



CSCE002 Project

Lab: 3B

Instructors:-

Prof: Dr. Hossameldin Hassan

TA: Eng. Esraa Saeed Bayoumi

Team Members

- Abdelrahman Ahmed Abdelkarimragab. ID: 202000898.
- *Omar Mohamed Abdelmonem Elsayed. ID: 202002099. (Leader)*

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Thank You!

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An Overview

Introduction

We are two students at the Nile University. In this project, we are creating an advanced GUI calculator that employs many elements of modern scientific calculators and other additional features.

License

The calculator is licensed under the LGPL-2.1 License.

Github

GitHub link: <https://github.com/Omar-Sigma/csce002proj>

Features

- Basic operations.
- Other operations, such as exponentiation, factorials, permutations and combinations, etc.
- Scientific functions (Exponential, logarithmic, trigonometric, hyperbolic)
- The ability to work with the four main number systems and Degrees
- The functionality for user-defined variables.
- Being able to use previous answers and copy them to clipboard.
- Being able to add notes.
- A user-friendly interface.

- A "Help" section.
- A minimal size.

Future Possible Features

- Future possible additions:-
- The ability to perform multiple heavy operations concurrently is being considered.
- Adding differentiation and integration capabilities.
- Adding root finding.
- Adding a linear system of equations solver.
- Adding a differential equations solver.

The Application

Dependencies

- A standard Python3 with pip (for installing ttkthemes, sympy, etc).
- ttkthemes.
- Sympy.
- Pyinstaller for freezing the application. (spec files are included with icons)
- Venv (Virtual environments). To run pyinstaller in it.

Executables

Currently available executables:-

- Windows 10 executable. (Tested on Windows 7)
- Linux executable. (Tested on Debian 10)

Mac

For a Mac executable, you can help out development by installing pyinstaller and freezeing the application on a mac.

The Developers

The two developers of the project are:-

- Abdelrahman Ahmed AbdelkarimRagab
- Omar Mohamed Abdelmonem Elsayed

Abdelrahman Ahmed AbdelkarimRagab

Role

Role: Main Developer.

Wrote gui code and important functions.

His work was useful as both direct parts of the code and as a blueprint.

Wrote the first working functions that have been added upon.

Helped with formatting the gui and providing good suggestions.

Contributions

- The first versions of the evaluate function.
- A function for clearing previous answers.
- A function that inserts the corresponding symbol to the input field.
- 4 functions that designs the 4 toggle buttons (bin, hex, dec, oct)
- A function that closes all other toggle buttons when the user clicks on any toggle button.
- A toggle button switching function. Creating a seperate .py file for this file.

Omar Mohamed Abdelmonem Elsayed

Role

Role: Owner and maintainer of the GitHub Repository. Main Developer.

Wrote gui code and other important functions.

Added modifications on Abdelrahman's work. Added several functions. Main designer of the GUI.

Added classes and imports for better code organization and smoother development.

Contributions

- Some of the functions he added:-
- The input clear functions.
- The variable and variable checking and clearing functions.
- A function that modifies user-friendly input to executable input and writes the number in hex, binary and oct forms, and provides support for degrees, radians, and permutations/combinations capabilities.
- A function that shows the result in decimal format.
- Functions to navigate the user to and from the help and about sections, in addition to a scrollbar.
- Adding various imports to the code. Creating the help text file. Editing some of abdelrahman's functions.

Instructions

Launching The App

To use the app, simply download a release based on your operating system from "releases" in the GitHub link above. Download the latest versions.

Unzip it in the desired directory and use it. Do NOT tamper with any files or their hierarchical structure.

Note: for linux executables, set permissions first by typing:-

```
chmod +x binaryname
      e.g. :-
chmod +x PowerCalc
```

Then, to run:-

```
./binaryname
      e.g. :-
./PowerCalc
```

Using The App

The use of this calculator is very similar to using calculators like Casios. You MUST not leave any brackets open.

1-You can use the buttons displayed on the screen to type a number or anything you want, please click the button of the instruction you want and it will appear immediately in the entry box.

2-There are buttons for numbers e.g. [1, 2, 3, 4,...,] symbols e.g.[, e] ,mathematical operations e.g. [+ , - , x , ÷ , !] and marks e.g.[. ,) , (]. Click on it's button and it will

be displayed immediately in the entry box on the screen.

3-To use the trigonometric and hyperbolic functions [sin ,cos, csch, coth,...] buttons, click on them: they will be displayed on the screen. Then enter the value you want. after you have entered the value click on the closing bracket button “) “ in order not to cause any errors to occur.

4-To use the logarithmic functions e.g.[log, ln]: to use the natural logarithm function, click on the “ln” button then enter the desired value. Then click on the closing bracket button “) “ in order not to cause any errors to occur. For the log function, click on the “log” button, there will be two entry places. In the first place to the left enter the number you need, then in the second place on the right enter the base.

5-To use roots: for square roots, click on the button “ $\sqrt{}$ “ then enter the value you need, then click on the closing bracket button “) “ in order not to cause any errors to occur. To use any nth root, click on the button “ $\sqrt[n]{}$ “, there will be two entry places. In the first place to the left enter the number you need, then in the second place on the right enter the power of the root function.

6-Using powers: If you need to add a power of 2 to your value, first enter the value you need then click on the button “ x^2 ” and it will add the power of 2 to the value you entered immediately. If you want to add any other power to your value enter your value first then click on the button “ x^{\wedge} ” and write the desired exponent.

7-If you want to clear all what’s in the display box, click on the button “clr” and everything in the display box will be cleared.

8-If you want to assign variables and save them in the memory for later, use the assign section on the top right of the calculator, first choose the variable you need then write the value you need to assign in the small entry box at it’s right. you can assign many values at the same time. after you enter the values click on the “Assign” button at the top of the assign section and the entered values will be assigned to the variables in front of them. If you want to clear the values you have previously assigned in the assign section, click on the button “clear” on the right of the assign section.

9-if you want to write some notes or important rules you may forget you can use the notes section in the top middle of the calculator, just click on the entry box there

and start typing your notes using the keyboard and it will be saved. if you want to delete your notes click on the “clear notes” button at the top of the notes section.

10-to use your last answer in the next calculation click on the ” Ans ” button at the top left of the calculator beside the answer display box and it will be typed in the entry box as “ans” which is your previous answer.

11-in order to evaluate your calculations, after you finish entering your operation click on the “=” button to evaluate your answer, it will appear immediately in the answer display box above.

12-Click on “dec” after specifying the number of desired decimal places in the adjacent field in order to show the result in decimal format.

13-To write any number in any number system and perform operations on it:- =
Hexadecimal: write the number suffixed by 0x. So for example to type the number F: 0xF3 = Octal: write the number suffixed by 0o. So for example to type the number F: 0x71 = Binary: write the number suffixed by 0b. So for example to type the number F: 0x10100 Typing any number in that manner and then clicking equal will convert it to decimal. You can also write them like this in calculators. For example $(0b10)*(0xF)$

14-To convert any thing to one of the formats above, just type your desired operation and then click on one of the toggle buttons (hex, binary, oct) to have the result converted to them.

15-To use degrees, click on the degree toggle button.

16-Use the permutation and combination functions in the same manner as the nth root. You type the two parameters inside the brackets respectively.

Thank You!

Regards,

- Abdelrahman Ahmed AbdelkarimRagab.
- Omar Mohamed Abdelmonem Elsayed.