3D Matrix and Vector Library Initial Design

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1 Introduction

This is my initial design for the PP assignment in which I am writing my own 3D matrix and vector library. It will be capable of doing several operations on vectors and matrices and the focus will be on simplicity and ease of use but also efficiency.

2 Class Designs

2.1 Matrix Class

This class will hold the attributes to make up a matrix as well as the methods to perform operations on it and between multiple matrices. When the constructor is called a value for row and column size will be passed in in order for a matrix to be created which will be stored elsewhere in memory as the pointer *matrix. This will mean that separate classes will not need to be created for each size of matrix (eg 2X2 or 2X4 would have needed separate classes). I will then also have a function to input the values for the matrix. The size of the rows and columns will also be stored as private attributes after being inputted in the constructor so that later on if a function such as matrixProduct is called the rows and columns of each matrices can immediately be compared and an error can be thrown if their not compatible.

2.2 Vector Class

This class provides vector operations as well as setting the initial vector. The class will consist of 3 attributes, the x, y and z coordinates and several other functions to apply operations to the vector. As the vector is a fixed size as I am only working with 3D vectors, only one class is needed so creating the vector is a lot simpilar then creating a matrix. This can be done through simple get and set functions to assign values to the x,y, and z coordinates and then storing these values in the array vector. Examples of the type of operations that will be able to be applied are finding the projection, normal and reflection of the vector.

2.3 Scene Class

To ensure the operations applied to the matrix and vector classes work correctly and to show the library in action I will produce some kind of visual output so a scene class will be needed. This will include functions to initialize and re size the window.

3 Likely Problems

Despite my design being relatively simple I have targeted a few areas that I foresee problems arising in. My main concern is finding a way to easily input the values into the matrix after a pointer to it is created when the constructor is called. I also foresee problems when multiple matrices are needed in one function and similarly how to access there values.

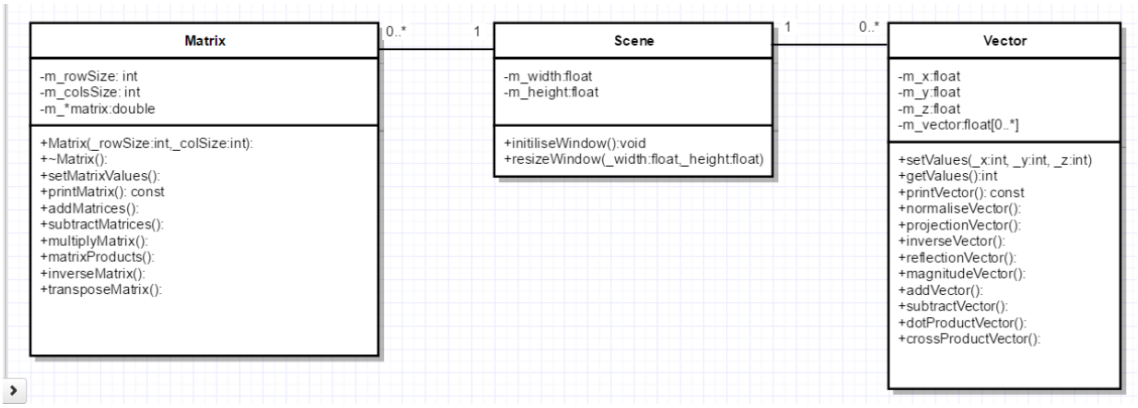

Figure 1: UML Diagram.