Function Plotter

- This project is for Master Micro Company.
- Language: Python
- Development environment: PyCharm
- Project type: Desktop Application

Aim

plots arbitrary user-entered function.

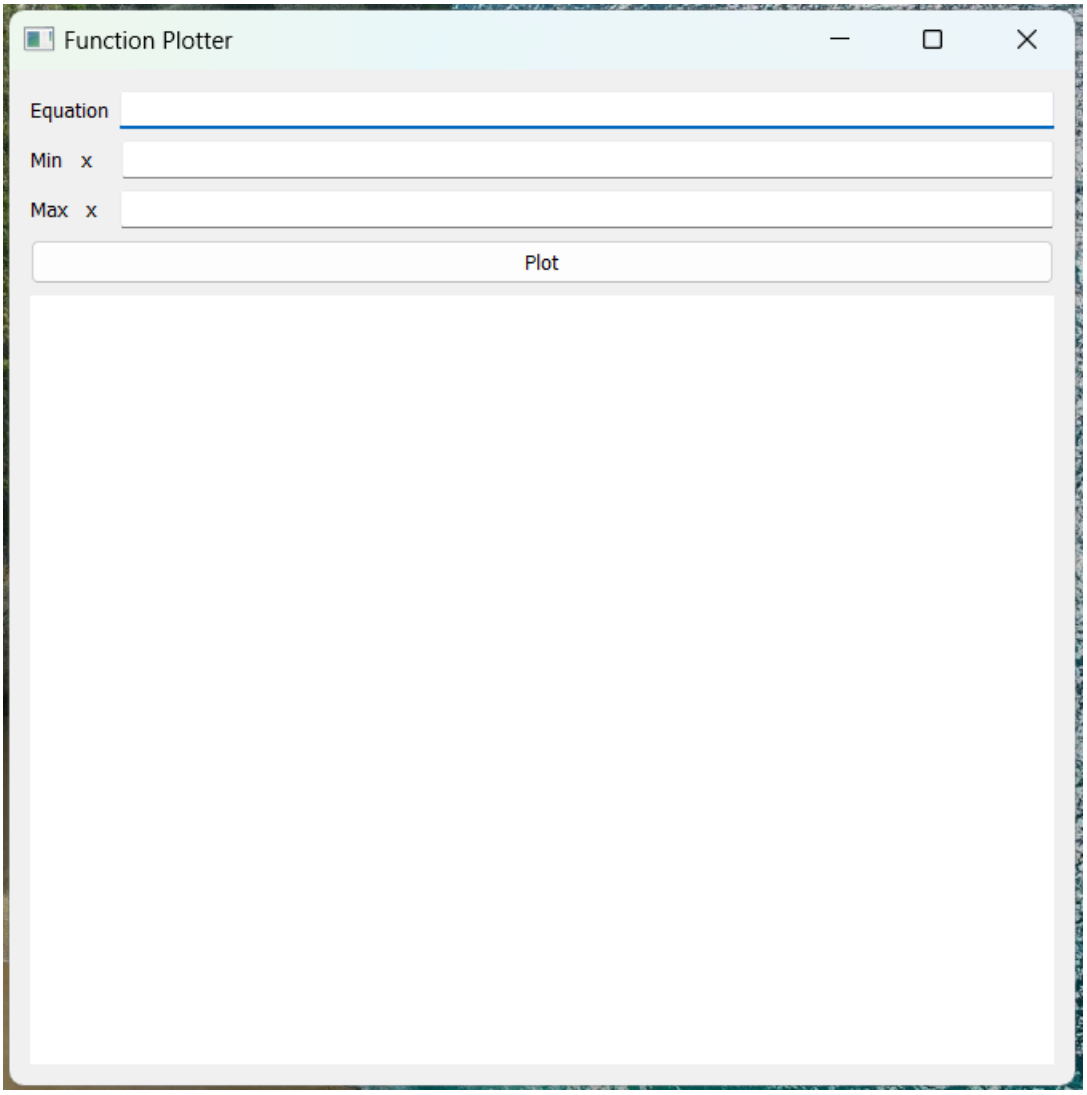
Procedure Details

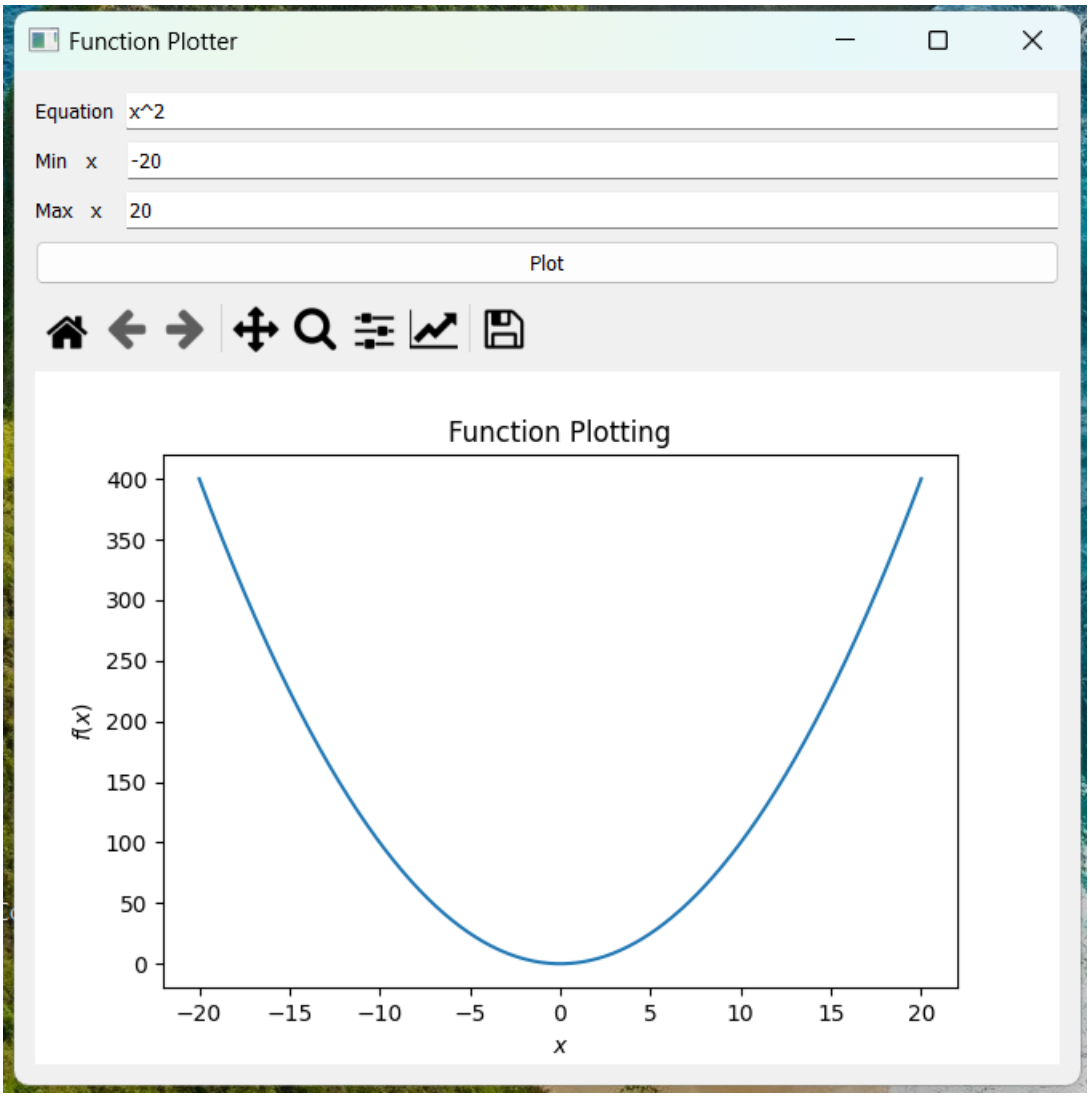
1. Write a Python GUI program that plots an arbitrary user-entered function.
2. Take a function of x from the user, e.g., 5*x^3 + 2*x.
3. Take min and max values of x from the user.
4. The following operators must be supported: + - / * ^ sin cos tan.
5. Apply appropriate input validation to the user input.
6. Display messages to the user to explain any wrong input.

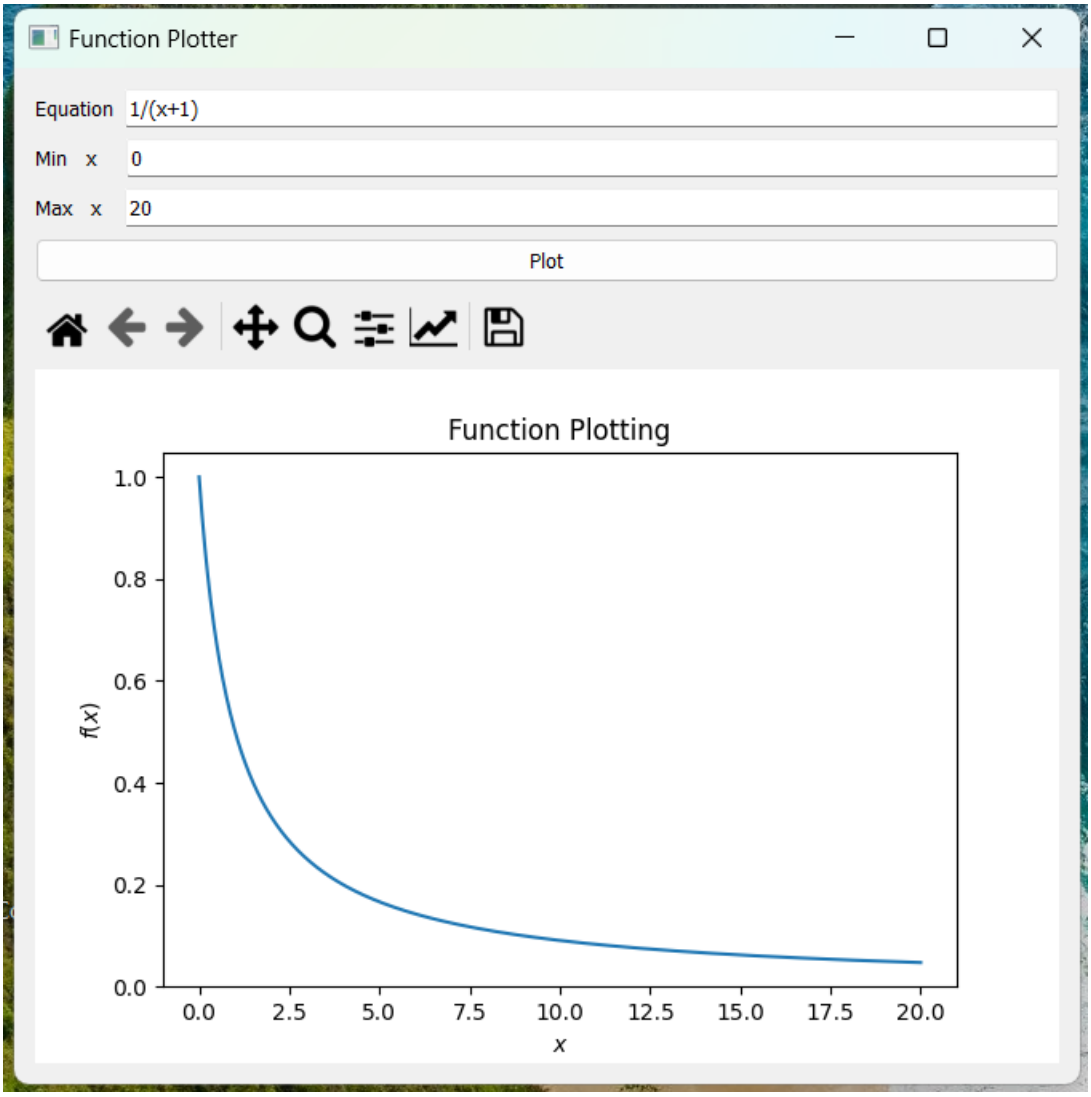
Extra Features

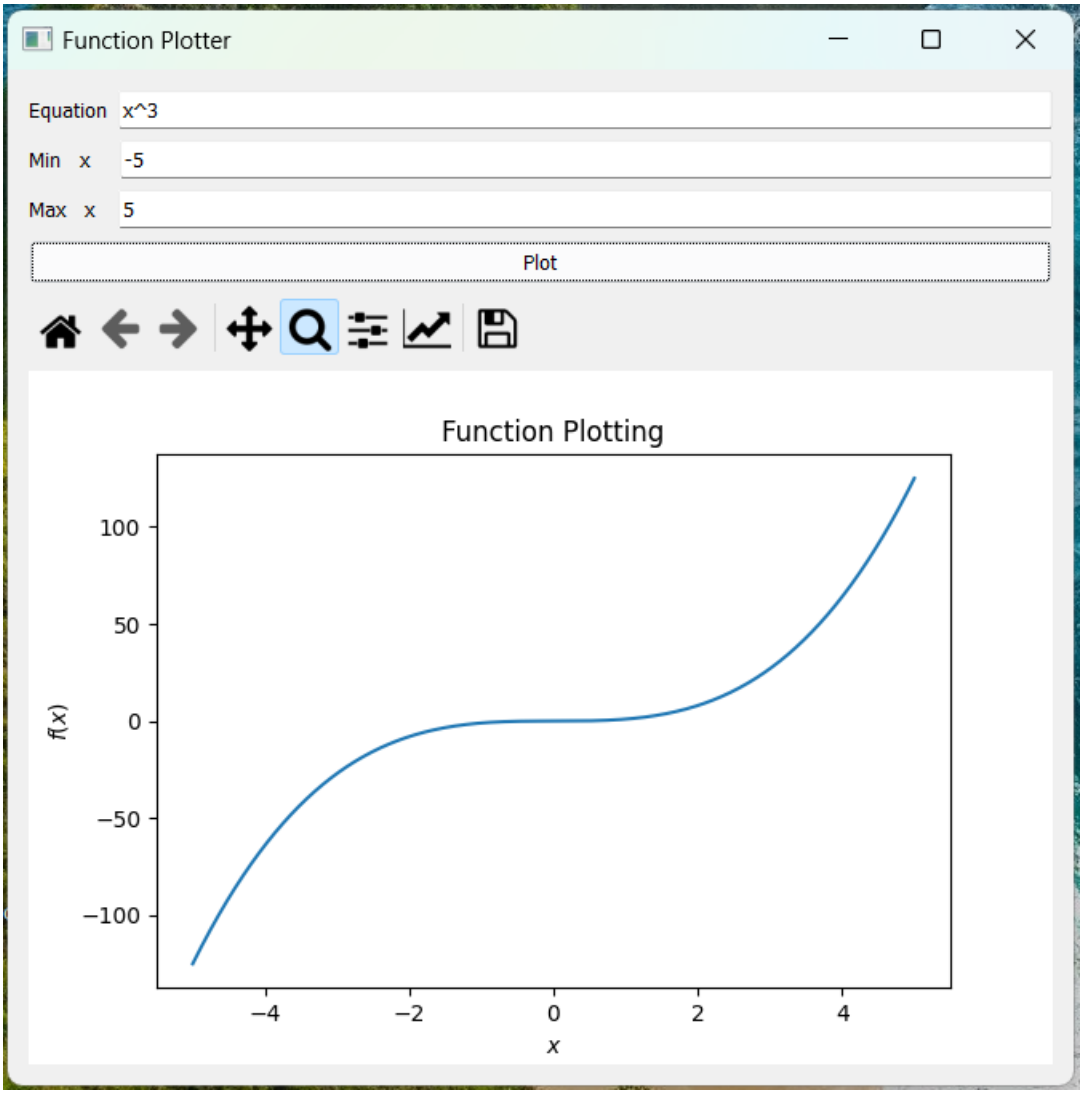
1. support sin, cos, tan, sqrt and e
2. user can enter constant instead of expression of x
3. user can enter function in any one of this forms
    - y = expression
    - expression
4. add features provided by NavigationToolbar2QT like
    - saving the plot to a file
    - panning and zooming the plot
    - resetting the view

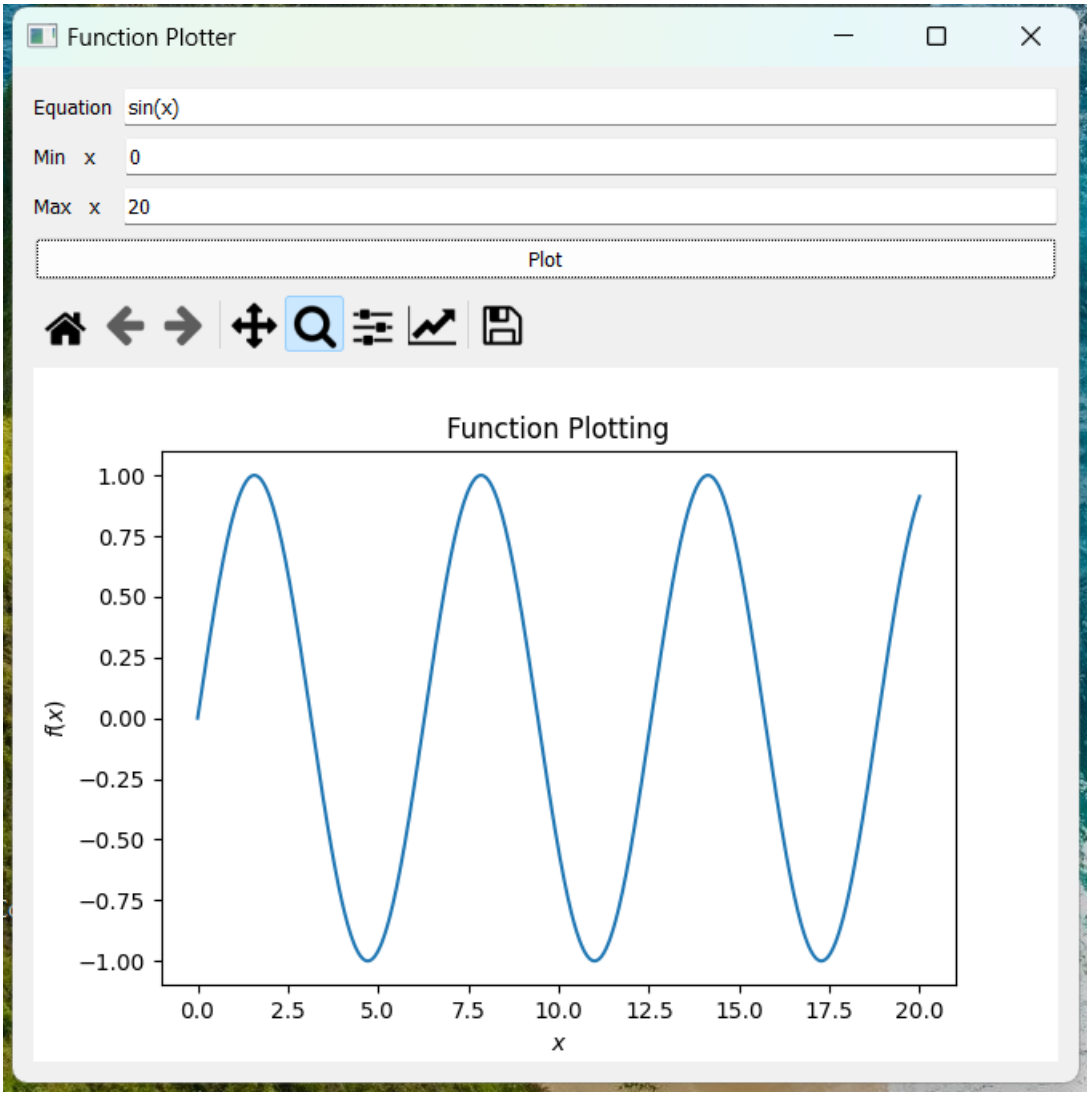
Output

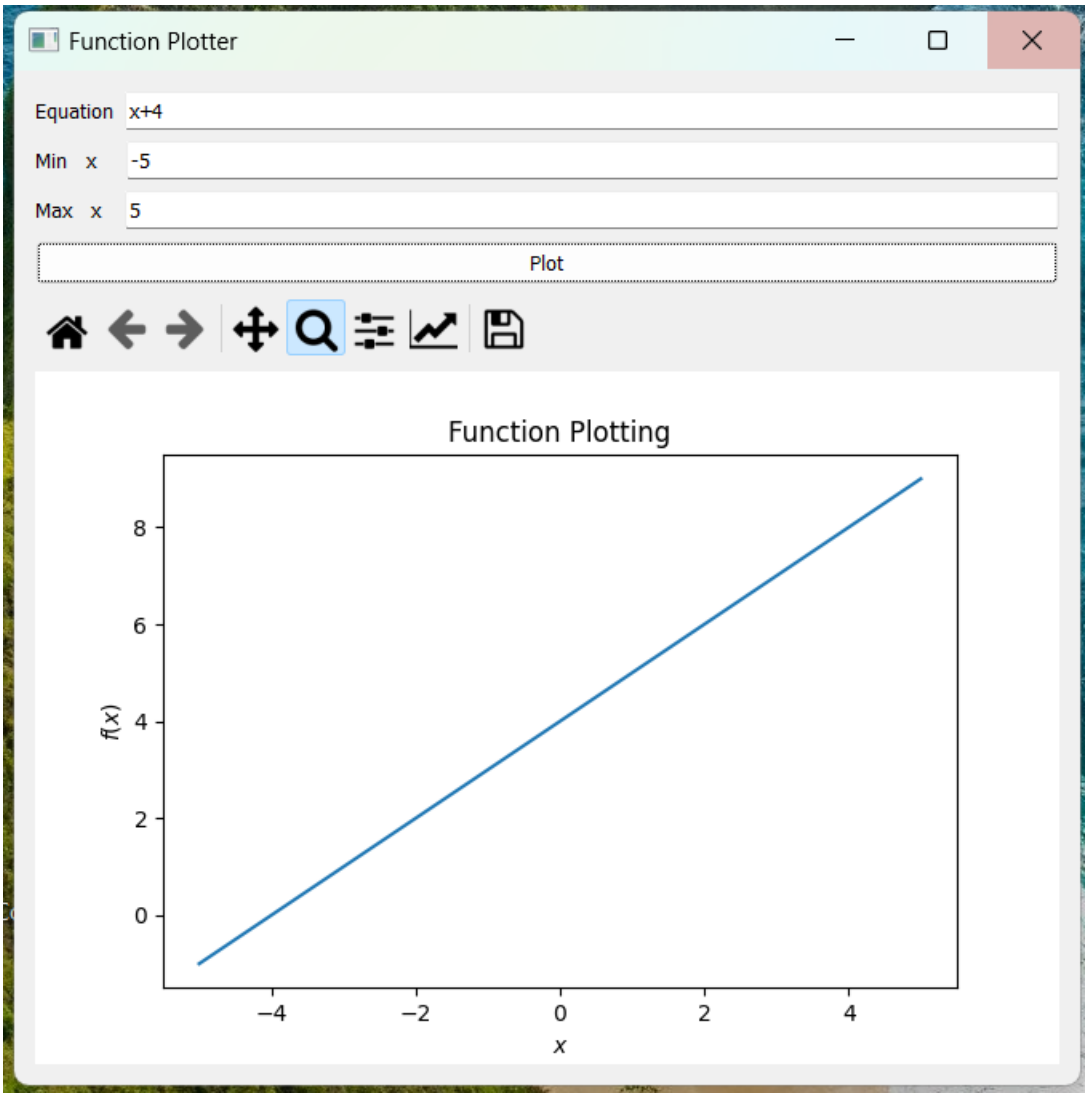


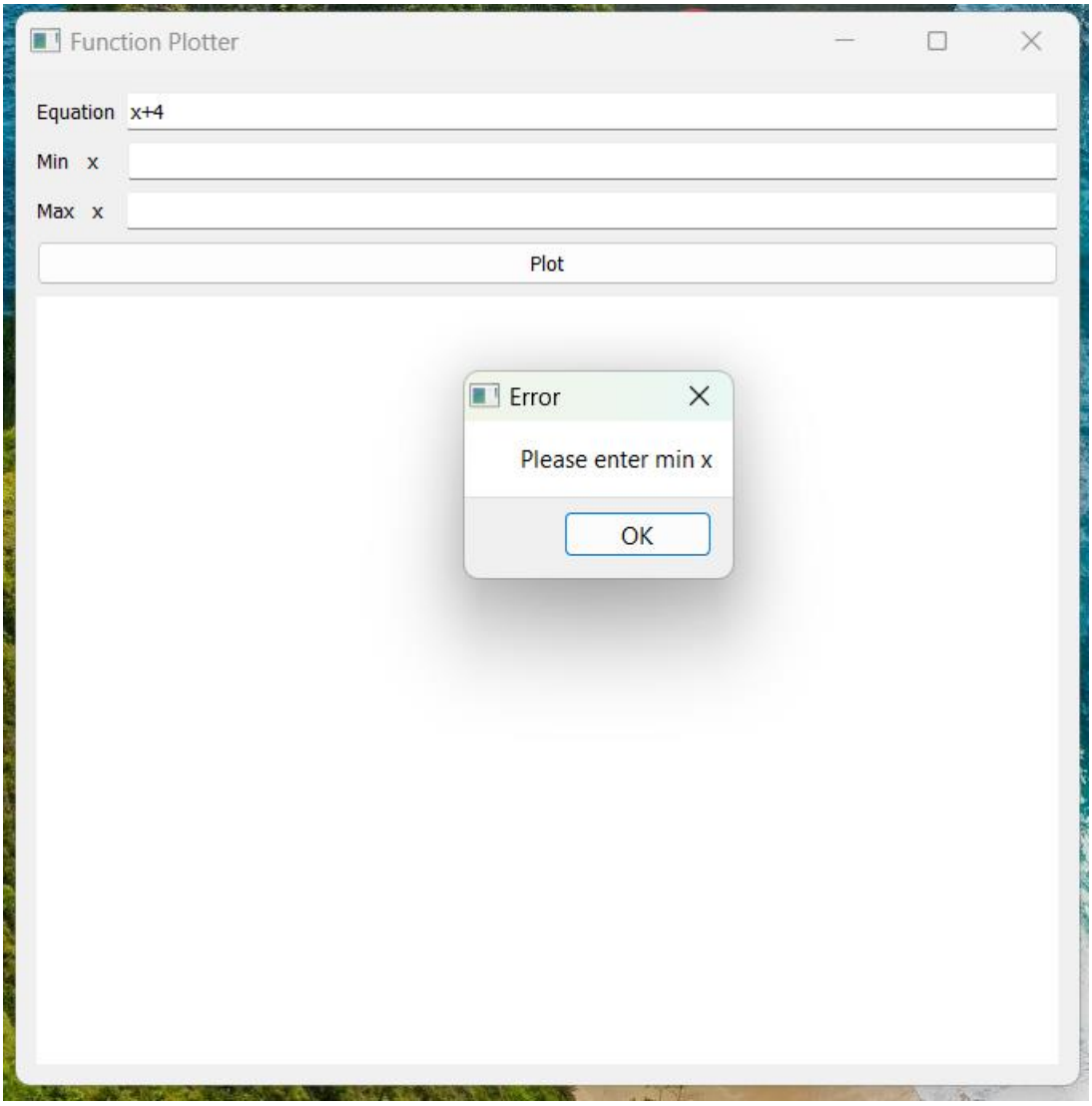

Function Plotter
Equation x^2
Min x -20
Max x 20
Plot
Function Plotting
400
350
300
250
200
150
100
50
0
f(x)
−20
−15
−10
−5
0
5
10
15
20
x

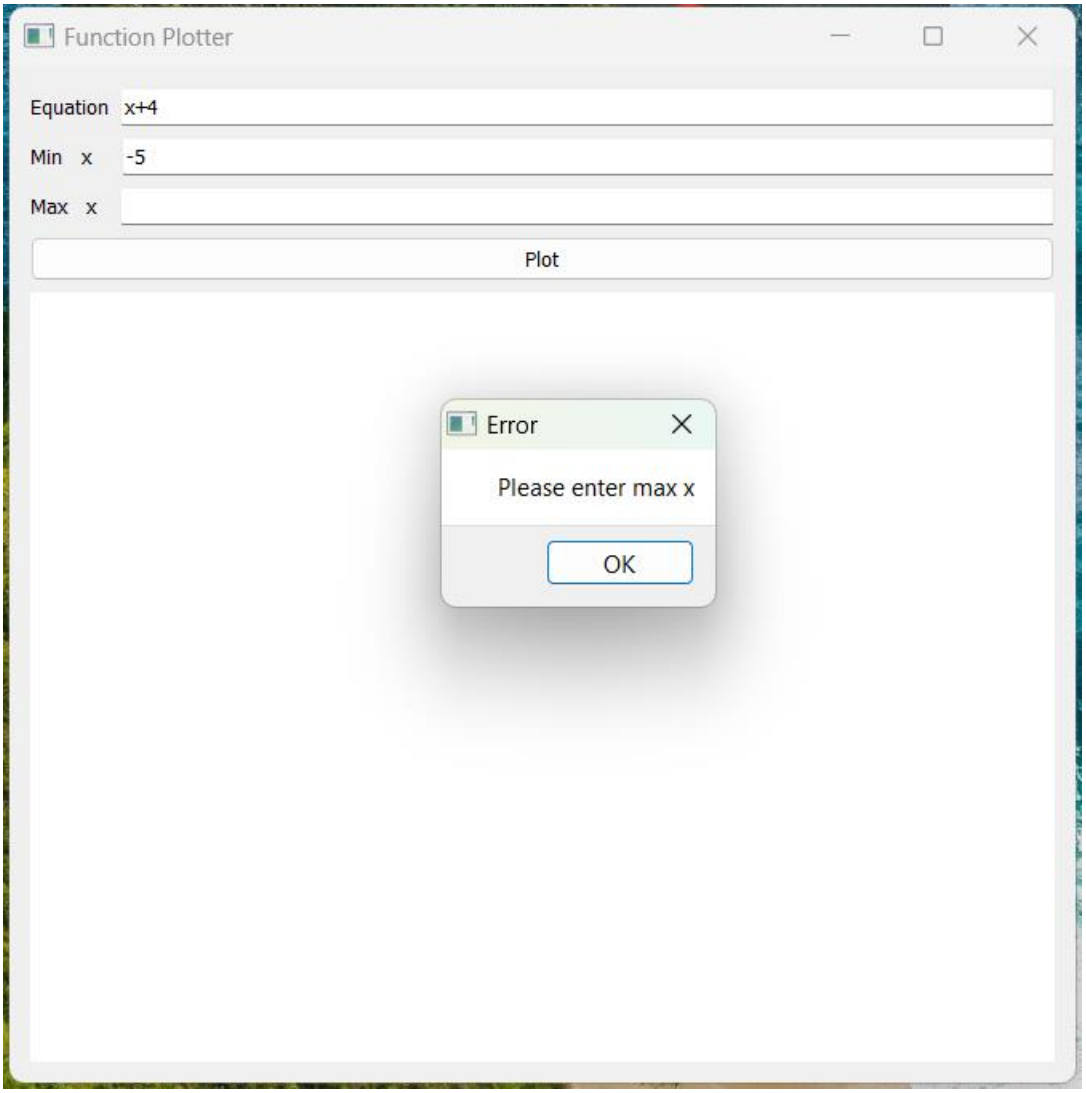

Function Plotter
Equation
1/(x+1)
Min x
0
Max x
20
Plot
Function Plotting
1.0
0.8
0.6
0.4
0.2
0.0
f(x)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
x

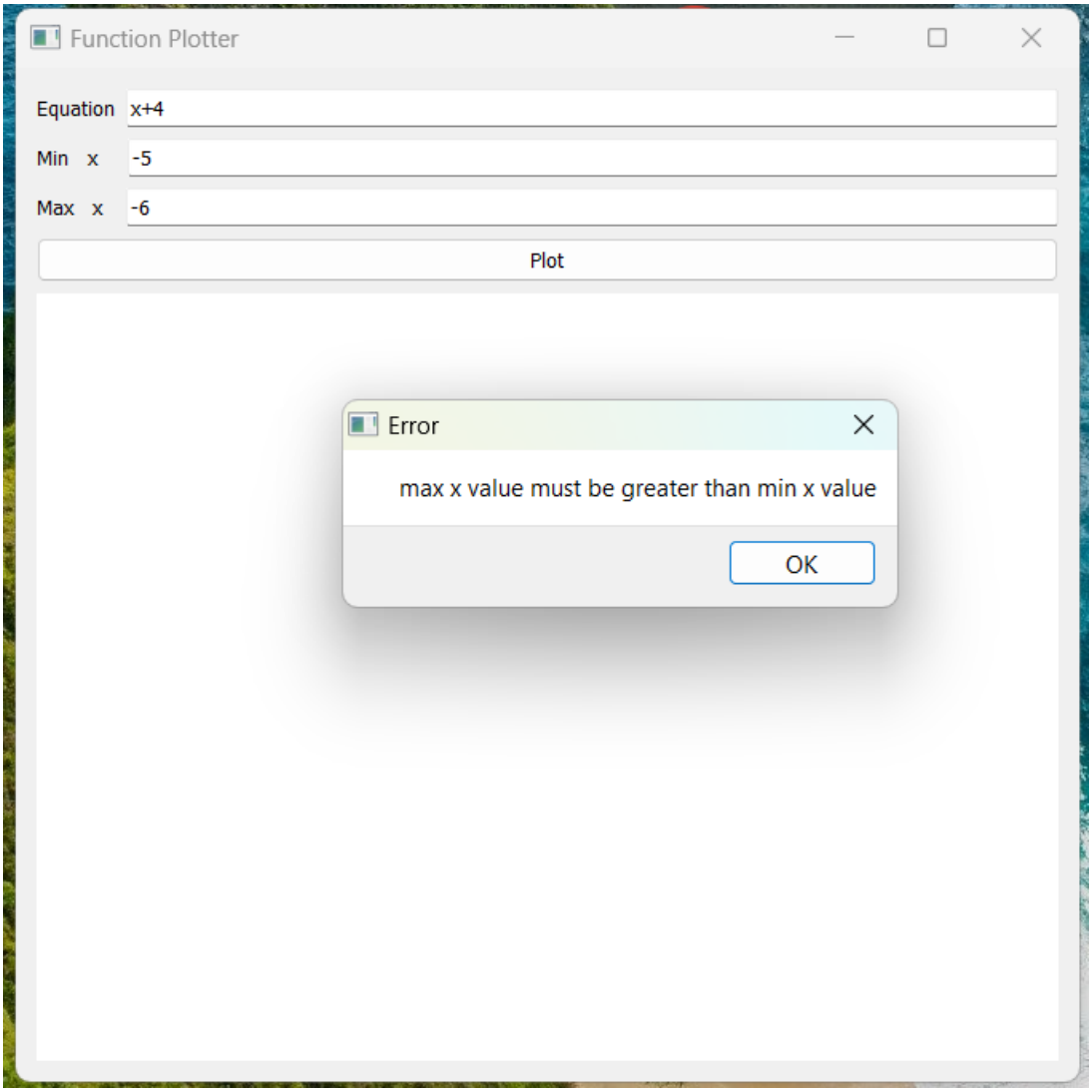

Function Plotter
Equation x^3
Min x -5
Max x 5
Plot
Function Plotting
100
50
0
−50
−100
f(x)
−4
−2
0
2
4
x

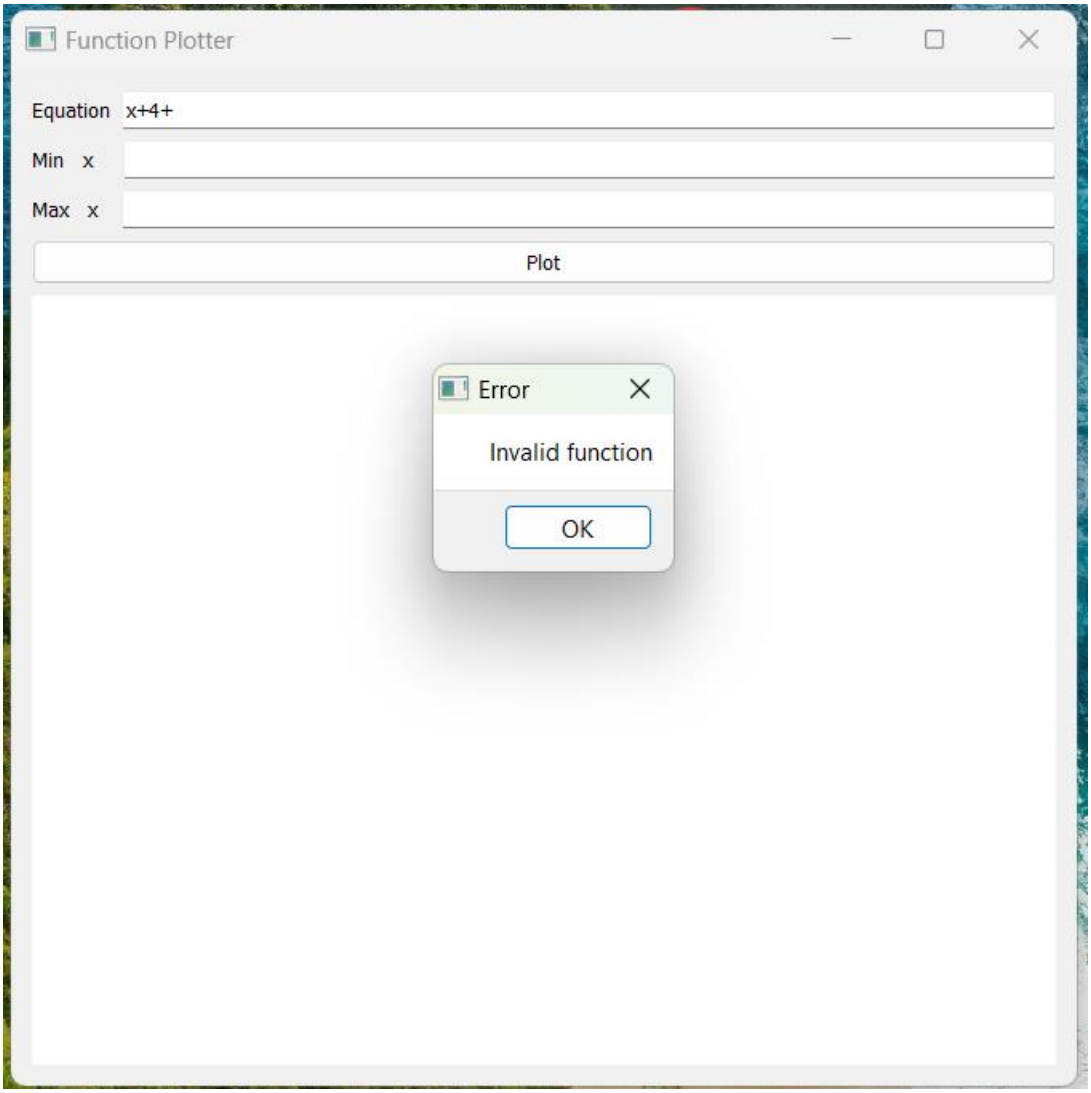

Function Plotter
Equation
sin(x)
Min x
0
Max x
20
Plot
Function Plotting
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
f(x)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
x

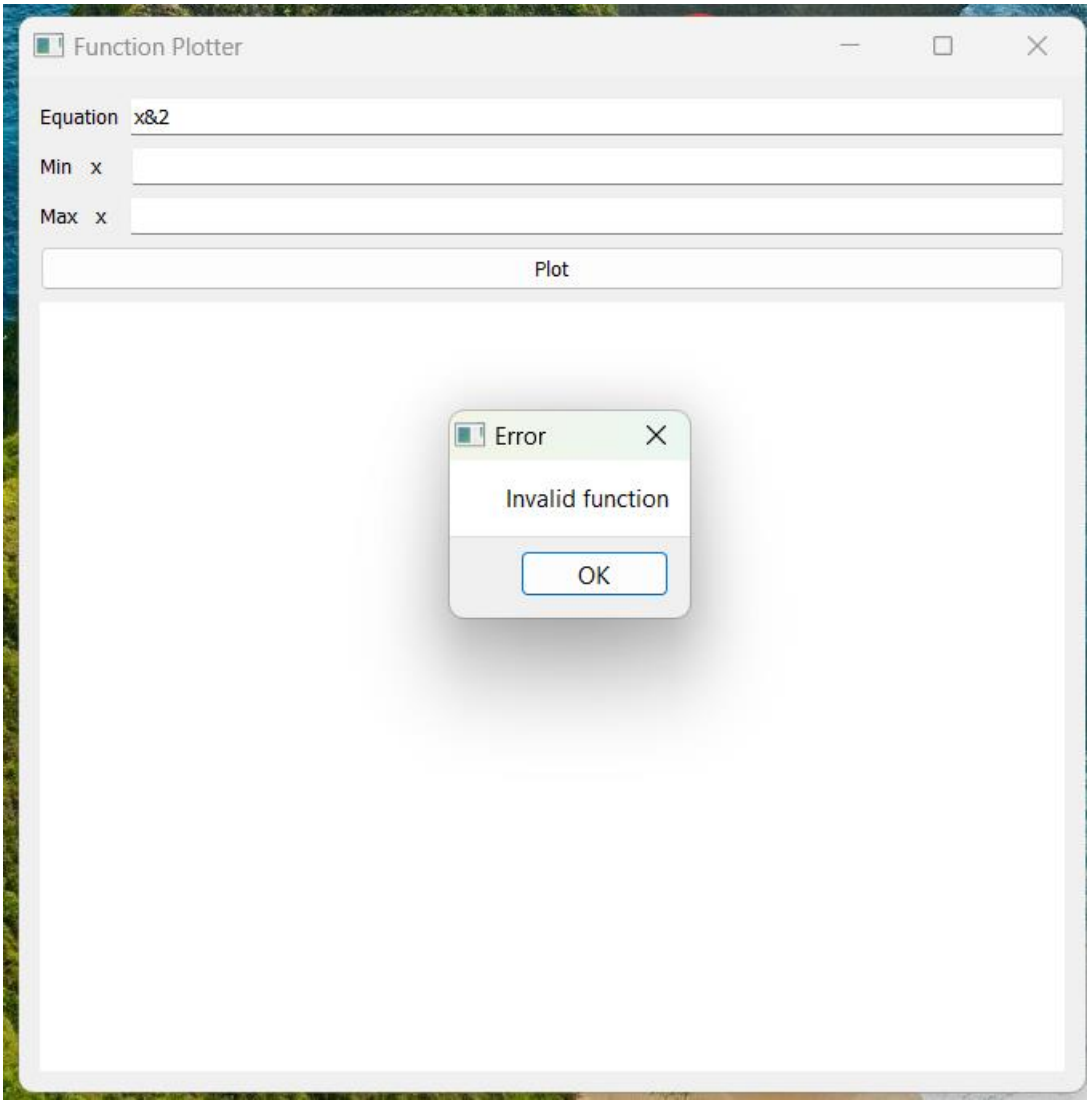

Function Plotter
Equation x+4
Min x -5
Max x 5
Plot
Function Plotting
8
6
4
2
0
f(x)
−4
−2
0
2
4
x

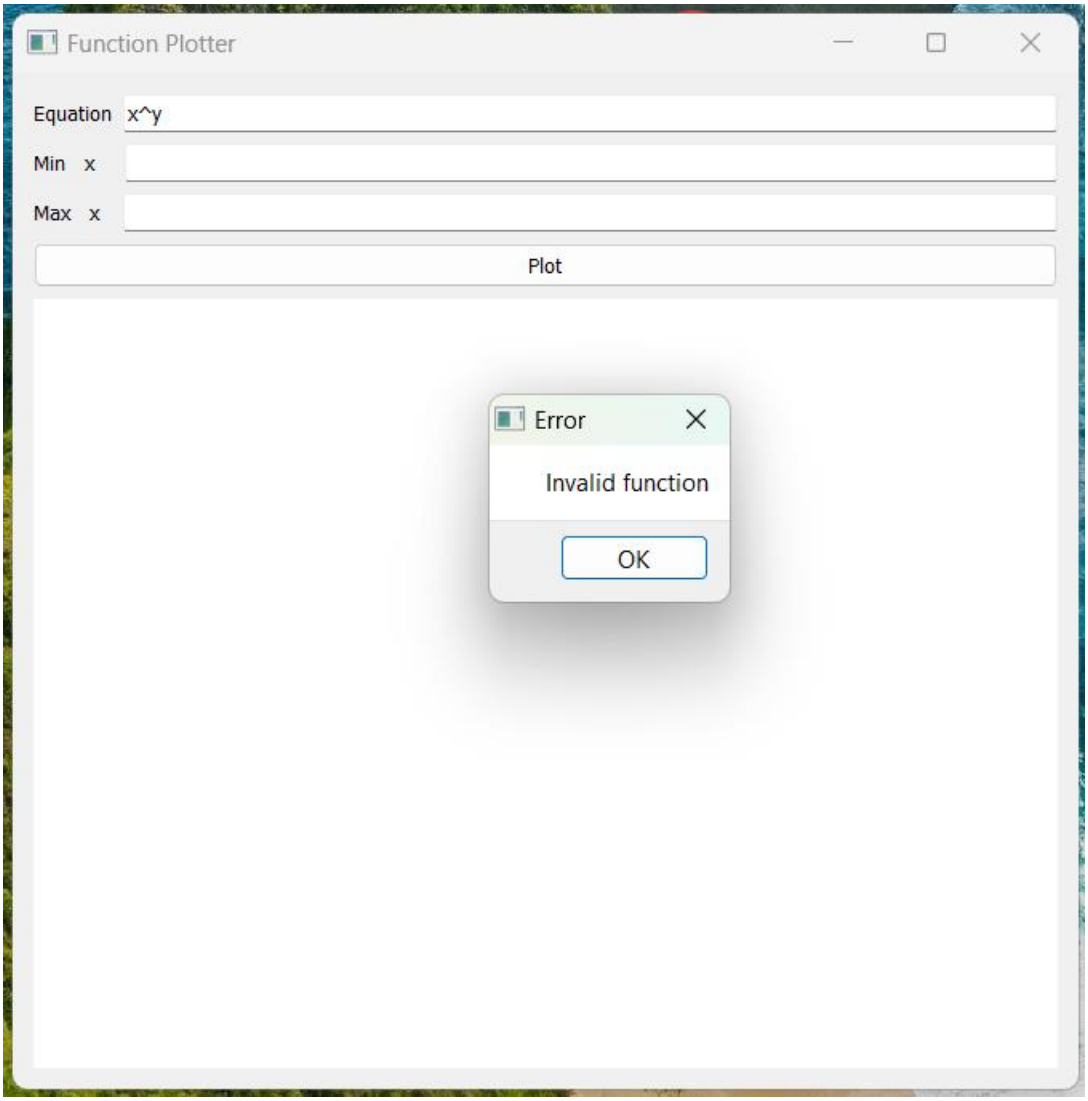

Function Plotter
Equation
x+4
Min x
Max x
Plot
Error
Please enter min x
OK

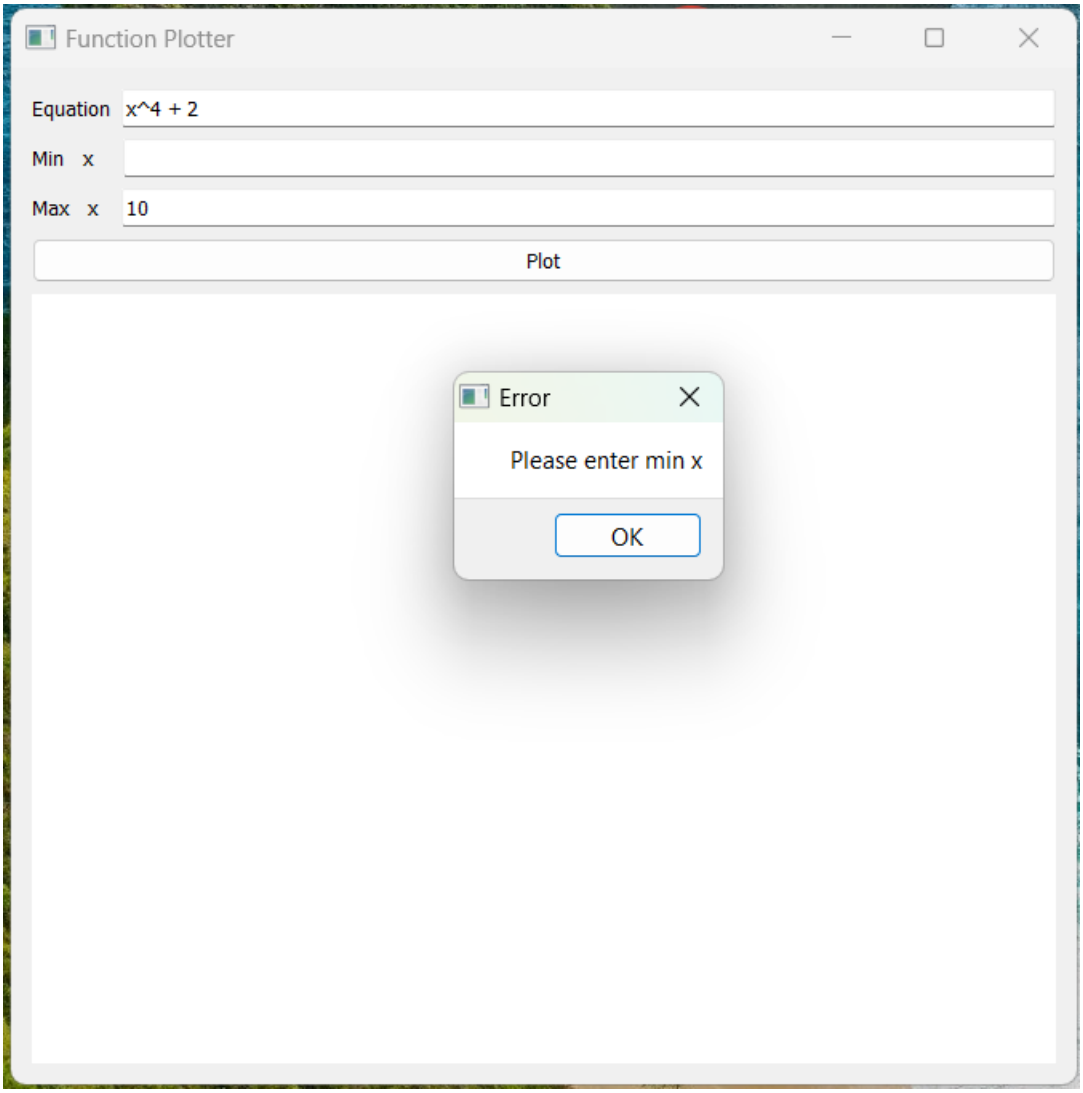

Function Plotter
Equation
x+4
Min x
-5
Max x
Plot
Error
Please enter max x
OK

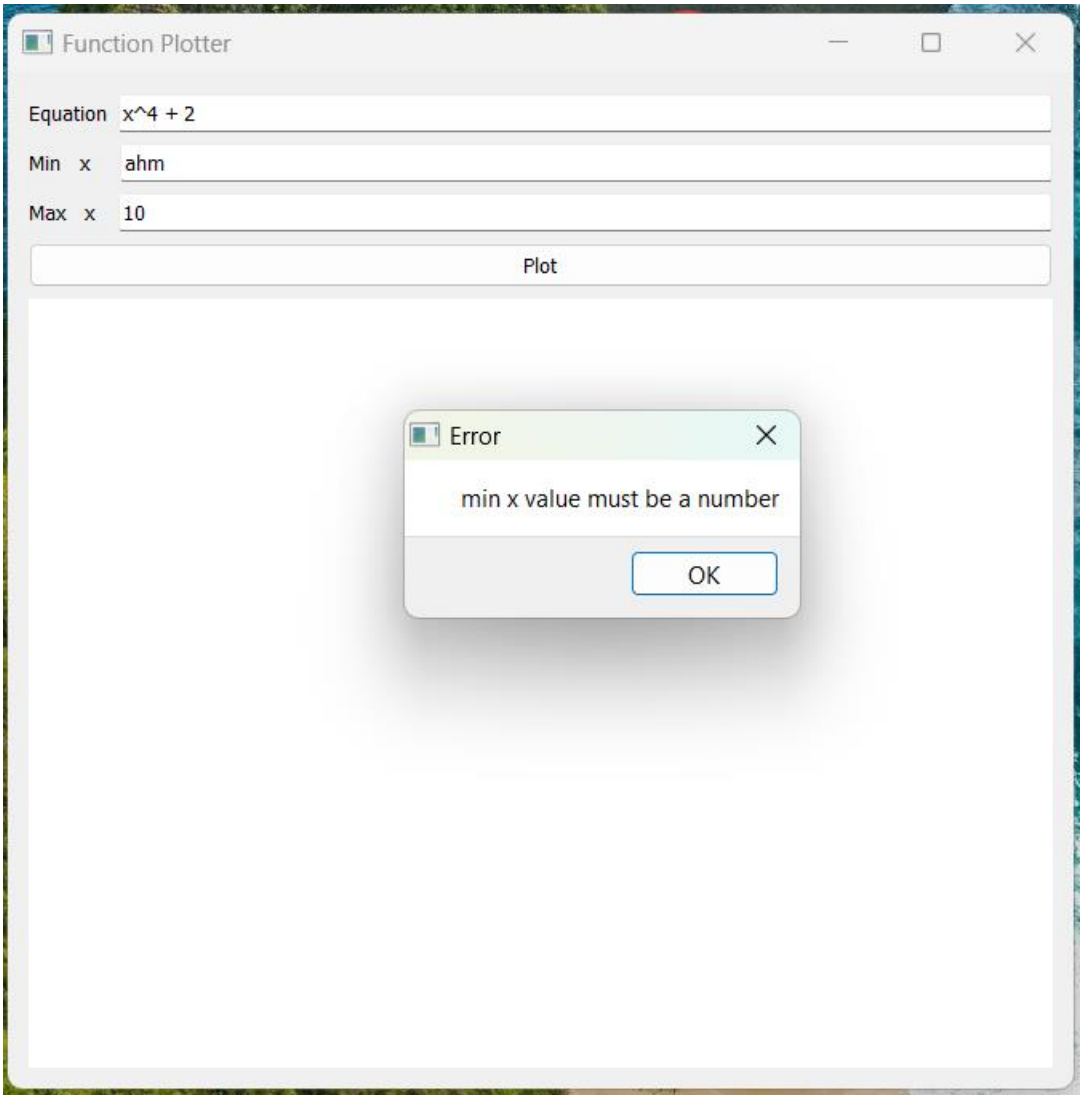

Function Plotter
Equation x+4
Min x -5
Max x -6
Plot
Error
max x value must be greater than min x value
OK

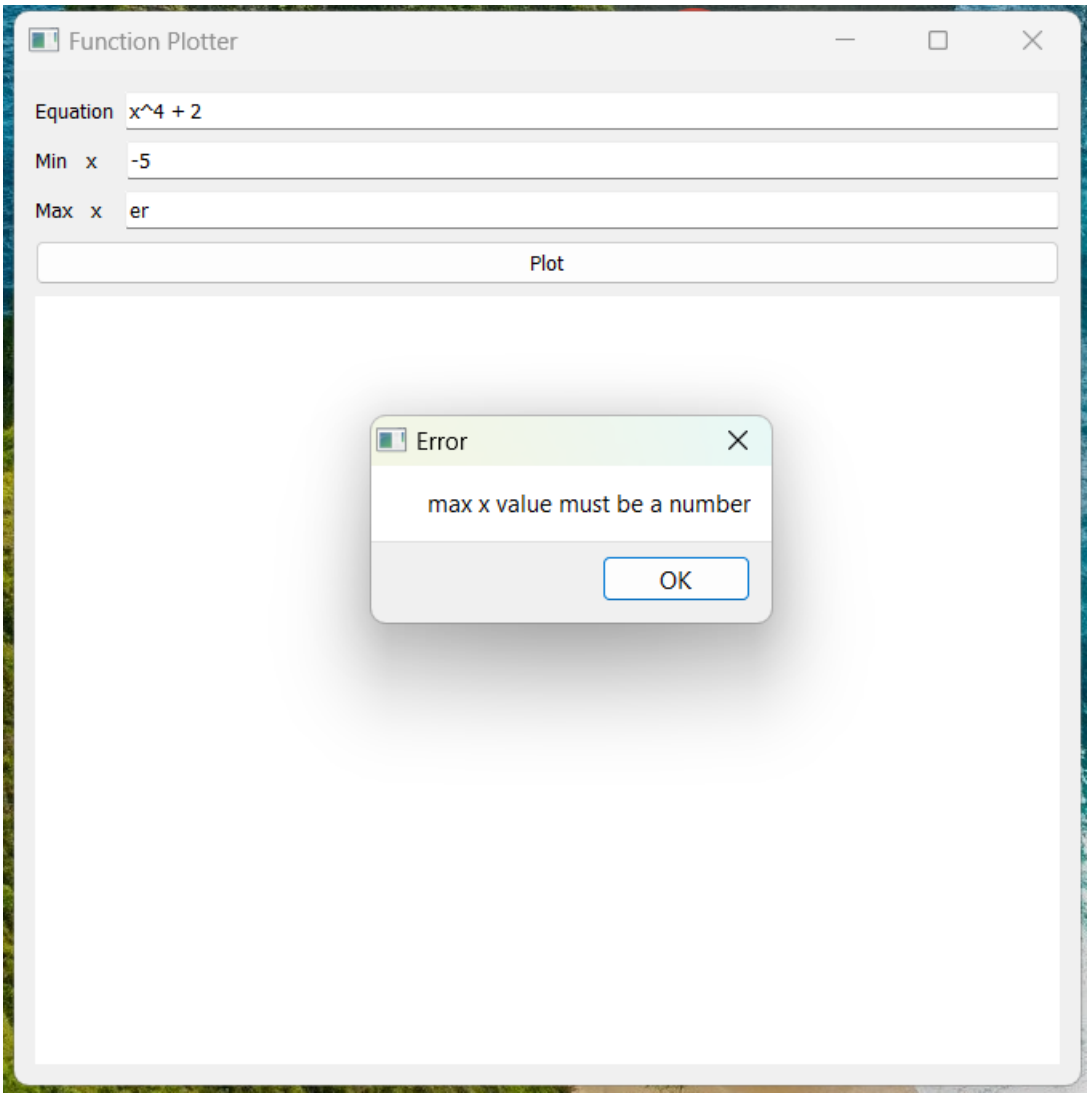

Function Plotter
Equation x+4+
Min x
Max x
Plot
Error
Invalid function
OK

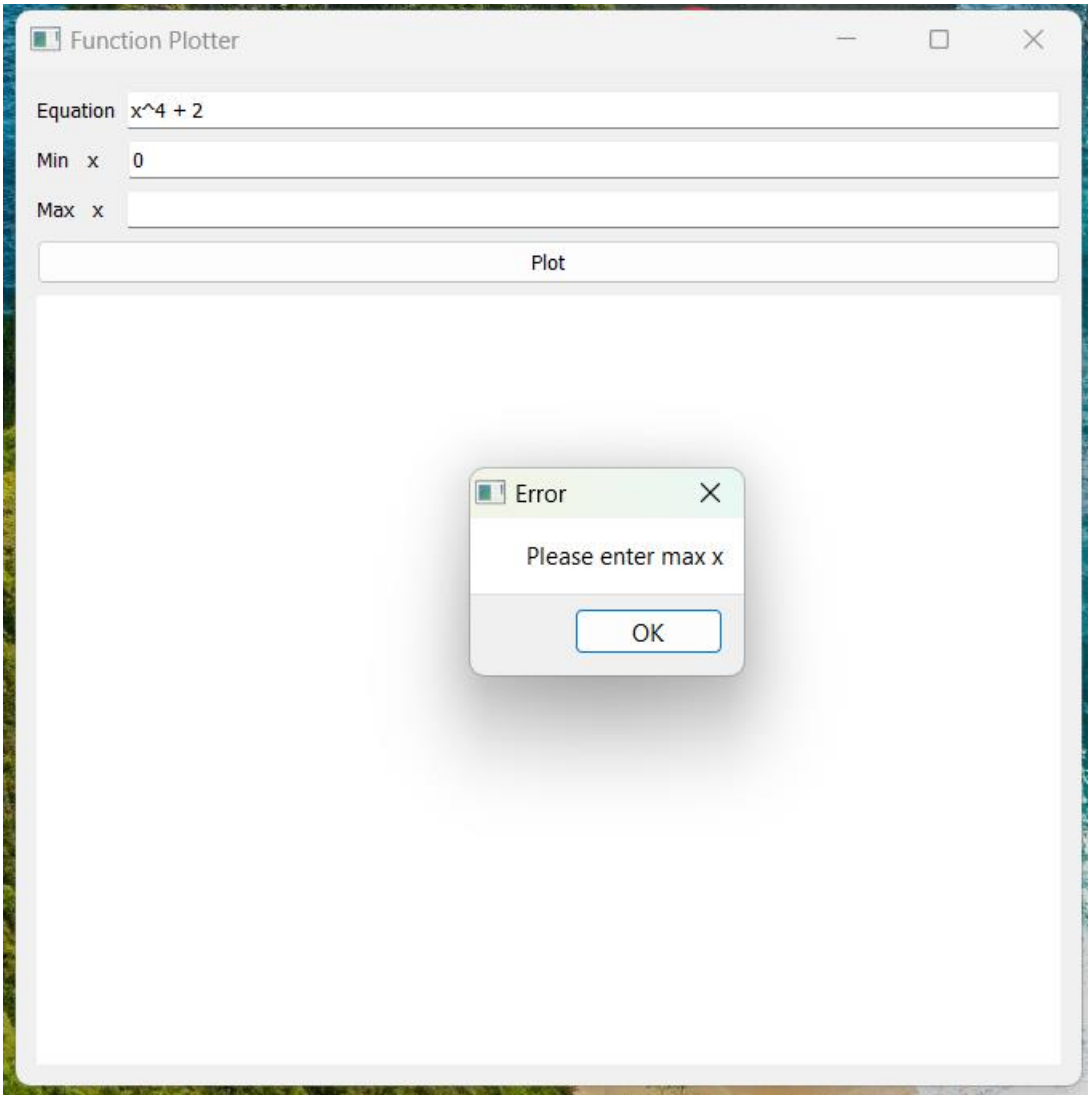

Function Plotter
Equation
x&2
Min x
Max x
Plot
Error
Invalid function
OK

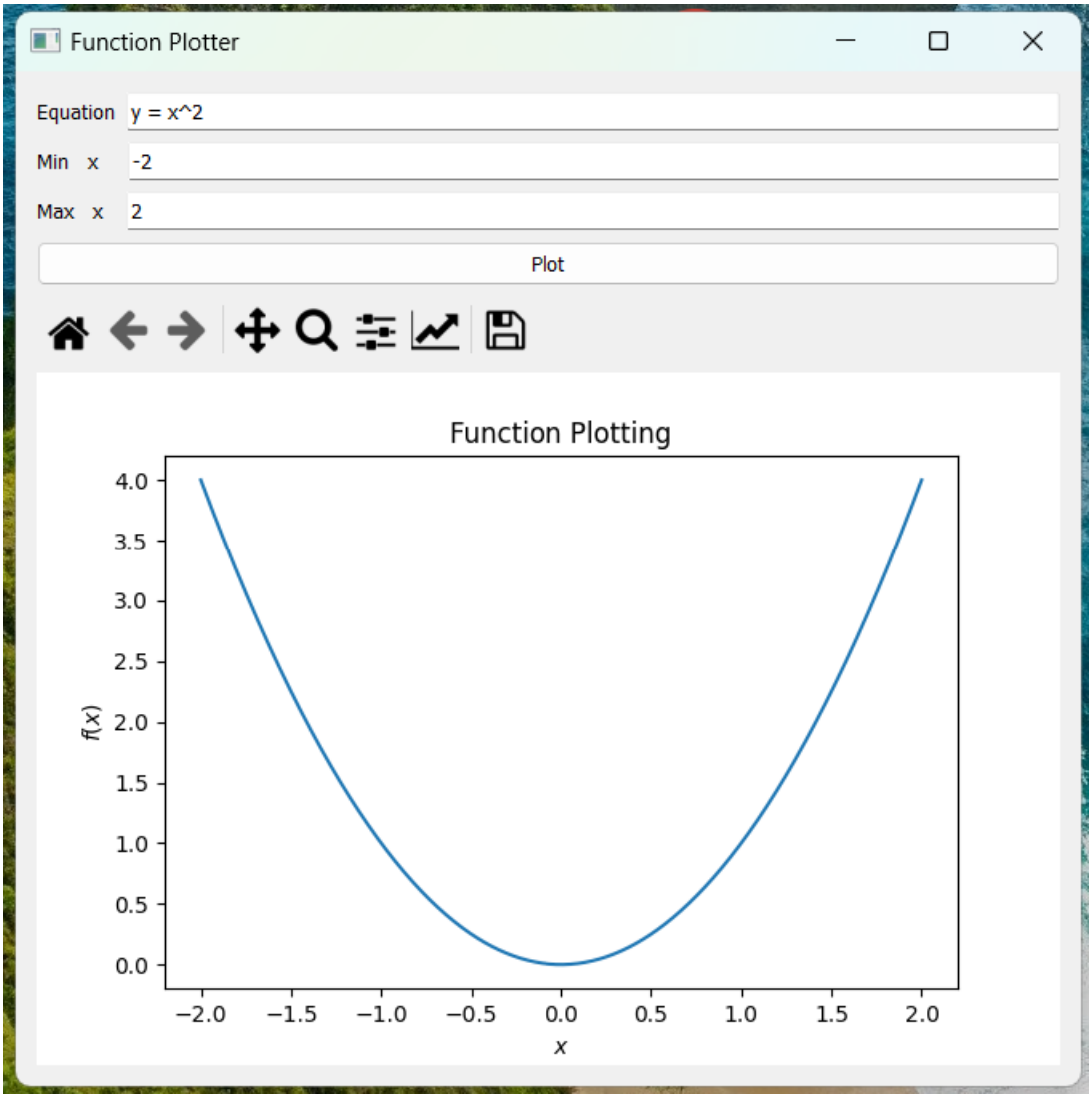

Function Plotter
Equation
x^y
Min x
Max x
Plot
Error
Invalid function
OK

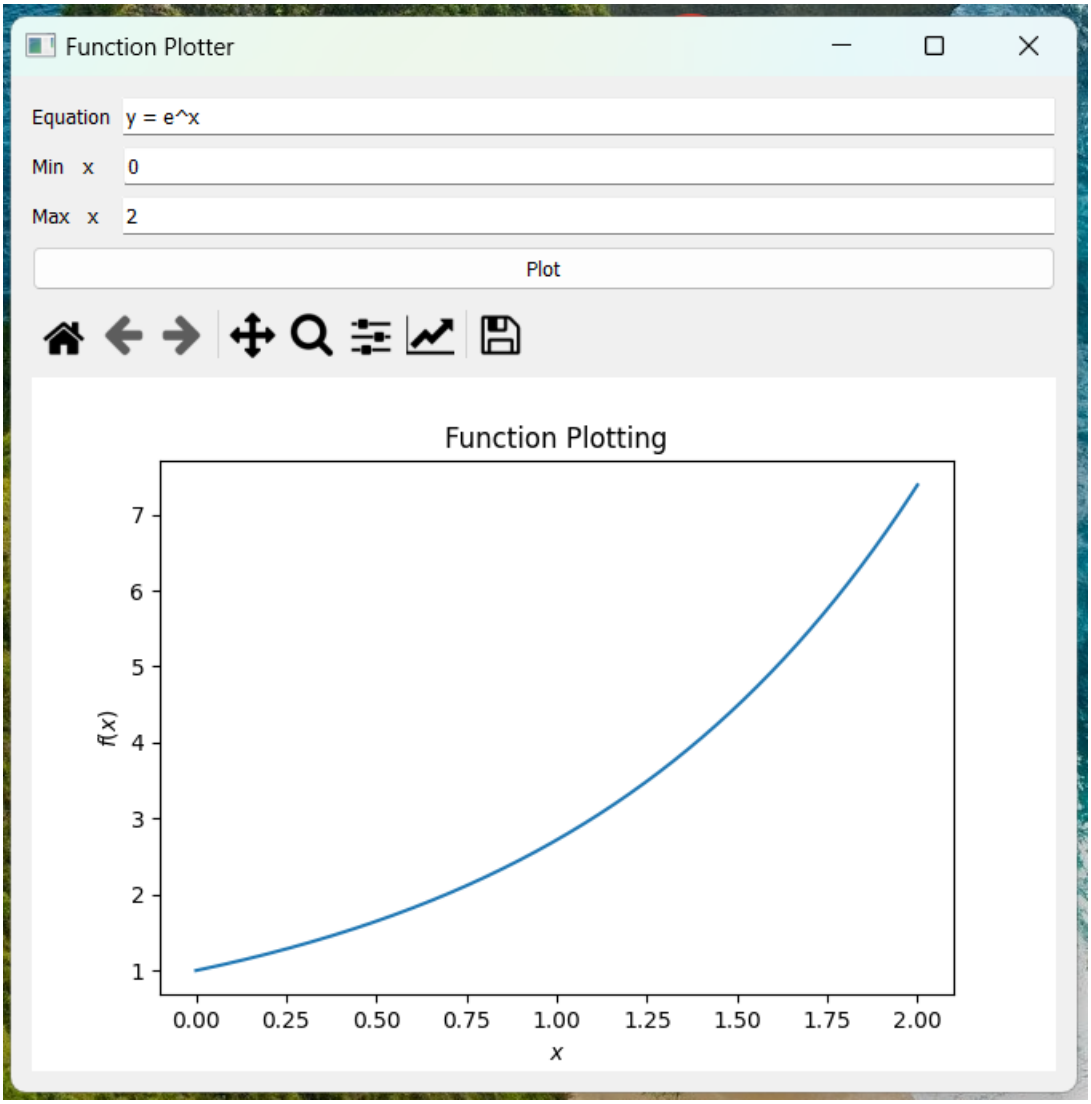

Function Plotter
Equation
x^4 + 2
Min x
Max x
10
Plot
Error
Please enter min x
OK

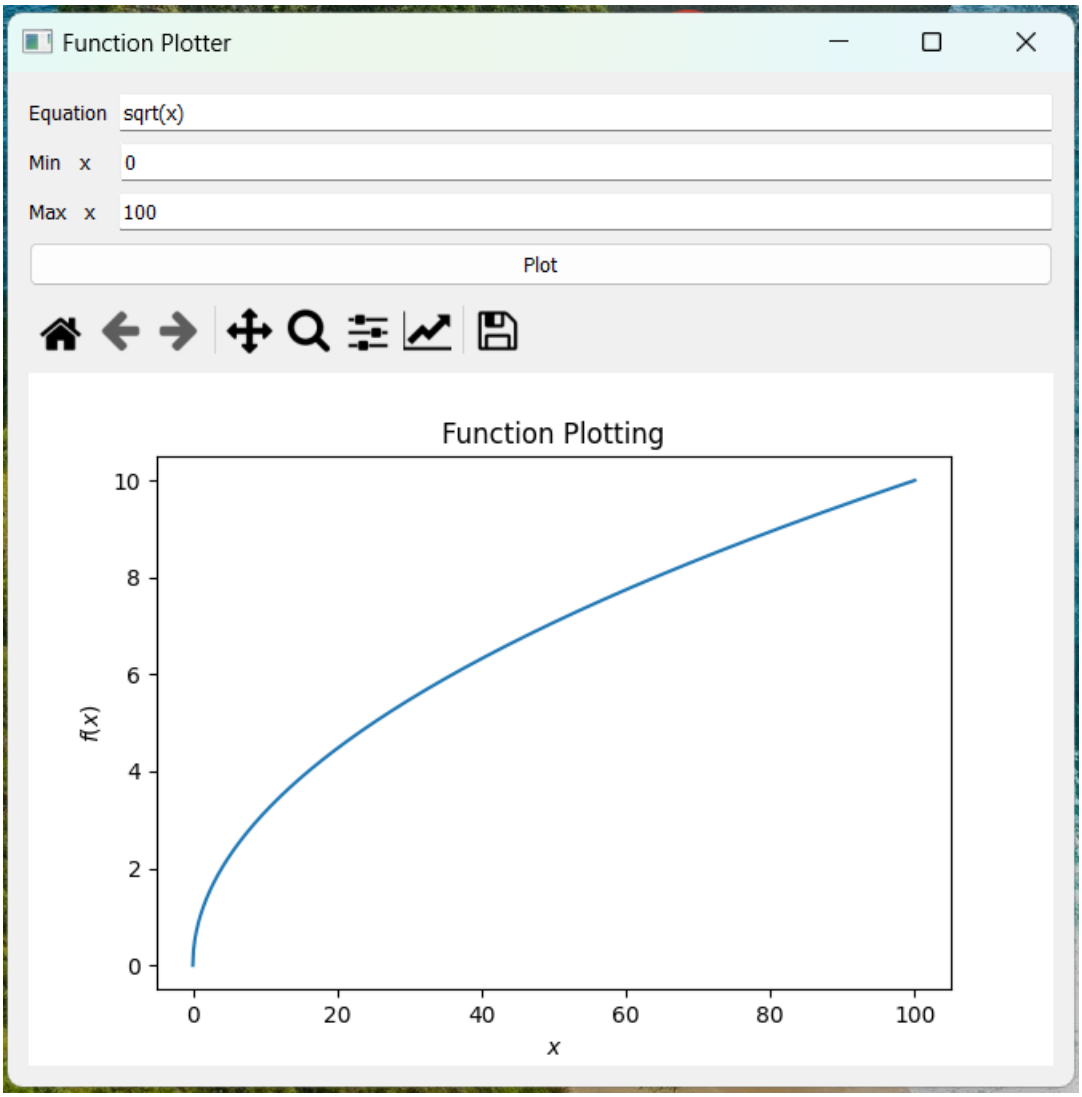

Function Plotter
Equation
x^4 + 2
Min x
ahm
Max x
10
Plot
Error
min x value must be a number
OK

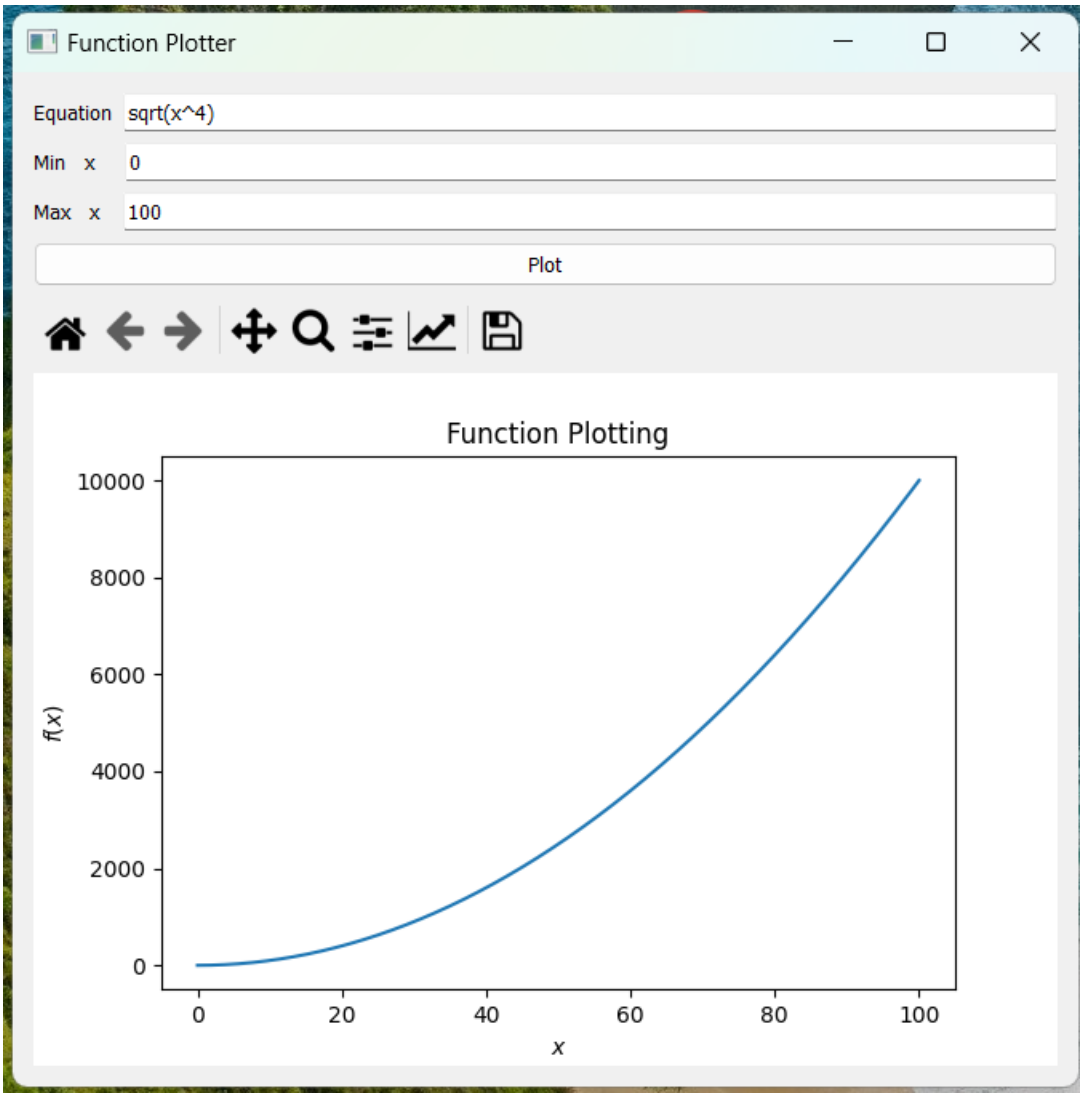

Function Plotter
Equation
x^4 + 2
Min x
-5
Max x
er
Plot
Error
max x value must be a number
OK

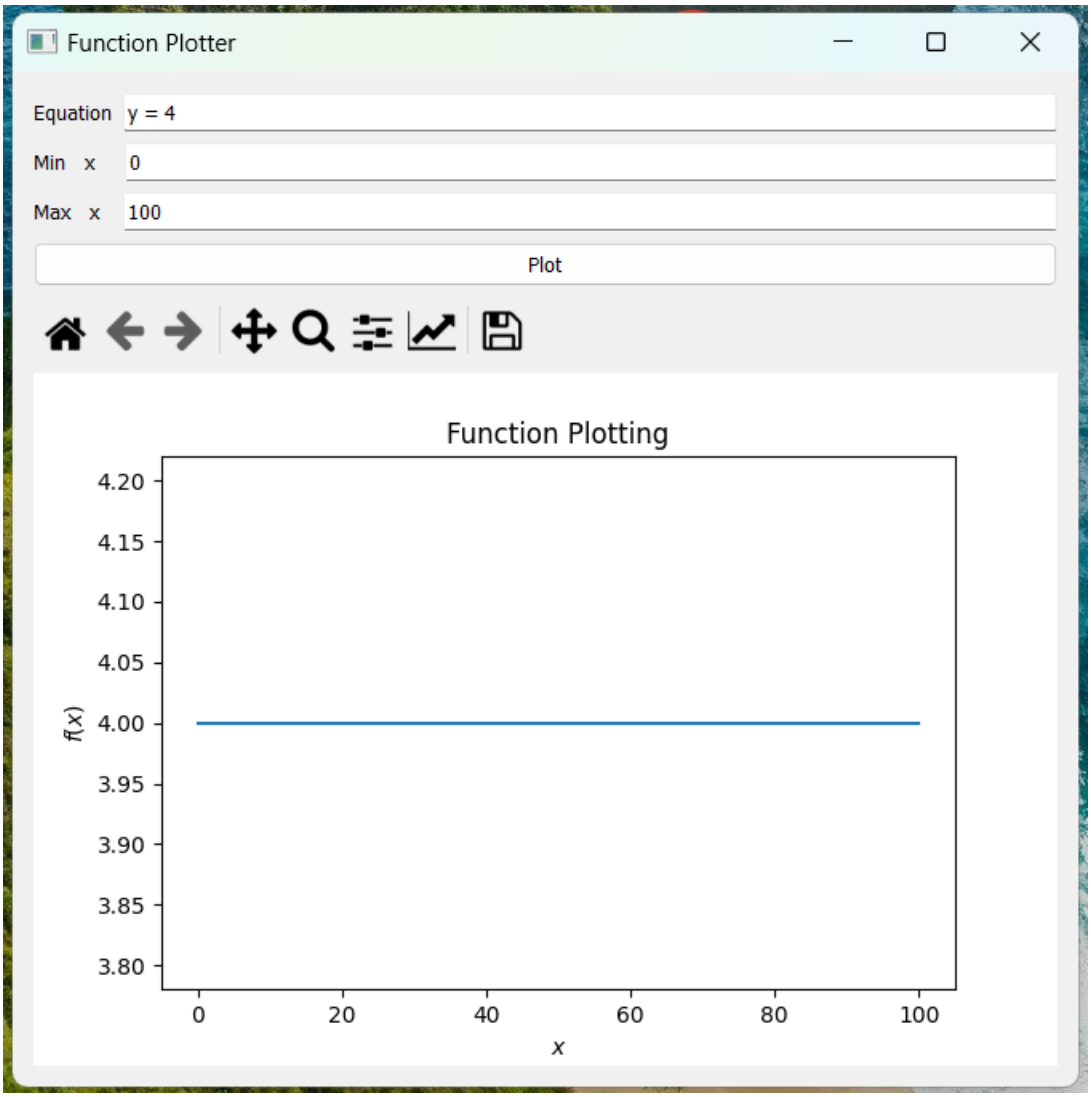

Function Plotter
Equation
x^4 + 2
Min x
0
Max x
Plot
Error
Please enter max x
OK

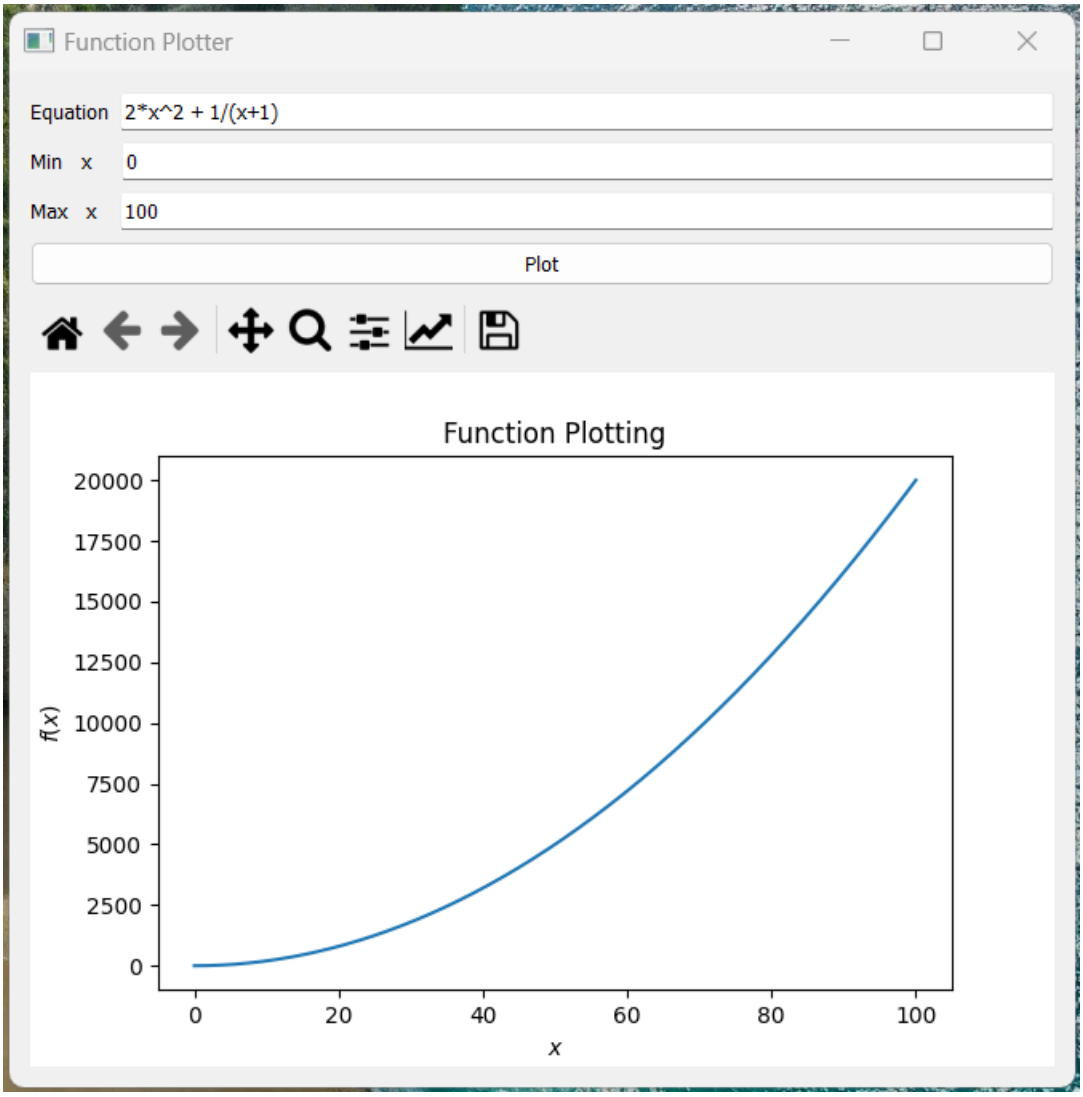

Function Plotter
Equation
y = x^2
Min x
-2
Max x
2
Plot
Function Plotting
f(x)
x
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0

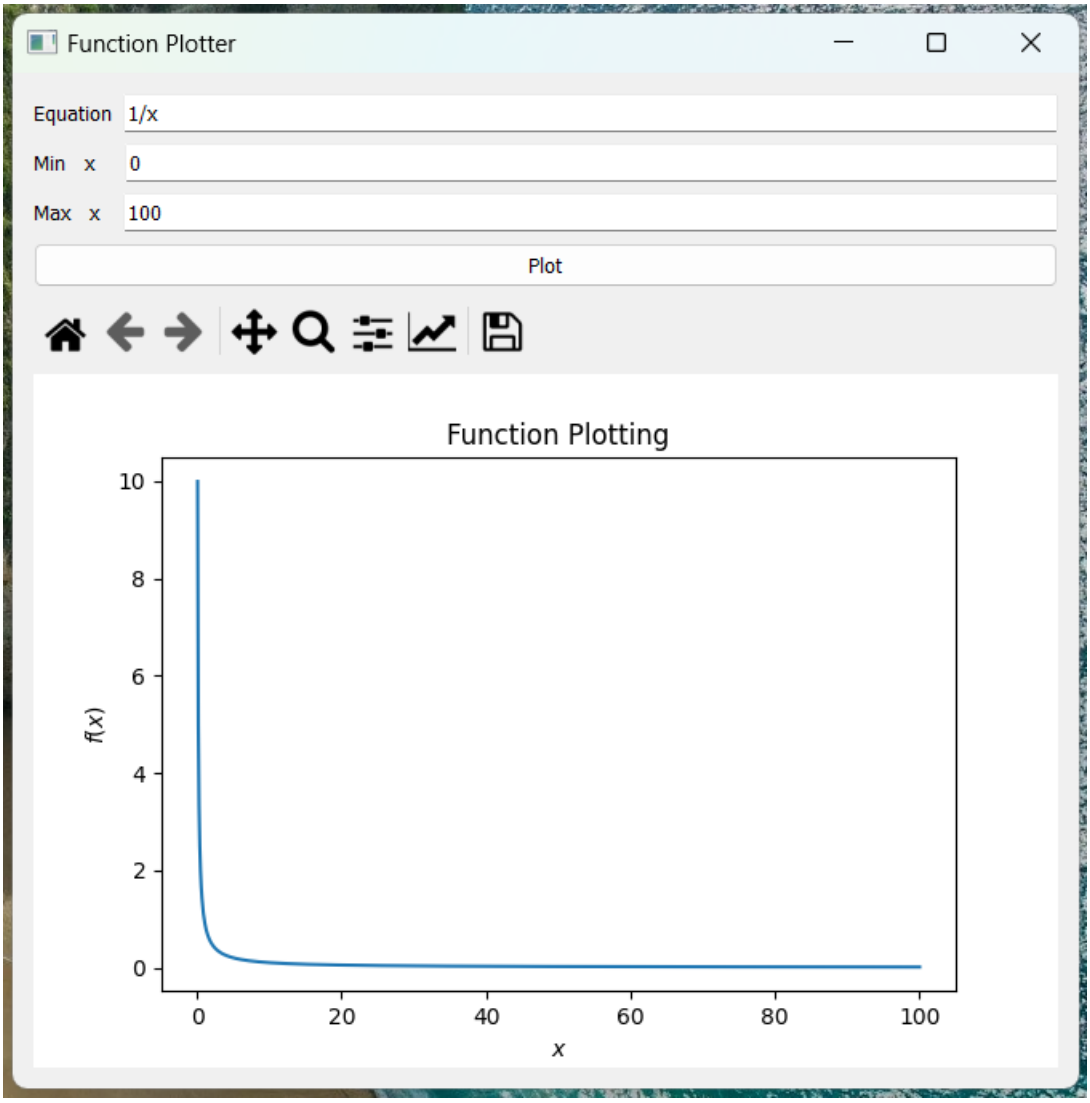

Function Plotter
Equation
y = e^x
Min x
0
Max x
2
Plot
Function Plotting
f(x)
x
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
1
2
3
4
5
6
7


Function Plotter
Equation
sqrt(x)
Min x
0
Max x
100
Plot
Function Plotting
f(x)
x
0
20
40
60
80
100
0
2
4
6
8
10


Function Plotter
Equation
sqrt(x^4)
Min x
0
Max x
100
Plot
Function Plotting
10000
8000
6000
4000
2000
0
f(x)
0
20
40
60
80
100
x


Function Plotter
Equation
y = 4
Min x
0
Max x
100
Plot
Function Plotting
4.20
4.15
4.10
4.05
4.00
3.95
3.90
3.85
3.80
f(x)
0
20
40
60
80
100
x


Function Plotter
Equation
2*x^2 + 1/(x+1)
Min x
0
Max x
100
Plot
Function Plotting
20000
17500
15000
12500
10000
7500
5000
2500
0
f(x)
0
20
40
60
80
100
x


Function Plotter
Equation 1/x
Min x 0
Max x 100
Plot
Function Plotting
f(x)
x
0
2
4
6
8
10
0
20
40
60
80
100

Requirements

- App Requirements

```
pip install PySide2
pip install numpy
pip install matplotlib
```

- Testing Requirements

```
pip install pytest
pip install pytest-qt
```

Usage

- Run app.py file.

```
python app.py
```

- In case of testing, run test.py file.

```
pytest test_app.py
```