Review of an efficient scientific calculator

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Abstract:

Scientific calculators are being used widely in our modernized education system. It has made our daily life effortless and also acts as the principal key for calculations. With the acceptance of mathematics in science and technology, it required the calculation to be speedy and accurate. Scientific calculators are multi-purpose, it is functional in every field of science. So, every human must be proficient at computing skills .This research has successfully described design and development of a scientific calculator program. This report outlines the design and development of computer software system with the help of Visual Studio code. The program is written in C language. Basically all basic operations including all trigonometric functions can be done in this calculator.

Keywords: Scientific calculator, C language, Microsoft Visual Studio code, Trigonometric functions.

1. Introduction

Generally, Basic arithmetic to complex mathematics will be easier to solve with the application of calculator since early 1960s-invention of solid-state calculator. With the advancement of technology, virtual calculators came in scenario which doesn't exists in reality. C programming language was developed by Dennis Ritchie at Bell Laboratories of AT&T in the time between 1972 and 1973 to build an operating system. Subjects mainly related to engineering and technology, are highly computational. So, it will be difficult to evaluate a subject without taking the help of science invention. Calculator is now reached in every hand. But it is unfortunate that most of the student community is not fully familiar with the proper usage of calculator. In order to catch up with the scientific world it is important to know the full operation of calculator. Here a scientific calculator is made that doesn't have a physical form but it exists in codes.

2. Literature survey

Calculators are part and parcel of modern education. Involvement of science and engineering in different fields of knowledge is increasing with each bit of time is passed by, and they are playing a role in description and characterization of the delicate phenomena of nature arising day by day.

A researcher has shown us [1] how to smartly utilize the computation efficiently to do tricky calculations. Even number systems calculations can be easily done by using this calculator. Not only number systems, is anyone able to calculate the total power of their house and monthly electricity bill by just simply multiplying the values.

Another group of researchers [2] has shown us that scientific calculators can also be used by giving voice commands for solving equations. Apart from that, the usage of a scientific calculator should be learnt properly. A researcher has shown us how to properly use [3] scientific calculator to get the most out of it while doing any kind of complex operations.

A typical scientific calculator it allows students to evaluate arithmetic expressions entered from the keyboard; numbers and operators are entered; and pressing return gives the numeric result of the calculation. In addition, ChemCalc [4] knows the atomic weights of the elements, Avogadro's number, and some useful constants. Whenever an atomic symbol is found in the expression to be evaluated, the atomic weight is substituted. Likewise, the gas constant is substituted for R, Avogadro's number is substituted for A, 3.14159 is substituted for II, etc. This makes easy entry of expressions to calculate the weight percentage of an element in a molecule or the molecular weight of a compound. The most fabulous thing of a calculator is that it needs very low computation power to operate. Keeping this in mind, a microcontroller based [5] scientific calculator is also created to show the versatility of calculator specifically scientific calculator.

Evolution of calculator:

1963

1975

2022

3. Objectives

A normal calculator performs various operations/calculations on different numbers supplied by the user. As an example, scientific calculators can perform normal and trigonometric calculations. This project explains the method of scientific calculator using c programming. The purpose of this project is to create an effective calculator where user can easily calculate complex mathematical problems which are incapacitate in normal calculator.

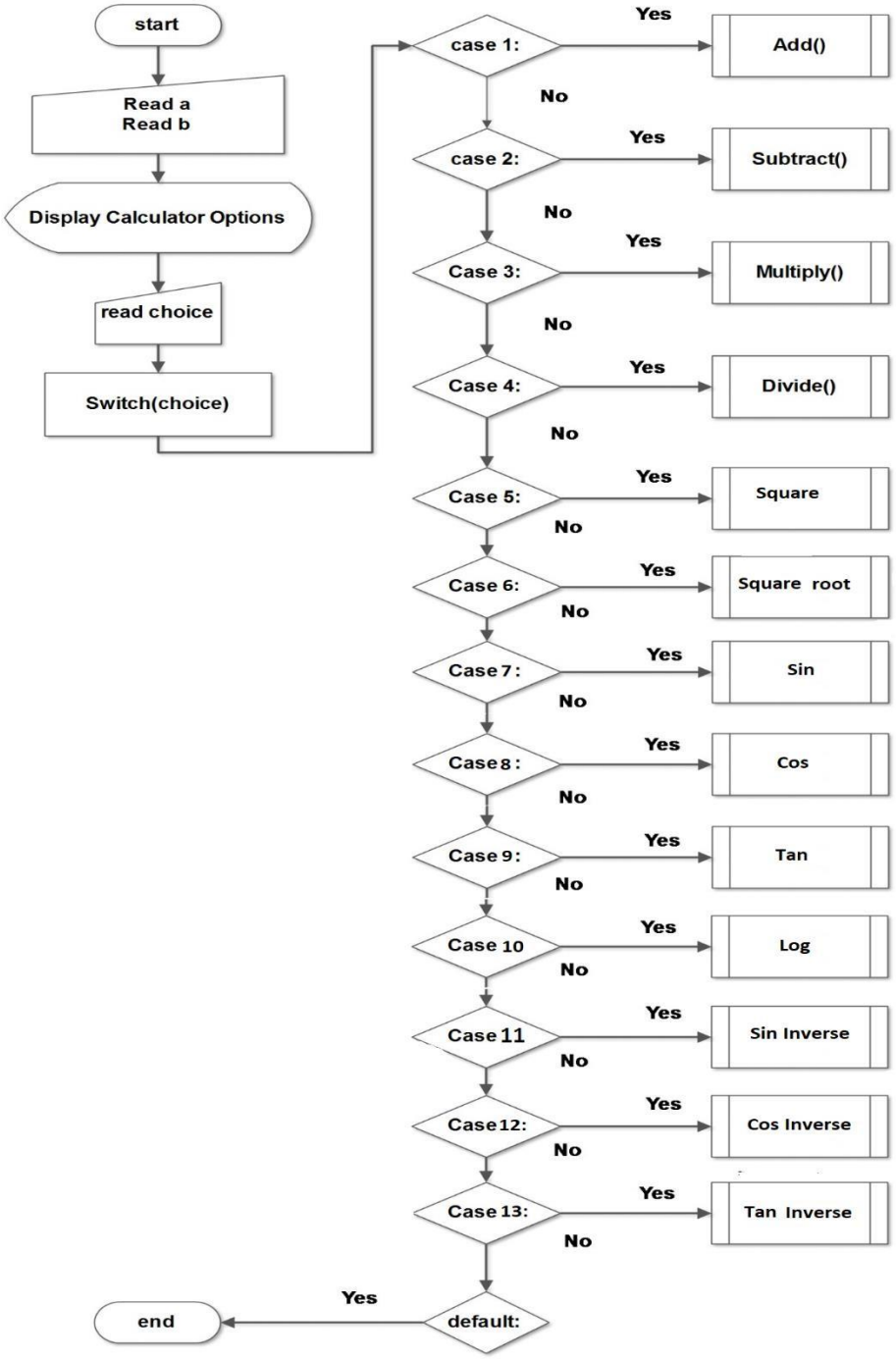

Figure 1: Block diagram of scientific calculator

4. Working Principle

Scientific calculators are nothing but just a different kind of calculator with some extra features. In normal calculator, four basic operations like addition, subtraction, multiplication and division

are performed. But trigonometric functions (sine, cosine, tangent), inverse trigonometry, and even logarithmic values also can be evaluated in the scientific calculator,

Flow chart of the proposed scientific calculator is shown in Figure 1.

In the flowchart, the logic is shown how it is actually working. First and foremost reading a and b all calculating features will be shown. Then the input will be given by user. Now all functional and logical operations will happen in processing unit. Finally the result will be shown in the display.

- User will have to run the source code in a C compiler.
- A menu will appear on screen.
- In the menu, there will be options with corresponding numbers (i.e., if user wants to do addition, then he or she will have to give input the corresponding number).
- User will provide the input of one or two numbers according to operation.
- Lastly, computer will calculate and will provide answer with accuracy up to six digits after decimal.

5. Result and discussion

The source code has been implemented for the proposed work and has been verified. It has been found that the source code is correct. Here three examples dictating three functions like sin function, logarithm and square root function have been taken for the understanding of the proposed research work. Figure 2 shows the menu list at starting of the proposed calculator.

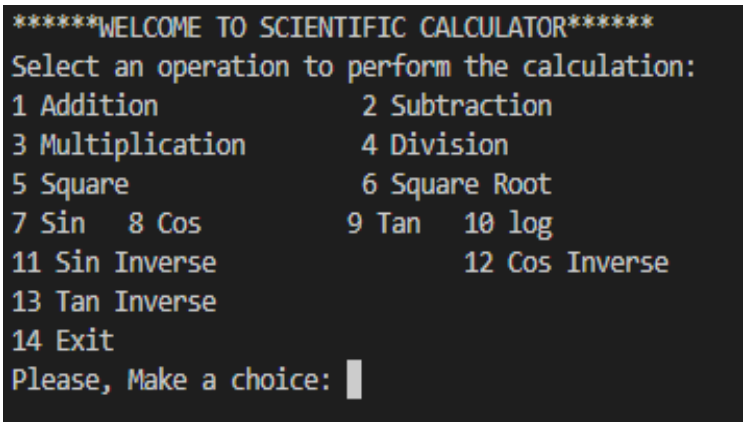

Figure 2: Screenshot of the proposed calculator

Example 1: Sin Function

With sin function, the input value is provided in radian (as degree values are known prior to us) by the user and proposed code as explained in Figure 3 has been implemented to get the results with accuracy up to six digits after decimal.

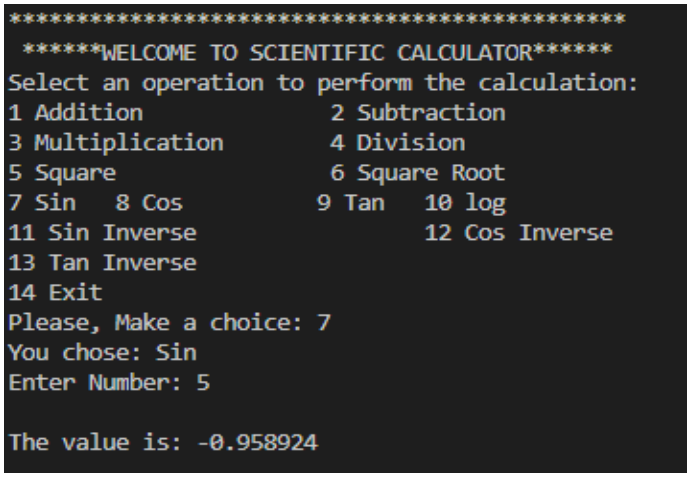

Figure 3: Screenshot of sin function

Example 2: Log function

If a user needs a result of a logarithm function, then it can also be done by using the proposed code as explained in Figure 4.

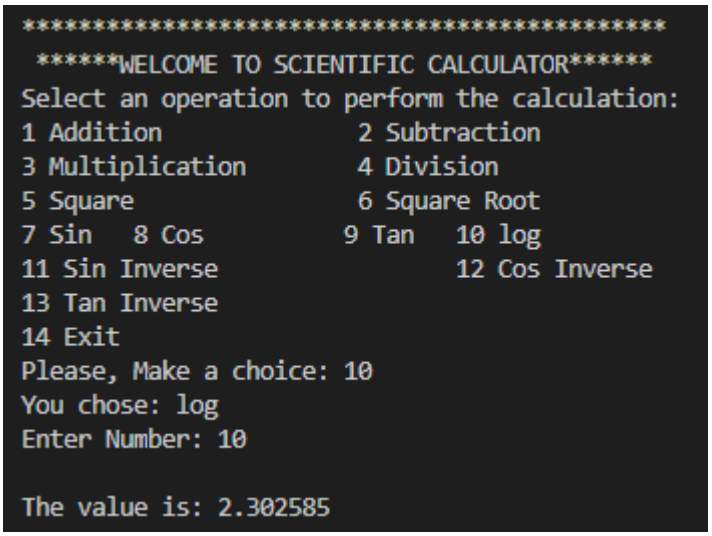

Figure 4: Screenshot of log function

Example 3: Square root function

Square root is also another important feature as it is needed in mathematics. The following program code has been utilized to get the answer of a square root of user given input as given in Figure 5.

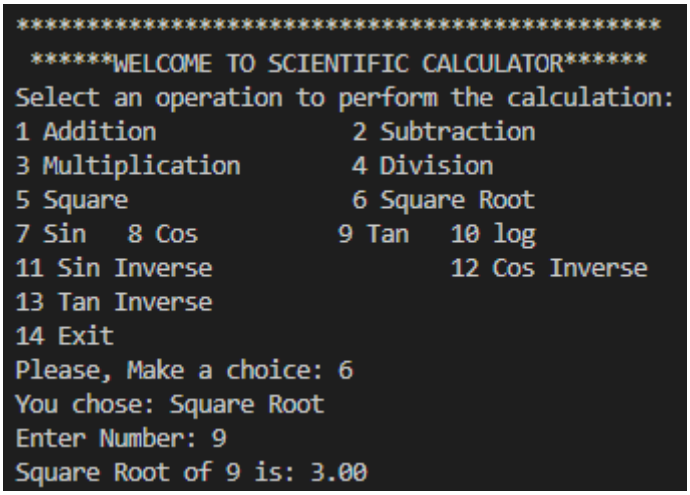

Figure 5: Screenshot of square root function

6. Conclusion

This project has its novelty in this arena of research. It is helpful to learn and understand the many trivial concepts of C Language. The fast moving of internet justify the bright future and opportunity of this project. This research provides the groundwork for preparing a scientific calculator using C programming. This research is limited to arithmetic operations only. Later, the matrix function and binary function can be added for the implementation. Apart from this a database of formulae can be considered as a important feature so that it can be easy for the students.

7. References

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