**Scientific Calculator**

**Using C Language**

**Submitted by**

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# Introduction

In today's rapidly advancing world, scientific calculators play an integral role in various fields of science, engineering, and mathematics. These calculators provide advanced mathematical functions, complex calculations, and scientific notation capabilities that aid professionals, students, and researchers in their daily tasks. To delve into the world of calculator programming and explore the fundamental concepts of C language, we embark on a project to create our very own scientific calculator.

By undertaking this project, we aim not only to develop a functional scientific calculator but also to foster our programming skills, problem-solving abilities, and understanding of mathematical concepts. Through the process, we will explore the practical implementation of mathematical algorithms, learn about the intricacies of handling user input, and gain insights into the art of software development.

In conclusion, the creation of a scientific calculator using the C programming language presents an exciting opportunity to explore the fundamentals of programming while tackling complex mathematical operations. As we embark on this project, we anticipate acquiring valuable skills and knowledge that will propel us forward in our journey as aspiring programmers.

# Objective

The project's primary objective is to design and implement a scientific calculator using the C programming language. By doing so, we aim to deepen our understanding of C's syntax, data types, functions, and control flow, while simultaneously honing our problem-solving and algorithmic thinking skills.

Our scientific calculator will be equipped with a user-friendly interface that allows users to perform a wide range of mathematical operations, including basic arithmetic, trigonometric calculations, logarithmic functions, exponentiation, and much more. It will incorporate features such as memory storage, history tracking, and error handling, making it a versatile tool for both novice learners and experienced professionals.

# Descriptions

**Variables:**

* **op**: A character variable used to store the user's choice from the menu.
* **num1** and **num2**: Double precision variables used to store the numbers entered by the user for calculations.
* **res**: A double precision variable used to store the result of the calculations.
* **angle**: A double precision variable used to store the angle in radians for trigonometric calculations.
* **c**: A character variable used to store the user's choice for continuing or exiting the program.

**Functions:**

* **main()**: The main function that serves as the entry point of the program. It displays a menu, gets the user's choice, performs the selected calculation, and asks if the user wants to continue or exit the program.
* **printf()**: A function used to print messages and display the menu options and calculation results on the console.
* **scanf()**: A function used to read user input from the console. It retrieves the user's choice, numbers, and continuation choice.
* **sqrt()**: A function from the **math.h** library used to calculate the square root of a number.
* **sin()**: A function from the **math.h** library used to calculate the sine of an angle in degrees.
* **cos()**: A function from the **math.h** library used to calculate the cosine of an angle in degrees.
* **tan()**: A function from the **math.h** library used to calculate the tangent of an angle in degrees.

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# Programs

#include <stdio.h>

#include <math.h>

int main() {

// Define some variables.

char op;

double num1, num2, res, angle;

// Display the menu.

printf("Scientific Calculator\n\n");

printf("1. Addition\n");

printf("2. Subtraction\n");

printf("3. Multiplication\n");

printf("4. Division\n");

printf("5. Square root\n");

printf("6. Sine\n");

printf("7. Cosine\n");

printf("8. Tangent\n");

printf("9. Exit\n\n");

// Get the user's choice.

scanf(" %c", &op);

// Switch on the user's choice.

switch (op) {

case '1':

printf("Enter two numbers: ");

scanf("%lf %lf", &num1, &num2);

res = num1 + num2;

printf("%lf + %lf = %lf\n", num1, num2, res);

break;

case '2':

printf("Enter two numbers: ");

scanf("%lf %lf", &num1, &num2);

res = num1 - num2;

printf("%lf - %lf = %lf\n", num1, num2, res);

break;

case '3':

printf("Enter two numbers: ");

scanf("%lf %lf", &num1, &num2);

res = num1 \* num2;

printf("%lf \* %lf = %lf\n", num1, num2, res);

break;

case '4':

printf("Enter two numbers: ");

scanf("%lf %lf", &num1, &num2);

res = num1 / num2;

printf("%lf / %lf = %lf\n", num1, num2, res);

break;

case '5':

printf("Enter a number: ");

scanf("%lf", &num1);

res = sqrt(num1);

printf("The square root of %lf is %lf\n", num1, res);

break;

case '6':

printf("Enter a number: ");

scanf("%lf", &num1);

angle = num1 \* M\_PI / 180.0;

res = sin(angle);

printf("The sine of %lf is %lf\n", num1, res);

break;

case '7':

printf("Enter a number: ");

scanf("%lf", &num1);

angle = num1 \* M\_PI / 180.0;

res = cos(angle);

printf("The cosine of %lf is %lf\n", num1, res);

break;

case '8':

printf("Enter a number: ");

scanf("%lf", &num1);

angle = num1 \* M\_PI / 180.0;

res = tan(angle);

printf("The tangent of %lf is %lf\n", num1, res);

break;

case '9':

return 0;

}

// Get the user's choice again.

printf("Do you want to continue? (y/n) ");

char c;

scanf(" %c", &c);

// If the user wants to continue, call the main function again.

if (c == 'y') {

main();

}

return 0;

}

# Outputs

