Plotting List Data with the *matplotlib* Package

First, make sure you use at least Python 3.7 version, then install package matplotlib.
On Windows, open a command prompt, and execute the following command:

```
pip install matplotlib
```

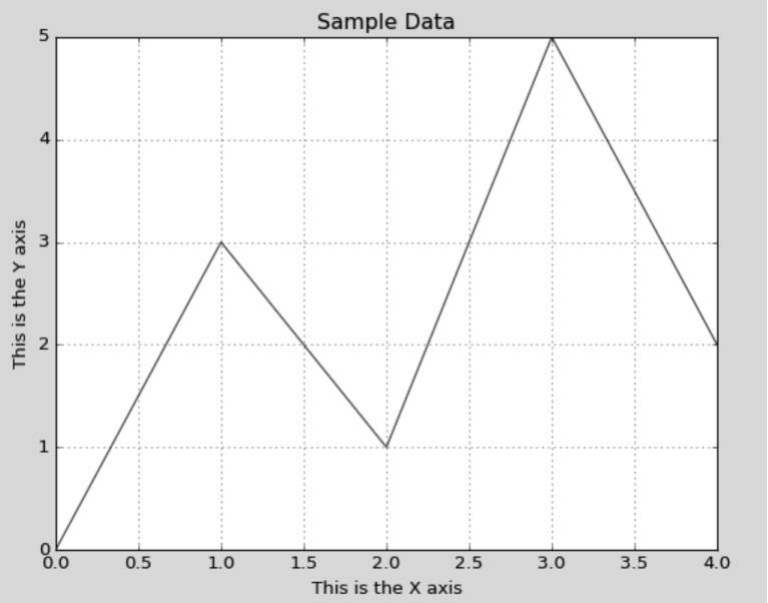
On MAC, become a superuser, then execute the following command:

```
pip3 install matplotlib
```

```
# This program displays a simple line graph.
import matplotlib.pyplot as plt

def main():
   # Create lists with the X and Y coordinates of each data point.
   x_coords = [0, 1, 2, 3, 4]
   y_coords = [0, 3, 1, 5, 2]

   # Build the line graph.
   plt.plot(x_coords, y_coords)

   # Display the line graph.
   plt.show()

# Call the main function.
main()
```

```
1  # This program displays a simple line graph.
2  import matplotlib.pyplot as plt
3
4  def main():
5     # Create lists with the X and Y coordinates of each data point.
6     x_coords = [0, 1, 2, 3, 4]
7     y_coords = [0, 3, 1, 5, 2]
8
9     # Build the line graph.
10     plt.plot(x_coords, y_coords)
11
12     # Add a title.
13     plt.title('Sample Data')
14
15     # Add labels to the axes.
16     plt.xlabel('This is the X axis')
17     plt.ylabel('This is the Y axis')
18
```

```
19      # Add a grid.
20      plt.grid(True)
21
22      # Display the line graph.
23      plt.show()
24
25  # Call the main function.
26  main()
```



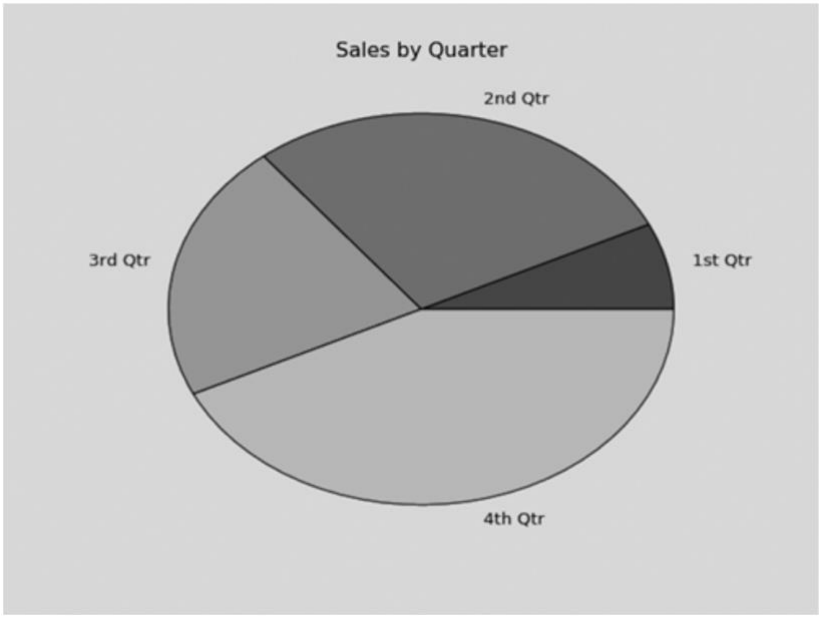
What can you do with matplotlib?

1. Plotting a Line Graph
2. Plotting a Bar Chart
3. Plotting a Pie Chart

Plotting a Pie Chart

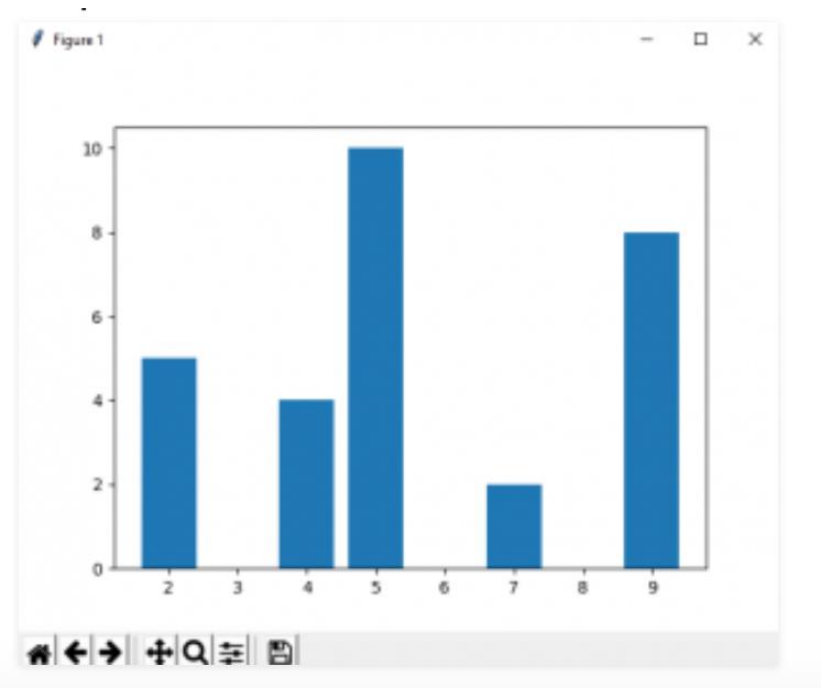
```
1 # This program displays a simple pie chart.
 2  import matplotlib.pyplot as plt
 3
 4 def main():
 5      # Create a list of sales amounts.
 6      sales = [100, 400, 300, 600]
 7
 8      # Create a list of labels for the slices.
 9      slice_labels = ['1st Qtr', '2nd Qtr', '3rd Qtr', '4th Qtr']
10
```

```
11      # Create a pie chart from the values.
12      plt.pie(sales, labels=slice_labels)
13
14      # Add a title.
15      plt.title('Sales by Quarter')
16
17      # Display the pie chart.
18      plt.show()
19
20 # Call the main function.
21 main()
```



Bar Plotting

```
# This program displays a simple bar plot.
# importing matplotlib module
from matplotlib import pyplot as plt

# x-axis values
x = [5, 2, 9, 4, 7]

# Y-axis values
y = [10, 5, 8, 4, 2]

# Function to plot the bar
plt.bar(x,y)

# function to show the plot
plt.show()
```



Python turtle library

```
# Python program to draw square
# using Turtle Programming
import turtle
skk = turtle.Turtle()

for i in range(4):
   skk.forward(50)
   skk.right(90)

turtle.done()
```

```
# Python program to draw hexagon
# using Turtle Programming
import turtle
polygon = turtle.Turtle()

num_sides = 6
side_length = 70
angle = 360.0 / num_sides

for i in range(num_sides):
   polygon.forward(side_length)
   polygon.right(angle)

turtle.done()
```

```
# Python program to draw
# Spiral Square Outside In and Inside Out
# using Turtle Programming
import turtle   #Outside_In
wn = turtle.Screen()
wn.bgcolor("light green")
wn.title("Turtle")
skk = turtle.Turtle()
skk.color("blue")

def sqrfunc(size):
    for i in range(4):
        skk.fd(size)
        skk.left(90)
        size = size-5

sqrfunc(146)
sqrfunc(126)
sqrfunc(106)
sqrfunc(86)
sqrfunc(66)
sqrfunc(46)
sqrfunc(26)
```