Function, Module and Class

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Week 6: Learning objectives

Get to know:

1. Functions and Modules
2. Class (OOP basics)

Function

Function - not to repeat one action again and again

```python
def functionName(input1, input2, ...):
    """ this function is ... """

    expression

    return output(s)


import numpy as np
```

Documenting a function is crucial!

Docstring prototype

```
13
14  def my_function(name, age):
15      """
16
17
18      Parameters
19      ----------
20      name : str
21          name of person.
22      age : int
23          age of person.
24
25      Returns
26      -------
27      Grades
28
29      """
30
31
32  help(my_function)
33  print(my_function.__doc__)
34
```

Function arguments

- Positional ("input")
- Keyword ("input=value") - with a default value
- Optional positional (*args)
- Optional keyword (**kwargs)

Scope of variable

Module

As your program gets longer, you may want

- to split it into several files for easier maintenance
- to use also a handy function that you have written in several programs without copying its definition into each program.

To support this, Python has a way to put definitions in a file and use them. Such a file is called a *module*; definitions from a module can be imported into other modules or script.

Class – OOP philosophy

Def: Object-oriented programming (OOP) is a computer programming model that organizes software design around data, or objects, rather than functions and logic. An object can be defined as a data field that has unique attributes and behavior.

Important concepts:

- Object (instance)
- Method
- Inheritance (super, child classes)
- Setters and getters
- Variable accessibility – Public/Private/Protected

Additional reading: Why is "class" useful?

Please read most upvoted answer by "dantiston":
https://stackoverflow.com/questions/33072570/
when-should-i-be-using-classes-in-python

Homework

1. Task 1
2. Task 2
3. Task 3

- Submit your result as a Github repository
- Deadline: 1 week

Task 1: Function arguments

Jupyter notebook дээр зөвхөн args, зөвхөн args=value, зөвхөн
*args, зөвхөн **kwargs аргументуудтай (4 тусдаа функц) болон
эдгээрийн холимог (2 функц) байгуулж, ажиллуулж үзүүл. Нийт
6 функц.

Task 2: Class

Create a bank deposit class which you can

- withdraw money
- deposit
- check the balance

Show on Jupyter notebook how it works

Examples:

- https://www.engineeringbigdata.com/
  python-atm-code-for-account-balance-withdraw-and-deposit-functions/
- https://www.geeksforgeeks.org/
  python-program-to-create-bankaccount-class-with-deposit-withdraw-function/
- https://www.vtupulse.com/python-programs/
  python-program-using-classes-and-objects-to-deposit-and-withdraw-money-in-a-bank-account/
- Tkinter GUI - https:
  //www.youtube.com/watch?v=SF-enJWjekY&list=PLtMugc7g4GapTtbhzODIjw7FJK-xJEBEE&index=16

Task 3: Module

- Өгсөн тоон list-ний нийлбэр, ялгавар, үржвэрийг олдог 3 тусдаа функц бүхий модуль файл үүсгэ.
- Дээрх модульд "main" гэдэг функц нэм. Уг функц нь "жишээ" list-ний хувьд дээрх 3 функцийг ажиллуулан үр дүн гарч буйг хэвлэн гаргаж харуулдаг байна.
- if __name__ == '__main__': дотор main() функцийг ажиллуулна (do something-ийн оронд байршин)
- python "yourModuleName".py гэж terminal дээр уншуулахад гарах үр дүн юу вэ? (screenshot байхад болно)
- Өөр файл дотроос "import yourModuleName" гэж импортлоход өмнөх хэсгийн үр дүнгүүд хэвлэгдэж гарахгүй байгаа. Яагаад?

Check out on (answer of Fooz) "if __name__ == '__main__'":
https://stackoverflow.com/questions/419163/what-does-if-name-main-do

Thank you!