CS 355 Lab #8: 3D Lighting

Overview

In this lab, you will implement a simple 3D lighting program.

User Interface

Your only interaction will be through the keyboard. Pressing the keyboard will change the perceived location of light. The light will rotate around the sphere. The following keys should rotate the light in the following ways:

a	Move left
d	Move right
w	Move up
s	Move down
q	Turn counter clockwise
e	Turn clockwise

Implementation Notes

All of the 3D geometry and projection is provided for you in this lab. Again, we are using the Pygame package to do this. Make sure to include the basicShapes.pyc and wireframe.pyc files in the same directory as your code. It will not run without them.

If the lab file is setup correctly, when you run the code, you should see a very faint beach ball displayed in a window. The ambient light portion of the lab is done for you, but you will need to implement the diffuse and specular reflections from the Phong model.

The code provides the viewing vector and the incoming light vector. However, you will need to calculate the reflection vector for specular lighting. The reflection vector can be calculated as

$$r = l - 2(l \cdot n)n$$

where r is the reflection vector, l is the incoming light vector, and n is the normal to the surface at that point.

Submitting Your Lab

Your code should be contained inside a single .py file. To submit the lab, simply submit this file through Learning Suite. **You do not need to include the wireframe.pyc and basicShapes.pyc files with your submission.** If you need to add any special instruction, you can add them there in the notes when you submit.

Rubric

- Correct rendering of diffuse reflection (20 points)
- Correct rendering of specular reflection (20 points)
- Correct navigation of light source (20 points)
- Generally correct behavior otherwise (10 points)

  TOTAL: 70 points