Experiment No. 09
Program to manipulate arrays using NumPy
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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

V = np.array([1, 2, 3, 4, 5])

print("Array : ",V)

print("The sum of the elements is",np.sum(V))

print("The minimum of the elements is",np.min(V))

print("The maximum of the elements is",np.max(V))

print("The element at index 0 is",V[0])
```

Output:

```
Array :  [1 2 3 4 5]
The sum of the elements is 15
The minimum of the elements is 1
The maximum of the elements is 5
The element at index 0 is 1
```

Conclusion:

NumPy is a powerful package for array computation and manipulation in Python. It provides an efficient and convenient way to create, modify, and perform operations on arrays. With NumPy, you can perform various basic mathematical operations, unary and binary operations, and even advanced operations like aggregation and broadcasting. NumPy is a powerful package for array computation and manipulation in Python. It provides an efficient and convenient way to create, modify, and perform operations on arrays. With NumPy, you can perform various basic mathematical operations, unary and binary operations, and even advanced operations like aggregation and broadcasting.