

## Python for physicists - exercise 4

Submission instructions - please read carefully:

- To be submitted by \*\*\* in the moodle (Lemida) system.
- \*\*\* files with py suffixes must be submitted - named exactly as detailed below for each exercise.

That is to say that:

- Do not submit complete projects, libraries, zip files, etc., and do not submit all exercises in one file, but in separate files with the names listed below.
- Make sure that the files run and do what is needed (on a recent version of Python, 3.5 or higher).
- Use only the commands we learned in the practice.

**Exercise 1.** Submit it as file name: myfuncs.py

Write a function that accepts as a parameter a natural number  $n$ , and generates  $n$  natural numbers between 1 and 100, the function should return the average of the numbers.

Write another function that accepts as a parameter a natural number  $n$ , and generates  $n$  natural numbers between 1 and 100, the function should return the standard deviation of the numbers.

Note: In this question please do not use packages such as NumPy. Write the code that calculates the mean and standard deviation yourself, rather than using ready-made functions that do it for you.

**Exercise 2.** Submit it as file name: ex04-02.py

Write a program that imports the package you created in exercise 1 (i.e. the file myfuncs.py).

The software must receive input from the user in the following way:

*Enter n:*

And the user must enter a natural number (it can be assumed that the input is correct). So, the software receives input from the user in the following form:

*Enter epsilon:*

And the user must enter a positive number (it can be assumed that the input is correct).

The software will randomly generate  $n$  integers between 1 and 100 and calculate the average of the  $n$  numbers (there is a need to use the function you imported from your answer in the first question)

The software will repeat this operation 1000 times ("rounds").

The software will calculate the number of rounds out of the 1000 in which the average of the  $n$  numbers exceeds 50 more than epsilon, and print the answer as a percentage, with one digit after the period.

**Example:**

Enter n: 10

Enter epsilon: 0.5

Result: 95.6%

**Another example:**

Enter n: 5000

Enter epsilon: 0.5

Result: 51.1%

Keep in mind that the numbers are randomly generated so do not expect to get the same results as the examples.