# INTRODUCTION TO DATA ANALYTICS    BME456C

## EXPERIMENT NO 1:

**Use Numpy (Numerical Python) to create single and multi-dimensional array and perform various operations using Python.**

**What is the NumPy array?**

Python **NumPy array** is a collection of a homogeneous data type. **It** is most similar to the python list. You can insert different types of data in it. Like integer, floating, list, tuple, string, etc.

To create a multidimensional array and perform a mathematical operation python **NumPy ndarray** is the best choice. The ndarray stands for **N-Dimensional arrays**.
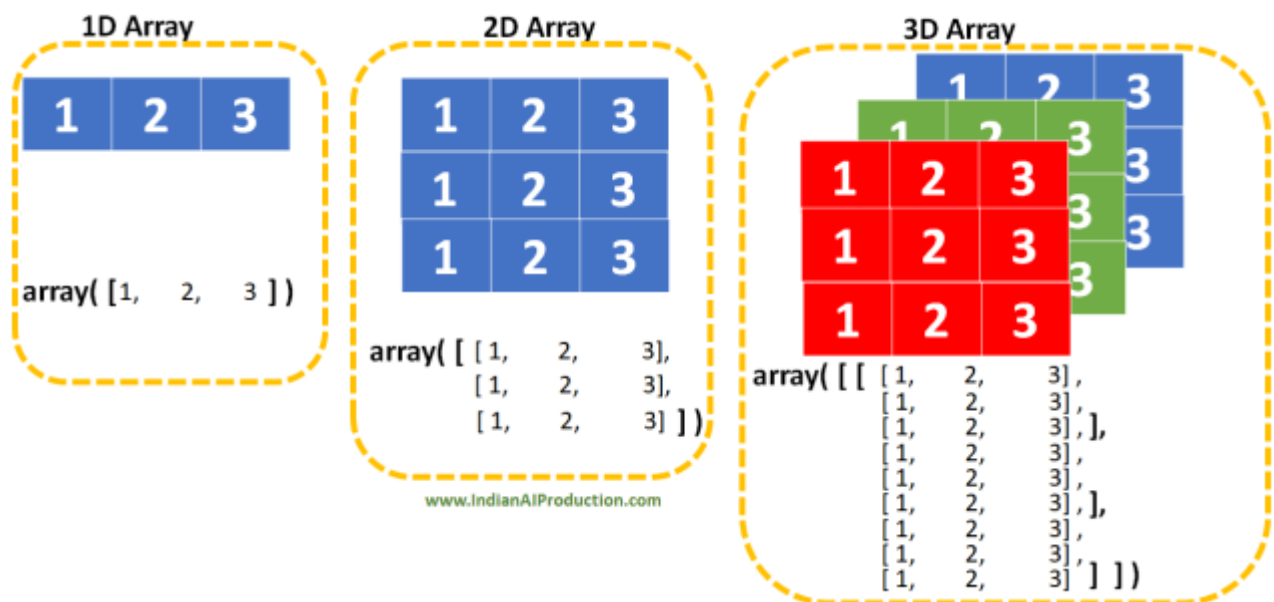


Figure: Representation of NumPy ndarray (multidimensional array)

**Example 1:**

**Create 1-D NumPy Array using Array () Function**

```
import numpy as np
# creating the list
list = [100, 200, 300, 400]
# Creating a 1-D array from the list
n = np.array(list)
# Printing the 1-D array
print(n)
```

**Output:**

```
[100 200 300 400]
```

**Example 2:**

**Creating the single-dimensional array.**

```
# numpy library imported
import numpy as np

# creating single-dimensional array
arr_s = np.arange(5)
print(arr_s)
```

**Output:**

[0 1 2 3 4]


**Example 3:**

For **Multidimensional array,** you can use **reshape ( )** method along with **arrange ( )**

import numpy as np

arr_m = np.arange(12).reshape(6, 2)

print(arr_m)


**Output:**

[[ 0  1]

 [ 2  3]

 [ 4  5]

 [ 6  7]

 [ 8  9]

 [10 11]]


**Example 4:**


import numpy as np

arr_m = np.arange(12).reshape(2, 2, 3)

print(arr_m)

**Output:**

[[[ 0  1  2]

  [ 3  4  5]]

 [[ 6  7  8]

  [ 9 10 11]]]

# Operations on Numpy Array

**Arithmetic Operations:**

# Python code to perform arithmetic

# operations on NumPy array

import numpy as np

# initializing the array

arr1 = np.arange(4, dtype = np.float_).reshape(2, 2)

print('First array:')

print(arr1)

print('\nSecond array:')

arr2 = np.array([12, 12])

print(arr2)

print('\nAdding the two arrays:')

print(np.add(arr1, arr2))

print('\nSubtracting the two arrays:')

```python
print(np.subtract(arr1, arr2))
print('\nMultiplying the two arrays:')
print(np.multiply(arr1, arr2))
print('\nDividing the two arrays:')
print(np.divide(arr1, arr2))
```

**Output:**

First array:

[[ 0.  1.]

 [ 2.  3.]]


Second array:

[12 12]


Adding the two arrays:

[[ 12.  13.]

 [ 14.  15.]]


Subtracting the two arrays:

[[-12. -11.]

 [-10.  -9.]]


Multiplying the two arrays:

[[ 0.  12.]

[ 24.  36.]]


Dividing the two arrays:

[[ 0.          0.08333333]

 [ 0.16666667  0.25      ]]