

## Lab #7 – cpe471

### Simple lighting – diffuse lighting on a sphere

Today we will implement simple diffuse lighting for a sphere obj file. Starting with any prior lab code that reads in an obj file (including the mesh normal), you will add the necessary code to shade the mesh with diffuse lighting. For this lab, you will need to modify both the .cpp file and the vertex shader.

#### Task 1:

Change the code to read in a sphere mesh and alter the drawing so that you can draw two spheres side by side that are rotating around the Y axis.

#### Task 2:

Now modify the vertex shader (and .cpp file as necessary) to shade the sphere with Gouraud diffuse and ambient shading (this means that you will compute the color in the vertex shader). Throughout this assignment be careful about what space your values are in. For Gouraud shading, please keep all your vectors in world space.

- 1) You can choose a fixed light position in world space to use to compute the light vector (note that each vertex will have a different light vector for our point light). Start with a light position of (1, 1, 1)
- 2) You can choose two different diffuse colors for each sphere. Represent each color with a vec3 ( $k_d$ )
- 3) Compute the diffuse shading as  $k_d * \max(0, \text{dot}(\text{light}, \text{normal}))$
- 4) Compute the ambient shading for this lab as  $k_d * (\text{ambient\_coefficient})$  – use a small value  $< 0.5$  for the ambient coefficient.
- 5) For one sphere, update the normal to follow the rotation
- 6) For the other sphere, leave the normal as they are (so the lighting stays ‘fixed’ or painted on the sphere)

An example of a single frame would look as follows:

