EXPERIMENT 1

Objective : The aim of this experiment is to develop a basic 3D interactive environment where a spherical or cylindrical object can move, jump, collide with other objects, and interact with elements like planes and cubes. The object should also change color upon reaching different levels and have the ability to shoot at cubes.

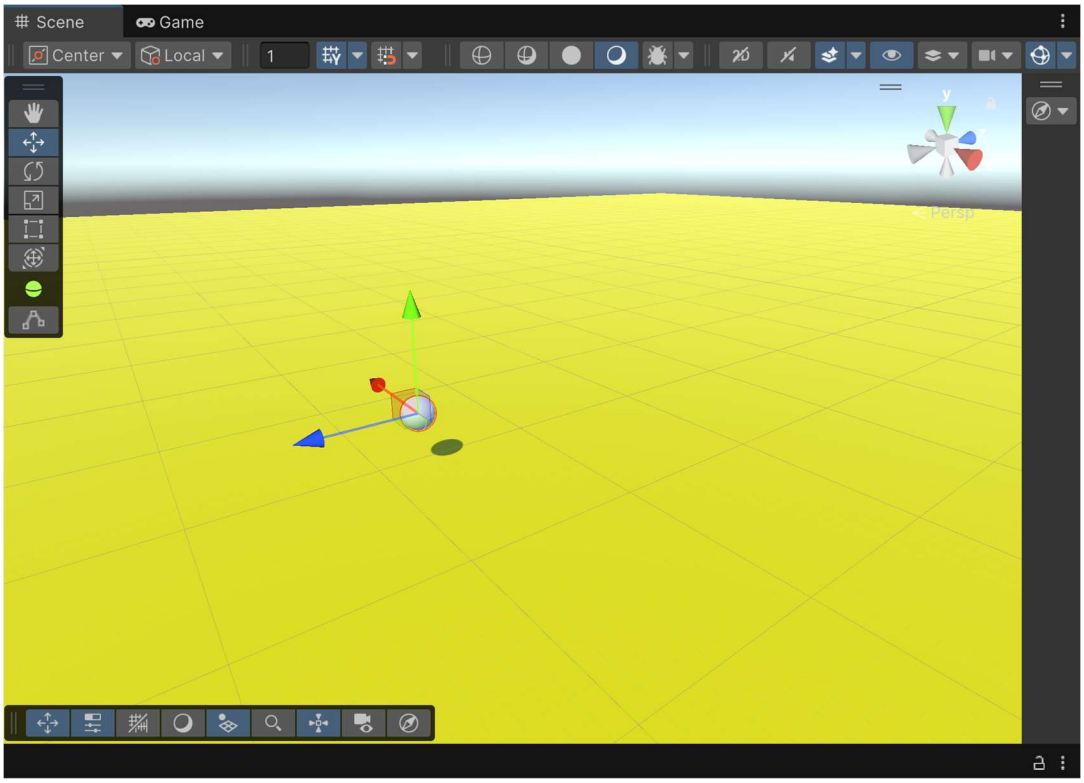
Procedure :

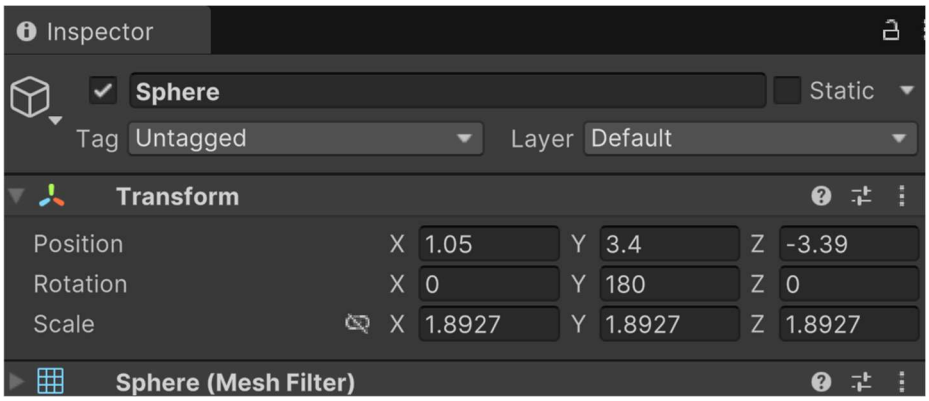
Step 1:

- A Plane was added to the Unity scene to serve as the base.
- The Directional Light was adjusted to provide proper illumination, ensuring a well-lit environment.
- The Main Camera was repositioned and rotated to provide a clear view of the entire scene. The view was adjusted to ensure all objects were visible either at the center or off to the side.

Step 2:

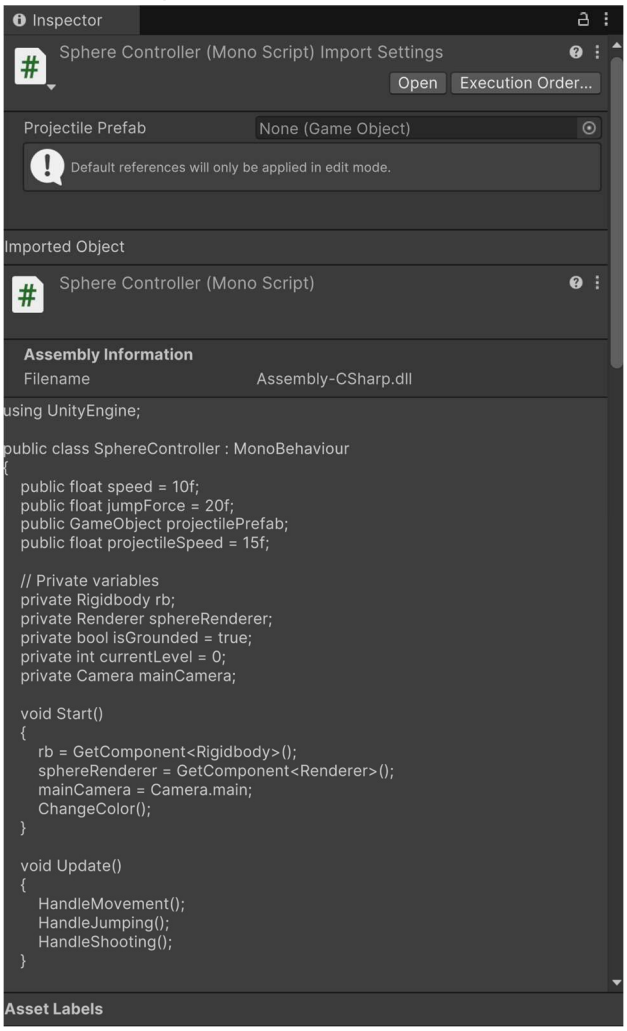
- Sphere was added to the scene at appropriate coordinates so that it lies above the plane (1.05, 3.4, -3.39)





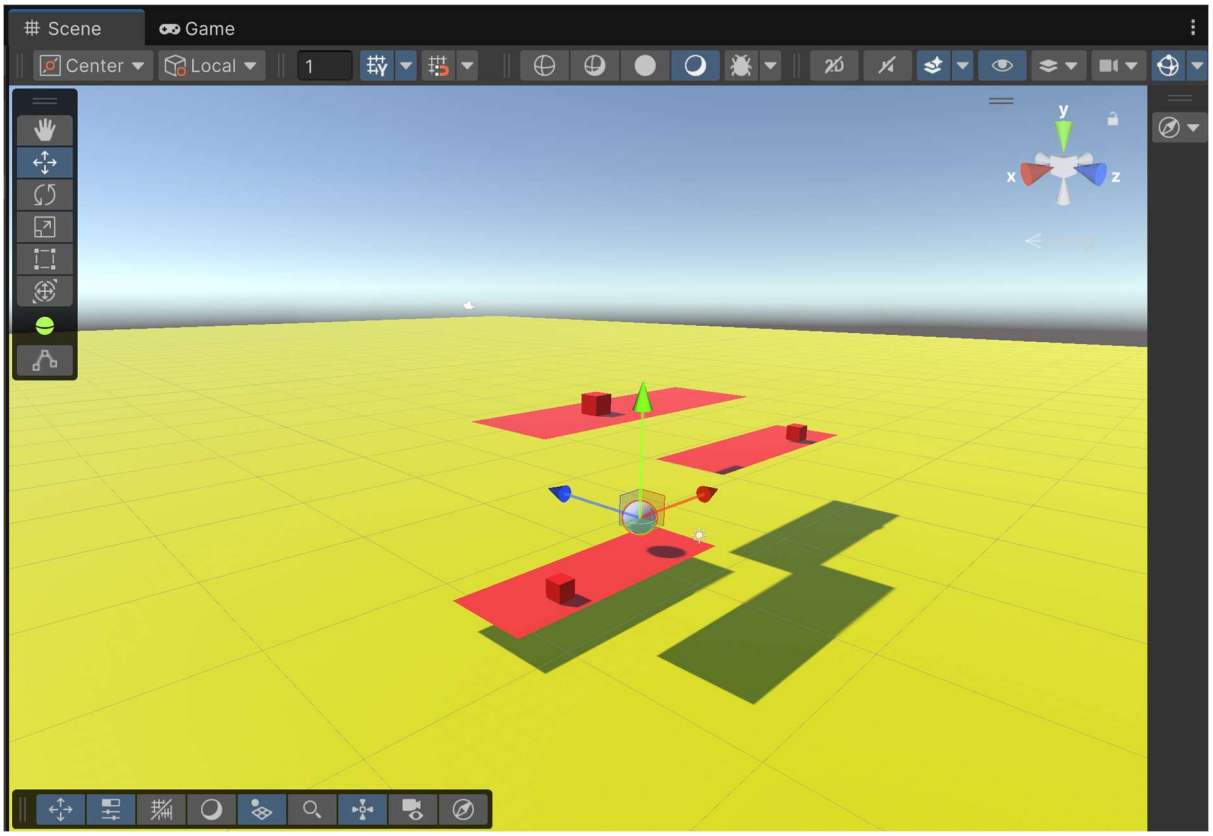
Step 3:

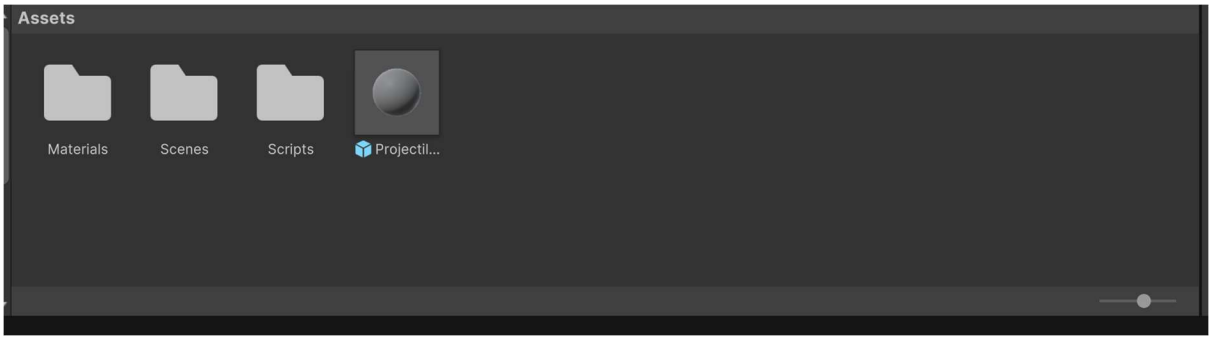
- Created a C# script named "SphereController" and attached it to the player sphere. The script implements:
    - WASD/Arrow key movement
    - Space bar jumping mechanics
    - Colour change functionality
    - Mouse-based shooting system
    - Collision detection with platforms



Step 4:

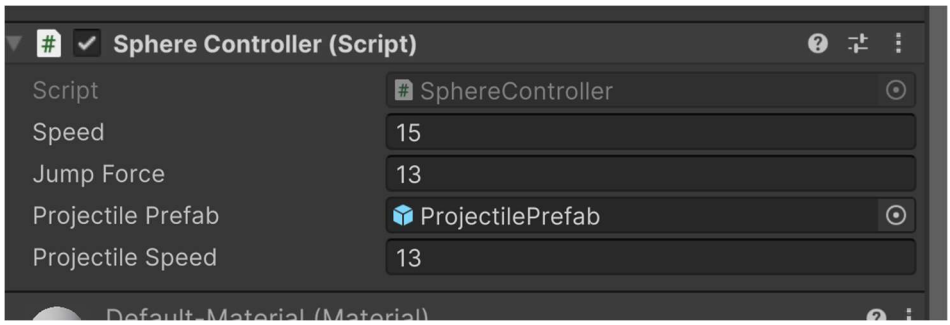
- Multiple platforms were created at the below positions
    - First level: (5, 1.49, -3)
    - Second level: (-10.4, 5.85, -3)
    - Third level: (4.18, 10.4, -2)
- For implementing shooting mechanism, cubes were added to the scene
- Created prefab for the sphere and dragged this sphere from Hierarchy to the Project window.





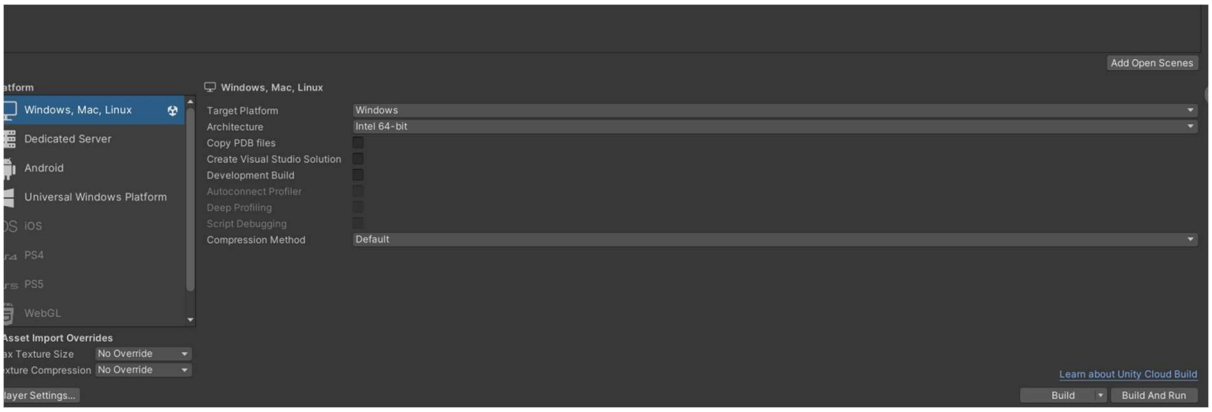
Step 5:

- Implemented shooting mechanics in the controller script.
    - When the player clicks:
        - The script detects the left mouse button click (Input.GetMouseButtonDown(0))
        - Gets mouse position using Camera.main.ScreenPointToRay(Input.mousePosition)
        - Creates a raycast to determine target point in 3D space.
    - Projectile creation and movement:
        - Instantiates projectile prefab slightly in front of player
        - Calculates direction from spawn point to target and applies force to projectile using AddForce
        - Projectile travels through space using physics and can collide with cubes and other objects
        - It eventually gets destroyed after a few seconds.
    - Implemented two colour change systems:
        - Sphere color changes: Triggers when touching a new platform
        - Uses random colour generation
        - Platform colour changes: Changes platform colour upon player(sphere) contact.
- Adjusted movement speed to 15 for better gameplay feel.



Step 6:

- Clicked "Build", created a "Windows Build" folder, and let Unity build the executable.



And the experiment completed with this.

Recorded Video

A video of the scene has been recorded and attached.

Conclusion:

This experiment successfully demonstrated movement mechanics, collision handling, level progression with visual cues, and interactive shooting functionality in a 3D environment. Future improvements could include adding animations, sound effects, and more complex level designs for an enhanced user expe