

Title: Motion of object and interaction with static object.

EXPERIMENT NO: 3

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Aim: To create a Unity script for motion of object and interaction with static object.

Description/Concept:

In this experiment, a player cube with a Rigidbody and BoxCollider component is used to demonstrate basic physics interactions and movement control in Unity. Initially, the cube is allowed to fall under gravity until it touches the ground or any other collider, detected via collision events.

Once the cube lands, it automatically moves forward at a specified speed using Rigidbody velocity. The forward movement continues until the cube collides with any wall or another object, upon which the cube's velocity is set to zero, stopping the movement immediately.

The script uses OnCollisionEnter to detect when the cube has landed (to start moving) and when it hits any obstacle (to stop moving). Rigidbody constraints are optionally used to freeze the cube after stopping preventing any unintended sliding.

This setup demonstrates essential game mechanics like physics-based falling, automatic movement, and collision-triggered stopping.

Program/Coding:

```
using UnityEngine;

public class AutoForwardNoGravity : MonoBehaviour
{
    public float speed = 5f;
    private Rigidbody rb;
    private bool stopMoving = false;

    void Start()
    {
```

```

        rb = GetComponent<Rigidbody>();
        rb.useGravity = false; // Disable gravity
        rb.linearVelocity = transform.forward * speed;
    }

    void FixedUpdate()
    {
        if (!stopMoving)
        {
            rb.linearVelocity = transform.forward * speed;
        }
        else
        {
            rb.linearVelocity = Vector3.zero;
        }
    }

    void OnCollisionEnter(Collision collision)
    {
        if (collision.gameObject.tag == "Floor")
            return;

        stopMoving = true;
        rb.linearVelocity = Vector3.zero;

        Debug.Log("Ball stopped: collided with " + collision.gameObject.name +
            "; Speed = 0");
    }
}

```

Output:

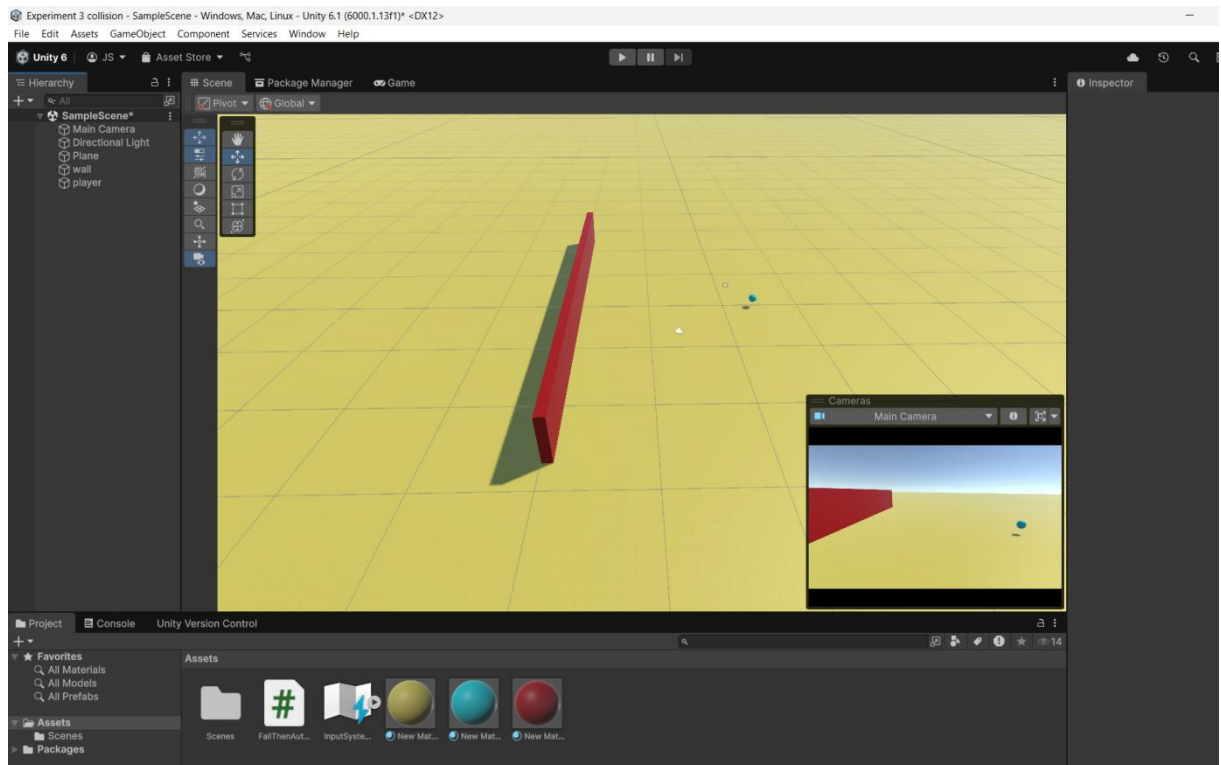
When the scene starts, the player cube falls downward naturally under Unity's gravity.

Upon landing on the ground or any object, the cube begins to move forward automatically at the predefined speed.

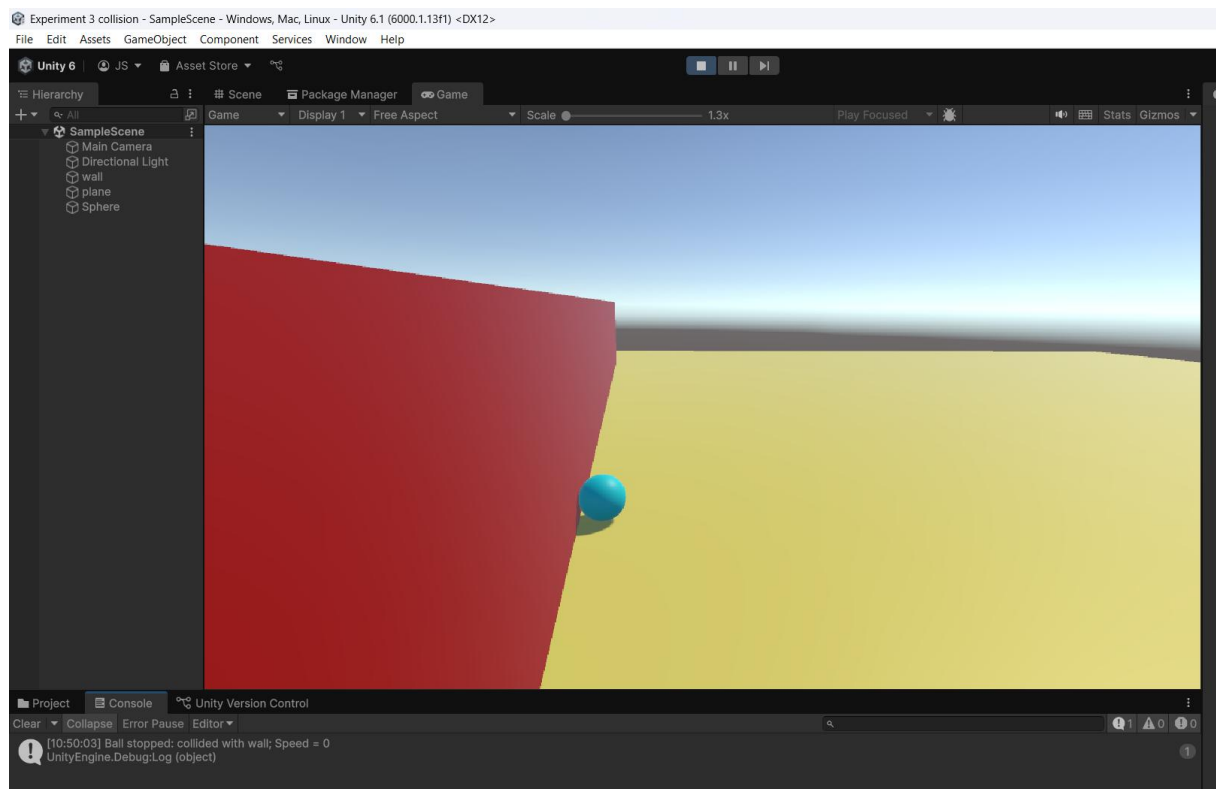
When the cube collides with a wall or any other obstacle, it immediately stops moving and

remains stationary.

The cube should not slide or move unintentionally after stopping.



AFTER:



Conclusion:

The experiment effectively demonstrated the use of Unity's physics engine to control an object's movement through scripting. By combining Rigidbody components and collision detection events, the cube was able to fall under gravity, start automatic forward movement upon landing, and stop immediately when colliding with obstacles. This shows how game objects can be programmed for realistic interactions and controlled behaviors in a 3D environment. The use of Rigidbody constraints ensured stability by preventing unintended motion post-collision. This foundational approach is essential for developing interactive and responsive gameplay mechanics in Unity.

Result:

Script was created for motion of object and interaction with static object were successfully implemented and tested in Unity Game Engine 6.1 Their application in game mechanics was understood through coding and console outputs.