**PAF- KARACHI INSTITUTE OF ECONOMICS & TECHNOLOGY**

**College of Engineering**

# Algorithm And Data Structures

# Open Ended Lab

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**Class ID:** 104770, 104769

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|---|---|---|---|---|---|
| **PLOs** | **PLO2 – Problem Analysis** | | **Bloom's Taxonomy** | **C4 – Analyze** | |
| | **PLO3 – Design and Development** | | | **C3 – Apply** | |
| | **PLO9 – Individual and Teamwork** | | | **A3 – Assume responsibility** | |
| **COMPLEX ENGINEERING PERFORMANCE** | | | | | |
| **CLO's** | **Aspects of Assessments** | **Excellent (75-100%)** | **Average (50-75%)** | **Poor (<50%)** | **Marks** |
| **CLO2 40%** | **Problem Analysis** Problem identification, analysis /literature review, resulting in meaningful conclusions | Completely identifies the problem in question through efficient analysis/produces near to exact results | Partially identifies the problem in question and with academic support produces the required results. | Lack of identification of the problem, needing more than par support to analyze the problem and production of results. | |
| **CLO3 30%** | **Design & Development** Design / Develop solutions for complex engineering problems covered under the scope of this course | A complete solution / Explain necessary theories according to task description with great use of time and resource material. | Solution was complete but need minor modifications / student could have followed specification more closely. | Solution was complete but did not work, needed several modifications / did not make correct use of resource material or instructions. | |
| **CLO7 30%** | **Team Work** Completion of Lab tasks with proper team work and contribution. | Proactively work with other team members to complete assigned tasks. | Worked well with team but did not offer much positive feedback. | Very little, if any, contributions to group and less contribution in completion of overall lab tasks. | |
| | | | | **Total Marks: 30** | |

# SCIENTIFIC CALCULATOR

## (GUI)
## Using Algorithm and Data Structures
## And Object Oriented Programming (C#)

*Submitted by <AHSAN NADEEM – 10812>, Class ID <104770>*
*<M.MUNEEB – 10731>, Class ID <104769>*

## ABSTRACT

**This work was centered on the Design and implementation of a scientific calculator for education organization. The study traced the calculator system as a tool to completely change mathematical knowledge and sophisticated problems solving strategies had advanced the field of simulated engines in mathematics. The end result of a simple calculator system was its ability to process numbers and operators, and provides a useful result.**

**By using this GUI based calculator like mathematical tool can simplify everyday problems and tasks. Calculations and organized and reliable, making error-prone hand calculations unnecessary. The calculator is very easy to use, and even for beginners. Physically, the calculator is thin and light for optimal portability. Aesthetically, it is sleek and stylish, without sacrificing ergonomics. Because this calculator is portable, easy to use, and drains little power, it could be used extensively in third world countries. Several fields are greatly improved by the calculator, including education, commerce, and scientific research. In the professional sector,**

## INTRODUCTION

Our group choose this project because in this project we apply all function and statement what we studied till now. The scientific calculator is a type of an electronic calculator in which different calculating methods are involved. The methods contain scientific, mathematical and some methods related to engineering. These types of calculators are used when one is going for a higher education, because higher education contains these types of essential elements. Other than that, the scientific calculators have more features as compared to the ordinary calculator in which many kinds of calculations can be performed. The functions which are involved in this type of calculator are scientific notation, floating point values, logarithmic functions, exponential functions, complex numbers, vectors addition and subtraction, permutation and combination, HCF and LCM, equation solving, matrix calculations.

## DEVELOPMENT

Acknowledging that it is difficult to appeal to students with varying levels of experience, perhaps there could be some more instruction on programming for less experienced students. The code reviews were also helpful.

We used in project

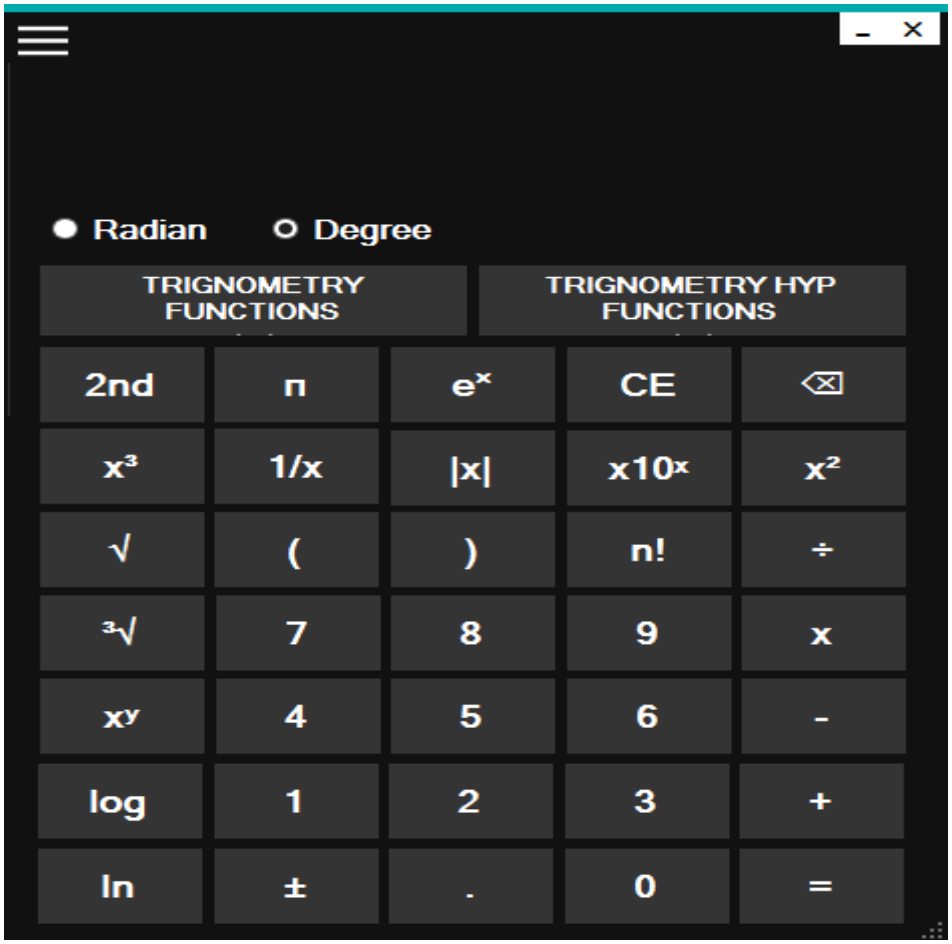
- Infix to postfix Conversion
- Postfix evaluation
- GUI Base

Our project perform various Operation's like:

- Expression solving using Infix-To-Postfix Conversion And Evaluation
- Equation Solving
- Matrix Problem Solving
- Trigonometric Functions

## CONSTRUCTION

In this part, details about the project's construction, how it was put together and how it is powered. The information in this section should be presented in a manner simple enough that your juniors from future semesters could understand on the very first day of the class, while still being technically accurate. In this project, we use OOP (C#) (GUI). We first make its console version in order to test our logic and code whether it is working correctly or not? Through this we can fix Bugs in our project and then convert it into (GUI).

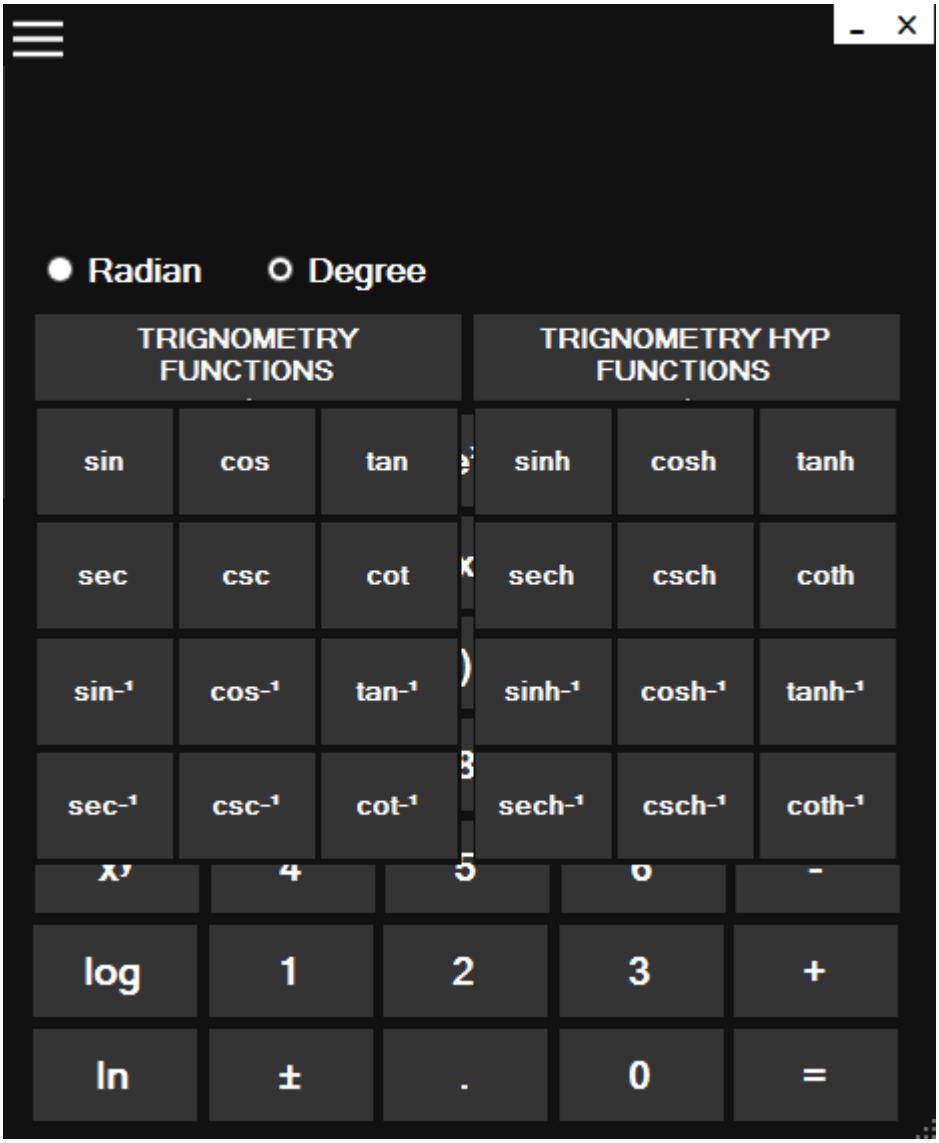



We try to make our project like the one in our Windows (8, 10).

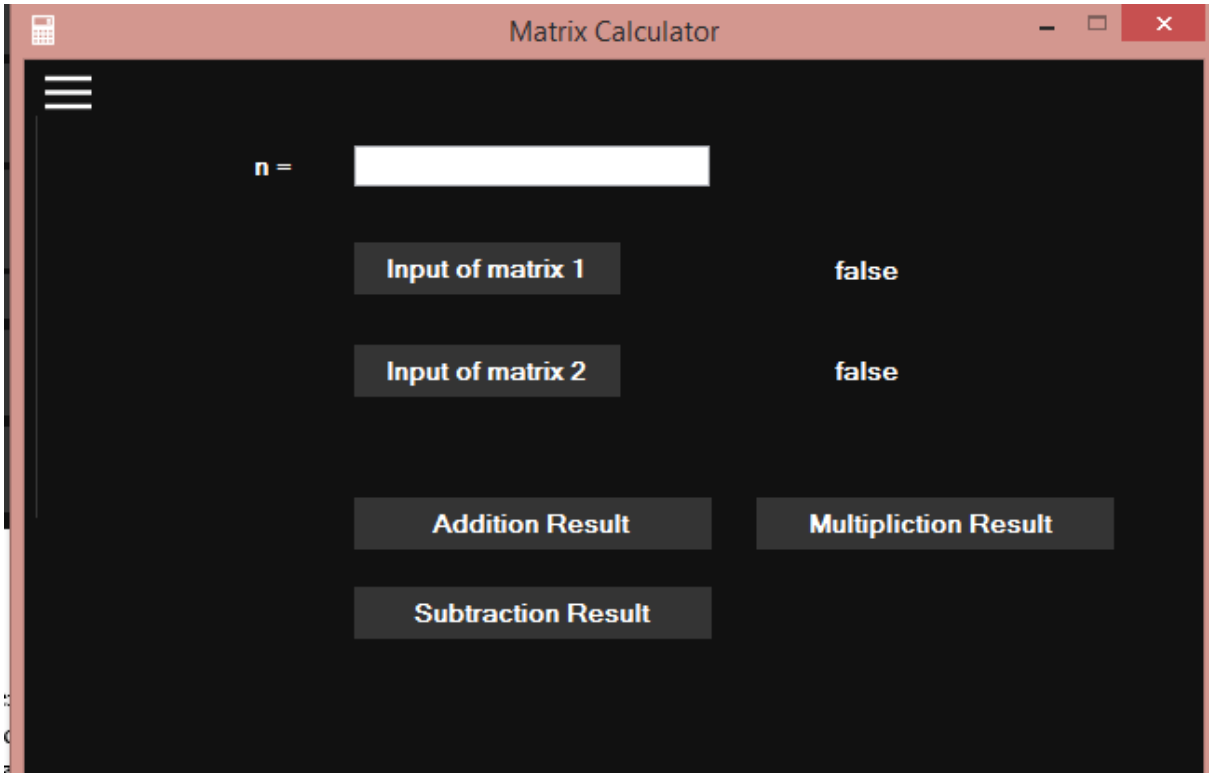
For that purpose we keep our design of

calculator simple and clean.

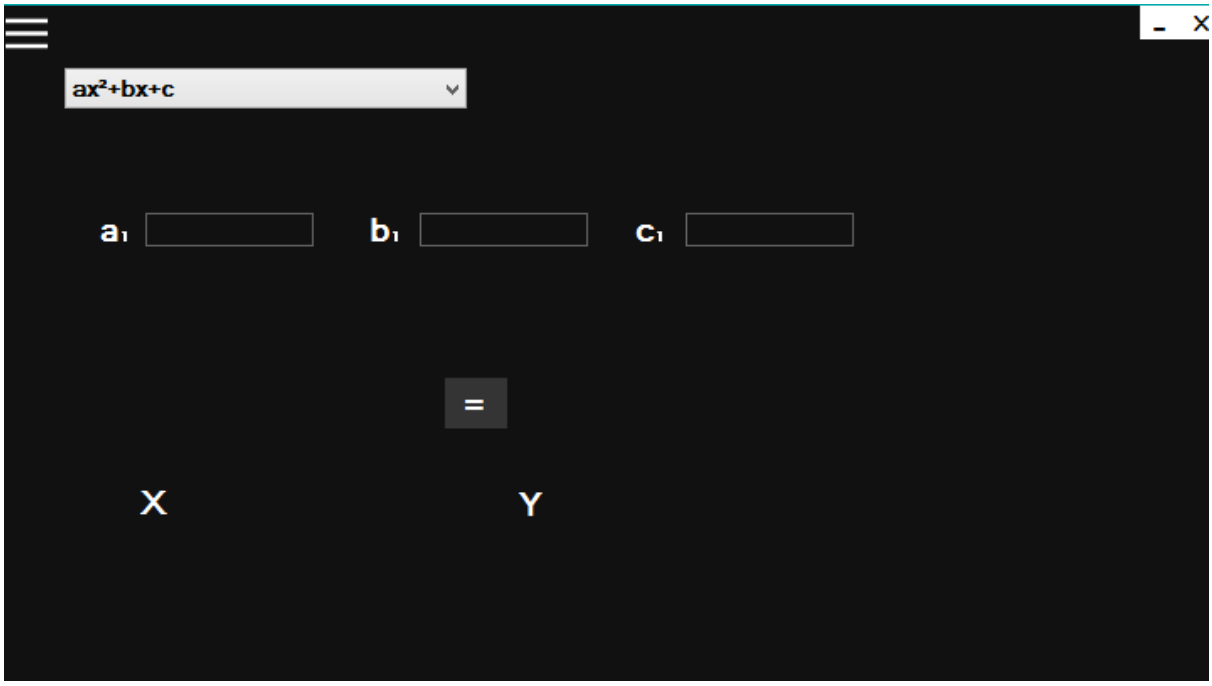
For that we choose to design our project using black and white theme. With some simple transitions.




## MATRIX CALCULATOR:




## EQUATION SOLVER




In addition in our project, we also add some **Number System Conversions**

**For example:**

1. Binary to decimal
2. Binary to octal
3. Binary to Hexa-Decimal
4. And it’s Arithmetic operation.

And so on.

## APPLICATIONS

In most countries, students use calculators for schoolwork. There was some initial resistance to the idea out of fear that basic arithmetic skills would suffer. There remains disagreement about the importance of the ability to perform calculations "in the head", with some curricula restricting calculator use until a certain level of proficiency has been obtained, while others concentrate more on teaching estimation techniques and problem-solving. Research suggests that inadequate guidance in the use of calculating tools can restrict the kind of mathematical thinking that students engage in. Others have argued that calculator use can even cause core mathematical skills to atrophy, or that such use can prevent understanding of advanced algebraic concepts.

There are other concerns - for example, that a pupil could use the calculator in the wrong fashion but believe the answer because that was the result given. Teachers try to combat this by encouraging the student to make an estimate of the result manually and ensuring it roughly agrees with the calculated result. Also, it is possible for a child to type in $-1 \times -1$ and obtain the correct answer '1' without realizing the principle involved. In this sense, the calculator becomes a crutch rather than a learning tool, and it can slow down students in exam conditions as they check even the most trivial result on a calculator.

## TESTING

Testing is the major control measure used during software development. Its basic function is to detect errors in the software. During requirement analysis and design, the output is a document that is usually textual and no executable. After the coding phase, computer programs are available that can be executed for testing purpose. This implies that testing not only, has to uncover errors

introduced during coding, but also errors introduced during previous phase. Thus the goal of testing is to uncover the requirements, design and coding errors in the programs. The program involves many type of conversions. These conversions has to done carefully

## CONCLUSION

The project will be designed and implemented based on the following assumption. That the use C sharp programming language will make the program to run on any computer. That the project will ensure timely and accurate processing in computer. That the speed of the computer will improve after the implementation of the anticipated simple scientific calculator. Finally, having done this that the facts and figures manipulated are reliable, the designed software to run primarily.

## REFERENCES


- **Stack Overflow:** https://stackoverflow.com/
- **Microsoft Docs:** https://docs.microsoft.com/en-us/dotnet/api/system?view=net-5.0