3D GALLERY

BACHELOR OF COMPUTER ENGINEERING

By

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Guide

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Experiment 10

Aim: Create a Personal 3D Gallery Project with Unity

Tools Used: Unity Hub

Theory:

Explanation about project

This project will familiarize you with the basics of Unity including navigating a 3D environment, implementing first person controls, and building a project.

Procedure

Planning 3D Gallery Project

Step 01: Start your project

1. In the "Projects" tab in Unity Hub, click "New", and select "3D"
2. Give your project a name, select a save location and click "Create" Wait while Unity builds a blank project
3. Once the project is loaded, explore the tools in the top left of the Unity interface that will allow you to move around your project, and use the Q-W-E-R-T-Y keys as shortcuts
4. In the Hierarchy panel in the top left, locate the Main Camera and the Directional Light objects
5. Click between the Scene view and the Game view Locate the Inspector panel on the right
6. Locate the Project panel on the lower left

Step 02: Adding a simple primitive

1. From the top left menu, click on GameObject > 3D Object > Cube
2. With the cube selected, increase its size by setting the X and Z scale values to 40 in the Inspector Panel
3. Click on the Game view to see that the cube has become wide and flat, forming the shape we will use as our ground plane

Step 03: Importing a first person controller from the Unity Asset Store

In order to move around your project, you'll need to add a "first-person controller", which will be a stand-in for the user in your 3D space. The controller we have chosen for this project can be found and imported from the Unity Asset Store

1. Next to the Game view tab, select the Asset Store tab Search for "first person all-in-one", click Download and accept the terms of service agreement, then click Import
2. Click Import on the "Import Unity Package" window that opens
3. Click on the Scene view and find the "First Person AIO Pack" in the "Assets" folder in your Project panel
4. In the Project panel, open Assets > FirstPerson AIO Pack > DemoScene > Scene, then double-click on "Demo.unity" to open it Click Play to try out the demo scene, then press Esc and click Play again to stop the demo scene (or use CTRL/CMD + P)
5. Go back to your personal project scene by clicking File > Open Scene and finding where you saved it
6. With your project open, go back to the Project panel and open First Person AIO Pack > First Person AIO, then drag the "FirstPerson-AIO" object (the blue cube) into the Hierarchy on the left-hand side of the Unity editor
7. Since the "FirstPerson-AIO" object already includes a Camera, Right-Click > Delete the Main Camera within the Hierarchy
8. Click Play at the top of the user interface (or use shortcut CMD/CTRL + P) to allow the user to look around with the mouse, and walk around with either the W-A-S-D or Arrow keys
9. Use shortcut CMD/CTRL + P to exit the play mode
10. Important: Remember to save your project with File > Save

Create Interaction to Project

Step 01: Developing your 3D world

1. In Unity, in the Project panel, select the Assets subfolder, then click the + icon and from the drop menu, choose 'Folder' and name it 'Models'. Double-click to go into this folder

2. From the downloaded assets drag all of the assets from the downloaded model folder into your new ‘Models’ folder
3. Select the cube in the Hierarchy panel. Right-click on it and choose Delete to remove it
4. Drag the ‘museum’ model from the Models folder into the Hierarchy panel in Unity
5. In the Inspector panel, change the Scale to 10 on the X, Y and Z axes
6. To view the scene properly, ensure the museum model is selected in the Hierarchy panel and hit F with your mouse over the scene window.
7. Holding down Alt and moving the mouse enables you to rotate the scene
8. Holding Alt-CTRL(PC) or Right-Click+CTRL(Mac) enables zooming in and out of the scene

Step 02: Adding colliders and lighting

1. Click the ‘museum’ model in the Hierarchy panel and open the dropdown menu next to it
2. Select ‘AngleRoom’ and then in the Inspector choose Add Component > Physics > Mesh Collider
3. Select ‘OctagonRoom' and Shift-click on ‘Walkway_3’ to select all rooms, then in the Inspector choose Add Component > Physics > Mesh Collider
4. Open the ‘Lights’ group by clicking the dropdown arrow next to it. Select the first light, then Shift+click on the last light to select all the lights
5. In the Inspector panel, in the Light component, change the Shadow Type to ‘No Shadows’ to make it run more smoothly as shadows have been baked into the model texture
6. Still in the Inspector panel, increase the Range to 20 to make the scene brighter
7. Return to the Hierarchy panel, select the ‘Lights’ group, then move the light control in the Scene down a little on the Y axis to make the rooms a little brighter

Step 03: Adding materials and audio

1. Select the FirstPerson-AIO in the Hierarchy. In the scene, drag the controller inside the RoundRoom (where the welcome room will be)
2. Rotate the FirstPerson-AIO to look at the 'Welcome' text.
3. Switch to the 'Game' view to check how the project will look when it starts
4. Switch back to Scene View and ensure the FirstPerson-AIO Pack is selected in the project panel.
5. In the Inspector panel, scroll down to see where the AudioSFX properties are located.
6. Go back to the Project Panel. Inside the Assets>First Person AIO Pack>DemoScene folder>Working Materials folder, you will find the Physics Materials folder. Select this to see the Physics Materials
7. Open the Museum group in the Hierarchy panel and click-drag the 'Carpet' Physics Material from the Project panel into AngleRoom in the Hierarchy panel.
8. Repeat by dragging the Carpet material onto the OctagonRoom and the RectangleRoom as well
9. Drag the Concrete Physics Material onto RoundRoom and repeat this for Walkway, Walkway_1, Walkway_2 and Walkway_3
10. With the FirstPerson-AIO selected in the Hierarchy window, scroll down in the Inspector panel to reach the Audio/ SFX setup, then expand 'Rock and Concrete Clips'
11. Click 'Add new physics material'. Drag the Concrete Physics material onto the field that says 'None (Physics Material). This connects the sound to walking on Concrete
12. Now expand 'Custom Material Clips' and click 'Add new physics material'. Drag over the Carpet Physics material to the field that says 'None (Physics Material)'.
13. Press Play (or CMD+P) to test the sound effects as you walk in different rooms

Refining the Project

Step 01: Adding a UI and proximity triggers

1. From the top menu, click GameObject > UI > Text. Switch to Game View to see how the text is displayed in the lower-left corner of the screen.
2. Check that Canvas>Text is selected in the Hierarchy panel.
3. Then, in the Inspector panel under Rect Transform, click on the Anchor icon, then hold Alt and click 'left/top'
4. Change the Width to 500 but leave Height at 30. Click on the Anchor icon again, then hold Alt and click 'left/top'
5. In the Text component, Increase the Font Size to 18 and change the Color to yellow, and change the actual Text to 'Title'
6. In the Rect Transform component, change the Pos X to 280 and the Pos Y to -30
7. At the top of the Inspector, name the text element "ArtTitle'.
8. Click where it says 'Untagged', then choose 'Add Tag.' Click the plus (+) to add a tag and name it 'ArtTitle'. Repeat this for 'Auth' and 'Description' so you have three tags. It is essential that these three tags are spelled exactly 'ArtTitle', 'Auth' and 'Description,' including correct capitalization, because the code will look for that spelling later.
9. Select ArtTitle in the Hierarchy panel and, in the Inspector, change the tag from 'Untagged' to 'ArtTitle'.
10. Repeat steps 1-6 and step 8 to make 2 more text boxes. Name them 'Author' and 'Desc' then tag them 'Auth' and 'Description' respectively. You will also have to change their Height and Pos Y to be appropriate for the length and position of those text elements.

Step 02: Adding images and a script

1. Select Assets in the Project Panel, hit the + icon and choose 'Folder' in the pop-up menu. Name this folder 'Textures'.
2. Go back and select Assets in the Project Panel, hit the + icon and choose 'New Folder' in the pop-up menu. Name the folder 'Scripts'.

3. From the downloaded assets, drag over the two textures into your new Textures folder.
4. Then drag the Proximity.cs script from your downloaded assets into your new Scripts folder.
5. Return to the scene view by selecting the Scene tab, then from the top menu, click GameObject > 3D Object > Plane. Drag the 'da3' texture from the Textures folder onto the Plane.
6. In the Inspector panel, find the Rotation properties in the Transform component and change the fields so that the plane is 90º on the x-axis and -90º on the y-axis.
7. Change the position of the panel over a wall in the scene with the move tool.
8. Scale it to 0.5 on the x-axis and 0.5 on the z.
9. Find the Direction Light in the Hierarchy panel and uncheck the Light in the Inspector to disable it.
10. To make the scene brighter, select all Lights in the Light group by clicking the first and shift-clicking the last.
11. In the Inspector panel, increase the intensity to 2.

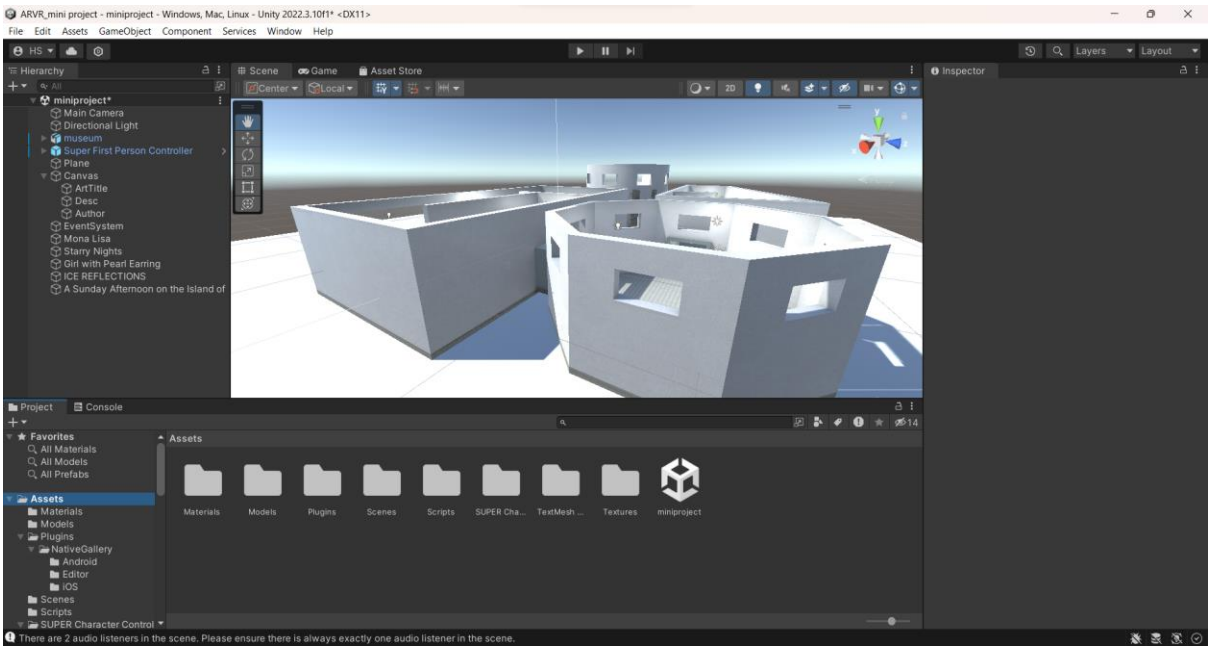
Step 03: Creating interaction with a proximity script

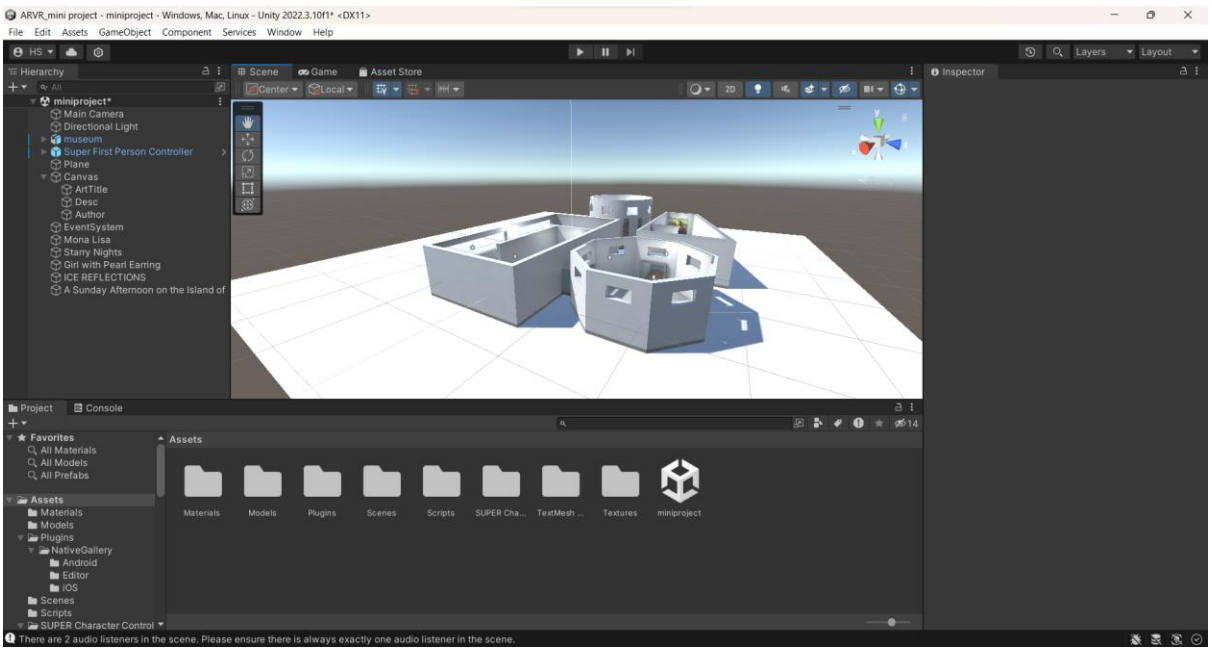
1. Drag the Proximity.cs script from the Scripts folder onto the Plane in the Hierarchy.
2. Write some text for the Title, Author, and Description of the painting into the relevant fields in the Inspector for the Proximity Script. Alternatively, you may have this text already in a separate text document, and you can copy and paste it in directly.
3. Hit Play to test walking up to the gallery work and seeing the text display in the UI.

Step 04: Submit Project

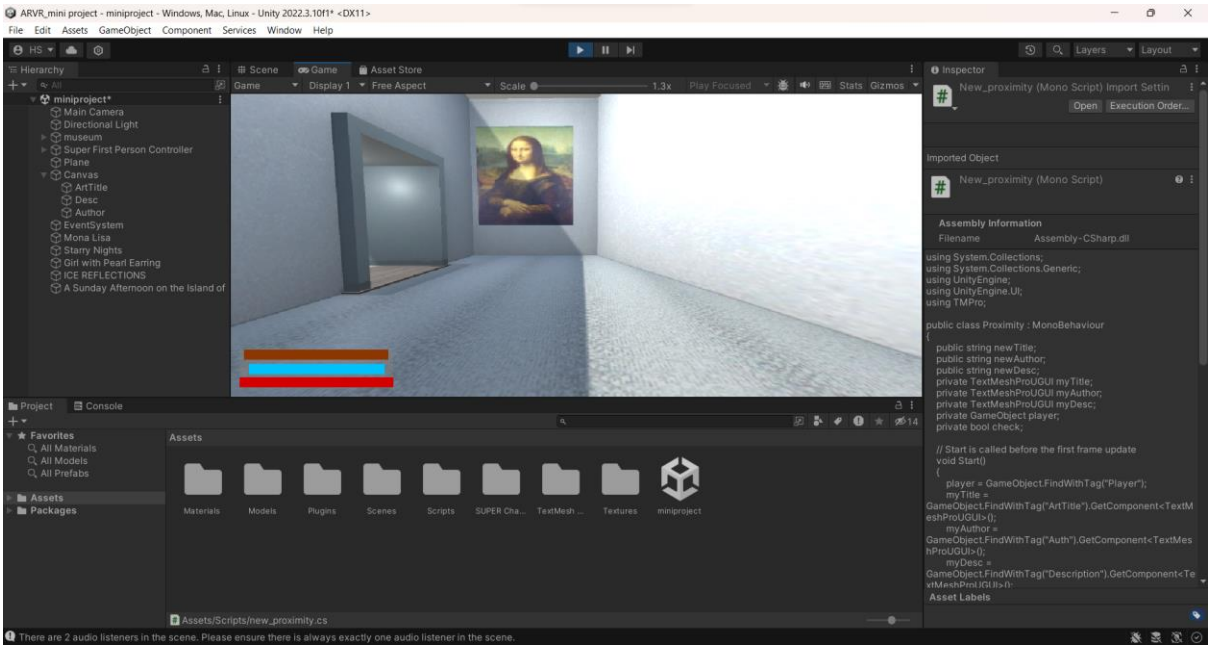
Test your personal project using the "Play" button at the top of the screen in Unity. Check that it works!

Output Screenshots:






Scene
Game
Asset Store
Game
Display 1
Free Aspect
Scale
1.3x
Play Focused
Stats
Gizmos
Welcome
14


ARVR_mini project - miniproject - Windows, Mac, Linux - Unity 2022.3.10f1* <DX11>
File Edit Assets GameObject Component Services Window Help
Hierarchy
miniproject*
Main Camera
Directional Light
museum
Super First Person Controller
Plane
Canvas
ArtTitle
Desc
Author
EventSystem
Mona Lisa
Starry Nights
Girl with Pearl Earring
ICE REFLECTIONS
A Sunday Afternoon on the Island of
Scene
Game
Asset Store
Inspector
Project
Console
Favorites
All Materials
All Models
All Prefabs
Assets
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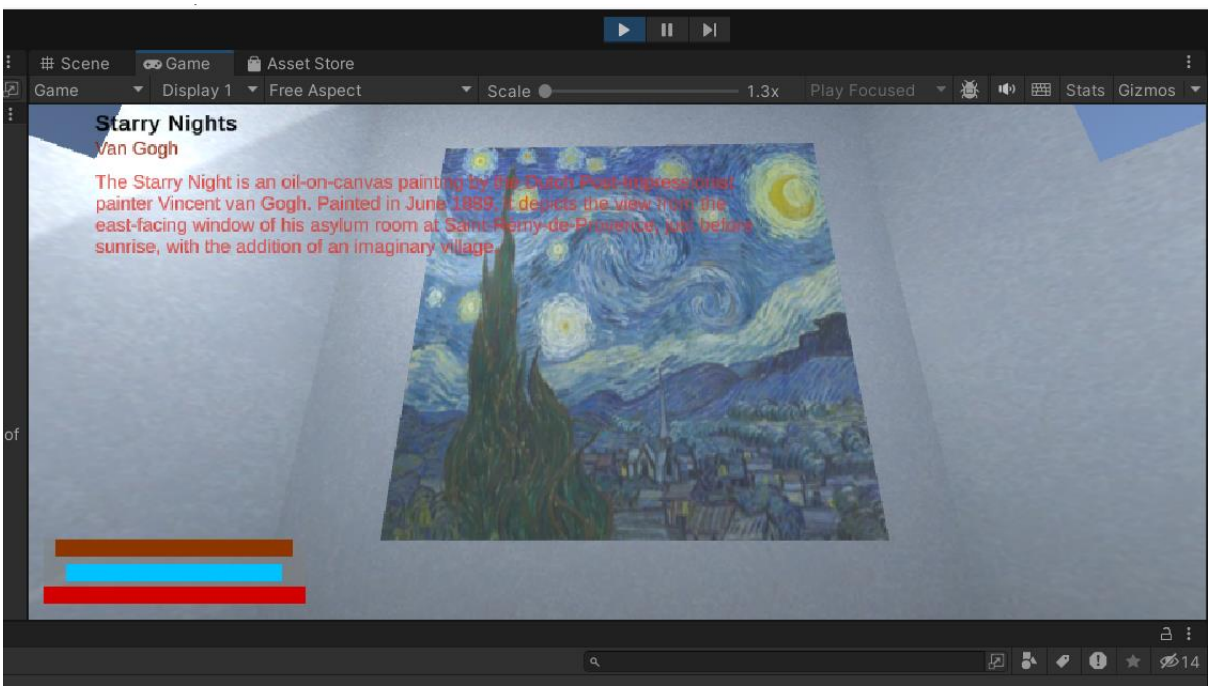
Materials
Models
Plugins
Scenes
Scripts
Textures
miniproject
Assets/Scripts/new_proximity.cs
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.UI;
using TMPro;
public class Proximity : MonoBehaviour
{
public string newTitle;
public string newAuthor;
public string newDesc;
private TextMeshProUGUI myTitle;
private TextMeshProUGUI myAuthor;
private TextMeshProUGUI myDesc;
private GameObject player;
private bool check;
// Start is called before the first frame update
void Start()
{
player = GameObject.FindWithTag("Player");
myTitle = GameObject.FindWithTag("ArtTitle").GetComponent<TextMeshProUGUI>();
myAuthor = GameObject.FindWithTag("Auth").GetComponent<TextMeshProUGUI>();
myDesc = GameObject.FindWithTag("Description").GetComponent<TextMeshProUGUI>();


Scene
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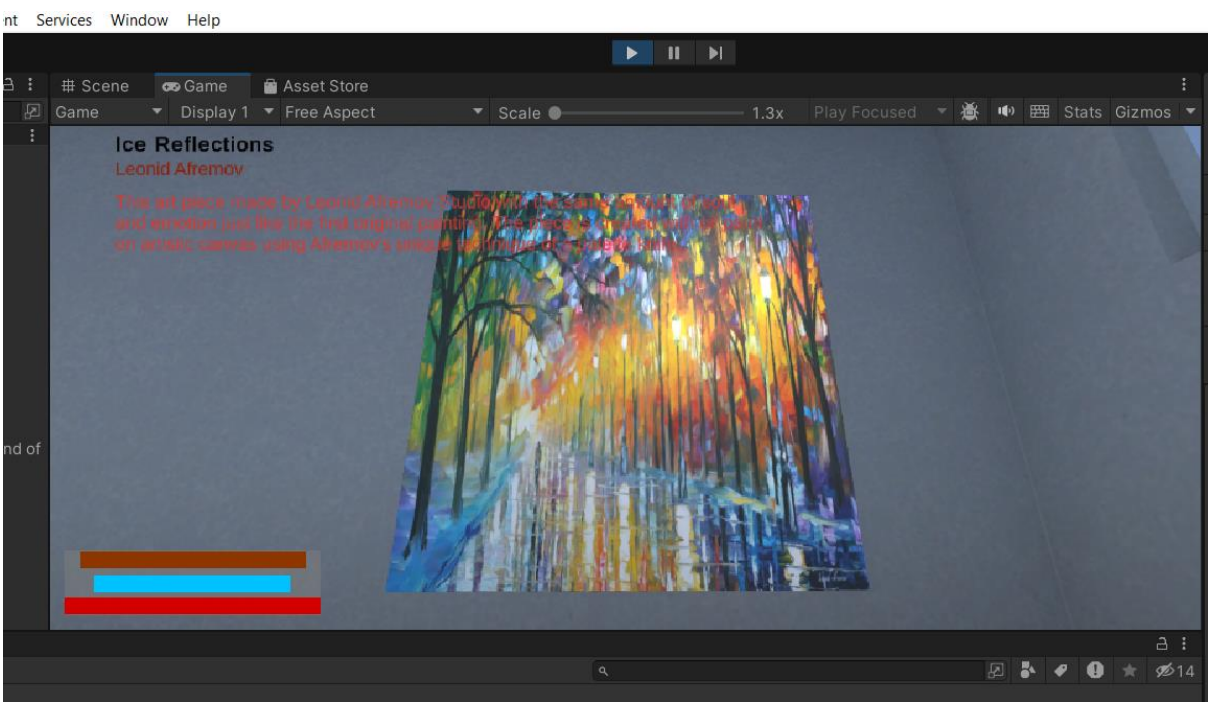
Play Focused
Stats
Gizmos
Starry Nights
Van Gogh
The Starry Night is an oil-on-canvas painting by the Dutch Post-Impressionist
painter Vincent van Gogh. Painted in June 1889, it depicts the view from the
east-facing window of his asylum room at Saint-Rémy-de-Provence, just before
sunrise, with the addition of an imaginary village.
14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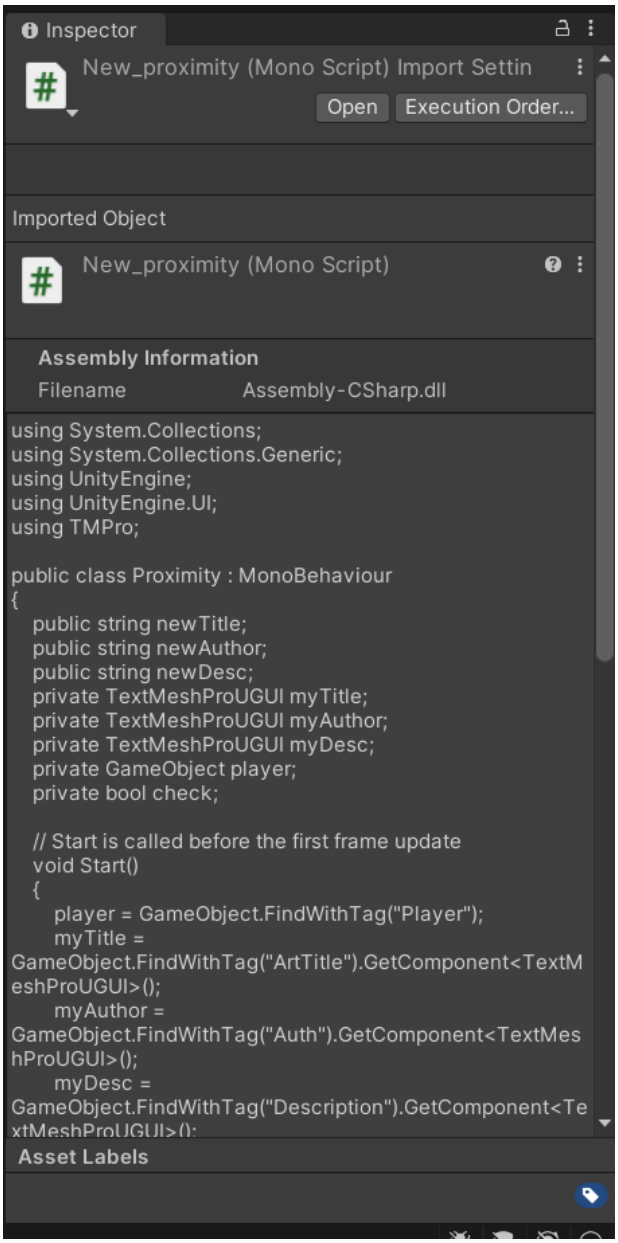
Inspector
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Assembly Information
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using System.Collections.Generic;
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using TMPro;
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myDesc =
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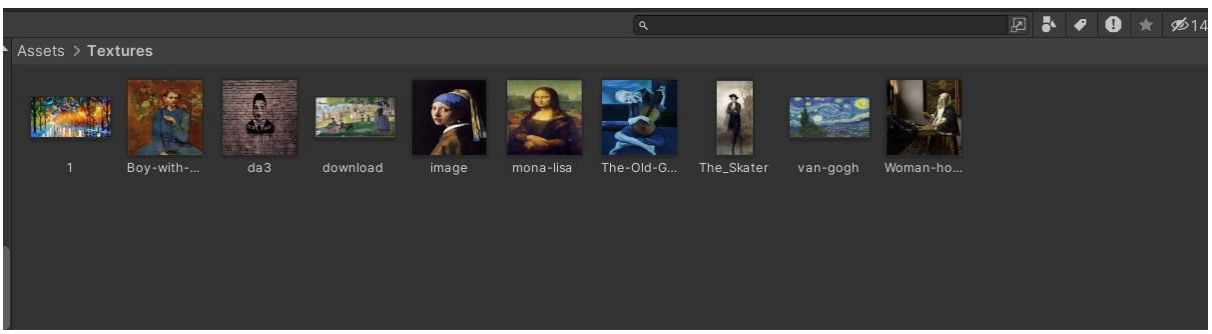
Assets > Textures
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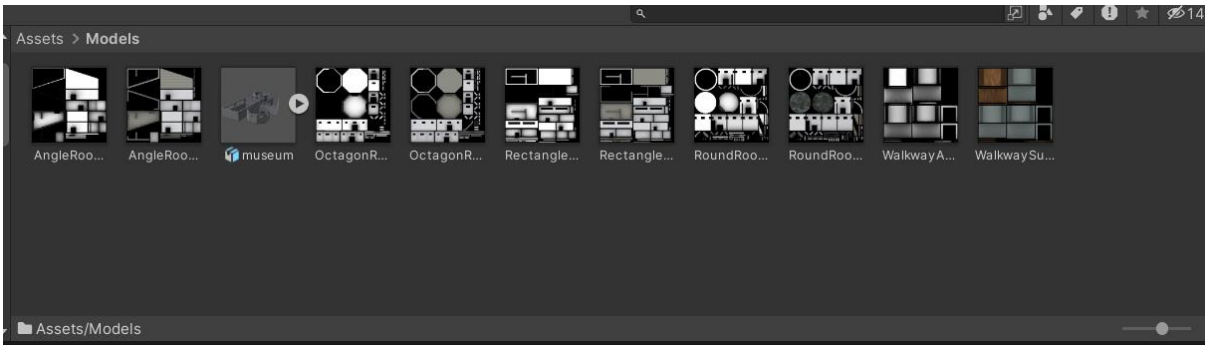
The_Skater
van-gogh
Woman-ho...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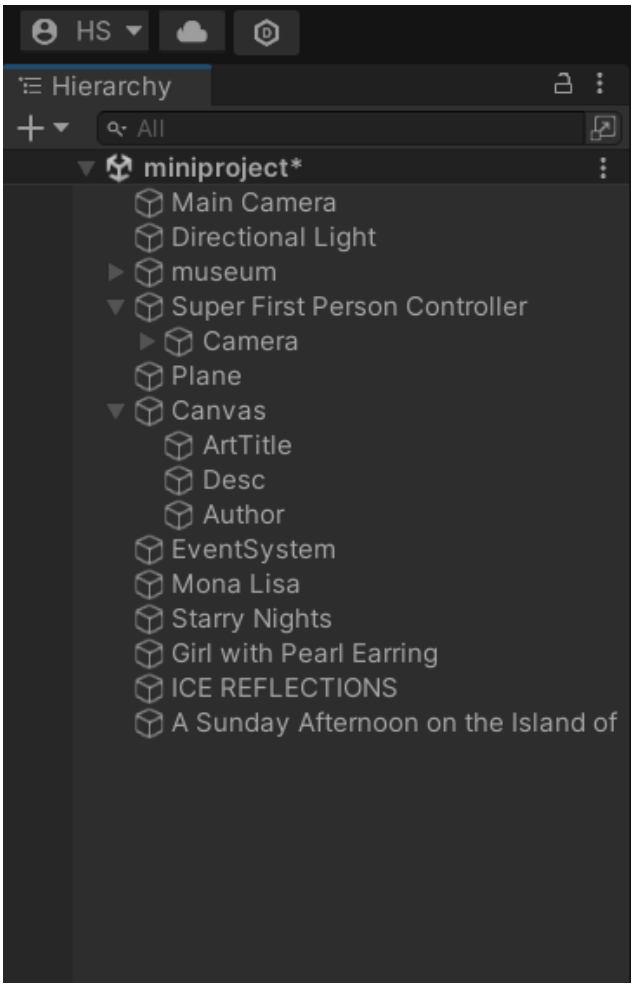
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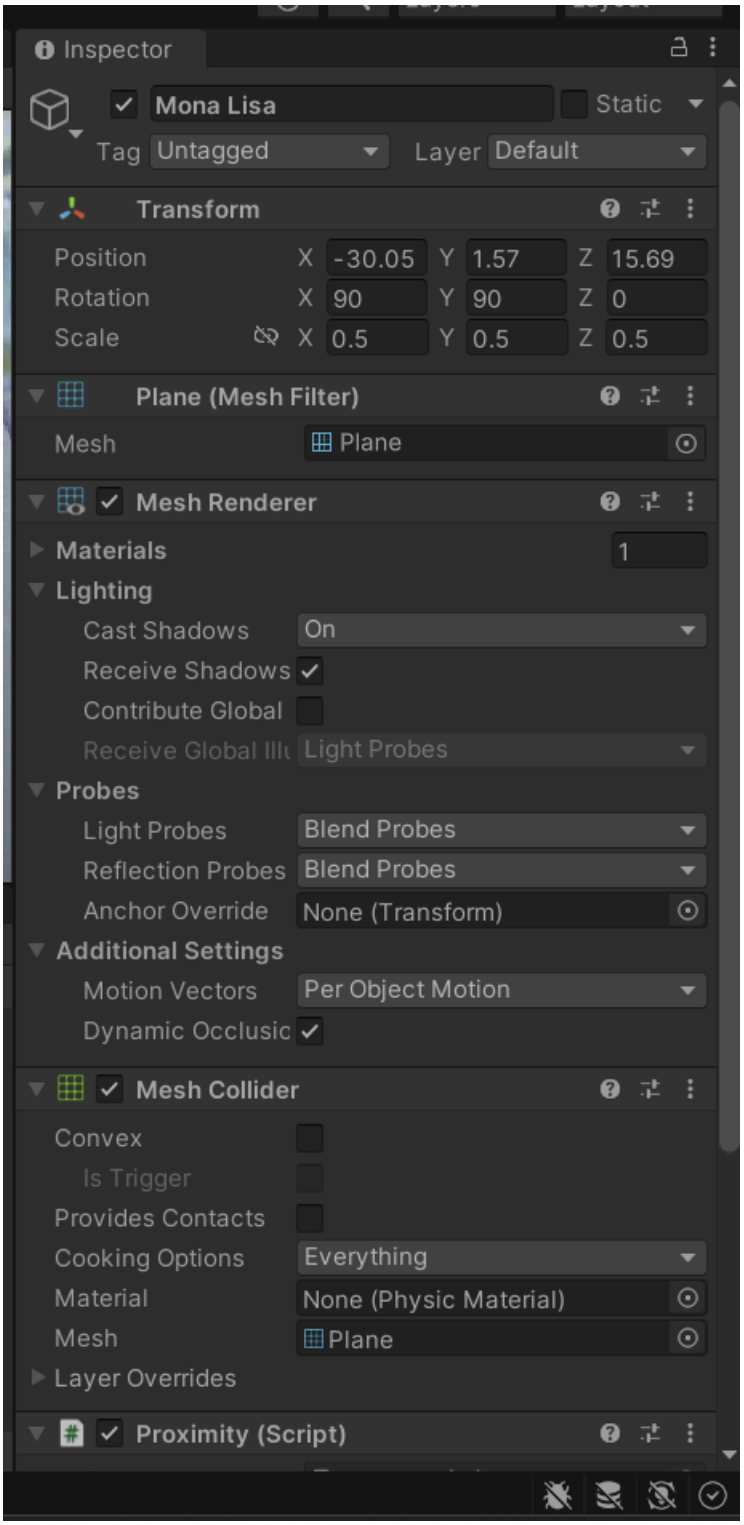
Inspector
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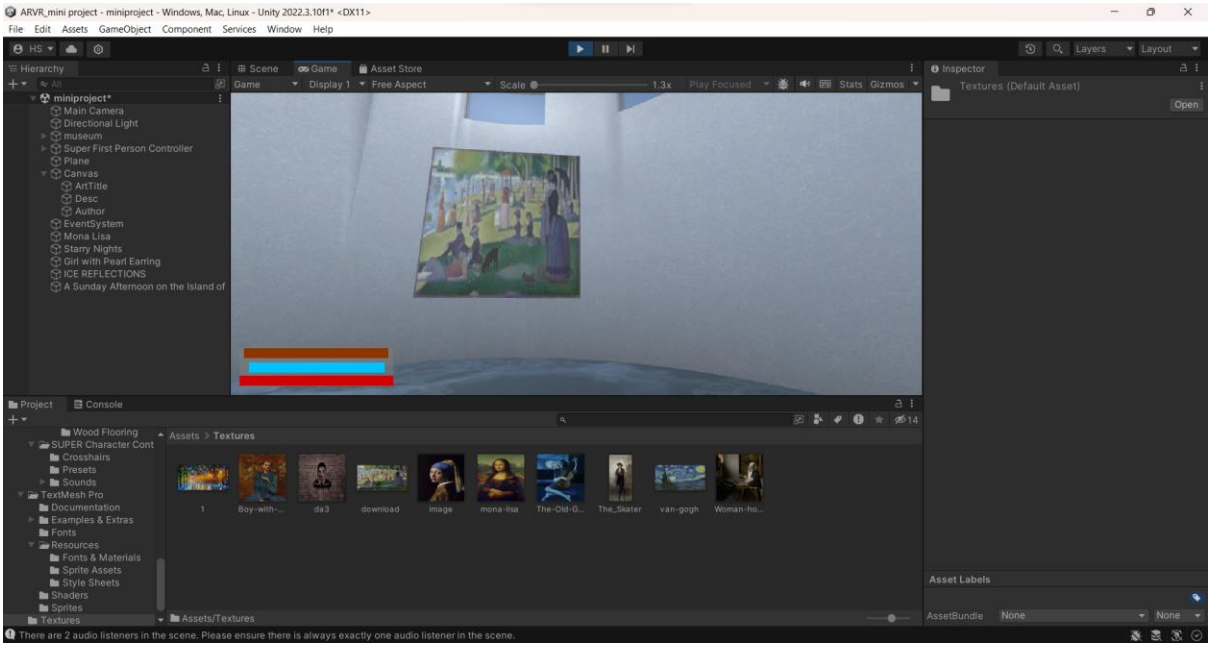
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The-Old-G...
The_Skater
van-gogh
Woman-ho...
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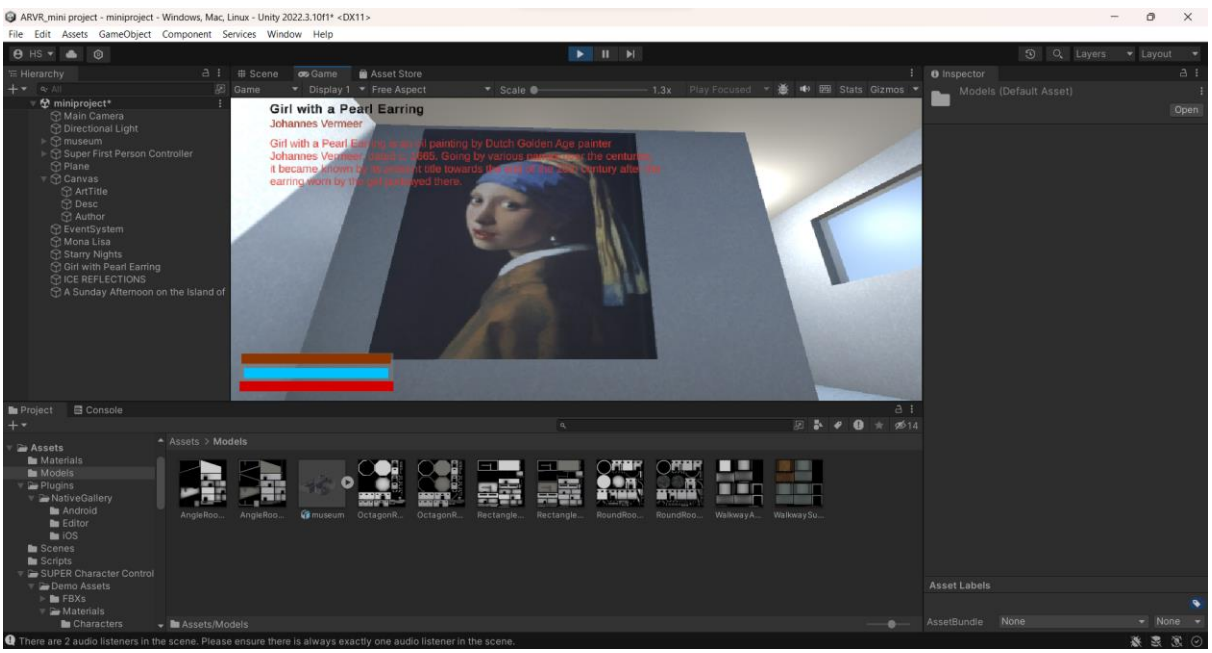
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RoundRoo...
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WalkwayA...
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Title
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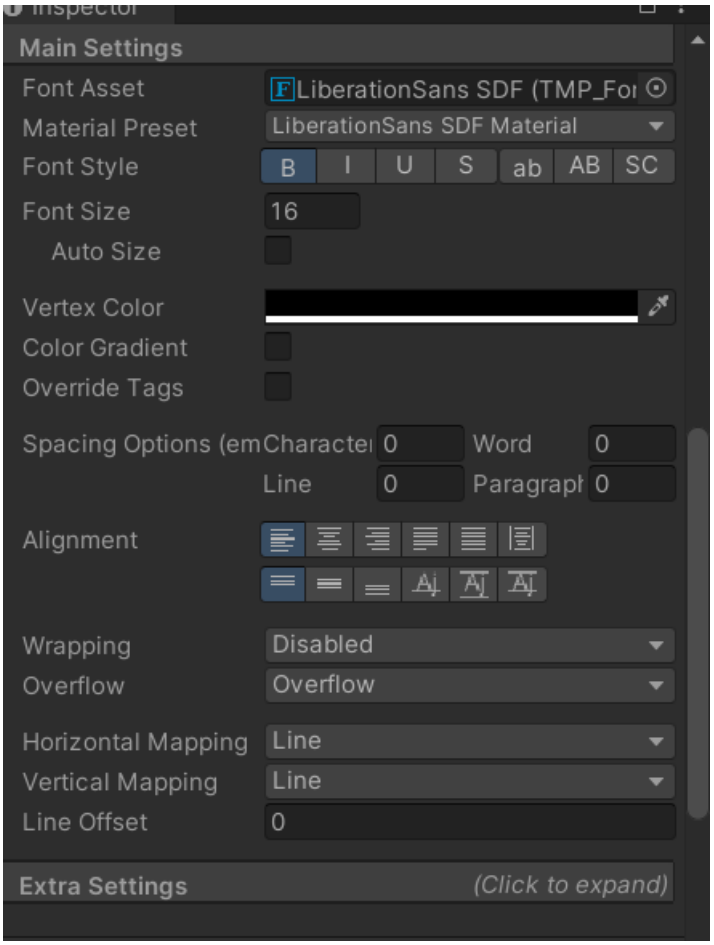
Description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Extra Settings
(Click to expand)