

In [1]: *#Create Different Types of NumPy Arrays (1D, 2D, 3D):*

```
# Importing NumPy  
import numpy as np
```

In [2]: *# Creating a 1D array*
array_1d = np.array([1, 2, 3, 4, 5])
print("1D Array:", array_1d)

1D Array: [1 2 3 4 5]

In [3]: *# Creating a 2D array*
array_2d = np.array([[1, 2, 3], [4, 5, 6]])
print("2D Array:\n", array_2d)

2D Array:

```
[[1 2 3]  
 [4 5 6]]
```

In [4]: *# Creating a 3D array*
array_3d = np.array([[[1, 2], [3, 4]], [[5, 6], [7, 8]]])
print("3D Array:\n", array_3d)

3D Array:

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

In [5]: *#Perform Basic Arithmetic Operations on Arrays*

```
# Creating two arrays for arithmetic operations  
array_a = np.array([1, 2, 3])  
array_b = np.array([4, 5, 6])  
  
# Basic arithmetic operations  
addition = array_a + array_b  
subtraction = array_a - array_b  
multiplication = array_a * array_b  
division = array_a / array_b  
  
print("Addition:", addition)  
print("Subtraction:", subtraction)  
print("Multiplication:", multiplication)  
print("Division:", division)
```

Addition: [5 7 9]

Subtraction: [-3 -3 -3]

Multiplication: [4 10 18]

Division: [0.25 0.4 0.5]

In [6]: *#Use Indexing and Slicing to Access Elements*

```
# Creating a sample array
```

```

array_sample = np.array([[10, 20, 30], [40, 50, 60], [70, 80, 90]])

# Accessing elements using indexing
element = array_sample[1, 2] # Access element in 2nd row, 3rd column
print("Element at (1, 2):", element)

# Slicing the array
sliced_array = array_sample[0:2, 1:3] # Accessing first two rows and columns 1 and 2
print("Sliced Array:\n", sliced_array)

```

Element at (1, 2): 60

Sliced Array:

```

[[20 30]
 [50 60]]

```

In [7]: *#Explore Array Manipulation Functions (Reshape, Transpose, Concatenate)*

```

# Creating a sample array
array_to_reshape = np.array([[1, 2, 3], [4, 5, 6]])

# Reshaping the array
reshaped_array = array_to_reshape.reshape(3, 2)
print("Reshaped Array:\n", reshaped_array)

# Transposing the array
transposed_array = array_to_reshape.T
print("Transposed Array:\n", transposed_array)

# Concatenating two arrays
array_1 = np.array([[1, 2], [3, 4]])
array_2 = np.array([[5, 6], [7, 8]])
concatenated_array = np.concatenate((array_1, array_2), axis=0) # Concatenate along axis 0
print("Concatenated Array:\n", concatenated_array)

```

Reshaped Array:

```

[[1 2]
 [3 4]
 [5 6]]

```

Transposed Array:

```

[[1 4]
 [2 5]
 [3 6]]

```

Concatenated Array:

```

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

```

In [8]: *#Create and Use NumPy Random Number Generators*

```

# Set the seed for reproducibility
np.random.seed(42)

# Generating random numbers
random_array = np.random.rand(3, 3) # 3x3 array of random floats between 0 and 1
print("Random Array (3x3):\n", random_array)

```

```
# Generating random integers
random_integers = np.random.randint(1, 10, size=(3, 3)) # 3x3 array of random integers
print("Random Integers (3x3):\n", random_integers)
```

Random Array (3x3):

```
[[0.37454012 0.95071431 0.73199394]
 [0.59865848 0.15601864 0.15599452]
 [0.05808361 0.86617615 0.60111501]]
```

Random Integers (3x3):

```
[[8 3 6]
 [5 2 8]
 [6 2 5]]
```

In []: