Progress Update

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1 Progress

In the last half of the week, I was able to get Python OpenGL to work on my personal computer, with the primary intention of being able to view and edit the dihedral angle demonstration program. Moreover, I took time to change parts of the code in order to learn some of the things that I can implement in my project. For instance, I have been playing around with the code in order to try to make different shapes. Mainly, I replaced `GL_TRIANGLES` with `GL_POLYGONS`, which gave me more freedom in what shapes I can define with the vertices defined in the `vv` array.

2 Plans for Immediate Future (Weekend)

Since I still haven't been able to get C++ OpenGL to work, I will continue to work on my project in Python OpenGL until I am able to figure out how to successfully reference the C OpenGL library in programs. As far as I can tell, the OpenGL aspects of both programming languages are fairly similar, and I think it would be beneficial to start learning the different capabilities of the graphics libraries so that I can implement them once C++ OpenGL is working on my computer.

A specific thing that I would like to learn to do with OpenGL in the near future is to create a spotlight that will shine on the rotating object, as I am having difficulty visualizing the 3D nature of the rotation without any reference for depth in the animation. Also, I would like to gain greater understanding on the details behind how the dihedral animation works so that I can implement it in other programs. I understand the general concept, but I am also interested in the details as that concept is central to my project.

3 Plans for the *Slightly* More Far-Off Future

However, before I get too involved in exploring the coding aspect of the project, I would also like to research some of the theory behind the project that I am planning to do. Namely, I need to come up with a detailed plan on how

I will generate an input for the program and how the program will analyze the polyhedron net of interest. Currently, I have several ideas that need further exploration before they can begin to be implemented.

One of the things that I would need to program to be able to calculate is the number of edges, faces, and vertices that the resulting polyhedron will have. Those numbers can then be used to calculate the Euler characteristic of the object by using the following equation:

$$\chi = V - E + F \tag{1}$$

The resulting value of χ will determine whether or not the polyhedron will be concave, having an Euler characteristic equal to that of a sphere ($\chi = 2$). Other χ values can indicate other types of polyhedra (e.g. concave).

I am turning in this progress report instead of a new draft of my proposal as sufficient changes were not made to the draft in order to justify turning it in again. Attention will be given to refining the proposal this weekend and researching the theory needed to present at the seminar that will be coming up.