VIT®
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)
CHENNAI

GAME PROGRAMMING LAB 5

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REGISTER NUMBER : 21BAI1876

FACULTY : GRACELINE JASMINE

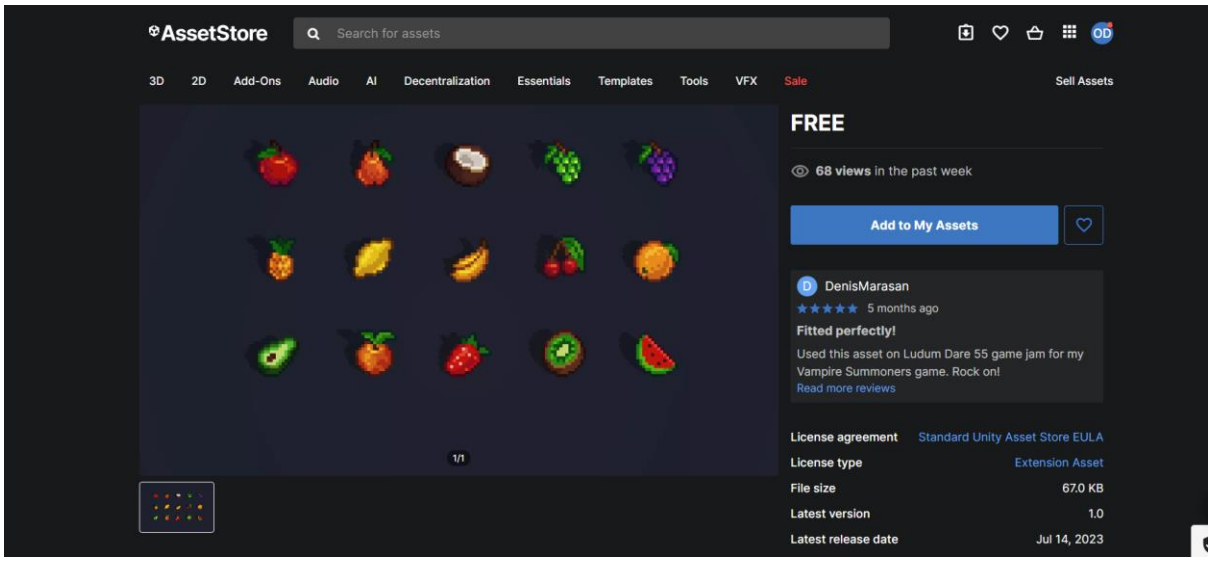
INSTRUCTIONS

Give a simple sketch to show the design of a 2D tile-based game similar to *Melon Maker*, incorporating the core game mechanics such as object stacking, merging to create higher-tier items (e.g., merging watermelons), and managing space constraints within the grid?
Write the steps needed to implement the stacking, merging, and score-tracking mechanics, while ensuring smooth player interaction and intuitive game progression?

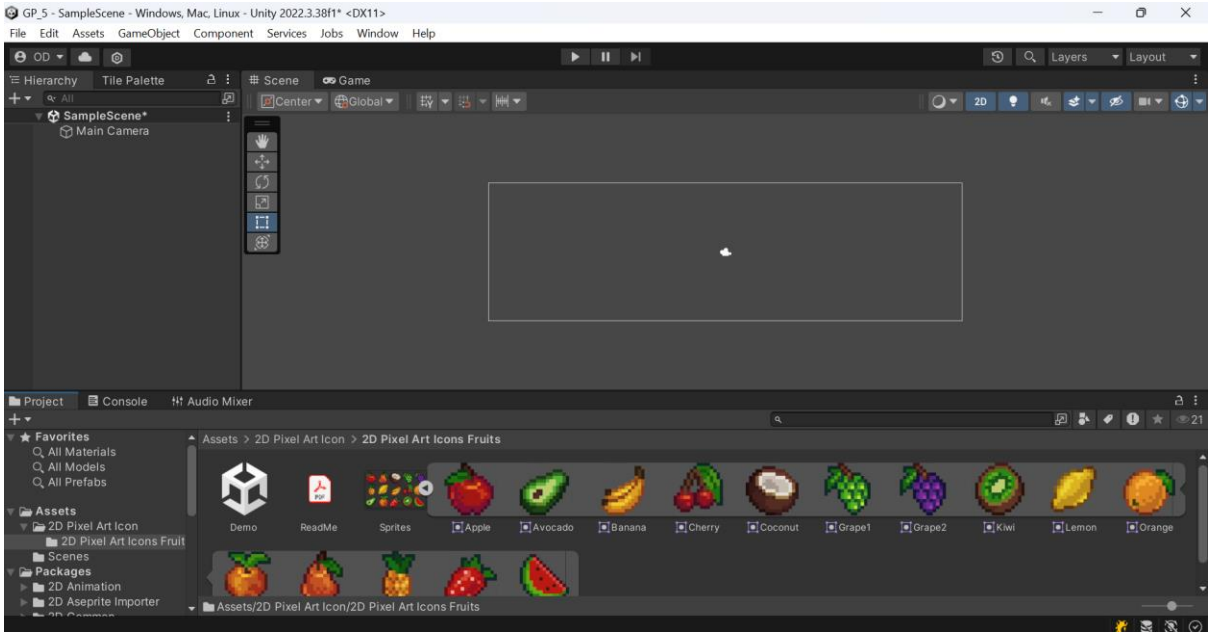
Game Mechanics in *Melon Maker*:

1. **Tile-based Grid System:** The game is based on a grid where objects (e.g., fruit) can be placed or moved.
2. **Object Stacking:** Players can stack objects of the same type, leading to their combination into a higher-tier object.
3. **Merging Mechanism:** When two objects of the same type (e.g., two watermelons) are merged, they create a higher-level object (e.g., a giant watermelon).
4. **Space Management:** Players must strategically manage limited grid space, planning object placements to prevent the board from filling up.
5. **Score Tracking:** Points are awarded based on successful merges, and players aim to achieve the highest score possible.
6. **Game Over Condition:** The game ends when the grid is completely filled, and no more valid moves are possible.
7. **Level Up:** Fix a constrain to check level completion and on successful completion, generate a new scene and display "You Won"

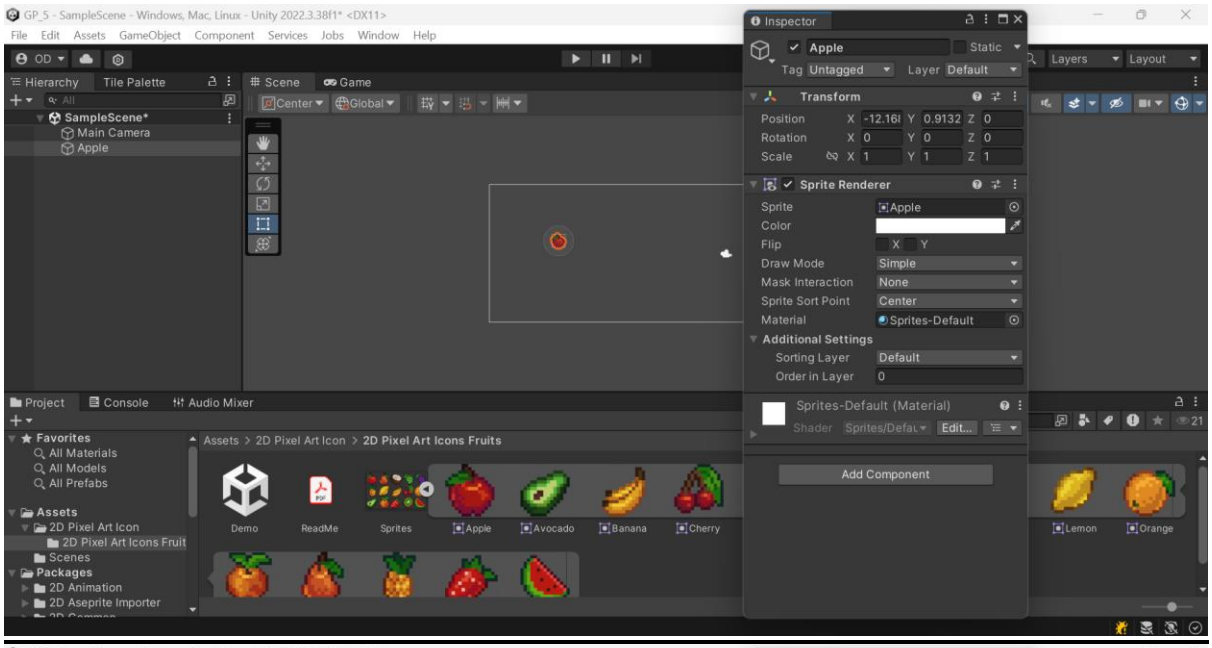
Step 1: Installing the suitable fruit package asset

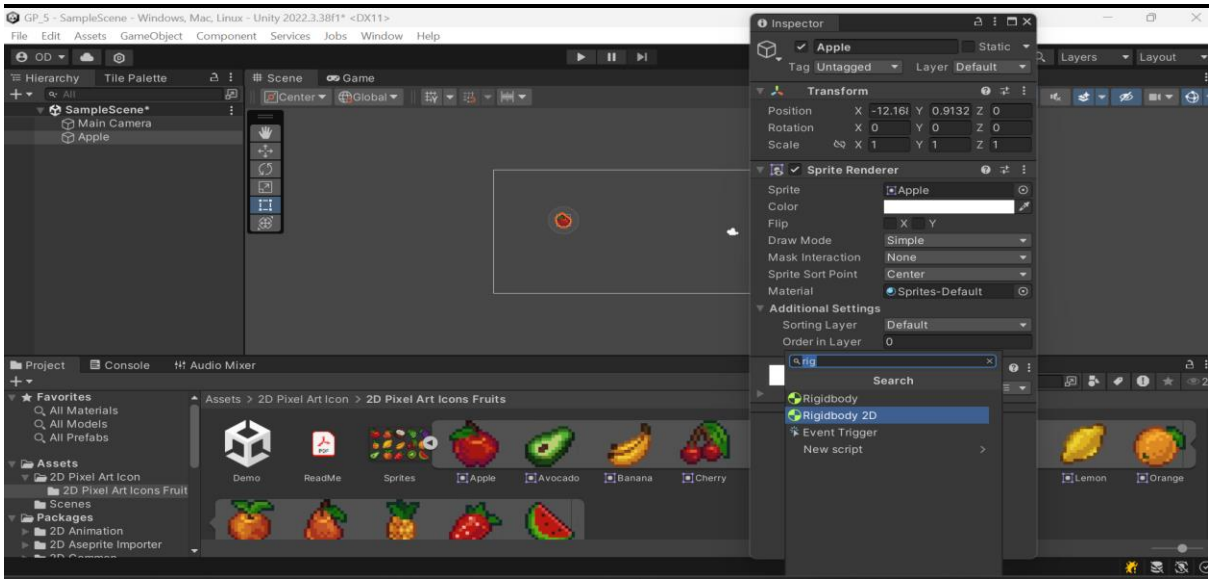


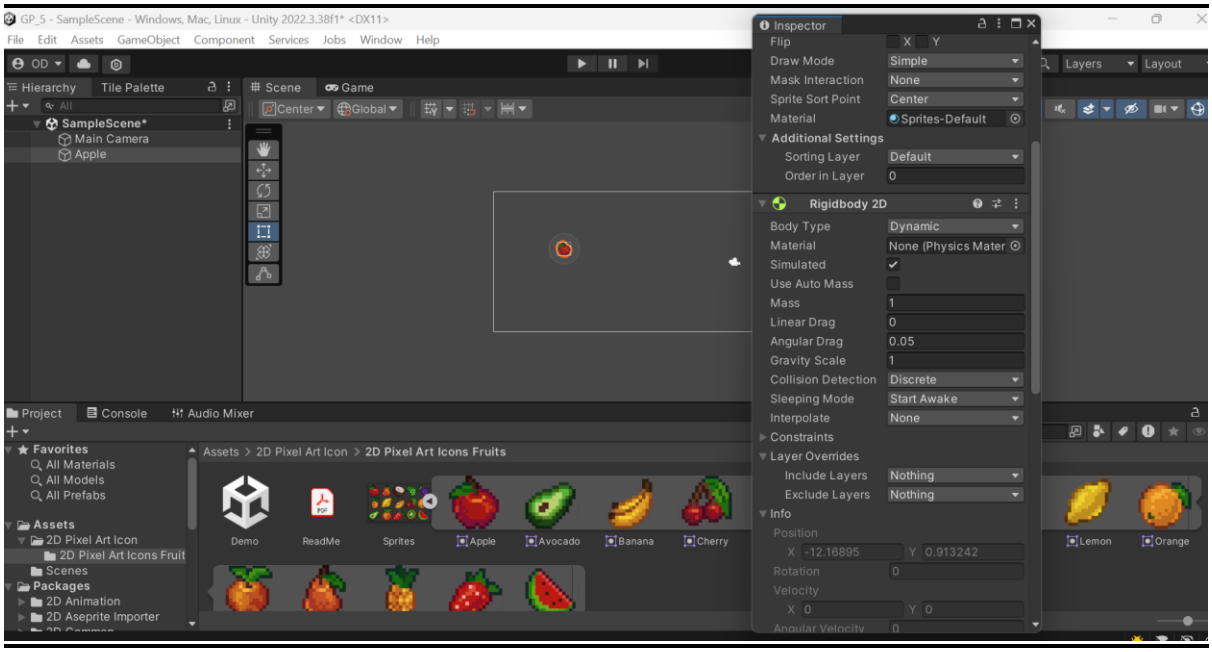
Step 2: Open the asset package by importing all it's necessary components.



Step 3: Now for certain such fruits, dragging them into the main scene and adding the physics 2D components[mainly the RigidBody2D and PolygonCollider2D] for all those fruits. Repeat the procedure for 3 or more such fruits as per needed for the game.


GP_5 - SampleScene - Windows, Mac, Linux - Unity 2022.3.38f1* <DX11>
File Edit Assets GameObject Component Services Jobs Window Help
Hierarchy Tile Palette
SampleScene*
Main Camera
Apple
Scene Game
Inspector
Apple
Static
Tag Untagged
Layer Default
Transform
Position X -12.161 Y 0.9132 Z 0
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1
Sprite Renderer
Sprite Apple
Color
Flip X Y
Draw Mode Simple
Mask Interaction None
Sprite Sort Point Center
Material Sprites-Default
Additional Settings
Sorting Layer Default
Order in Layer 0
Sprites-Default (Material)
Shader Sprites/Defaul Edit...
Add Component
Project Console Audio Mixer
Favorites
All Materials
All Models
All Prefabs
Assets
2D Pixel Art Icon
2D Pixel Art Icons Fruit
Scenes
Packages
2D Animation
2D Aseprite Importer
Assets > 2D Pixel Art Icon > 2D Pixel Art Icons Fruits
Demo
ReadMe
Sprites
Apple
Avocado
Banana
Cherry
Lemon
Orange


GP_5 - SampleScene - Windows, Mac, Linux - Unity 2022.3.38f1* <DX11>
Inspector
Apple
Static
Tag Untagged
Layer Default
Transform
Sprite Renderer
Search
Rigidbody
Rigidbody 2D
Event Trigger
New script


GP_5 - SampleScene - Windows, Mac, Linux - Unity 2022.3.38f1* <DX11>
Inspector
Rigidbody 2D
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Material None (Physics Mater
Simulated
Use Auto Mass
Mass 1
Linear Drag 0
Angular Drag 0.05
Gravity Scale 1
Collision Detection Discrete
Sleeping Mode Start Awake
Interpolate None
Constraints
Layer Overrides
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Exclude Layers Nothing
Info
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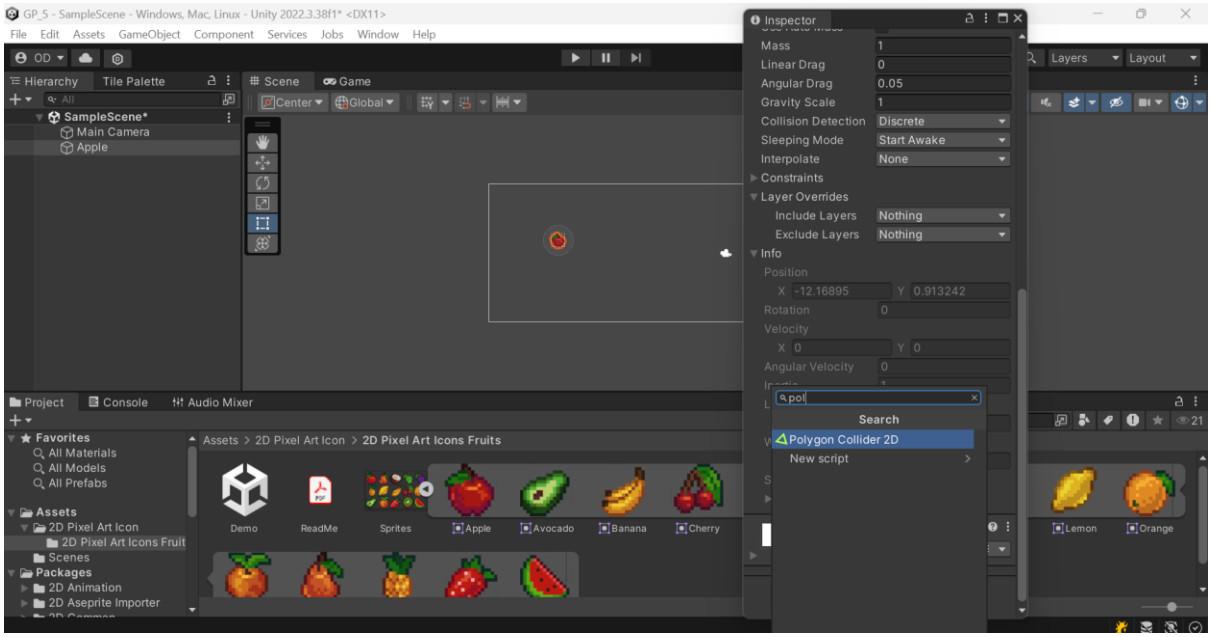
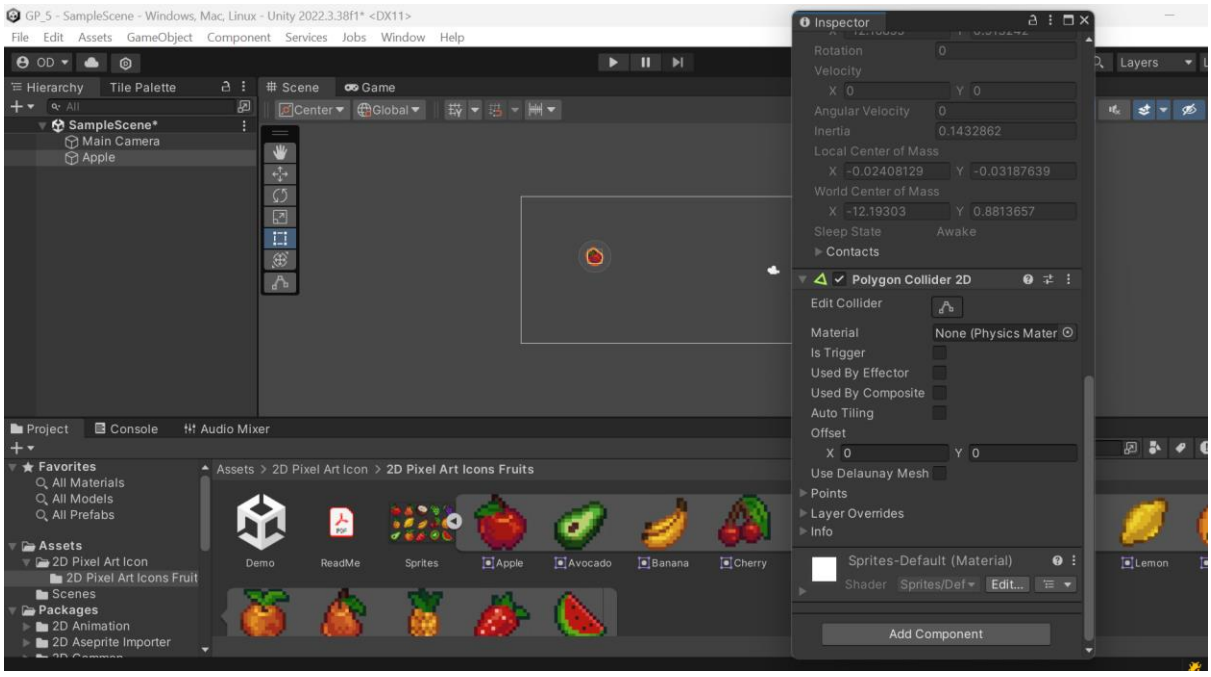
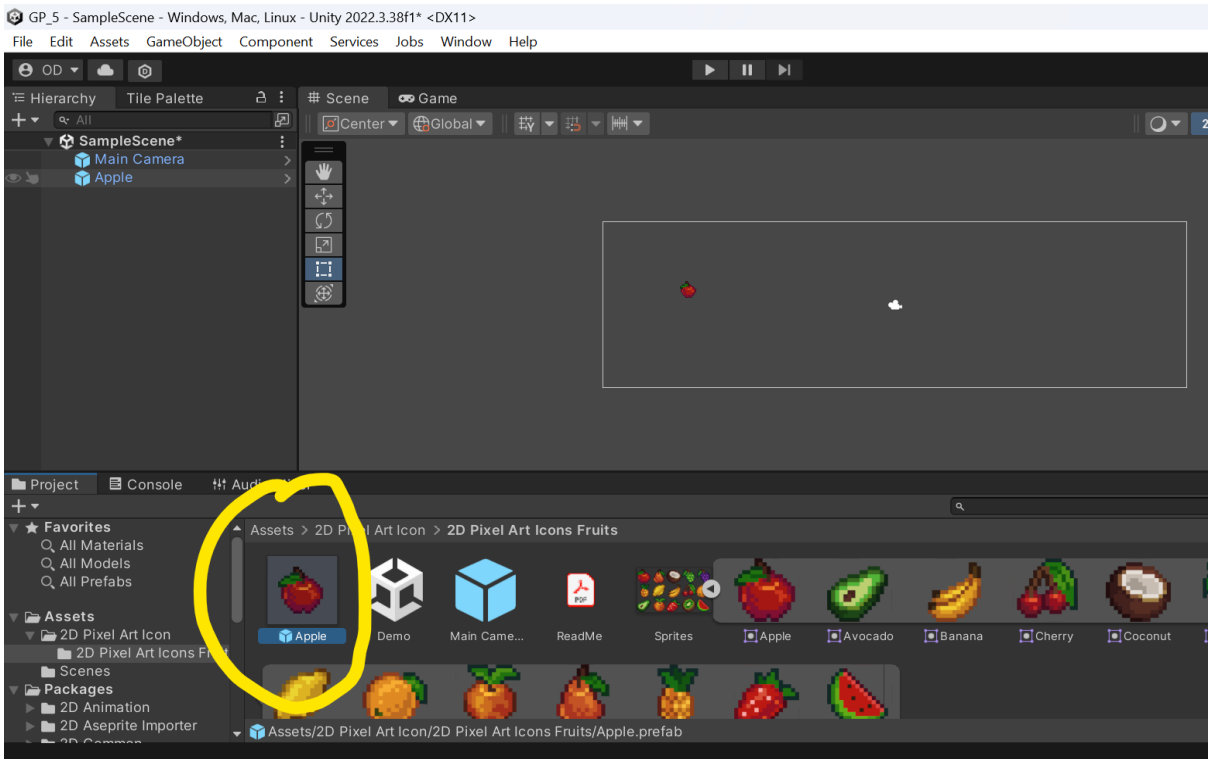
Rotation 0
Velocity
X 0 Y 0
Angular Velocity 0



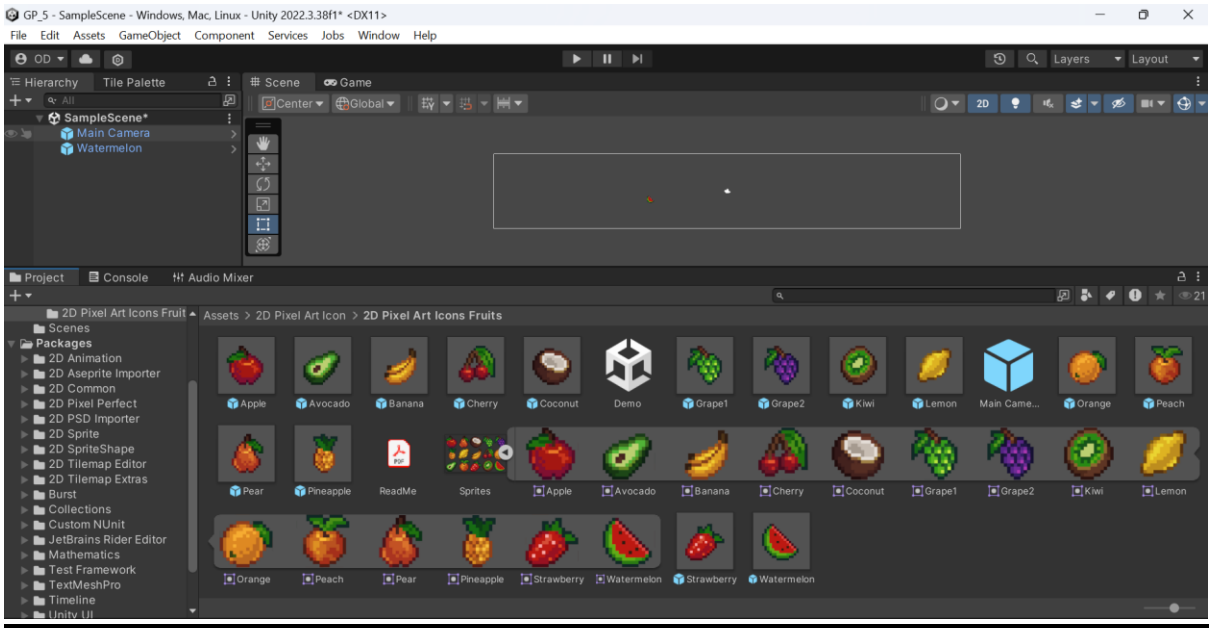


Step 4: Dragging the fruit enabled with physics2D components accordingly.

The below highlighted apple components is Physics2D enabled which is added to the assets in the 2D Pixel Art Icons.

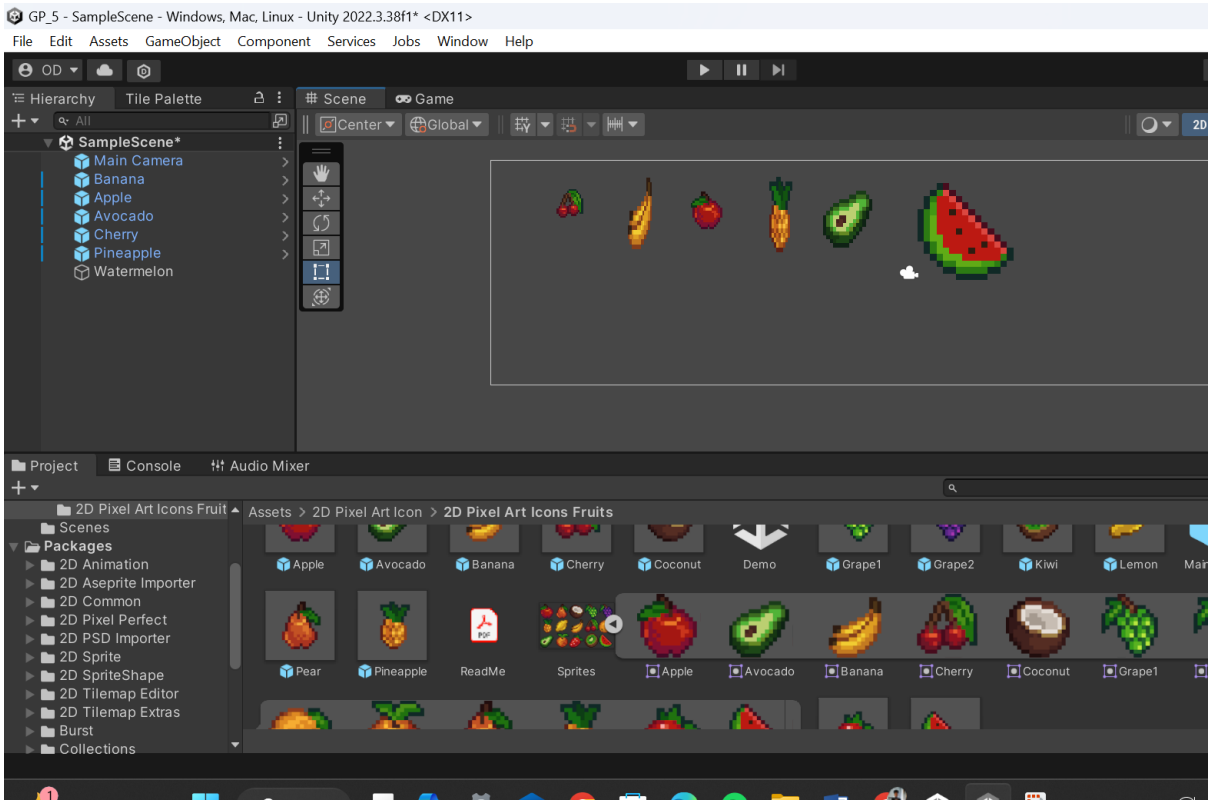


<u>Step 5: Repeating procedure step 3 and 4 respectively again and again for all the fruits which will be taken into consideration for constructing the game. After doing the same for every other fruit, we get a view like this. You can see every fruit is visible 2 times (one is original, other is Physics2D components enabled ones).</u>

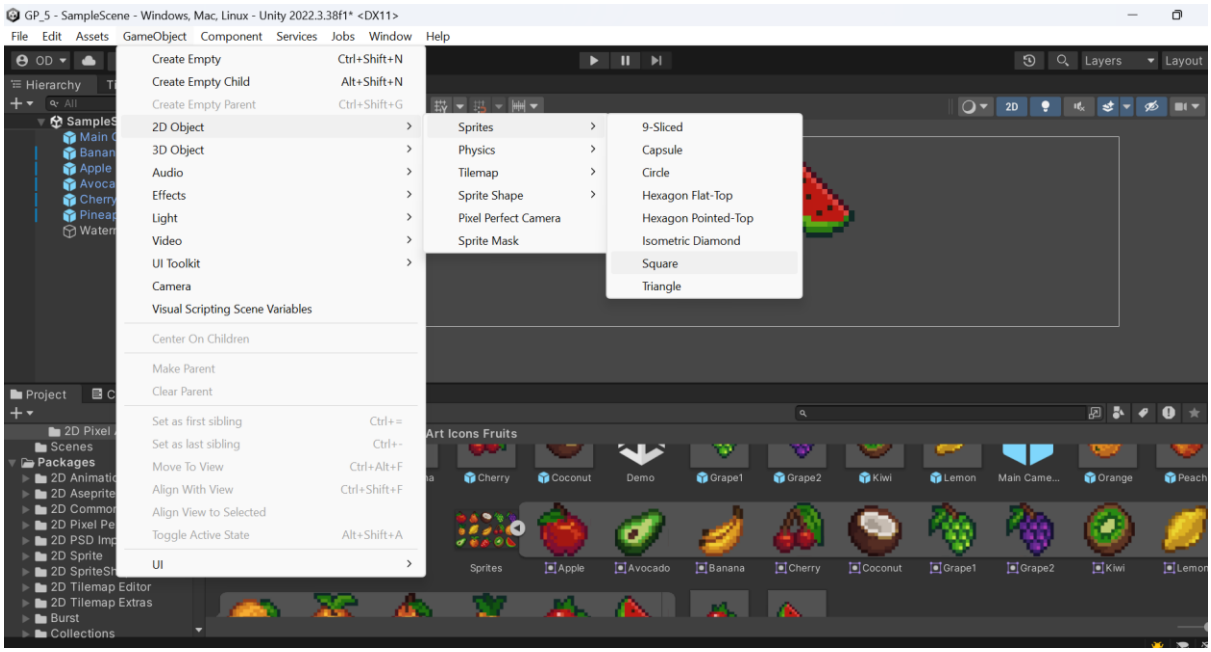


Here itself, I have checked if the physics is working properly for fruits.

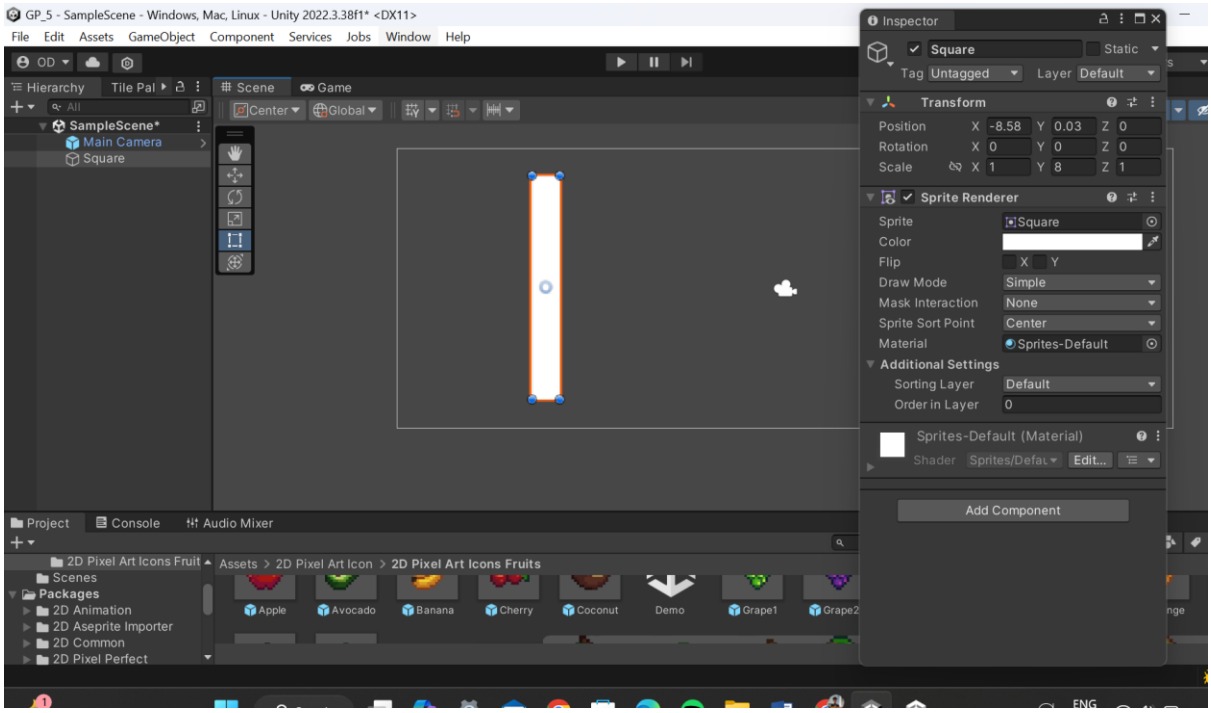
Step 6: Resizing the fruits accordingly as per the need in our game.



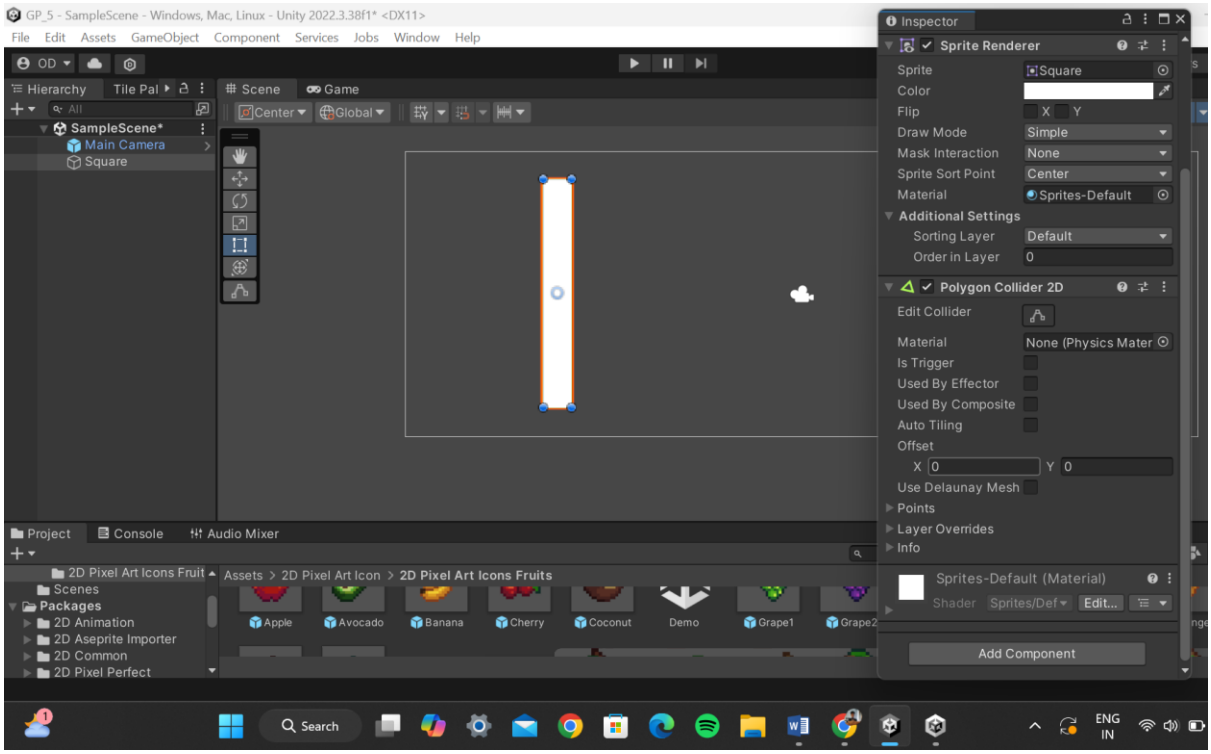
Step 7: Creating 2D Objects which will constitute for the construction of the container/jar.



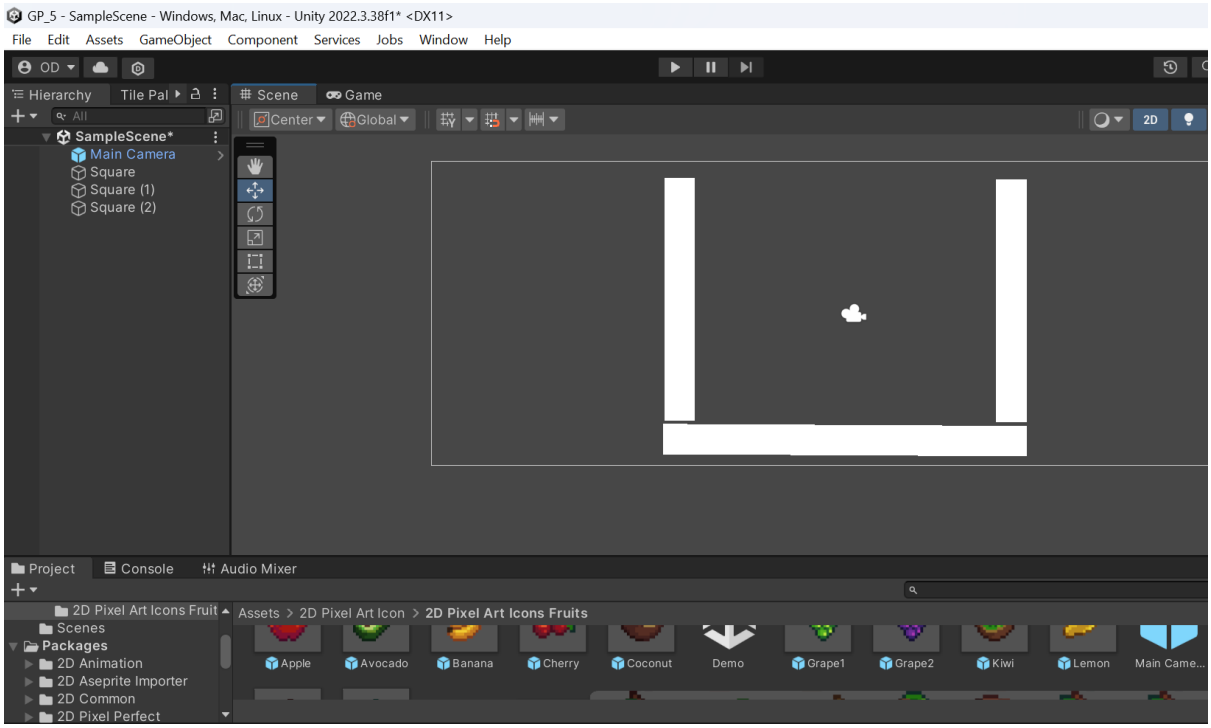
Resizing accordingly:



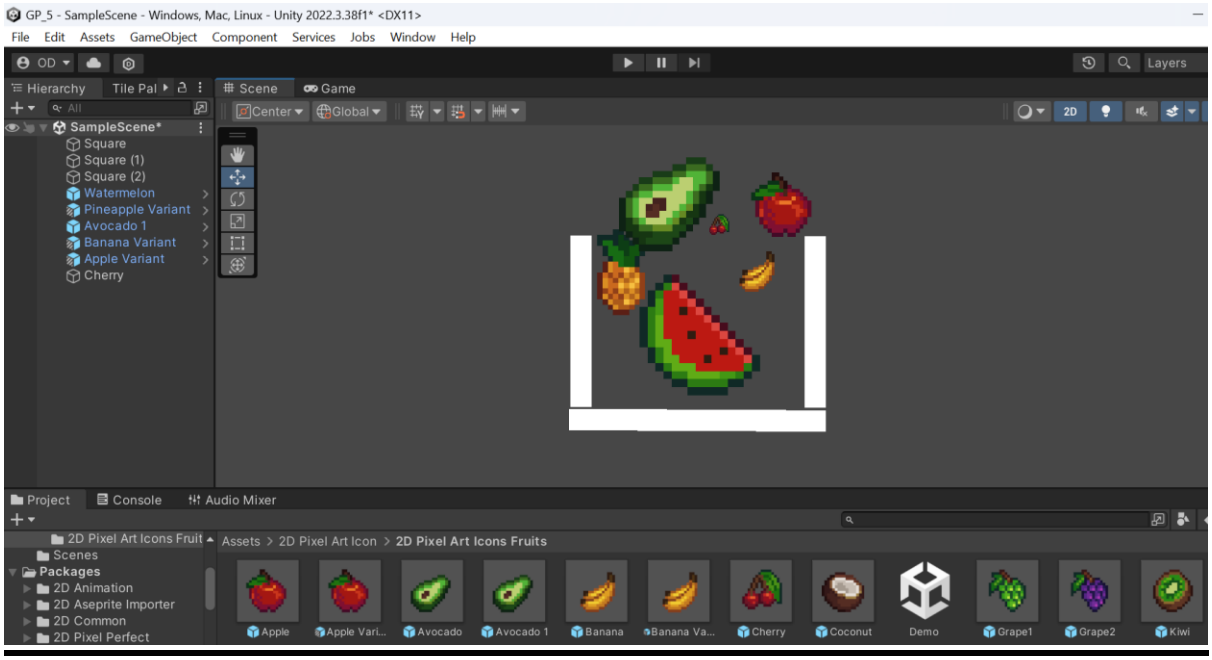
Adding PolygonCollider 2D Component for the above.



Creating more such components for jar construction, so

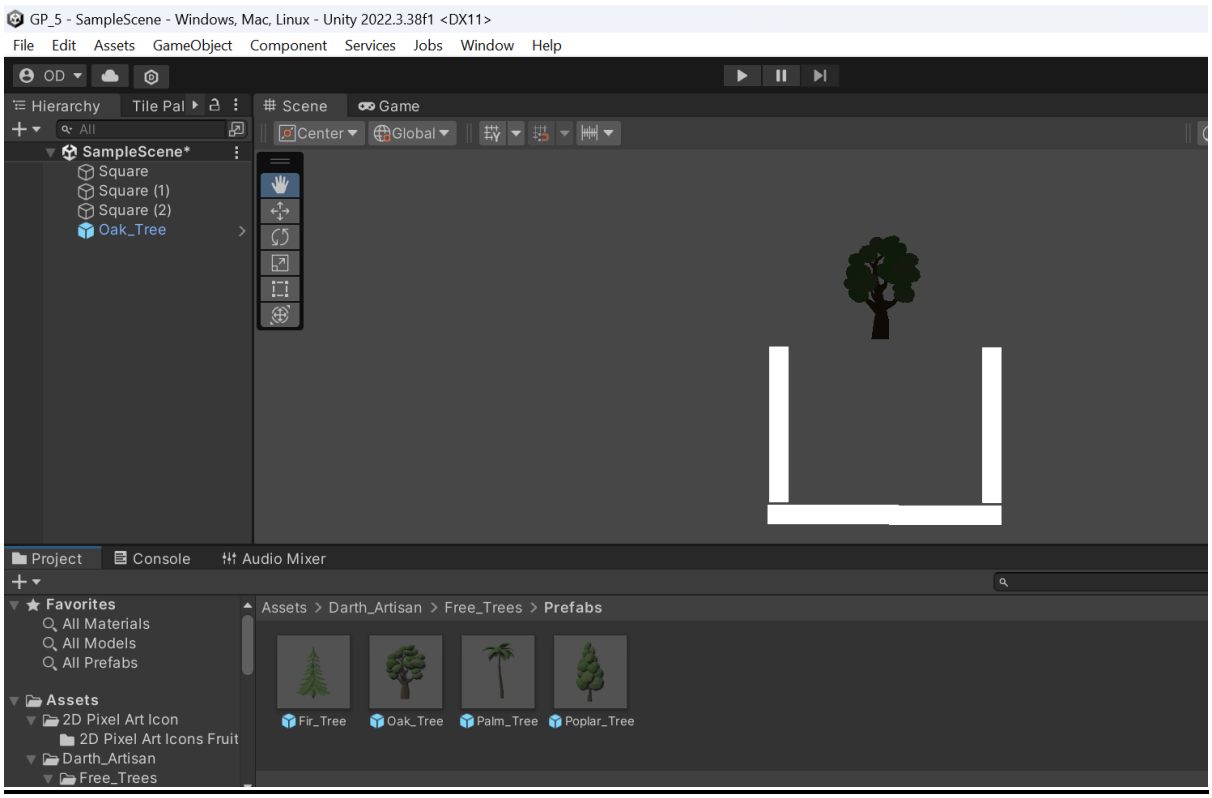


Fruits resized again accordingly to fit in jar and distinguish by size.

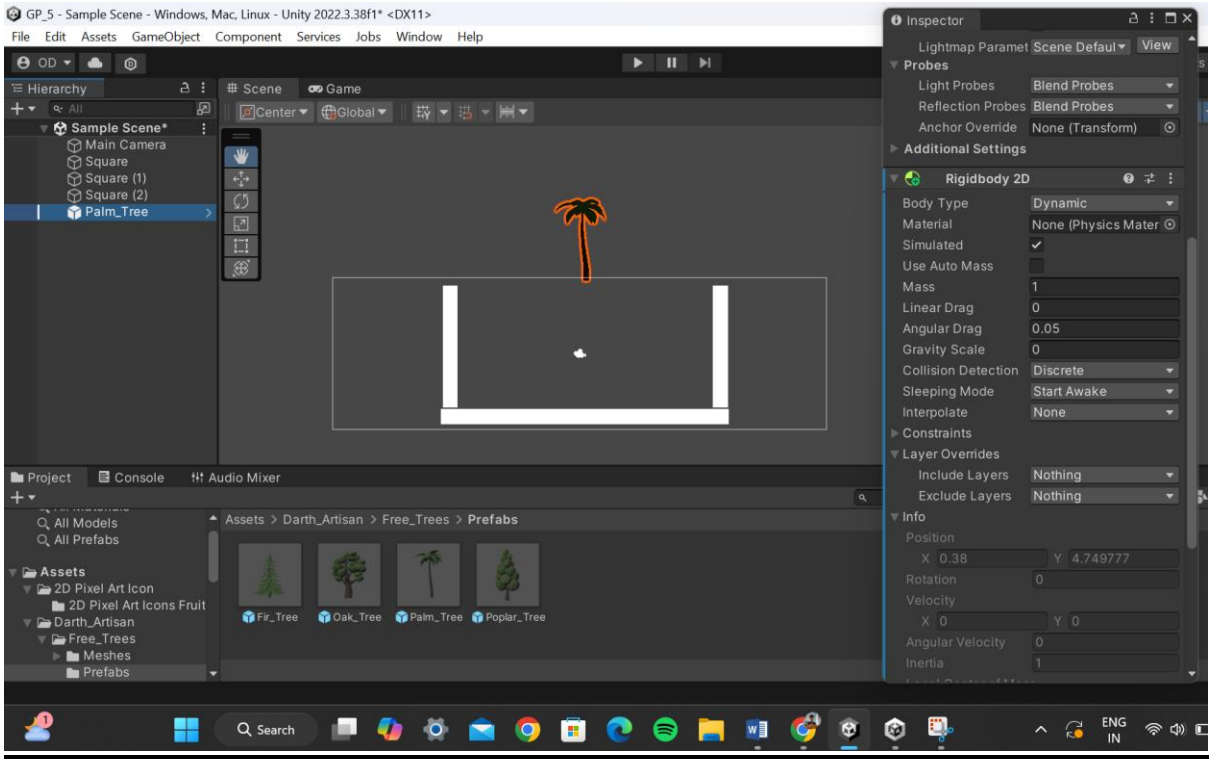


Step 8: Putting tree and testing for its motion by executing CScript code

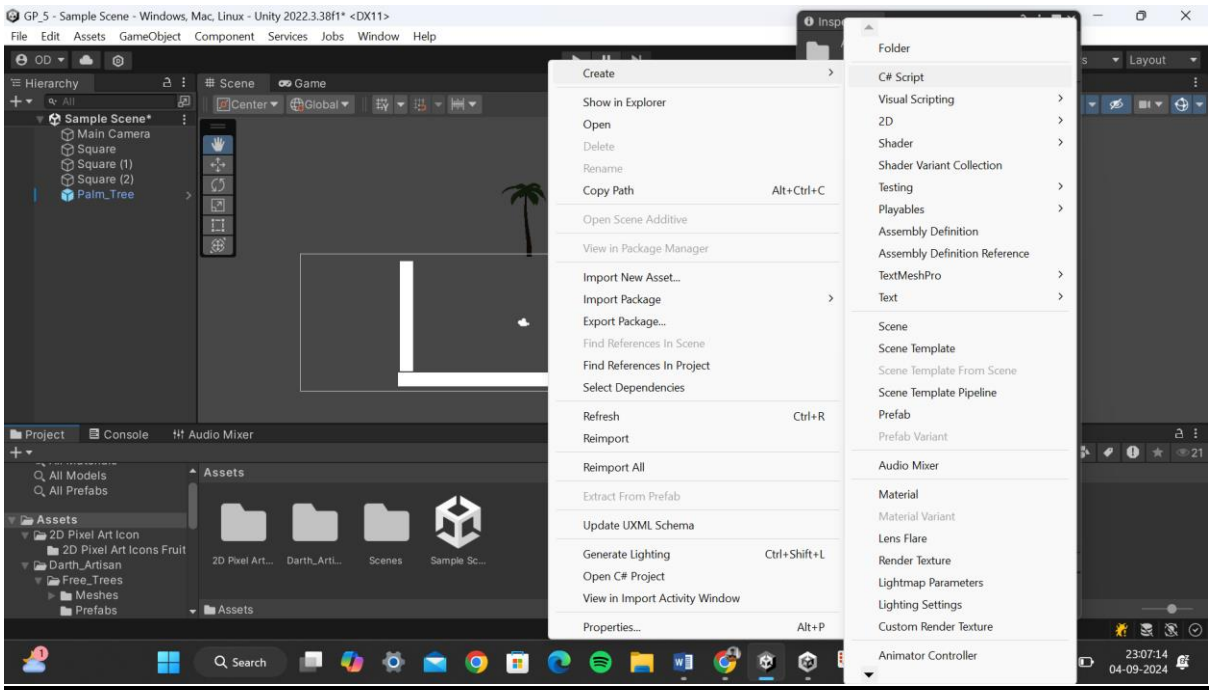
Adding for just looks

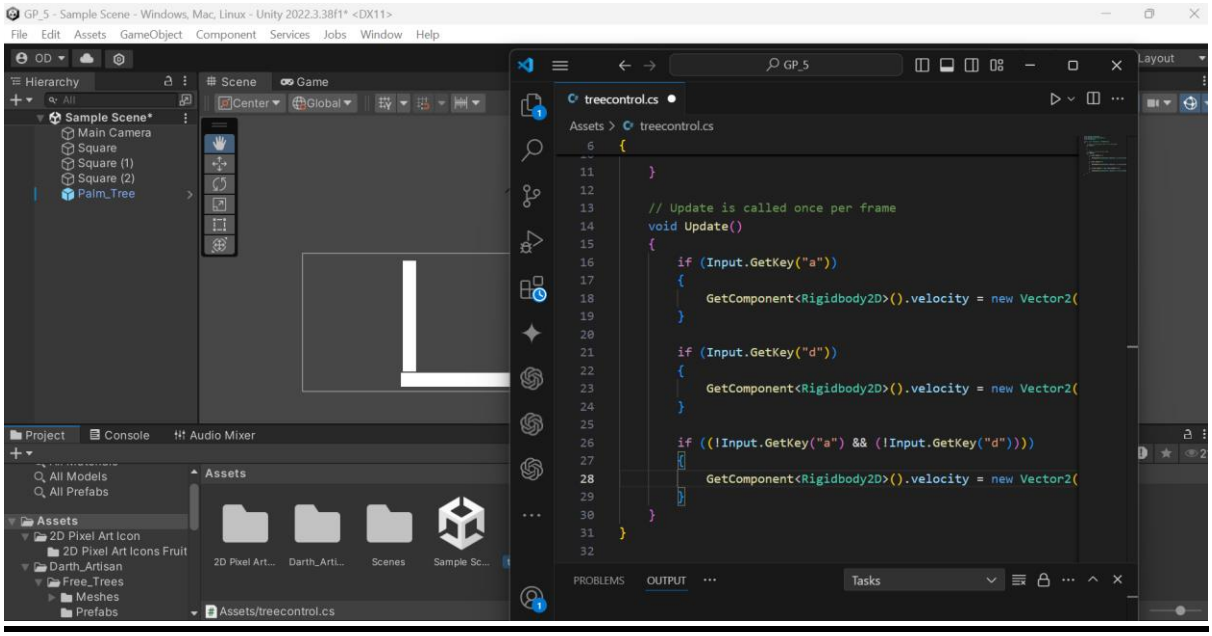


Set tree symbol gravity to 0



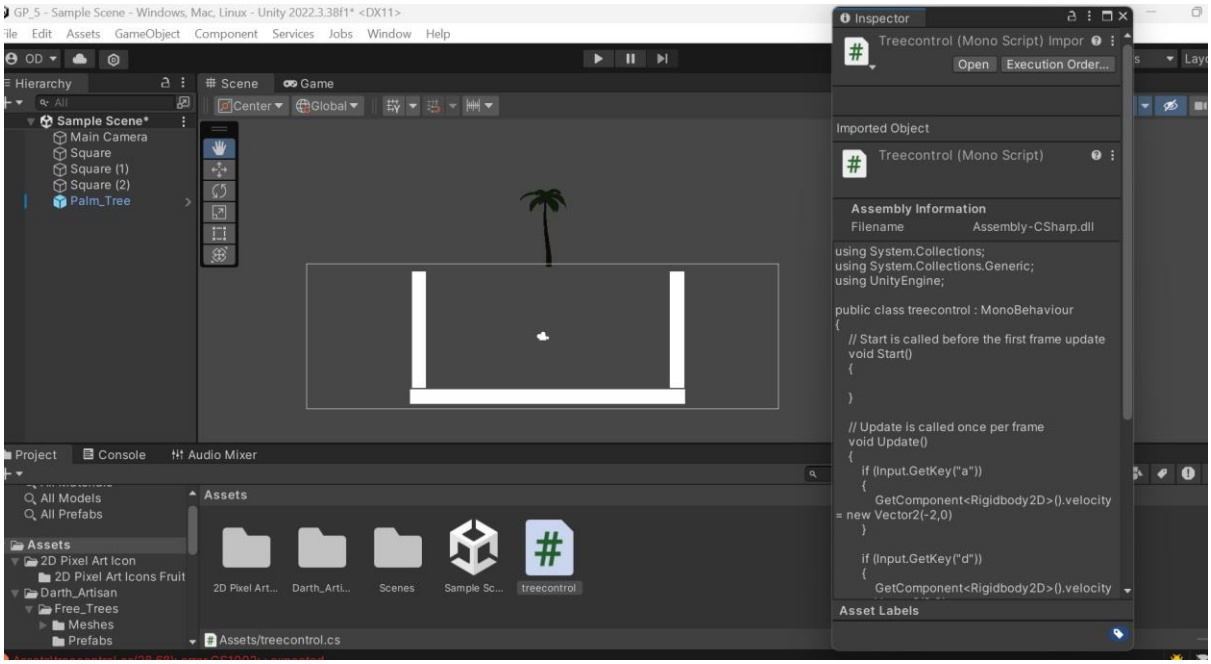
Add C# Script


GP_5 - Sample Scene - Windows, Mac, Linux - Unity 2022.3.38f1* <DX11>
File Edit Assets GameObject Component Services Jobs Window Help
Hierarchy
Sample Scene*
Main Camera
Square
Square (1)
Square (2)
Palm_Tree
Scene
Game
Project
Console
Audio Mixer
Assets
All Models
All Prefabs
2D Pixel Art Icon
2D Pixel Art Icons Fruit
Darth_Artisan
Free_Trees
Meshes
Prefabs
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
Find References In Project
Select Dependencies
Refresh Ctrl+R
Reimport
Reimport All
Extract From Prefab
Update UXML Schema
Generate Lighting Ctrl+Shift+L
Open C# Project
View in Import Activity Window
Properties... Alt+P
Folder
C# Script
Visual Scripting
2D
Shader
Shader Variant Collection
Testing
Playables
Assembly Definition
Assembly Definition Reference
TextMeshPro
Text
Scene
Scene Template
Scene Template From Scene
Scene Template Pipeline
Prefab
Prefab Variant
Audio Mixer
Material
Material Variant
Lens Flare
Render Texture
Lightmap Parameters
Lighting Settings
Custom Render Texture
Animator Controller
Search

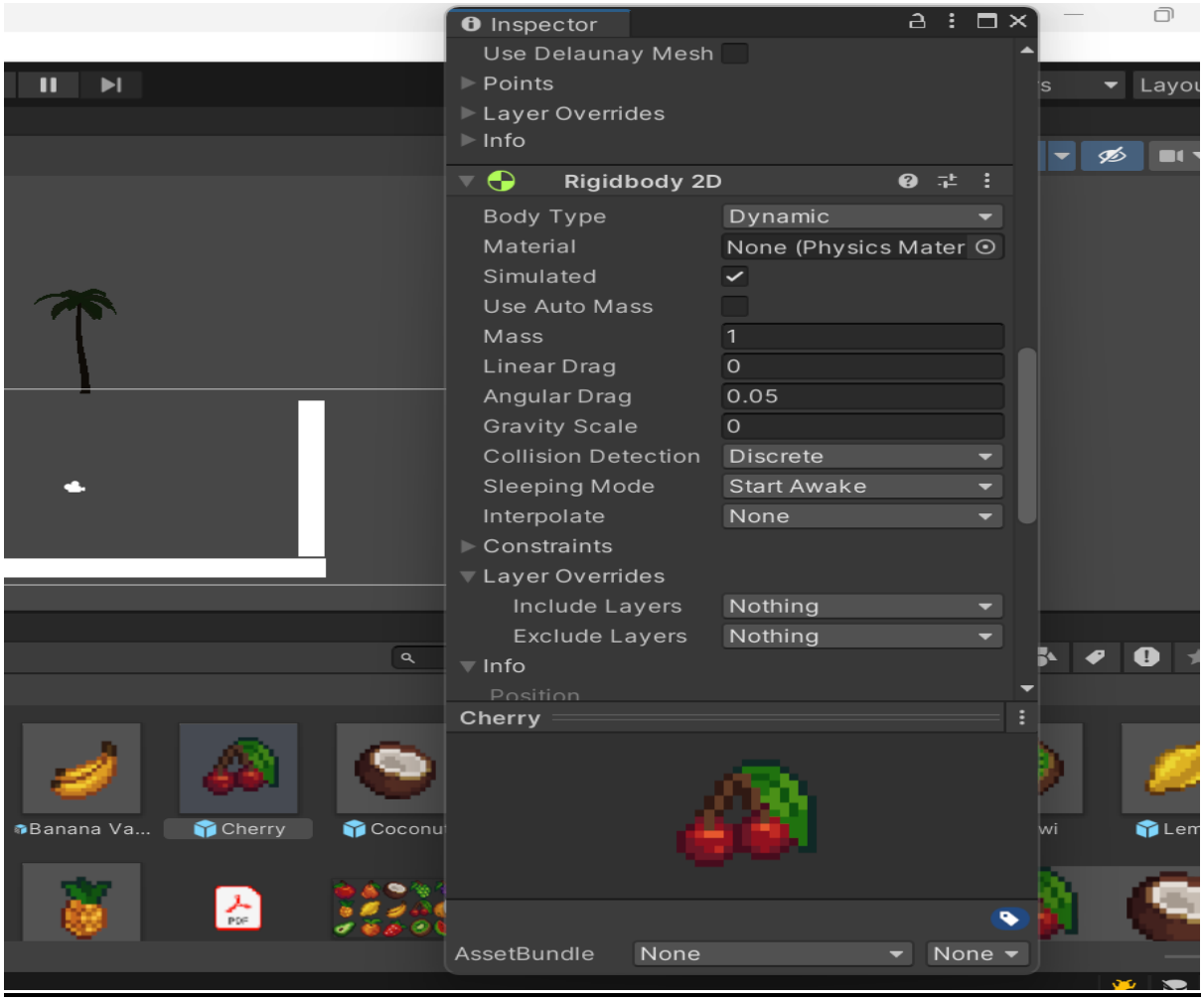

GP_5 - Sample Scene - Windows, Mac, Linux - Unity 2022.3.38f1* <DX11>
treecontrol.cs
Assets > treecontrol.cs
// Update is called once per frame
void Update()
if (Input.GetKey("a"))
GetComponent<Rigidbody2D>().velocity = new Vector2(
if (Input.GetKey("d"))
GetComponent<Rigidbody2D>().velocity = new Vector2(
if ((!Input.GetKey("a") && (!Input.GetKey("d"))))
GetComponent<Rigidbody2D>().velocity = new Vector2(
PROBLEMS
OUTPUT
Tasks
Assets/treecontrol.cs

CODE:

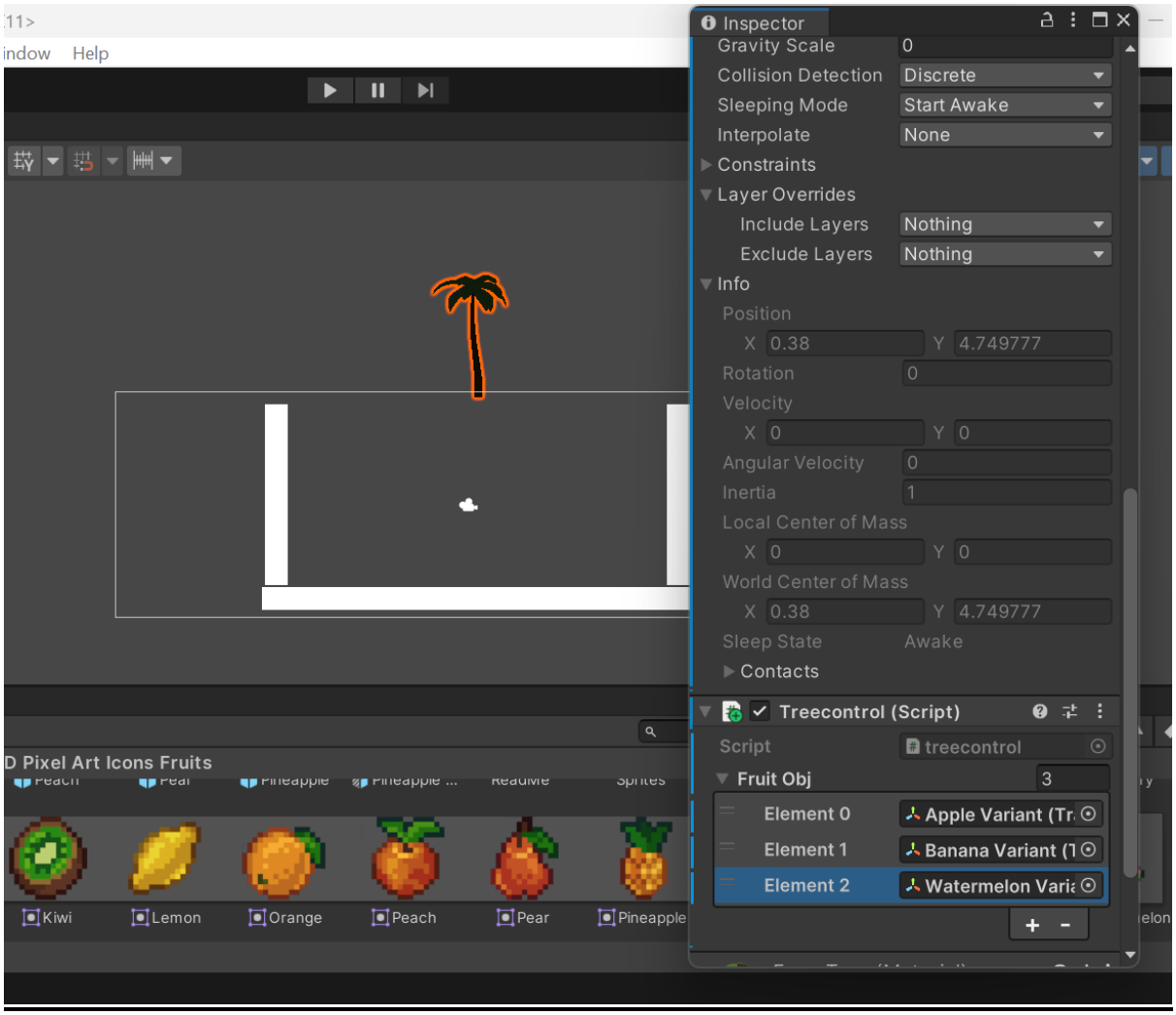
```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class treecontrol : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }
    // Update is called once per frame
    void Update()
    {
        if (Input.GetKey("a"))
        {
            GetComponent<Rigidbody2D>().velocity = new Vector2(-2,0)
        }

        if (Input.GetKey("d"))
        {
            GetComponent<Rigidbody2D>().velocity = new Vector2(2,0)
        }

        if ((!Input.GetKey("a") && (!Input.GetKey("d"))))
        {
            GetComponent<Rigidbody2D>().velocity = new Vector2(0,0)
        }
    }
}
```



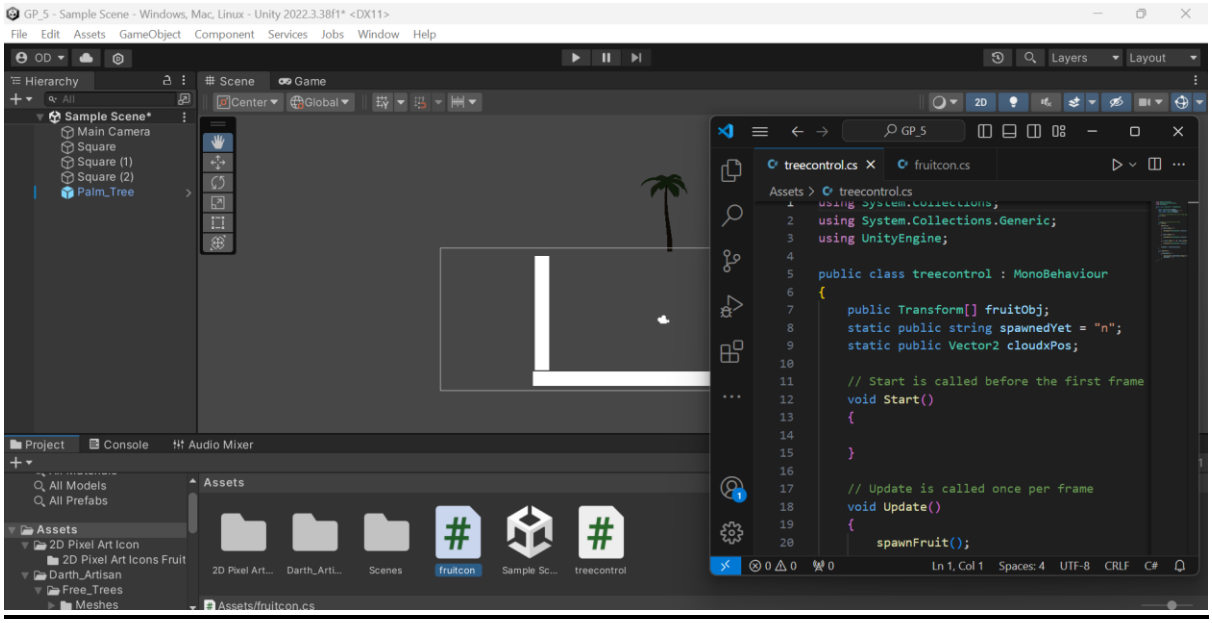
Step 9: Putting gravity scale as zero for all the fruits in RigidBody2D



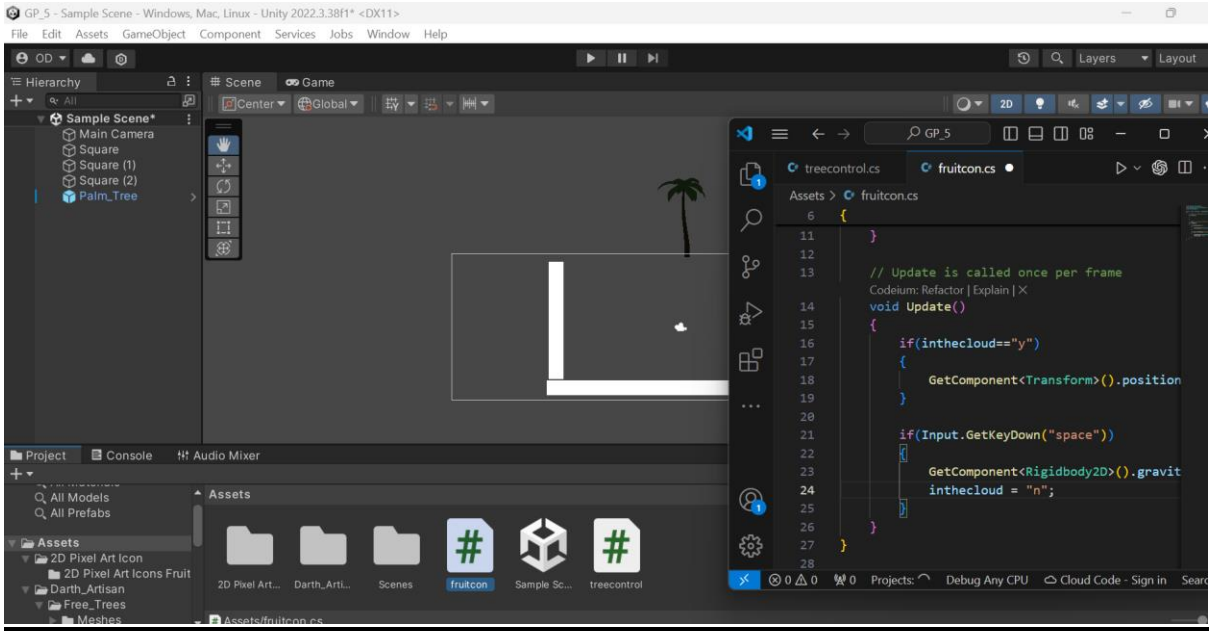
Step 10: Adding the fruits under the palm tree/cloud elements under the script component.



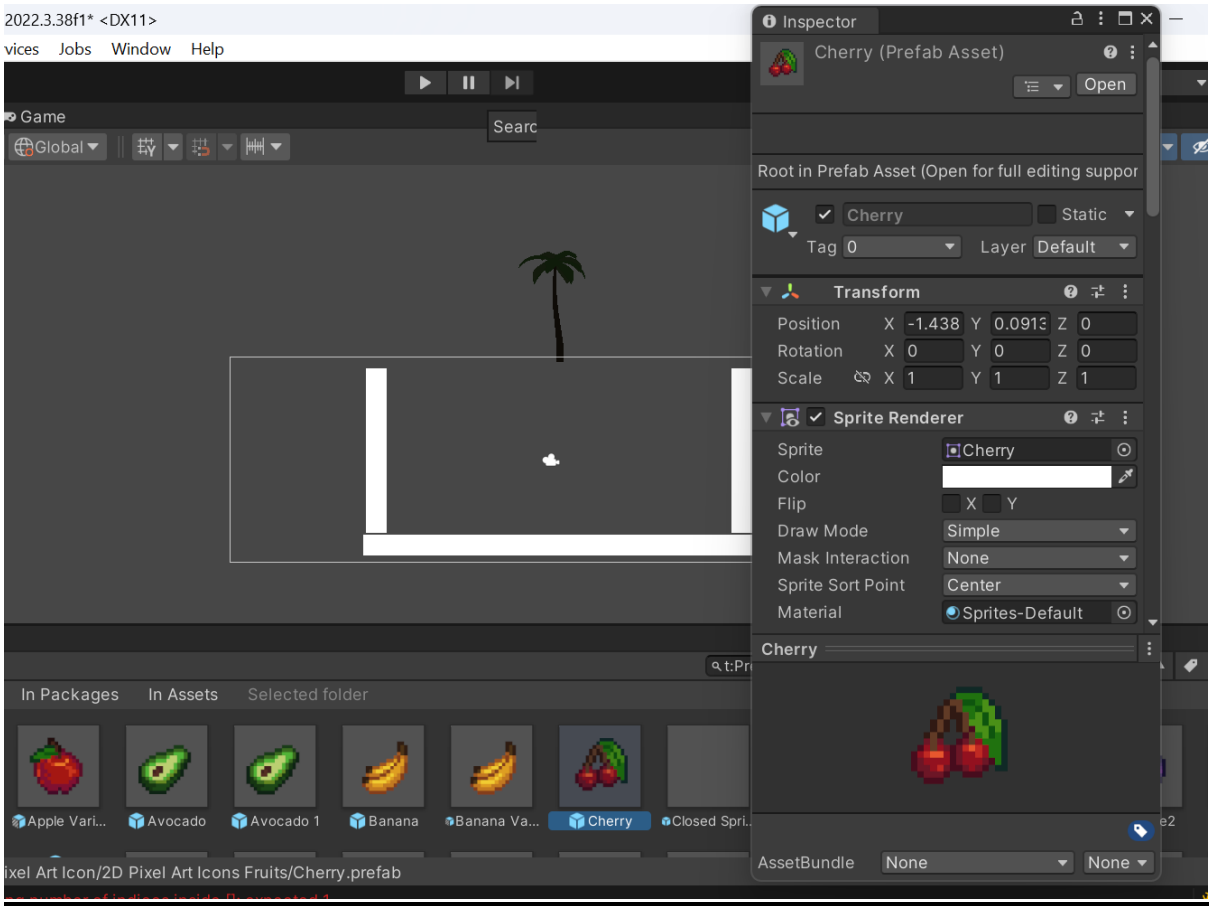
Step 11: Modifying the code

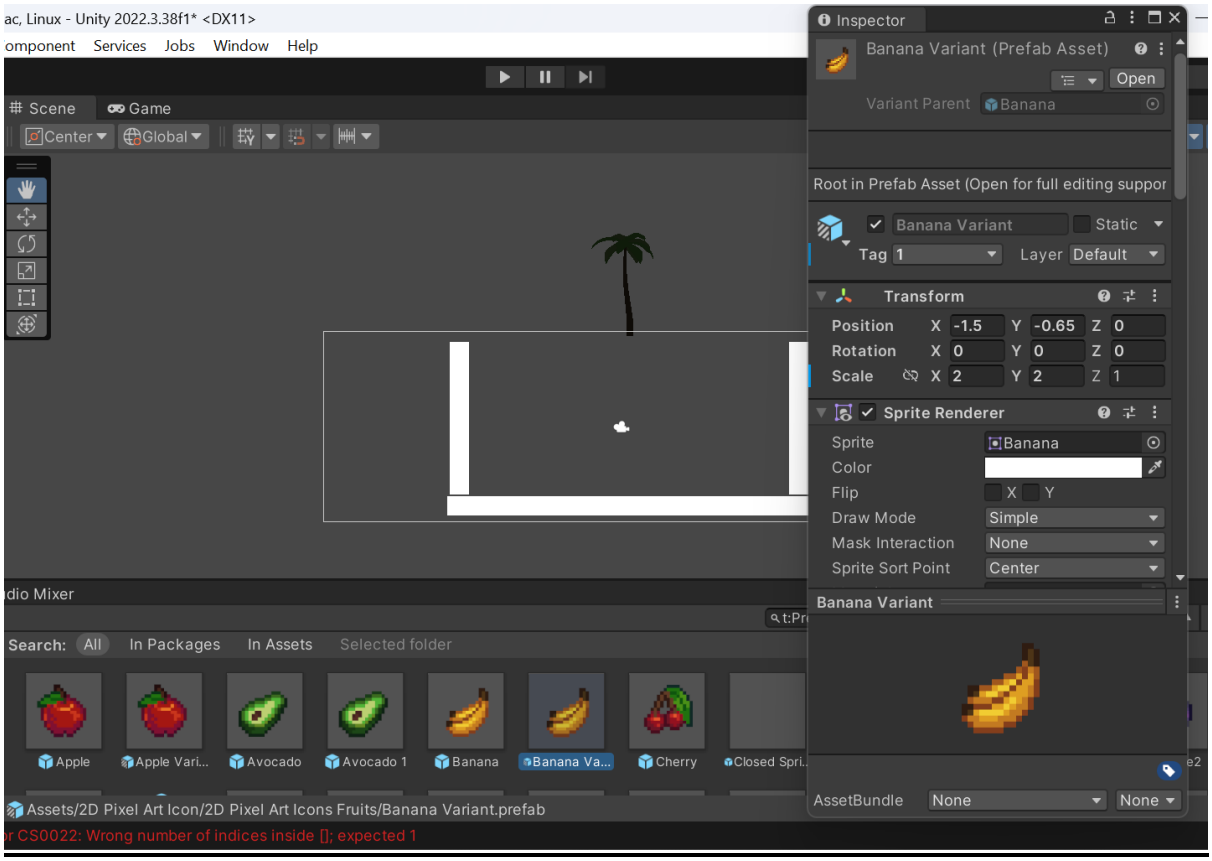


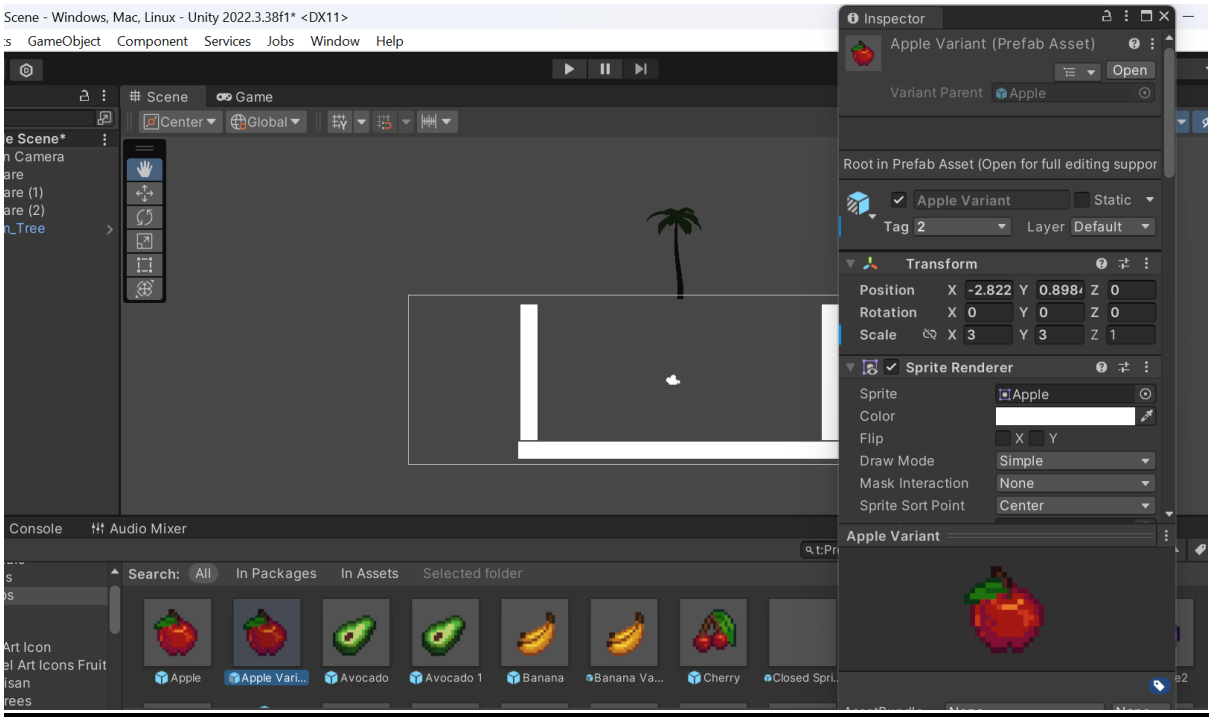
Step 12: Additionally modify code in the fruitcon.cs file

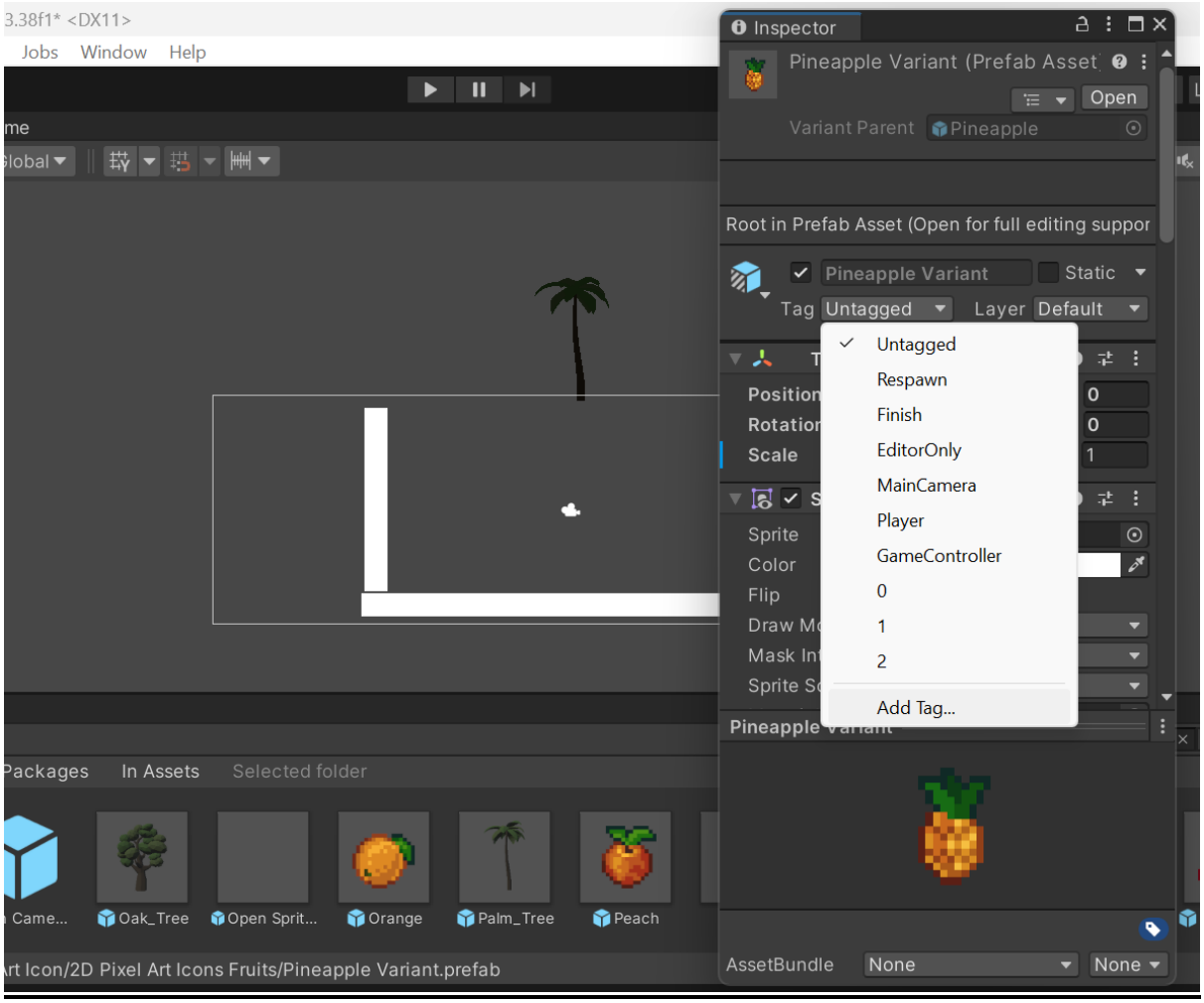


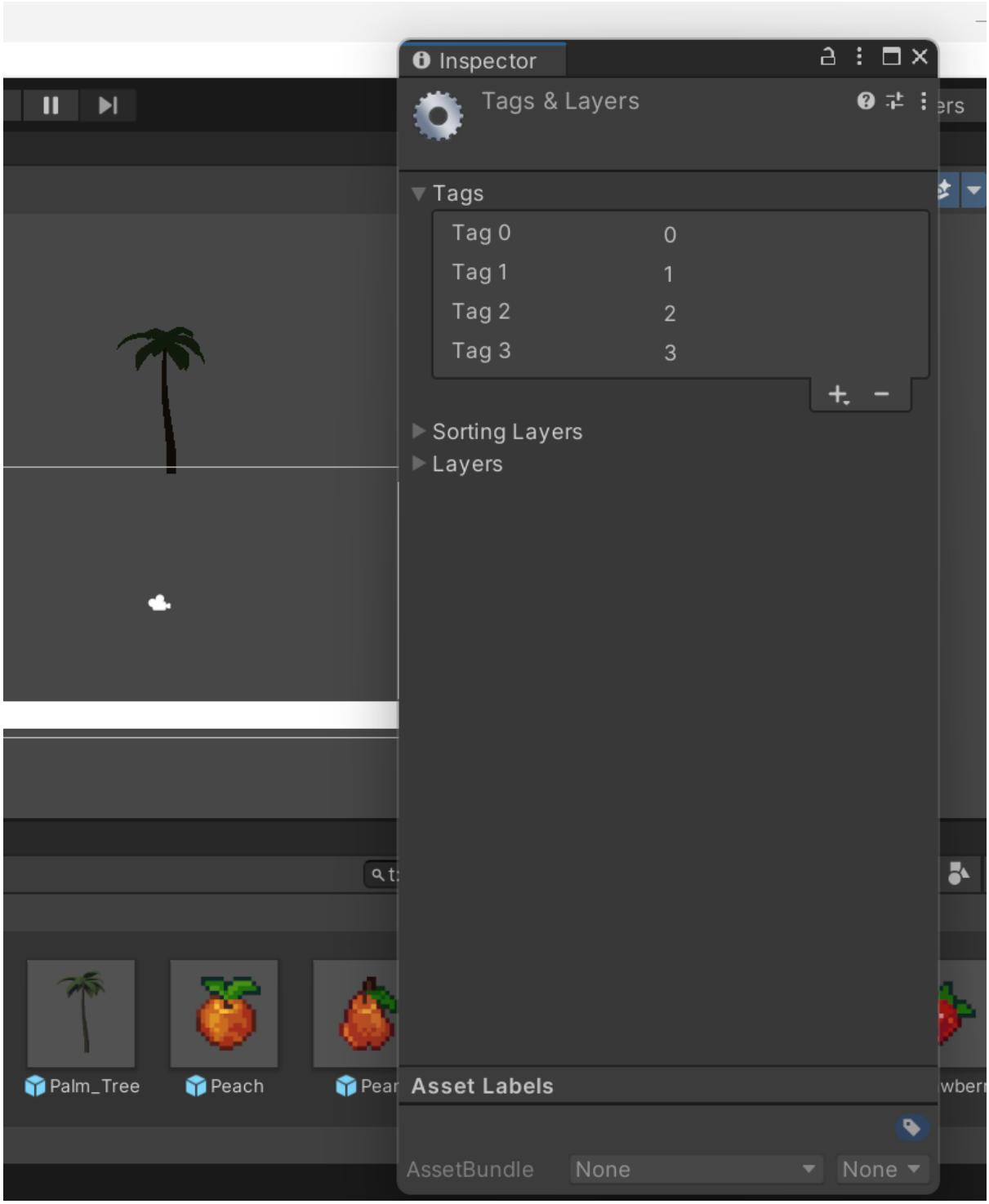
Step 13: Adding Tags for the objects[Similarly for other fruits as well.]

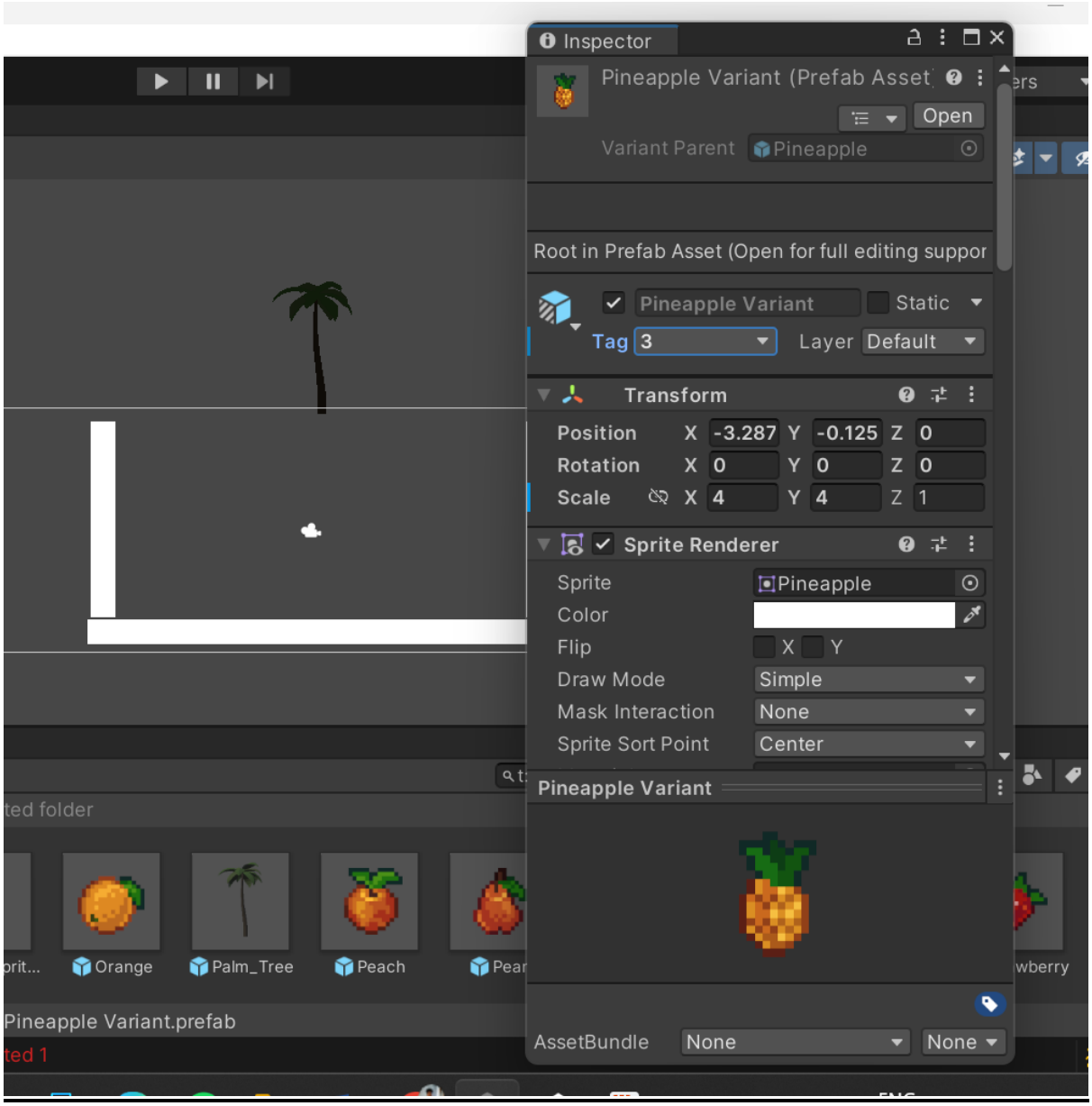



ac, Linux - Unity 2022.3.38f1* <DX11>
omponent Services Jobs Window Help
Scene
Game
Center
Global
Inspector
Banana Variant (Prefab Asset)
Open
Variant Parent
Banana
Root in Prefab Asset (Open for full editing suppor
Banana Variant
Static
Tag 1
Layer Default
Transform
Position X -1.5 Y -0.65 Z 0
Rotation X 0 Y 0 Z 0
Scale X 2 Y 2 Z 1
Sprite Renderer
Sprite Banana
Color
Flip X Y
Draw Mode Simple
Mask Interaction None
Sprite Sort Point Center
Banana Variant
dio Mixer
Search: All In Packages In Assets Selected folder
Apple
Apple Vari...
Avocado
Avocado 1
Banana
Banana Va...
Cherry
Closed Spri...
Assets/2D Pixel Art Icon/2D Pixel Art Icons Fruits/Banana Variant.prefab
AssetBundle None None
r CS0022: Wrong number of indices inside []; expected 1


Scene - Windows, Mac, Linux - Unity 2022.3.38f1* <DX11>
s GameObject Component Services Jobs Window Help
Scene
Game
Center
Global
Inspector
Apple Variant (Prefab Asset)
Open
Variant Parent
Apple
Root in Prefab Asset (Open for full editing suppor
Apple Variant
Static
Tag 2
Layer Default
Transform
Position X -2.822 Y 0.8984 Z 0
Rotation X 0 Y 0 Z 0
Scale X 3 Y 3 Z 1
Sprite Renderer
Sprite Apple
Color
Flip X Y
Draw Mode Simple
Mask Interaction None
Sprite Sort Point Center
Apple Variant
Console
Audio Mixer
Search: All In Packages In Assets Selected folder
Apple
Apple Vari...
Avocado
Avocado 1
Banana
Banana Va...
Cherry
Closed Spri...


3.38f1* <DX11>
Jobs Window Help
Inspector
Pineapple Variant (Prefab Asset
Open
Variant Parent Pineapple
Root in Prefab Asset (Open for full editing suppor
Pineapple Variant
Static
Tag Untagged
Layer Default
Untagged
Respawn
Finish
EditorOnly
MainCamera
Player
GameController
0
1
2
Add Tag...
Position
Rotation
Scale
Sprite
Color
Flip
Packages
In Assets
Selected folder
Oak_Tree
Open Sprit...
Orange
Palm_Tree
Peach
AssetBundle
None
None
rt Icon/2D Pixel Art Icons Fruits/Pineapple Variant.prefab


Inspector
Tags & Layers
Tags
Tag 0 0
Tag 1 1
Tag 2 2
Tag 3 3
Sorting Layers
Layers
Palm_Tree
Peach
Asset Labels
AssetBundle
None
None


Inspector
Pineapple Variant (Prefab Asset
Open
Variant Parent
Pineapple
Root in Prefab Asset (Open for full editing suppor
Pineapple Variant
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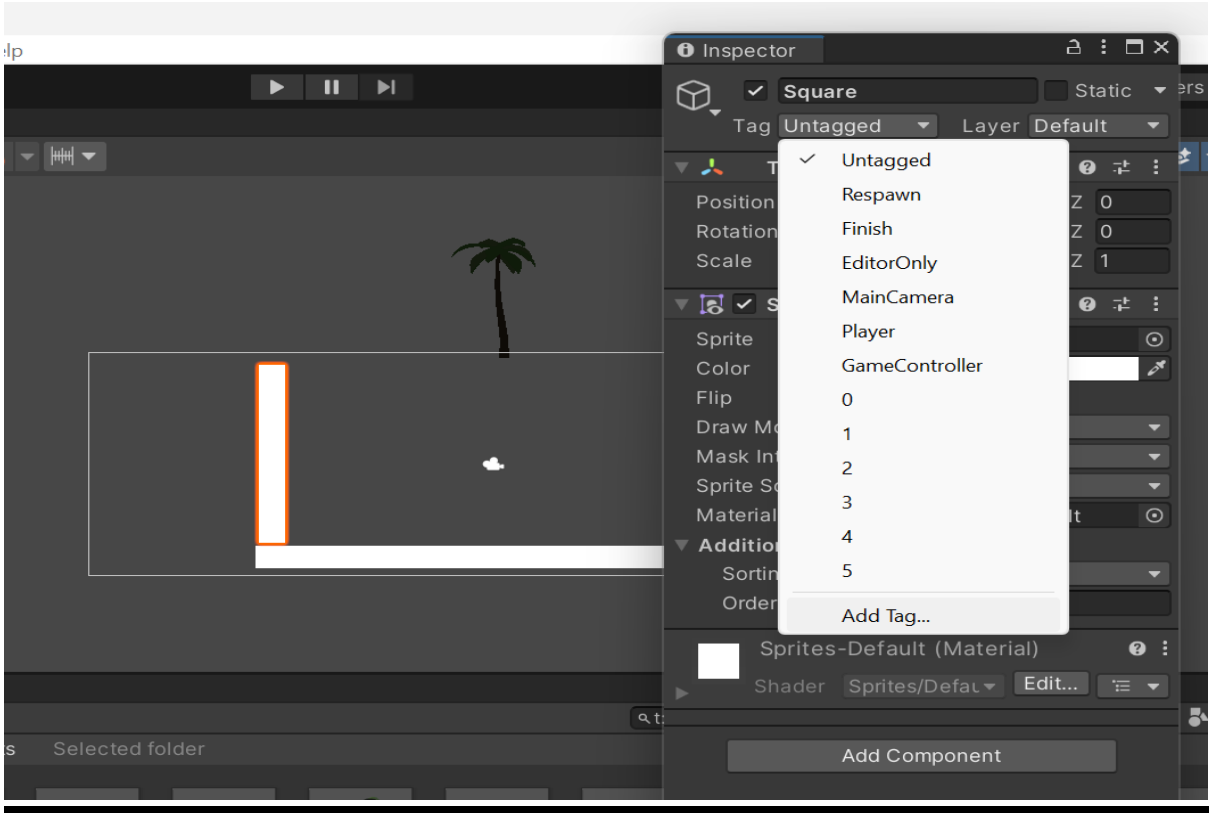
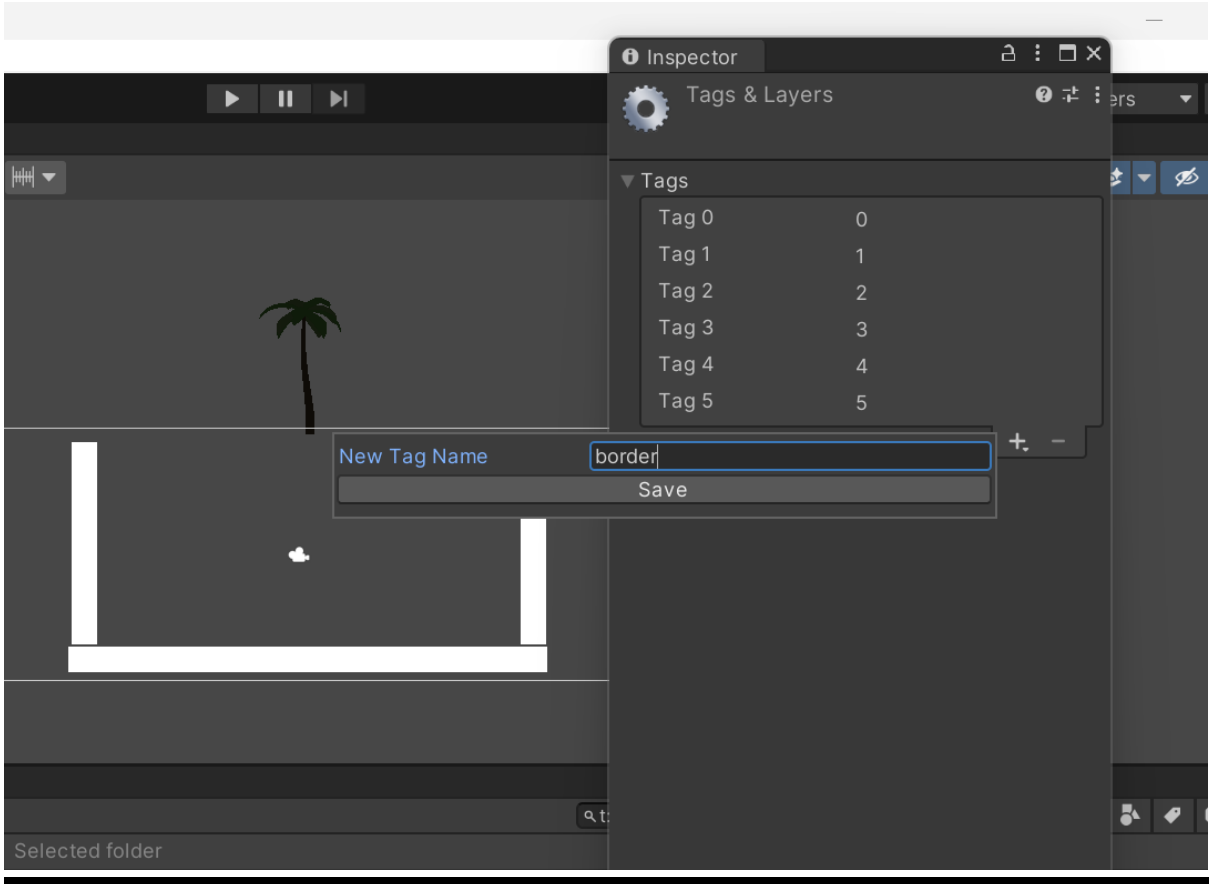
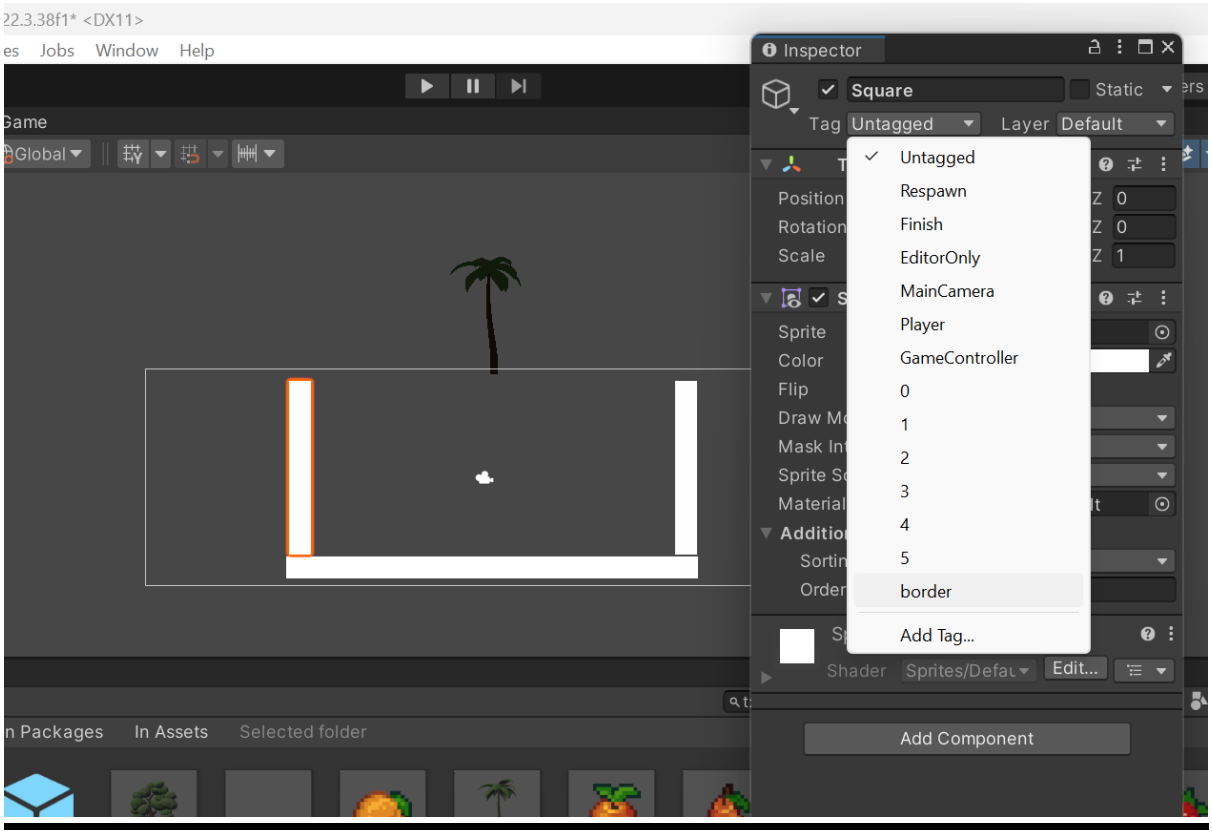
Layer
Default
Transform
Position
X -3.287
Y -0.125
Z 0
Rotation
X 0
Y 0
Z 0
Scale
X 4
Y 4
Z 1
Sprite Renderer
Sprite
Pineapple
Color
Flip
X
Y
Draw Mode
Simple
Mask Interaction
None
Sprite Sort Point
Center
Pineapple Variant
AssetBundle
None
None
Orange
Palm_Tree
Peach
Pineapple Variant.prefab

So on..

Step 14: Adding Tags for border as well.



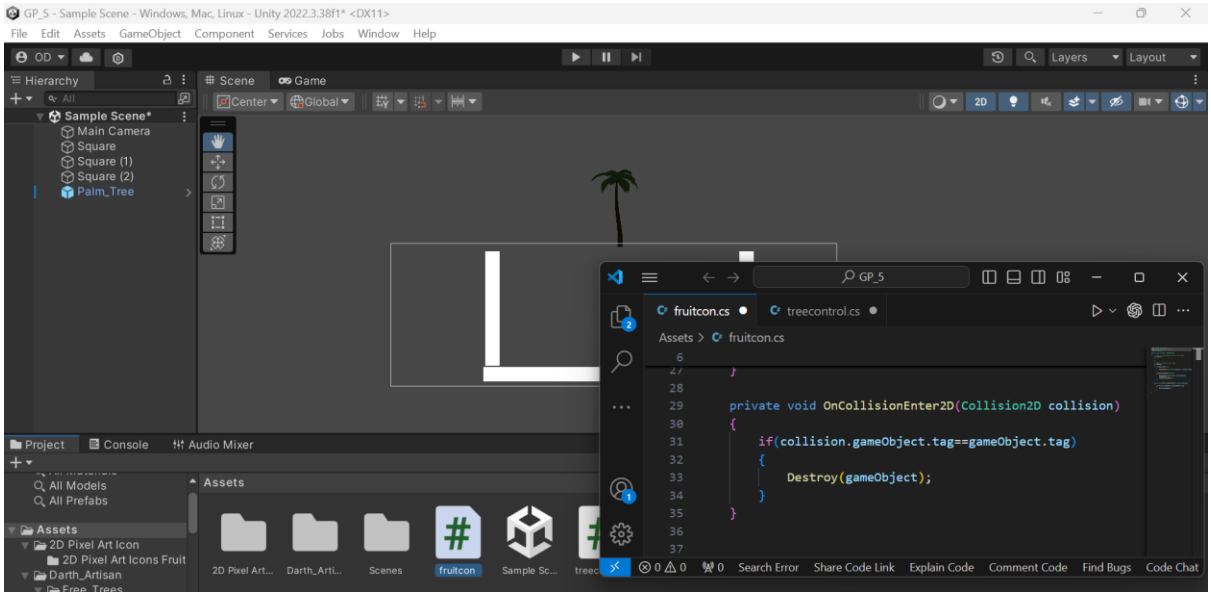

Inspector
Tags & Layers
Tags
Tag 0 0
Tag 1 1
Tag 2 2
Tag 3 3
Tag 4 4
Tag 5 5
New Tag Name
border
Save
Selected folder

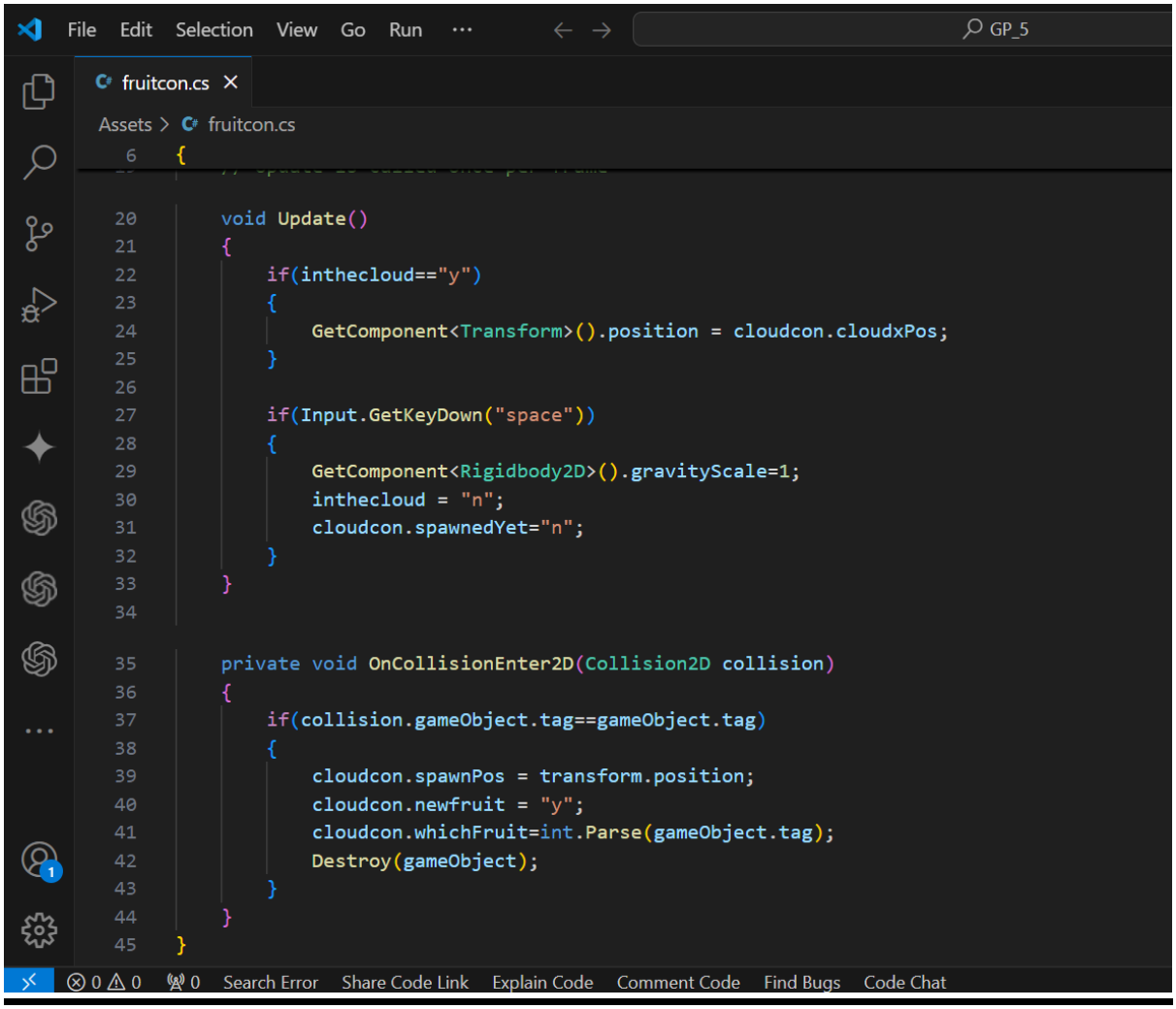

Inspector
Square
Static
Tag Untagged
Layer Default
Untagged
Respawn
Finish
EditorOnly
MainCamera
Player
GameController
0
1
2
3
4
5
border
Add Tag...
Add Component
In Assets
Selected folder

Do similarly for other 2 white blocks as well.

Step 15: Modifying the code adding OnCollision2D in fruitcon.cs file.

```
Assets > treecontrol.cs > treecontrol
5   public class treecontrol : MonoBehaviour
        2 references
7       public Transform[] fruitObj;
        2 references
8       static public string spawnedYet = "n";
        1 reference
9       static public Vector2 cloudxPos;
        0 references
10      static public Vector2 spawnPos;
        0 references
11      static public string newfruit="n";
12
```





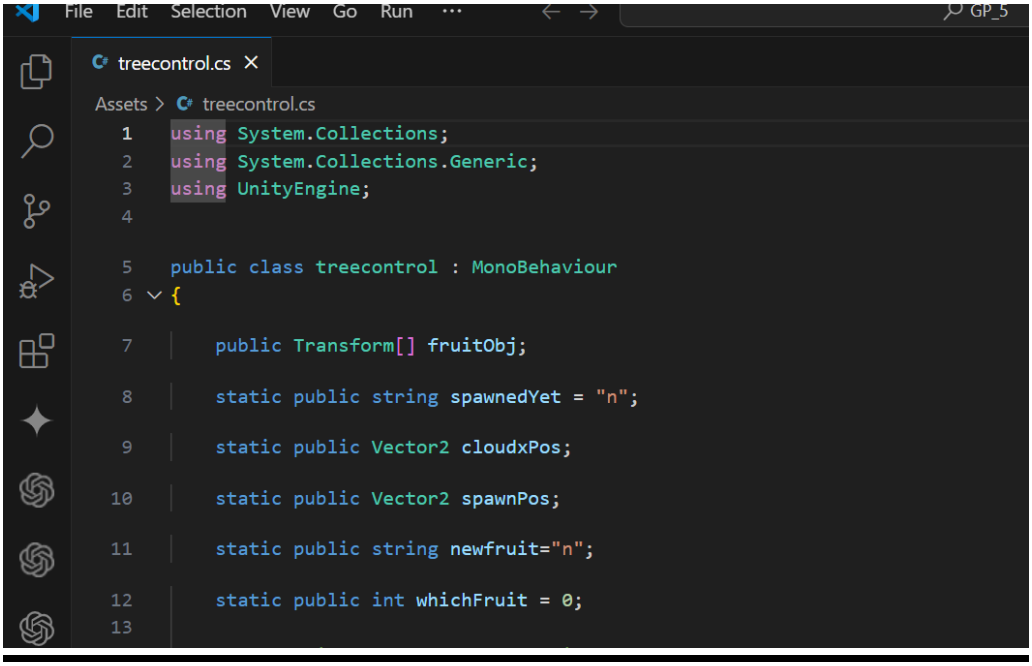
```
File Edit Selection View Go Run ···  GP_5

fruitcon.cs
Assets > fruitcon.cs
6   {

20      void Update()
21      {
22          if(inthecloud=="y")
23          {
24              GetComponent<Transform>().position = cloudcon.cloudxPos;
25          }
26
27          if(Input.GetKeyDown("space"))
28          {
29              GetComponent<Rigidbody2D>().gravityScale=1;
30              inthecloud = "n";
31              cloudcon.spawnedYet="n";
32          }
33      }
34

35      private void OnCollisionEnter2D(Collision2D collision)
36      {
37          if(collision.gameObject.tag==gameObject.tag)
38          {
39              cloudcon.spawnPos = transform.position;
40              cloudcon.newfruit = "y";
41              cloudcon.whichFruit=int.Parse(gameObject.tag);
42              Destroy(gameObject);
43          }
44      }
45  }

⊗ 0 ⚠ 0  0  Search Error  Share Code Link  Explain Code  Comment Code  Find Bugs  Code Chat
```



```
File Edit Selection View Go Run ···  GP_5

treecontrol.cs
Assets > treecontrol.cs
1   using System.Collections;
2   using System.Collections.Generic;
3   using UnityEngine;
4

5   public class treecontrol : MonoBehaviour
6   {

7       public Transform[] fruitObj;

8       static public string spawnedYet = "n";

9       static public Vector2 cloudxPos;

10      static public Vector2 spawnPos;

11      static public string newfruit="n";

12      static public int whichFruit = 0;
13
```

```
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treecontrol.cs ×
Assets > treecontrol.cs
1   using System.Collections;
2   using System.Collections.Generic;
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4
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```

FINAL IMPLEMENTATION: