

Numpy Questions

NumPy is a powerful library for numerical computing in Python.

It provides support for arrays, matrices, and many mathematical functions to operate on these data structures efficiently.

It is widely used in *scientific computing*, *data analysis*, and *machine learning*.

```
import numpy as np
```

```
list1 = [1, 2, 3]
list2 = [4, 5, 6]
list3 = [7, 8, 9]
```

"1: Create a 3x3 square matrix in NumPy by static method."

```
matrix = np.array([list1, list2, list3])
matrix
```

```
array([[1, 2, 3],
       [4, 5, 6],
       [7, 8, 9]])
```

"2: Create a 3x3 square matrix in NumPy by giving user input."

```
matrix = np.array([[int(input(f"Enter the value for row {_+1}, column {j+1}: "))
for j in range(3)] for _ in range(3)])
matrix
```

```
array([[1, 2, 3],
       [4, 5, 6],
       [7, 8, 9]])
```

"3: Create two matrices of same order in NumPy using user input and show their addition."

```
matrix1 = np.array([[int(input(f"Enter the value for row {_+1}, column {j+1} of
matrix 1: ")) for j in range(3)] for _ in range(3)])
matrix2 = np.array([[int(input(f"Enter the value for row {_+1}, column {j+1} of
matrix 2: ")) for j in range(3)] for _ in range(3)])
print(f"Matrix 1: {matrix1}\nMatrix 2: {matrix2}")
matrix1 + matrix2
```

```
Matrix 1: [[9 8 7]
           [6 6 5]
           [4 3 3]]
Matrix 2: [[2 2 1]
           [2 3 5]
           [7 5 9]]
```

```
array([[11, 10, 8],
       [8, 9, 10],
       [11, 8, 12]])
```

"4: Create two matrices of same order by user input in NumPy and show their difference by subtracting them."

```
matrix1 = np.array([[int(input(f"Enter the value for row {_+1}, column {j+1} of
matrix 1: ")) for j in range(3)] for _ in range(3)])
matrix2 = np.array([[int(input(f"Enter the value for row {_+1}, column {j+1} of
matrix 2: ")) for j in range(3)] for _ in range(3)])
print(f"Matrix 1: {matrix1}\nMatrix 2: {matrix2}")
matrix1 - matrix2
```

```
Matrix 1: [[7 3 5]
           [7 2 5]
           [0 9 8]]
```

```
Matrix 2: [[7 6 5]
           [1 3 4]
           [5 6 3]]
```

```
array([[ 0, -3,  0],
       [ 6, -1,  1],
       [-5,  3,  5]])
```

"5:Create two matrices of same order in NumPy by user input and multiply them and show their output."

```
matrix1 = np.array([[int(input(f"Enter the value for row {i+1}, column {j+1} of
matrix 1: ")) for j in range(3)] for i in range(3)])
matrix2 = np.array([[int(input(f"Enter the value for row {i+1}, column {j+1} of
matrix 2: ")) for j in range(3)] for i in range(3)])
print(f"Matrix 1: {matrix1}\nMatrix 2: {matrix2}")
matrix1 @ matrix2
```

```
Matrix 1: [[8 6 5]
           [4 9 7]
           [5 3 5]]
Matrix 2: [[ 6  7  3]
           [ 5  4  1]
           [ 9 66 44]]
```

```
array([[123, 410, 250],
       [132, 526, 329],
       [ 90, 377, 238]])
```

"6:Write a program in NumPy to create a matrix and to print the upper triangle of the matrix."

```
np.triu(matrix)
```

```
array([[1, 2, 3],
       [0, 5, 6],
       [0, 0, 9]])
```

"7:Write a program in NumPy to create a matrix and to print the lower triangle of the matrix."

```
np.tril(matrix)
```

```
array([[1, 0, 0],
       [4, 5, 0],
       [7, 8, 9]])
```

"8:Write a program in NumPy to create a matrix and then to print it's transverse."

```
matrix.T
```

```
array([[1, 4, 7],
       [2, 5, 8],
       [3, 6, 9]])
```

"9:Write a program in NumPy to create a matrix and then to print it's diagonal."

```
print(f"Matrix: {matrix}")
np.diag(matrix)
```

```
Matrix: [[1 2 3]
         [4 5 6]
         [7 8 9]]
```

```
array([1, 5, 9])
```

"10. Write a program in NumPy to create a matrix and to check whether a matrix is symmetric or not. (A symmetric matrix is equal to its transpose.)"

```
is_symmetric = np.array_equal(matrix, matrix.T)
print(f"Matrix:\n{matrix}")
print(f"Is the matrix symmetric? {is_symmetric}")
```

Matrix:

```
[[1 2 3]
 [4 5 6]
 [7 8 9]]
```

Is the matrix symmetric? False