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GAM 400

Tessellation Project

Milestone Checklist

Milestone 1: The primary goal of this milestone is refamiliarize myself with the Falcor framework and learn the basics of the tessellation pipeline through implementation of simple toy effects.

1. The user will be able to switch between different modes to view and test each independent feature listed in this document
2. The user will be able to change the tessellation factors of a full screen quad
3. The user will be able to load any displacement map onto an arbitrary model
4. The user will be able to dynamically alter the geometry of a plane with their mouse
5. The user will be able to enable and disable wireframe in the interface

Milestone 2: This milestone, I should have a decent grasp on the basics of the tessellation pipeline. With this knowledge, I will aim to implement non-trivial tessellation-based effects in terrain generation and water.

1. The user will be able to enter a seed that generates a “world” with both generated terrain and generated and simulated water
2. The user will be able to use their mouse to alter the generated terrain
3. The user will be able to alter the direction, color, and intensity of the directional light lighting the world

Milestone 3: This milestone, I should understand the tessellation pipeline well. With this knowledge, I will aim to implement one or more advanced tessellation-based effects. However, what these effects should be will probably be based on my experiences in the second milestone implementing terrain and water. Thus, I propose the following potential options:

1. Improve Terrain and Water
   1. The user will notice that the water reacts well to the mouse based dynamic altering of terrain
   2. The user will notice the generated world is more complex, including rivers and waterfalls
   3. The user will notice the water simulation is more robust
   4. (This may be a bit of a stretch goal) The user will notice that the terrain now includes simulated grass

1. Model Altering Tessellation Effects
   1. The user will be able to apply a shader to clip a model to a set height
   2. The user will be able to view this clipping shader interpolating the height over a period to create the effect like the model building up or warping in
   3. The user will be able to apply a shader that scales the volume of a model
   4. The user will be able to view this volume scaling shader interpolating the volume over a period to create the effect of a model inflating or deflating
   5. The user will be able to view this volume scaling shader varying the volume over a period to create the effect of the model pulsing like a heartbeat
2. Fur/Hair Rendering
   1. The user will be able to load specific models with simulated hair/fur
   2. The user will be able to alter the length and density of the hair/fur
   3. The user will be able to apply forces like wind to the hair/fur and control the strength and direction of those forces
3. Level of Detail
   1. The user will be able to alter the detail of the geometry of an arbitrary model
   2. The user will be able to enable a mode where the detail of the geometry of an arbitrary model is automatically scaled based on distance from the camera