

Matrix Calculator

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GitHub QR code:



GitHub QR link:

<https://github.com/MaHmoudHaBlaSs/Array.h>

Our project is based on functions that works on one matrix or two matrices.

The functions for one matrix are:

- 1-Multiply Matrix By Number [Scalar Multiplication].
- 2-Get Summation of The Main Diagonal.
- 3-Get Sum Of Each Row.
- 4-Interchange The Diagonals.
- 5-Check Lower ,Upper Or Diagonal Matrix.
- 6-Transpose Matrix
- 7-Check Sparse.
- 8-Check Symmetric

The functions for two matrices are:

- 1-Add The Two Matrices.
- 2-Subtract The Two Matrices.
- 3-Multiply The Two Matrices.
- 4-Check Equality of The Two Matrices

To build the program we used a main file called "App.c", a header called "array.h" and made a library called "2D_File.c" so when the main file runs, it calls the functions from the header "array.h" using the library "2D_File.c".

For example:

```
Enter The Type of Operation 1 for 1-Operand Operation & 2 for 2-Operand Operation :
1
Enter Number of Rows : 3
Enter Number of Columns : 3
Initialize The Matrix :
5 4 7
5 6 2
12 36 5
+5 +4 +7
+5 +6 +2
+12 +36 +5

Select Operation :
1-Multiply Matrix By Number [Scalar Multiplication].
2-Get Summation of The Main Diagonal.
3-Get Sum Of Each Row.
4-Interchange The Diagonals.
5-Check Lower ,Upper Or Diagonal Matrix.
6-Transpose Matrix
7-Check Sparse.
8-Check Symmetric
3
Sum Of Row 0 = 16
Sum Of Row 1 = 13
Sum Of Row 2 = 53
Press Esc to Exit , Else to Continue ...
```

To initialize one matrix, write 1, then enter how many rows and columns then enter the numbers then choose a function by typing it's number and here I chose to get the sum of each row by typing "3".

Another Example:

```
Enter The Type of Operation 1 for 1-Operand Operation & 2 for 2-Operand Operation :
2
Enter Number of Rows For The First Matrix : 2
Enter Number of Columns For The First Matrix : 3
Initialize The First Matrix :
2 5 4
-8 +5 0
+2 +5 +4
-8 +5 +0

Enter Number of Rows For The Second Matrix : 3
Enter Number of Columns For The Second Matrix : 2
Initialize The Second Matrix :
2 5
+8 -8
1 0
+2 +5
+8 -8
+1 +0

Select Operation :
1-Add The Two Matrices.
2-Subtract The Two Matrices.
3-Multiply The Two Matrices.
4-Check Equality of The Two Matrices
3
+48 -30
+24 -80

Press Esc to Exit , Else to Continue ...
```

It is very similar to the previous example but here you initialize two matrices and pay attention to the number of rows and columns for the two matrices or it won't run and here is an example:

```
Enter The Type of Operation 1 for 1-Operand Operation & 2 for 2-Operand Operation :
2
Enter Number of Rows For The First Matrix : 2
Enter Number of Columns For The First Matrix : 3
Initialize The First Matrix :
2 5 4
-9 8 0
+2 +5 +4
-9 +8 +0

Enter Number of Rows For The Second Matrix : 2
Enter Number of Columns For The Second Matrix : 2
Initialize The Second Matrix :
2 5
-8 4
+2 +5
-8 +4

Select Operation :
1-Add The Two Matrices.
2-Subtract The Two Matrices.
3-Multiply The Two Matrices.
4-Check Equality of The Two Matrices
1
Invalid Dimensions Passed !
Press Esc to Exit , Else to Continue ...
```

In the end, you can close the program by tapping the Esc button, or make another program by tapping any other key.