

2019

Statistics Project Documentation

DR / MAHMOUD MONIR

SECOND YEAR | Term2 - Statistics

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Abstract

This is a Python GUI Project; its main function is to implement and apply every topic we learnt in statistics from Graphs to Correlation and Regression in a simple python application.

Introduction

As was described in the abstract, this application is a simple python application in which a simple implementation of the concepts we learnt in statistics course in this term.

It includes three sections:

- Graph Section.
- Data Measurement Section.
- Correlation and regression Section.

Each Section contains inside input fields to enter the data requirements to evaluate it.

For Example, Graph section contains inside a list of available Graphs that application can measure data on, when choosing one of graph list items, application will show input fields to enter data the user wants to draw its graph and so on in other two sections.

References

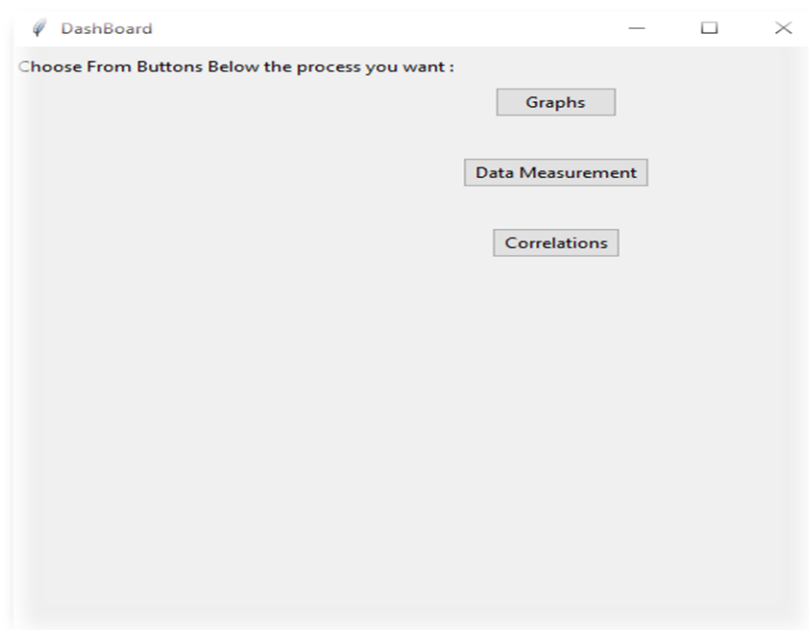
- Python:

- ✓ https://www.youtube.com/watch?v=rzqjYKyciUM&list=PLF8OvnCBIEY1j4hxogXqJk08ASU7D_W87&index=1
- ✓ <https://www.geeksforgeeks.org/python-programming-language/>
- ✓ <https://www.w3schools.com/python/>

- Graphs

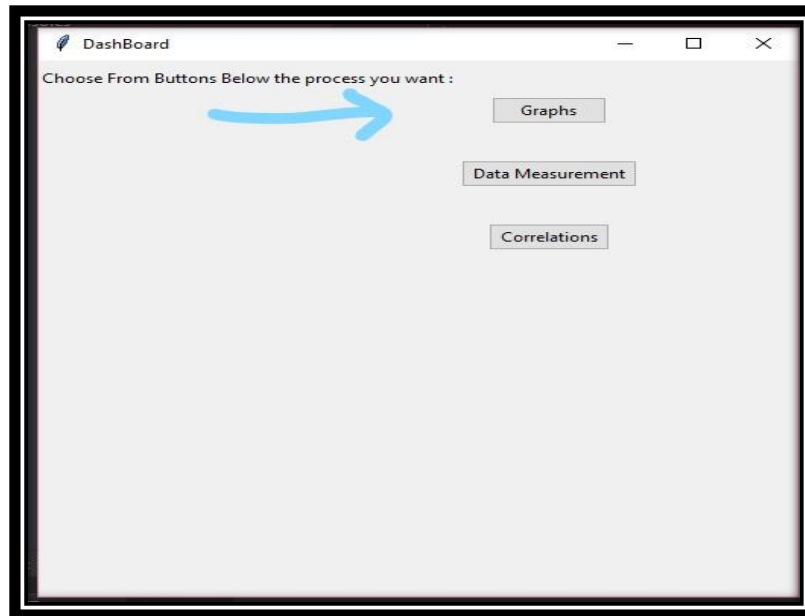
- ✓ <https://www.youtube.com/playlist?list=PLQVvva0QuDfefDfXb9Yf0la1fPDKluPF>
- ✓ Google

Application Processes

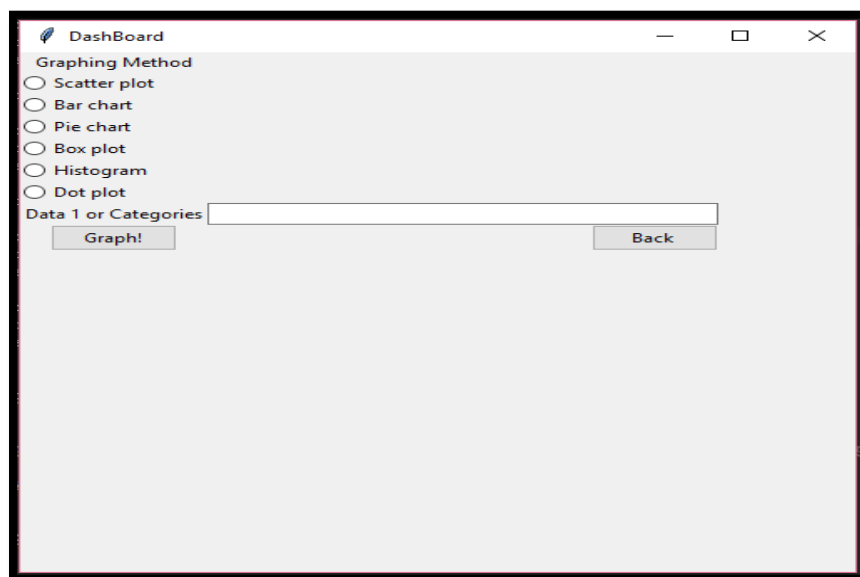


When user open the application, the screen above of dashboard will appear first in which a question to select from the three buttons the type of operation he want to do.

In case of choosing **Graph** button



This form will disappear and the screen below will
appear:



From the list of Graph Method, the user should select the type of graph he wants to get.

Let's Take an Example and apply on it:

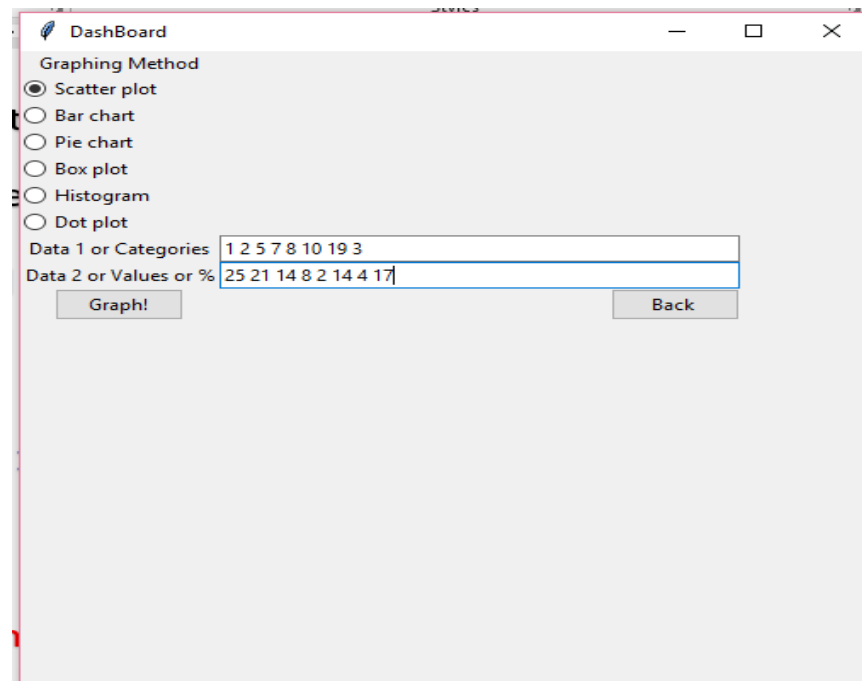
$X = [1, 2, 5, 7, 8, 10, 19, 3]$

$Y = [25, 21, 14, 8, 2, 14, 4, 17]$

Notes:

- Don't make more than one space between number and another
- Number of elements in the first entry must be equal to the second entry element numbers

Let's Select Scatter Plot:



The 'DashBoard' window displays the 'Graphing Method' section with the following options:

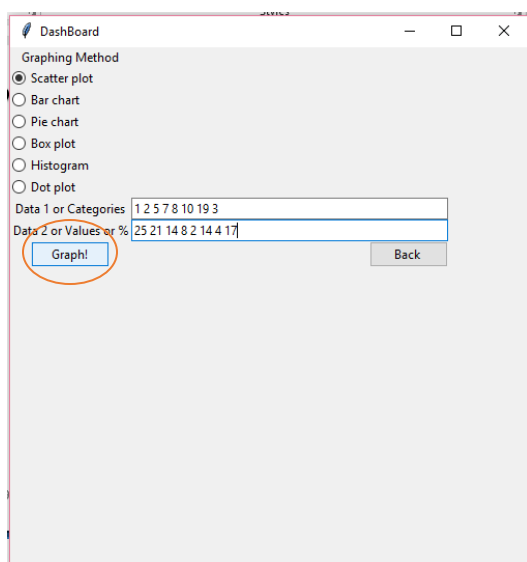
- ☒ Scatter plot
- ☐ Bar chart
- ☐ Pie chart
- ☐ Box plot
- ☐ Histogram
- ☐ Dot plot

Data input fields:

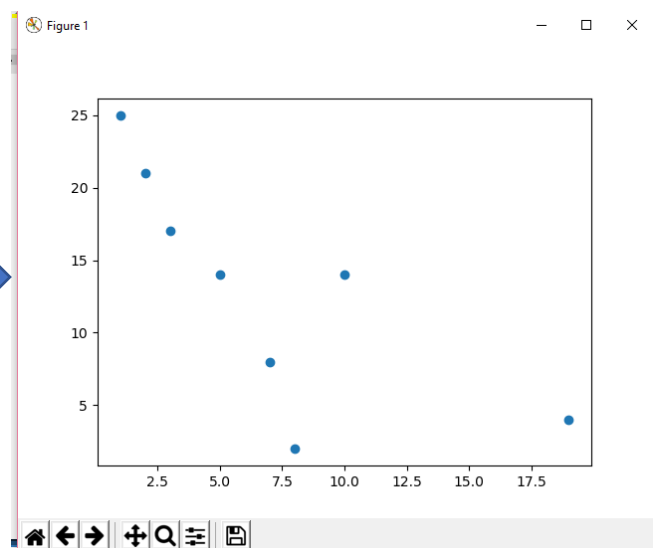
- Data 1 or Categories: 1 2 5 7 8 10 19 3
- Data 2 or Values or %: 25 21 14 8 2 14 4 17

Buttons: Graph! (highlighted), Back

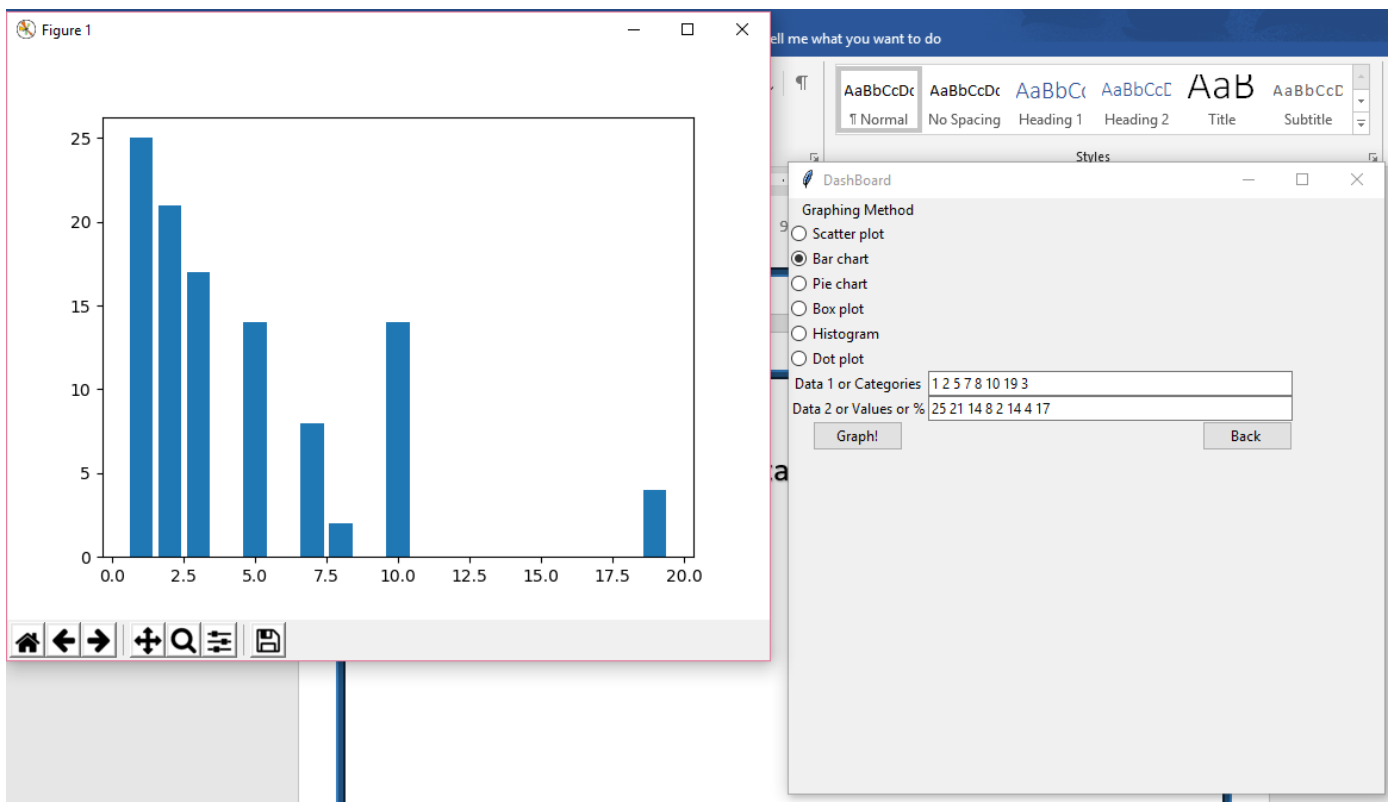
For Getting the graph depending on our Selection after entering data we should press **Graph!**



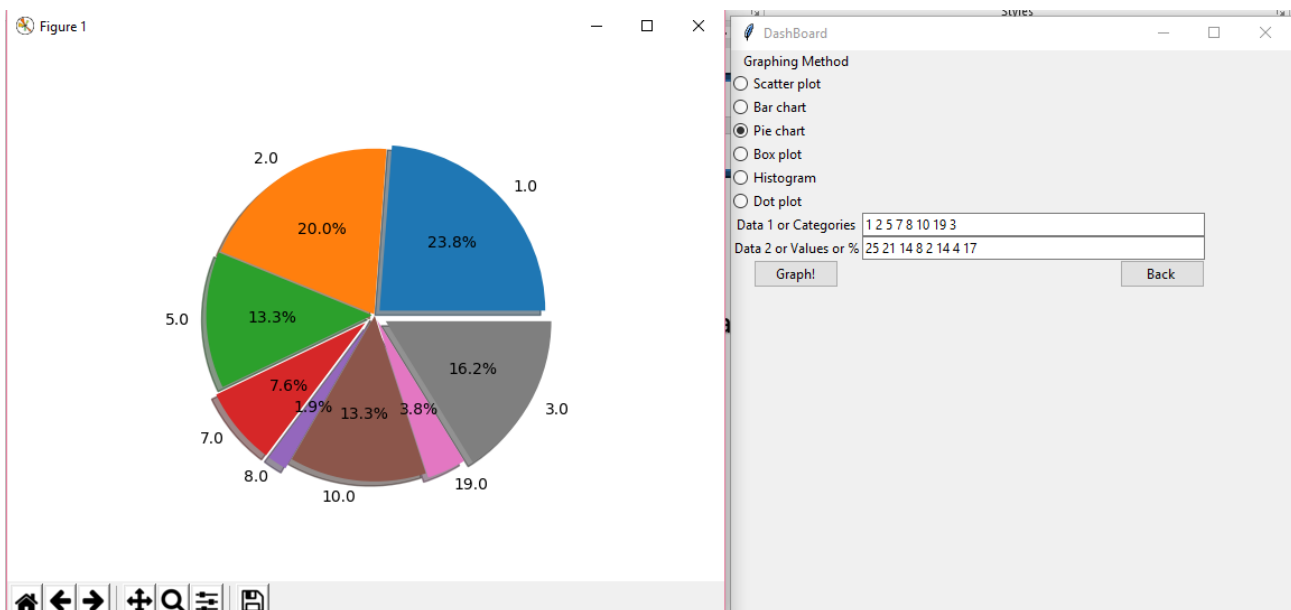
This screenshot shows the same 'DashBoard' window as above, but with the 'Graph!' button circled in red to indicate it should be clicked.



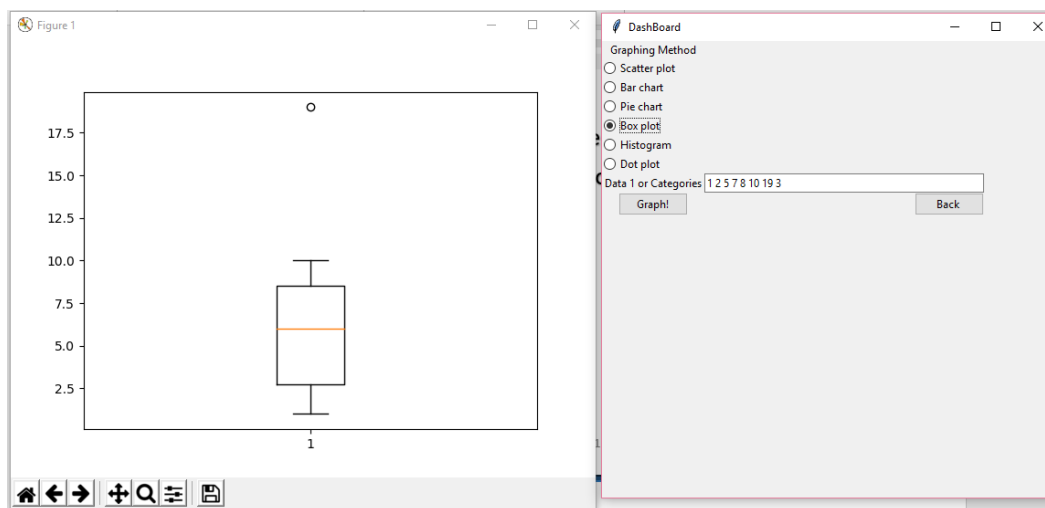
on the same previous data, Let's Select Bar Chart
and click **Graph!**:



on the same previous data, Let's Select Pie Chart and click **Graph!**:



on Box Plot he will disappear the second entry as he wants a single x category to draw its box plot:



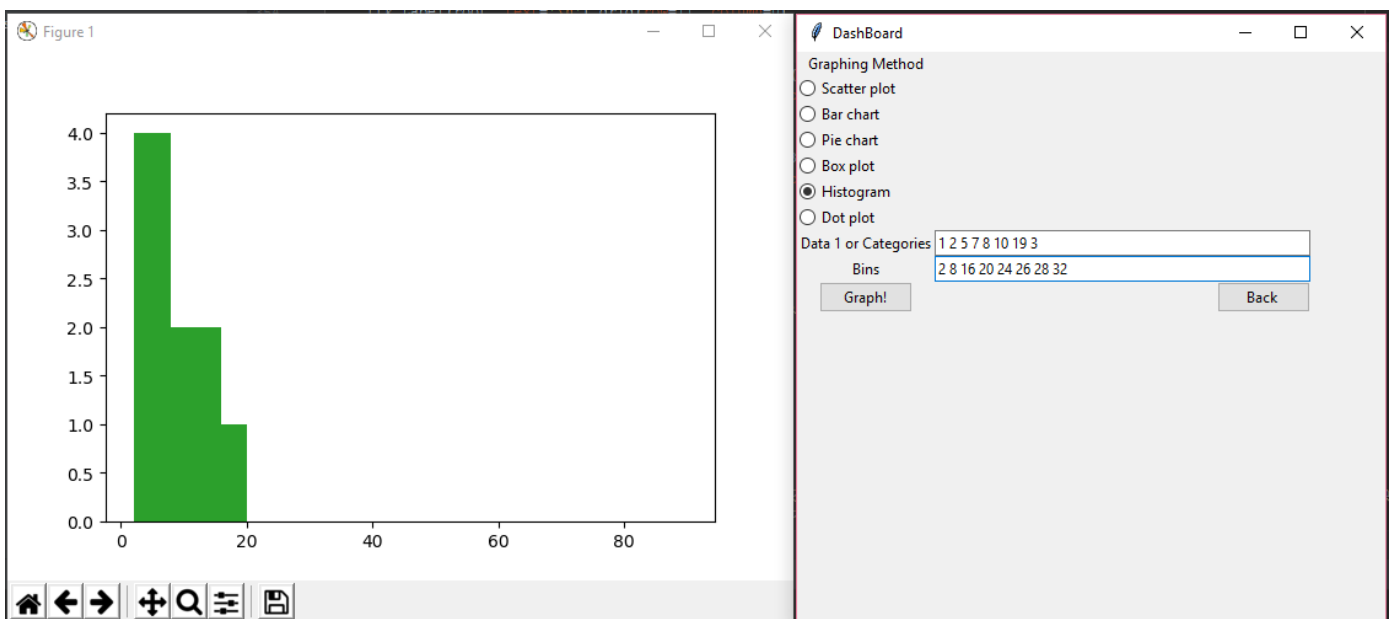
When clicking histogram, the second entry will appear with a name “Bins”

In which you should enter the first and the last number of each interval.

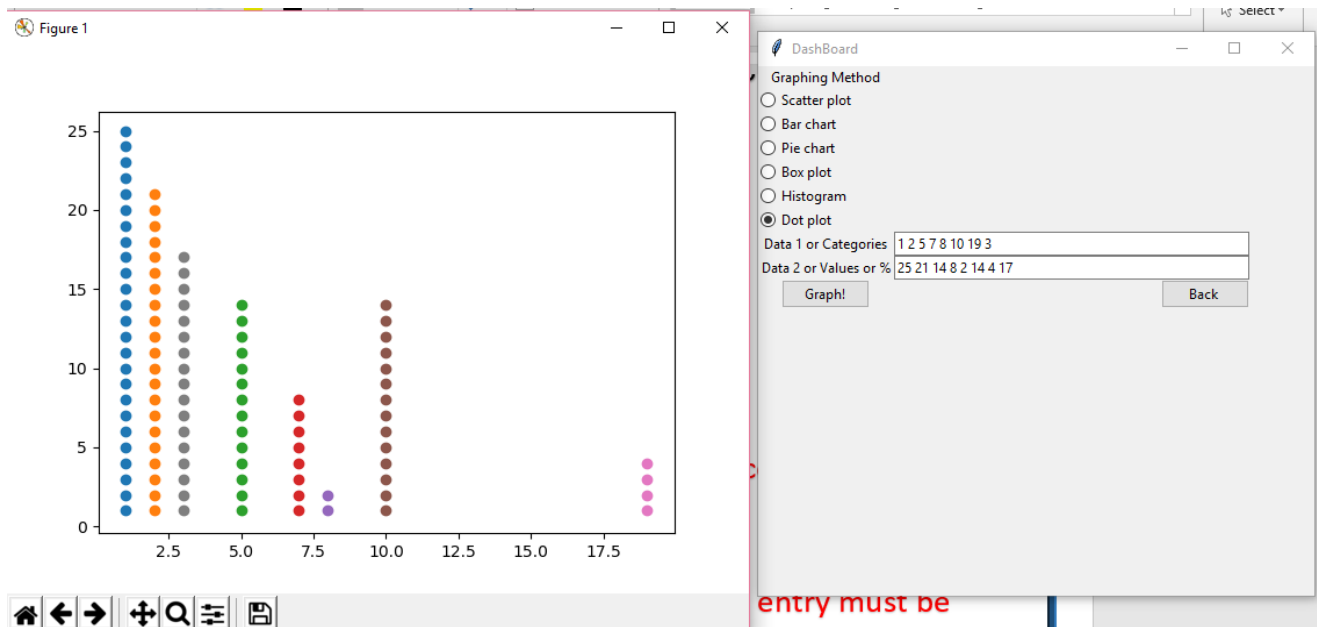
Notes:

- Don't Enter unarranged Numbers in bins entry
- Make sure that the ratio of numbers to each other are suitable. not too small or very high

Let's Take Example:



On the first example the dot plot in the same processes of the others will be:

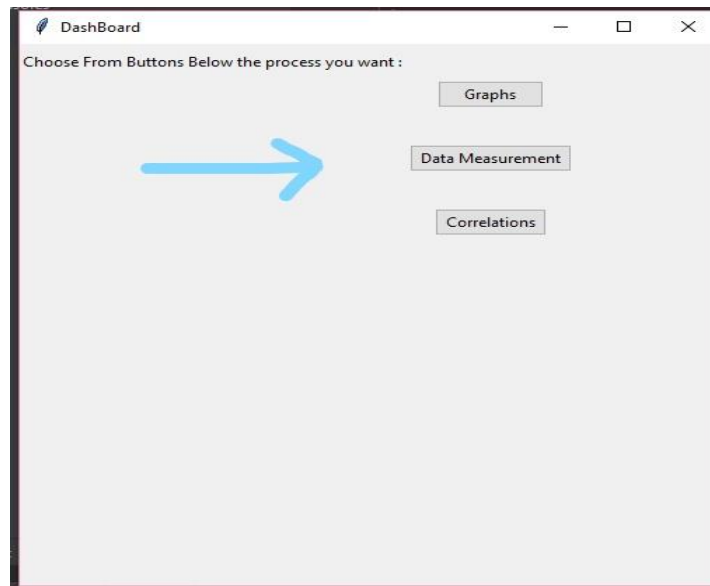


To go back to the first form of dashboard you should press **Back** button:

The 'DashBoard' window shows the same configuration as the previous screenshot. The 'Back' button is circled in red, indicating it should be pressed to return to the first form of the dashboard.

When clicking on the dashboard

Data Measurement Button the form below will appear:



A screenshot of a window titled "Data Measurement". At the top, there is a text label "Enter The Series of Data You Want To Measure :" followed by a text input field and a "show result" button. Below this, there are several labels for statistical measures: "Mean :", "Standard Deviation :", "Mode :", "IQR :", "Median :", "Range :", and "Variance :". At the bottom right, there is a "Back" button.

Notes:

- Make sure that there is no more than one space between number and another

Let's take an example:

8 7 8 7 2 5 4 7 8 9 6 1 4 7 2 5 4 7 5 3 9 8 7 1

And click **show result**

Data Measurement

Enter The Series of Data You Want To Measure :

8 7 8 7 2 5 4 7 8 9 6 1 4 7 2 5 4 7 5 3 9 8 7 1

show result

Mean :	5	Standard Deviation :	2.48327740429189
Mode :	7	IQR :	4.0
Median :	6		
Range :	8		
Variance :	6.166666666666667		

Back

After clicking show result, application will take the data we entered and get it's mean, mode, median, Range, Variance, Standard Deviation, and The interquartile range of them.

To go back to the first form of dashboard you should press **Back** button:

Data Measurement

Enter The Series of Data You Want To Measure :

Mean :	5	Standard Deviation :	2.48327740429189
Mode :	7	IQR :	4.0
Median :	6		
Range :	8		
Variance :	6.16666666666667		

When clicking Correlation Button on the dashboard form, the form below will appear:

DashBoard

Choose From Buttons Below the process you want :

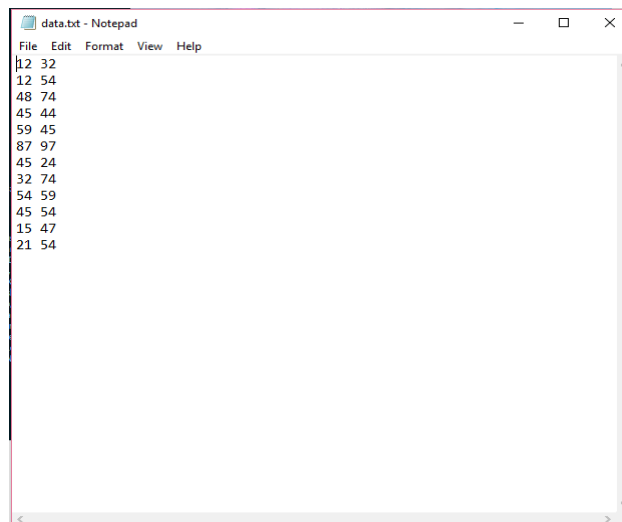
Regression & Correlation

Correlation Method	Correlation Results
<input type="radio"/> Pearson's Method	Correlation Coefficient
<input type="radio"/> Spearman's Method	Statistical Significance
<input type="radio"/> Kendall's Method	<input type="button" value="Open File"/>
<input <="" td="" type="button" value="Calculate correlation!"/> <td><input type="button" value="Graph and Calculate Linear Regression"/></td>	<input type="button" value="Graph and Calculate Linear Regression"/>
<input type="button" value="Back"/>	

At the left of the form there is a list of correlation methods, the user must select the method of measurement from them and then the user must click **open file** button to get the file of the data.

Notes:

- You must make a txt file in which two columns of x and y like this



- Make sure that there are no spaces or blank line after these two columns

- Make very sure that the txt file is inside the folder of the project for preventing any errors.
- Enter in the txt file valid data

After selecting the file, to calculate correlation and statistics significance, you should click

Calculate Correlation! Button and the result will appear on the right of the form like the following:

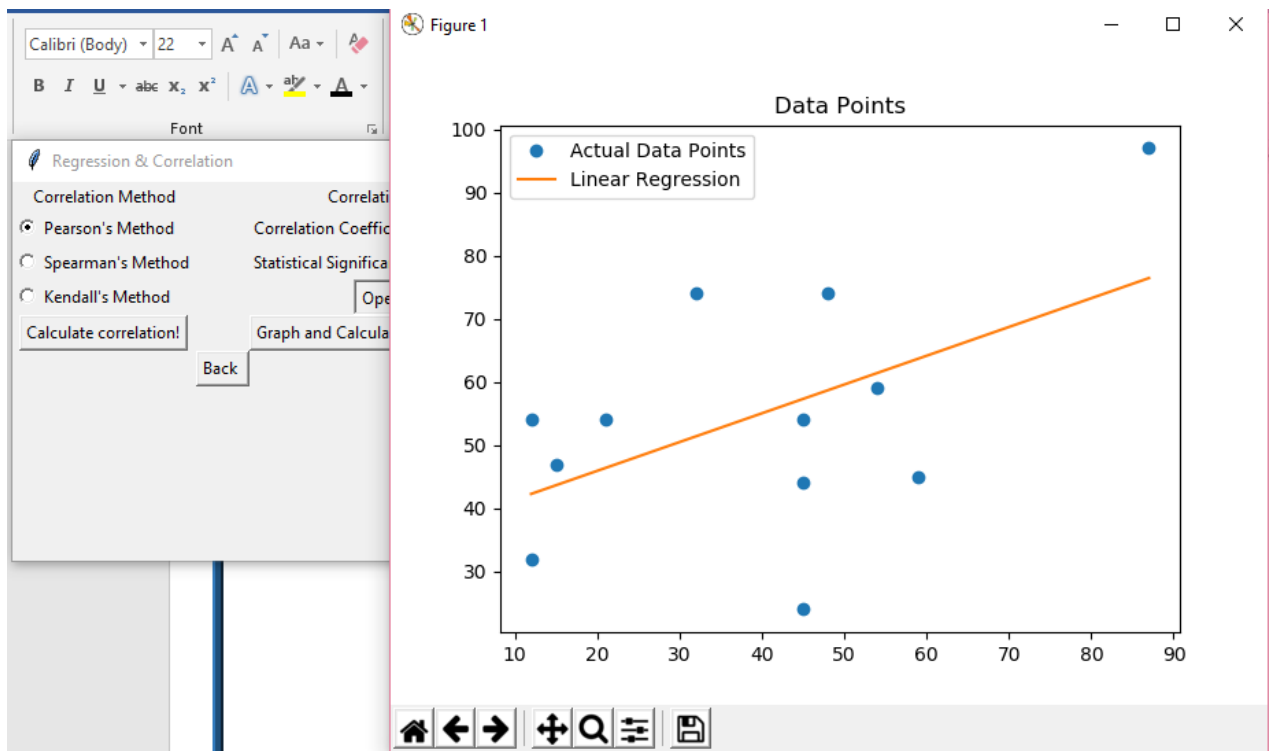
Regression & Correlation

Correlation Method	Correlation Results
<input checked="" type="radio"/> Pearson's Method	Correlation Coefficient: 0.5174354754619755
<input type="radio"/> Spearman's Method	Statistical Significance: 0.0849020517458747
<input type="radio"/> Kendall's Method	

Buttons: Open File, Graph and Calculate Linear Regression, Back, Calculate correlation!

To get the graph of actual data points and the regression line we must after the previous processes press

Graph and Calculate Linear Regression, on the previous example the result will be:



Peripherals

Python Libraries we used

- Tkinter
- Statistics
- Numpy
- SciPy
- Matplotlib

Editors we used:

- PyCharm IDE.