

Final Project Proposal

Andrew Liu

Overview

For the final project of this course, I want to explore ways of applying the interactive computer graphics concepts we learned in class toward artistic expression, as seen in projects like those on Shadertoy. For this project, I want to implement new graphics concepts like procedural generation and instancing while focusing on interesting uses for the concepts we already covered.

Objectives

For this project, I would like to create a scene composed of various procedurally generated geometries paired with shader effects to create an interactive art piece that you can explore through the camera's point of view. I seek to incorporate the following concepts we discussed in class and assignments. Frame Buffers to render texture and apply interesting shader effects. Vertex Array Objects, Element Buffer Objects, and Vertex Buffer Objects to store and construct objects; Blinn-Phong illumination; and other OpenGL concepts.

There are a few new graphics concepts that I would like to focus on implementing in this project; first is procedural geometry generation to create the terrain the scene is in. To implement procedural generation, I would like to generate a height map texture. On top of the height map, I'd like to generate the terrain in such a way that it has a low-poly appearance by having each triangle have a uniform normal. Second is mesh instancing, specifically to create grass/ foliage to populate the scene. The third is a more flexible mouse-controlled camera to allow the user to explore the scene with added freedom. And finally, I would implement multiple moving light sources.

The following are some stretch goals I would like to include in the scene if I have enough time: a tessellation shader to change the level of detail depending on the distance from the camera, light attenuation, distance-dependant fog, dynamically moving scene, and finally, a jitter shader to give 'life' to still objects.

Grading

Topic	Grade (%)
OpenGL Basics	15%
Procedural Geometry Generation	40%
Instancing	25%
Flexible mouse-controlled camera	10%
Multiple Moving Light Sources	10%
Extra Credit	Grade (%)
Tessellation shader	10%
Change instancing on distance from camera	5% (?)
Additional Effects (Changing sky, Light Trails, Fog, Glowing)	5% (?)