

OPERATING SYSTEM PROJECT REPORT



Project Topic:

Matrix Calculator in C
using Thread

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Abstract

A matrix is a two-dimensional set of values used for storing numerical information, depicting transformations on a coordinate plane, computing statistical data, or even encoding neural networks. Matrix computations are taught in linear algebra and advanced modeling courses in college curricula, in preparation for use in real occupations.

Current free matrix calculators are often inaccurate, function under a user interface that is difficult to navigate, or lack important traits such as exportable data. The goal of the project was to engineer an application that performs most college-level matrix calculations while maximizing computational accuracy and usability. The program was coded to include a list of attributes that functioned as guidelines for optimizing the interface.

The calculator's performance was compared to other programs using function accuracy tests and a scoring matrix that included user interface assessments. A free matrix calculator with maximal usability and exact computational results will make calculations faster and easier, allowing matrices to truly become the standardized format for data storage

Introduction

Matrices are used in many different areas of math. They are useful for calculating changes in two-dimensional motion and in making changes to large groups of data. This method of storage is compact, reliable, and versatile, as it can be converted into many different forms.

However, even basic calculations with matrices can be tedious; operations as basic as multiplication require realigning the two factor matrices and multiplying long strings of elements for each section of the product matrix. For this reason, it is more efficient to use programmed calculators to perform operations on these data types.

In that project we perform various operation on matrix in C. Every Operation perform on 2×2 , 3×3 and 4×4 matrix. The reason is that all operation required same no of row and Column for Operation. So, for simplicity we make it menu driven for required order of Matrix.

Matrix Operation

As we Know that there are various Operation of Matrix in C. We have Performed that Operation with a Cursor Blinking Input. We have Performed Some of its Operation on Matrix which are given Below:

- Addition
- Subtraction
- Multiplication
- Scalar Multiplication
- Transpose
- Determinant
- Singular and Non-Singular Matrix

Project Detail

We have made this Project in C using Thread. Each Thread executes one operation on matrix. Project is Menu driven. On user Choice it performed the required Operation on Matrix. All Operations Performed on 2×2 , 3×3 and 4×4 matrix. Now we will discuss one by one each Operation in detail.

Addition:

In that Operation user have to enter the elements of First Matrix with a Cursor blinking (input). Then enter the Elements of Second Matrix and then user Computes its addition and Print on Screen.

Subtraction:

In that Operation user have to enter the elements of First Matrix with a Cursor blinking (input). Then enter the Elements of Second Matrix and then user Computes its subtraction and Print on Screen.

Multiplication:

In that Operation user have to enter the elements of First Matrix with a Cursor blinking (input). Then enter the Elements of Second Matrix and then user Computes its multiplication and Print on Screen.

Scalar Multiplication:

In that Operation user have to enter the elements of First Matrix with a Cursor blinking (input). Then enter the Multiplication Value and then user Computes its multiplication and Print on Screen.

Transpose:

In that Operation user have to enter the elements of First Matrix with a Cursor blinking (input). Then calculator check that the transpose of entered matrix will be possible or not. If Possible then Print on Screen. Otherwise show a message to User.

Determinant:

In that Operation user have to enter the elements of First Matrix with a Cursor blinking (input). Then calculator perform the operation on that and print on screen.

Singular and Non-Singular:

In that Operation user have to enter the elements of First Matrix with a Cursor blinking (input). Then calculator perform the operation on that if determinant is zero then print on screen.

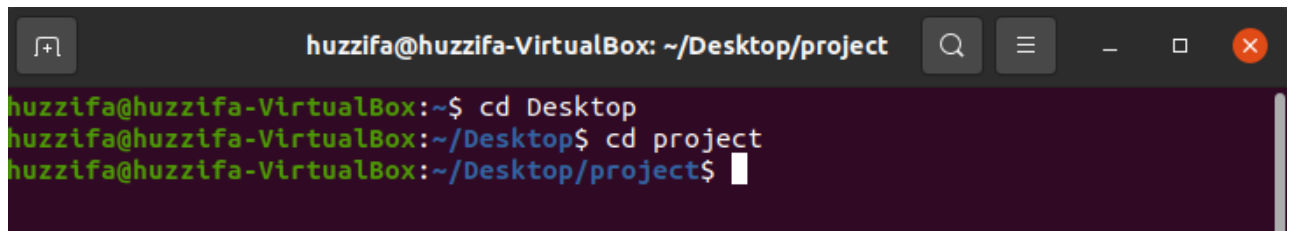
Project Features

This Project Perform the matrix operation in C. Following are the Features of that Project. All Operations Performed on 2*2, 3*3 and 4*4 matrix.

- Project is menu driven.
- Operates on 2*2, 3*3 and 4*4 matrix.
- Implementation with Threads.
- Gotoxy is Implemented.
- Clear command is Implemented.

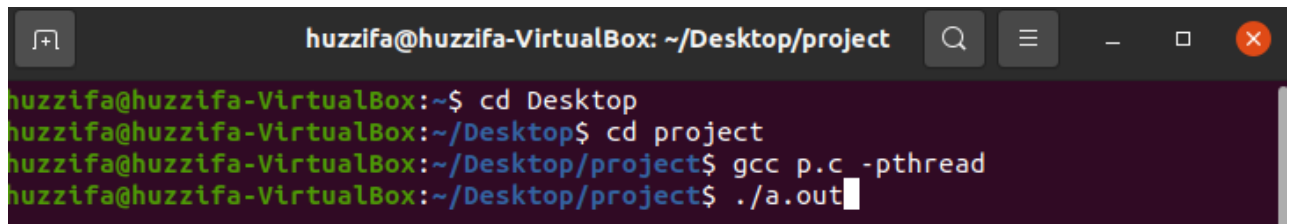
Steps for Compiling Project

- First you have to locate the required Directory through Terminal.

A terminal window titled 'huzzifa@huzzifa-VirtualBox: ~/Desktop/project'. The prompt is 'huzzifa@huzzifa-VirtualBox:~\$'. The user enters 'cd Desktop', and the prompt changes to 'huzzifa@huzzifa-VirtualBox:~/Desktop\$'. The user enters 'cd project', and the prompt changes to 'huzzifa@huzzifa-VirtualBox:~/Desktop/project\$'.

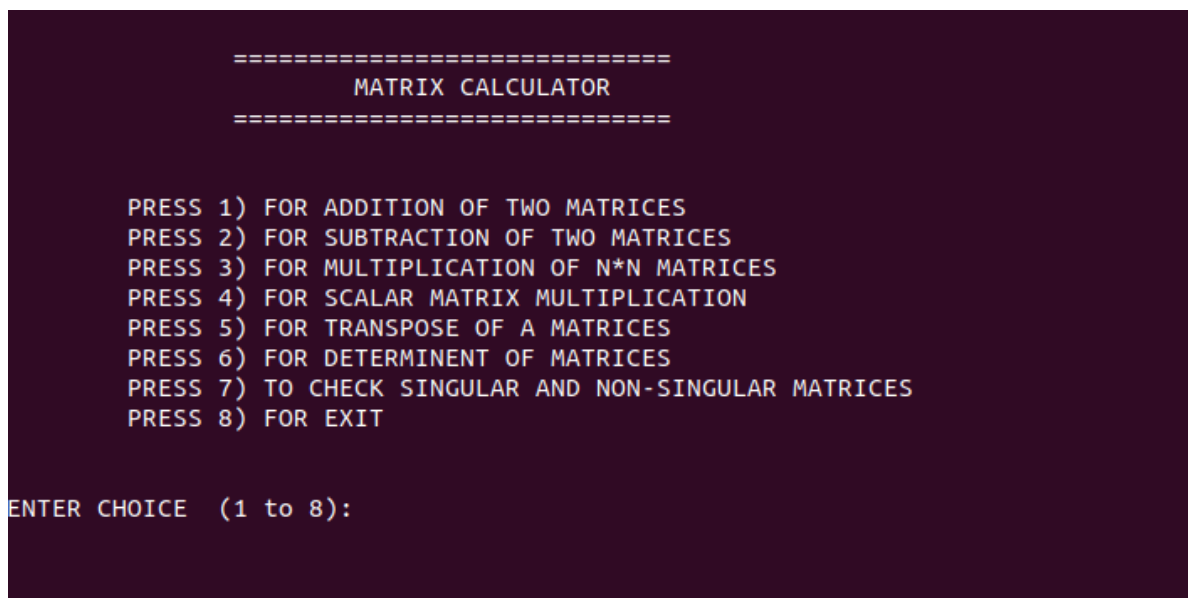
```
huzzifa@huzzifa-VirtualBox:~$ cd Desktop
huzzifa@huzzifa-VirtualBox:~/Desktop$ cd project
huzzifa@huzzifa-VirtualBox:~/Desktop/project$
```

- Then, you have to compile the thread file with keyword pthread.

A terminal window titled 'huzzifa@huzzifa-VirtualBox: ~/Desktop/project'. The prompt is 'huzzifa@huzzifa-VirtualBox:~\$'. The user enters 'cd Desktop', and the prompt changes to 'huzzifa@huzzifa-VirtualBox:~/Desktop\$'. The user enters 'cd project', and the prompt changes to 'huzzifa@huzzifa-VirtualBox:~/Desktop/project\$'. The user enters 'gcc p.c -pthread', and the prompt changes to 'huzzifa@huzzifa-VirtualBox:~/Desktop/project\$'. The user enters './a.out', and the prompt changes to 'huzzifa@huzzifa-VirtualBox:~/Desktop/project\$'.

```
huzzifa@huzzifa-VirtualBox:~$ cd Desktop
huzzifa@huzzifa-VirtualBox:~/Desktop$ cd project
huzzifa@huzzifa-VirtualBox:~/Desktop/project$ gcc p.c -pthread
huzzifa@huzzifa-VirtualBox:~/Desktop/project$ ./a.out
```

- Then, you have to compile out file.

A screenshot of a C program output. It shows a menu for a 'MATRIX CALCULATOR' with 8 options. The prompt 'ENTER CHOICE (1 to 8):' is visible at the bottom.

```
=====
MATRIX CALCULATOR
=====

PRESS 1) FOR ADDITION OF TWO MATRICES
PRESS 2) FOR SUBTRACTION OF TWO MATRICES
PRESS 3) FOR MULTIPLICATION OF N*N MATRICES
PRESS 4) FOR SCALAR MATRIX MULTIPLICATION
PRESS 5) FOR TRANSPOSE OF A MATRICES
PRESS 6) FOR DETERMINENT OF MATRICES
PRESS 7) TO CHECK SINGULAR AND NON-SINGULAR MATRICES
PRESS 8) FOR EXIT

ENTER CHOICE (1 to 8):
```

Conclusion

In this way you can easily use the required Operation. Project Perform the matrix operation in C. All Operation Performed using Threads. All Operations Performed on 2×2 , 3×3 and 4×4 matrix. In case of Addition and Subtraction user performed the operation. But in case of Transpose of an entered matrix it first checks the possibility of transpose for the entered matrix and then perform the operation. You can easily exit the project by pressing the Required option.