Kansas Instruments

Doing Math With C++

User's Manual

Version 1.0

Revision History

Date	Version	Description	Author
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Test Case

1.   Purpose

This user manual details the general use, advanced features, and examples of how to use this software. This manual also contains a glossary of terms, frequently asked questions, and troubleshooting tips to help users further understand the software.

2.   Introduction

The purpose of the software is to evaluate simple arithmetic expressions given by the user. The main file gets the user input and proceeds to check if the input is valid. It then feeds it to the Calculator class. The Calculator class uses the built-in stack class from the programming language C++ to push and handle the elements in the given expression. This command-line interface (CLI) program is focused on simplifying computations while promptly identifying and notifying users of any invalid expressions. To run the program, the user can either download the precompiled calculator binary file (for Linux) from the GitHub repository, or they can download/clone the repository and compile the program themselves using the g++ command 'g++ -o calculator main.cpp calculator.cpp' in the source directory. The Calculator program is a CLI-based program and the user is expected to run the program and then provide the mathematical expression when prompted by the CLI; the program is designed to catch invalid expressions. The program will continue to ask for and solve equations until the user exits by entering 'q' or closing the program.

3.   Getting started

1.) Download the code files on your computer and run it in the terminal
2.) A prompt will come up in the terminal asking you to enter an expression. Here are the rules for the input:
    a.) Valid inputs include any mathematical expression that can parse and evaluate arithmetic expressions containing integers and operators +, -, *, /, %, and ^.

        i.) '+' addition, '-' subtraction, '*' multiplication, '/' division, '%' modulus, '^' exponentiation, '()' parentheses

        ii.) ex: 1+1

        iii.) 2+(3*2)

        iv.) 3^2

        v.) 4%2

    b.) Inputs can only be numbers and operators, i.e. no letters or other symbols. Also, mathematical symbols (cos, sin, ln, etc.) are not compatible with this calculator

        i.) a + 2 -> error

        ii.) 4@ 2 -> error

        iii.) cos(4) -> error

        iv.) e^2 -> error

        v.) pi + 2 -> error

    c.) Inputs and outputs of 9 digits or less

    d.) Operators and operands must be correctly matched. Below is a sample invalid input:

        i.) (2 + 3   -> unmatched parentheses

      e.)   The expression must adhere to mathematical rules (e.g., no division by zero).

            i.)   4/0 -> This will generate an error

      f.)   The user should then enter their mathematical expression and hit enter. Then, the program will produce the numeric value of that expression and print that value to the screen.

4.   Advanced features

Multiplication Using Parentheses: Our calculator supports the multiplication of a number using parentheses instead of the multiplication symbol between terms. Example: Our software will process 5(2+3) as 5 * (2+3).

5.   Troubleshooting

If you get the error '-bash: ./calculator: Permission denied' while first trying to run the software on Linux, type the command 'chmod 777 ./calculator' or 'chmod +x calculator' in your shell to grant yourself execution permissions.

If you are getting an unexpected error, verify that you did not accidentally enter an invalid input with the "Getting Started" section. Remember that this calculator only accepts integers, operators, parentheses, and spaces. Extra symbols, including quotation marks, are considered invalid inputs.

6.   Examples

1.) You want to calculate 1+1.
      a.) see the Getting Started guide on how to open the program
      b.) enter 1+1 into the command line and hit enter
      c.) the program will output 2.000000
2.) You want to calculate 2-1
      a.) enter 2-1 into the command line and hit enter
      b.) output is 1.000000
3.) You want to calculate 2*2+(3/1)+2^3
      a.) enter 2*2+(3/1)+2^3
      b.) output is 15.000000

7.   Glossary of terms

Command Line Interface (CLI):- This is the interface that users get when they are using some shell or terminal to run any program or command.

8.   FAQ

1.   Does this program take mathematical symbols like e, π, or trigonometric ratios and symbols?

> No, the program only accepts integers, operators, parentheses, and spaces.

2.   What are the maximum digits for output?

> 32 digits, throws max. integer limit reached if exceeded.