SANJAY GHODAWAT UNIVERSITY

Kolhapur

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PROJECT PRESENTATION
On

"MATRIX CALCULATOR"

By

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Introduction

A matrix is a rectangular array of numbers or symbols arranged in rows and columns. There are different types of matrices like row matrix, column matrix, horizontal matrix, vertical matrix, square matrix, diagonal matrix, identity matrix, equal matrix, singular matrix, etc. The three basic matrix operations are addition, subtraction, and multiplication. The following section contains various C programs on matrix operations, matrix types, matrix diagonals, sparse matrix, invertible matrix, and adjacency matrix.

Each sample program on the matrix includes a program description, C code, and program output . All examples have been compiled and tested on Windowsand Linux systems.

Problem definition

1.Input: The input to the program would typically include the matrices to be added, subtracted, or multiplied, as well as any additional information needed for the specific problem, such as the dimensions of the matrices.
2. Output: The output of the program would typically include the resulting matrix from the addition, subtraction, or multiplication operation, as well as any additional information needed for the specific problem.
3. Constraints: The problem definition would typically include any constraints on the input matrices or the operation, such as the dimensions of the matrices or the type of numbers they contain

Objectives

- This program will help student to solve matrix problem easily.

- C programming language supports matrix as a data type and offers more flexibility. And also it consumes less memory while processing.

- By storing values in a matrix rather than as individual variables, C program can access and perform operations on the data more efficiently.

- It is easier to extract information about object rotation, and also easy to manipulate in the C program

Scope

- Basic matrix operations: Addition, subtraction and multiplication of matrices.
- Linear algebra: Matrix addition, subtraction, and multiplication are fundamental operations in linear algebra, and are used in many algorithms and computations in this field.

- Computer graphics: Matrix addition, subtraction, and multiplication are used for performing transformations on objects in computer graphics, such as translation, rotation, and scaling.

- Scientific computing: These operations are used in various scientific computing applications, such as solving partial differential equations and simulating physical systems.

- Machine learning: Matrix addition, subtraction, and multiplication are used in many machine learning algorithms, such as linear regression and neural networks.

- Robotics: Robotics heavily relies on Linear Algebra, these operations can be used for controlling the movement of robots and determining the position and orientation of robots in space.

Problem identification

1. Incorrect matrix dimensions: If the matrices being added, subtracted, or multiplied have different dimensions, the program will not work as expected.

2. Memory allocation issues: Improper memory allocation for the matrices can result in incorrect results or program crashes.

3. Incorrect mathematical operations: If the mathematical operations for matrix addition, subtraction, and multiplication are implemented incorrectly, the program will not produce the correct results.

4. Data type issues: Mixing data types such as using float values for one matrix and int values for another can result in unexpected results.

5. Input validation: Failing to validate user input can result in incorrect results or crashes.

System requirement specification

- Software Requirement:

  Dev C++
- Hardware Requirement

  Laptop
  Intel(R) Core(TM) i3-Processor
  RAM-1 GB Minimum
  Storage-100GB

Methodology

Step 1: Start the Program.
Step 2: choice the calculator option
Step 3: Enter the row and column of the first (a) matrix.
Step 4: Enter the row and column of the second (b) matrix.
Step 5: Enter the elements of the first (a) matrix.
Step 6: Enter the elements of the second (b) matrix.
Step 7: process of calculation which you have selected
Step 8: printing final matrix
Step 9: End

Output design

```
1.addition
2.subtraction
3.multiflication
ENTER YOUR CHOICE:2
enter the number of rows and columns for: A(between 1 to 50):3
3
enter the number of rows and columns for: B(between 1 to 50):3
3
```

```
enter element of 1st matrix:
enter element a11:1
enter element a12:2
enter element a13:3
enter element a21:4
enter element a22:5
enter element a23:6
enter element a31:7
enter element a32:8
enter element a33:9
enter elements of 2nd matrix:
enter element b11:0
enter element b12:1
enter element b13:2
enter element b21:3
enter element b22:4
enter element b23:5
enter element b31:6
enter element b32:7
enter element b33:8
subtraction of two matrices:
1   1   1
1   1   1
1   1   1
```

Advantages

There are several advantages of using matrices in C programming:

1)Simplicity: Matrix operations are simple mathematical operations that can be easily performed and understood.

2)Versatility: Matrix operations are used in many different fields, including engineering, physics, computer science, and economics, making them a versatile tool.

3)Compact representation: Matrices provide a compact and efficient representation of large amounts of data.

4)Image and signal processing: Matrix operations are widely used in image and signal processing, where they are used to transform and manipulate digital signals.

Future scope

1. Optimization: With the advancement of computer hardware, the optimization of matrix operations in C programming is crucial for achieving faster results and reducing computational time.

2. Parallel computing: With the increasing demand for high-performance computing, parallel computing techniques can be applied to matrix operations to improve the computational efficiency.

3. Machine learning applications: Matrix operations play a crucial role in many machine learning algorithms, such as neural networks and support vector machines. As machine learning continues to advance, the importance of matrix operations in this field is expected to grow.

4. Graphic processing: Matrix operations are widely used in computer graphics for transforming and manipulating 2D and 3D objects. With the increasing demand for high quality graphics and animations, the scope for matrix operations in computer graphics is expected to grow.

Conclusion

• In conclusion, matrix addition, subtraction, and multiplication are essential concepts in linear algebra and computer programming.

• These operations are widely used in various fields such as computer graphics, computer vision, machine learning, and more.

• The implementation of matrix operations in C programming involves reading the elements of the matrices, performing the mathematical operations, and displaying the result.

• The future scope of matrix operations in C programming is vast, with potential developments in areas such as optimization, parallel computing, machine learning applications, graphic processing, and big data processing.

• Overall, matrix operations are fundamental to many areas of computer science and engineering and their importance is expected to continue to grow in the future.

References

Websites:

1. WWW.javatpoint.com
2. WWW.easycalculation.com

Books:

1. computer fundamentals and programing in c
   - Reema thareja
2. C,the complete reference
   - Herbert schildt

THANK YOU