Experiment No. 8
Program to manipulate arrays using NumPy
Date of Performance:27/03/2024
Date of Submission:03/04/2024

Experiment No. 8

Title: Program to manipulate arrays using NumPy

Aim: To study and implement arrays manipulation using NumPy

Objective: To introduce NumPy package

Theory:

Numpy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays. It is the fundamental package for scientific computing with Python.
Besides its obvious scientific uses, Numpy can also be used as an efficient multi-dimensional container of generic data.

Arrays in Numpy

Array in Numpy is a table of elements (usually numbers), all of the same type, indexed by a tuple of positive integers. In Numpy, number of dimensions of the array is called rank of the array.A tuple of integers giving the size of the array along each dimension is known as shape of the array. An array class in Numpy is called as **ndarray**. Elements in Numpy arrays are accessed by using square brackets and can be initialized by using nested Python Lists.

Creating a Numpy Array

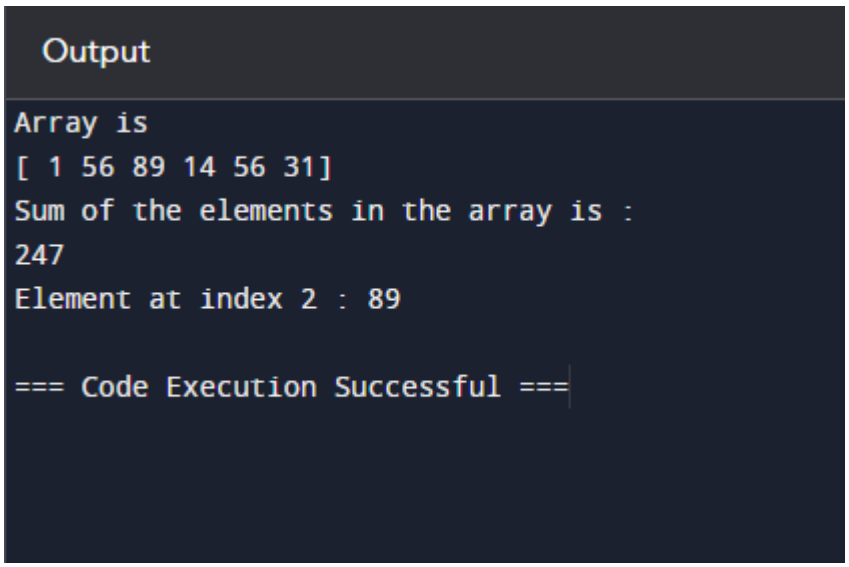
Arrays in Numpy can be created by multiple ways, with various number of Ranks, defining the size of the Array. Arrays can also be created with the use of various data types such as lists, tuples, etc. The type of the resultant array is deduced from the type of the elements in the sequences.

Note: Type of array can be explicitly defined while creating the array.

Code:

```
import numpy as np

a=[1,56,89,14,56,31]

b=np.array(a)

print("Array is")

print(b)


print("Sum of the elements in the array is :")

print(np.sum(b))


# Function to find the element at the given index

def find_element_at_index(b, index):

    if index < 0 or index >= len(b):

        return "Index out of range"

    else:

        return b[index]


index = 2

element = find_element_at_index(b, index)

print("Element at index", index, ":", element)
```

Output:



Conclusion:

The provided Python code uses a library called NumPy to do math stuff with arrays more easily. It starts by turning a regular list into a NumPy array, which makes working with numbers smoother and faster. Then, it adds up all the numbers in the array using a special NumPy function. The code also has a neat function that finds a number in the array at a specific position, making sure the position is valid.

sssIn a nutshell, this code shows how NumPy helps us handle numbers in arrays better. With NumPy, doing math with arrays becomes simpler and more efficient, making it super useful for tasks like science, data analysis, and machine learning.