

To plot the data we need to use two additional packages:

- the MATLAB plotting library (called matplotlib), and
- the NumPy.

To install the **MATLAB plotting library**:

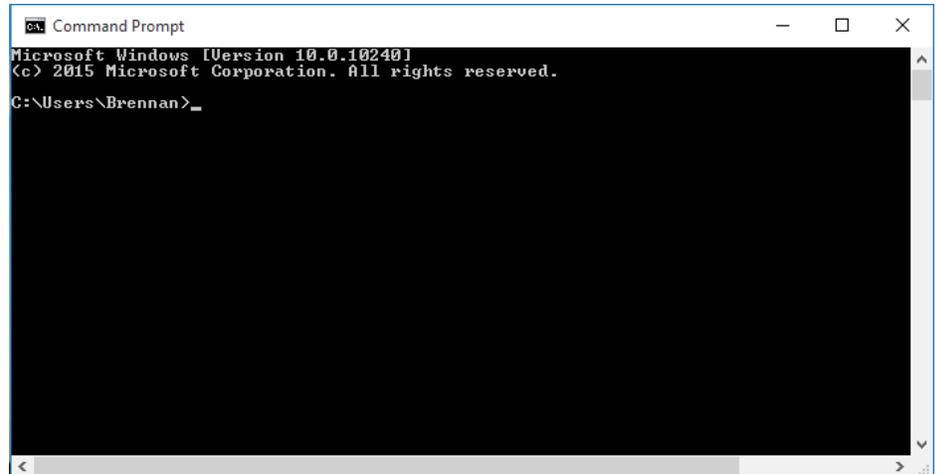
Start the **command window**:

1. go to **Start** (right click) → **Run** (left click)

2. type:

cmd

3. click OK



In the command window:

4. type:

python -m pip install -U pip --user

and hit Enter

5. type:

python -m pip install -U matplotlib

and hit Enter

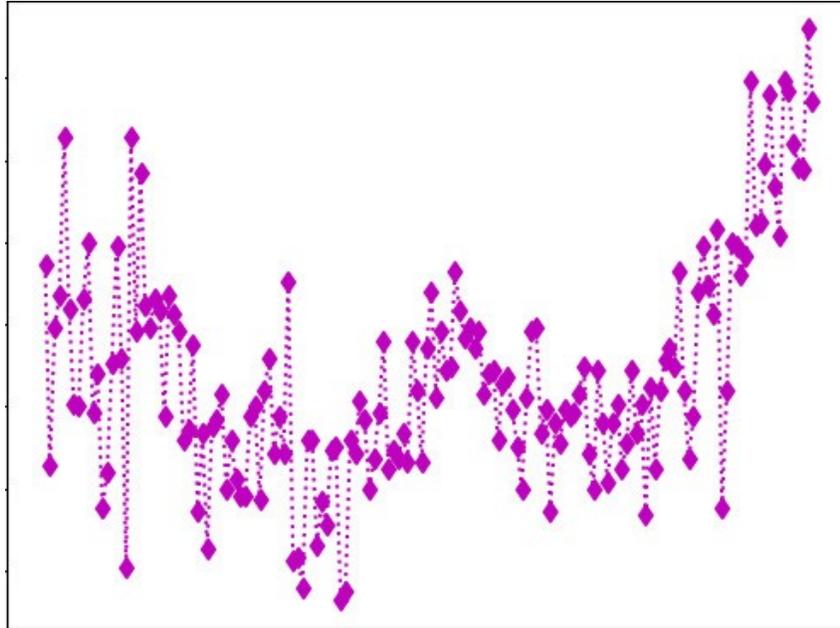
Make sure that you don't see any messages in red!

To install the **NumPy**:

in the **command window (cmd)** type:

pip install numpy

1. Consider the program **01-oceanTemperatures.py**. Modify the program to show the dotted magenta colored line with data points marked by 'thin diamond marker'.



Show the resulting program to the instructor or the in-class tutors.

2. Consider the program **03-alcRelatedFatalities.py**. We can observe three more spikes in the graph. Modify the program to show **all the four spikes** (with the vertical lines) and modify the message to say "Fatalities spikes in ..., ..., .., and ..." (put the appropriate years).

Show the resulting program to the instructor or the in-class tutors.

3. Let's write program to show the temperature averages for NYC.

Step 1:

Here is the link to the average NYC temperatures:

<https://www.currentresults.com/Weather/New-York/Places/new-york-city-temperatures-by-month-average.php>

Record this data into a file named **TempAveragesNYC.txt** in the format: high,low

Example:

38,27

42,29

and so forth

Step 2:

In Python Editor, create a New File and save it as **TempAveragesNYC.py**. This will be our program.

(1) import the **matplotlib** and give s “short name” to it **plt**:

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

(2) open the file **TempAveragesNYC.txt** for reading

```
src = open( ??? )
```

replace the question marks by the appropriate code

(3) Create two empty lists that will store the information about the high and low temperatures:

```
high = []  
low = []
```

(4) Create a list with the names of the twelve months. It is recommended to use only the first three letters of the month’s name so that it will fit in the graph nicely (otherwise the names of the months might overlap).

```
months = [ ????
```

(5) Process the file: get all the information from it and record it into the lists **high** and **low**:

```
for line in src:  
    ???    split the line by the comma, save the results in two temporary variables  
    ???    append one of the values to the list of high temperatures  
    ???    append the other value to the list of low temperatures
```

(6) Plot the high temperatures first. Use the parameters (in the order given):

- months names,
- list of high temperatures,
- line should be of red color, solid
- label the line (for example, “High”)

```
plt.plot(???, ???, ???, ???)
```

(7) Do the same for the low temperatures. The line should be of blue color.

```
???
```

(8) Give the title of "New York City Temperatures: Averages by Month" to the graph

```
plt.title(???)
```

(9) Give the labels for the axes: "Month" for the x-axis and "Temperature, in Fahrenheit degrees" for the y-axis

```
plt.xlabel(???)  
plt.ylabel(???)
```

(10) Display the legend in the right upper corner, with the shadow.

```
plt.legend(???, ???)
```

(11) Finally, show the plot!

```
???
```

Show the resulting program to the instructor or the in-class tutors.
Feel free to add more styling to your program.