Final Year B. Tech. CSE Augmented Reality and Virtual Reality

**Assignment No. 4**

**Submitted by:**

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**Title: Develop a Scene in Unity with Game Objects and Apply Transformations, Components, and Control**

**Aim**

To understand the features of Unity for developing a scene, applying Rigid Body, Material, and Box Collider components to game objects, and controlling them through a script.

**Theory**

**Key Features Used for Scene Creation**

* **Game Objects**: Unity allows you to create 3D game objects like cubes, spheres, and planes. These are the basic building blocks of a scene.
* **Transformations**: Transformations such as translation (moving), scaling (resizing), and rotation (spinning) are used to position and modify game objects.
* **Video and Audio Sources**: Unity supports video playback using the Video Player component and sound effects or background music using the Audio Source component.

**Rigid Body, Material, and Box Collider**

1. **Rigid Body Component**:
   * Makes a game object responsive to physics, such as gravity and collisions.
   * Example: Adding a rigid body to a cube allows it to fall naturally when the scene starts.
2. **Material**:
   * Controls the visual appearance of objects, like color, texture, and surface behavior (e.g., shiny or matte).
   * Example: Adding a material to a sphere can make it appear metallic or glossy.
3. **Box Collider**:
   * Defines the physical boundary of an object for detecting collisions.
   * Example: A box collider around a cube ensures it doesn’t pass through other objects during interactions.

**Steps to Develop the Scene**

1. **Create Game Objects**:
   * Add a **Cube**, **Sphere**, and **Plane** to the scene from the GameObject menu.
2. **Apply Transformations**:
   * Move, scale, and rotate the objects using the Transform component in the Inspector.
3. **Add Rigid Body Component**:
   * Select the Cube and Sphere, then add the Rigid Body component from the Inspector.
4. **Apply Materials**:
   * Create materials in the **Assets** folder and assign them to the Cube and Sphere to change their appearance.
5. **Add Box Colliders**:
   * Ensure the Cube and Sphere have Box Collider components to detect collisions.
6. **Add Video and Audio**:
   * Attach a Video Player component to the Plane and assign a video file.
   * Add an Audio Source component to play background music or sound effects.
7. **Write a Script to Control Objects**:
   * Create a C# script to move or rotate the Cube and Sphere based on player inputs (e.g., keyboard controls).

**Conclusion**

Thus, we have understood the features of Unity to develop a scene and applied Rigid Body, Material, and Box Collider components to game objects. Additionally, we controlled game objects using a script.

**FAQs**

1. **What is the Rigid Body Component?**
   * The Rigid Body component enables game objects to interact with Unity's physics system, making them affected by forces like gravity and collisions.
2. **What is the use of Rigid Body and Box Collider?**
   * **Rigid Body**: Adds physical behavior, like falling or bouncing.
   * **Box Collider**: Defines the physical shape of an object for collision detection.
3. **How can you control game objects in Unity?**
   * Game objects can be controlled using scripts written in C#. By modifying their Transform properties (like position, rotation, and scale) in response to player inputs, you can make them move, rotate, or scale dynamically.