SmartCalc

for version 2.0, 03 December 2023

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This manual is for SmartCalc (version 2.0, 03 December 2023), extended version of the usual calculator, which can be found in the standard applications of each operating system.

Thx to school.

Table of Contents

1 Overview

The SmartCalc v2.0 program:

- The program developed in in C++ language of C++17 standard.
- The program code located in the src folder
- The program built with Makefile which contains standard set of targets for GNU-programs: all, install, uninstall, clean, dvi, dist, tests. Installation directory is HOME
- Code follow the Google style
- Classes implement within the ‘s21‘ namespace
- Full coverage of modules related to calculating expressions with unit-tests using the GTest library
- GUI implementation, based on any GUI library with Qt
- The program implement using the MVC pattern
- Integers, real numbers with a dot and numbers in exponential notation can be input into the program.
- The calculation done after you complete entering the calculating expression and press the = symbol.
- Calculating arbitrary bracketed arithmetic expressions in infix notation
- Calculate arbitrary bracketed arithmetic expressions in infix notation with substitution of the value of the variable x as a number
- Plotting a graph of a function given by an expression in infix notation with the variable x (with coordinate axes, mark of the used scale and an adaptive grid)
- Domain and codomain of a function are limited to at least numbers from -1000000 to 1000000
- Verifiable accuracy of the fractional part is at least to 7 decimal places
- Users can to enter up to 255 characters
- Bracketed arithmetic expressions in infix notation supports the following arithmetic operations and mathematical functions:
  - Arithmetic operators:

    `Brackets` (a + b)

    `Addition` a + b

    `Subtraction`
    a - b

    `Multiplication`
    a * b

    `Division` a / b

    `Power` a ^ b

    `Modulus` a mod b

    `Unary plus`
    +a

`Unary minus`
-a

- Functions:

`Computes cosine`
cos(x)

`Computes sine`
sin(x)

`Computes tangent`
tan(x)

`Computes arc cosine`
acos(x)

`Computes arc sine`
asin(x)

`Computes arc tangent`
atan(x)

`Computes square root`
sqrt(x)

`Computes natural logarithm`
ln(x)

`Computes common logarithm`
log(x)

- special mode "credit calculator":

`Input` total credit amount, term, interest rate, type (annuity, differentiated)

`Output` monthly payment, overpayment on credit, total payment

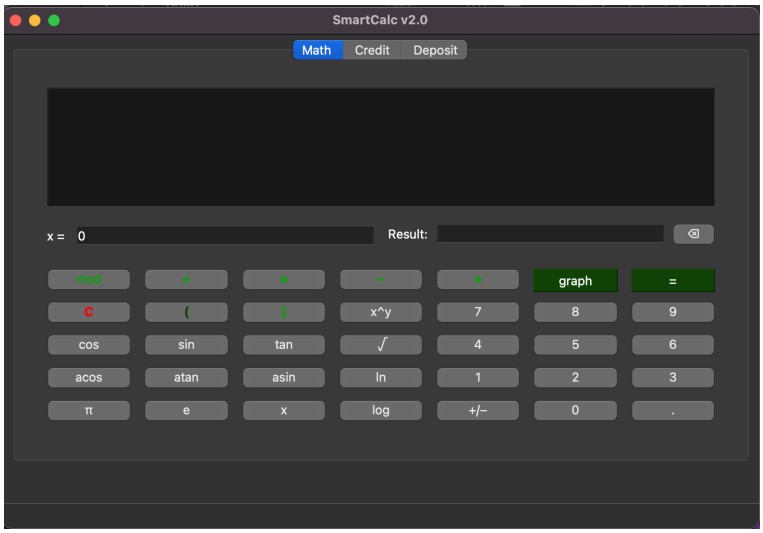
- special mode "deposit profitability calculator":

`Input` deposit amount, deposit term, interest rate, tax rate, periodicity of payments, capitalization of interest, replenishments list, partial withdrawals list

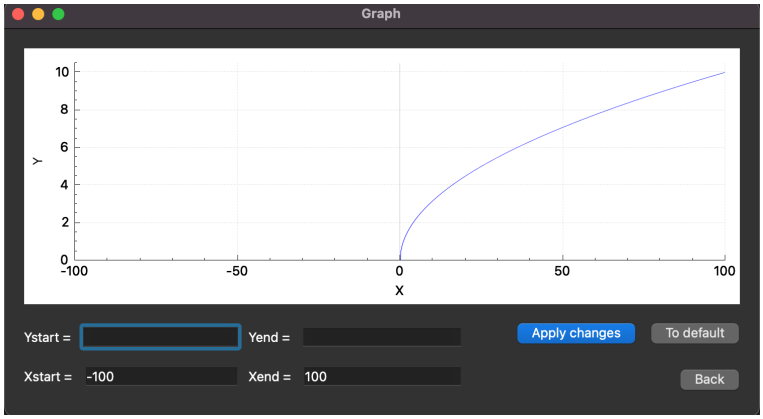
`Output` accrued interest, tax amount, deposit amount by the end of the term

2 Interface & output

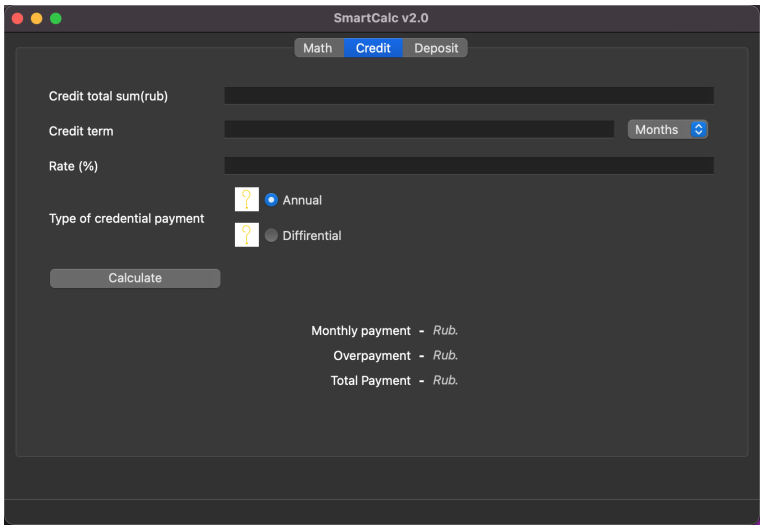
Calculator:



Plotting a graph:



Credit calculator:



Deposit profitability calculator: