Multi-functional Calculator

Guidebook

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Functionalities

Basic Arithmetic:

Below is the Basic Arithmetic Window, which is what you first see when running user_interface.py.

Click the buttons to enter your expression. As you finish, click “=” to begin calculation.

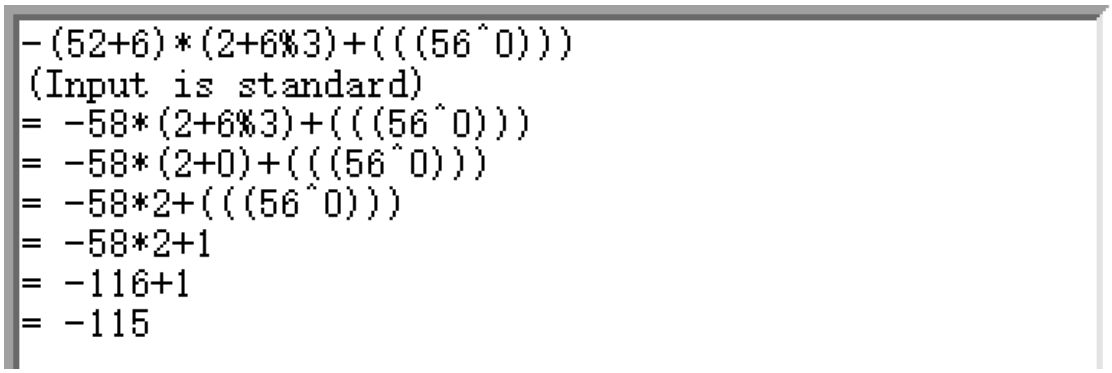
Any order and combination of addition, subtraction, multiplication, division, power, square root, and mod of any positive,

negative, whole, or decimal numbers are is supported.

If your expression is in the standard form, then the calculation will be displayed step-by-step.

Input:

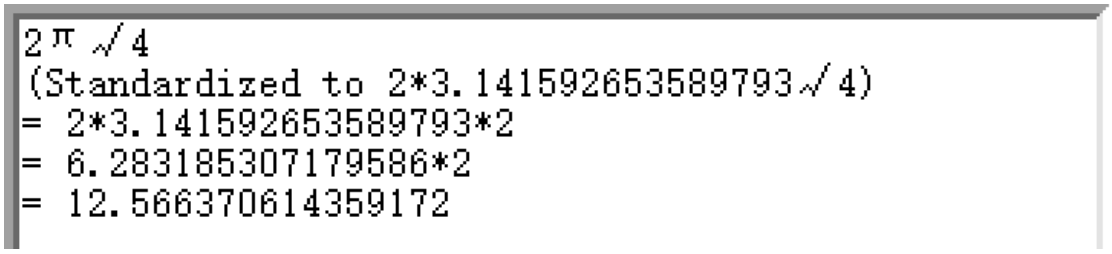
Output:



If your expression is not standard, then it will first be standardized into the form that my algorithm can process.

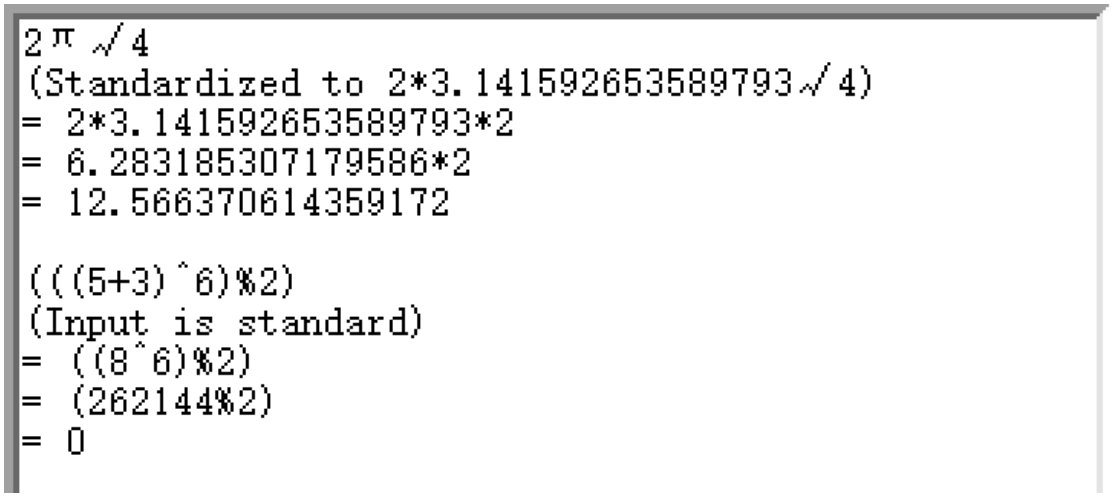
Input:

Output:

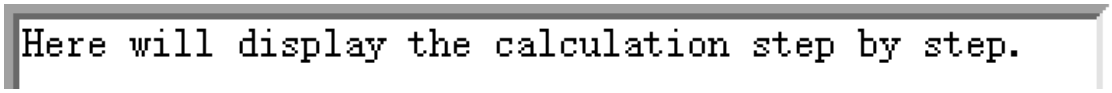


Use the red “CLEAR” button at top-right to clear the output window.

Original:

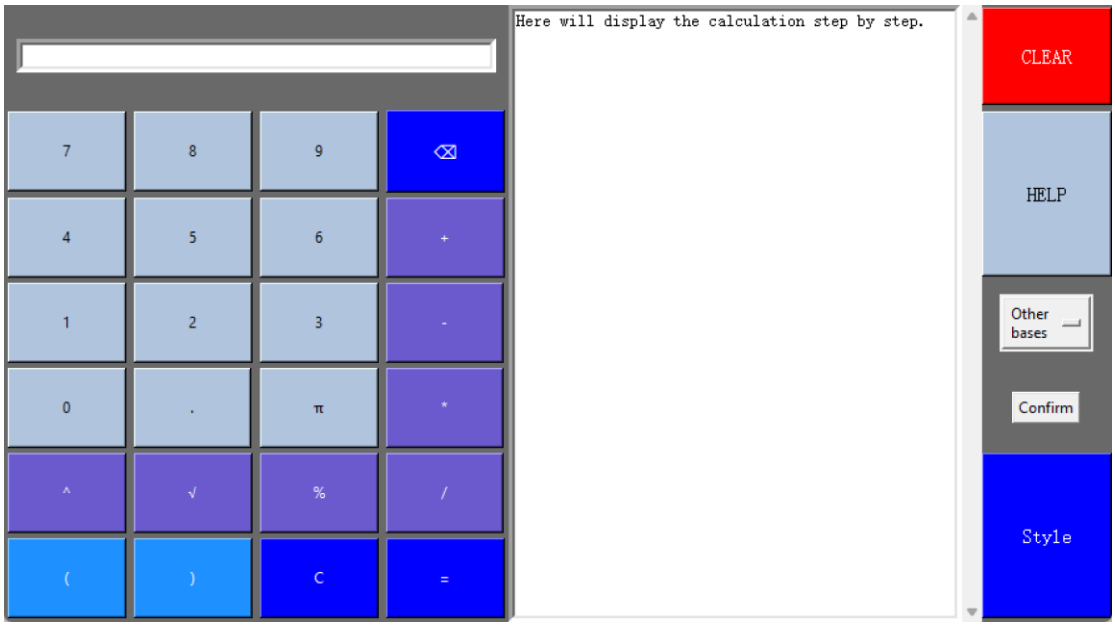


Clicked “CLEAR”:

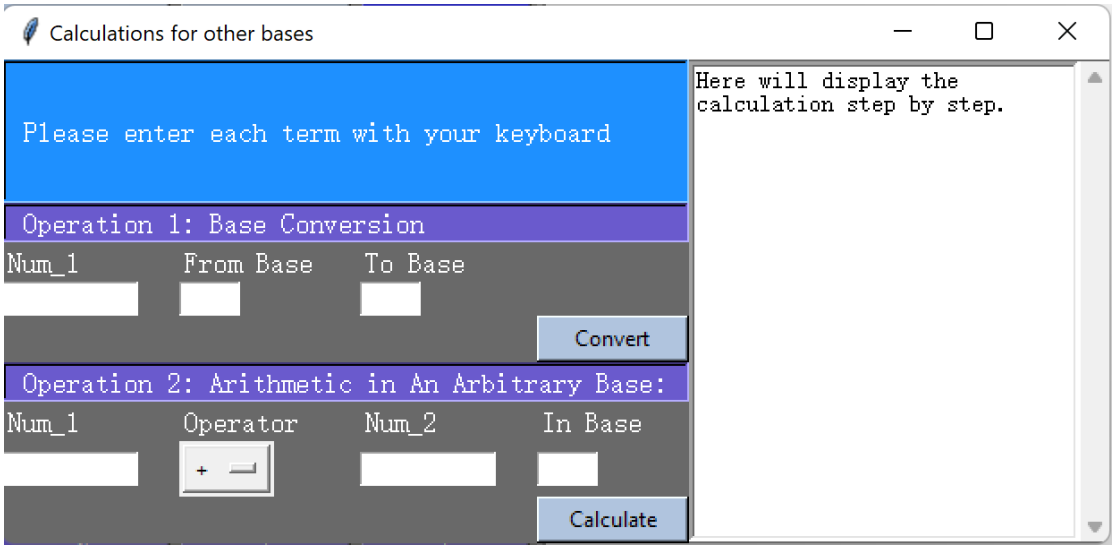


Other Bases:

From the Basic Arithmetic window, click the “Other Functions” button at the right to select the “Other Bases”, and click “Confirm”.



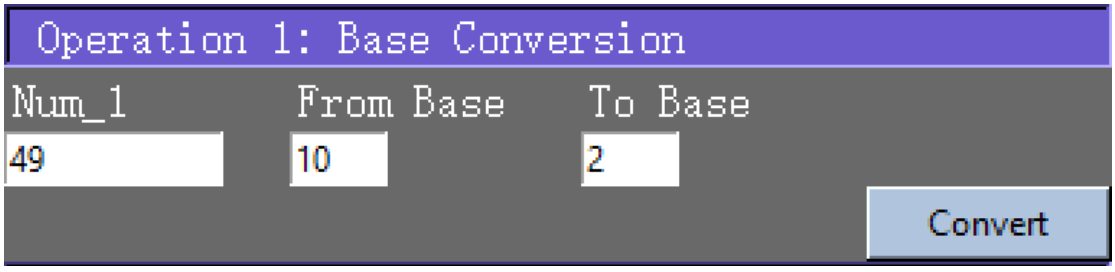
The Other Bases window appears:



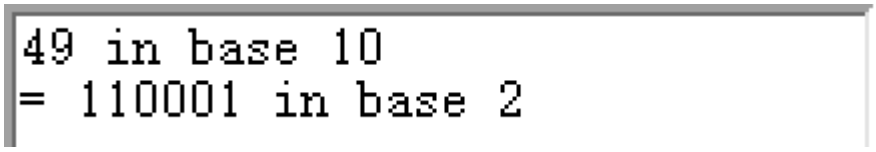
Operation 1:

The base conversion of a whole number, either positive or negative, from any base to another base.

Input:

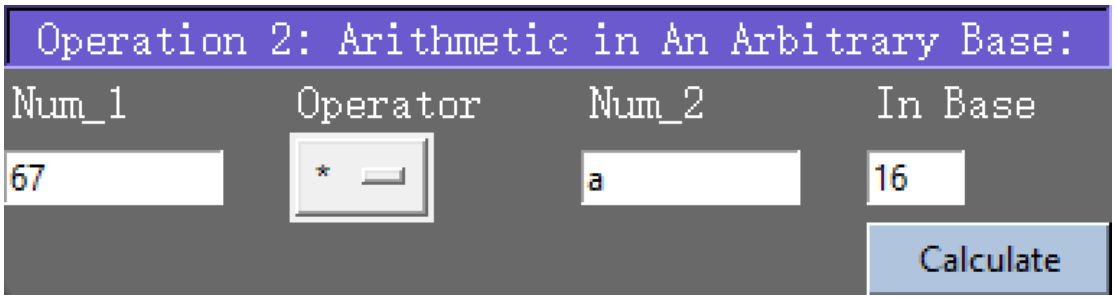


Output:

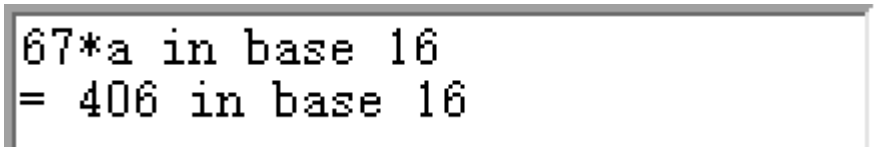


Operation 2:
Basic Arithmetic (+, -, *, and /) for any two whole number in any base.

Input:



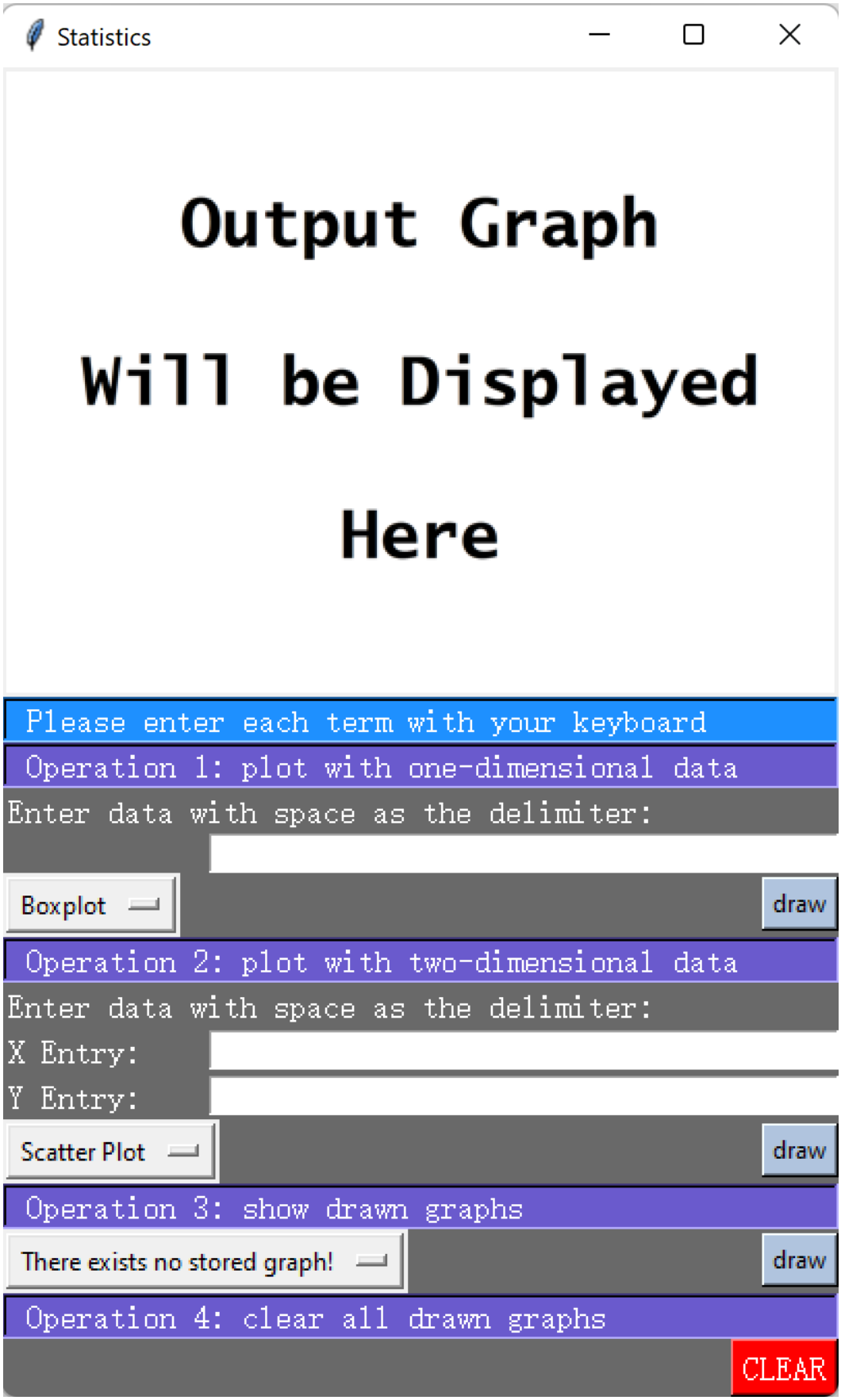
Output:



Statistics:

From the Basic Arithmetic window, click the “Other Functions” button at the right to select the “Statistics”, and click “Confirm”.

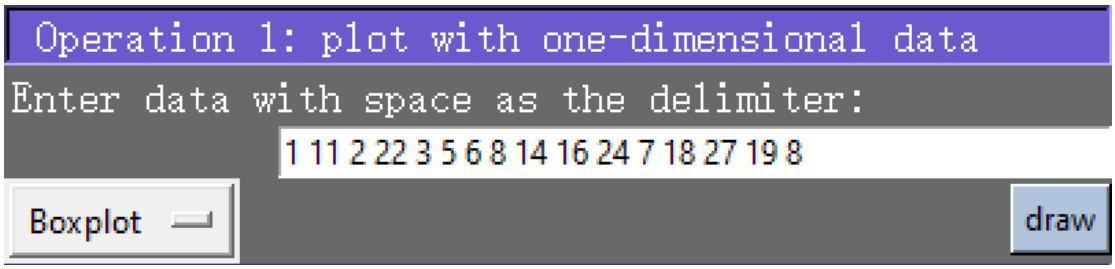
The Statistics window appears:



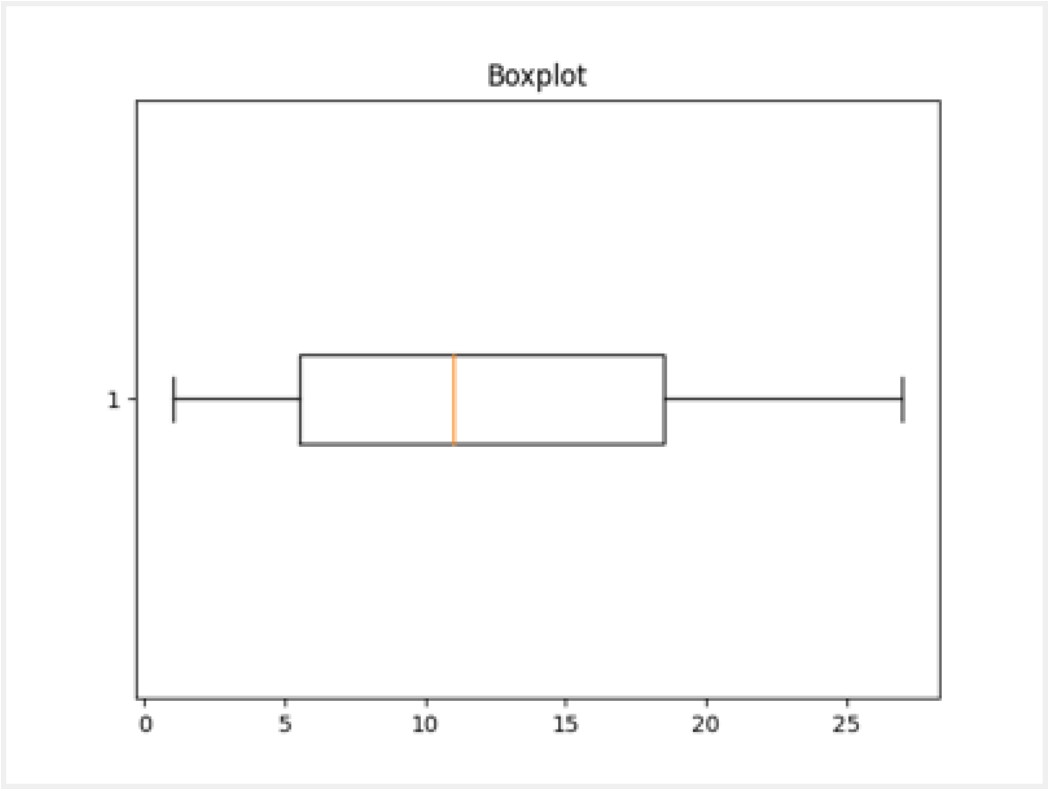
Operation 1:

Plot with one-dimensional data. Supported graph types are boxplot, histogram, and stem-and-leaf plot.

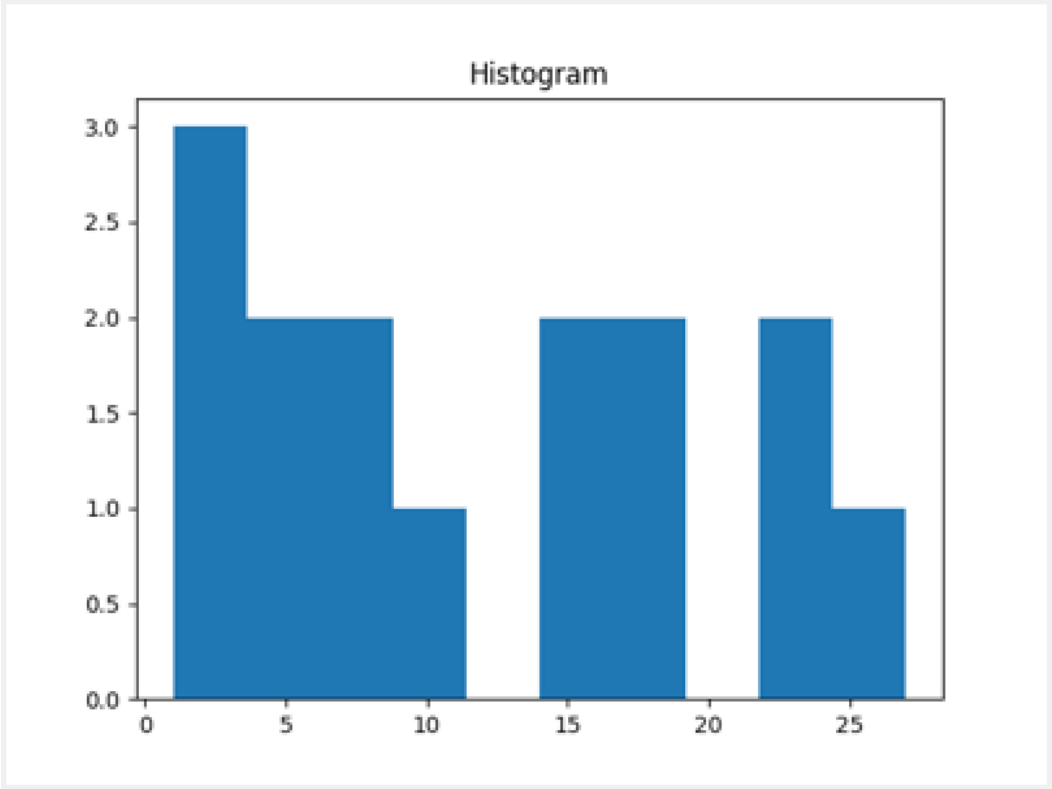
Input:



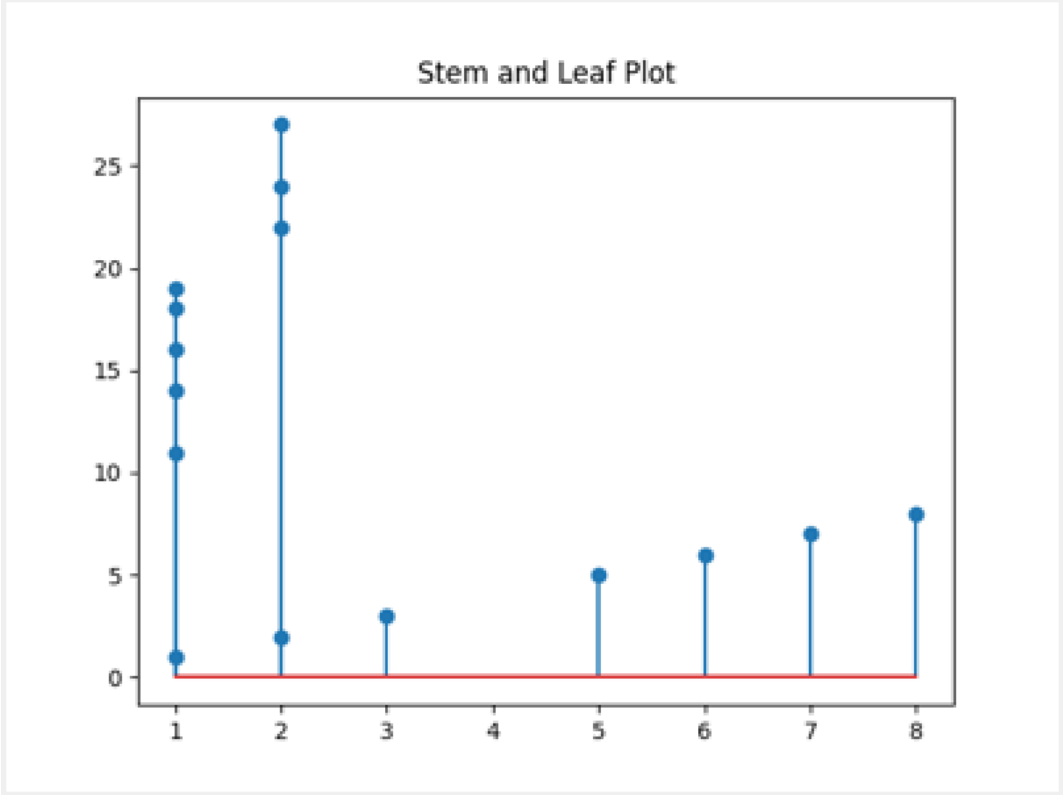
Boxplot:



Histogram:

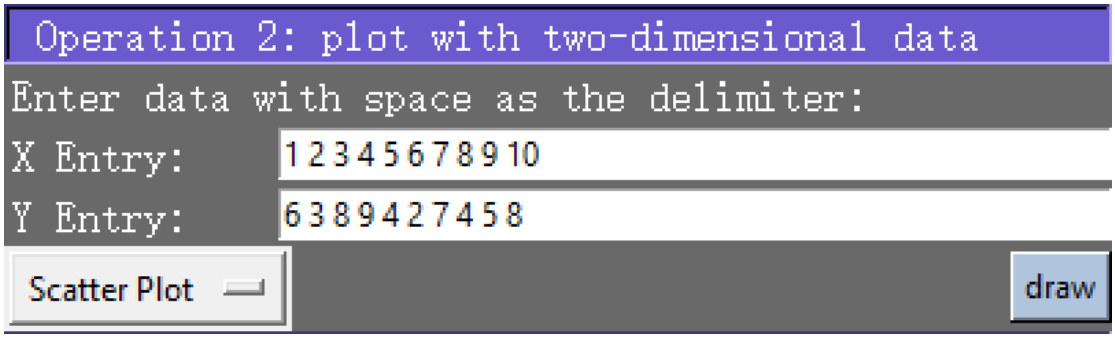


Stem and Leaf Plot:

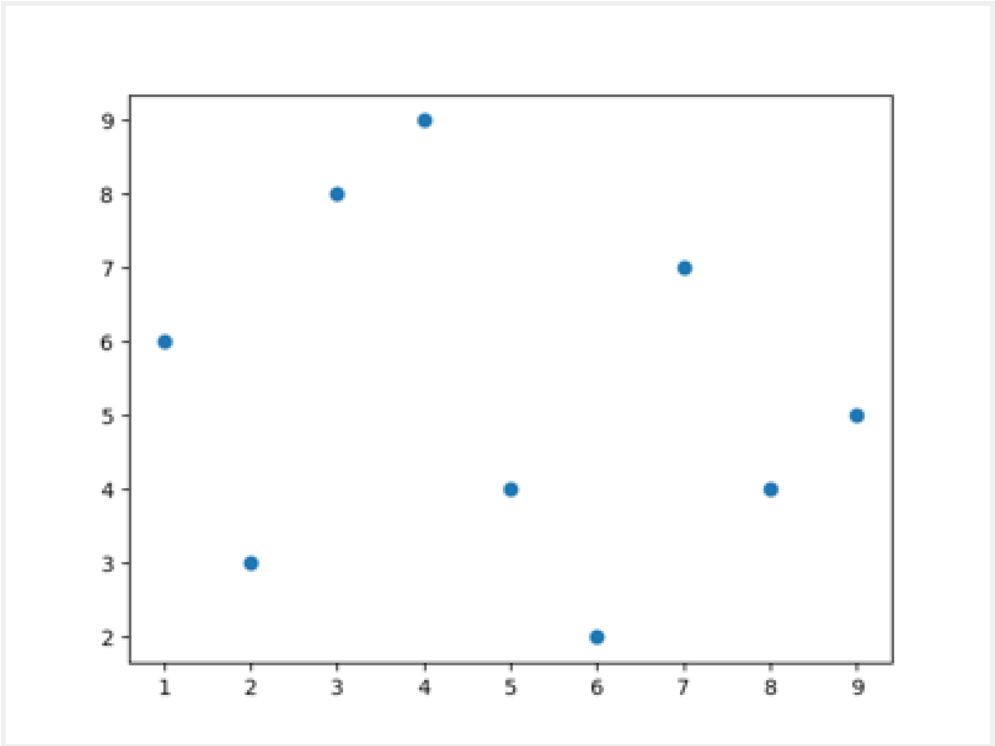


Operation 2:
Plot with two-dimensional data. Supported graph types are scatter plot, line chart, and linear regression graph.

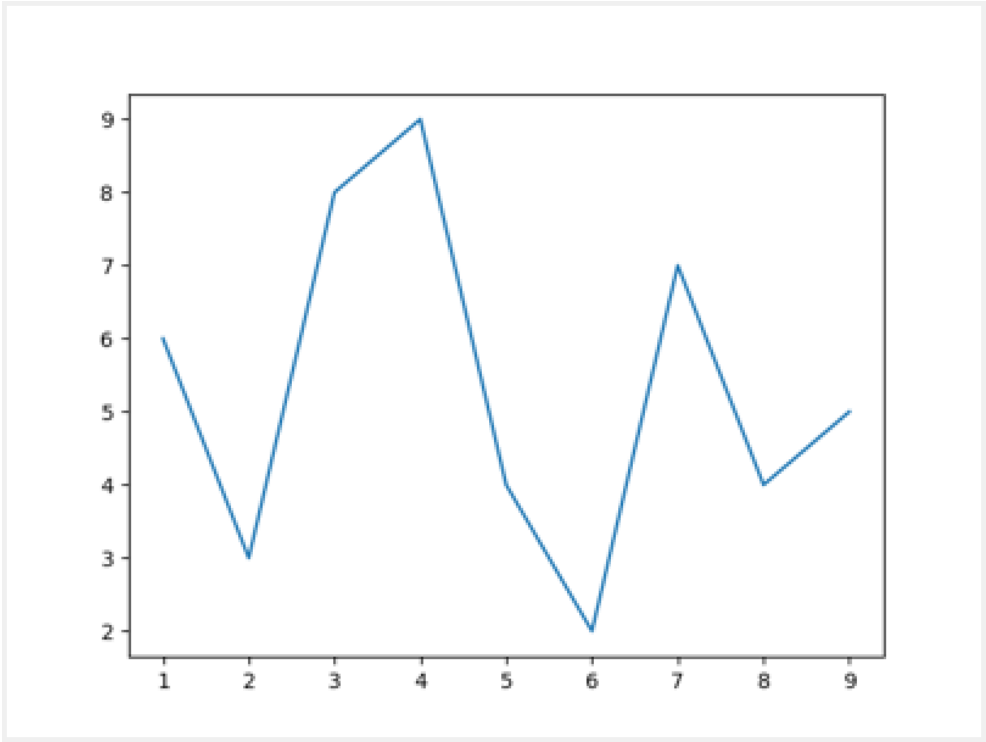
Input:



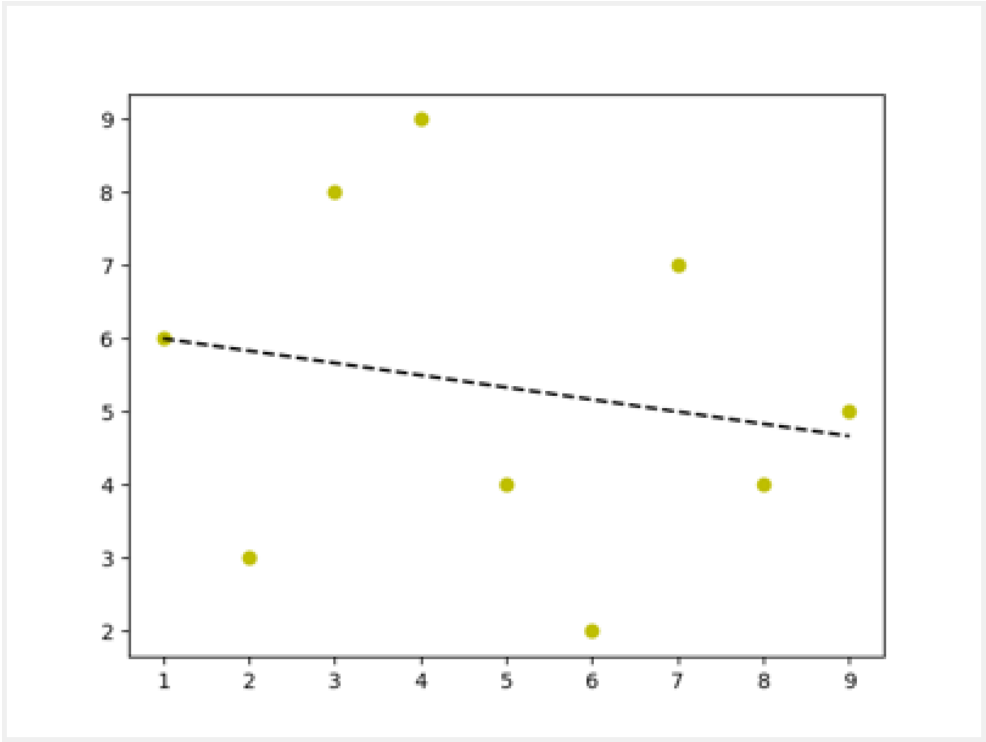
Scatter Plot:



Line Chart:



Linear Regression:



Error Handling

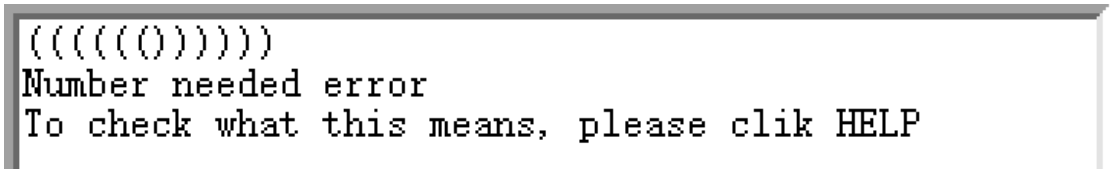
Basic Arithmetic:

If your input cannot be standardized to a form that my algorithm can process, the output window will generate an error message.

1.Number needed error:
Your expression doesn't contain a number, so there is nothing to calculate.

Input:

Output:

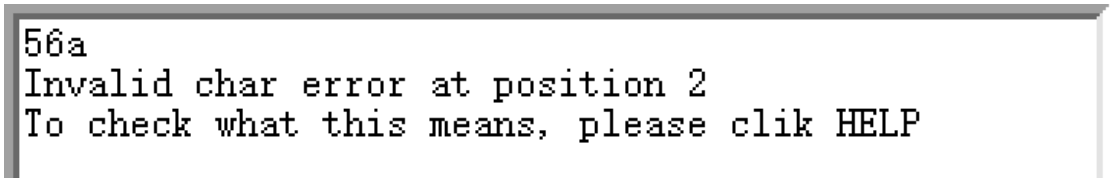


2.Invalid char error:
It is also okay to type your expression with your computer keyboard. However, if you

type some character that is not recognizable by my algorithm, it will tell you.

Input:

Output:



3.Bracket error

The number or position of your brackets has some problem.

Input_1:

Input_2:

Output:

```
((5+3)*5
Bracket error at position 7
To check what this means, please clik HELP

)6+3(
Bracket error at position 0
To check what this means, please clik HELP
```

4.Too many operators error:

You enter more operators than there should be.

Input:

```
6++3
```

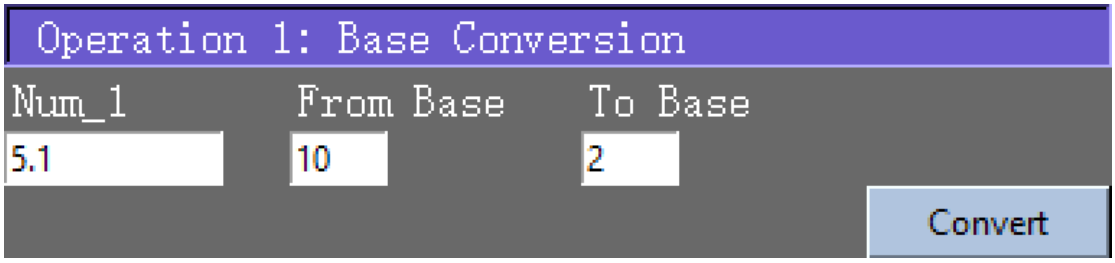
Output:

```
6++3
Too many operators error at position 2
To check what this means, please clik HELP
```

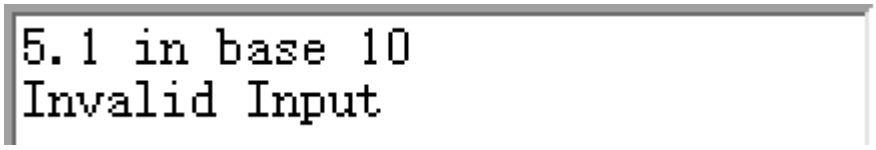
Other Bases:

The algorithm only supports whole numbers. If you type a decimal number, you will get an error message.

Input:

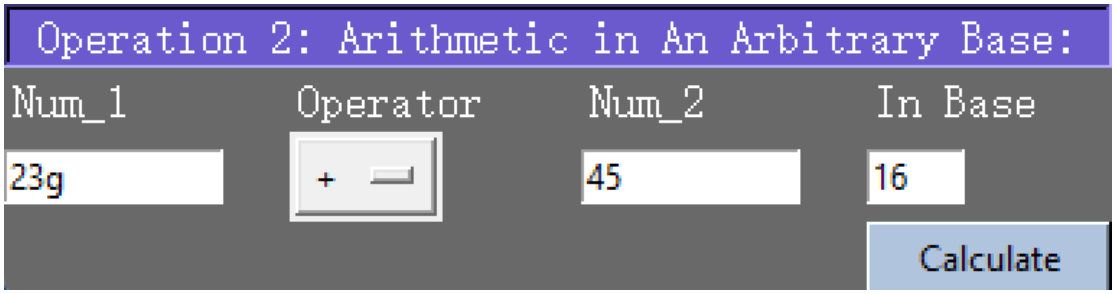


Output:



By the definition of base, each base has some valid characters and some invalid ones. If you type an invalid letter for the base you choose, you will get an error message.

Input:

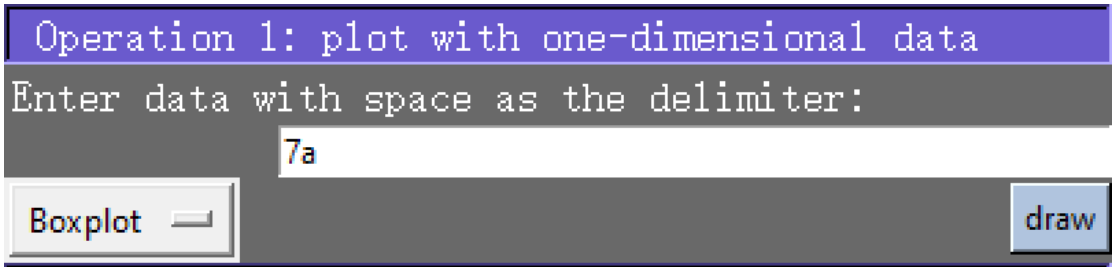


Output:

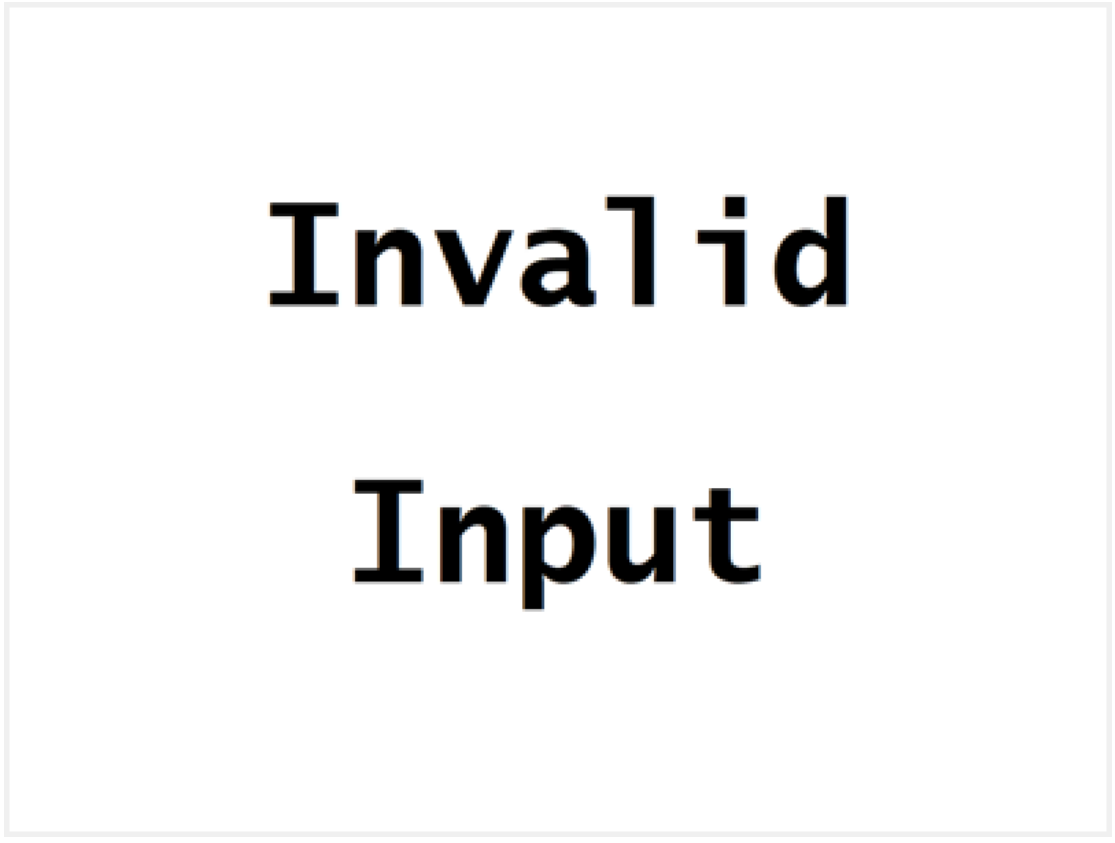
Statistics:

If you enter invalid characters, you will get an error message.

Input:

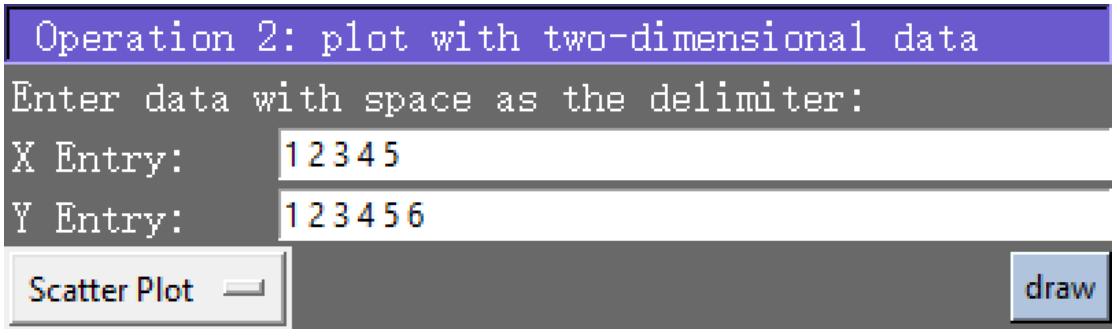


Output:

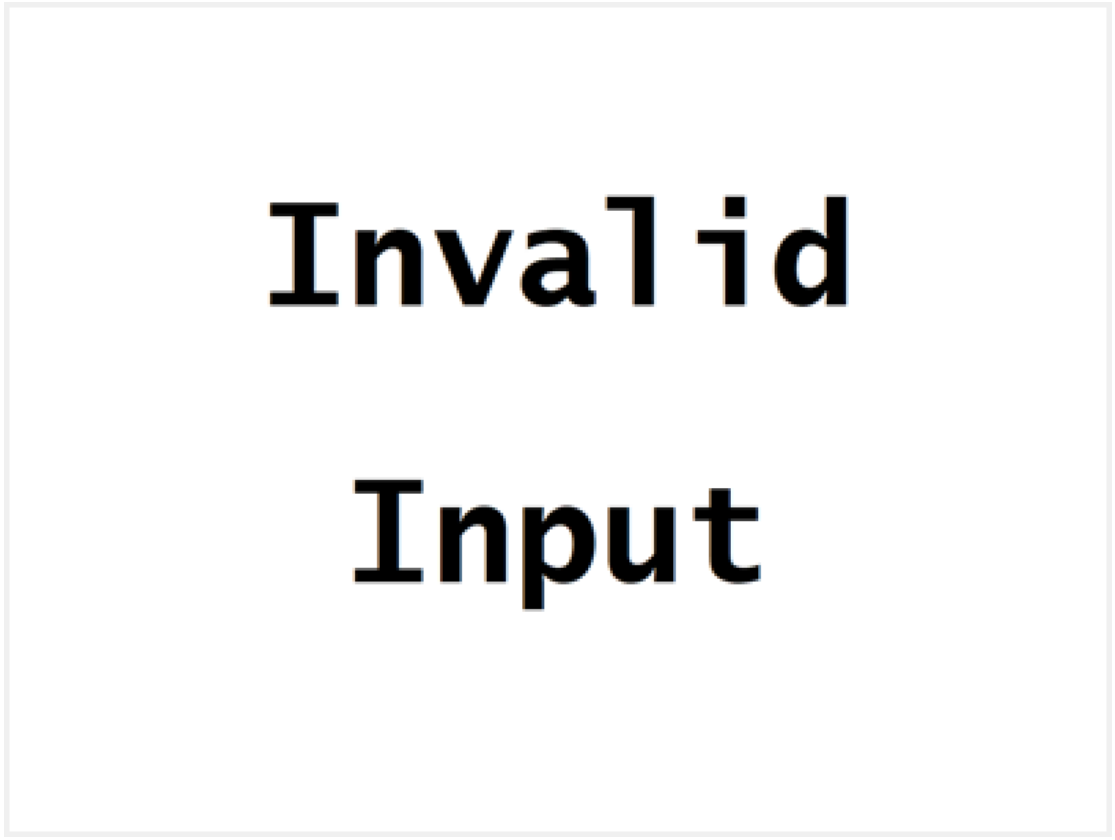


When plotting with two-dimensional data, if the length of x data is different from that of y data, you will get an error message.

Input:



Output:

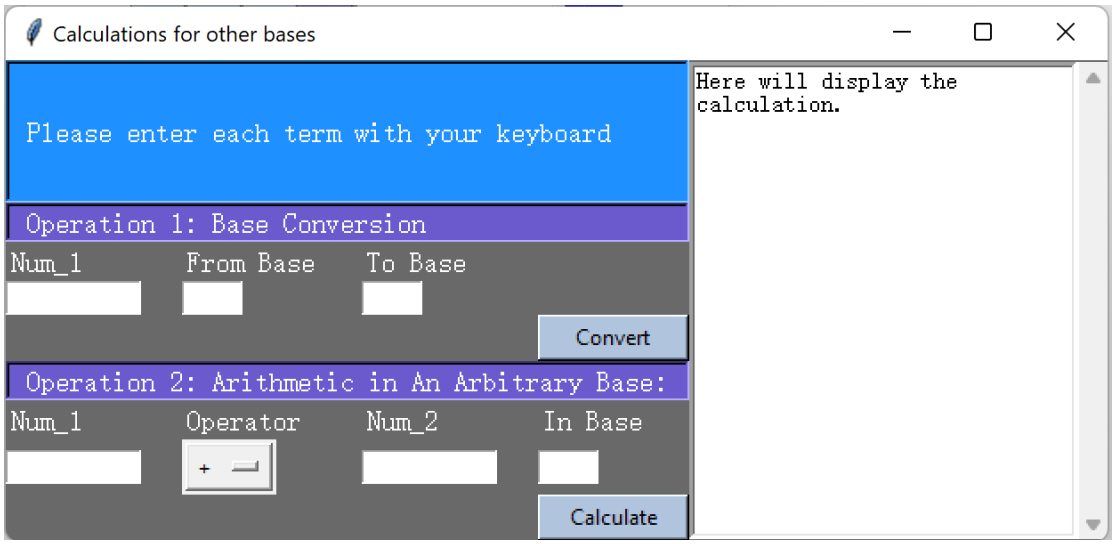


Style

Blue:

The default style.

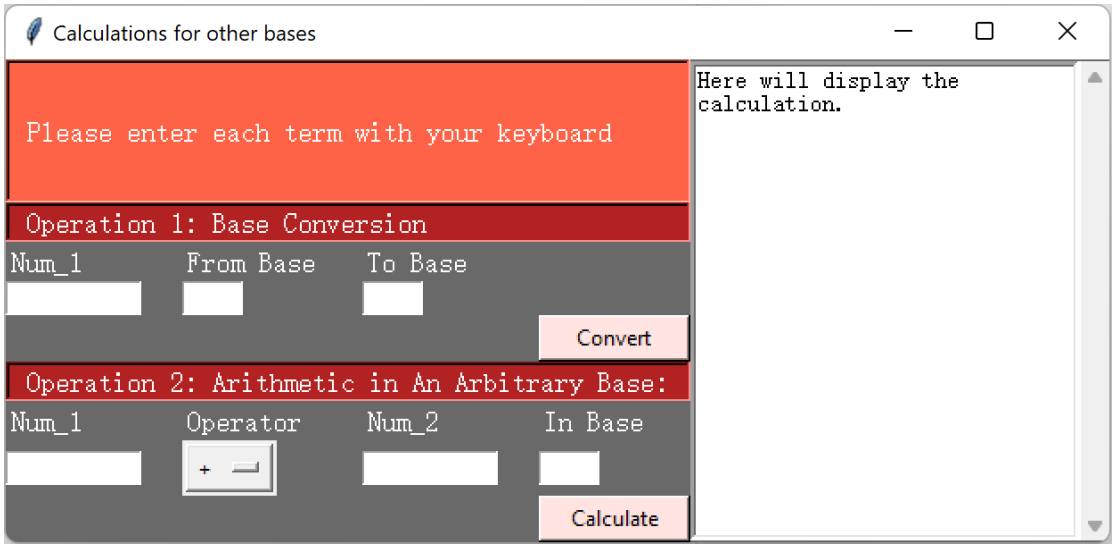
Or select by clicking the “Style” button.




Statistics
Output Graph
Will be Displayed
Here
Please enter each term with your keyboard
Operation 1: plot with one-dimensional data
Enter data with space as the delimiter:
Boxplot
draw
Operation 2: plot with two-dimensional data
Enter data with space as the delimiter:
X Entry:
Y Entry:
Scatter Plot
draw
Operation 3: show drawn graphs
There exists no stored graph!
draw
Operation 4: clear all drawn graphs
CLEAR

Red:

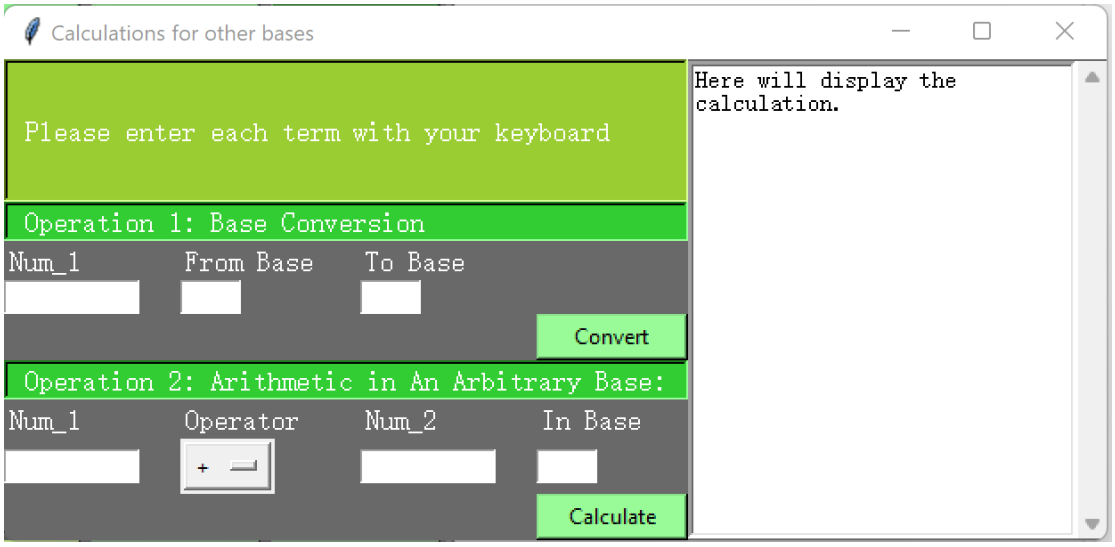
Select by clicking the “Style” button.




Statistics
Output Graph
Will be Displayed
Here
Please enter each term with your keyboard
Operation 1: plot with one-dimensional data
Enter data with space as the delimiter:
Boxplot
draw
Operation 2: plot with two-dimensional data
Enter data with space as the delimiter:
X Entry:
Y Entry:
Scatter Plot
draw
Operation 3: show drawn graphs
There exists no stored graph!
draw
Operation 4: clear all drawn graphs
CLEAR

Green:

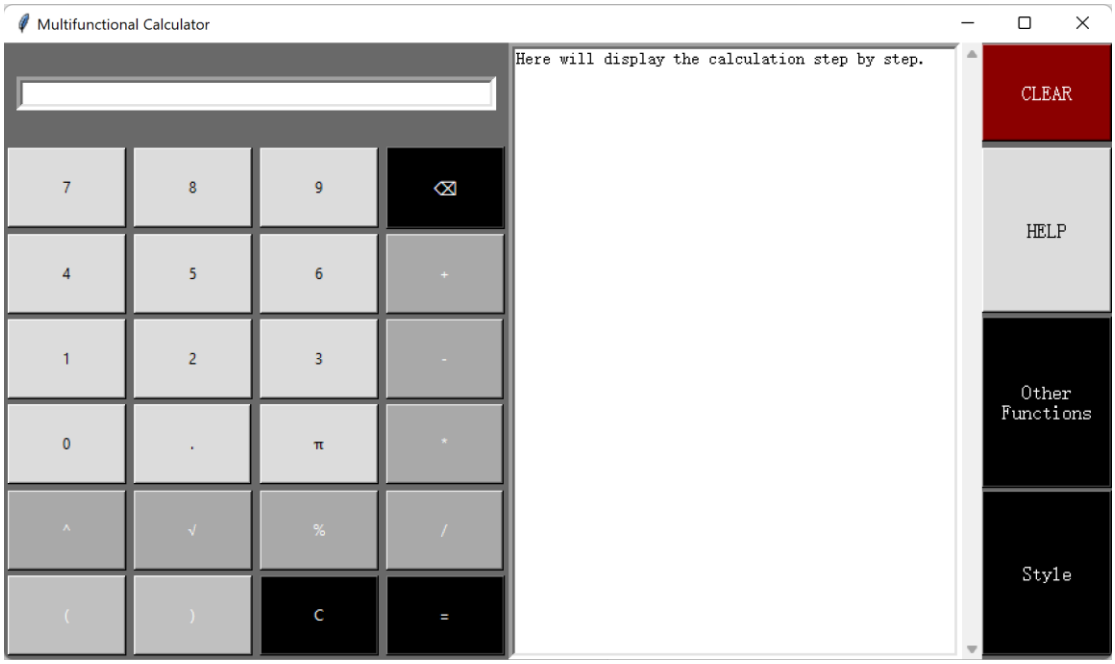
Select by clicking the “Style” button.

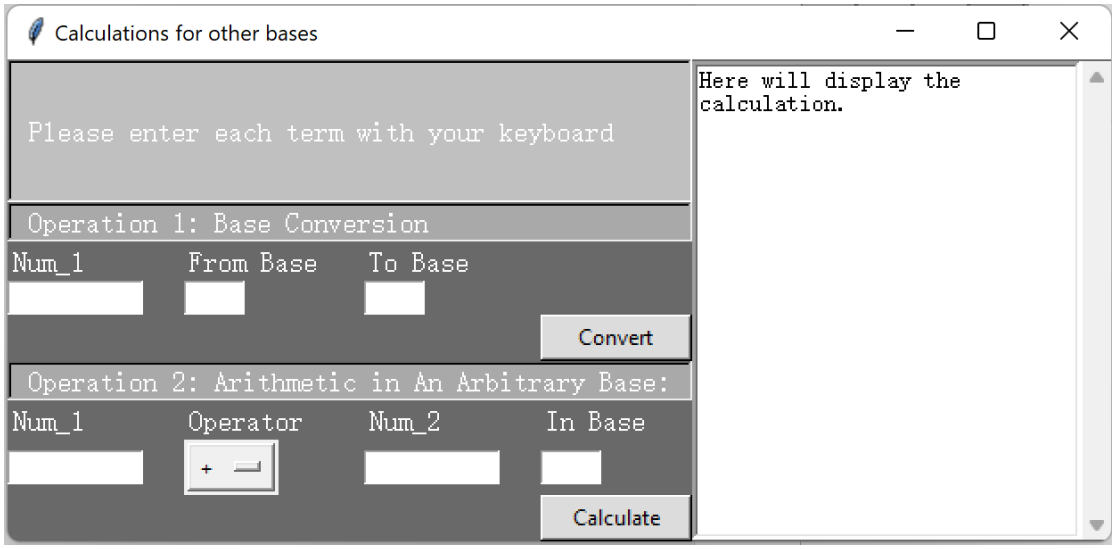



Statistics
Output Graph
Will be Displayed
Here
Please enter each term with your keyboard
Operation 1: plot with one-dimensional data
Enter data with space as the delimiter:
Boxplot
draw
Operation 2: plot with two-dimensional data
Enter data with space as the delimiter:
X Entry:
Y Entry:
Scatter Plot
draw
Operation 3: show drawn graphs
There exists no stored graph!
draw
Operation 4: clear all drawn graphs
CLEAR

Black:

Select by clicking the “Style” button.






Statistics
Output Graph
Will be Displayed
Here
Please enter each term with your keyboard
Operation 1: plot with one-dimensional data
Enter data with space as the delimiter:
Boxplot
draw
Operation 2: plot with two-dimensional data
Enter data with space as the delimiter:
X Entry:
Y Entry:
Scatter Plot
draw
Operation 3: show drawn graphs
There exists no stored graph!
draw
Operation 4: clear all drawn graphs
CLEAR