Assignment 2: Apple Picking in a Tangible Virtual Environment

Introduction: In this assignment, you'll use Unity's haptic plug-in to make objects touchable. In addition, you'll use prefabs, rigid body, colliders, physics, and material properties to define game objects.

Unzip the attached file. Under the **Models** folder, there are two obj models: **apple.obj** and **bowl.obj**. You'll use these two models in this assignment.

As the program starts, you can see a fruit bowl filled up with apples of various colors i.e., red, green, and yellow. You'll be able to grab apples with a haptic device. You'll also be able change colors by interacting with the apples with a haptic device. The attached demo explains these interactions with apples with a haptic device.

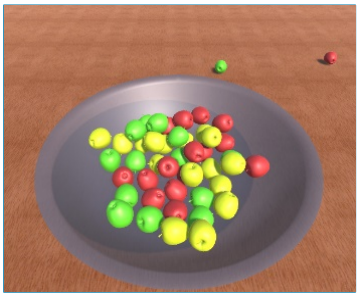

Figure 1: A fruit bowl filled up with apples with different colors.

Assignment Specification:

Below are the to-do lists for this assignment.

Creating Objects and Prefabs **Total 10 points**

1 point

- Add a plane to the scene. The plane is positioned at (0, -1, 0). Assign appropriate material and physical properties to it. Make the plane **Touchable**.

5 points

- Next, add the fruit bowl that is placed just at the top of the plane. Use the attached **bowl.obj** model. Apply proper transformation so that the fruit bowl looks upright as demonstrated in the figure. Scale the model so that its size covers the haptic workspace (i.e., the green box) properly. Do some adjustments if necessary. Assign

appropriate material and physical properties to the fruit bowl. The fruit bowl is touchable and stays attached (fixed) to the plane.

6 points

- Next, create a prefab for the apple. Use the attached **apple.obj** file. Apply appropriate transformation so that its size looks like the one demonstrated in Figure 1. Assign appropriate material and physical properties to the apple. You should be able to touch and grab an apple with a haptic device by pressing the first button of the stylus. For apples with different colors, create prefab variants. Fill the fruit bowl with apples.

Pick Apple and Change Color **8 points**

- As you touch an apple while the second button of the stylus is pressed down, its color will change to some random color. Thus, you'll be able to randomly change colors of apples. This has been demonstrated in the attached demo. You'll write C# scripts to make this change happen for any apple when you touch it with the second stylus button pressed down.

Use a Virtual Environment **5 points**

Add Unity's XR plug-in to interact with apples with a haptic device in a virtual environment wearing a VR headset. Add a C# script to adjust the haptic workspace to interact in a virtual environment.

Submission

- Zip the following folders under the project workspace: **Assets**, **Project Settings**, and **Packages**. Submit the zipped file via canvas. Name the file as GroupNameCSCD477Assignment2.zip.
    - Here, GroupName will consist of the last name of each member of the group, (i.e., Foster_Frodge_CookCSCD477_577Assignment2.zip or Harper_Howard_SpencerCSCD477_577Assignment2.zip).
- If canvas cannot upload the zipped file due to its large file size, upload it on the google drive and email the link to me.

Submission deadline is Wednesday, November 3.

This assignment weighs 25% of this course.