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CSC 425: Computer Graphics

Programming Assignment #1

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Abstract:

The goal of this project was to design and implement a mesh viewer program which displayed a 3-d model from type .m format. The purpose of this project was to provide experience using graphics packages, specifically OpenGL, and give an understanding of 3D viewing, transformations, and projection in the OpenGL pipeline. Also, it provided experience working with geometric primitives in OpenGL.

Problem Description:

The problem was a mesh viewer was needed so, one needed to be created to solve this problem. It needed to be able to display a 3D mesh and allow for different transformations, projections and user input to solve this problem.

Implementation Details:

The solution to this problem was implemented in a linear way. Step by step the implementation went as follows:

1. Decided on which language/library to use. – JOGL and JFrame
2. Created a Popup window to receive the mesh file the user inputs.
3. Created a regex to read and parse the .m file. – Using Java’s Matcher class
4. Displayed a window showing the 3D mesh.
5. Implemented a checkered floor and displayed the X, Y, and Z axis.
6. Created a bounding box using the X, Y, Z coordinates of the model.
7. Created a Menu to allow user input to change the display and projection view.
8. Registered callbacks to handle mouse input.
9. Implemented mouse based transformations.
10. Tested and fixed bugs.

Running Results and Analysis

Overall, the results of this project were very good. The project does what it was supposed to with a few minor bugs. One such bug that is still present is: the translation feature, when pressed, offsets the model by a small factor down and to the right. However, the 3D model can still be translated with ease.

Conclusion:

To conclude, I learned a great deal when completing this project. Not only did I learn that OpenGL can be used, but also how to use it; specifically implementing it with other visual libraries (JFrame) to display objects. Also, I got a good understanding of how 3D viewing and transformations are done via the OpenGL pipeline. Thanks to this project I also learned a great deal about regex and Java’s Matcher library, which was a nice bonus.