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 modules that allow the user to perform operations on matrices and lists,. 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 3D Modeling by C. Fralick 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 hope to create a basic calculator so that I can make sure the code for creating and evaluating binary expression trees is functioning properly. During thesecond quarter, I plan to work on my matrix editor module (and if possible, the list editor module). For the first two or three week section, I plan to work on the editor GUI to make sure it displays properly. After that, I plan to work on three or four matrix-related operations during every section. 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). The testing will occur as I program each operation to see if it works.

Expected Results

The only results I'm currently expecting are to have a fully functional program that does all of the tasks stated above by the end of the third quarter. In terms of runtime efficiency, I expect my program to run slower than programs written in other languages because it's written in Java. I'm also unsure about how to present my program, other than just putting it up on the Intranet. Possible areas for future research include writing 3D graphics programs in other languages, such as Python and C.

Program Structure