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Project3 Report

As this project is the continuation of my project 2, the geometry model is pretty much the same as the last project. However, I have a sphere class, which allows me to create a sphere in my project3. Since this project requires three lights sources and have at least one directional or positional. In order to make a more realistic scene, I generate a sphere and make it look like a moon, and it also has clouds surround it.

In order to generate the model, I need to first generate the sphere and it actually causes me a lot of trouble. The sphere is quite a sophisticated or difficult geometry to make, I spend lots of time on the vertices because I wasn't sure how to construct the sphere structure. After the sphere generation, I simply just play around with the vec3 position variable and see where I can put the sphere and treat it as a moon. Then I use the sphere geometry also generate some objects and randomly place them in a certain area to make it look like a cloud. In addition to the model generation, I also searched some rgb color to make the moon and cloud more realistic until I am satisfied with the final result.

Speaking of the project specifications, the interactive viewing is working just fine. The model starts rotating when the user press down the left mouse key and drag around, and it rotates along the mouse motion accordingly. The handleCommand function is overwritten in the ModelViewWithPhongLighting class, and it can detect characters "O", "P", and "Q", then generate different viewing type.

In terms of the interactive controls, I have keys "O", "P" and "Q" as the project description mentions, they control the viewing types like orthogonal, perspective and

oblique. And with the left mouse key being pressed, you can drag around the model freely, they mouse scroll also can zoom in or out.

For this project, the interactive viewing part is really straight forward, I don't have much problems with it. However, the lighting model is really difficult because I really need to understand each variable and how it works in the phong local lighting model. This involves lots of vector calculations, and one single mistake can cause the whole project not showing anything. When the first time I finished writing the lighting model, it gave all the errors in the terminal because I didn't pass the lightstrength, globalAmbient to the shader, and I end up spending hours to find out why. After the lighting model set up correctly, I have struggled a lot to find a way to present that my model has three different light sources, because this process needs me to play with the parameters, like ka, kd, lightpostions and lightstrength. There is no best way to do this but I have to constantly changing the parameters for the best result. After comparing each result, I have finally generated my personal favorite. It was long but worth the time.

There is only one thing I need to notify you when you run my program. If you look closely, you will probably only see two light sources leave really obvious reflection on the sphere. Those two light sources are the directional, and I put the positional light source in the center of the "moon", so It won't leave any obvious trace on the moon but makes the whole scene a little brighter.