Assignment No. 4

# Submitted by:

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**Title:** Develop a scene in Unity that includes game objects such as a cube, sphere and plane. Apply transformations on these 3 game objects, add a video and audio source and apply Rigid body component, Material and Box collider to the game objects. Write a program to control game objects.

**Aim:** To understand the features of Unity to develop a scene and apply Rigid body component, Material and Box collider to the game objects.

# Theory:

**Key Components for Scene Creation in Unity**

When building scenes in Unity, several essential components define the physical properties and behaviors of objects. These components play a crucial role in simulating realistic interactions, physics, and visual appearances, making scenes more immersive and interactive. Three commonly used components in scene creation are the **Rigidbody, Material, and Box Collider**.

**1. Rigidbody Component**

The Rigidbody component enables physics-based movement and interactions for GameObjects. Adding a Rigidbody allows objects to respond to forces and collisions realistically, simulating real-world physics such as gravity, velocity, and mass.

* **Gravity:** When enabled, gravity affects the GameObject, causing it to fall or remain stationary based on its surroundings.
* **Mass:** Determines how much force is required to move the object. Heavier objects need more force to accelerate.
* **Drag:** Simulates air resistance; linear drag slows movement, while angular drag reduces rotational speed.
* **Collision Detection:** Interacts with colliders to define object behavior upon impact, such as bouncing, sliding, or stopping.
* **Kinematic Rigidbody:** When enabled, the object is controlled via scripts rather than the physics engine, useful for precise movements without external forces.

**2. Material Component**

The Material component defines a GameObject’s visual appearance, determining how it interacts with light and contributing to the overall aesthetics of the scene.

* **Shader:** Controls how light interacts with the object’s surface. Unity provides built-in shaders like Standard, Unlit, and Skybox for different visual effects.
* **Texture:** Images applied to materials add detail and realism, such as reflections, transparency, and surface patterns.
* **Color:** Allows developers to change the base color of an object, used for tinting textures or creating solid-colored surfaces.
* **Additional Properties:** Features like metallic, smoothness, normal maps, and emission influence how light is reflected, create surface details, and simulate glowing effects.

**3. Box Collider Component**

The Box Collider component defines a rectangular collision boundary around a GameObject, enabling interactions with other objects in the scene.

* **Collision Detection:** Detects when objects collide, essential for mechanics like stopping a character at a wall or registering an object hitting the ground.
* **Size and Center:** Can be adjusted to fit the shape of the GameObject for precise collision detection.
* **Is Trigger:** When enabled, the collider acts as a trigger, detecting when objects enter or exit its boundary without blocking them. Useful for invisible barriers, event triggers, and pass-through objects.
* **Collision Layers:** Allows selective interaction between objects, improving performance and enabling specific gameplay mechanics.

**Conclusion**

In summary, Unity provides powerful components to develop immersive scenes. By applying **Rigidbody, Material, and Box Collider**, developers can enhance GameObjects with physics-based interactions, realistic visual appearances, and precise collision detection. These components, combined with scripting, enable the creation of dynamic and interactive game environments.

ScreenShot:



