Numpy Practice Questions

Q1. Create a NumPy array of size 10, filled with random integers between 1 and 100. Find and print the indices of all even elements.

Q2. Generate a (4, 4) matrix of random numbers and replace all elements on the diagonal with their square root.

Q3. Write a program to create an array of size 20 with values ranging from 1 to 20. Reshape it into a (4, 5) matrix, and then calculate the sum along each row and column.

Q4. Write a program to normalize a 1D array of random floats to have a mean of 0 and a standard deviation of 1.

Q5. Given an array of integers, replace all negative numbers with their absolute values and all positive numbers greater than 50 with 50.

Q6. Create a (3, 4, 5) array with random integers between 1 and 100. Calculate and print the mean value for each 2D slice along the first axis.

Q7. Write a function that takes two 2D arrays of the same shape and returns their element-wise division, handling division by zero by replacing the result with 0.

Q8. Generate an array of shape (5, 5) where each element is the Manhattan distance from the center of the matrix.

Q9. Create a (6, 6) matrix of random integers. Use Boolean indexing to replace all elements divisible by 3 with -1.

Q10. Given a 3D array of shape (2, 3, 4), flatten it along different axes using .ravel() and .flatten(). Explain the difference in output.

Q11. Write a function that takes a 2D array and flips it both horizontally and vertically without using loops.

Q12. Generate a random array of size 30 and partition it into three equal-sized arrays, each sorted in ascending order.

Q13. Write a program to create a random array and find the top three maximum values without sorting the array.

Q14. Create a (10, 3) array of random integers representing student scores in three subjects. Calculate and print the student with the highest total score.

Q15. Write a function that accepts a 1D NumPy array and a target sum. Return all pairs of indices in the array whose corresponding elements add up to the target sum.

Q16. Create a (6, 6) matrix with values ranging from 1 to 36. Slice and print the last row and the last column.

Sample Output:

Last row: [31, 32, 33, 34, 35, 36]

Last column: [6, 12, 18, 24, 30, 36]

Q17. Given a (5, 5) matrix of random integers, extract a (3, 3) sub-matrix from the center.

Sample Input:

[[10, 15, 20, 25, 30],
[35, 40, 45, 50, 55],
[60, 65, 70, 75, 80],
[85, 90, 95, 100, 105],
[110, 115, 120, 125, 130]]

Q18. Create a (4, 4) matrix filled with values from 1 to 16. Slice out and reverse the last two rows.

[[1, 2, 3, 4],
[5, 6, 7, 8],
[9, 10, 11, 12],
[13, 14, 15, 16]]

Output: [[12, 11, 10, 9],
[16, 15, 14, 13]]