WESTERN UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

SE2250b – Software Construction

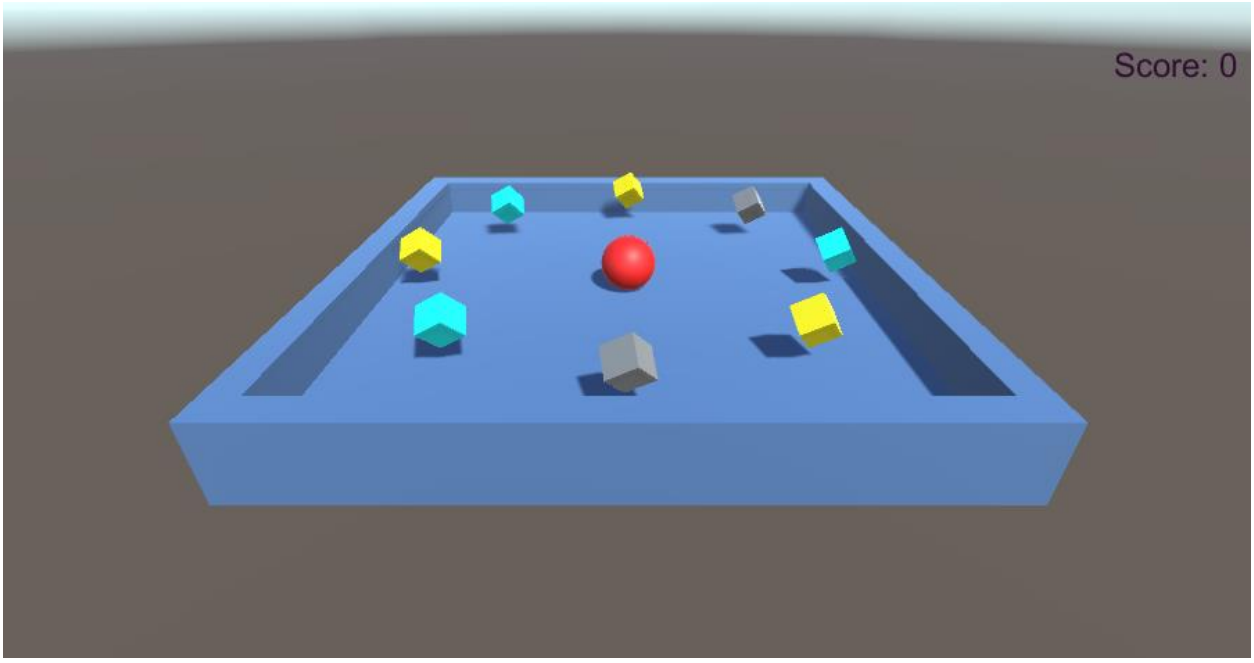
Assignment 1 (10%): Roll a ball

Deadlines:

Sections 002, 003, and 004: 08:00 am, Wednesday, February 3rd, 2021
Note: Prepare for Assignment 1 demo during your Lab session scheduled time on Week 4.

NOTE: Proper coding practices should be used. Examples include but are not limited to: following: naming conventions, project organization, proper code formatting, meaningful comments, clean code (no old commented out code or unnecessary code), and any other topics discussed in lectures or labs.

In this assignment you will create a simple 3D game where the player collects objects by rolling a ball. A very simple version is shown below: the red ball represents the player and the cubes represent the pickup objects. Your box and pickup objects need to look different than those in the figure below. For example, you could use a triangle or a combination of rectangles for the box, use different shapes for the pickups, and organize pickups in a different pattern.



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Consider the following requirements:

1. Player:
   - The player rolls the ball within the box by pressing the arrow keys.
   - The ball must behave as if it is pushed.
   - When the ball hits the wall of the box, it should bounce back like a real ball rolled against the wall.
   - The ball must remain in the box and not bounce out of the box. The wall height must remain reasonably low to enable a full view of the playing area.
2. Pickup objects:
   - Eight or more pickup objects (cubes in the figure) must be located just above the box. There should be types of pickup objects that look the same. For example, maybe there are four square pickup objects, two cubes, and two cylinders.
   - All pickup objects should be created dynamically (cannot start the game with pickup objects in place).
   - There should only be one or a very few pickup assets in the project (less than the number of the pickup objects in the game).
3. Picking up objects:
   - When the ball hits a pickup object, the pickup object must disappear, and the score must increase. Display the score in the upper right corner.
   - Pickup objects that look different must result in different point gains and all that look the same must result in the same number of points.
   - When there are no more pickups, the game should pause for a few seconds and then restart.

For this assignment you need to do two parts:

A. (6 points) Identify two different alternatives, A and B, to design the game according to requirements. Describe each approach in detail including advantages and disadvantages. Alternatives could include but are not limited to the following: different ways to design the box and pickups, different strategies to position the pickups, and different ways to handle scores. You must consider not only the look and feel but also how you use assets in Unity (Game Objects, Classes, or any other assets). This should be up to one page long.
B. (14 points) Implement the game according to provided requirements
   1. Player – 4 points
   2. Pickups – 5 points
   3. Picking up objects – 5 points

Tips:

- To display the score, use UI->Text object.
- Take advantage of scripting autocomplete to find methods and fields.

Deliverables:

- Functionality demonstrated to a TA during the lab. Make sure you can explain your implementation of the game. This is a part of the mark received for Part B.
- All game files uploaded to OWL as one zip file. This should contain all the files needed to run your game from UNITY.
- A PDF file uploaded to OWL containing answers to Part A (make sure your name is included in the file)

If the student did not demo the solution to TA during the lab section on the due date or before because of reasonable justification (illness or other special circumstances), the student must contact the professor within the two days following the deadline to arrange the time for the demo. For no demo, 50% of the available mark will be deducted.