Game-3111 Advanced Graphics Programming
Assignment #1

1. Introduction

In this assignment, you will be implementing everything we learned so far in order to draw a city skyline (like Toronto) in DirectX.

2. Overview

Cities have always been designed using simple geometrical shapes. A city usually consists of at least a tower (like CN Tower) in the corner with buildings next to each tower. There usually is an arena (like Rogers Center).

3. Logistics

For this assignment you are going to work in a group of **TWO** students. This group would be your work group for all assignments this semester (Choose Wisely). There are multiple deadlines and multiple submissions for this assignment so make sure you are aware of them. All submissions for this assignment are electronics. Only one submission is required for the whole group, make sure that all names are included in the submission.

4. Deliverables & Deadlines

Parts 1, 2, & 3 before Monday the 10th of February 2020

5. What you need to do

Group names and IDs

Pick your teammate wisely.

Part 1: Generating Primitives

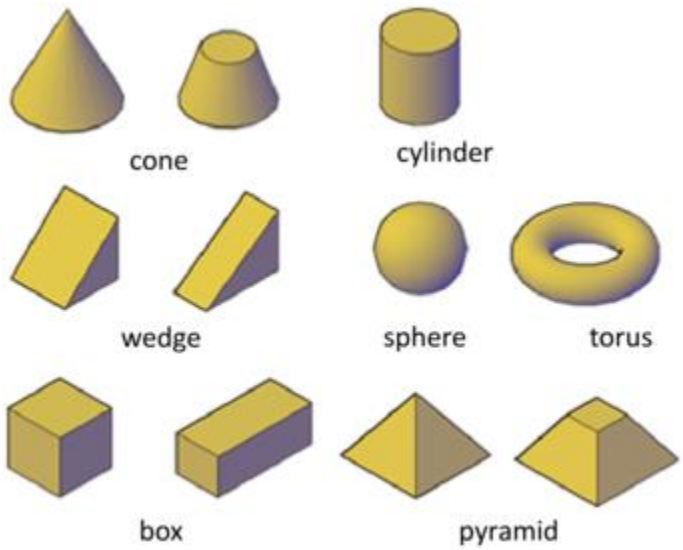
The framework provided has a GeometryGenerator class that already has implementations for the following primitives:

• Box
• Cylinder
• Sphere
• GeoSphere
• Grid
• Quad

You are to expand on this class and implement functions that would generate **6 new primitives**, you can implement the following primitives or different primitives that you might want to use in your city design.

• Cone
• Wedge
• Torus
• Pyramid
• Diamond
• Triangular Prism

A certain primitive can be modified to create a new primitive. Refer to the image on the right for an example. (A cube can be a cuboid using the same function)



Deliverables:
A modified Geometry Generator class that implements the primitives discussed above.

Part 2: City Skyline Design

With your teammate, start sketching out how your city will look like. Make sure to use geometric primitives that the geometry generator class can generate when designing your city. Label each of the objects that creates your city.

After sketching out the city, think about where each labeled object is placed in terms of world coordinates. Write down a list of all the objects in your city with coordinates of where each object should be placed in the world.

Deliverables:

- A sketch of what your city will look like. Could be hand sketched, on paint, photoshop, 3D modelling program, or whatever format you prefer. (I recommend using google sketchup)

- A document that lists all the objects in your city with the locations of each object in world coordinates.

Part 3: Drawing your City Skyline

Using the framework and your modified geometry generator, start drawing your city skyline by modifying the ShapesApp.cpp file (week4/Shape in the github!).

Deliverables:

A modified ShapesApp.cpp

6. To Hand In

You must demo your work to me in the lab (either Monday Feb 10th, Tuesday Feb 11th or Feb 14th) and you "also" need to "email me" the google drive link to your assignment codes before Feb 10th. Please place all the documents, sources codes, project files, solution, common folder, etc… in a folder named "student ids – lab assignment 1 " and save it in the Google drive. Afterwards, send me the "link" by emailing it to me at Hooman.Salamat@georgebrown.ca

7. Evaluation

This assignment will be graded using the following rubric.
It is advisable to review this rubric before submitting your work.

Part 1 (3 points in total):

- Your primitives are created correctly. (0.5 points/primitive awarded)
- Your primitive functions are simple to understand and include appropriate comments.

Part 2 (2 points in total):

- Your city skyline sketch is clear and illustrates all the different objects involved in building your city. (1.0 point awarded)
- The locations of the objects in the document are correct. (0.5 points awarded)
- The document is clearly formatted and structured. The file is divided in a way that allows the reader to understand where each object is in the city and where each object is located in the world. (0.5 points awarded)

Part 3 (10 points in total):

- Each object in the city is rendered correctly (according to the designed sketch). (10.0 points awarded)
- Objects are rendered correctly but out of place. (5.0 points awarded)
- Not all objects (at least 50% of the objects) are rendered, but the rendered objects are correctly in place. (2.0 points awarded)
- Not all objects (less than 50% of the objects) are rendered, and/or they are rendered out of place. (1.0 points awarded)