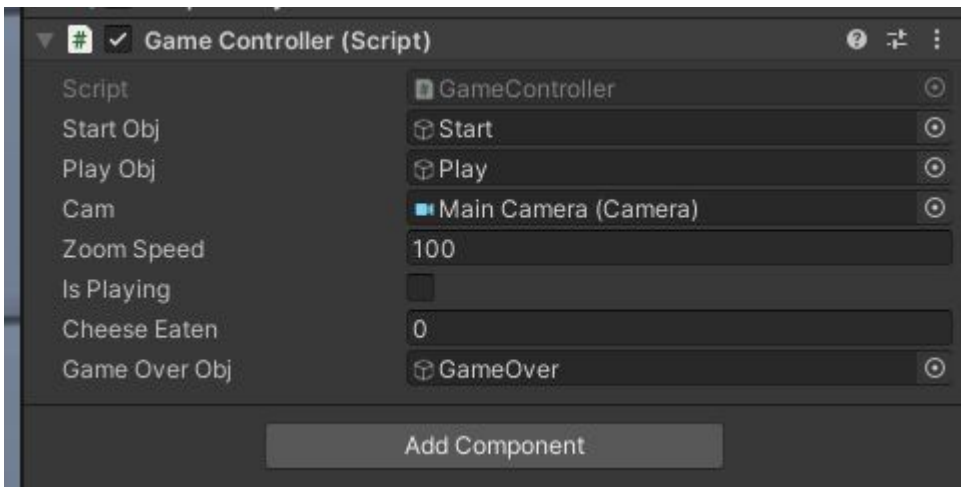
- 2) Add a box collider to the Cat. Use ISO camera mode to align the box properly.



- 3) In the GameController script, add a coroutine and public method to start the coroutine. The goal is to show the game over screen after 1 second.

```
13
14     public GameObject GameOverObj;
15
16     0 references
17     public void EndGame()
18     {
19         StartCoroutine>ShowGameOver();
20     }
21
22     1 reference
23     IEnumerator ShowGameOver()
24     {
25         yield return new WaitForSeconds(1f);
26         GameOverObj.SetActive(true);
27     }
```

- 4) Assign the game over object to the script from the hierarchy



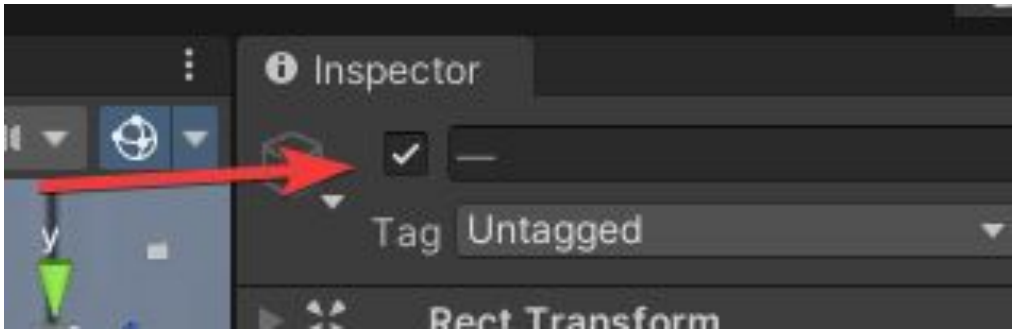
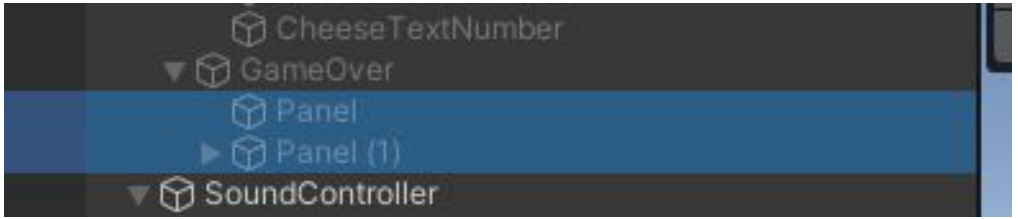
- 5) In the MouseController script, add new references and update the collision event.

```
19
20 //Touching Cat
21 public GameObject mouseParticlesPrefab;
22 public AudioSource musicSource;
23 public AudioClip catChompSound;
24
25
26 Unity Message | 0 references
27 private void OnCollisionEnter(Collision collision)
28 {
29     if (collision.transform.CompareTag("Cat"))
30     {
31         //create particles
32         Instantiate(mouseParticlesPrefab,
33             transform.position,
34             Quaternion.identity);
35
36         //stop music
37         musicSource.Stop();
38
39         //play cat chomp sound
40         soundController.PlayOneShot(catChompSound);
41
42         //start game over coroutine
43         gameController.EndGame();
44
45         //destroy mouse
46         Destroy(gameObject);
47     }
```

- 6) Assign the references to the script

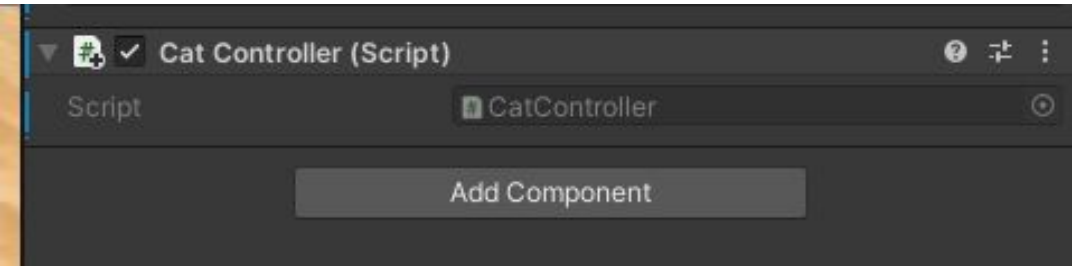


- 7) Make sure the panels that are children of the GameOver object are enabled.

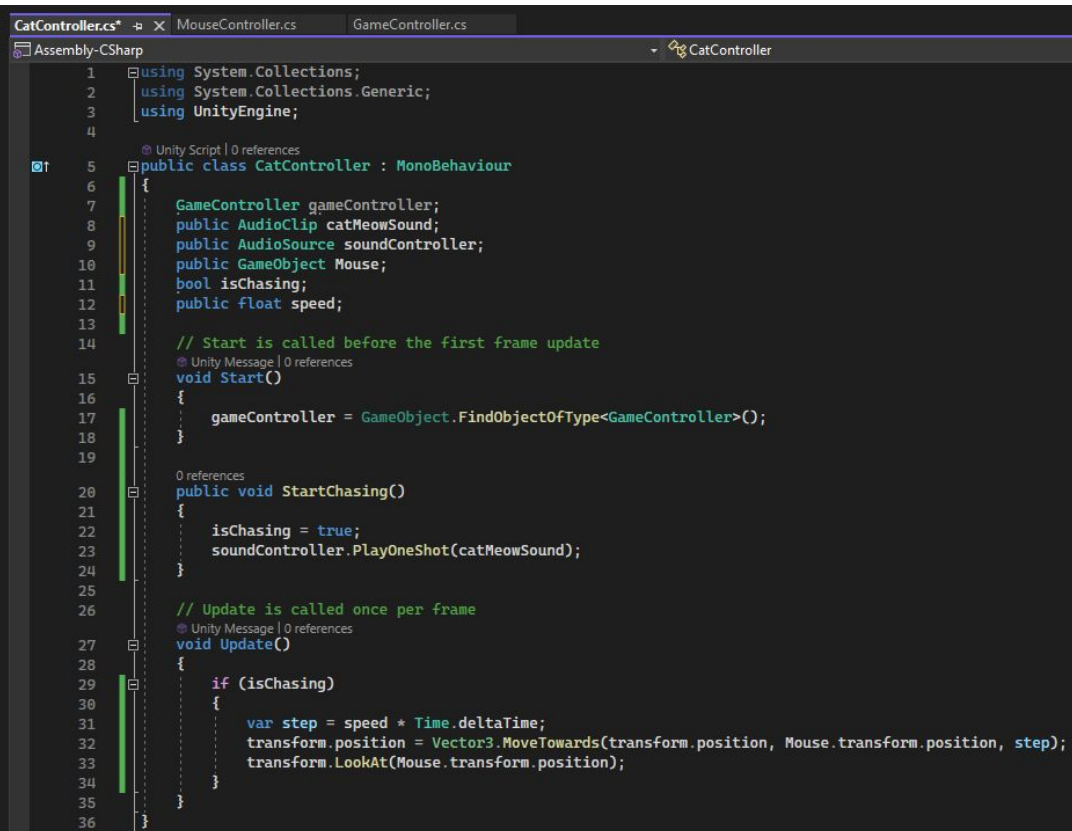


CAT CHASING MOUSE

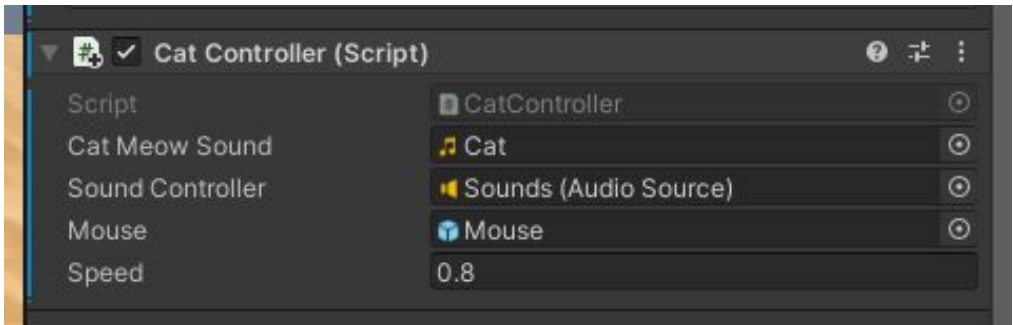
- 1) Add a script to the Cat object called "CatController"



- 2) Add code to make the cat meow and start chasing the mouse



- 3) Assign the references to the script and set the speed to 0.8f



- 4) Add code to the MouseController cheese collision to call the method on the cat if the amount of cheese eaten == 1

```
if (collision.transform.CompareTag("Cheese"))
{
    //increase cheese counter
    gameController.cheeseEaten += 1;
    cheeseCounter.text = gameController.cheeseEaten.ToString();

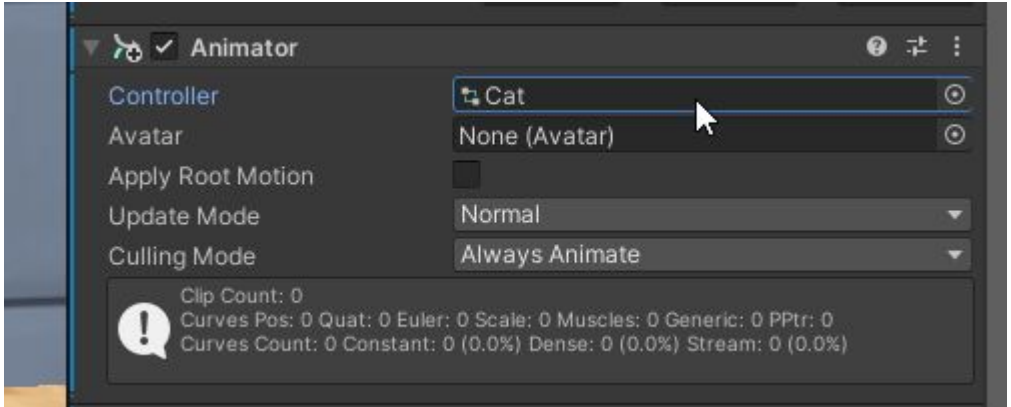
    //activate cat if needed
    if(gameController.cheeseEaten == 1)
    {
        FindObjectOfType<CatController>().StartChasing();
    }

    //play chomp sound
    soundController.PlayOneShot(chompSound);

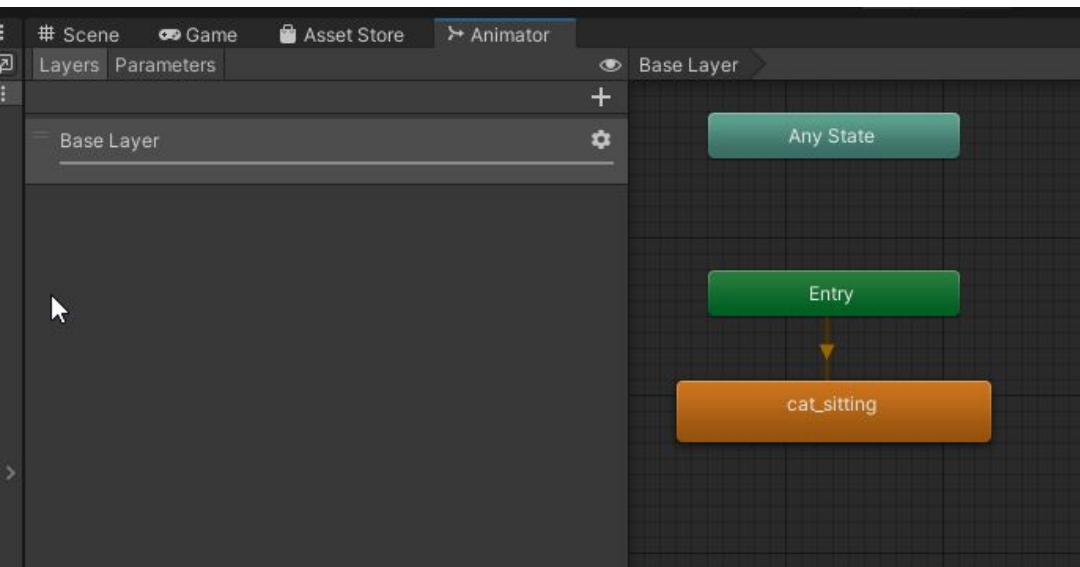
    //create particles
    Instantiate(cheeseParticlesPrefab,
```

SET UP CAT ANIMATIONS

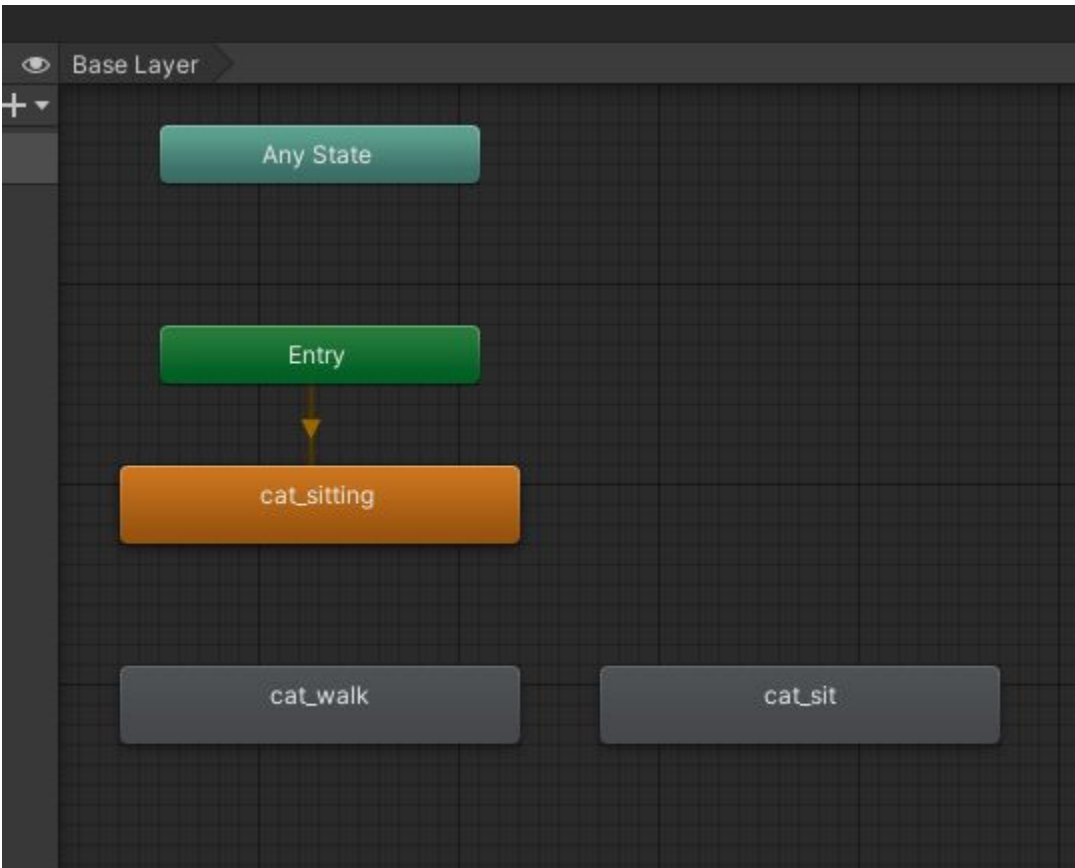
- 1) Open the Animation Controller by double clicking on it. This can be found in the Animator component on the Cat object.



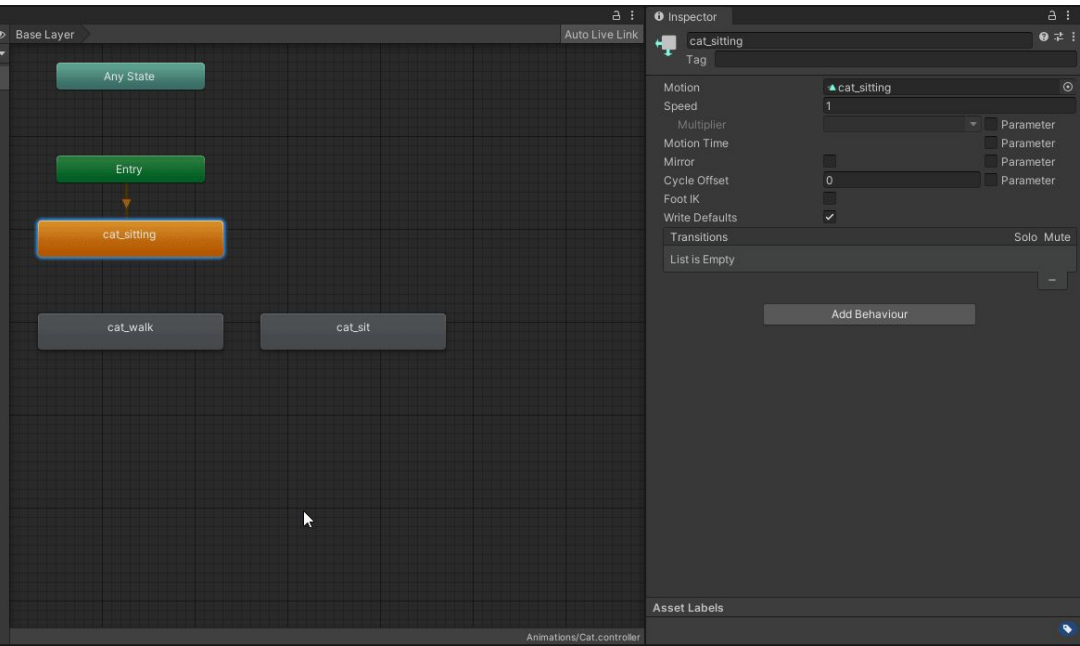
- 2) With the Animator tab open, select the Parameters tab and add a new bool parameter called “chasing”



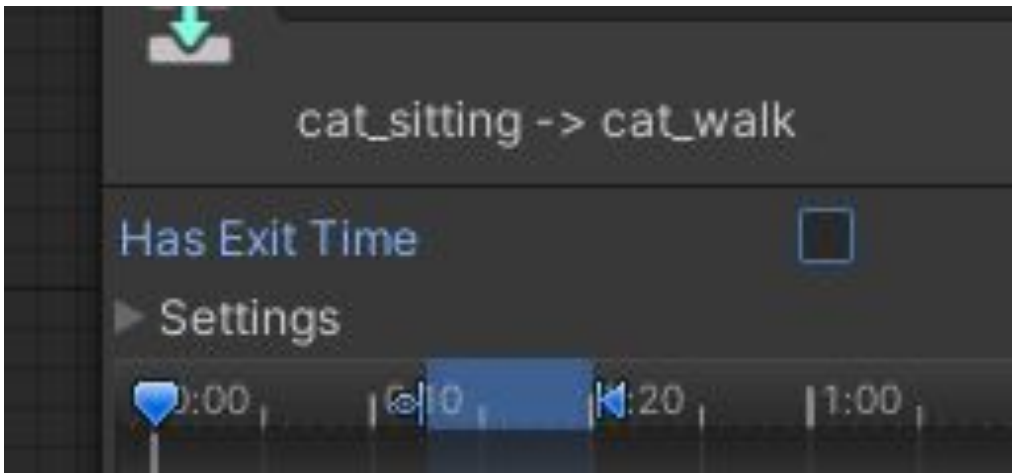
- 3) Drag and drop the “cat_walk” animation into the Animator window
- 4) Drag and drop the “cat_sit” animation into the Animator window



- 5) Make a transition from the “cat_sitting” to the “cat_walk” animation. Add the “chasing == true” condition to this link.

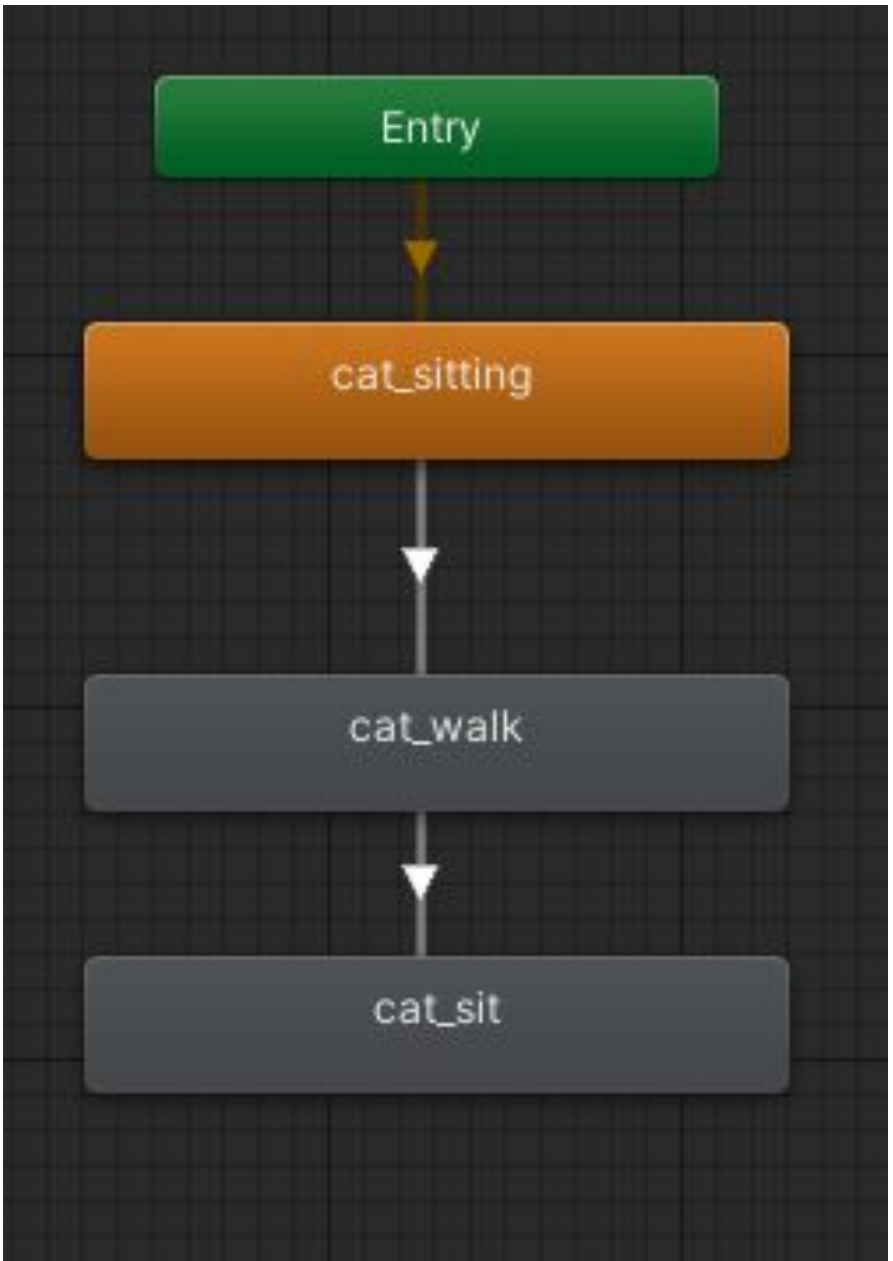


- 6) Turn off “Has Exit Time”



- 7) Make a transition from the “cat_walk” to the “cat_sit” animation. Add the “chasing == false” condition to this link.

Also make sure “Has Exit Time” is turned off.



ACTIVATE CAT ANIMATIONS

- 1) In the CatController script, add a StopChasing() method and update the animations as needed.

```
1 reference
20 public void StartChasing()
21 {
22     isChasing = true;
23     soundController.PlayOneShot(catMeowSound);
24     GetComponent<Animator>().SetBool("Chasing", true);
25 }
26
0 references
27 public void StopChasing()
28 {
29     isChasing = false;
30     GetComponent<Animator>().SetBool("Chasing", false);
31 }
32
```

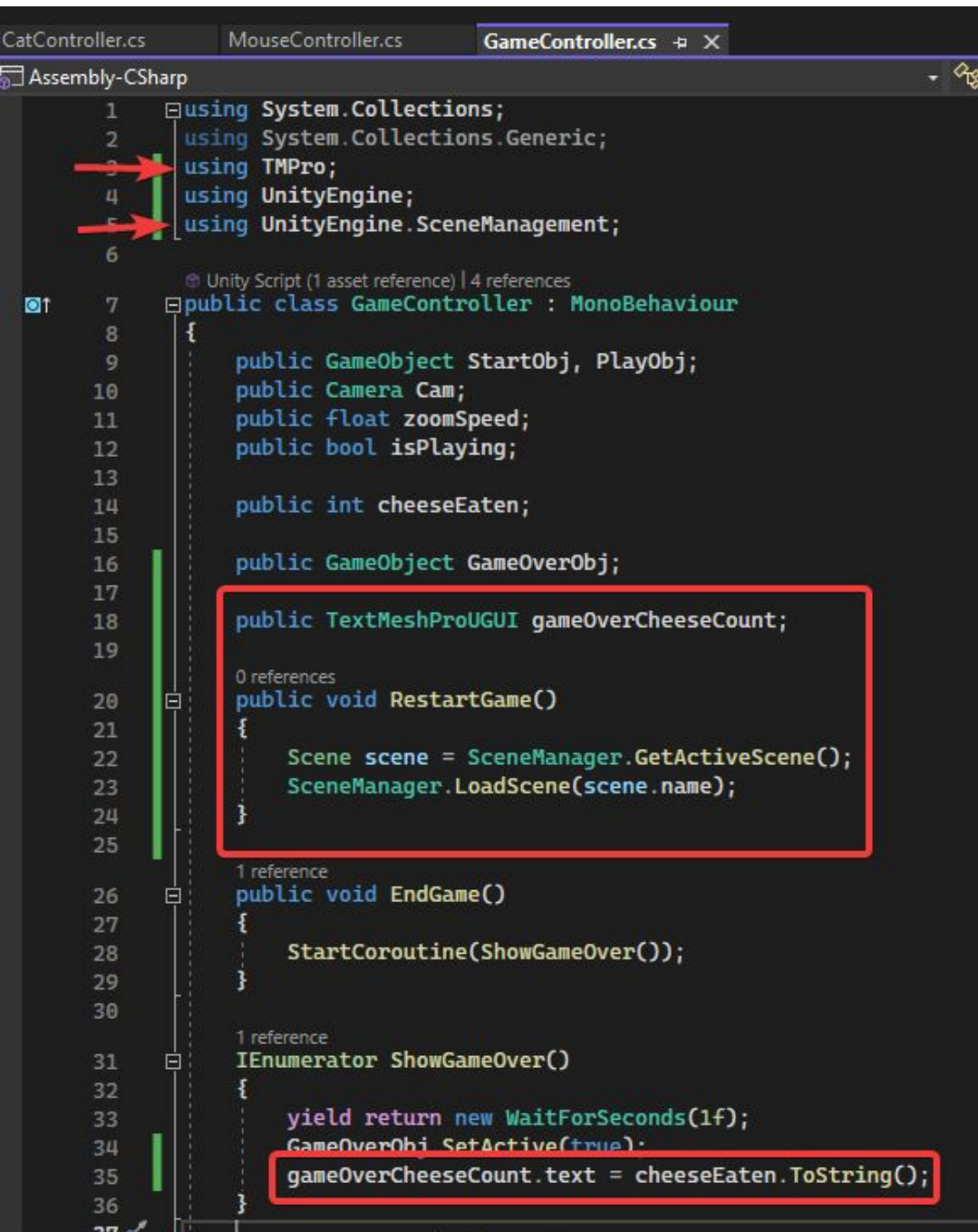
- 2) In the MouseController script, activate the StopChasing function in the Cat controller

```
Unity Message | 0 references
26 private void OnCollisionEnter(Collision collision)
27 {
28     if (collision.transform.CompareTag("Cat"))
29     {
30         //Stop Chasing
31         collision.transform.GetComponent<CatController>().StopChasing();
32     }
33     //create particles
34     Instantiate(mouseParticlesPrefab,
35         transform.position,
36         Quaternion.identity);
37
38     //stop music
39     musicSource.Stop();

```

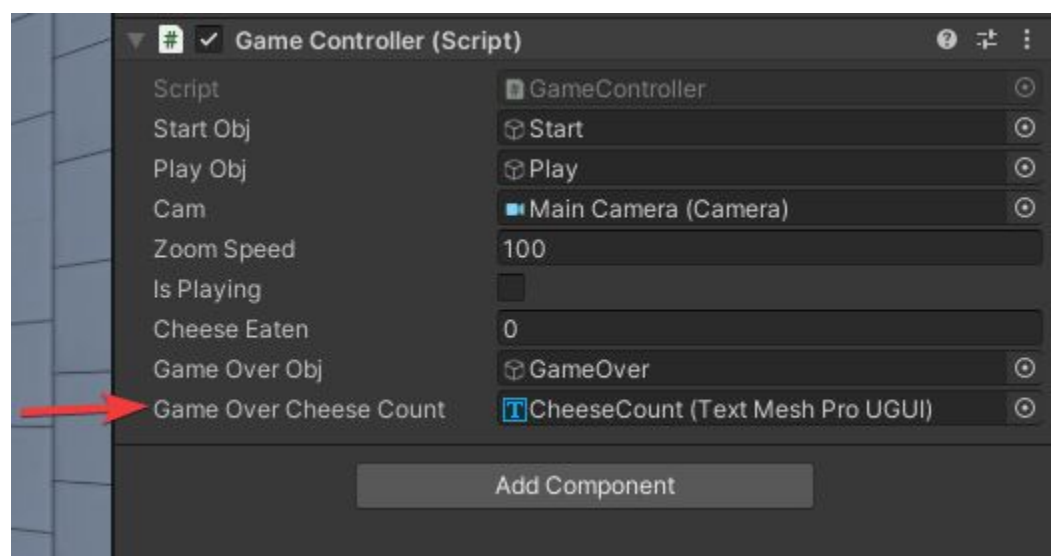
GAME OVER

- 1) In the GameController script, add a method to restart the game. Also, update the cheese count on the game over screen.



```
1 using System.Collections;
2 using System.Collections.Generic;
3 using TMPro;
4 using UnityEngine;
5 using UnityEngine.SceneManagement;
6
7 public class GameController : MonoBehaviour
8 {
9     public GameObject StartObj, PlayObj;
10    public Camera Cam;
11    public float zoomSpeed;
12    public bool isPlaying;
13
14    public int cheeseEaten;
15
16    public GameObject GameOverObj;
17
18    public TextMeshProUGUI gameOverCheeseCount;
19
20    public void RestartGame()
21    {
22        Scene scene = SceneManager.GetActiveScene();
23        SceneManager.LoadScene(scene.name);
24    }
25
26    public void EndGame()
27    {
28        StartCoroutine>ShowGameOver());
29    }
30
31    IEnumerator ShowGameOver()
32    {
33        yield return new WaitForSeconds(1f);
34        GameOverObj.SetActive(true);
35        gameOverCheeseCount.text = cheeseEaten.ToString();
36    }
37 }
```

2) Assign the “CheeseCount” game object to the GameController script



3) Add the ability to restart the game with the “PlayAgainButton”

