Anna Wolff

1. Describe the difference between the Gouraud shading and Phong shading models. Include screen shots from your application (or pictures from lector or online) to help strengthen your discussion.

2. The Phong reflection model includes several non-physical (non-realistic) components in the model. List and describe these components that are not realistic and describe why they are made.

Shown on the left, Gouraud shading computes the color for an image on a vertex-by-vertex basis by using the normal, lighting, and view vectors in the vertex shader. This information is then passed to the fragment shader which interpolates the colors between two vertices. Gouraud shading looks less realistic and has more sharp edges, however it can be improved as you add more polygons and therefore vertices to your image.

On the right, Phong shading does the bulk of its calculations in the fragment shader. The same three vectors are passed from the vertex shader into the fragment shader where the calculation is performed. Since the fragment shader is working with vectors rather than vertexes, it is able to create a more realistic and precise image.

A picture containing light, lamp

Description automatically generatedA picture containing light

Description automatically generated

One non-realistic component of the Phong model is that it has to interpolate the normal vectors for all of the non-vertex points in the image. Because the computer is essentially making a prediction with this, it can leave the image looking less realistic. Additionally, a half vector is used in place of an angle measurement. These things are done so that the program is less computationally expensive. If you tried to use the exact calculations for each of these, the program would take much longer to run.