1. Create a 4X2 integer array and Prints its attributes

Attributes like:

1. The shape of an array.
2. Array dimensions.
3. The Length of each element of the array in bytes.

**CODE:**

import numpy as np

arr = np.array([[1, 2],

                [3, 4],

                [5, 6],

                [7, 8]])

print("Array:")

print(arr)

print("\nShape of array:", arr.shape)

print("Array dimensions:", arr.ndim)

print("Length of each element in bytes:", arr.itemsize)

1. Create a 5X2 integer array from a range between 100 to 200 such that the difference between each element is 10

**CODE:**

import numpy as np

# Create array using arange and reshape

arr = np.arange(100, 200, 10).reshape(5, 2)

print("5x2 Integer Array with elements from 100 to 200 with a difference of 10:")

print(arr)

#### Add the following two NumPy arrays

import numpy

arrayOne = numpy.array([[5, 6, 9], [21 ,18, 27]])

arrayTwo = numpy.array([[15 ,33, 24], [4 ,7, 1]])

**CODE:**

import numpy as np

arrayOne = np.array([[5, 6, 9], [21, 18, 27]])

arrayTwo = np.array([[15, 33, 24], [4, 7, 1]])

result = arrayOne + arrayTwo

print("Result of adding arrayOne and arrayTwo:")

print(result)

1. Create an 8X3 integer array from a range between 10 to 34 such that the difference between each element is 1 and then Split the array into four equal-sized sub-arrays.

Expected Output:

Creating 8X3 array using numpy.arange

[[10 11 12]

[13 14 15]

[16 17 18]

[19 20 21]

[22 23 24]

[25 26 27]

[28 29 30]

[31 32 33]]

Dividing 8X3 array into 4 sub array

[array([[10, 11, 12],[13, 14, 15]]),

array([[16, 17, 18],[19, 20, 21]]),

array([[22, 23, 24],[25, 26, 27]]),

array([[28, 29, 30],[31, 32, 33]])]

**CODE:**

import numpy as np

# Create the 8x3 array using numpy.arange()

array = np.arange(10, 34).reshape(8, 3)

print("Creating 8x3 array using numpy.arange:")

print(array)

sub\_arrays = np.split(array,4)

print("\nDividing 8X3 array into 4 sub arrays:")

for i, sub\_array in enumerate(sub\_arrays):

    print(sub\_array)

1. Write a NumPy program to generate six random integers between 10 and 30.   
   Expected Output:  
   [20 28 27 17 28 29]

**CODE:**

import numpy as np

random\_integers = np.random.randint(10, 31, size=6)

print("Generated random integers between 10 and 30:")

print(random\_integers)

1. Write a NumPy program to generate five random numbers from the normal distribution.

Expected Output:  
[-0.43262625 -1.10836787 1.80791413 0.69287463 -0.53742101]

**CODE:**

import numpy as np

random\_numbers = np.random.normal(size=5)

print("Generated random numbers from the normal distribution:")

print(random\_numbers)

1. Write a NumPy program to create a 3x3x3 array with random values.

**CODE:**

import numpy as np

random\_array = np.random.rand(3, 3, 3)

print("3x3x3 array with random values:")

print(random\_array)

1. Write a NumPy program to normalize a 3x3 random matrix.

**CODE:**

import numpy as np

# Create a 3x3 random matrix

random\_matrix = np.random.rand(3, 3)

print("Original random matrix:")

print(random\_matrix)

# Normalize the matrix using Min-Max normalization

min\_value = np.min(random\_matrix)

max\_value = np.max(random\_matrix)

normalized\_matrix = (random\_matrix - min\_value) / (max\_value - min\_value)

print("\nNormalized matrix:")

print(normalized\_matrix)

1. Write a NumPy program to shuffle numbers between 0 and 10 (inclusive).

**CODE:**

import numpy as np

numbers = np.arange(11)

np.random.shuffle(numbers)

print("Shuffled numbers between 0 and 10 (inclusive):")

print(numbers)

1. Write a NumPy program to create a 5x5 array with random values and find the minimum and maximum values.

**CODE:**

import numpy as np

array = np.random.rand(5, 5)

print("5x5 array with random values:")

print(array)

min\_value = np.min(array)

max\_value = np.max(array)

print("\nMinimum value:", min\_value)

print("Maximum value:", max\_value)