# Python Programming

## Lab:- 16(Numpy slicing)

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**Numpy**:- **NumPy (Numerical Python) is a powerful library in Python that provides support for large, multi-dimensional arrays and matrices, along with a collection of mathematical functions to operate on these arrays. It is fundamental for scientific computing and serves as the foundation for many other libraries, such as Pandas and Matplotlib.**

**Example:**

lab17.py > ...

```
47
48  import numpy as np
49
50  # Create a 2D NumPy array (3x4 matrix)
51  array = np.array([[10, 20, 30, 40],
52                    [50, 60, 70, 80],
53                    [90, 100, 110, 120]])
54
55  # Slicing examples
56  # 1. Get the first two rows and the first three columns
57  slice_1 = array[:2, :3]
58
59  # 2. Get the last row
60  slice_2 = array[-1, :]
61
62  # 3. Get the first column
63  slice_3 = array[:, 0]
64
65  # 4. Get the bottom-right 2x2 submatrix
66  slice_4 = array[1:, 2:]
67
68  # Print the slices
69  print("Slice 1 (First 2 rows, First 3 columns):\n", slice_1)
70  print("Slice 2 (Last row):\n", slice_2)
71  print("Slice 3 (First column):\n", slice_3)
72  print("Slice 4 (Bottom-right 2x2 submatrix):\n", slice_4)
73
```

**1. Write a NumPy program to create an array of 10 zeros, 10 ones, and 10 fives**

**Program :-**

lab17.py > ...

```
import numpy as np

# Create an array of 10 zeros, 10 ones, and 10 fives
array_zeros = np.zeros(10)
array_ones = np.ones(10)
array_fives = np.full(10, 5)

# Combine the arrays
result_array = np.concatenate((array_zeros, array_ones, array_fives))

print(result_array)

```

**Output:-**

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL TEST RESULTS PORTS

```
PS C:\Users\Raj Kumar\Desktop\python programming> & "C:/Users/Raj Kumar/AppData/Local/Programs/Python/Python312/python.exe" "c:/Users/Raj Kumar/Desktop/python programming/lab17.py"
[0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 5. 5. 5. 5.
 5. 5. 5. 5. 5. 5.]
PS C:\Users\Raj Kumar\Desktop\python programming>
```

**2. Write a NumPy program to create a 3x3 matrix with values ranging from 2 to 10.**

**Program:-**

```
#2.Write a NumPy program to create a 3x3 matrix with values ranging from 2 to 10.

import numpy as np

# Create a 3x3 matrix with values ranging from 2 to 10
matrix = np.arange(2, 11).reshape(3, 3)

print(matrix)


```

**Output:-**

```
PS C:\Users\Raj Kumar\Desktop\python programming> & "C:/Users/Raj Kumar/AppData/Local/Programs/Python/Python312/python.exe" "c:/U
sers/Raj Kumar/Desktop/python programming/lab17.py"
[[ 2  3  4]
 [ 5  6  7]
 [ 8  9 10]]
PS C:\Users\Raj Kumar\Desktop\python programming>
```

**3. Write a NumPy program to create an array with values ranging from 12 to 38.**

**Program:-**

```
22  #3.Write a NumPy program to create an array with values ranging from 12 to 38.
23  import numpy as np
24
25  # Create an array with values ranging from 12 to 38
26  array = np.arange(12, 39)
27
28  print(array)
29
30
31
32
```

**Output:-**

```
PS C:\Users\Raj Kumar\Desktop\python programming> & "C:/Users/Raj Kumar/AppData/Local/Programs/Python/Python312/python.exe"
sers/Raj Kumar/Desktop/python programming/lab17.py"
[12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
 36 37 38]
PS C:\Users\Raj Kumar\Desktop\python programming>
```

**4. Write a NumPy program to convert a list and tuple into arrays. Input: my_list = [1, 2, 3, 4, 5, 6, 7, 8]**

**Input: my_tuple = ([8, 4, 6], [1, 2, 3])**

**Program:-**

lab17.py > ...

```
29
30  #4.Write a NumPy program to convert a list and tuple into arrays. Input: my_list = [1, 2, 3, 4, 5, 6, 7, 8]
31  #Input: my_tuple = ([8, 4, 6], [1, 2, 3])
32
33  import numpy as np
34
35  # Input list and tuple
36  my_list = [1, 2, 3, 4, 5, 6, 7, 8]
37  my_tuple = ([8, 4, 6], [1, 2, 3])
38
39  # Convert the list and tuple into arrays
40  array_from_list = np.array(my_list)
41  array_from_tuple = np.array(my_tuple)
42
43  # Print the results
44  print("Array from list:", array_from_list)
45  print("Array from tuple:", array_from_tuple)
46
47
48
```

**Output:-**

```
PS C:\Users\Raj Kumar\Desktop\python programming> & "C:/Users/Raj Kumar/AppData/Local/Programs/Python/Python312/python.ex
sers/Raj Kumar/Desktop/python programming/lab17.py"
Array from list: [1 2 3 4 5 6 7 8]
Array from tuple: [[8 4 6]
 [1 2 3]]
PS C:\Users\Raj Kumar\Desktop\python programming>
```