COSC 4370 HomeWork 3

Name: **Hoang Tran**

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1. **Problem**

We will be using 3D viewing skills from class, as well as our artistic creativity, to create several 3D scenes with OpenGL. We are going to implement the 3D viewing and Phong shading model to produce the image which is required in the assignment.

2. **Method**

To view the object from the camera, we need to do view matrix which transform vertices from world-space to view-space and the projection matrix sets things up so that after multiplying with the projection matrix, each coordinate's W will increase the further away the object is. Then We create the image using Phong Model which is a very basic, but real looking light model for surfaces that has three parts: ambient, diffuse, and specular lighting.

3. **Solution**

+ we need to set up camera's position and Angle view. This is a way how we see the cube (in camera.h)

+ create camera transformation by setting matrix projection. It transforms all vertex data from the eye coordinates to the clip coordinates

+ To get the cube, we need to set up gl_Position correctly. it holds the position of the vertex in clip space and set up color = vec4(vec3(1.f,0.f,0.f), 1.0f) in **phong.frag** to get the red cube. Otherwise, you will just see a black screen.

+ we start to implement Phong model into the cube by using three part: ambient, diffuse, and specular lighting

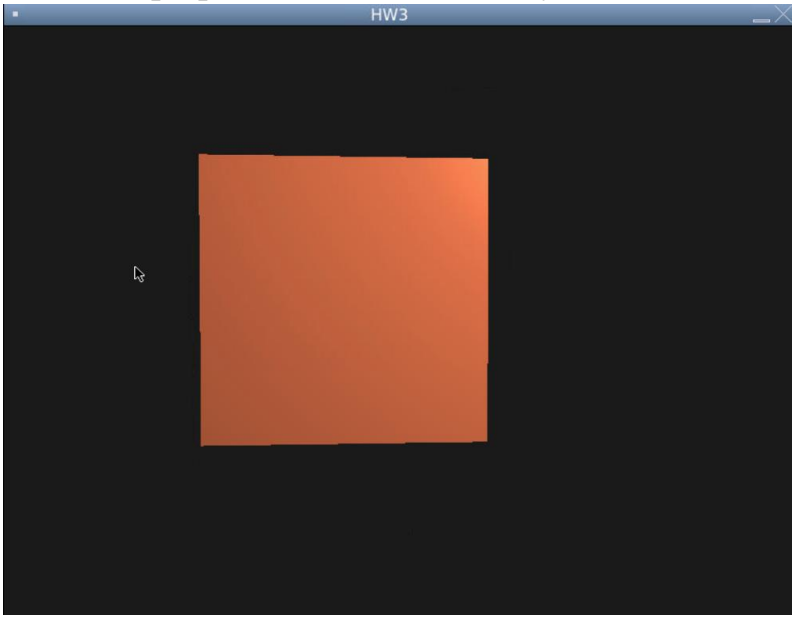
* Ambient lighting is light that floods the scene and lights up the object evenly in all directions.

* Diffuse lighting is directional light, essentially meaning that faces facing towards the light source will be better illuminated and faces pointing away will be darker due to how the light is hitting them. , we compute the product of the vector dots between the normal and incident light, multiplied by the color of the current light to represent the diffuse light.

*specular lighting simulates the bright spot of a light that appears on shiny objects.

4. **Result**

My reproductions match 70% exactly. I don't know why it looks like that. Error happens when I run the code. It said it cannot link to shader. Maybe because of Computer that makes outcome like that. It may work well with another laptop. Pls, let me know why It looks different from original one.



5. **Source for doing HW3**

https://learnopengl.com/Lighting/Basic-Lighting