National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Computing

Computer Graphics

Class: BSCS

Assignment 1

Submission Due: Oct 4th, 2018, 11:59 pm

Instructor: M. Muddassir Malik

Assignment 1

Introduction

In this assignment you have to understand and implement the following concepts

- Basic Drawing
- Tessellation and Twist

Objectives

- To develop skills for using OpenGL and GLSL

Tools/Software Requirement

- WebGL enabled browser and an appropriate IDE.
- You cannot use libraries such as THREE.js

Problem Statement:

Task 1: Create a program that draws on user click. On the first click a dot is shown on the screen. Upon second click a line is shown between first click and second. Third click turns it into a triangle, forth click into a quad and fifth into a pentagon. **[20]**. User can control the following:

1. Color of the drawing
2. Size of the dot shown on the first click

Use dat.GUI in program for implementing all controls. **[20]**

You will get credit for adding more functionality. This is open ended and use your imagination to incorporate more features. **[20]**

Task 2: In this task you will code functionality to tessellate a triangle using recursion and apply twist to the vertices.

Twist: It is the rotation of vertices depending upon how far they are from the origin. The further a vertex is from the origin the greater it rotates. 'd' is the distance from the origin. Twist will be implemented using a slider where user can select the angle.

$$x' = x\cos(d\theta) - y\sin(d\theta)$$
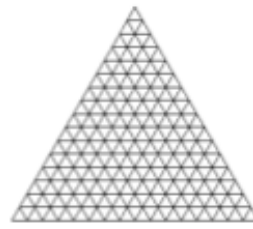$$y' = x\sin(d\theta) + y\cos(d\theta)$$
$$d \propto \sqrt{x^2 + y^2}$$

Tessellation: A triangle can be subdivided into multiple triangles. For example a triangle can easily be divided into 4 sub triangles. In turn each triangle can be further divided into four more and so on. The number of times each triangle will be divided depends on the user chosen number. **You must use dat.gui for controls. [40]**

triangle

tessellated triangle

twist without tessellation

twist after tessellation

Any assumptions that you take must be properly stated.

You must do this work individually. You cannot share your code with anyone or copy code. Plagiarism will result in zero marks.

Deliverables

Submit only ONE zip file on the given LMS link, which contains both the tasks in folders named TASK1 and TASK2. Make sure to bundle all the **dependent libraries** in the zip file so your program is **ready to run**. Your file should be named as asg1[YOUR FIRST AND LAST NAME].zip

Always submit 1 day before the deadline to avoid any last-minute delays.