ITP 449, FALL 2020

HOMEWORK 3
30 POINTS

For each one of the following questions, write Python code in PyCharm.

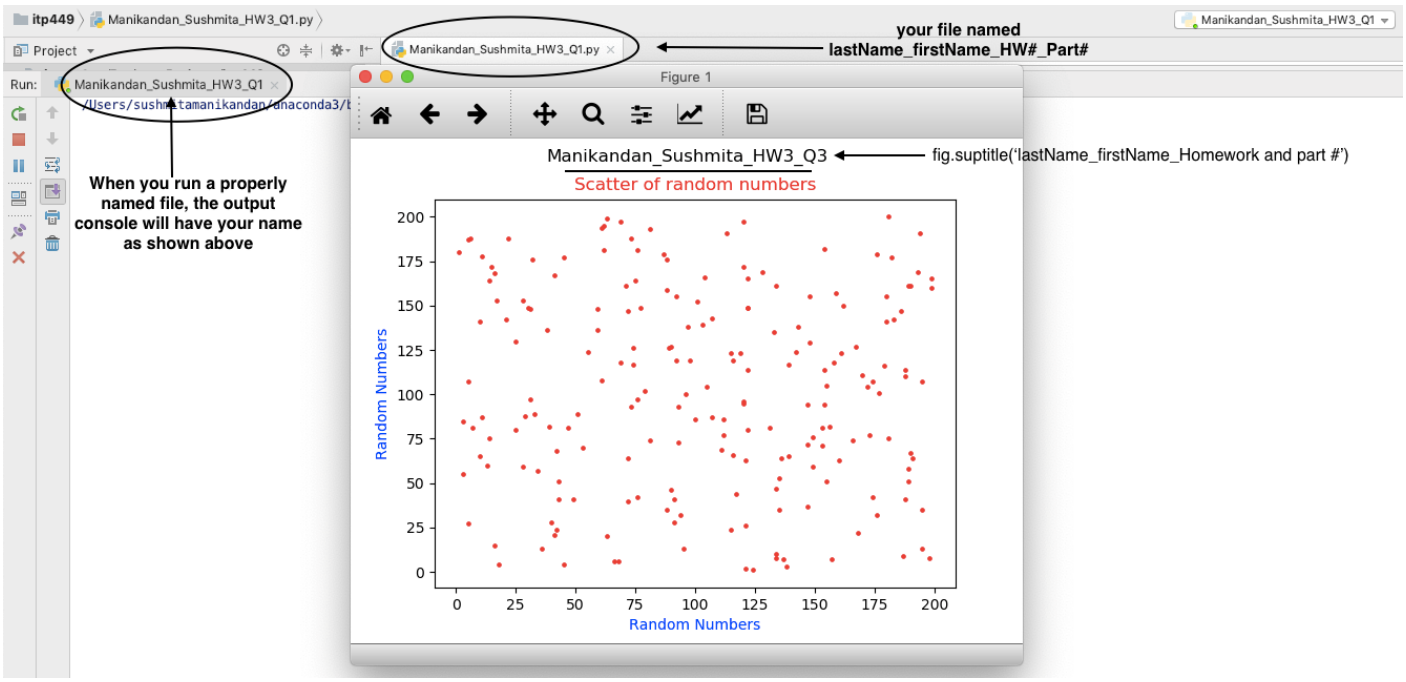
- For each question, create a *new* Python file. Name each *lastname_firstname_hw3_q1.py* etc.
- Create a header in each file using *comments* to display your name and HW information. After that write your Python code.

```
#Tommy Trojan
#ITP 449 Fall 2020
#HW3
# Q1
```

SUBMISSION Instructions:

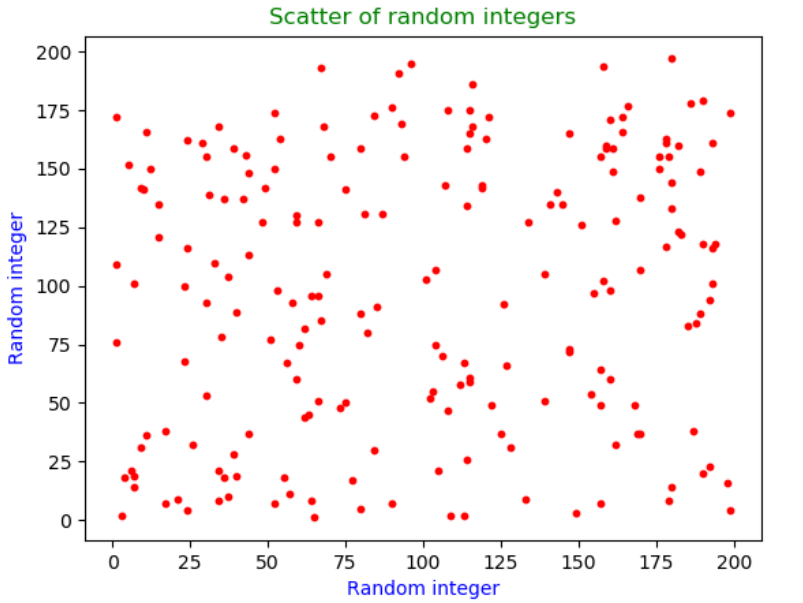
1. A Word doc (lastname_firstname_hw#_output.doc) with the screenshot of ALL outputs WITH YOUR NAME*, their relevant test cases (where applicable), and your analysis (where applicable).
2. Compress the Word doc and the python files into lastname_firstname_hw#.zip. Submit the zip file on Blackboard

*Here is an example of a valid output screenshot:



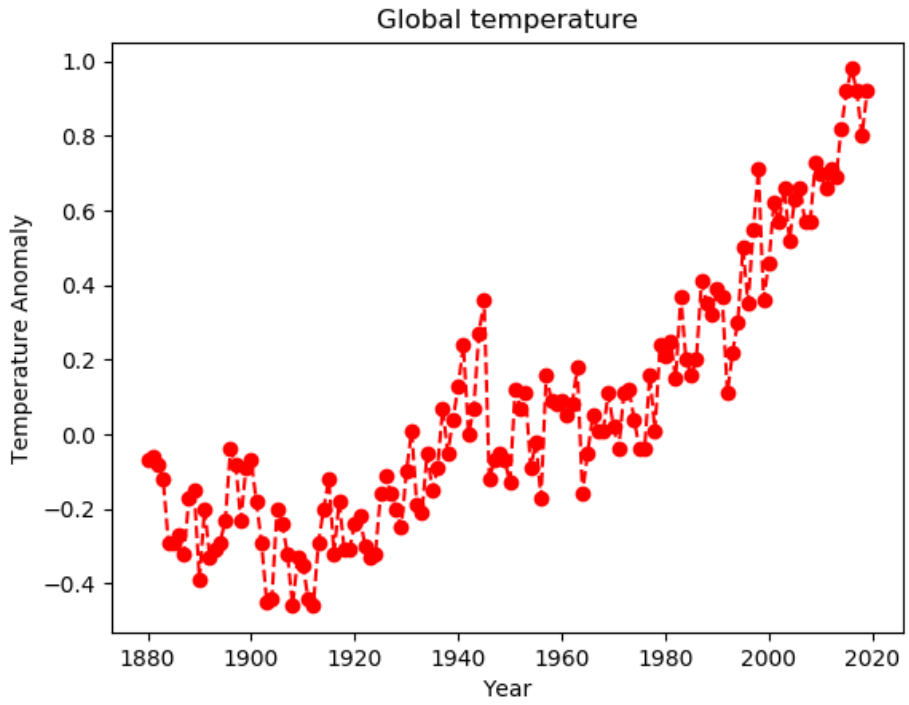
Questions

1. Use *numpy* to create 200 random integers between 1 and 200. Store them in X. Similarly, create 200 more random integers between 1 and 200. Then display a scatter plot of X vs Y. Format the plot as shown below.



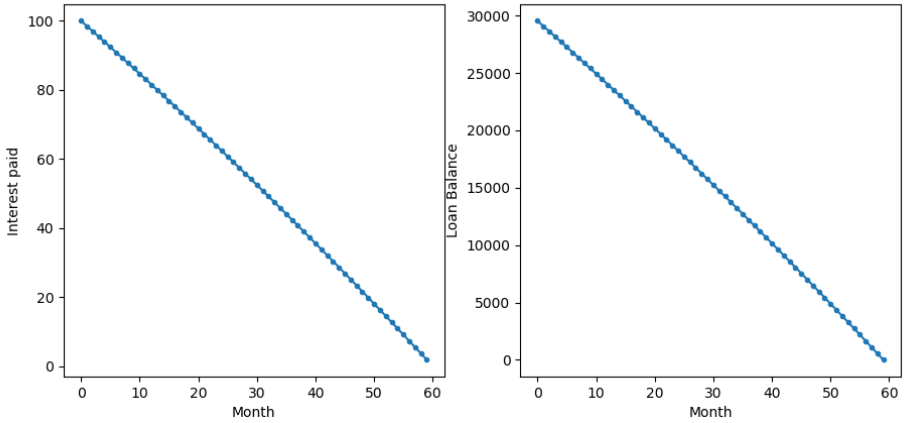
2. Download the temperature dataset from National Climatic Data Center, National Oceanic and Atmospheric Administration. Go to http://www.ncdc.noaa.gov/cag/time-series/global to explore the data set. Plot the global temperature for the past 140 years
    a. Choose Time Scale - *Annual*
    b. Enable Options –*Display Trend and per decade*
    c. Then download as *csv* file
    d. Edit the csv file to keep only the Year and Value data, delete any header text in the csv file.
    e. Use pandas to read this csv file.

    Write a program to make the following plot.



3. Write a program that prompts the user to enter a *loan amount*, *interest rate*, and number of *years* for a car loan. Then it prints the monthly payment amount.
   Loan Amount: 30000.00
   Annual Interest Rate: 4.00
   Years: 5
   Your monthly payment is: $552.50

   Now plot the monthly *interest paid* vs *month* as well as the *principal balance* vs *month*. Use subplots.



Zip all files together and submit it on Blackboard.