Nitty-gritty of Data and Exploratory Analysis with Python 3

Dev Skill
Class 3

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Introduction to Advanced Python3:

Function

The concept of a function is one of the most important ones in mathematics. A common usage of functions in python is to implement mathematical functions. Such a function is computing one or more results, which are entirely determined by the parameters passed to it.

The general syntax –

```
def function-name (Argument):
    """   DocString   """
    Statements, i.e. the function body
    Return value or object.
```

Docstring:

The first statement in the body of a function is usually a string, which can be accessed with function_name.__doc__. This statement is called Docstring.

Return Values:

After doing all kinds of calculation in the function body it can return a single value or multiple values or a collection even a function itself.

Argument:

In mathematics, an argument of a function is a value that must be provided to obtain the function's result. It is also called an independent variable. The same definition will work for python function also. There are two types in python function.

- ➢ Required Argument
- ➢ Default/Keyword Argument (it should be always written at the last of the function argument list)

Exercise:

Find Volume of a Sphere:

Mathematical Formula:

$$Volume\ of\ Sphere = \frac{4}{3}\pi r^3$$

Conversion of feet/inches to Centimeter:

Hint : 1 feet = 12 inches
         1 Inch = 2.54 centimeters.

The required function will take 2 arguments, feet and inches. One may pass only feet to the function as arguments, and then the default value of the inches will be 0.

Lambda Expression:

Lambda expressions - also known as "anonymous functions" - allow you to create and use a function in a single line. They are useful when you need a short function that you will only use once.

Basic syntax for python list lambda Expression is –

lambda **i :** *<expression* **(i)>**

Exercise:

Make python code for a Quadratic Function:

      Mathematical Formula:

$$f(x) = a + bx + cx^2$$

Map:

map() is a function which takes two arguments:

map(function, collection).

Here map takes a function and a collection as argument, apply that function on each elements of the collection, and return a new collection.

Exercise:

Conversion of Celsius to Fahrenheit:

      Mathematical Formula: $T_{(°F)} = T_{(°C)} \times 9/5 + 32.$

      Use the list, Celcius = [22.6, 25.8, 27.3, 29.8]

Filter:

filter() is a function which takes two arguments:

filter(function, collection).

It is used to filter out all the elements of a collection, for which the argument function returns True.
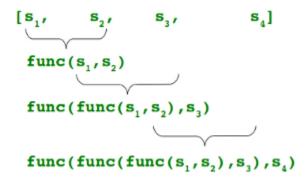
Reduce:

reduce(function, collection).

If seq = [s_1, s_2, s_3, ... , s_n], calling reduce(func, seq) works like this:

- At first the first two elements of seq will be applied to func, i.e. func(s_1,s_2) The list on which reduce() works looks now like this: [func(s_1, s_2), s_3, ... , s_n]

- In the next step func will be applied on the previous result and the third element of the list, i.e. func(func(s_1, s_2),s_3)
The list looks like this now: [func(func(s_1, s_2),s_3), ... , s_n]

- Continue like this until just one element is left and return this element as the result of reduce()

$$[s_1, \quad s_2, \quad s_3, \quad s_4]$$

$$func(s_1, s_2)$$

$$func(func(s_1, s_2), s_3)$$

$$func(func(func(s_1, s_2), s_3), s_4)$$

Exapmple :

Calculating Sum of the list [47,11,42,13].