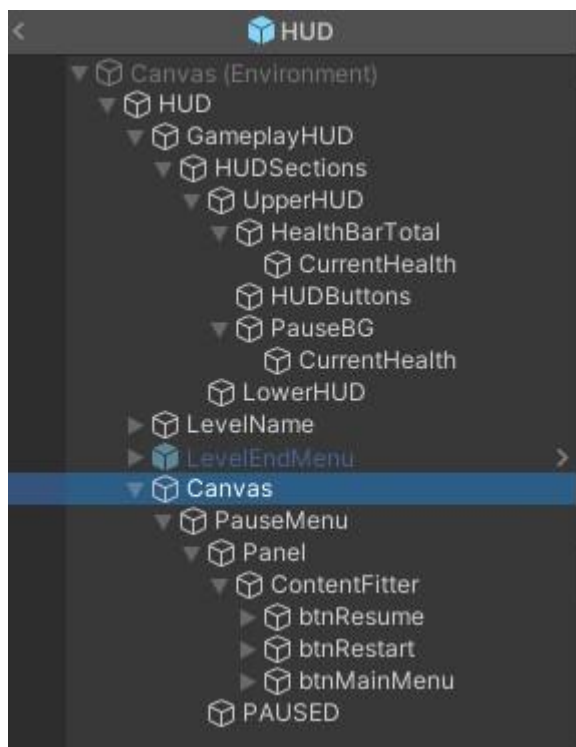


Sprint 01

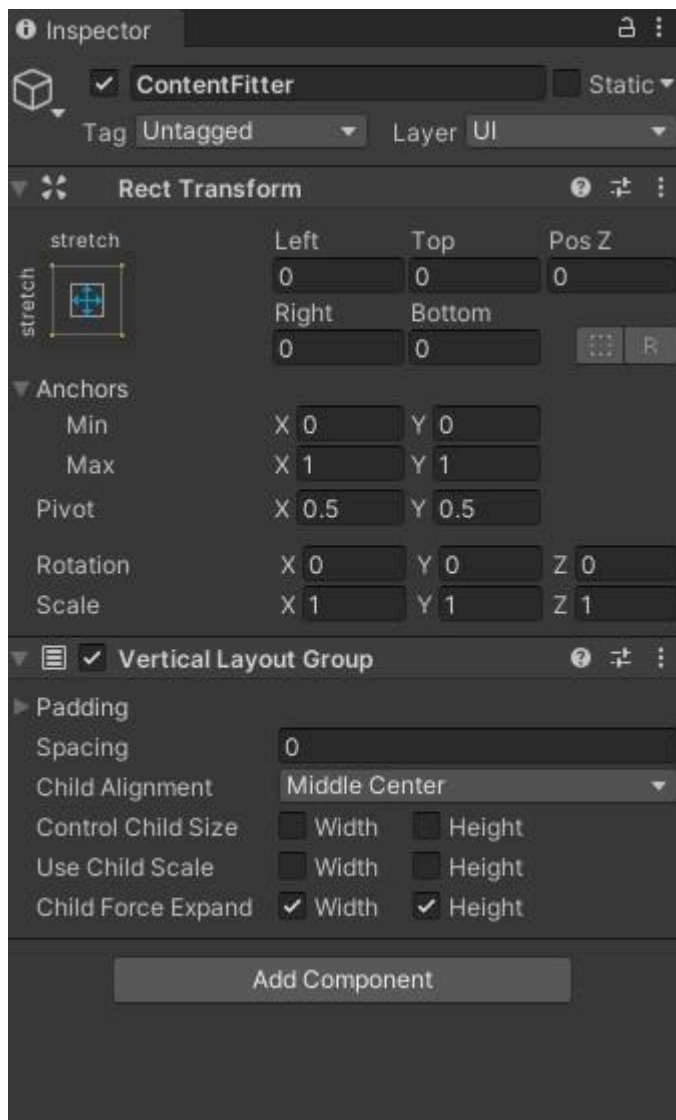
Assignment 01 : Pause Menu

Step 01: Setup

- First, I loaded up the project in Unity. Then loaded a Scene (**LevelThree**).
- Then I created a “Canvas” under the “HUD” GameObject.



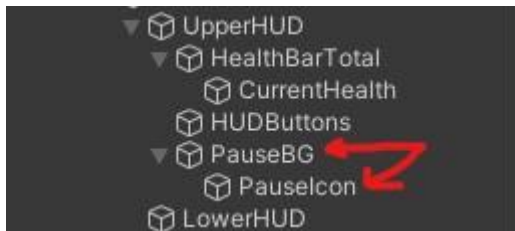
- Then I created a “Panel” and in that created an Empty GameObject.
- Then I created a button & duplicated it 2 times to create 3 in total.
- And added “Vertical Layout Group” component and aligned them properly.



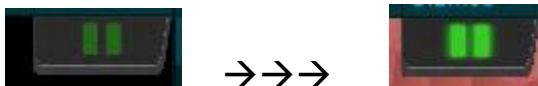
- Meanwhile I was setting the anchor points for each UI Component accordingly, so as it would fit properly.



- Then I duplicated the “*HealthBarTotal*” Component and replaced the textures/images with the Pause Button images and renamed them.

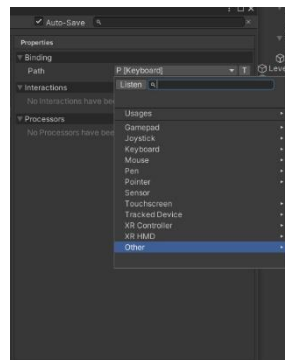
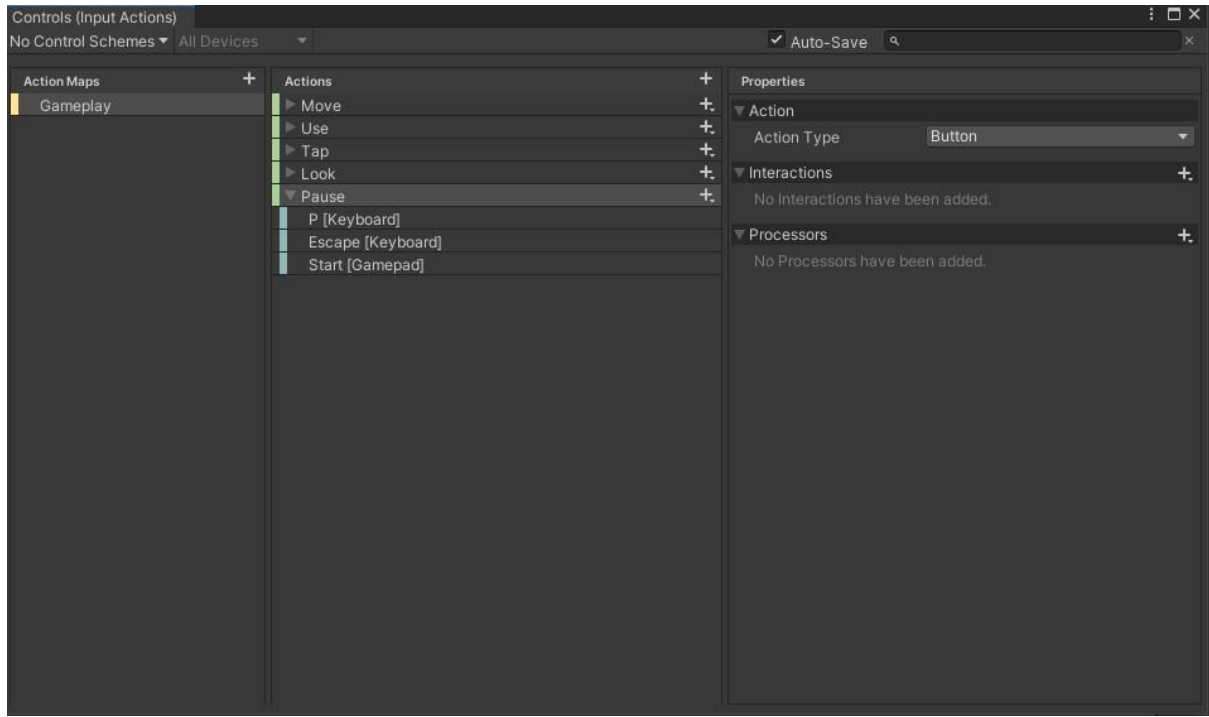


- I also added a Highlighter when the mouse pointer is rolled over the Pause Icon.

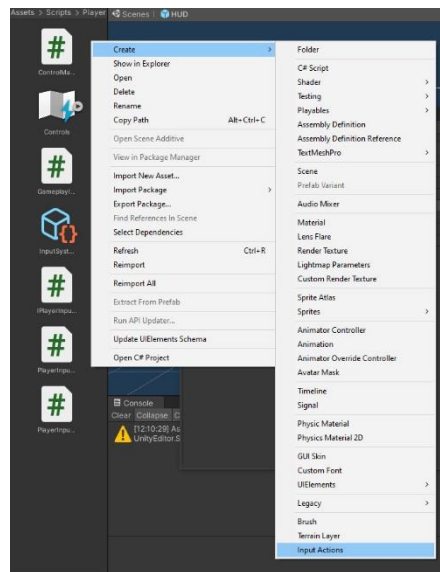


Step 02: Setting up Action Maps

- I created a new Action Key for “Pause” Inputs.
- I added the Keyboard as well as the Game Controller Inputs.



❖ Creating an Action Inputs.



- The “ControlMapping” Script is automatically generated as soon as you create an “Input Action”.

```
Assets > Scripts > Player > Input > ControlMapping.cs X
1 // GENERATED AUTOMATICALLY FROM 'Assets/Scripts/Player/Input/Controls.inputactions'
2
3 using System;
4 using System.Collections;
5 using System.Collections.Generic;
6 using UnityEngine.InputSystem;
7 using UnityEngine.InputSystem.Utilities;
8
9 7 references
10 public class @ControlMapping : IInputActionCollection, IDisposable
11 {
12     12 references
13     public InputActionAsset asset { get; }
14     1 reference
15     public @ControlMapping()
16     {
17         asset = InputActionAsset.FromJson(@"{
18             ""name"": ""Controls"",
19             ""maps"": [
20                 {
21                     ""name"": ""Gameplay"",
22                     ""id"": ""fe52b9dc-9152-4fad-9938-1234ef537c29"",
23                     ""actions"": [
24                         {
25                             ""name"": ""Move"",
26                             ""type"": ""Value"",
27                             ""id"": ""3ac0935c-90b0-40d6-8cea-e28c3d901720"",
28                             ""expectedControlType"": ""Vector2"",
29                             ""processors"": "",
30                             ""interactions"": """"
31                         },
32                         {
33                             ""name"": ""Use"",
34                             ""type"": ""Button"",
35                             ""id"": ""476325a6-5d15-4d52-8fb1-cba5073c2e71"",
36                             ""expectedControlType"": ""Button"",
37                             ""processors"": "",
38                             ""interactions"": """"
39                         }
40                     ]
41                 }
42             ]
43         });
44     }
45 }
```

ControlMapping Script

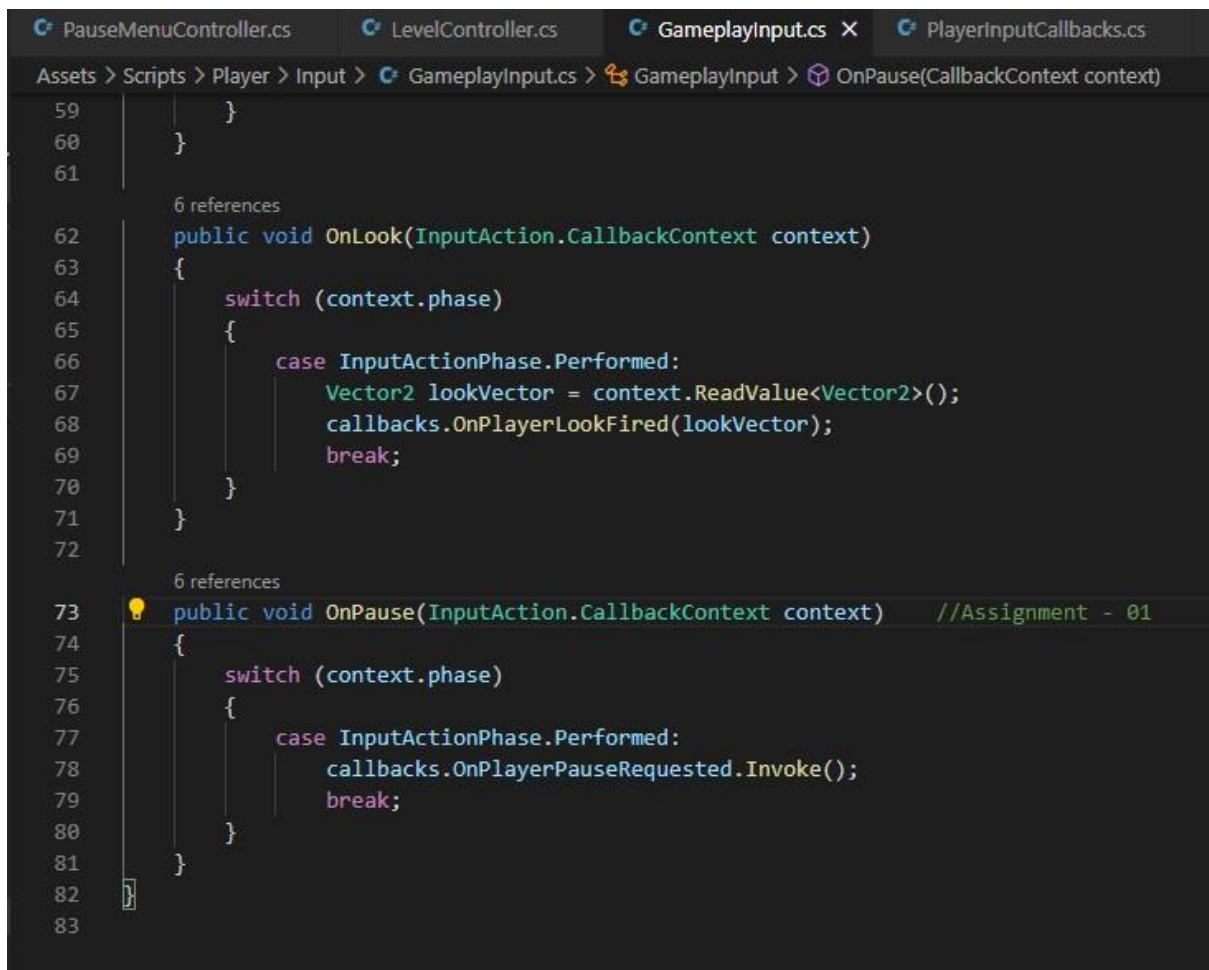
```
Assets > Scripts > Player > Input > ControlMapping.cs > ControlMapping > ControlMapping.IGameplayActions
387 |         @Pause.started += instance.OnPause;
388 |         @Pause.performed += instance.OnPause;
389 |         @Pause.canceled += instance.OnPause;
390 |     }
391 | }
392 |
393 | 3 references
    public GameplayActions @Gameplay => new GameplayActions(this);
394 | 3 references
    public interface IGameplayActions
395 | {
396 |     6 references
    void OnMove(InputAction.CallbackContext context);
397 |     6 references
    void OnUse(InputAction.CallbackContext context);
398 |     6 references
    void OnTap(InputAction.CallbackContext context);
399 |     6 references
    void OnLook(InputAction.CallbackContext context);
400 |     6 references
    void OnPause(InputAction.CallbackContext context);
401 | }
402 |
403 |
```

ControlMapping Script

- Then you need to manually set an *action event* for the *Key Input* you just created.
- In this Project, that thing is managed by creating a “*GameplayInput*” which calls the “*ControlMapping*” script using an *Interface* – “*IGameplayActions*”.

```
PauseMenuController.cs  LevelController.cs  GameplayInput.cs X  PlayerInputCallbacks.cs  PlayerInputBroadcaster.cs
Assets > Scripts > Player > Input > GameplayInput.cs > GameplayInput > GameplayInput(ControlMapping controlMapping, PlayerInputCallbacks call
1  using UnityEngine;
2  using UnityEngine.AI;
3  using UnityEngine.InputSystem;
   2 references
4  public class GameplayInput : ControlMapping.IGameplayActions
5  {
   3 references
6  |   private ControlMapping controlMapping;
   8 references
7  |   private PlayerInputCallbacks callbacks;
8  |
   1 reference
9  |   public GameplayInput(ControlMapping controlMapping,
10 |       PlayerInputCallbacks callbacks)
11 |   {
12 |       this.controlMapping = controlMapping;
13 |       this.callbacks = callbacks;
14 |       controlMapping.Gameplay.SetCallbacks(this);
15 |   }
16 |
   1 reference
17 |   public void Enable()
18 |   {
19 |       controlMapping.Gameplay.Enable();
20 |   }
21 |
   1 reference
22 |   public void Disable()
23 |   {
24 |       controlMapping.Gameplay.Disable();
25 |   }
26 |
   6 references
27 |   public void OnMove(InputAction.CallbackContext context)
28 |   {
29 |       Vector2 movementVector = context.ReadValue<Vector2>();
30 |   }
```

GameplayInput Script



```
59     }
60 }
61
62 6 references
63 public void OnLook(InputAction.CallbackContext context)
64 {
65     switch (context.phase)
66     {
67         case InputActionPhase.Performed:
68             Vector2 lookVector = context.ReadValue<Vector2>();
69             callbacks.OnPlayerLookFired(lookVector);
70             break;
71     }
72 }
73
74 6 references
75 public void OnPause(InputAction.CallbackContext context) //Assignment - 01
76 {
77     switch (context.phase)
78     {
79         case InputActionPhase.Performed:
80             callbacks.OnPlayerPauseRequested.Invoke();
81             break;
82     }
83 }
```

GameplayInput Script

- Then you need to create a Function Event in the “PlayerInput” script and call or invoke a delegate method.
- In this example, you need to invoke the “OnPlayerPauseRequested” delegate.
- OnPlayerPauseRequested is located in the “PlayerInputCallbacks” script.
- They are two delegates.


```
Assets > Scripts > Player > Input > PlayerInputCallbacks.cs > PlayerInputCallbacks
1  using System;
2  using UnityEngine;
3
4  11 references
5  public class PlayerInputCallbacks
6  |
7  | 5 references
8  |   public Action<Vector2> OnPlayerMoveFired = delegate { };
9  |   3 references
10 |   public Action<Vector2> OnPlayerLookFired = delegate { };
11 |
12 | 1 reference
13 |   public Action OnPlayerTapFired = delegate { };
14 |   1 reference
15 |   public Action OnPlayerTapReleased = delegate { };
16 |
17 | 2 references
18 |   public Action OnPlayerStartUseFired = delegate { };
19 |   1 reference
20 |   public Action OnPlayerEndUseFired = delegate { };
21 |
22 | 2 references
23 |   public Action OnPlayerPauseRequested = delegate { }; //Assignment - 01
24 |   1 reference
25 |   public Action OnPlayerResumeRequested = delegate { }; //Assignment - 01
26 |
27 |
28 |
29 |
```

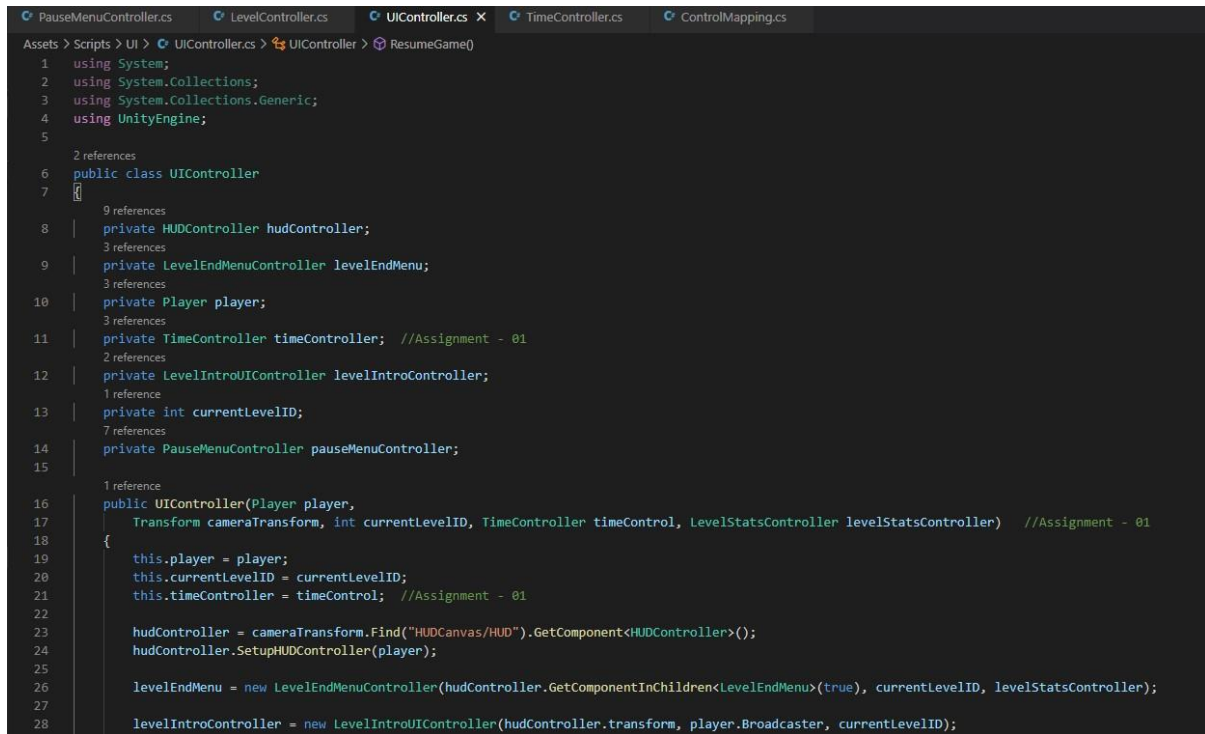
PlayerInputCallBacks Script

❖ Setting up the Pause Menu Code in Scripts.

- After adding Player Action Inputs, I added a reference of “TimeController” Script in the “LevelController”, and passed as a parameter in “UIController” script.

```
Assets > Scripts > Level > LevelController.cs > LevelController
1  using System;
2  using System.Collections;
3  using UnityEngine;
4  using UnityEngine.AI;
5
6  4 references
7  public class LevelController : MonoBehaviour
8
9      1 reference
10     public int levelID;
11     1 reference
12     public Action OnLoadComplete = delegate { };
13     1 reference
14     public Action<float> OnLevelComplete = delegate { };
15     0 references
16     public Action<Levels.Data> OnLevelLoadRequest = delegate { };
17     0 references
18     public Action OnExitRequest = delegate { };
19     0 references
20     public Action OnPickupCollected = delegate { };
21
22     5 references
23     private CameraController cameraController;
24     4 references
25     private UIController uiController;
26     14 references
27     private Player player;
28     2 references
29     private TimeController timecontroller; //Assignment - 01
30     4 references
31     private LevelStatsController levelStatsController;
32
33     0 references
34     public void Start()
35     {
36         LevelDependancies dependancies = GetComponentInChildren<LevelDependancies>();
37         if(dependancies == null)
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```

- Next, I added a reference of “*TimeController*” script in the “*UIController*” script too.
- Then passed the required 5th argument in the public *UIController*() function.
- And assignment the argument (timeControl) to timeController.



```

1  using System;
2  using System.Collections;
3  using System.Collections.Generic;
4  using UnityEngine;
5
6  2 references
7  public class UIController
8  {
9  9 references
10 | private HUDController hudController;
11 | 3 references
12 | private LevelEndMenuController levelEndMenu;
13 | 3 references
14 | private Player player;
15 | 3 references
16 | private TimeController timeController; //Assignment - 01
17 | 2 references
18 | private LevelIntroUIController levelIntroController;
19 | 1 reference
20 | private int currentLevelID;
21 | 7 references
22 | private PauseMenuController pauseMenuController;
23
24  1 reference
25  public UIController(Player player,
26 | Transform cameraTransform, int currentLevelID, TimeController timeControl, LevelStatsController levelStatsController) //Assignment - 01
27  {
28 | this.player = player;
29 | this.currentLevelID = currentLevelID;
30 | this.timeController = timeControl; //Assignment - 01
31
32 | hudController = cameraTransform.Find("HUDCanvas/HUD").GetComponent<HUDController>();
33 | hudController.SetupHUDController(player);
34
35 | levelEndMenu = new LevelEndMenuController(hudController.GetComponentInChildren<LevelEndMenu>(true), currentLevelID, levelStatsController);
36
37 | levelIntroController = new LevelIntroUIController(hudController.transform, player.Broadcaster, currentLevelID);

```

PauseMenuController Script

- Then again I set a reference to “*PauseMenuController*” Script.
- I called *PauseMenuController* script by calling it as a child object from the HUD (Parent) GameObject.
- Then I set Two Methods to Pause & Resume the Game, which would call up the “*TimeController*” script.
- I also called them in the “*OnLevelFailed*” & “*OnLevelCompleted*” methods.

```
Assets > Scripts > UI > UIController.cs > UIController > OnLevelFailed(string message)

76      1 reference
77      public void OnLevelFailed(string message)
78      {
79          levelEndMenu.Show(message, false);
80          PauseGame(); //Assignment - 01
81      }
82
83      1 reference
84      public void OnLevelComplete(string message)
85      {
86          levelEndMenu.Show(message, true);
87          PauseGame(); //Assignment - 01
88      }
89
90      1 reference
91      public void Update()
92      {
93          levelIntroController.Update();
94      }
95
96      4 references
97      private void PauseGame() //Assignment - 01
98      {
99          timeController.StopTime();
100      }
101
102      2 references
103      private void ResumeGame() //Assignment - 01
104      {
105          timeController.StartTime();
106      }
107  }
```

PauseMenuController Script

- Then I created two functions which would enable the required respective components/GameObjects **enable** or **disable** (Pause Menu & HUD).

```

PauseMenuController.cs  LevelController.cs  UIController.cs X  TimeController.cs  ControlMapping.cs
Assets > Scripts > UI > UIController.cs > UIController > PauseGame()
56
1 reference
57 private void ShowResume() //Assignment - 01
58 {
59     ResumeGame();
60
61     player.Broadcaster.EnableActions(ControlType.Gameplay);
62     hudController.ShowHUD();
63     pauseMenuController.Hide();
64     Debug.Log("Game Resumed - by function!");
65 }
66
1 reference
67 private void ShowPause() //Assignment - 01
68 {
69     PauseGame(); //Timescale = 0;
70
71     player.Broadcaster.EnableActions(ControlType.None);
72     hudController.HideHUD();
73     pauseMenuController.Show();
74     Debug.Log("Game Paused - by function!");
75 }
76

```

PauseMenuController Script

- Next, I passed two delegate functions and called them (or Invoked) them from the “PauseMenuController” script.

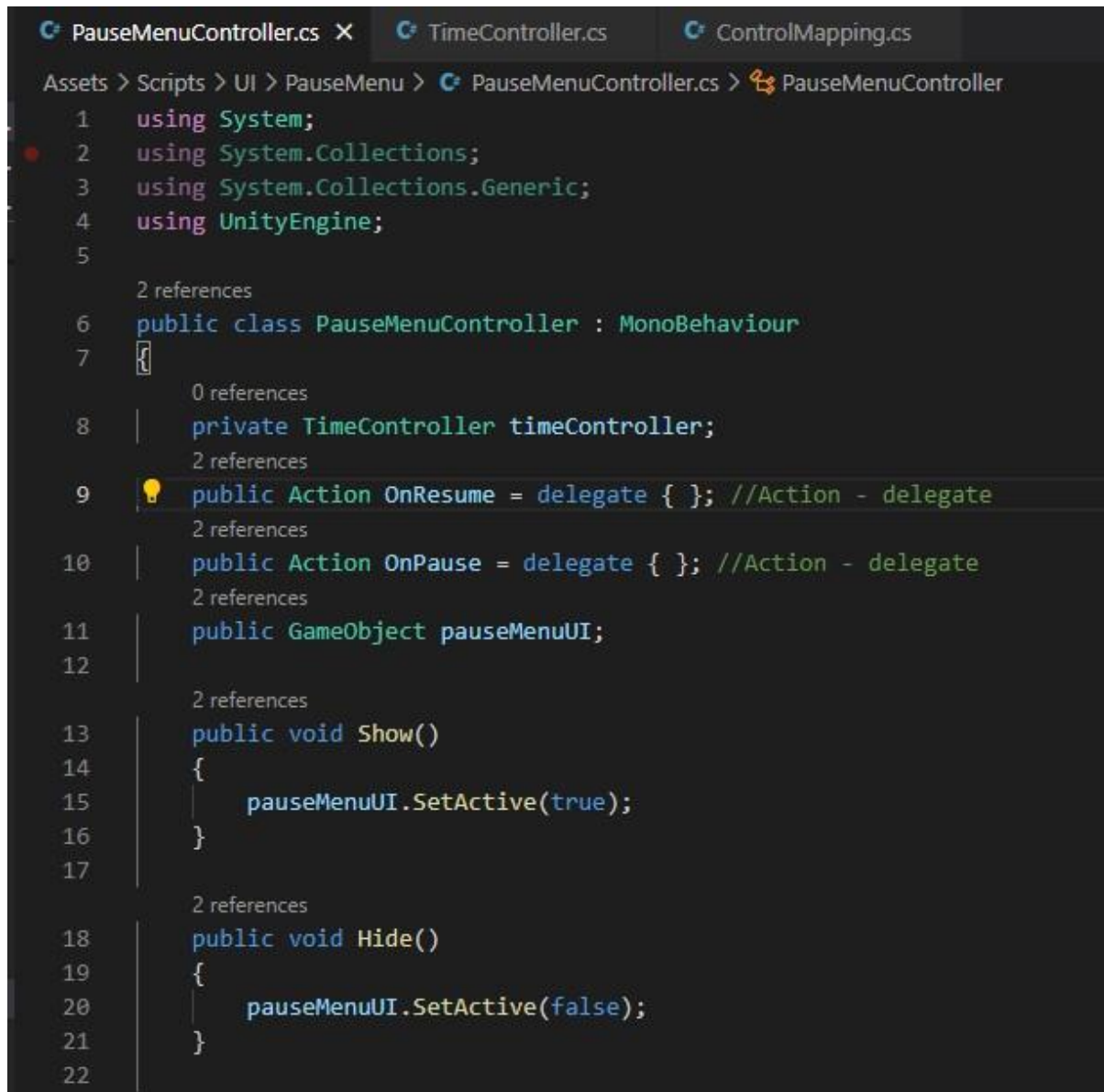
```

Assets > Scripts > UI > UIController.cs > UIController > UIController(Player player, Transform cameraTransform, int currentLevelID, TimeController timeControl, LevelStatsController levelStatsController)
26 levelEndMenu = new LevelEndMenuController(hudController.GetComponentInChildren<LevelEndMenu>(true), currentLevelID, levelStatsController);
27
28 levelIntroController = new LevelIntroUIController(hudController.transform, player.Broadcaster, currentLevelID);
29
30 pauseMenuController = hudController.GetComponentInChildren<PauseMenuController>(); //Assignment - 01
31
32 player.Broadcaster.Callbacks.OnPlayerPauseRequested += () => ShowPause(); //Assignment - 01
33 player.Broadcaster.Callbacks.OnPlayerResumeRequested += () => ShowResume(); //Assignment - 01
34
35 pauseMenuController.OnResume += () => //Assignment - 01
36 {
37     ResumeGame();
38
39     player.Broadcaster.EnableActions(ControlType.Gameplay);
40     hudController.ShowHUD();
41     pauseMenuController.Hide();
42     Debug.Log("Game Resumed - by delegate!");
43 };
44
45 pauseMenuController.OnPause += () => //Assignment - 01
46 {
47     PauseGame();
48
49     player.Broadcaster.EnableActions(ControlType.None);
50     hudController.HideHUD();
51     pauseMenuController.Show();
52     Debug.Log("Game Paused - by delegate!");
53 };
54
55
56

```

UIController Script

- In the “PauseMenuController” script, I created two “**action delegates**”.

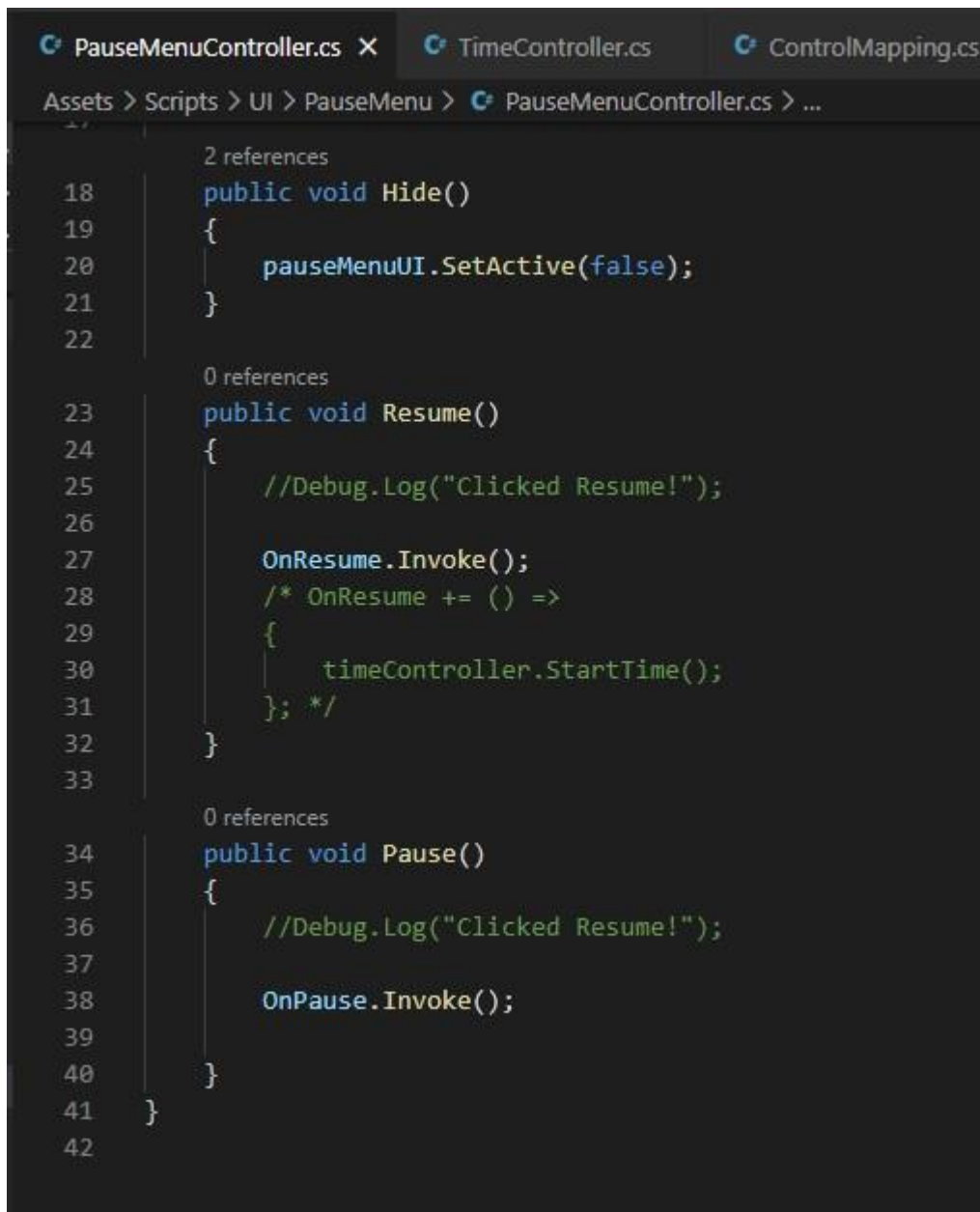


```
Assets > Scripts > UI > PauseMenu > PauseMenuController.cs > PauseMenuController

1  using System;
2  using System.Collections;
3  using System.Collections.Generic;
4  using UnityEngine;
5
6  2 references
7  public class PauseMenuController : MonoBehaviour
8  {
9      0 references
10     private TimeController timeController;
11     2 references
12     public Action OnResume = delegate { }; //Action - delegate
13     2 references
14     public Action OnPause = delegate { }; //Action - delegate
15     2 references
16     public GameObject pauseMenuUI;
17
18     2 references
19     public void Show()
20     {
21         pauseMenuUI.SetActive(true);
22     }
23
24     2 references
25     public void Hide()
26     {
27         pauseMenuUI.SetActive(false);
28     }
29 }
```

PauseMenuController Script

- Then I created two functions where I would Invoke these two delegate functions.



```
Assets > Scripts > UI > PauseMenu > PauseMenuController.cs > ...

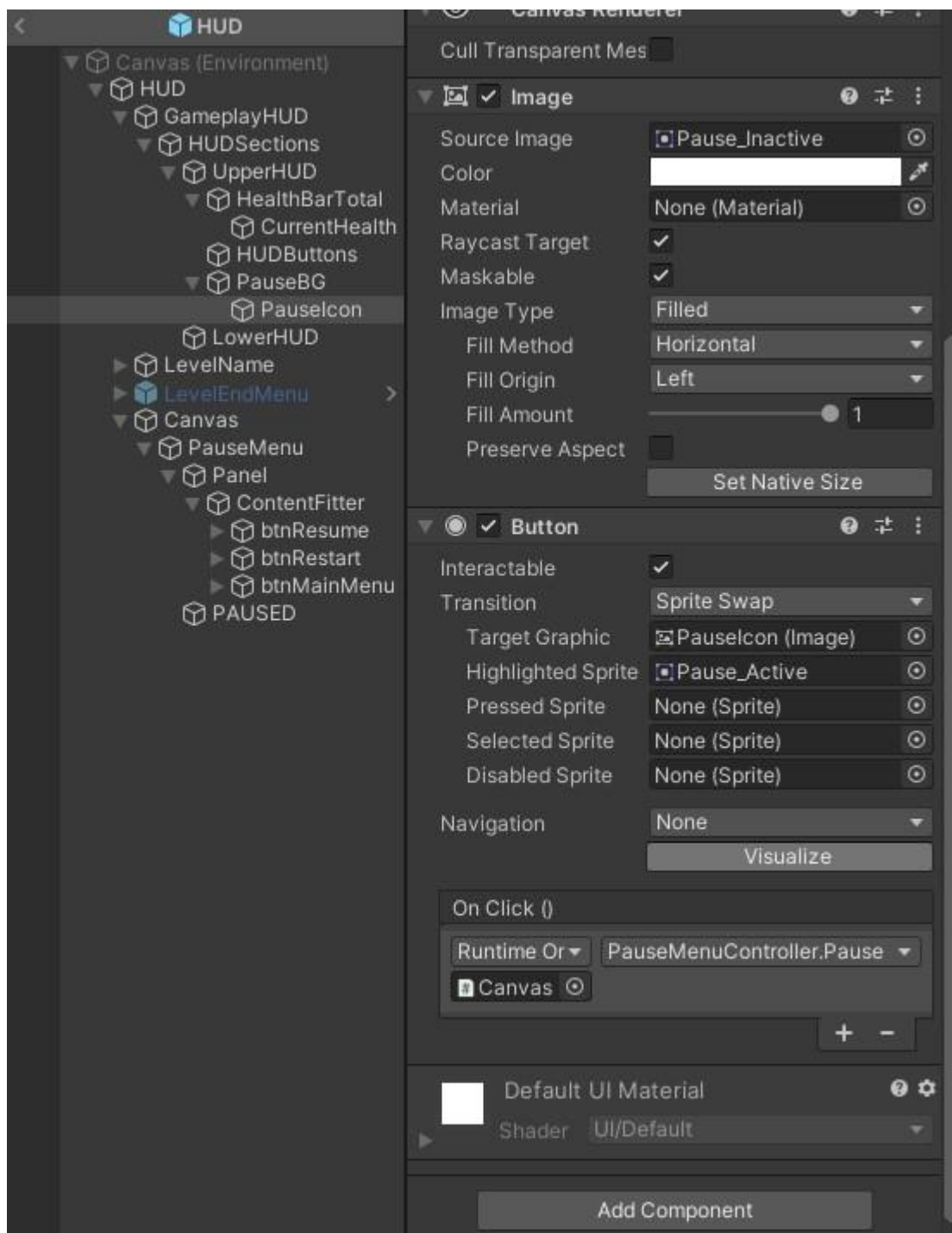
2 references
18 public void Hide()
19 {
20     pauseMenuUI.SetActive(false);
21 }
22

0 references
23 public void Resume()
24 {
25     //Debug.Log("Clicked Resume!");
26
27     OnResume.Invoke();
28     /* OnResume += () =>
29     {
30         timeController.StartTime();
31     }; */
32 }
33

0 references
34 public void Pause()
35 {
36     //Debug.Log("Clicked Resume!");
37
38     OnPause.Invoke();
39 }
40 }
41 }
42
```

PauseMenuController Script

- I did this so as to make the “**Resume**” and the “**Pause**” buttons work.
- I linked the Function to the Buttons by using Unity’s Event System Interface, i.e., **OnClick()** Interface from the Inspector.

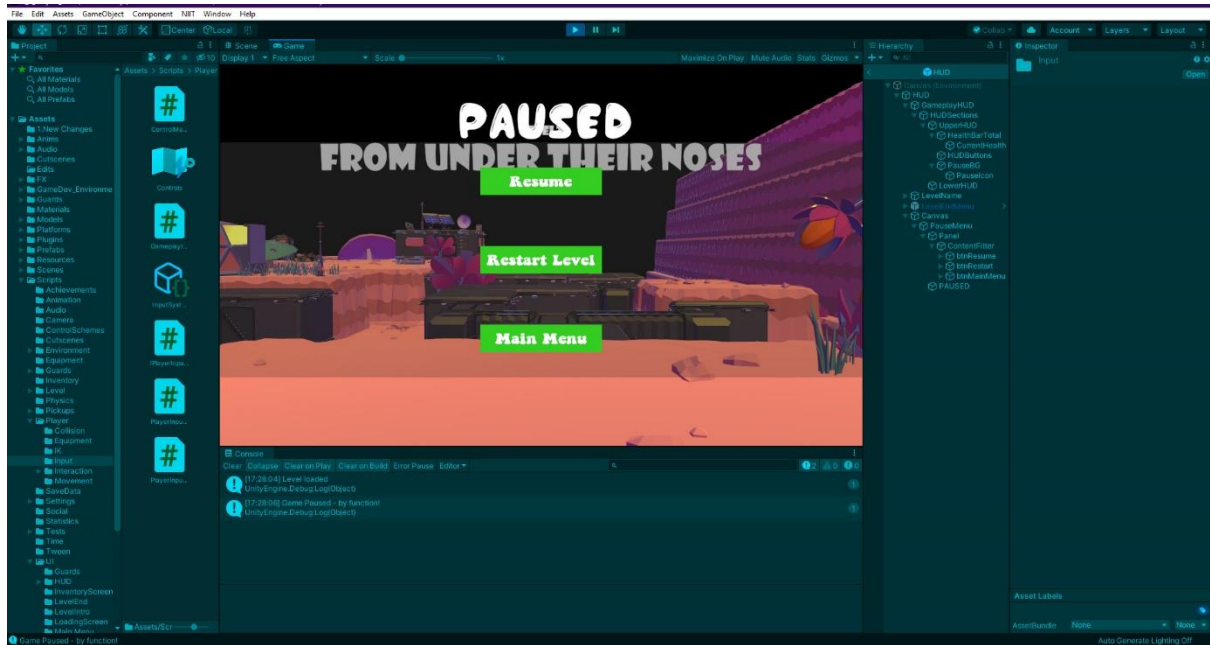


Pause Icon (Button)

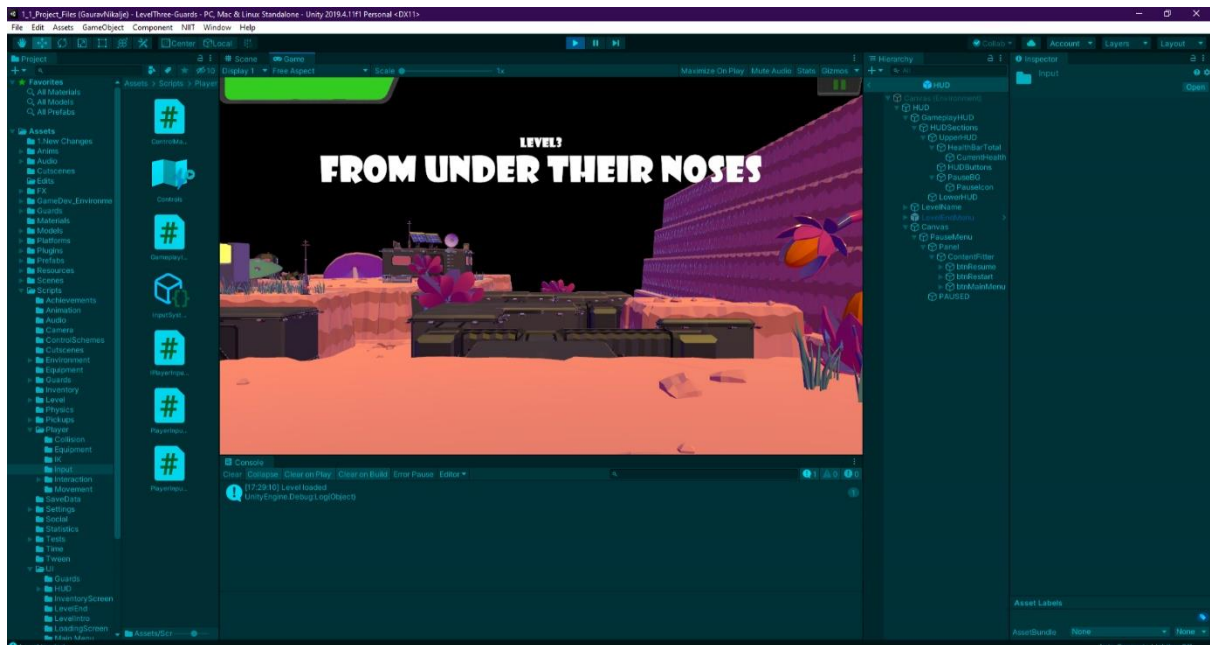


Resume Button

❖ Final Result.



Game Paused



Game Resumed

Step 03: What have I learnt

- **Explain what a canvas is, the process of setting up a canvas and the different settings available.**

- Canvas is the basic UI Amoebic.
- It is the most basic UI element that needs to be created before you add any UI components like buttons, images, TextMeshPro, etc...
- It is on this component that you add the other UI Object.
- You can also add the UI components without using canvas, but it won't fit/align according to the Screen or UI.

- **What does manipulating Time.timeScale do? Why is it useful when implementing pausing?**

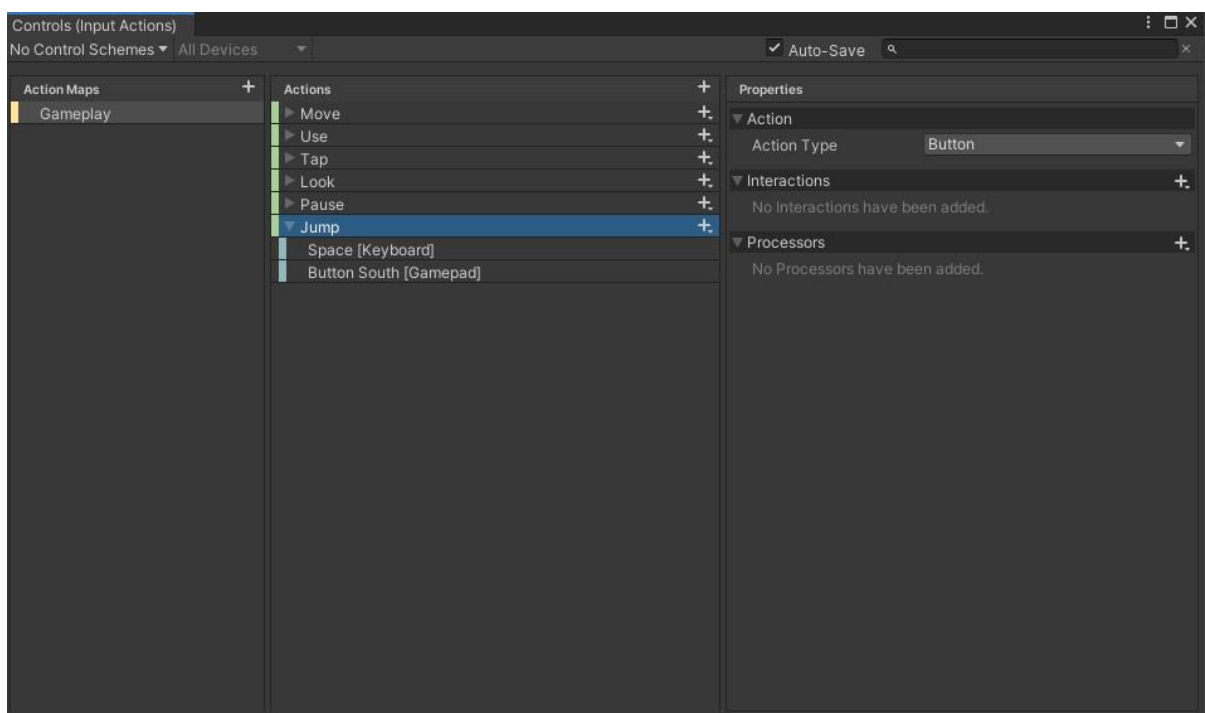
- Manipulating Time.timeScale changes the Time.deltaTime value.
- As it is multiplied with Time.deltaTime i.e.,
- If Time.timeScale is set to value "1f" then the game runs in normal mode.
 - As $Time.deltaTime * Time.timeScale = Time.deltaTime * 1 = Time.deltaTime$ (value).
- If Time.timeScale is set to value "0f" then the game stops or is paused.
 - As $Time.deltaTime * Time.timeScale = Time.deltaTime * 0 = 0$.
- It is also used to add slow motion effects.

- **What is a VerticalLayoutGroup? Give a use case for when this component could be useful.**

- It is an UI Component or attribute which helps to align the UI Elements properly.
- With proper spacing and alignment.
- **Spacing:** Helps to create spaces between UI elements
- **Padding:** Helps to leave space from Left, Right, Top & Bottom.
- **Child Alignment:** Help align the UI Elements. (as Centre, Top, Bottom, Left, Right) Similar to “Rect Transform’s Alignment”. (Anchor Presets)
- The rest three options are used to change the sizes of the child elements/components.

- **Give a step-by-step guide of adding a new Input Action for jump. You don't have to implement jump code. Just create and call a function "Jump" in the PlayerController.**

- First, I created an Action Map Key in the “*Input Actions*” (*Controls*) and assigned it both the “*Keyboard*” as well as the “*Video Game Controller*” button or key. i.e., “*Spacebar*” & “*South*” Button.



- Then I declared its execution in the “*GameplayInputs*” script, with the “***OnJump()***” function.
- In it, I Invoked the “*OnPlayerRequestedJump*” delegate function, which prints a message into the Console - “***Jump!***”

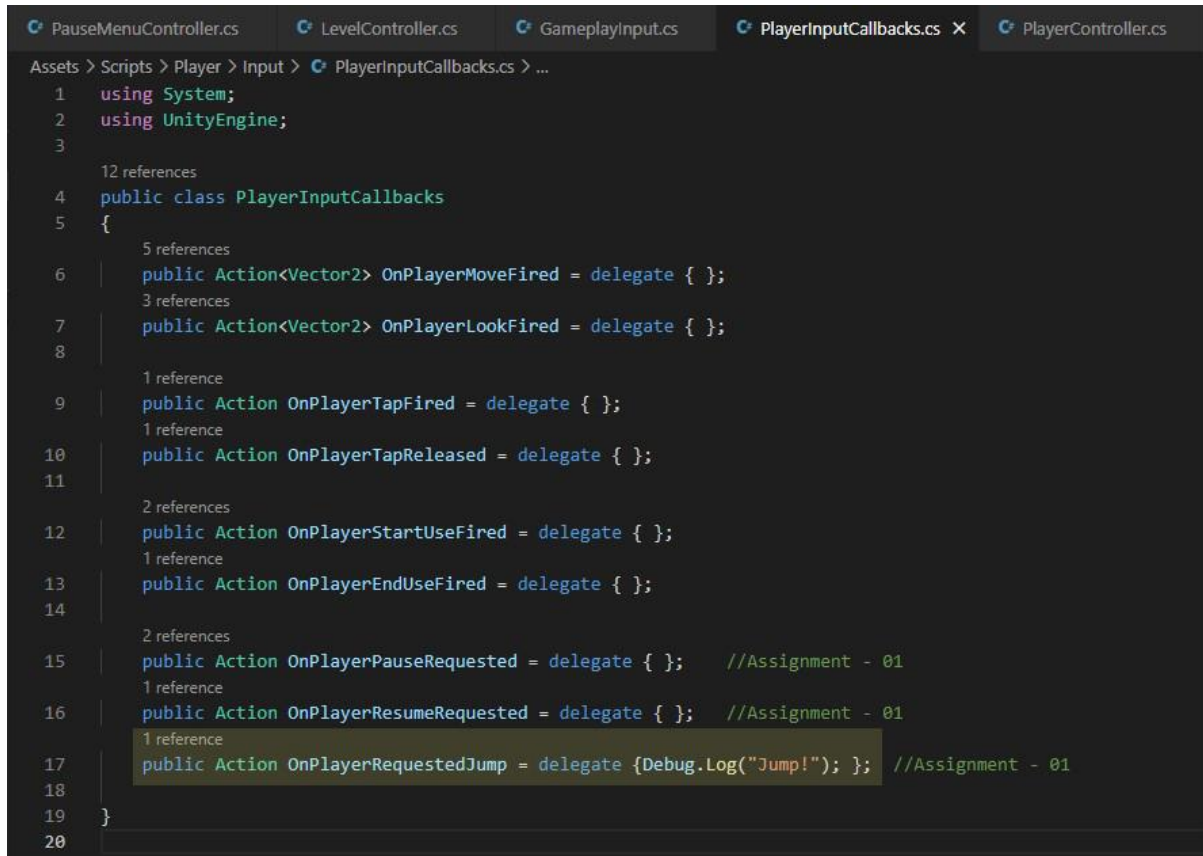
```

65     {
66         case InputActionPhase.Performed:
67             Vector2 lookVector = context.ReadValue<Vector2>();
68             callbacks.OnPlayerLookFired(lookVector);
69             break;
70     }
71 }
72
73 6 references
74 public void OnPause(InputAction.CallbackContext context) //Assignment - 01
75 {
76     switch (context.phase)
77     {
78         case InputActionPhase.Performed:
79             callbacks.OnPlayerPauseRequested.Invoke();
80             break;
81     }
82 }
83
84 6 references
85 public void OnJump(InputAction.CallbackContext context) //Assignment - 01
86 {
87     switch(context.phase)
88     {
89         case InputActionPhase.Performed:
90             callbacks.OnPlayerRequestedJump?.Invoke();
91             break;
92     }
93 }

```

GameplayInput Script

- I created this delegate function in the “*PlayerInputCallbacks*” script.
- I added a “***Debug.Log***” method that prints the message.



```
Assets > Scripts > Player > Input > PlayerInputCallbacks.cs > ...
1  using System;
2  using UnityEngine;
3
4  12 references
5  public class PlayerInputCallbacks
6  {
7      5 references
8      public Action<Vector2> OnPlayerMoveFired = delegate { };
9      3 references
10     public Action<Vector2> OnPlayerLookFired = delegate { };
11
12     1 reference
13     public Action OnPlayerTapFired = delegate { };
14     1 reference
15     public Action OnPlayerTapReleased = delegate { };
16
17     2 references
18     public Action OnPlayerStartUseFired = delegate { };
19     1 reference
20     public Action OnPlayerEndUseFired = delegate { };
21
22     2 references
23     public Action OnPlayerPauseRequested = delegate { }; //Assignment - 01
24     1 reference
25     public Action OnPlayerResumeRequested = delegate { }; //Assignment - 01
26     1 reference
27     public Action OnPlayerRequestedJump = delegate {Debug.Log("Jump!"); }; //Assignment - 01
28 }
29
30
```

PlayerInputCallbacks Script

-----THE END-----