Pytuto (Python Tutorial) 1st assignment.

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This task was designed for those who just started python. I wish them try to complete the task and improve their python skill. Please search as many solutions as you can through the internet and ask questions to me and your teammates to tackle down the tasks. However, DO NOT share codes. Good luck.

Mathematical Calculation

No matter what computer languages you learn, mathematical calculation is very important because you have to use calculation related functions or modules every time. For example, you might be able to think of '1+1 =2' and you can make the computer calculate that equation as follows.

i>>> 1+1
o>>> 2
* 'i' means you type the code IN and 'o' means computer's solution for your code OUT.

I would like to expand this simple equation to much complicated one because you might not be satisfied with this simple equation. You may want to multiply or subtract vectors or scalar. Maybe you want to generate matrixes and multiply or subtract them from vectors. Unfortunately, generating matrix is not that simple and computer languages are not running in that way. (If you already studied MATLAB which is matrix friendly language, you might be baffled why generating matrix can be difficult.) However, don't worry because a number of the smartest programmers already solved that problem by introducing 'modules'. In MATLAB, most of the modules are already imported so that the users don't have to import modules every time. But in Python, you have to import specific modules whenever you use for your needs. This looks a bit uncomfortable at the first time, but it has many advantages such as memory saving, running fast, preventing variable name collision and so on.

Two modules will be used in this assignment: math, numpy

- math is very simple and useful function for calculation. You can get more information: https://docs.python.org/2/library/math.html

- numpy is a super important module. Therefore it has been applied for many modules. Find more information: https://docs.scipy.org/doc/numpy-dev/user/quickstart.html

A) Simple calculation

- 1. Use +, -, /, *, ** at least once with the number 10
  2. You need to get the number that is lower than 10. The shortest combination is better.
  ex) 10+10-10+10/10*10..... until you find the number that is lower than 10.

- 1. Make two vectors by using random function. Each vector should contain 10 numbers. (generate any numbers)
  2. Sum them up.
  3. Find maximum and minimum values from the vector.
  ex) Generate vector A and B > A+B = C > Find max and min from C
  look) numpy.random.rand, random.gauss, random.random

B) Generate sine wave with noise

- 1. Make sine wave
  2. Add noise by adding random values
  3. Plot the sine wave.
  ex) x value: x = numpy.arange(??), y value is also needed.
  look) numpy.arange, numpy.sin, matplotlib.pyplot

C) Find specific number

- 1. Make a 10*10 random number matrix. Use numpy.random.rand(10,10)
  2. Find how many random numbers are smaller than 0.5. (50 out of 100?)
  3. What is the max value from them? (0.xx will be the max value among them)
  4. Assign a 10*10 matrix (you made this at the first step) into 'randMat1' and 'randMat2' variable.
  5. Use randMat1 and switch values between 0.3 ~ 0.6 to 0.
  6. Use randMat2. If you sum the numbers from 1st to 100th cumulatively, what is every 10th value from the matrix.
  For example, 10th, 20th, 30th, ..., 90th, and 100th values.
  ex) If there is[1,1,1,1,.....1,1,1](this is 10*10 matrix) 10th value will be 10 and 30th value will be 30.
  look) numpy.random, random

If you finish your assignment, please send the code to 'hyung8758@gmail.com'.

Your code should contains the assignment numbers (e.g, 1st assignment), your name and email address. Ask questions and give comments to me. It is always welcome.

*** TODAY'S TIP ***

- 코딩: 컴퓨터는 수치는 잘 다루지만 문자는 그렇지 못하므로 어떤 문자든지 한 번은 수치로서 변환해야 한다. 스크립트 파일 내에 한글이 포함된 경우, 이를 파이썬에 미리 알릴 필요가 있다. 구체적으로는 스크립트 파일 첫 부분에 다음과 같이 기술한다.
  window경우 : #! -*- coding:cp949 -*-
  mac경우 : #! -*- coding:utf-8 -*-

- 파이썬 변수 종류
  - string : str('abc')
  - integer : int(35)
  - float : float(35)
  - iterator : iter('abc')

- 인덱싱
  a = 'python'
  a[0:1] = 'p'
  a[1:4] = 'yth'
  a[:2] = 'py'
  a[-2:] = 'on'
  a[:] = 'python'
  a[::2] = 'pto'