Tkinter Matplotlib

Summary: in this tutorial, you'll learn how to display a graph from the Matplotlib library on a Tkinter application.

Display a bar chart from matplotlib in Tkinter applications

Matplotlib is a third-party library for creating professional visualizations in Python. Since Matplotlib (https://matplotlib.org/) is a third-party library, you need to install it before use.

To install the matplotlib package, you can use the following `pip` command:

```
pip install matplotlib
```

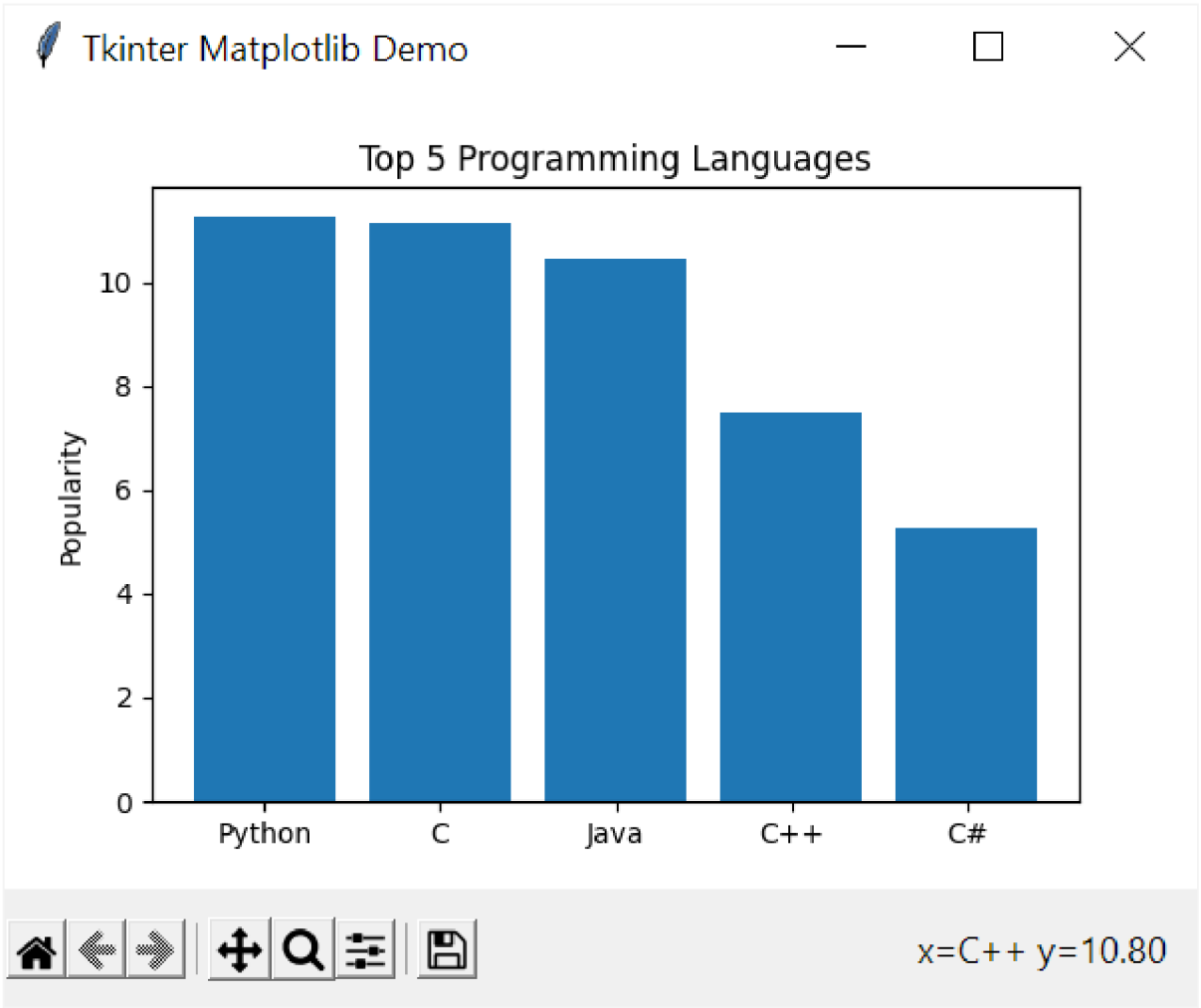
The following program uses the `matplotlib` to create a bar chart that shows the top five programming languages by popularity.

```
import tkinter as tk
import matplotlib

matplotlib.use('TkAgg')
```

```
from matplotlib.figure import Figure
from matplotlib.backends.backend_tkagg import (
    FigureCanvasTkAgg,
    NavigationToolbar2Tk
)


class App(tk.Tk):
    def __init__(self):
        super().__init__()

        self.title('Tkinter Matplotlib Demo')

        # prepare data
        data = {
            'Python': 11.27,
            'C': 11.16,
            'Java': 10.46,
            'C++': 7.5,
            'C#': 5.26
        }
        languages = data.keys()
        popularity = data.values()

        # create a figure
        figure = Figure(figsize=(6, 4), dpi=100)

        # create FigureCanvasTkAgg object
        figure_canvas = FigureCanvasTkAgg(figure, self)

        # create the toolbar
        NavigationToolbar2Tk(figure_canvas, self)

        # create axes
        axes = figure.add_subplot()
```

```
        # create the barchart
        axes.bar(languages, popularity)
        axes.set_title('Top 5 Programming Languages')
        axes.set_ylabel('Popularity')

        figure_canvas.get_tk_widget().pack(side=tk.TOP, fill=tk.BOTH, expand=1


if __name__ == '__main__':
    app = App()
    app.mainloop()
```

Output:



How it works.

First, import the `matplotlib` module

```
import matplotlib
```

and call the `use()` function to tell which backend the `matplotlib` will use:

```
matplotlib.use('TkAgg')
```

In this case, we use `TkAgg` backend, which is made to integrate into Tkinter.

Second, import the following `Figure`, `FigureCanvasTkAgg`, and `NavigationToolbar2Tk` classes:

```
from matplotlib.figure import Figure
from matplotlib.backends.backend_tkagg import (
    FigureCanvasTkAgg,
    NavigationToolbar2Tk
)
```

The `Figure` class represents the drawing area on which `matplotlib` charts will be drawn.

The `FigureCanvasTkAgg` class is an interface between the `Figure` and Tkinter `Canvas`.

The `NavigationToolbar2Tk` is a built-in toolbar for the figure on the graph.

Third, prepare the data for showing on the bar chart:

```
data = {
    'Python': 11.27,
    'C': 11.16,
    'Java': 10.46,
    'C++': 7.5,
    'C#': 5.26
}
languages = data.keys()
popularity = data.values()
```

The data is a dictionary with the keys are the programming languages and values are their popularity in percentage.

Fourth, create a `Figure` to hold the chart:

```
figure = Figure(figsize=(6, 4), dpi=100)
```

The `Figure` object takes two arguments: size in inches and dots per inch (dpi). In this example, it creates a 600×400 pixel figure.

Fifth, create a `FigureCanvasTkAgg` object that connects the `Figure` object with a Tkinter's `Canvas` object:

```
figure_canvas = FigureCanvasTkAgg(figure, self)
```

Note that the `FigureCanvasTkAgg` object is not a `Canvas` object but contains a `Canvas` object.

Sixth, create a `matplotlib` 's built-in toolbar:

```
NavigationToolbar2Tk(figure_canvas, self)
```

Seventh, add a subplot to the figure and return the axes of the subplot:

```
axes = figure.add_subplot()
```

Eighth, create a bar chart by calling the `bar()` method of the axes and passing the languages and popularity into it. Also, set the title and the label of the y-axis:

```
axes.bar(languages, popularity)
axes.set_title('Top 5 Programming Languages')
axes.set_ylabel('Popularity')
```

Finally, place the chart on the Tkinter's root window (https://www.pythontutorial.net/tkinter/tkinter-window/) :

```
figure_canvas.get_tk_widget().pack(side=tk.TOP, fill=tk.BOTH, expand=1)
```

Summary

- Use `matplotlib` library to create professional-quality visualization in the Tkinter application.