Relief-OpS Workshop: Introduction to Python

UNIVERSITY OF Southampton

Objectives

At the end of this session participants should be able to:

- Know about Python Programming Language.
- Understand Python fundamentals.
- Able to run Python example code.

Agenda

- Introduction to Python Programming Language.
- Introduction to Jupyter Notebook.
- Hands-on Python Programming Language.

Introduction to Python

Programing Language

- Programming language is language with a purpose to give an instruction to a computer. In other words, it is a way of a programmers to communicate with a computer.
- There are dozens of programming language used in industry today. E.g (Java, Javascript, c++, etc).

What is Python?

- Python is an easy to learn, powerful programming language. It has efficient high-level data structures with a simple and easy to understand syntax, and also offers flexibility to built your code.

Introduction to Python

Why Python?

- Easy to learn and use yet powerful and versatile.
- Python strive to be as close as the human language as possible.
- Cross-platform.
- Rich ecosystem (library, tools, documentation).


```java
public class Example {
    public static void main(String[] args) {

        System.out.println("Text to be printed");

    }
}
```

```cpp
#include <iostream>
using namespace std;

int main() {
  cout << "Hello World!";
  return 0;
}
```

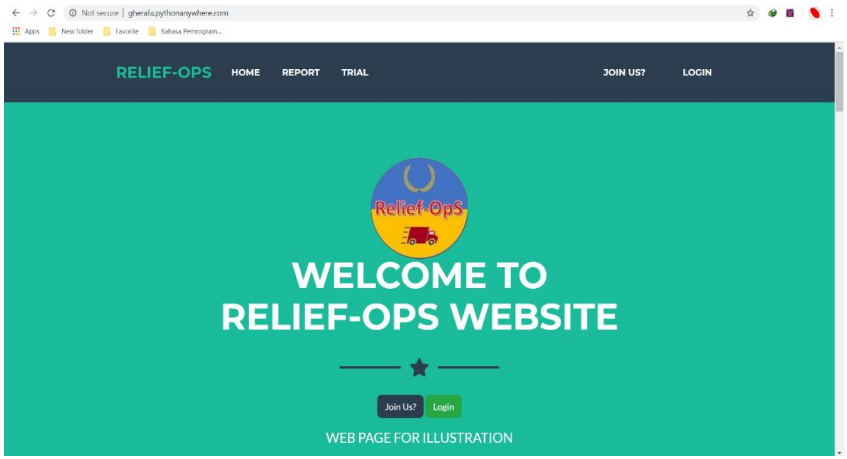
```
print("Hello, World!")
```

Introduction to Python

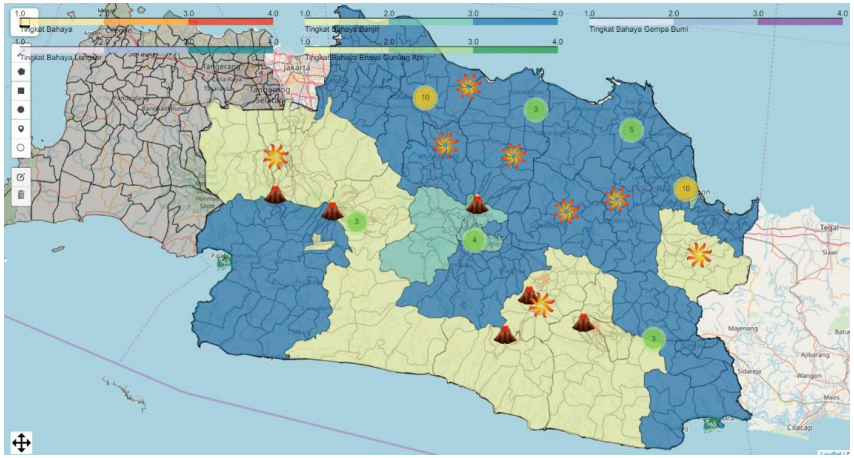
Where Python used?

Example of python usage

Web Developing



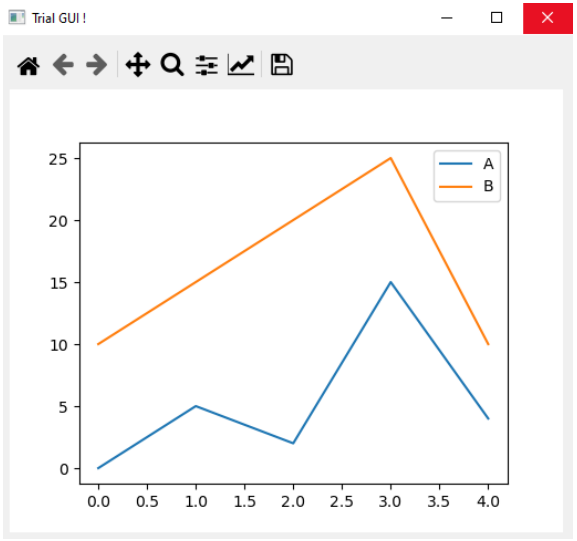
Web Page using Python

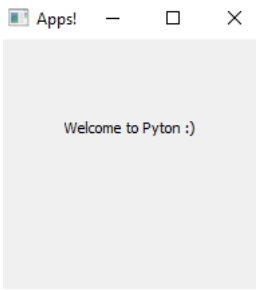


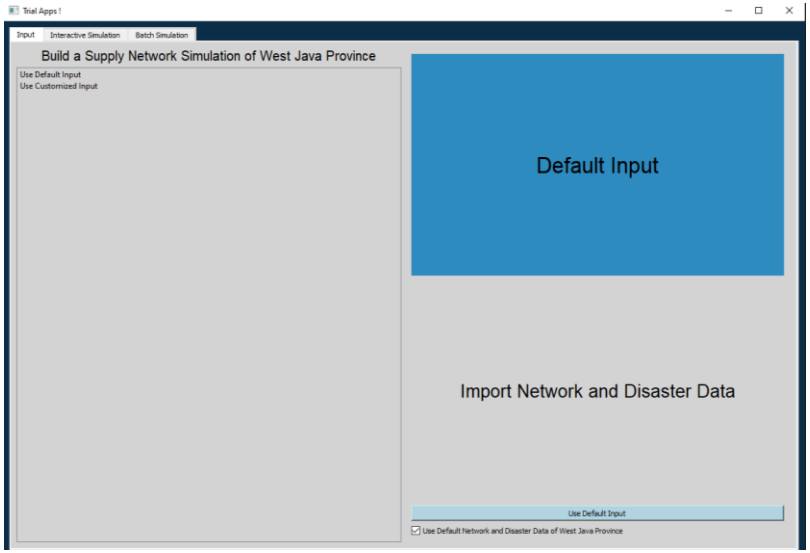
Visualization in the Web Page

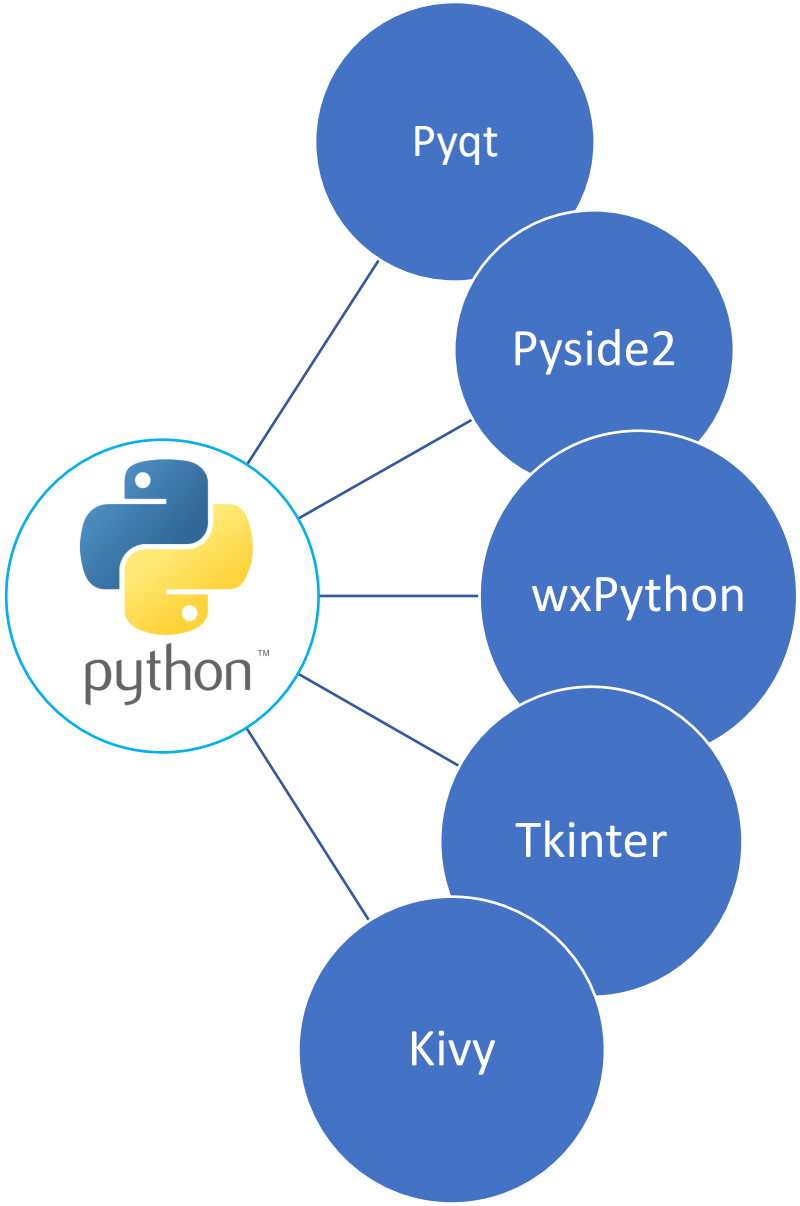
Example of python usage

Graphical User Interface





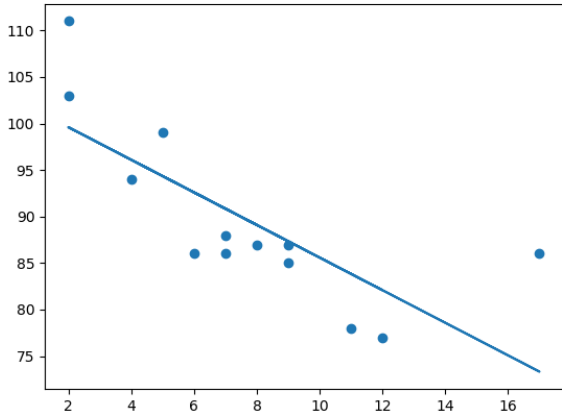




Example of python usage

Machine Learning

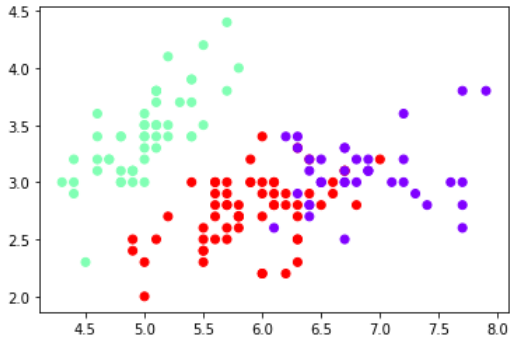
Deep Learning



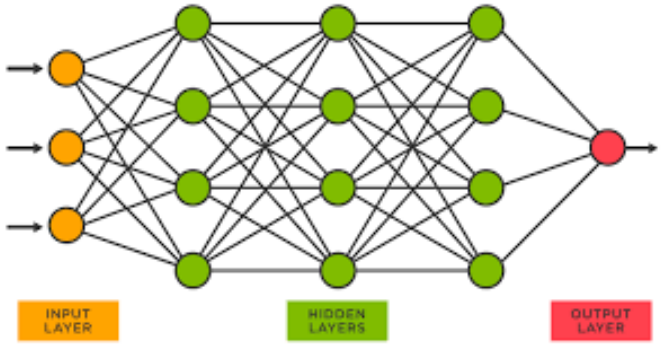
Linear regression in Python

Visualizing Clustering

```
plt.scatter(x[:, 0], x[:, 1], c=y_kmeans3, cmap='rainbow')
<matplotlib.collections.PathCollection at 0x1eec1aa8d30>
```



Kmeans Clustering using Python



Neural Network Scheme

- Dhiraj, K.
- https://www.w3schools.com/python/python_ml_getting_started.asp

Example of python usage

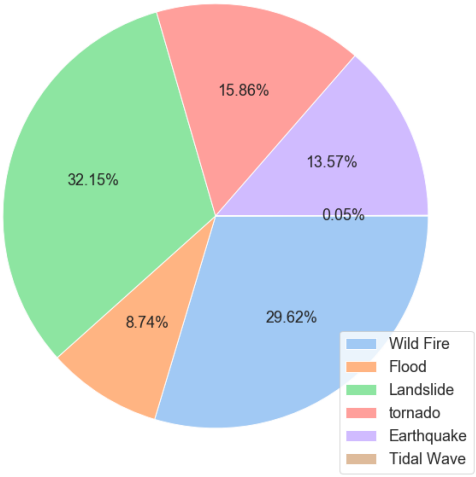
GIS

Data Cleansing

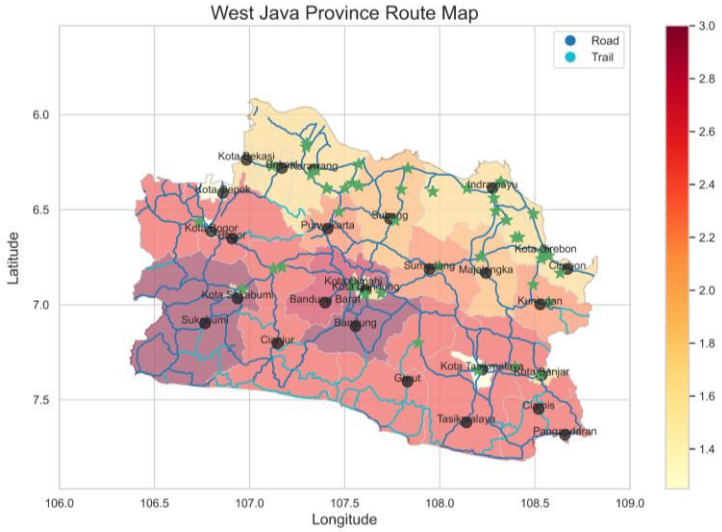
Data Visualization

Index	Kabupaten_	Banjir	GempaBumi	Longsor	ErupsiGunu
0	BANDUNG	3	3	3	3
1	BANDUNG BARAT	2	3	3	3
2	GARUT	1	3	3	3
3	GARUT SELATAN	1	3	3	3
4	KUNINGAN	1	2	3	3
5	BEKASI	3	2	1	1
6	SUBANG	3	2	1	2
7	Kota BEKASI	3	2	1	1
8	Kota CIKARANG	3	2	1	1
9	Kota BANDUNG	2	3	1	1
10	SUMEDANG	3	2	3	1
11	MAJALENGKA	3	2	2	1
12	Kota Depok	1	2	1	1
13	Kota CIMAHI	2	3	1	1
14	Kota CIREBON	2	2	1	1
15	TASIKMALAYA	1	3	3	3
16	CIANJUR	1	3	3	3
17	CIREBON	3	2	1	1
18	Kota Banjar	3	2	1	1
19	BOGOR	1	3	3	3
20	Kota SUKABUMI	1	3	3	1
21	BOGOR BARAT	1	3	3	3
22	SUKABUMI	3	3	3	3
23	Kota BOGOR	1	2	1	1
24	INDRAMAYU	3	2	1	1
25	PURWAKARTA	3	2	2	2
26	CIAMIS	3	3	3	1
27	PANGANDARAN	3	3	3	1
28	Kota TASIKMAL...	1	2	1	1

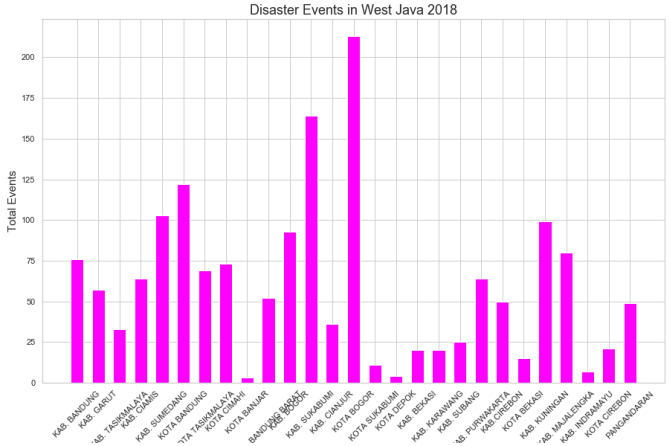
Dataframe in Python



Pie Chart



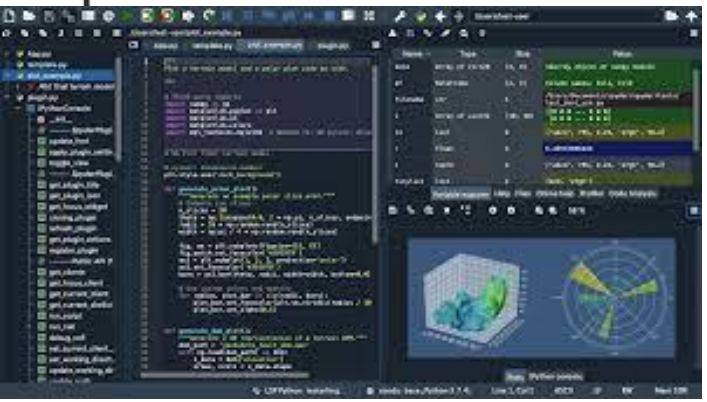
Map Visualization using Python



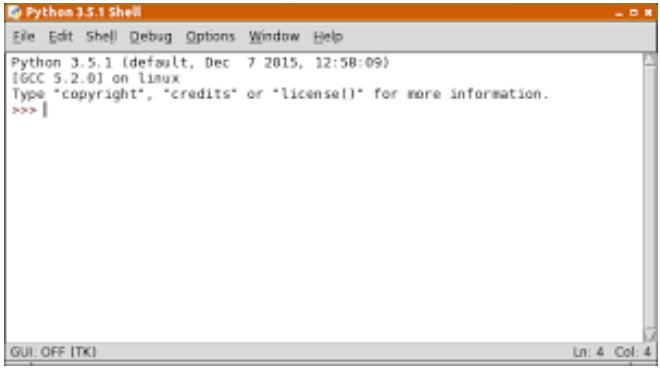
Bar Chart

Run your Python file.

SPYDER
The Scientific Python Development Environment

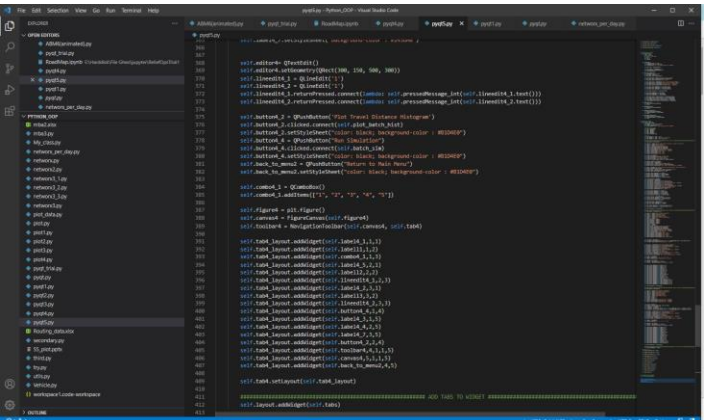


IDLE



Examples of IDE
(Integrated Development Environtment)

Visual Studio Code

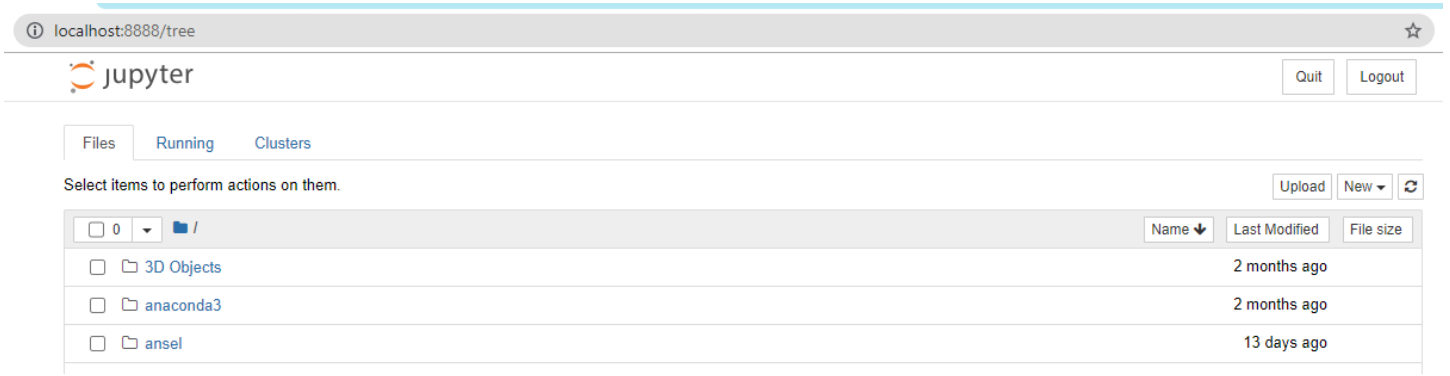


PyCharm

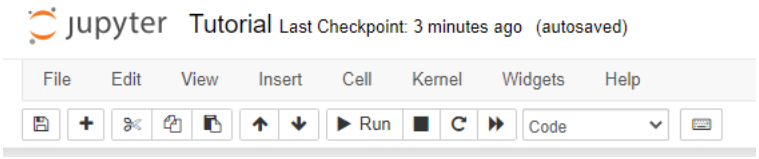
Jupyter Notebook

- Easy to use.
- Interactive environtment.
- Also can work as a presentation tool.

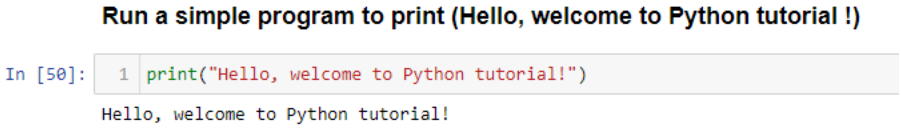
Start page



Header



Command Line

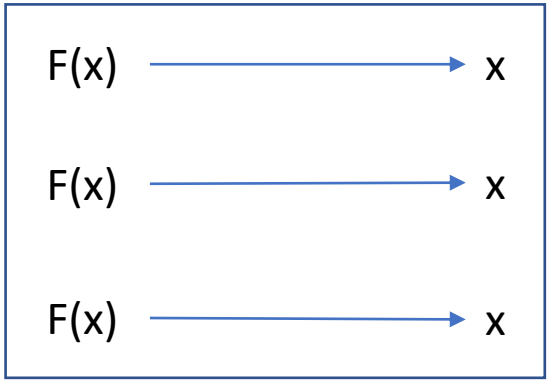


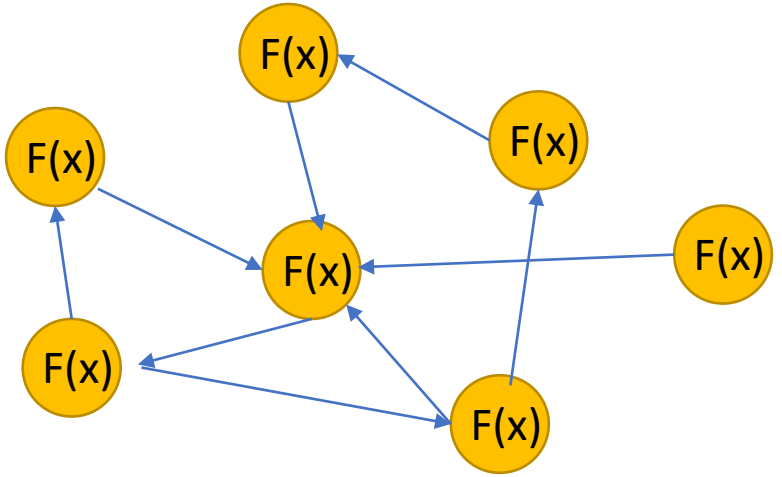
Programming Paradigm

Classification of programming languages based on its characteristics.

Procedural Programming

- Is a programming paradigm that based on subroutines procedure calls.
- Is formed by several functions and code blocks to perform some specified tasks
- Relies on procedure (functions) to operate on data structure.
- Whenever the program requires to perform that particular task, the functions will be called.

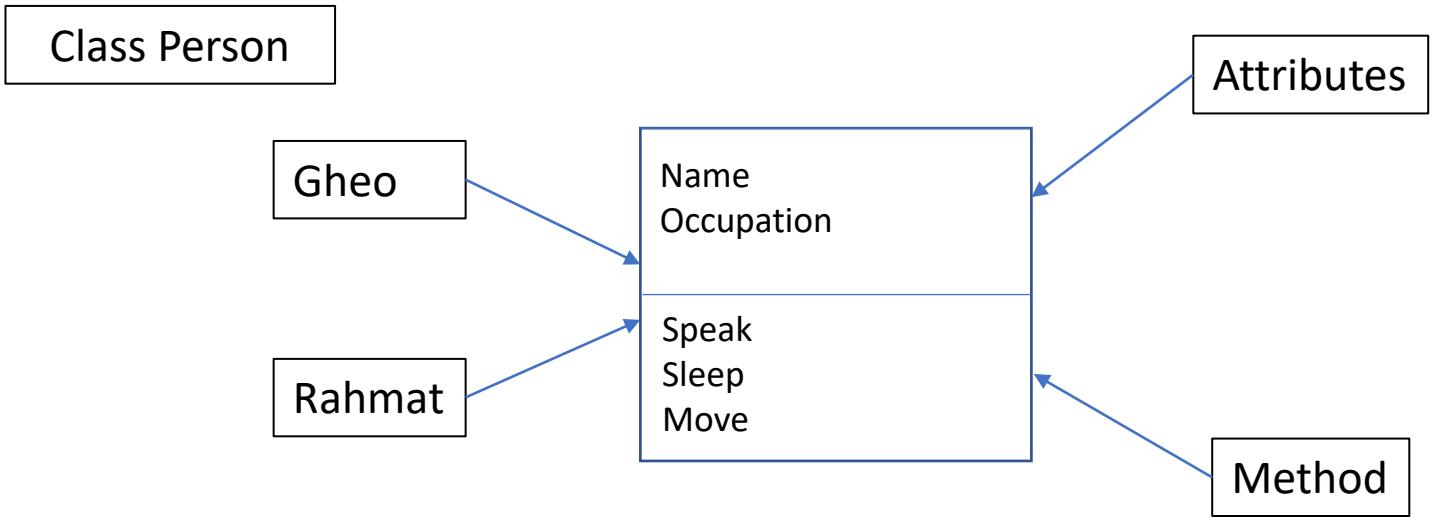




Programming Paradigm

Object Oriented Programming(OOP)

- Is a method of structuring program by bundling related attributes and behaviors into individual objects.
- Is an approach to models real-world related entities as a software object that have some data associated with it and allowing it to perform certain functions.
- Using object to operate on its own data structure.



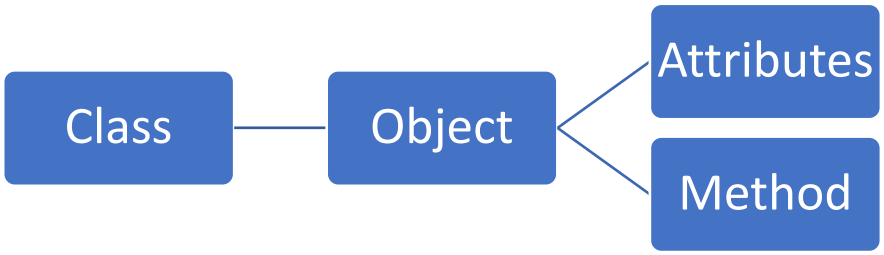
Programming Paradigm

Class.
Is a user-defined blueprint of how something should be defined.

Object.
Is an instance of a class. Copy of the class with its actual values.

Attributes.
Represented by attributes of an object created by the class.

Method
Function which acts as a behavior and action of an object created by the class.




```
In [56]:
1 class cat:
2     def __init__(self, name, breed):
3         self.name = name
4         self.breed = breed

In [57]:
1 billy = cat('billy', 'persian')

In [58]:
1 billy.name

Out[58]: 'billy'

In [59]:
1 billy.breed

Out[59]: 'persian'
```