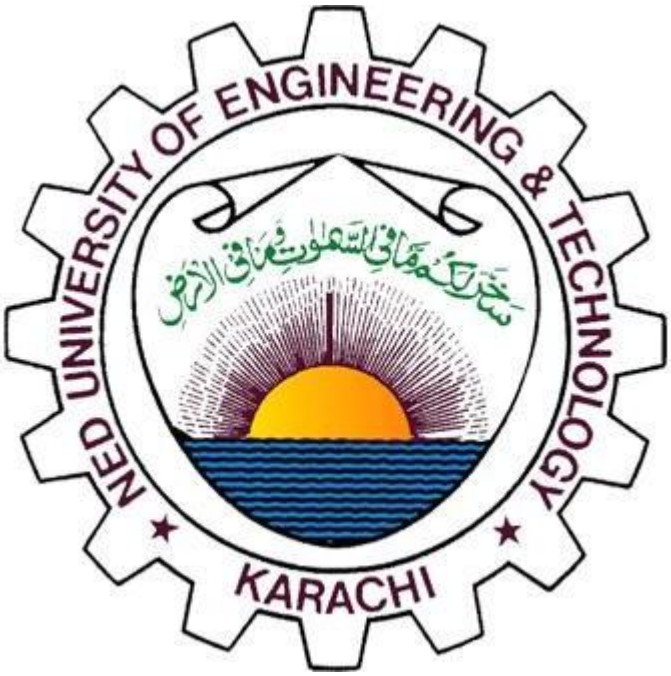
CCP-Proposal



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Introduction

In the modern era of scientific computing, matrices play a vital role in various domains such as engineering, computer graphics, data science, physics, and applied mathematics. Performing matrix operations manually can be time-consuming and prone to errors, especially when dealing with large data sets.
To address this, our project — **Matrix Calculator** — aims to create a **C based console application** that performs a wide range of matrix operations efficiently and accurately.

The system will provide users with a simple yet powerful interface to perform key matrix functions such as addition, subtraction, multiplication, transpose, determinant, and inverse. This project demonstrates our understanding of **arrays, functions, loops, and logical implementation** in C

Objectives

The main objectives of the Matrix Calculator project are:

1. To develop a user-friendly calculator capable of performing essential matrix operations.
2. To strengthen our programming skills in C using arrays, loops, and functions.
3. To implement mathematical logic for matrix computation in a structured manner.
4. To reduce the manual effort involved in solving matrix-related problems.
5. To enhance understanding of **two-dimensional arrays** and **modular programming** concepts.

Scope of the Project

The Matrix Calculator will serve as a versatile tool for both students and professionals who work with matrices.
The scope includes:

- Performing basic arithmetic operations on matrices.
- Computing matrix properties such as **transpose, determinant**
- Supporting matrices up to a predefined size .
- Displaying results in a clear and readable format.
- Ensuring accurate results through error handling for invalid inputs (e.g., incompatible matrix size

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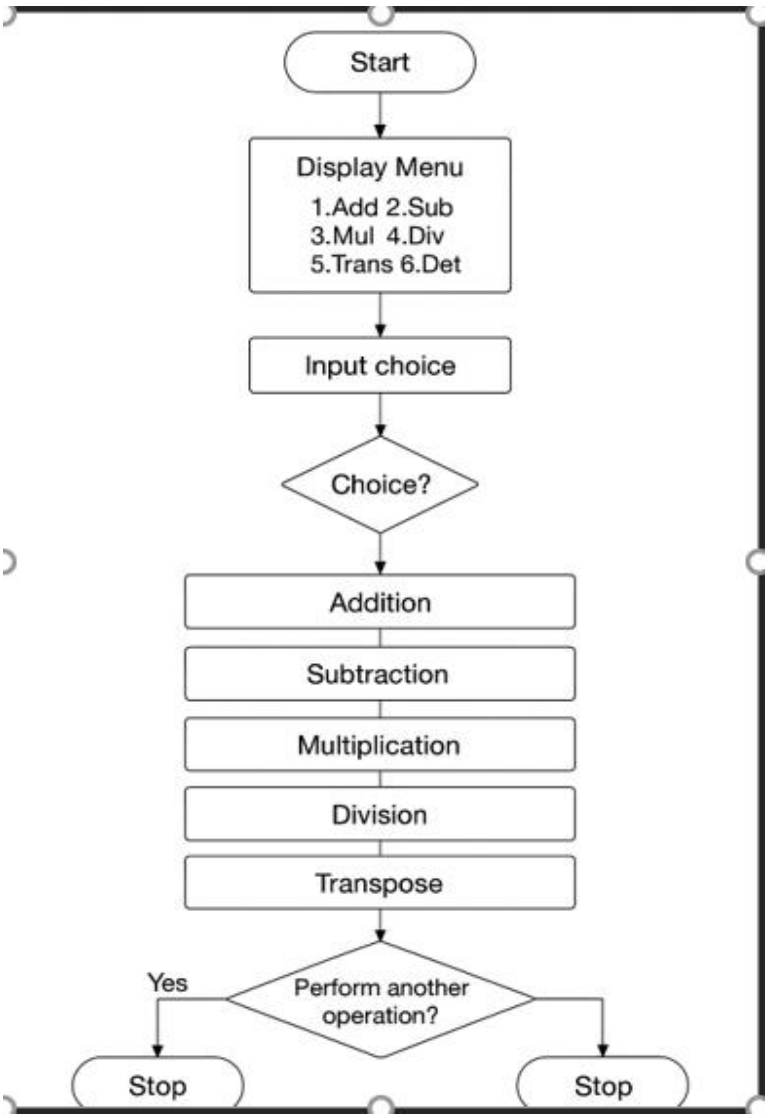
Algorithm Design

Creating flowcharts and algorithms for operations such as addition, subtraction, multiplication, transpose, determinant, and inverse.



5. Features

The **Matrix Calculator** will include the following main features:

Operation	Description
Matrix Addition	Adds two matrices of the same order
Matrix Subtraction	Subtracts one matrix from another
Matrix Multiplication	Multiplies two compatible matrices
Transpose	Swaps rows and columns
Determinant	Computes determinant of a square matrix
Inverse	Calculates the inverse (if determinant ≠ 0)
Display Function	Shows matrices in formatted form

Tools and Technologies

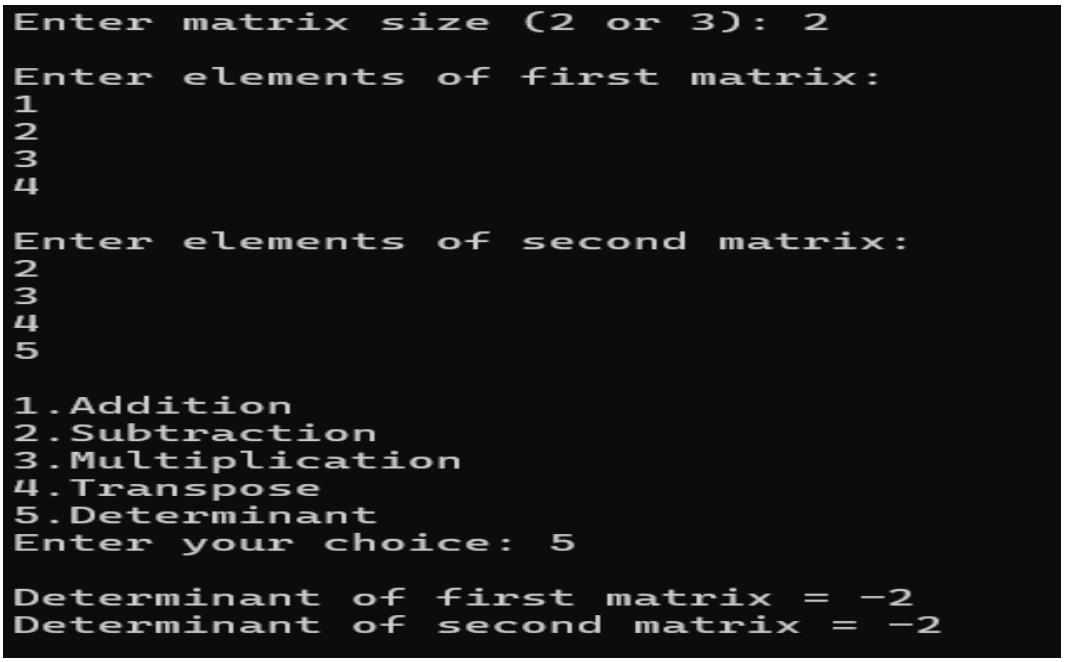
Category	Details
Programming Language	C
IDE	Dev-C/ Code::Blocks
Operating System	Windows
Data Structure	Two-Dimensional Arrays
Development Type	Console-Based Application

Expected Output

Upon successful completion, the project will:

- Accurately perform matrix operations.
- Serve as a learning tool for understanding matrix concepts in programming.

- Exhibit good coding practices, including modularity and error handling.
- Enhance logical and analytical skills through algorithm design.



Future Enhancements

Future development may include:

1. Graphical User Interface (GUI) using Qt or Python Tkinter.
2. File input/output for saving and loading matrices.
3. Support for floating-point operations and larger matrices.

Conclusion

The **Matrix Calculator** project is an efficient and educational application designed to strengthen our understanding of programming and mathematical logic. It combines theoretical knowledge of matrices with practical coding experience. This project will not only simplify matrix operations but also improve our computational thinking, teamwork, and problem-solving skills.
