Programming Assignment 1

Syed Abeer Hasan Zaidi

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Program Description and Purpose of Assignment

The assignment was to make a matrix data structure that can perform a variety of operations, and have a variety of operations performed on it. This matrix should be able to store a variety of data types. The purpose of this assignment was to give us an in depth introduction into working with abstract data types and data structures.

The Data Structure

The matrix class made is able to load in data from an input file, which has to be names infile.txt , as well as output its matrix as an output file, outfile.txt. The data is accessed through pointers and the memory for each element in the matrix is allocated on the stack using the new call. This data is then deallocated using the delete and delete[] call, to delete arrays. The class includes an overloaded element function that allows the user to both see or change an element in the matrix. The class can also correctly perform matrix addtion and multiplication, and return the resultant matrix.

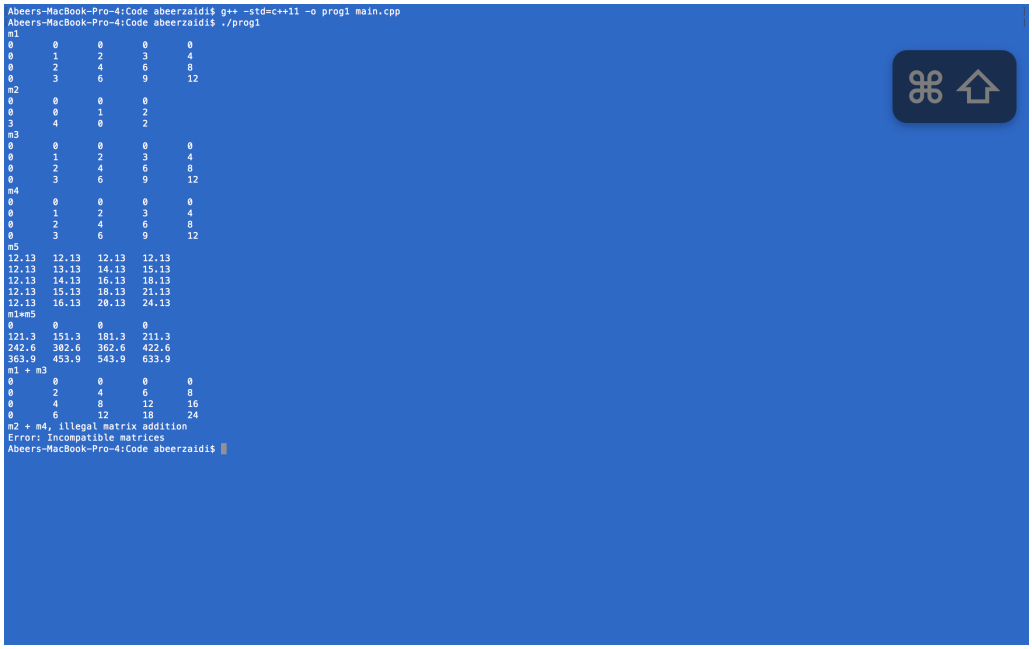
Compiling and Running instructions

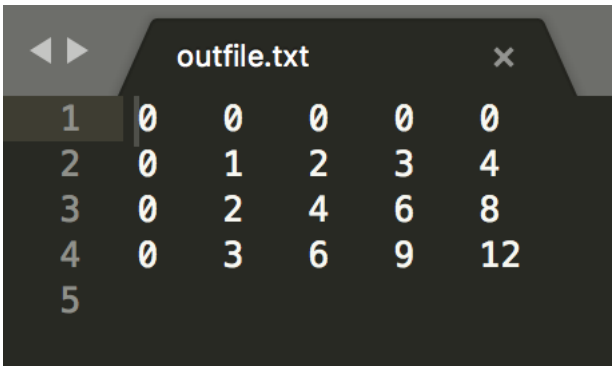
I compiled this program in my Macbooks terminal with the call g++ -std=c++11 -o prog1 main.cpp. I assigned the prog1 as the execution call, so the program would run in terminal when I would type ./prog1. The main function would then create a matrix, m1, and output its contents. After that it would create a second matrix, and populate it with inputs from a file called infile.txt. It would then test the file output function and output the matrix m1 as a text file called outfile.txt. The program would then create two copies of m1, m3 and m4, and output them for verification purposes. Matrix m3 was made using the copy constructor and matrix m4 was made using the copy assignment operator. It would then create a fifth matrix for multiplication purposes, and perform both valid and invalid operations on the exitsing matrices. The main function primarily tests the data structure, to make sure its working as it should be.

Logical Exceptions and bugs

The program handles exceptions and errors like if you're searching for an element thats outside the range of the matrix. It also deals with invalid addition or multiplication calls based on the dimensions of each matrix. It also handles invalid inputs into the matrix, type errors. However, the program currently can't properly handle multiplication between two different types of matrices, e.g. if a matrix filled with double elements is multiplied by a matrix filed with int elements. Also the program can't handle copy assignment calls and multiplication, or addition, calls at the same time, e.g. My_matrix m3 = m2*m1.

Testing Evidence




outfile.txt
1 0 0 0 0 0
2 0 1 2 3 4
3 0 2 4 6 8
4 0 3 6 9 12
5