EECS 4471 – Winter 2019 – LAS 1004

Lab 0a
Familiarization with UNITY 3D :: Unity Interface Basics

- *supervised labs begin this week (week 2)*
- *all computers in LAS 1004 have Unity installed and are useable for this lab – in future labs (using VR peripherals), a limited set of these computers will be used*

Preamble:

The goals of this introductory session are to familiarize yourself with the basic Unity Game Engine interface.

You will learn about the main components as they pertain to basic construction of a 3D 'scene'; how to adjust the camera that views the scene within the editor. You will also consider how to add and control the camera, objects/materials and basic lighting to the scene and to perform basic manipulations of these objects within the editor. You will learn about assets and their management within a unity project, and the concept of a prefabricated object (prefab). In the following session (next week), you will learn how to achieve finer control of such objects using scripts.

** Unity Version: 5.4*

Note: you will need to first setup a Unity Account (free) after you log in – this will be important for accessing the unity asset store later. You may also work with Unity offline (without store access). After login, you may create a new 'empty' project.

Goals:

1. Follow through introductory tutorials on the Unity website https://unity3d.com/learn/tutorials/topics/interface-essentials , namely:
    - USING THE UNITY INTERFACE; and
    - ESSENTIAL UNITY CONCEPTS

    a. Prioritize "Interface & Essentials" (if you are new to Unity). You should also reference 1st three sections from unity manual (docs.unity3d.com/Manual/index.html):
        - Working in Unity -> Getting Started; Asset Workflow; Main Windows;
        - Working in Unity -> Editor Features;
        - Graphics -> Graphics Overview -> Lighting; Cameras; and Materials

        In particular, become familiar with the following:

Interface/Editor elements and window panes

i. Adding primitives (spheres, squares, planes, etc) – explore effects of modifying transform property (notice that the world coord system is left handed); understand position & rotation effects
ii. Main camera (and its properties: culling, frustrum, etc.) – experiment with re-positioning the camera object and observe the camera preview for different configurations of near/far planes, etc.
iii. Light source(s) – experiment with directional, spot, etc.

GameObject Hierarchy (defines all scene elements)

i. Experiment with child-parent relationships between game objects (i.e. either with multiple primitives, or with lights or cameras as children of primitives) - explore

Assets

i. Materials – create basic material within the assets folders (colours/surface properties) to be dragged onto various primitives in your scene.
ii. Textures - Import images from internet or desktop into assets folder (or make subfolder Assets->Textures). This will create a texture object. Drag onto primitives and observe results. Note: you may have to modify scale properties of primitives (e.g. plane) to maintain appropriate aspect ratio for the image used

Prefabs

i. Create an object or parent object in hierarchy, and drag to assets folder. Drag instances of the resulting 'prefab' to your scene, and experiment with modifying the prefab properties (notice all instances should reflect any changes)

*** If familiar, you can move onto one of the sample projects or the task below*

2. Exercise:

In this exercise you will use Unity basics to create a simple 3D *diorama*: a three-dimensional full-size or miniature model, sometimes enclosed in a glass showcase for a museum (and typically a physical, tangible version of a static 'scene'). A diorama can be built on a flat surface or inside an enclosed area such as a box. A typical diorama consists of a backdrop (image), in front of which a number of 3D objects and props are placed – to give a sense of a 3D scene:

Here you will create a digital version, within which you can place the camera at different locations and orientations (and adjust basic lighting) to create alternative views of the scene lit in different ways.

Create your simple 'Diorama' with the following elements:

i. Ground plane
ii. Perpendicular plane (positioned along one edge of the ground plane)
iii. Several primitive objects (or model objects imported from asset store or internet). Experiment with placing them and orienting them to sit on or above the ground plane
iv. Main camera object
    (optional): you may consider attaching this to a moveable object (i.e. setup arrow keys to move a primitive, and attach camera to that primitive). Unity tutorial on 'roll a ball' has more information on this
v. Light object(s): try to include a directional and spot/point type source. Experiment with the spot/point light attached to (iv).
vi. Experiment with adding textures and materials (assets) to surface properties of primitives/planes. In particular, add an image texture to the perpendicular plane

DUE: January 25th, 5pm (Submit & Demo to TA: /12 marks)