

➤ Python NumPy Questions:

Python NumPy (Array, Random, Math):

- Write a Python program to print the NumPy version in your system.

```
import numpy as np
print(np.__version__)
```

- Write a Python program to reverse an array (first element becomes last).

```
import numpy as np
import numpy as np
x = np.arange(12, 38)
print("Original array:")
print(x)
print("Reverse array:")
x = x[::-1]
print(x)
```

- Write a Python program to convert a list and tuple into arrays.

```
import numpy as np
```

```
my_list = [1, 2, 3, 4, 5, 6, 7, 8]
print("List to array: ")
print(np.asarray(my_list))
my_tuple = ([8, 4, 6], [1, 2, 3])
print("Tuple to array: ")
print(np.asarray(my_tuple))
```

- **Write a Python program to find common values between two arrays.**

```
import numpy as np
array1 = np.array([0, 10, 20, 40, 60])
print("Array1: ",array1)
array2 = [10, 30, 40]
print("Array2: ",array2)
print("Common values between two arrays:")
print(np.intersect1d(array1, array2))
```

- **Write a Python program compare two arrays using numpy.**

```
import numpy as np
a = np.array([1, 2])
b = np.array([4, 5])
print("Array a: ",a)
```

```
print("Array b: ",b)
print("a > b")
print(np.greater(a, b))
print("a >= b")
print(np.greater_equal(a, b))
print("a < b")
print(np.less(a, b))
print("a <= b")
print(np.less_equal(a, b))
```

- **Write a Python program to change the dimension of an array.**

```
import numpy as np
x = np.array([1, 2, 3, 4, 5, 6])
print("6 rows and 0 columns")
print(x.shape)

y = np.array([[1, 2, 3],[4, 5, 6],[7,8,9]])
print("(3, 3) -> 3 rows and 3 columns ")
print(y)
x = np.array([1,2,3,4,5,6,7,8,9])
print("Change array shape to (3, 3) -> 3 rows and 3 columns ")
x.shape = (3, 3)
print(x)
```

- **Write a Python program (using numpy) to sum of all the multiples of 3 or 5 below 100.**

```
import numpy as np
x = np.arange(1, 100)
# find multiple of 3 or 5
n = x[(x % 3 == 0) | (x % 5 == 0)]
print(n[:1000])
# print sum the numbers
print(n.sum())
```

- **Write a Python program to convert a NumPy array into Python list structure.**

```
import numpy as np
x = np.arange(6).reshape(3, 2)
print("Original array elements:")
print(x)
print("Array to list:")
print(x.tolist())
```

- **Write a Python program to how to add an extra column to a numpy array.**

```
import numpy as np
x = np.array([[10,20,30], [40,50,60]])
```

```
y = np.array([[100], [200]])  
print(np.append(x, y, axis=1))
```

- **Write a Python program to check whether the numpy array is empty or not.**

```
import numpy as np  
x = np.array([2, 3])  
y = np.array([])  
# size 2, array is not empty  
print(x.size)  
# size 0, array is empty  
print(y.size)
```

- **Write a Python program to normalize a 3x3 random matrix.**

```
import numpy as np  
x= np.random.random((3,3))  
print("Original Array:")  
print(x)  
xmax, xmin = x.max(), x.min()  
x = (x - xmin)/(xmax - xmin)  
print("After normalization:")  
print(x)
```

- **How to swap two rows of an array?**

```
A = np.arange(25).reshape(5,5)
A[[0,1]] = A[[1,0]]
print(A)
```

- **Compute bootstrapped 95% confidence intervals for the mean of a 1D array X (i.e., resample the elements of an array with replacement N times, compute the mean of each sample, and then compute percentiles over the means).**

```
X = np.random.randn(100) # random 1D array
N = 1000 # number of bootstrap samples
idx = np.random.randint(0, X.size, (N, X.size))
means = X[idx].mean(axis=1)
confint = np.percentile(means, [2.5, 97.5])
print(confint)
```

- **Python program to create a random vector of size 10 and sort it.**

```
import numpy as np
x = np.random.random(10)
```

```
print("Original array:")
print(x)
x.sort()
print("Sorted array:")
print(x)
```

- **Write a Python program to check two random arrays are equal or not.**

```
import numpy as np
x = np.random.randint(0,2,6)
print("First array:")
print(x)
y = np.random.randint(0,2,6)
print("Second array:")
print(y)
print("Test above two arrays are equal or not!")
array_equal = np.allclose(x, y)
print(array_equal)
```

- **Write a Python program to add, subtract, multiply, divide arguments element-wise.**

```
import numpy as np
print("Add:")
print(np.add(1.0, 4.0))
```

```
print("Subtract:")
print(np.subtract(1.0, 4.0))
print("Multiply:")
print(np.multiply(1.0, 4.0))
print("Divide:")
print(np.divide(1.0, 4.0))
```

- **Write a Python program to get the dates of yesterday, today and tomorrow.**

```
import numpy as np
yesterday = np.datetime64('today', 'D') - np.timedelta64(1, 'D')
print("Yesterday: ", yesterday)
today = np.datetime64('today', 'D')
print("Today: ", today)
tomorrow = np.datetime64('today', 'D') + np.timedelta64(1, 'D')
print("Tomorrow: ", tomorrow)
```