UNIT - V

Python Libraries

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Python modules

- A python module is a file containing Python definitions and statements. A module can define functions, classes, and variables.
- To create a Python module, write the desired code and save that in a file with **.py** extension and you're good to go.
- For example, create a simple calc.py file, in which we define two functions, one **add** and another **subtract**. Now, your module is created. You can now use this module in other python files using the "import" keyword.
- In order to import the created module in another file you write as:
  import calc
- After importing you can do, "calc.add(1,2)"

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Python modules

- So, in the new python file you can do:
  import calc

```
print(calc.add(1,2))   #output: 3
print(calc.sub(1,2))   #output: -1
```


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Python modules

- There are also some in-built modules in python:
  - sys
  - math
  - os
  - datetime etc.
- sys - This module provides access to some variables used or maintained by the interpreter and to functions that interact strongly with the interpreter. It is always available. Unless explicitly noted otherwise, all variables are read-only.
- Some functions are version, stdin, stdout, argv, etc.
- Version function returns the python interpreter version
- stdin is used to take input from the command-line.
- argv outputs the list of command line arguments.

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datetime module

- module name “datetime”
- To display the current date, we can do datetime.datetime.now().
- Here, you need to understand that there are two types of objects “aware” and “naive”. An **aware** object can locate itself relative to other aware objects. A **naive** object does not contain enough information to unambiguously locate itself relative to other date/time objects.
- The datetime module is categorized into 6 main classes
- Two of those are:
  - date - An idealized naive date, assuming the current Gregorian calendar always was, and always will be, in effect. Its attributes are year, month, and day.
  - time - An idealized time, independent of any particular day, assuming that every day has exactly 24*60*60 seconds.

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math module

- The math module contains some popular functions like min(), max(), abs(), pow(), ceil(), etc.
- min(), max() – returns the highest and the lowest value in an iterable.
- abs() - returns the positive value of any number.

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NumPy

- It is an open source project
- NumPy is a Python library used for working with arrays.
- It also has functions for working in domain of linear algebra, Fourier transform, and matrices.
- NumPy aims to provide an array object that is up to 50x faster than traditional Python lists.
- The array object in NumPy is called ndarray, it provides a lot of supporting functions that make working with ndarray very easy.

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matplotlib

- Matplotlib is a low level graph plotting library in python that serves as a visualization utility.

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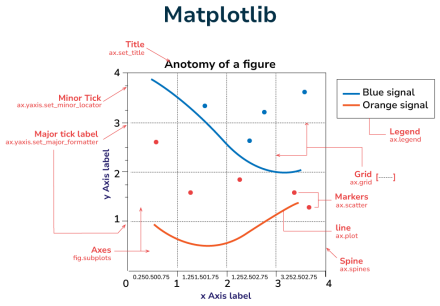
matplotlib



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Pandas

- Pandas is a Python library used for working with data sets.
- It has functions for analysing, cleaning, exploring, and manipulating data
- Pandas gives you answers about the data. Like:
  - Is there a correlation between two or more columns?
  - What is average value?
  - Max value?
  - Min value?
  - Basically it helps you in data manipulation and data analysis.

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Pandas

Pandas provides two types of classes for handling data:

1. Series: a one-dimensional labelled array holding data of any type such as integers, strings, Python objects etc.
2. DataFrame: a two-dimensional data structure that holds data like a two-dimension array or a table with rows and columns.

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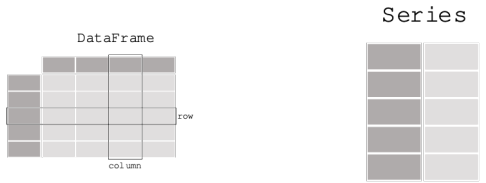
Pandas

- Each column in a DataFrame is a Series.
- A Pandas Series is like a column in a table.



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Pandas

- We can load .csv files into a dataframe by:
  df = pd.read_csv('data.csv')
- For json:
  df = pd.read_json()

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TODO

- Write a Python program to create a class representing a Circle. Include methods to calculate its area and perimeter.
- Write a Python program to create a person class. Include attributes like name, country and date of birth. Implement a method to determine the person's age.
- Write a Python program to create a class representing a shopping cart. Include methods for adding and removing items, and calculating the total price.

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