

Python Programming

Lab:- 20(Numpy mathematical operations)

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I'll be sharing some mathematical operations, Let's review on it.



1. Basic Arithmetic Operations:-

- **Addition:** Adds two arrays element-wise.

```
np.add(array1, array2)
```

- Example:

```
np.add([1, 2, 3], [4, 5, 6]) # Output: [5 7 9]
```

- **Subtraction:** Subtracts elements of one array from another.

```
np.subtract(array1, array2)
```

- Example:-

```
np.subtract([10, 20, 30], [5, 15, 25]) # Output: [ 5  5  5]
```

- **Multiplication:** Multiplies two arrays element-wise.

```
np.multiply(array1, array2)
```

- Example:-

```
np.multiply([2, 3, 4], [1, 5, 6]) # Output: [ 2 15 24]
```

- **Division:** Divides elements of one array by another element-wise.

```
np.divide(array1, array2)
```

- Example:-

```
np.divide([10, 20, 30], [2, 5, 6]) # Output: [5. 4. 5.]
```

2. Exponents and Logarithms:-

- **Power:** Raises each element of the array to the power of a number.

```
np.power(array, exponent)
```

- Example:-

```
np.power([2, 3, 4], 2) # Output: [ 4  9 16]
```

- **Exponential:** Computes the exponential (e^x) of each element.

```
np.exp(array)
```

- Example:-

```
np.exp([1, 2, 3]) # Output: [ 2.71828183  7.3890561 20.08553692]
```

3. Trigonometric Functions:-

- **Sine:** Computes the sine of each element in the array.

```
np.sin(array)
```

- Example:-

```
np.sin(np.array([0, np.pi/2, np.pi])) # Output: [0. 1. 0.]
```

- Cosine: Computes the cosine of each element.

```
np.cos(array)
```

- Example:-

```
np.cos(np.array([0, np.pi/2, np.pi])) # Output: [ 1.  0. -1.]
```

4. Rounding and Modulo:-

- Round: Rounds the values in an array to the nearest integer.

```
np.round(array)
```

- Example:-

```
np.round(array)
```

- Floor: Rounds each element to the nearest lower integer.

```
np.floor(array)
```

- Example:-

```
np.floor([1.7, 2.3, 3.9]) # Output: [1. 2. 3.]
```

- Ceil: Rounds each element to the nearest upper integer.

```
np.ceil(array)
```

- Example:-

```
np.ceil([1.2, 2.3, 3.1]) # Output: [2. 3. 4.]
```

- **Modulo:** Computes the remainder of the division of each element.

```
np.mod(array1, array2)
```

- Example:-

```
np.mod([10, 20, 30], [3, 7, 5]) # Output: [1 6 0]
```

Assignment Questions:-



Ques1:- Calculate the total revenue generated by two product categories in a store

Input:

```
category1_revenue = np.array([500, 600, 700, 550])
```

```
category2_revenue = np.array([450, 700, 800, 600])
```

Output: Total Revenue: [950 1300 1500 1150]

Program:-

```
lab20.py 7 ...
1  import numpy as np
2
3  # Input data
4  category1_revenue = np.array([500, 600, 700, 550])
5  category2_revenue = np.array([450, 700, 800, 600])
6
7  # Calculate total revenue
8  total_revenue = category1_revenue + category2_revenue
9
10 # Output the result
11 print("Total Revenue:", total_revenue)
12
```

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/Python39-64/Python.exe" "c:/Users/Raj Kumar/Desktop/python programming/lab20.py"
Total Revenue: [ 950 1300 1500 1150]
PS C:\Users\Raj Kumar\Desktop\python programming>
```

Ques 2.

Calculate the profit made by a company

Input:

```
revenue = np.array([10000, 12000, 11000, 10500])
```

```
expenses = np.array([4000, 5000, 4500, 4800])
```

Output: Profit: [6000 7000 6500 5700]

Program:-

```
14 #2.
15 import numpy as np
16
17 # Input data
18 revenue = np.array([10000, 12000, 11000, 10500])
19 expenses = np.array([4000, 5000, 4500, 4800])
20
21 # Calculate profit
22 profit = revenue - expenses
23
24 # Output the result
25 print("Profit:", profit)
26 |
```

```
30 |
31 |
32 |
```

Output:-

```
PS C:\Users\Raj Kumar\Desktop\python programming> & "C:/Users/Raj Kumar/AppData/Local/Programs/Python/Python38-64/Python.exe" "c:/Users/Raj Kumar/Desktop/python programming/lab20.py"
Profit: [6000 7000 6500 5700]
PS C:\Users\Raj Kumar\Desktop\python programming>
```

```
PS C:\Users\Raj Kumar\Desktop\python programming>
```

Ques 3.

Determine which products in a store are out of stock (quantity is 0).

Input: inventory = np.array([10, 0, 5, 0, 20, 0])

Output: Out of Stock Products: [0 0 0]

Program:-

```

27 #3.
28 import numpy as np
29
30 # Input data
31 inventory = np.array([10, 0, 5, 0, 20, 0])
32
33 # Find out-of-stock products (where quantity is 0)
34 out_of_stock = inventory[inventory == 0]
35
36 # Output the result
37 print("Out of Stock Products:", out_of_stock)
38 |

```

Output:-

```

PS C:\Users\Raj Kumar\Desktop\python programming> & "C:/Users/Raj Kumar/AppData/Local/Programs/Python/Python38-64/Python.exe" "c:/Users/Raj Kumar/Desktop/python programming/lab20.py"
Out of Stock Products: [0 0 0]
PS C:\Users\Raj Kumar\Desktop\python programming>

```

Ques 4. .Calculate the total cost of items in a shopping cart, considering the quantity and price per item.

Input: quantity = np.array([2, 3, 4, 1])

price_per_item = np.array([10.0, 5.0, 8.0, 12.0])

Output: Total Cost of Items: [20. 15. 32. 12.]

Program:-

```

30 #4.
31 import numpy as np
32
33 # Input data
34 quantity = np.array([2, 3, 4, 1])
35 price_per_item = np.array([10.0, 5.0, 8.0, 12.0])
36
37 # Calculate total cost of each item
38 total_cost = quantity * price_per_item
39
40 # Output the result
41 print("Total Cost of Items:", total_cost)
42

```

Output:-

```

PS C:\Users\Raj Kumar\Desktop\python programming> & "C:/Users/Raj Kumar/AppData/Local/Programs/Python/Python39-64/Python.exe" "c:/Users/Raj Kumar/Desktop/python programming/lab20.py"
Total Cost of Items: [20. 15. 32. 12.]
PS C:\Users\Raj Kumar\Desktop\python programming>

```