B481 Fall 2022

HW 5 Project Proposal

Zachary Graber (zegraber@iu.edu)

My rough idea for my final project is to model a ground-view on a small planet surface (note that by this I **don't** mean a solar system). I think that this would give rise to many fun opportunities to implement various graphics concepts. The requirements for the project might be met in the following ways:

<u>3D Scene:</u>

- The planet itself would be based on a sphere, which could be defined algorithmically to meet the "non-flat" requirement.

- To add additional interest, I would also like to explore generating terrain on the sphere using something like Perlin noise as a height map of sorts. This could be accomplished in a vertex shader.

- To meet the animation requirement, I would plan to implement some sort of movement on the planet, such as waves in water (this one is scary, since lighting water is hard), grass that blows in the wind, or otherwise.

<u>Interaction:</u>

- Two models in the scene need to respond to user interaction. The most obvious candidate is rotating the planet with the *rolling ball* algorithm.

- The other form of interaction I think would be interesting to implement is, as mentioned previously, controllable wind direction that affects grass.

Camera:

- Camera mode 1 would be interactive, letting the user explore the surface of the planet from a first-person view (not quite on the surface, but maybe flying above, like in a plane).

- Camera mode 2 would zoom the user out to "space" and circle the camera around the planet.

Illumination:

- Obviously, the project would implement diffuse lighting, but also Phong shading (meeting the requirements for specular highlights)

- My ideas for the two light sources include a Sun, and maybe something with a softer, less specular footprint.

Mapping:

- Both texture and bump mapping could be used on the planet's surface to achieve effects for materials like stone and (maybe) water.

- Bump maps would be especially useful for water effects.

- As mentioned previously, I would like to fit the surface sphere with a height map.