3D Graphics Module

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Abstract

The purpose of this research project is to write a program that allows the user to graph functions of two variables. The program will incorporate elements of 3D graphics by allowing the user to rotate, shrink, and stretch the graphs. The program will be included in the student Intranet as a module and will thus include elements of modular design. The program will also include a module to edit and perform operations on matrices, since matrix operations are needed for graphical operations. This project will allow researchers to compare the graphics capabilities of Java with those of other languages. The groups who will be interested in the results are TJ students who need a program to graph functions and researchers.

Background & Introduction

Previous projects concerning this area of research include The Investigation of Graphics in the Processing Language by C. Fralick, the City Block Project by M. Levoy, and TJForge Iodine for the modular programming component. The 3D graphics projects seemed to use rotation matrices to rotate graphs by an angle a. Iodine used HTML to program in the modules. Possible state-of-the art programs could be MatLab or other computer algebra systems or even the 3D-graphing feature of the TI-89.

Procedures

During the first quarter, I created a basic calculator so that I could make sure the code for creating and evaluating binary expression trees was functioning properly. During the second quarter, I worked on my matrix editor module. The development of the GUI took longer than expected, so I couldn't program in very many operations. During the third quarter, I plan to work on the actual graphing module. The first section will be devoted to working on the GUI, and each subsequent section will be devoted to graphing operations (such as rotations, projections, stretches, shrinks, etc). My lifecycle model is the Staged Delivery, where every few weeks I add functionality to an older version of my program with a specific goal in mind.

Results

So far, the listener class that parses strings to create binary expression trees can't handle nested functions. Also, the matrix editor Gui took more time than I originally thought, so I couldn't program in very many functions. However, possible tests for when I begin work on my graphing module involve comparisons between my program and packages such as OpenGL that already perform such 3D graphical operations.