

Introduction to Programming 2016-2017

Exercise 9

Question 1

Write a function called **myFiles** that reads data from an Excel file, processes the data and creates a graphical display of the results. The function should get one input argument: the name of an Excel file (a string). The Excel file will contain data arranged in a single table such that the first row and the first column in the table are texts, and all other cells contain numbers (see example file). The cell in the 1A location contains a text which is the name of the table.

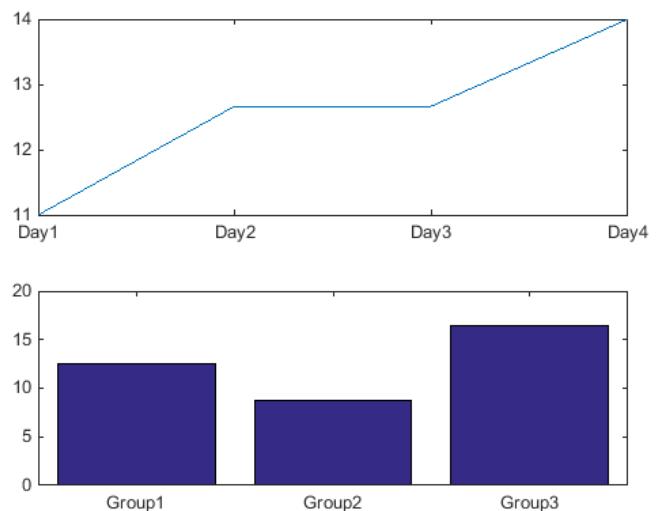
Your function should do the following:

1. Read the data from the Excel file and calculate two vectors: the means of the numbers in the columns of the data matrix and the means of the numbers in the rows of the matrix.
 2. Create a new figure with two subplots (arranged in one column), that will graphically display the mean vectors, according to the following:
 - In the top subplot use the **plot** command to plot the means of the columns.
 - In the bottom subplot use the **bar** command to display the means of the rows.
- **In both subplots:** Set the texts (strings) appearing at the first row/column of the data table in the Excel file as the XTickLabels of the plot and bar graphs, respectively.

Example for data in an Excel file* and the resulting figure and text file:

- An example Excel file is provided (xlsExample.xls), but your code should be written in a general way to deal with different file names, number of rows/columns, data values etc.

resData	Day1	Day2	Day3	Day4
Group1	11	13	12	14
Group2	9	9	9	8
Group3	13	16	17	20



Question 2

- *First of all read the whole question; then look at the example below; finally, create the function.*

The Meteorological Services monitor the amount of rain in each of the cities in Israel. This year, following the big storm, they had to do some analysis comparing between different cities in Israel: (1) Jerusalem, (2) Tel-Aviv, (3) Beer-Sheba, (4) Zefat and (5) Katzrin. Each day, during the 6 days of the storm, they calculated and wrote the amount of rain falling in each of these cities, in an Excel file named ‘weatherTable’.

The Excel file is given to you. The first sheet (called ‘dec2015’) includes the details of this month's weather.

Write a function called ‘**weatherCalc**’.

The function should get one input argument: a string with the name of a .mat file (for example: ‘**rainEx9**’).

In the function, do the following:

- a. Load the variable ‘**rainCell**’ from the .mat file (the mat file name was given to you by the input argument). This variable contains a name of an Excel file (string), and a threshold for declaration about a good rainy day in Jerusalem (scalar).

- b. Create the vector ‘**rainVec**’, containing the total amount of rain that fall in Israel in each day, by loading the relevant data from the Excel file (the Excel file name was given to you in the rainCell variable) into Matlab (rainVec size should be 1x6).

This variable should be returned as the first output argument of your function.

- c. **Without using the 'for' or 'while' loops:** create the variable ‘**goodDay**’ that includes the number of the day in which the amount of rain fall in Jerusalem was more than the threshold (given in the rainCell variable) (look at the example below).

This variable should be returned as the second output argument of your function.

- d. Create a 1x5 structure array called ‘**cityData**’ that includes the data from the ‘dec2015’ sheet with the following fields names:

- I. ‘**cityName**’ - a string - refers to the name of the city.
- II. ‘**totalNum**’ - a scalar - refers to the total amount of rain in each city throughout all the storm days.
- III. ‘**meanPerCity**’ - a scalar - refers to the average amount of rain in each city throughout all the storm days.

The structure array, cityData, should be returned as the third output argument of your function.

- e. Create a 5x2 cell array called ‘**weatherMonitor**’ that includes in each row the name of each city (string) (in the first column), and the percent of rain that fall in this city out of the total amount of rain that fall in Israel (scalar) (in the second column).

This array should be returned as the fourth output argument of your function.

Example:

For the following *rainEx9.mat* file, that contains the variable *rainCell* = { ‘*weatherTable*’, 60}

And for the following *weatherTable.xls* file:

	day 1	day 2	day 3	day 4	day 5	day 6
Jerusalem	12	24	30	50	67	30
Tel-Aviv	5	12	20	47	52	39
Beer-Sheba	3	5	10	11	12	0
Zefat	0	30	28	62	57	57
Katzrin	40	49	75	79	84	62

[*rainVec*, *goodDay*, *cityData*, *weatherMonitor*] = *weatherCalc*('rainEx9')

The output arguments will be:

rainVec = [60 120 163 249 272 188]

goodDay = 5

cityData =

1x5 struct array with fields:

cityName

totalNum

meanPerCity

for example: *cityData* (1,2) =

cityName: 'Tel-Aviv'

totalNum: 175

meanPerCity: 29.1667

```
weatherMonitor =  
    'Jerusalem'      [20.2471]  
    'Tel-Aviv'        [16.6350]  
    'Beer-Sheba'      [3.8973]  
    'Zefat'           [22.2433]  
    'Katzrin'         [36.9772]
```

General notes:

Submission date: Soft copy should be submitted by **Saturday (21.1.17) / Sunday (22.1.17)** (according to your tirgul group) - **24:00**.

Hard copy should be submitted at the beginning of your Tirgul group.

Good luck! ☺