[NUMPY]

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INTRODUCTION :-

Numpy is a python-based general-purpose array processing package. It is designed by "TRAVIS OLIPHANT" in 2005.

DEFINITION :-

Numpy is an abbreviation for numerical python. It includes high-performance multidimensional array object for manuplating these arrays.

It has a number of features :-

- A powerful N-dimensional array object.
- Sophisticated (broadcasting) functions
- Tools for integrating C/C++ & fortran code.

⇨ HOW TO INSTALL AND IMPORT NUMPY :-

Numpy is fairly simple to install if phython and PIP are already installed on a machine Use the following commands to install it :-

- PIP install numpy
- Import numpy
- Import numpy as np

⇨ Array in Numpy :-

- The homogeneous multidimensional array is Numpy's core object.
- Axes are the names for dimensions in Numpy. The number of axes determines the rank.
- In Numpy, the array object is known as ndarray.

Example :-

[[1,2,3],[4,2,5]]

rank = 2 (It is 2-dimensional or it has 2 axes)
first dimensional length = 2
second dimensional length = 3
overall shape can be expressed = (2,3)

∴ Here are steps to use Numpy as:

⇨ Creating Arrays :-

In arrays, a dimension is one level of array depth (nested arrays). In this section, various types of arrays are created :-

Example :-

1. creating 0-D array :-

```
import numpy as np
ar = np.array(42)
print(ar)
```

Result :- 42

2. Creating 1-D array :-

```
import numpy as np
ap = np.array([1,2,3])
print(ap)
```

Result :- [1,2,3]

3. Creating 2-D array :-

```
import numpy as np
ak = np.array([[1,2,3],[4,5,6]])
print(ak)
```

Result :- ([1,2,3],
[4,5,6])

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Page No.
Date

Access Array Elements :-

The index number in square brackets is used to access an array element.

Example :- ar[5]

∴ Numpy array indexes begin with 0, therefore the first element is index 0, the second has index 1 and so on.

- Access 1-D Array :-

```
ar = np.array([1,2,3])
print(ar[0])
```


Result :- 1

- Access 2-D Array :-

```
ar = np.array([[1,2,3],[4,5,6]])
print('2nd element on 1st dimen :', ar[0,1])
```

Result :- 2nd element on 1st dimen = 2