Graphics Application Coursework Proposal – Gabriel Lacey

Summary

The overall concept of the graphics application will be a simple portal "clone" in which the player will be able to travel between two islands in the middle of the ocean using two portals locked in place.

Techniques

- Vertex manipulation
    - The water surrounding both islands will be made from a plane, which is then manipulated in the vertex shader stage to simulate waves.
- Post processing (Render Texture)
    - A portal on each island will have a view through the other portal, allowing the player to travel from one to the other immediately
    - This will be done by having a camera positioned at each portal, rendering to a texture which is then used to texture a portion of a wall on the island.
    - The angle of each camera will update as the player moves around each portal, allowing it to look like an actual hole in the wall
    - Each render texture will also have edge detection filter applied to it using either the Sobel operator or depth-based detection
- Lighting and Shadows
    - A directional light will be used to simulate moonlight
    - A point light will be used to emit light from a bonfire on one of the islands
    - A spot light will be used to emit light from a torch the player carries with them
    - All objects will be shadowed correctly
- Tessellation
    - Each island will have a group of rocks on them, with distance-based tessellation applied so they appear more detailed the closer the player gets
    - This will result in the rocks becoming highly detailed when the player steps through a portal onto one island, but will be less detailed when viewing them from the distance of the other island
- Geometry Shader
    - The "sand" mesh the player walks over on each island will be passed through the geometry shader to leave depressions wherever the player walks
    - Each island will start as a relatively low detail mesh, and as sand is depressed the mesh will be subdivided and lowered in the correct locations