IT 166 Lab 14

Plotting in Python

Objectives

- Be able to plot figures using matplotlib and pandas.
- Be able to load various data into Pandas DataFrames and Series from CSV files
- Be able to plot figures using matplotlib and pandas.

Preparation

- Launch the Jupyter notebook.
- Rename the notebook page as “lab14”.
- Solution to one problem should occupy one cell.

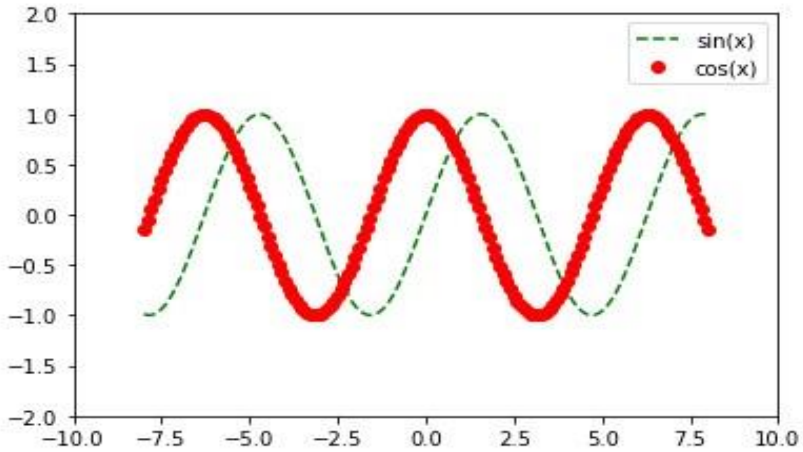
Please provide solutions to the problems below.

Problem 1

Use matplotlib to plot sin(x) and cos(x), where x is in [-8,8] Requirements:

1) Two plots should co-exist in one figure.
2) Use NumPy to generate x, where x is in [-8,8] with a step of 0.1 3) For the sin(x), set the plot to be green-dashed line with no markers.
4) For the cos(x), set the plot to be red dots.
5) Set the limit of x axis as [-10,10]. 6) Set the limit of y axis as [-2,2].
7) Set the legend using the ‘best’ parameter.

Expect outcome:

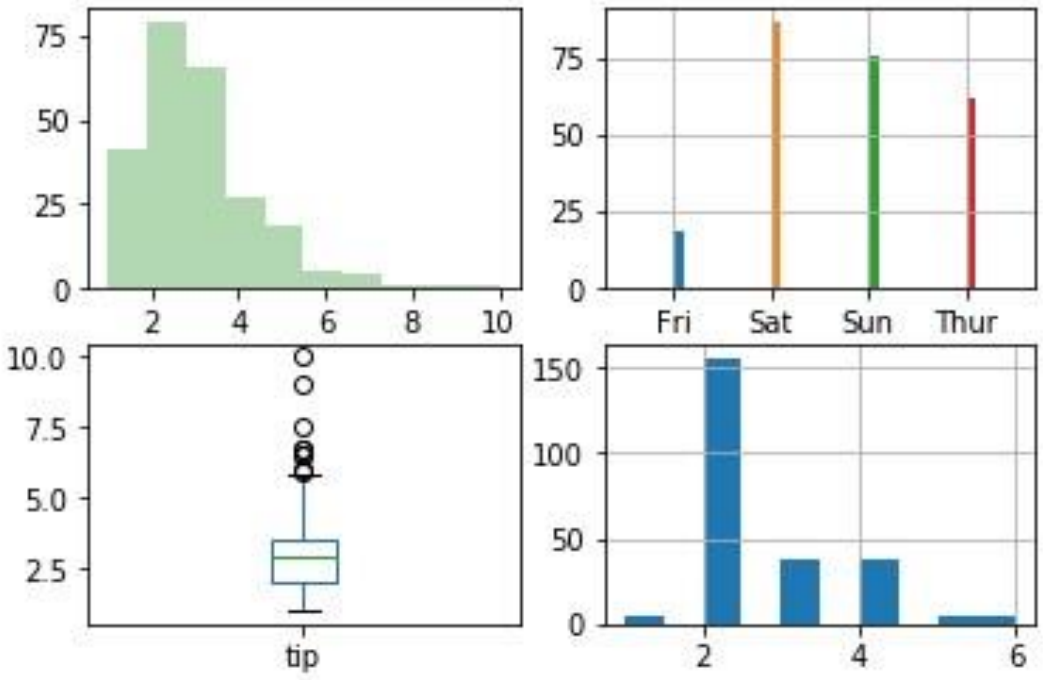


Problem 2

Use pandas to read the “tips.csv” file into a DataFrame. Create a figure that has four subplots, arranging the plots using a 2 by 2 mesh:

1) The top-left figure is a histogram of the column, “tip”. Set the color to be green and the number of bins is ten.
2) The top-right figure is a histogram of the column, “day”. You will need to use the following statement to group the column: grouped = df[‘day’].groupby(df[‘day’]) before plotting the histogram.
3) The bottom-left figure is a box-plot of the column, “tip”.
4) The bottom-right figure is a histogram of the column, “size”.

Expect outcomes:



Problem 3

Make sure the CSV files (e.g., AAPL.csv) are on the current working directory.

1. Load data from AAPL.csv, IBM.csv, MSFT.csv, and GOOG.csv to different pandas dataframes, all using colume "Date" as index.

2. Use matplotlib.pyplot to create a figure that has four subplots, arranging the plots using a 2 by 2 mesh:

- In the top-left sub-figure, plot AAPL's 'High' stock price using line chart
- In the top-right sub-figure, plot IBM's 'Low' stock price using scatter
- In the bottom-left sub-figure, plot MSFT's 'Close' stock price using histogram
- In the bottom-right sub-figure, plot GOOG's 'Agj Close' stock price using bar chart

Not required, but you can disable showing xticks with the code similar to the following:

```
import matplotlib.pyplot as plt
import matplotlib.ticker as ticker

ax = plt.subplot()
ax.xaxis.set_major_locator(ticker.NullLocator())
```

3. Use Pandas plot function to plot AAPL's "High", "Low" stock prices in the same figure.

4. Use Pandas boxplot function to plot AAPL's "High", "Low" stock prices in the same figure.

Boxplot is also called a Whisker plot which provides a summary of a set of data that includes minimum, first-quartile, median, third quartile, and maximum value. Please note: in a typical Boxplot figure, the bottom line indicates the minimum value and the top line indicates the maximum value. Between the bottom and top, the middle 3 lines indicate 1st quartile, median, and 3rd quartile respectively.