Lab 6 – Interfacing with other programs

1. Download and install R:
   - Download from here: https://cran.cnr.berkeley.edu/
   - You may need to configure R interpreter in PyCharm:
     - In PyCharm, open File->Settings
     - Select Languages & Frameworks->R-Language
     - Add the location of the Rgui.exe file in Windows

2. We have supplied the Rscript 'Exercise2.R'. This script simply generates a list of random numbers and returns the mean, median, and standard deviation. Write a short Python program that calls this Rscript as a subprocess.

3. We have supplied the following files for this excercise:

> **condition _data.csv**: a tab delimited text file (spreadsheet) that consists of values from 100 samples taken under 7 different conditions.
>
> **Exercise3.R** : We have also supplied an Rscript that reads a file 'tmp_python_out.csv' containing two columns of values with the header names "A" and "B" . The Rscript runs a T-test on the two distributions (A and B) and writes the output from the t-test to the file 'tmp_R_out.txt' (testing the null hypothesis that the means in the two distributions are the same).

Write a Python program that will use the information in condition_data.csv file to run the Rscript Exercise3.R on all possible pairs of conditions. The Python program's final output should be a text file that reports the names of each of the pairs tested (for example, condition_1 and condition_2), and the p-value of the corresponding T-test for each pair. You will need to format the data provided in condition_data.csv according to the specifications required by the Rscript, and write to the temporary file tmp_python_out.csv before you call a subprocess to run the Rscript. You will then need to parse the output file from the Rscript to produce the final output file for your program. Although this exercise can be solved easily in only R or only Python, the goal is to illustrate how you can call programs from Python and process their output. Please submit your Python script for the exercise. If you choose to modify your Exercise3.R file (you can make changes, but you are not required to) please submit this file too.