Worksheet #6

Charts (matplotlib)

1. Based on the code below, experiment with several possible values for the `color` , `linewidth` , `linestyle` and `marker` parameters of the `plot()` function, for the titles, for the `loc` parameter of the `legend()` function , and for the limits and marks of the axes

```
import matplotlib.pyplot as plt

x = [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
y = x
y1 = [i + 1 for i in x]
y2 = [i + 2 for i in x]
y3 = [i + 3 for i in x]
y4 = [i + 4 for i in x]
plt.plot(x, y, label="x")
plt.plot(x, y1, color="red", label="x+1")
plt.plot(x, y2, c="red", linewidth=2, label="x+2")
plt.plot(x, y3, c="red", lw=2, linestyle="--", label="x+3")
plt.plot(x, y4, c="red", lw=2, ls="--", marker="o", label="x+4")

plt.title('Chart Title')
plt.xlabel('X axis title')
plt.ylabel('YY axis title')

plt.legend(loc='upper left')

plt.xlim([-5, 15])
plt.ylim([-10, 20])

plt.xticks([0, 5, 10])
plt.yticks([0, 2, 4, 6, 8, 10, 12, 14])

plt.savefig("graf/graf.png")
plt.savefig("graf/graf.jpg")
plt.savefig("graf/graf.pdf")
```

2. From the lists of values:

```
x_values = [1, 2, 3, 4, 5]
y_values = [10, 8, 6, 4, 2]
```

   2.1. Create a line chart
   2.2. Insert text in the legend of both axes
   2.3. Give the chart a title

3. From the lists of values:

```
x_values = ['A', 'B', 'C', 'D', 'E']
y_values = [10, 8, 6, 4, 2]
```

3.1. Create a bar chart
3.2. Use the xticks() function to use x_values as the xx-axis labels
3.3. Insert text in axis labels
3.4. Give the chart a title

4. From the lists of values:

```
x_values = [1, 2, 3, 4, 5]
y_values = [10, 8, 6, 4, 2]
```

4.1. Create a scatterplot (scatterplot)
4.2. Insert text in the legend of both axes
4.3. Give the chart a title

5. From the lists of values:

```
months = ['January', 'February', 'March', 'April', 'May', 'June']
values = [105235, 107697, 110256, 109236, 108859, 109986]
```

5.1. create a chart
5.2. Bound the yy-axis values to [100,000, 120,000]
5.3. Add chart and axis titles
5.4. Turn the chart into a bar chart

6. The `temperatures.txt file` contains the average temperatures in Lisbon, Coimbra, Porto and Faro during a year.
   6.1. Plot a line graph of temperatures with the following characteristics:
      6.1.1. Different styles/markers for lines
      6.1.2. Chart and axis titles
      6.1.3. Scale of temperatures between 0ºC and 25ºC, with marks of 5 in 5
      6.1.4. Legend with the names of the cities
   6.2. Calculate average annual temperature by city
      6.2.1. Plot a bar graph of average temperatures
   6.3. Calculate annual maximum and minimum temperatures by city
      6.3.1. Plot a bar graph (side by side) of minimum and maximum temperatures