**Q1:** How do you create a 1D NumPy array with values from 0 to 9?

**A1:**

python

Copy code

import numpy as np

arr = np.arange(10)

print(arr)

*Output:*

csharp

Copy code

[0 1 2 3 4 5 6 7 8 9]

**Q2:** How do you create a 2D array of shape (3, 3) filled with zeros?

**A2:**

python

Copy code

arr = np.zeros((3, 3))

print(arr)

*Output:*

lua

Copy code

[[0. 0. 0.]

[0. 0. 0.]

[0. 0. 0.]]

**2. Array Manipulation**

**Q3:** How can you reshape a 1D array of 12 elements into a 2D array with 3 rows and 4 columns?

**A3:**

python

Copy code

arr = np.arange(12)

reshaped\_arr = arr.reshape(3, 4)

print(reshaped\_arr)

*Output:*

lua

Copy code

[[ 0 1 2 3]

[ 4 5 6 7]

[ 8 9 10 11]]

**Q4:** How do you vertically stack two 1D arrays?

**A4:**

python

Copy code

arr1 = np.array([1, 2, 3])

arr2 = np.array([4, 5, 6])

stacked\_arr = np.vstack((arr1, arr2))

print(stacked\_arr)

*Output:*

lua

Copy code

[[1 2 3]

[4 5 6]]

**3. Mathematical Operations**

**Q5:** How do you perform element-wise addition of two NumPy arrays?

**A5:**

python

Copy code

arr1 = np.array([1, 2, 3])

arr2 = np.array([4, 5, 6])

sum\_arr = arr1 + arr2

print(sum\_arr)

*Output:*

csharp

Copy code

[5 7 9]

**Q6:** How do you multiply each element in a NumPy array by 2?

**A6:**

python

Copy code

arr = np.array([1, 2, 3])

multiplied\_arr = arr \* 2

print(multiplied\_arr)

*Output:*

csharp

Copy code

[2 4 6]

**4. Boolean Indexing and Slicing**

**Q7:** How can you extract all elements from a NumPy array that are greater than 5?

**A7:**

python

Copy code

arr = np.array([1, 2, 3, 6, 7, 8])

filtered\_arr = arr[arr > 5]

print(filtered\_arr)

*Output:*

csharp

Copy code

[6 7 8]

**Q8:** How do you select only the odd numbers from a 1D array?

**A8:**

python

Copy code

arr = np.array([1, 2, 3, 4, 5, 6, 7, 8, 9])

odd\_numbers = arr[arr % 2 != 0]

print(odd\_numbers)

*Output:*

csharp

Copy code

[1 3 5 7 9]

**5. Statistical Operations**

**Q9:** How do you find the mean and standard deviation of the elements in a NumPy array?

**A9:**

python

Copy code

arr = np.array([1, 2, 3, 4, 5])

mean = np.mean(arr)

std\_dev = np.std(arr)

print("Mean:", mean)

print("Standard Deviation:", std\_dev)

*Output:*

yaml

Copy code

Mean: 3.0

Standard Deviation: 1.4142135623730951

**Q10:** How can you find the maximum and minimum values in a 2D array?

**A10:**

python

Copy code

arr = np.array([[1, 2, 3], [4, 5, 6], [7, 8, 9]])

max\_value = np.max(arr)

min\_value = np.min(arr)

print("Max:", max\_value)

print("Min:", min\_value)

*Output:*

makefile

Copy code

Max: 9

Min: 1

**6. Random Numbers**

**Q11:** How do you generate a 3x3 array of random numbers between 0 and 1?

**A11:**

python

Copy code

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

print(random\_arr)

**Q12:** How can you create a NumPy array of 5 random integers between 10 and 50?

**A12:**

python

Copy code

random\_integers = np.random.randint(10, 50, size=5)

print(random\_integers)

**7. Linear Algebra**

**Q13:** How do you compute the dot product of two vectors using NumPy?

**A13:**

python

Copy code

vec1 = np.array([1, 2, 3])

vec2 = np.array([4, 5, 6])

dot\_product = np.dot(vec1, vec2)

print(dot\_product)

*Output:*

Copy code

32

**Q14:** How do you compute the inverse of a 2x2 matrix?

**A14:**

python

Copy code

matrix = np.array([[1, 2], [3, 4]])

inverse\_matrix = np.linalg.inv(matrix)

print(inverse\_matrix)

*Output:*

lua

Copy code

[[-2. 1. ]

[ 1.5 -0.5]]

**8. Advanced Indexing**

**Q15:** How can you replace all odd numbers in a NumPy array with -1?

**A15:**

python

Copy code

arr = np.array([1, 2, 3, 4, 5])

arr[arr % 2 != 0] = -1

print(arr)

*Output:*

css

Copy code

[-1 2 -1 4 -1]

**9. Broadcasting**

**Q16:** How do you add a 1D array to each row of a 2D array?

**A16:**

python

Copy code

arr\_2d = np.array([[1, 2, 3], [4, 5, 6], [7, 8, 9]])

arr\_1d = np.array([1, 1, 1])

result = arr\_2d + arr\_1d

print(result)

*Output:*

lua

Copy code

[[ 2 3 4]

[ 5 6 7]

[ 8 9 10]]