Basic Programming IV: Functions

Hello!
I am Agil Haykal

I am a Data expert with extensive experience in multiple industries such as marketplace, insurance, banking, general taxation, consulting, and training.

In total, I trained more than 300 data scientists, engineers, and analysts.

Quote of The Day

Any fool can write code that a computer can understand. Good programmers write code that humans can understand.

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Table of Content

What will We Learn Today?

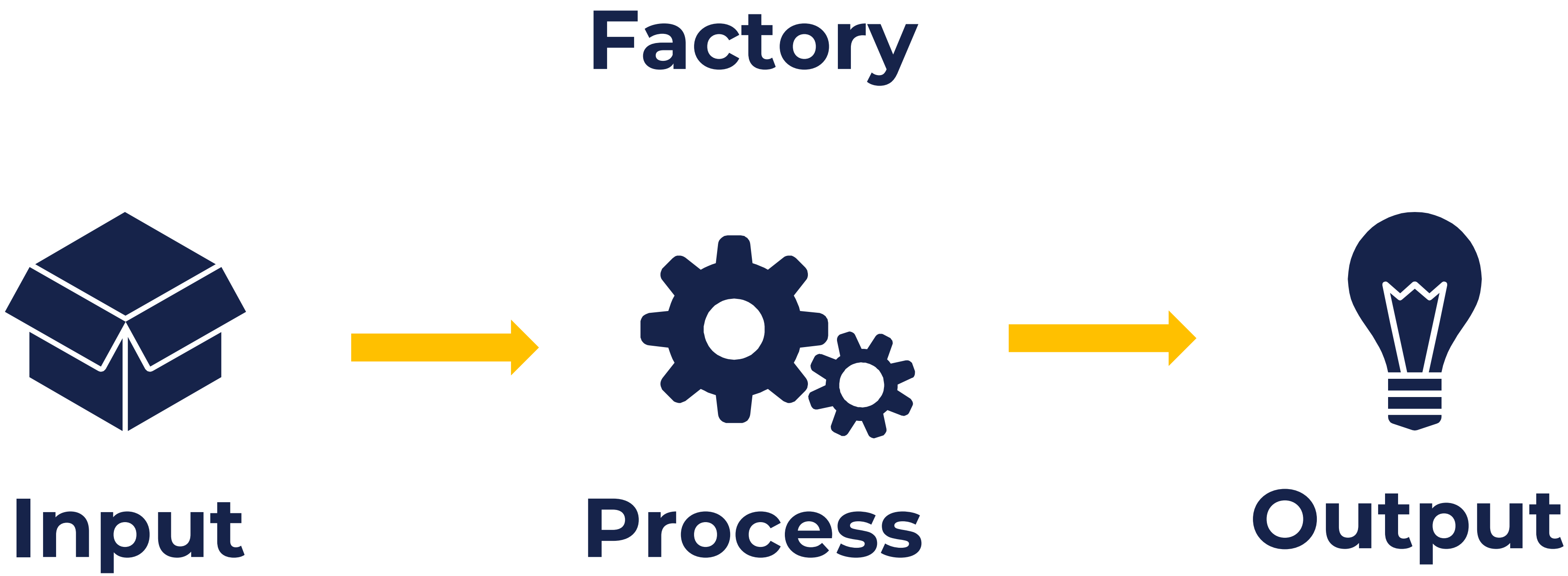
1. Functional Programming Concept
2. Let's Create Functions
3. Introduction to Library
4. String Manipulation

What is functional programming?

Functional Programming is a programming paradigm with software primarily composed of functions processing data throughout its execution.

To put it simply, function is like a factory which has input, sequence of processes, and output.

Function Analogy



Factory

Input

Process

Output

Benefit of Function

1. When you have repetitive process, you can use function to simplify the code.
2. Separate every workflow to its function. E.g., Clean data, Call data from csv, etc.
3. Having function in code will ease us to focus on solving problem, instead of debugging same process again and again.
4. Each problem or error is easy to trace through function.
5. Relatively useful to reduce memory usage.

Global vs. Local Variable

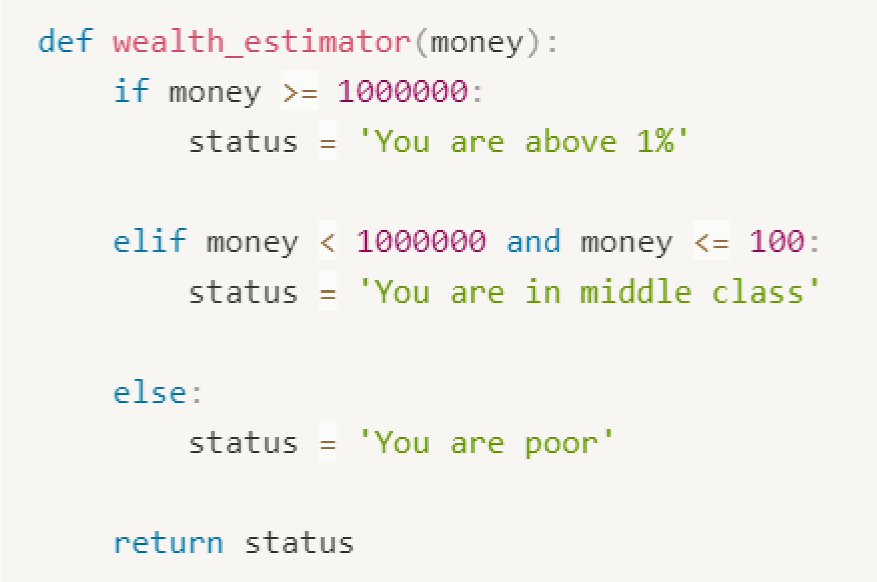
When we talk about function or class, understanding global and local variable is a must.

- **Global variable** can be accessed throughout the program body by all functions/class. It stays inside memory, unless we delete it or close the Python program.
- **Local variable** can be accessed only inside the function in which they are declared. After the function completed its work, the local variable will be automatically deleted.

Component of Function

Defining a function started with def , name, parentheses (), colon :

Every process inside function must be in tab or 4 spaces. We must choose between one of them. Because Python is space sensitive. Several services like Google Cloud Platform prefer 4 spaces to define function.



```
def wealth_estimator(money):
    if money >= 1000000:
        status = 'You are above 1%'

    elif money < 1000000 and money <= 100:
        status = 'You are in middle class'

    else:
        status = 'You are poor'

    return status
```

Input

- In python each input is called parameter. So, when 'parameter' is mentioned, keep in mind that it is input of a function.
- Function in Python is quite flexible compared to other programming language such as C++ or Java because Python do not strictly define its parameter's data type.
- We can put any data type inside parameter, for example string, integer, float, array, dictionary, even function itself.
- Regardless the flexibility of Python's parameter, once it is defined as a certain data type, do not insert it with different with other type. If we originally define parameter 'name' as a string, then do not insert it with integer (unless it is integer to float).

Input (2)

- Parameter is a variable inside the function that cannot be called from outside function, unless we put it as an output.
- A function can have no parameter at all. The data inside function can be from other sources, such as library (we will discuss next) and global variable (this is not recommended for teamwork project).
- A function also can have predefined or default parameter. If we do not insert any value, it will call its default value. Position of predefined parameter must be after empty one because it is not allowed to be empty.

Process

- Process inside function is like a sequence of steps to achieve something (such as output).
- Local variable inside function can only stay within it and will be deleted afterwards.
- We can do almost anything inside function, such as looping, conditional statement, call other function.
- Any process from any library can also work inside function.
- Make sure to give comment in each process to remind your future self or your teammates.

Output

- Output of function can be message or value. It depends on how we define it.
- To produce message, we can use **print**. Whereas to produce values we ca use **return**.
- Python's function can produce multiple values at the same time.
- If we want to select certain value from multiple **returns**, we can use underscore (_).

Let's Create Functions

1. Arithmetic Function
2. Arithmetic Function with Parameter
3. Arithmetic Function with Parameter and Output
4. Function with conditional statement
5. Function with for loop
6. Function inside function

Introduction to Library

What makes Python is a strong language for Data Science because of its libraries. A library is an outside code that we import to our project. We can use multiple libraries at the same time.

Library is a collection of code that is created by a person, community, or company. There are popular libraries for Data Science, such as numpy, pandas, sql-alchemy, matplotlib, seaborn, scikit-learn, tensorflow, etc.

By using library, almost 80% of our work is finished, and we can focus on the problem solving. We can create library for ourselves or contribute it for everyone around the world.

Let’s get back to Notebook!

String Manipulation

Manipulating string in Data Science is an essential skill to have. Because sometimes data is provided in dirty text. There is an advance Data Science branch which solely specialized in language and it is called Natural Language Processing. It gains insight from text and even voice.

- Concatenate
- Multiply
- Length
- Lower case, Upper case, Capitalize
- Replace
- Slice

Summary

1 Functional Programming

2 Let’s Create Function

3 Introduction to Library

4 String Manipulation

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Thank YOU