CS 115 - Introduction to Programming in Python
Lab Guide 10

Lab Objectives: Data visualization – matplotlib

Notes:

1. Upload your solutions as **a single .zip file** to the Lab10 assignment for your section on Moodle **by 17:30 on Sunday, December 27**. You must use the following naming convention: Lab10_Surname_FirstName.zip where Surname is your family name and FirstName is your first name.
2. Solutions sent through email will not be accepted.

IMPORTANT:

For the questions below:

- Do not use any loops. All data extraction can be done using Boolean/relational indexing.
- You may assume that the indicators/countries are sorted by GDP in ascending order.
- You may not assume the set of countries or the position of the country in the files.
- You may only use functionality discussed in CS115.

TIPS:

- `np.set_printoptions(suppress=True)`: displays the float values in the console with n decimal places, suppresses the scientific/exponential notation.
- The subplot function returns an axis object. The hist function returns a tuple containing the counts and bin edge values of a histogram. You can set the `xtick` marks of the histogram to the edge values using the following statements:

```
ax = plt.subplot(…)
data = plt.hist(…)
ax.set_xticks( data[1] )
```

1. Download the files: `indicators.txt` and `countries.txt`, the data in the files is parallel, meaning the name and region of a country in the `countries.txt` file is at the same position/index as the indicator data in `indicators.txt`.
2. Create a Python script that does the following:
   a. Using loadtxt, load the country/region data into a numpy array, `countries`, and the indicator data into a numpy array, `indicators`.
   b. Select all rows from indicators where the GDP is below 1000 and store as `indicators_under_1000`.
   c. Store the country/region data (`europe_countries`) and indicator data (`europe_data`) for all countries in Europe.
   d. Select the male and female employment indicators for Turkey and store as `turkey_employment_data`.
   e. Using the data from the appropriate numpy arrays, create the plots shown below.

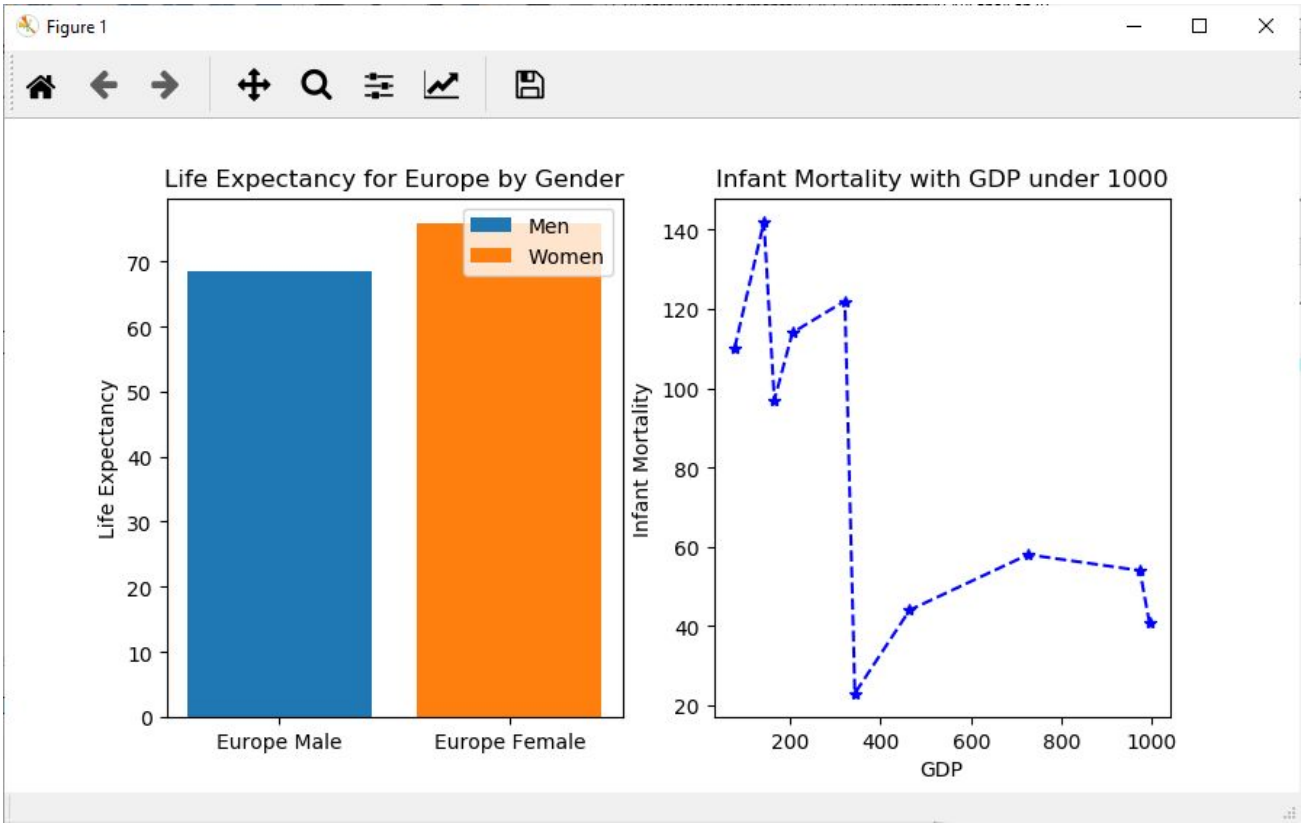
Figure 1
Life Expectancy for Europe by Gender
Men
Women
Life Expectancy
0
10
20
30
40
50
60
70
Europe Male
Europe Female
Infant Mortality with GDP under 1000
Infant Mortality
20
40
60
80
100
120
140
200
400
600
800
1000
GDP

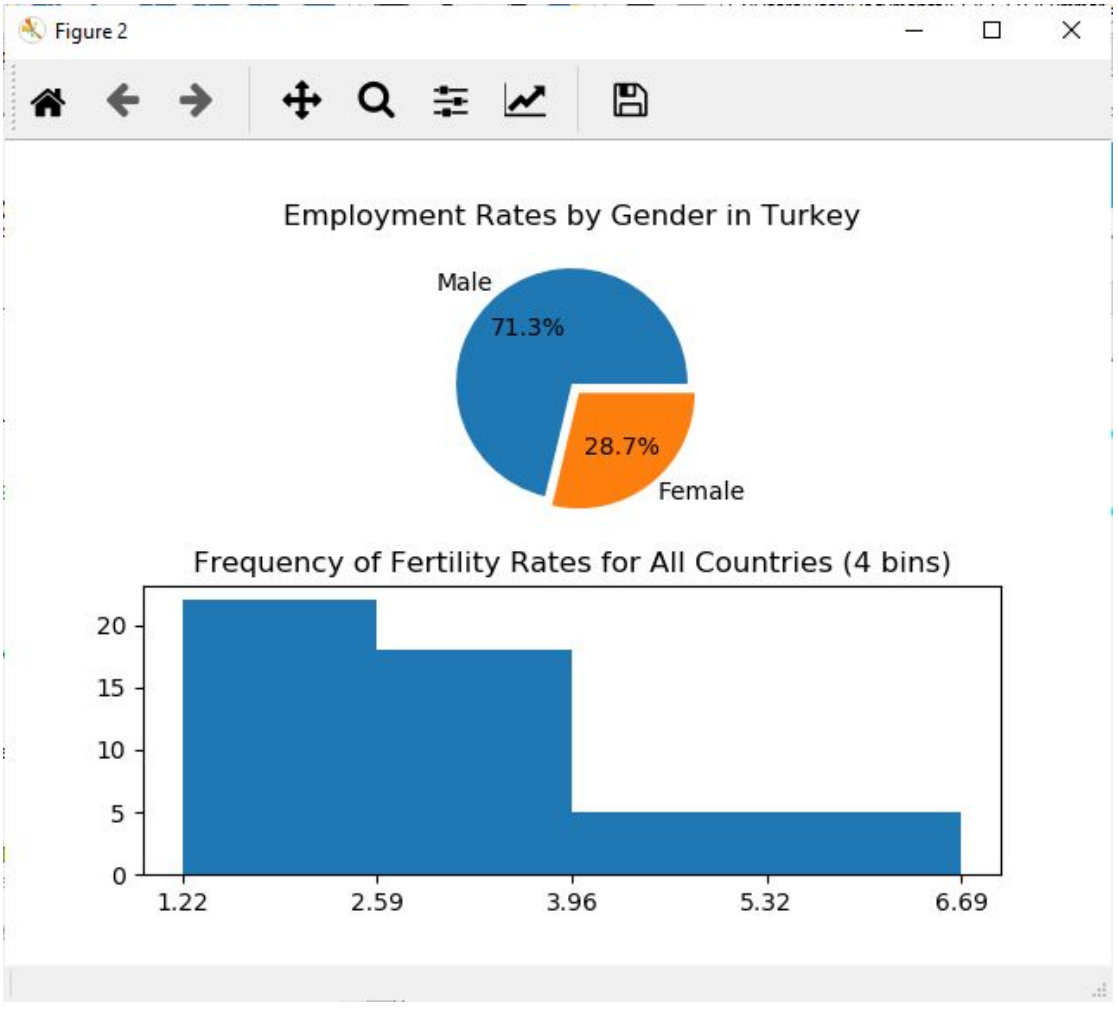
Figure 2
Employment Rates by Gender in Turkey
Male
71.3%
28.7%
Female
Frequency of Fertility Rates for All Countries (4 bins)
0
5
10
15
20
1.22
2.59
3.96
5.32
6.69