Assignment 4

CEG4500/CEG6500

Computer Graphics

Please implement a computer program that is capable of rendering a scene using the ray-casting method. Use your PLY reader to retrieve the scene from a file. Then, compute the correct color value for each pixel within the image by shooting a ray from the camera location through the pixel. Once, the ray hits the closest polygon of the scene, compute the color and intensity according to the Phong illumination model. If there is no color information in the PLY file then just assume an arbitrary constant color. The created image can then be displayed using the glDrawPixels command which copies the entire image to the framebuffer.

Pick an arbitrary location for the camera for your initial image. From there, your software should allow a user to rotate, zoom, and pan within the scene. Define the image plane at a fixed distance to the camera orthogonal to the view direction. For proper lighting, assume that a light source is located at the exact same place as the camera forming some sort of head light.

Once the image is rendered, your software should be able to – besides displaying the result on the screen – write the image to a file using the ppm file format. The ppm file format consists of a header which is then followed by the RGB values of all pixels written to the file row after row. The header contains one line which describes the type of the file, in our case "P6". Then, an arbitrary number of comments can follow starting with "#". Then, the dimensions (width x height) and the color depth are given in the following two lines. A sample ppm header can look like this (this describes a 512x256 image with color values ranging from 0 to 255 for each color channel):

```
P6
# CREATOR: Thomas Wischgoll
512 256
255
```

Department of Computer Science and Engineering