Red Challenge Teacher Guide

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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:
https://the-t-v1rus.github.io/NinjaChallenges/Guide/RedChallengeGuide.pdf

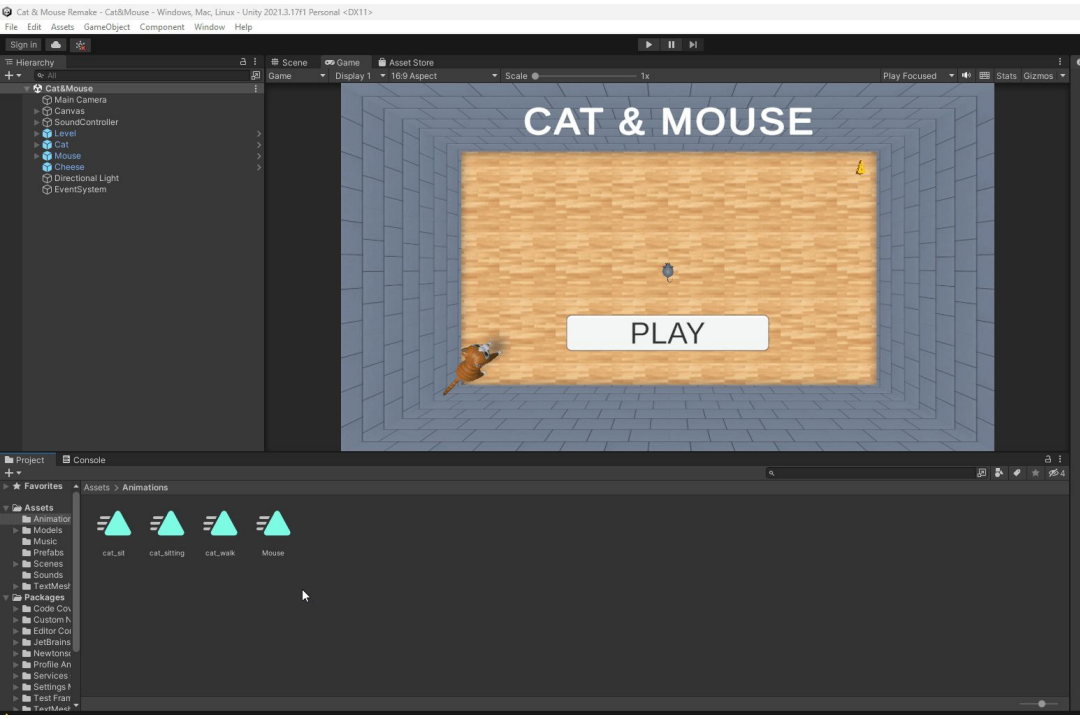
Completed Unity Package:
https://the-t-v1rus.github.io/NinjaChallenges/UnityPackage/RedChallenge_Completed.unitypackage

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



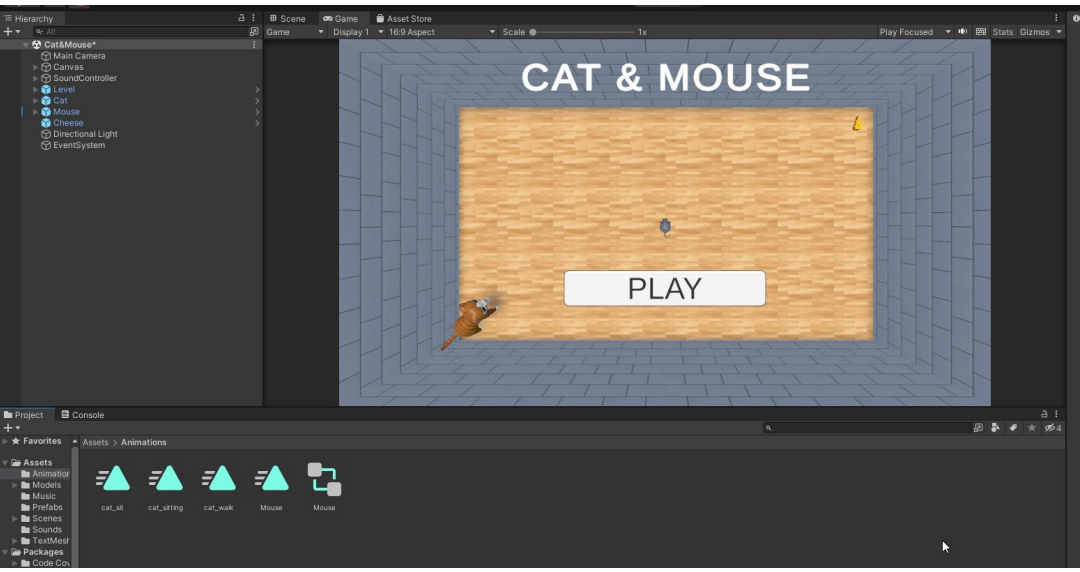
4) Play the game and make sure the mouse is not wagging its tail

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



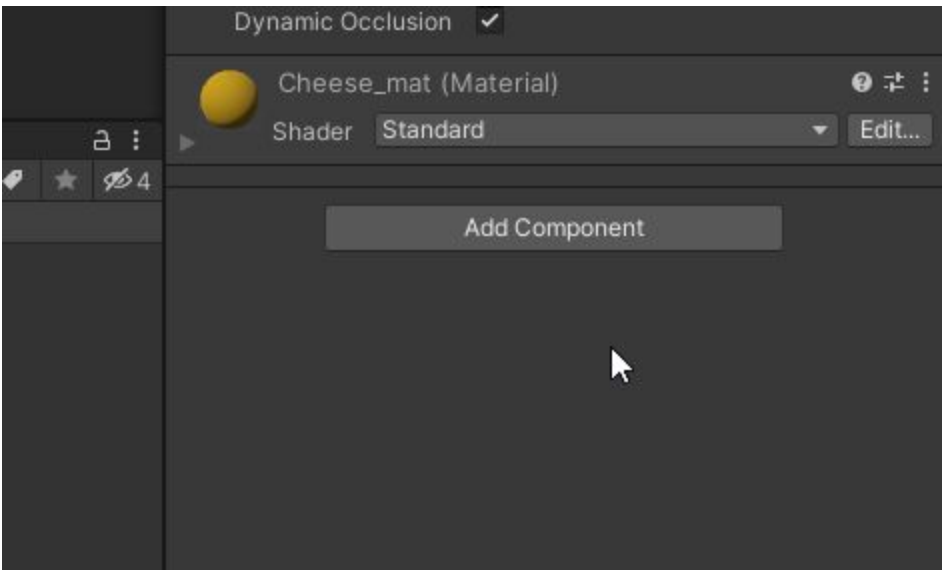
4) Play the game and make sure the cat is now sitting when you play the game

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.



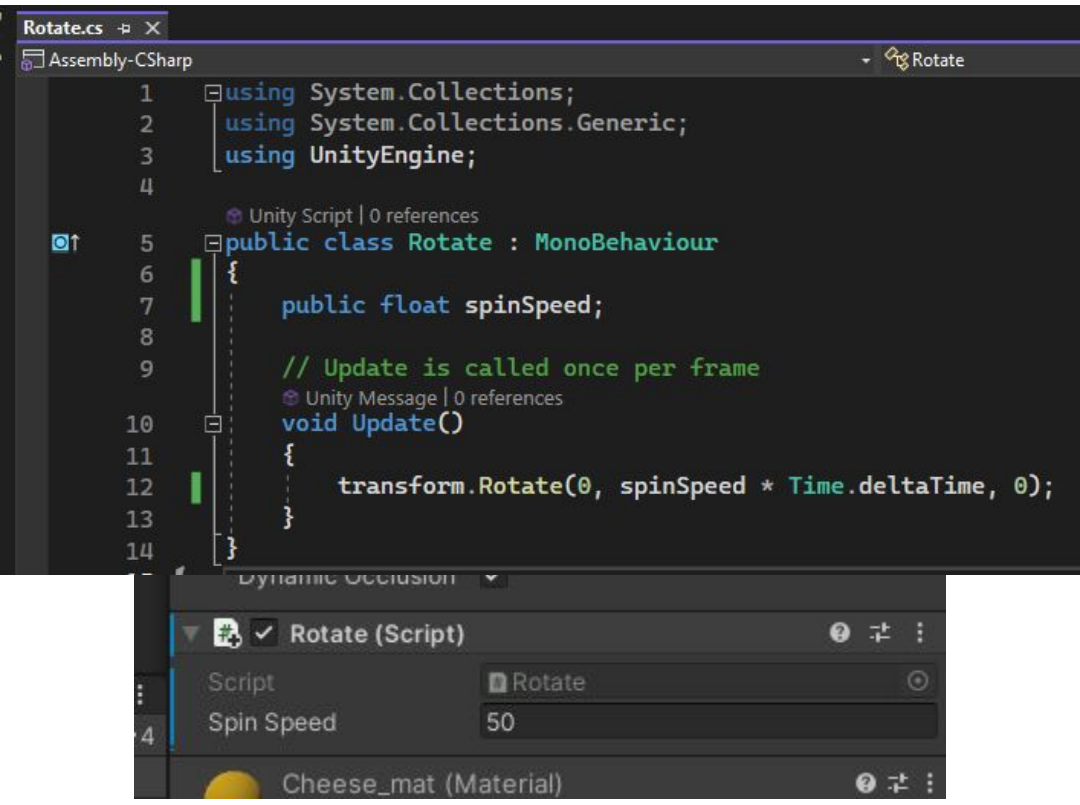
3) Open the script in Visual Studio

MAKE THE CHEESE ROTATE

4) Add a variable where we can change the rotation speed of the object

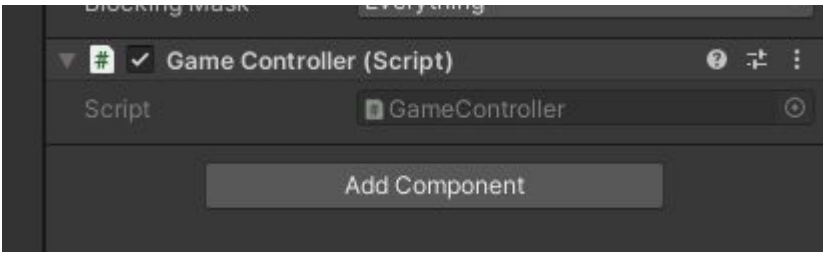
5) Add code in the update that makes the object spin in the Y axis based on the rotation speed. Make sure the multiply this by Time.deltatime so it will spin at the same speed on all devices

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 “GameConroller”.



GameController.cs*

Assembly-CSharp

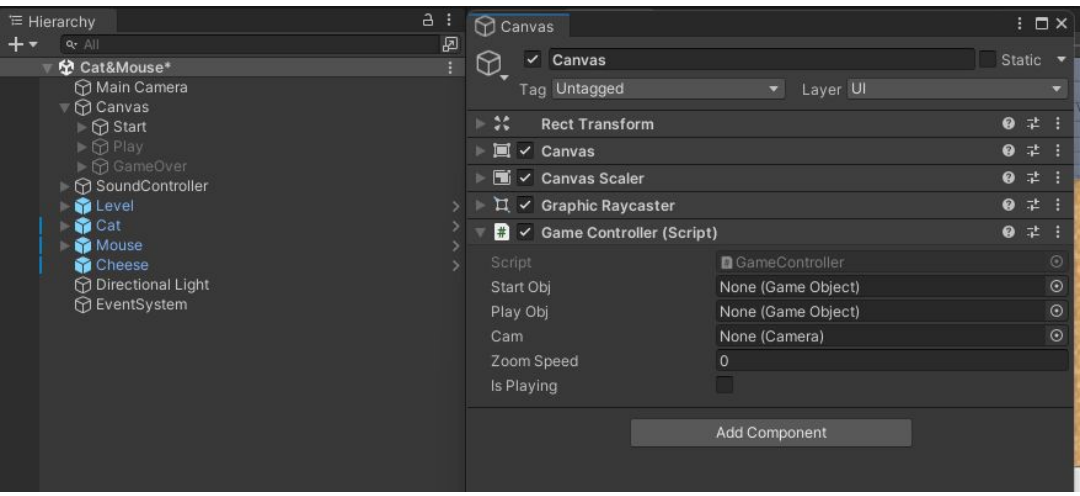
```
1   using System.Collections;
2   using System.Collections.Generic;
3   using UnityEngine;
4
    Unity Script | 0 references
5   public class GameController : MonoBehaviour
6   {
7       public GameObject StartObj, PlayObj;
8       public Camera Cam;
9       public float zoomSpeed;
10      public bool isPlaying;
11
12      // Start is called before the first frame update
        Unity Message | 0 references
13      void Start()
14      {
15          Cam = Camera.main;
16      }
17
18      // Update is called once per frame
        Unity Message | 0 references
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

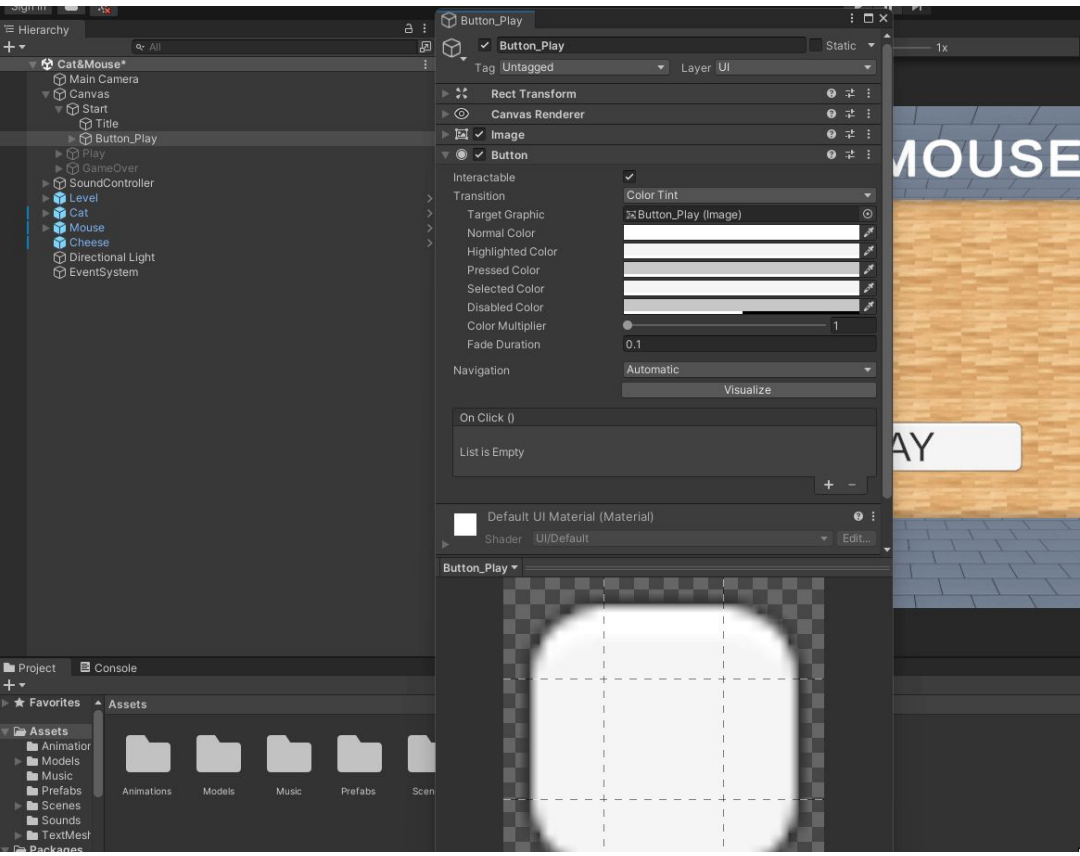
5) Close the “Canvas Properties” window



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.

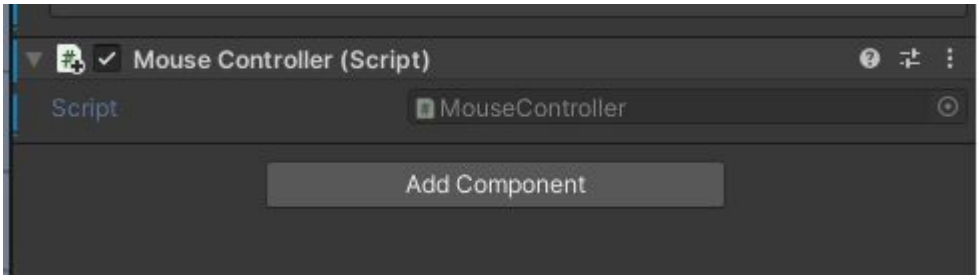
8) Drag the “Canvas” object into the first box, then choose the “GameController” script from the drop down, selecting the “PressStartButton” function.



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

```
Unity Script | 0 references
public class MouseController : MonoBehaviour
{
    GameController gameController;
    Camera cam;
    Plane plane = new Plane(Vector3.up, 0);
    Vector3 worldPosition;
    public float speed = 75f;

    // Start is called before the first frame update
    Unity Message | 0 references
    void Start()
    {
        gameController = FindObjectOfType<GameController>();
        cam = Camera.main;
    }

    // Update is called once per frame
    Unity Message | 0 references
    void Update()
    {
        if (gameController.isPlaying)
        {
            float distance;
            Ray ray = cam.ScreenPointToRay(Input.mousePosition);

            if(plane.Raycast(ray, out distance))
            {
                worldPosition = ray.GetPoint(distance);
            }
            worldPosition.y = 0;
            var step = speed * Time.deltaTime;
            transform.position = Vector3.MoveTowards(transform.position, worldPosition, step);
            transform.LookAt(worldPosition);
        }
    }
}
```

MOUSE FOLLOW CURSOR

Basically we are making a plane just like in scratch.

```
9    Plane plane = new Plane(Vector3.up, 0);
```

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.

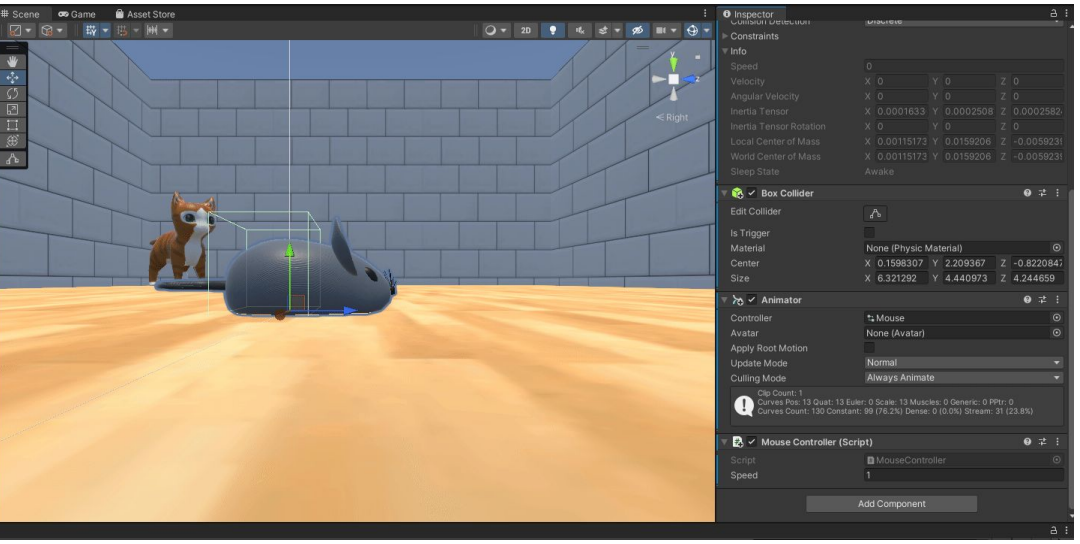
```
worldPosition.y = 0;
var step = speed * Time.deltaTime;
transform.position = Vector3.MoveTowards(transform.position, worldPosition, step);
transform.LookAt(worldPosition);
```

MOUSE COLLIDES WITH WALLS

1) Add a rigid body to the Mouse game object

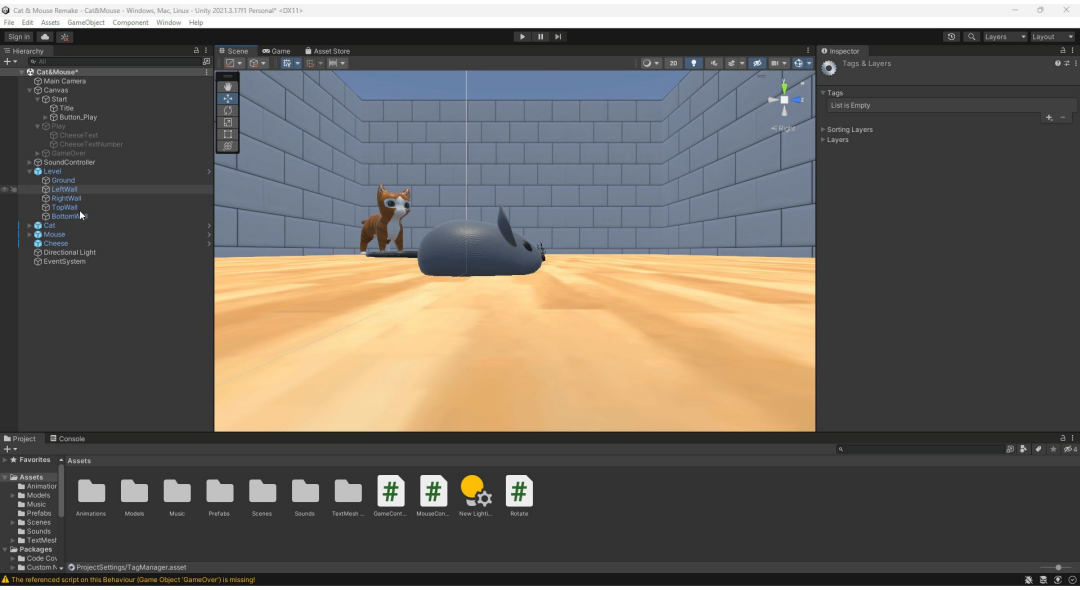
2) Add a box collider to the Mouse game object

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

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

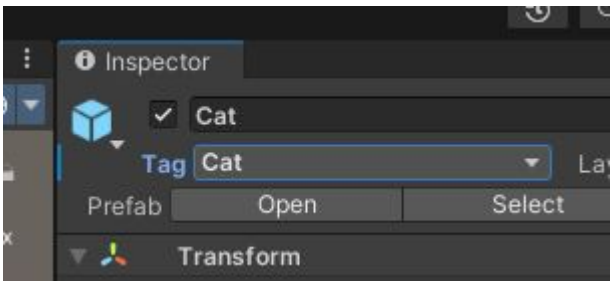
b) Drag the CheeseTextNumber object from the hierarchy into the “Cheese Counter” slot

c) Drag the Eat1 sound from the “Sounds” folder into the “Chomp Sound” slot

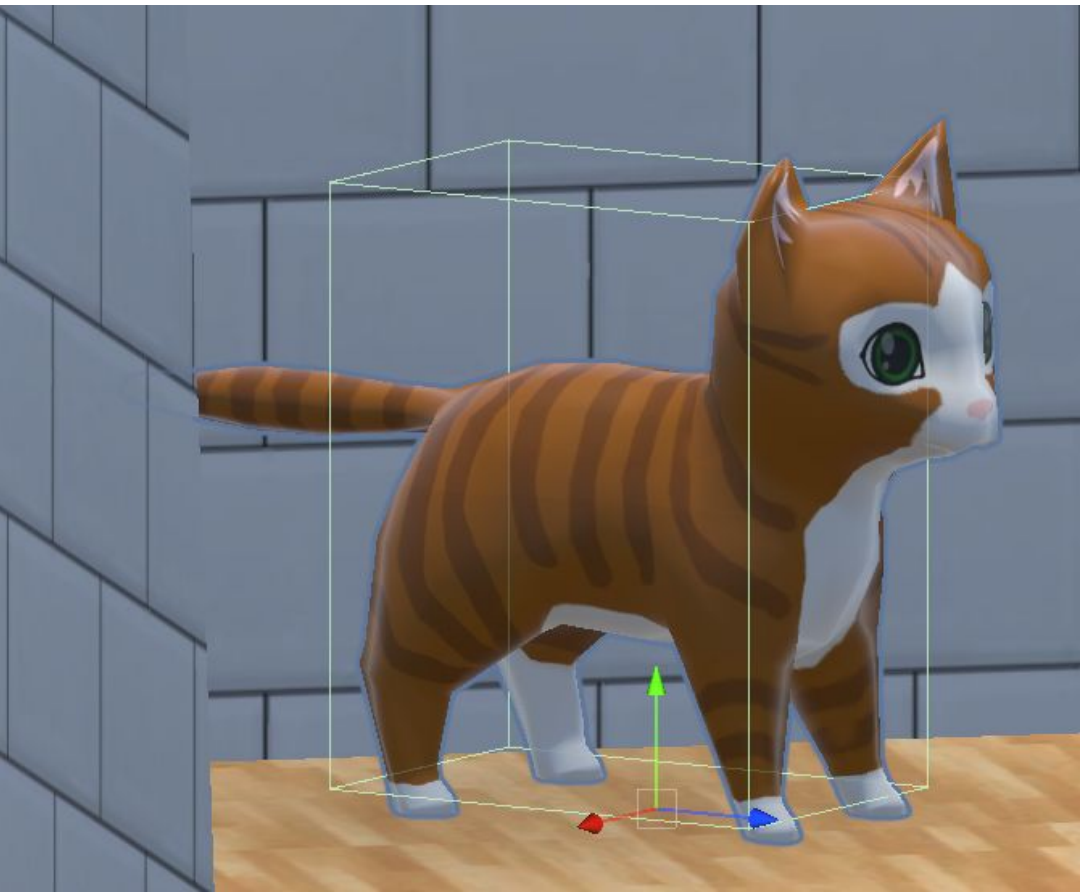
d) Drag the “Sounds” game object from the hierarchy into the “Sound Controller” slot

MOUSE TOUCHING CAT

1) Add a tag to the Cat game object called “Cat”



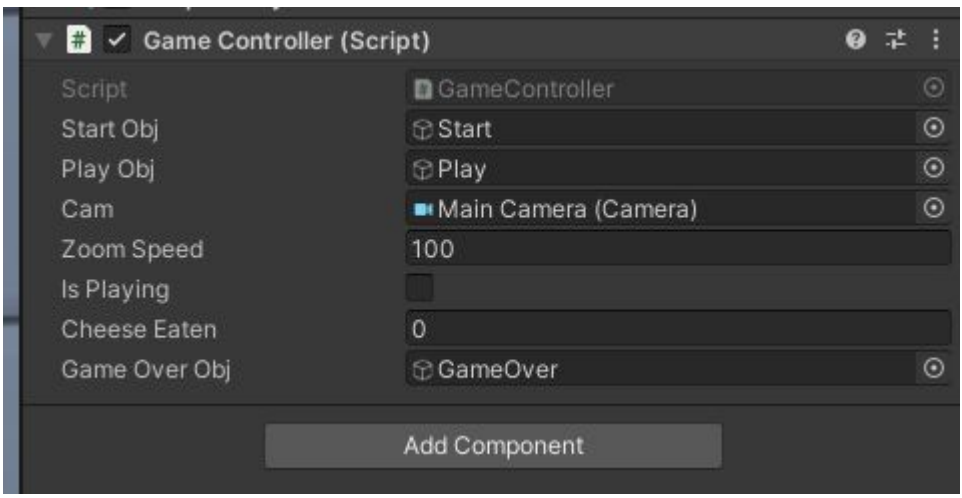
2) Add a box collider to the Cat. Use ISO camera mode to align the box properly.



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

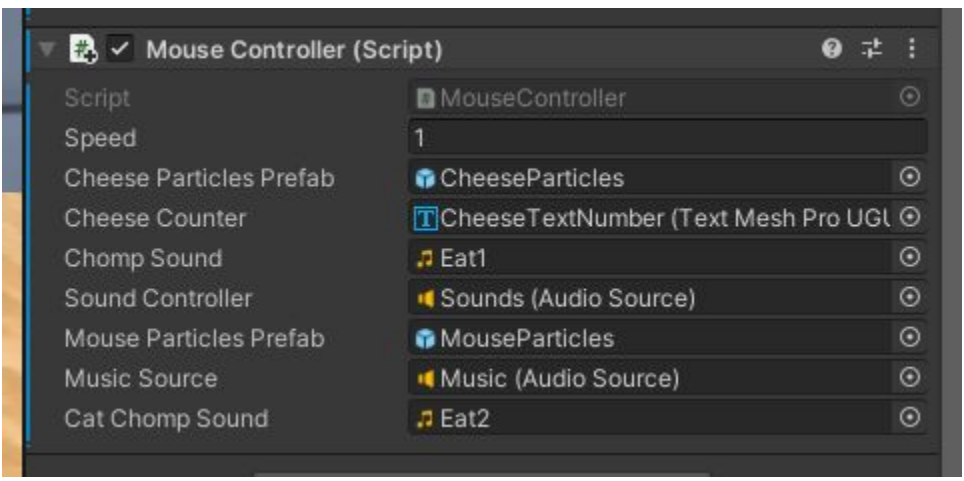
4) Assign the game over object to the script from the hierarchy



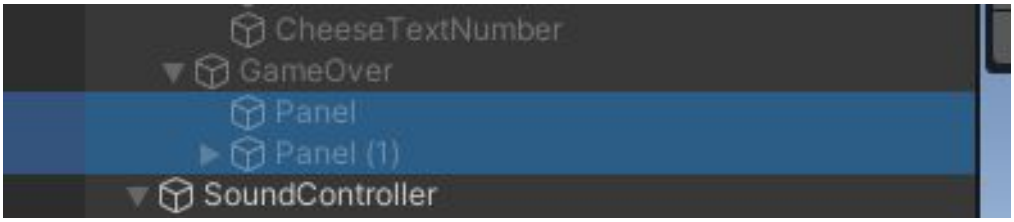
5) In the MouseController script, add new references and update the collision event.

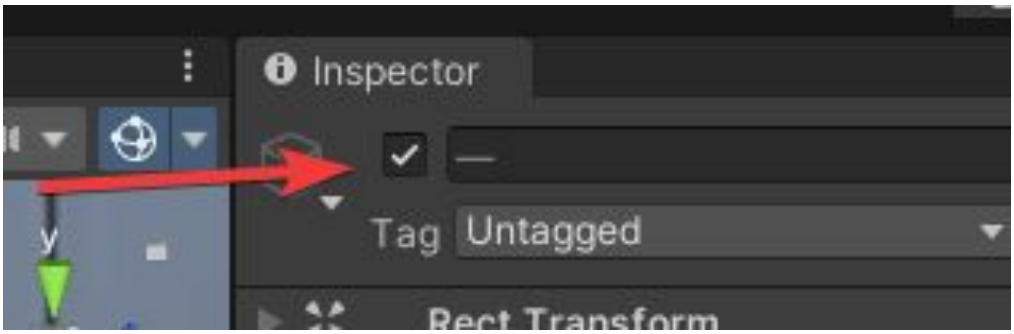
```
20      //Touching Cat
21      public GameObject mouseParticlesPrefab;
22      public AudioSource musicSource;
23      public AudioClip catChompSound;
24
25
        Unity Message | 0 references
26      private void OnCollisionEnter(Collision collision)
27      {
28          if (collision.transform.CompareTag("Cat"))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

6) Assign the references to the script



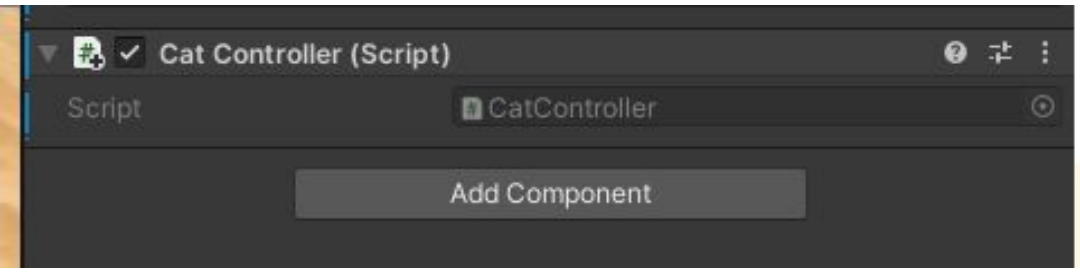
7) Make sure the panels that are children of the GameOver object are enabled.





CAT CHASING MOUSE

1) Add a script to the Cat object called “CatController”



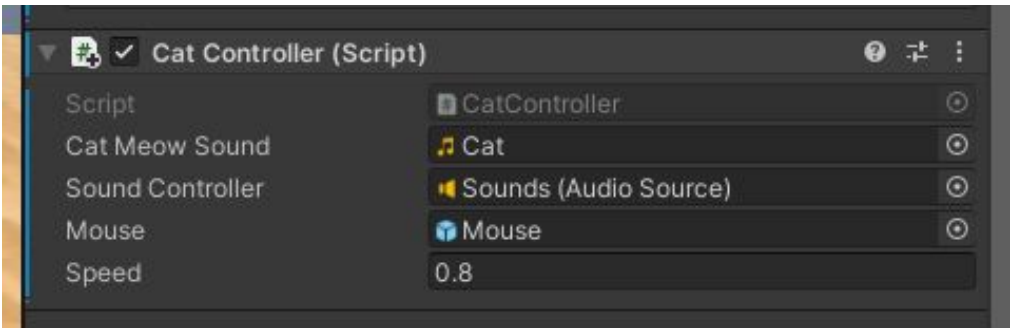
2) Add code to make the cat meow and start chasing the mouse

CatController.cs* | MouseController.cs | GameController.cs

Assembly-CSharp | CatController

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

Unity Script | 0 references
public class CatController : MonoBehaviour
{
    GameController gameController;
    public AudioClip catMeowSound;
    public AudioSource soundController;
    public GameObject Mouse;
    bool isChasing;
    public float speed;

    // Start is called before the first frame update
    Unity Message | 0 references
    void Start()
    {
        gameController = GameObject.FindObjectOfType<GameController>();
    }

    0 references
    public void StartChasing()
    {
        isChasing = true;
        soundController.PlayOneShot(catMeowSound);
    }

    // Update is called once per frame
    Unity Message | 0 references
    void Update()
    {
        if (isChasing)
        {
            var step = speed * Time.deltaTime;
            transform.position = Vector3.MoveTowards(transform.position, Mouse.transform.position, step);
            transform.LookAt(Mouse.transform.position);
        }
    }
}
```

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

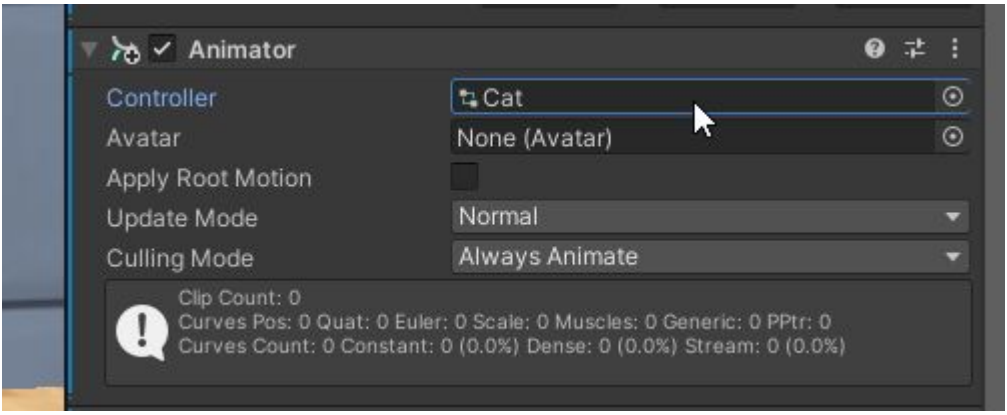


4) Add code to the MouseController cheese collision to call the method on the cat if the amount of cheese eaten == 1

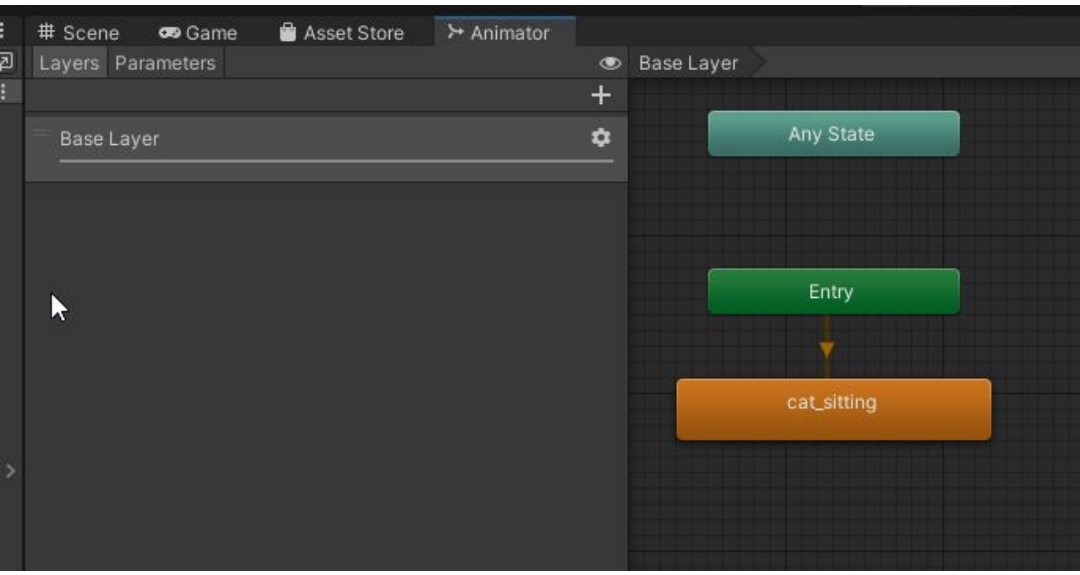
```
if (collision.transform.CompareTag("Cheese"))
{
    //increase cheese counter
    gameController.cheeseEaten += 1;
    cheeseCounter.text = gameController.cheeseEaten.ToString();

    //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.

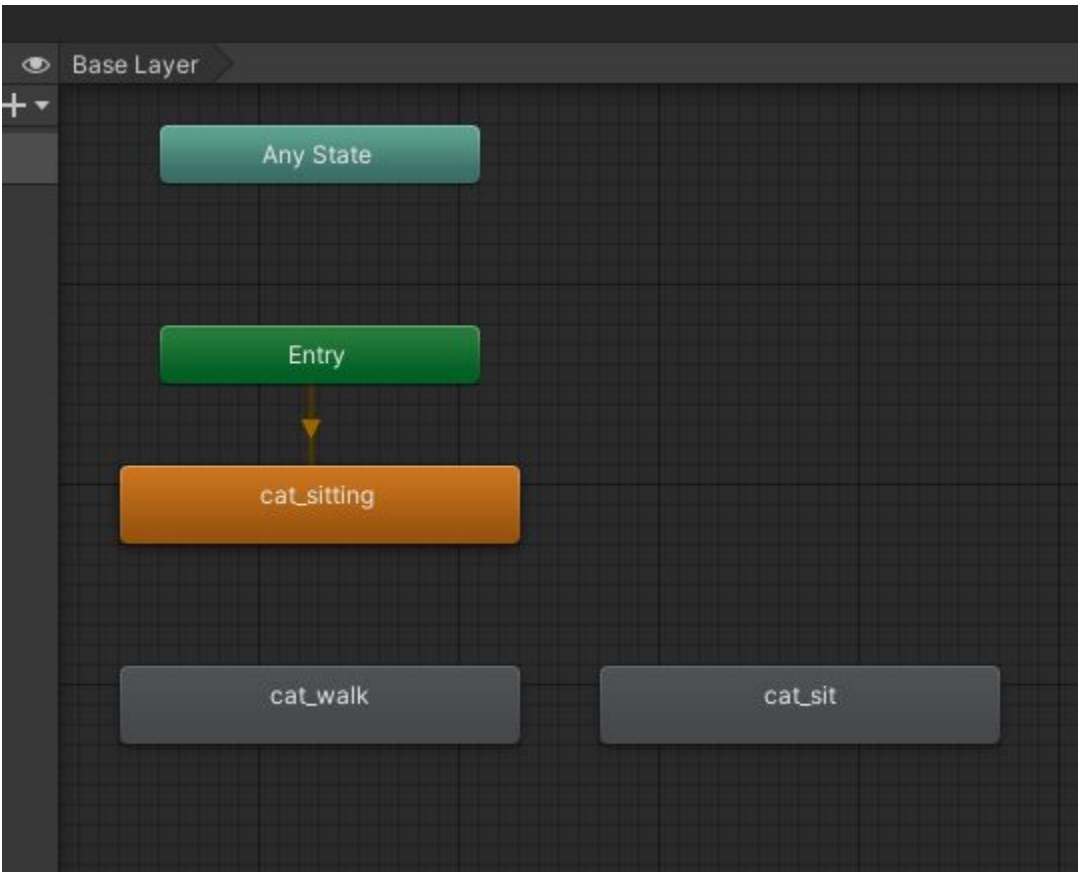


2) With the Animator tab open, select the Parameters tab and add a new bool parameter called “chasing”

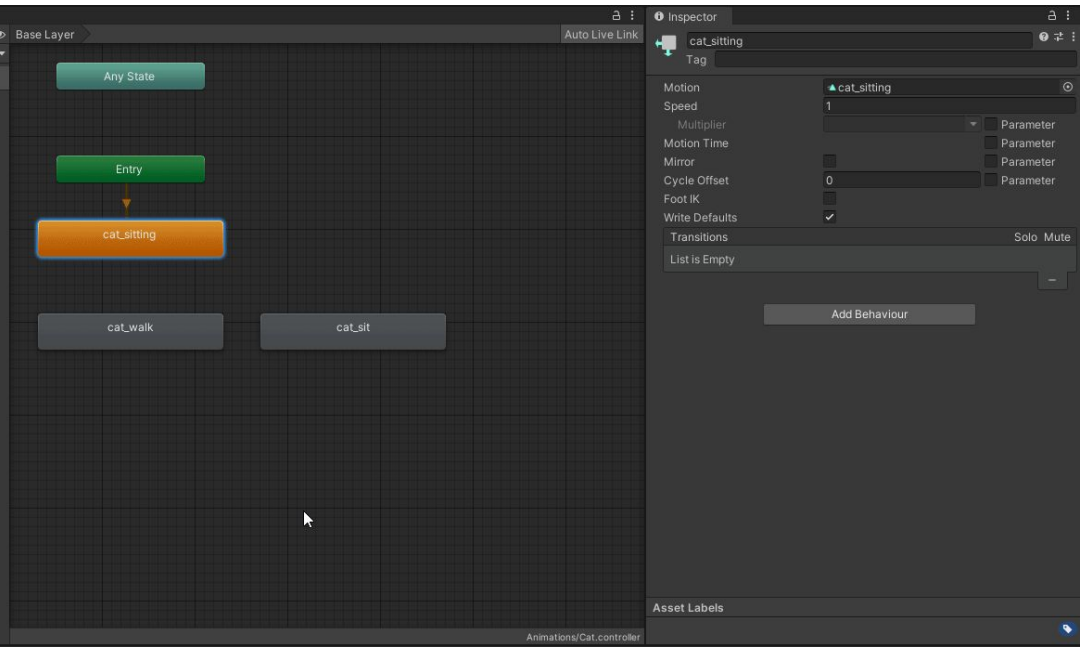


3) Drag and drop the “cat_walk” animation into the Animator window

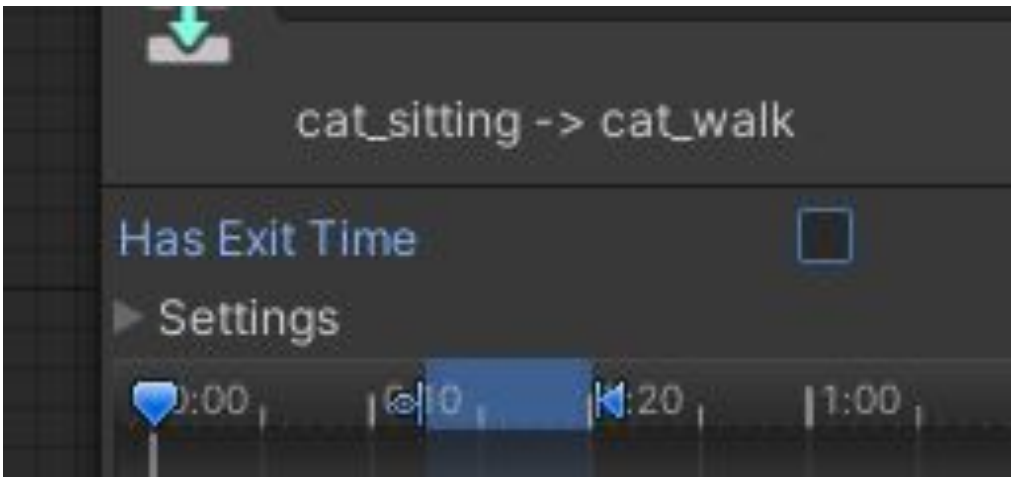
4) Drag and drop the “cat_sit” animation into the Animator window



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

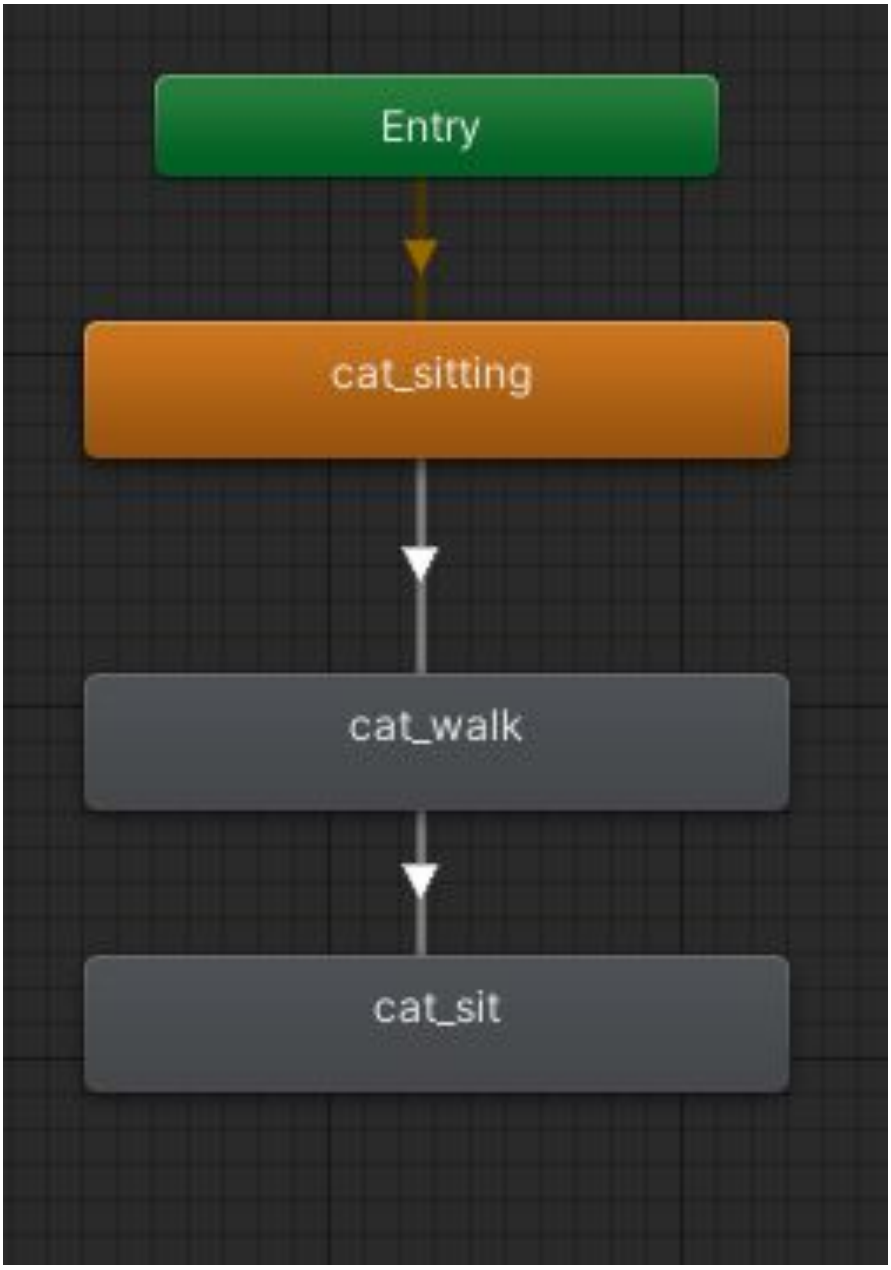


6) Turn off “Has Exit Time”



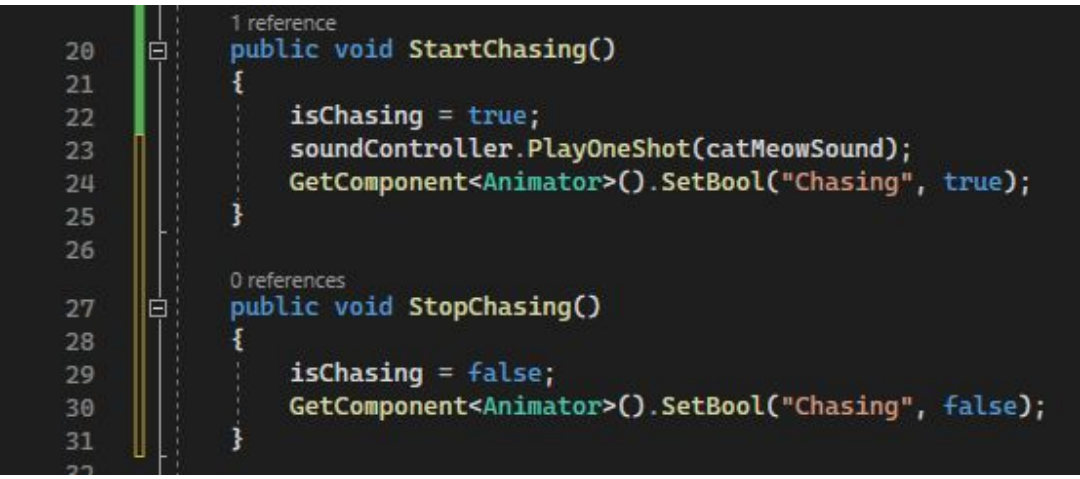
7) Make a transition from the “cat_walk” to the “cat_sit” animation. Add the “chasing == false” condition to this link.

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



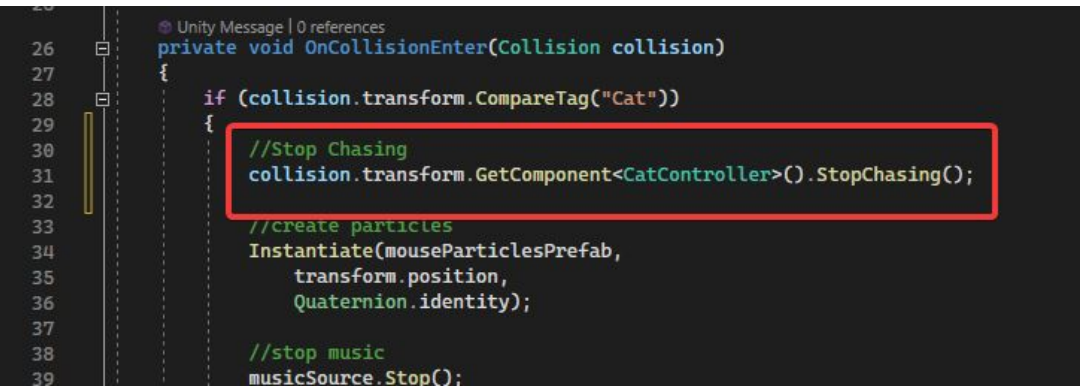
ACTIVATE CAT ANIMATIONS

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



```
1 reference
public void StartChasing()
{
    isChasing = true;
    soundController.PlayOneShot(catMeowSound);
    GetComponent<Animator>().SetBool("Chasing", true);
}

0 references
public void StopChasing()
{
    isChasing = false;
    GetComponent<Animator>().SetBool("Chasing", false);
}
```

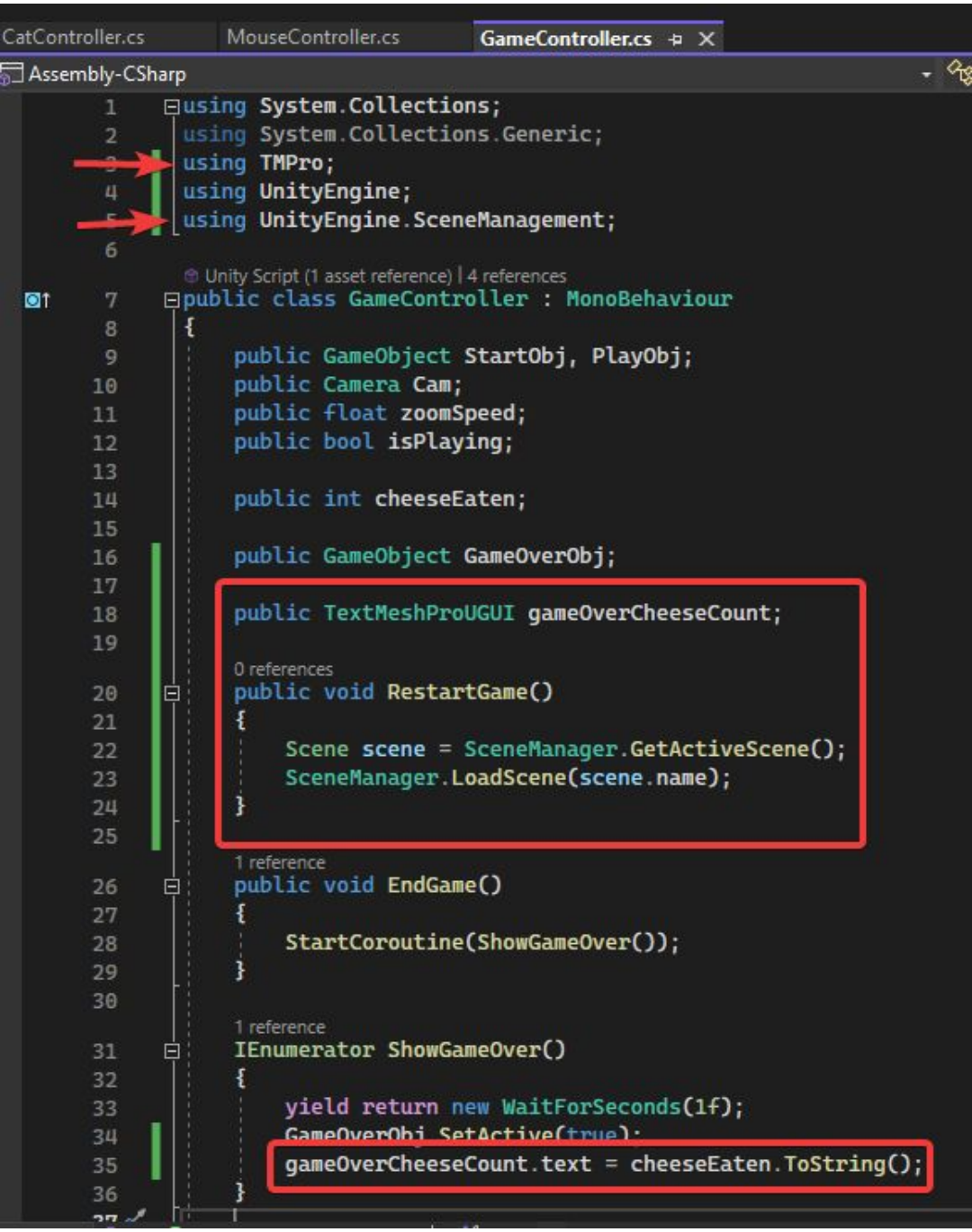
2) In the MouseController script, activate the StopChasing function in the Cat controller



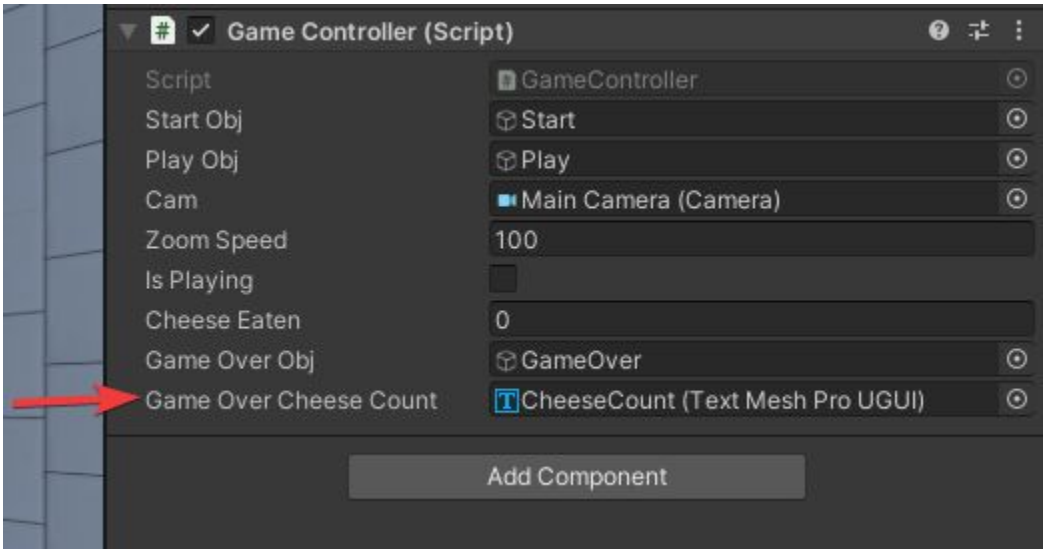
```
Unity Message | 0 references
private void OnCollisionEnter(Collision collision)
{
    if (collision.transform.CompareTag("Cat"))
    {
        //Stop Chasing
        collision.transform.GetComponent<CatController>().StopChasing();

        //create particles
        Instantiate(mouseParticlesPrefab,
            transform.position,
            Quaternion.identity);

        //stop music
        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.



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



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