**Topic: NumPy Arrays, Array Creation, and Indexing**

Exercise 1: Create a 1D NumPy array with values from 0 to 9. Reshape to 5x2 format

Exercise 2: Create a 2D NumPy array with a shape of (3, 3) containing random integers.

Exercise 3: Access and print the every third element of a given 1D NumPy array. input arr=[1,2,2,3,3,4,4,4]

Exercise 4: Retrieve the last column of a 2D NumPy array. input arr=[[2,4,5], [5,6,7], [5,7,8]]

Exercise 5: Create a NumPy array of even numbers between 10 and 50. try reshaping it to 2D as feasible

Exercise 6: Replace all negative values in a NumPy array with it's absolute value. input arr=[-4,5,6,-5,11, -1]

**Topic: Array Slicing and Masked Arrays**

Exercise 1: Extract the first three elements from a NumPy array. my\_array = np.array([1, 2, 3, 4, 5])

Exercise 2: Create a masked array that masks all values less than 5 in a given array. my\_array = np.array([1, 6, 3, 8, 2, 7, 4, 9, 5])

Exercise 3: Slice a 2D NumPy array to get the second row. my\_2d\_array = np.array([[1, 2, 3],[4, 5, 6],[7, 8, 9]])

Exercise 4: Create a masked array that masks all even numbers in a given array. my\_array = np.array([1, 2, 3, 4, 5, 6, 7, 8, 9])

Exercise 5: Slice a 3D NumPy array to obtain the second 2D array. my\_3d\_array = np.array([[[1, 2, 3],[4, 5, 6]],[[7, 8, 9],[10, 11, 12]]])

Exercise 6: Use a mask to filter out values greater than 20 from a NumPy array. np.array([10, 25, 5, 30, 15, 40, 20])

**Topic: Array Iteration**

Exercise 1: Iterate over the elements of a 1D NumPy array and print every even position item in them. np.array([10, 20, 30, 40, 50])

Exercise 2: Iterate over the rows of a 2D NumPy array and calculate their sums. np.array([[1, 2, 3],[4, 5, 6],[7, 8, 9]])

Exercise 3: Create a 1D NumPy array of 20 different elements and find the indices of the top 3 maximum values.

Exercise 4: Iterate over a 3D NumPy array and find the maximum value in each 2D slice. np.array([[[1, 2, 3],[4, 5, 6]],[[7, 8, 9],[10, 11, 12]]]

Exercise 5: Loop through a NumPy array and calculate the cumulative sum at each index. np.array([1, 6, 3, 8, 2, 7, 4, 9, 5]

Exercise 6: Iterate over a 2D NumPy array and replace negative values with their absolute values. input arr=[[2,-4,-5], [5,-6,-7], [5,-7,8]]

**Topic: Array Broadcasting and Reshaping**

Exercise 1: Multiply a 1D NumPy array by a scalar using broadcasting. np.array([1, 6, 3, 8, 2, 7, 4, 9, 5], take any scaler value

Exercise 2: Reshape a 1D NumPy array into a 2D array with shape (3, 4). np.array([1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12])

Exercise 3: Broadcast two NumPy arrays of different shapes to perform element-wise addition. np.array([[1, 2, 3],[4, 5, 6]]) and np.array([10, 20, 30])

Exercise 4: Flatten a 2D NumPy array into a 1D array. np.array([[1, 2, 3],[4, 5, 6]]

Exercise 5: Reshape a 1D NumPy array into a 3D array with shape (2, 3, 4). take a suitable 1D array

**Topic: Mathematical Operations**

Exercise 1: Perform element-wise addition of two NumPy arrays. take suitable 2D arrays

Exercise 2: Calculate the dot product of two 2D NumPy arrays of differing shapes.

Exercise 3: Find the mean and standard deviation of a given NumPy array. np.array([1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

Exercise 4: Calculate the element-wise square root of a NumPy array. np.array([1, 4, 9, 16, 25])

Exercise 5: Compute the element-wise exponential of a NumPy array. np.array([1, 4, 2])