



## Beginner (☆☆☆)

1. How do you import the NumPy library using an alias?
2. How do you check the version and configuration of NumPy?
3. How do you create a vector filled with zeros of size 10?
4. How do you find help/documentation for a NumPy function from the command line?
5. How do you create a zero vector of size 10 with the fifth element as 1?
6. How do you create a vector with values from 10 to 49?
7. How do you reverse a vector?
8. How do you create a 3x3 matrix with values from 0 to 8?
9. How do you find indices of non-zero elements in an array?
10. How do you create a 3x3 identity matrix?
11. How do you generate a 3x3x3 array with random values?
12. How do you find the min and max values in a 10x10 random matrix?
13. How do you calculate the mean of a random vector of size 30?
14. How do you create a 2D array with 1s on the border and 0s inside?
15. What is the result of operations like `0 * np.nan`, `np.nan == np.nan`, etc.?
16. How do you create a matrix with values below the diagonal?
17. How do you create a checkerboard pattern in an 8x8 matrix?
18. How do you find the index of a flat element in a 3D shape?
19. How do you create a checkerboard pattern using NumPy's tile function?
20. How do you normalize a matrix (values between 0 and 1)?
21. How do you define a custom data type for storing color (RGBA)?
22. How do you perform a matrix multiplication between two matrices?
23. How do you negate values between two given numbers in a vector?
24. What is the output of `sum(range(5), -1)` vs `np.sum(range(5), -1)`?
25. Which NumPy vector operations are legal or illegal?





## Beginner (★☆☆)

26. What happens when you divide integers or floats by zero in NumPy?
27. How do you round a float array away from zero?
28. How do you extract the integer part of a float using multiple methods?
29. How do you create a 5x5 matrix with row values ranging from 0 to 4?
30. How do you use a generator to create a NumPy array?
31. How do you create an array with evenly spaced values between 0 and 1 (excluded)?
32. How do you sort a random array?
33. How do you sum an array faster than using np.sum?
34. How do you check if two arrays are equal?
35. How do you make a NumPy array read-only?



## Intermediate (★★★)

36. How do you convert Cartesian coordinates to polar coordinates?
37. How do you replace the maximum value in an array with zero?
38. How do you create a structured array for (x, y) coordinate pairs?
39. How do you create a Cauchy matrix using two arrays?
40. How do you find the range of values for each NumPy scalar type?
41. How do you display all values in a large array?
42. How do you find the closest value to a given scalar in an array?
43. How do you create a structured array with position and color fields?
44. How do you compute pairwise distances between coordinates?
45. How do you cast a float array to integer type in place?
46. How do you read data from a file with missing values?
47. How do you iterate through all elements in a NumPy array with indices?
48. How do you create a 2D Gaussian-like array?
49. How do you randomly place a specific number of elements in a 2D array?
50. How do you subtract the row mean from a matrix?





## Intermediate (★★☆)

51. How do you sort a 2D array based on the values of one column?
52. How do you check if a 2D array contains any null (zero-only) columns?
53. How do you find the nearest value to a given number in a NumPy array?
54. How do you create a NumPy subclass with custom attributes?
55. How do you increment elements in an array using an index array with repeats?
56. How do you accumulate values into an array based on indices?
57. How do you count unique colors in a 3D image array?
58. How do you compute the sum across the last two axes of a 4D array?
59. How do you calculate means of grouped values in an array?
60. How do you efficiently get the diagonal of a matrix dot product?



## Advanced (★★★)

61. How do you interleave a vector with a fixed number of zeros?
62. How do you multiply a (5,5,3) array with a (5,5) array element-wise?
63. How do you swap two rows in a matrix?
64. How do you extract unique line segments from triangle definitions?
65. How do you recreate an array from a bincount?
66. How do you compute a moving average using a sliding window?
67. How do you create a rolling 2D view from a 1D array?
68. How do you invert booleans or negate floats in-place?
69. How do you compute the distance from a point to multiple lines?
70. How do you compute the distances from multiple points to multiple lines?
71. How do you extract a fixed-shaped subarray centered on a given point?
72. How do you generate overlapping subarrays from a vector?
73. How do you compute the rank of a matrix using SVD?
74. How do you find the most frequent value in an array?
75. How do you extract all 3x3 contiguous blocks from a 10x10 matrix?
76. How do you create a 2D symmetric matrix class?



77. How do you compute the sum of multiple matrix-vector products at once?
78. How do you compute the sum of blocks in a 2D array?
79. How do you simulate the Game of Life using NumPy?
80. How do you extract the top N largest values from an array?
81. How do you create a Cartesian product of multiple input arrays?
82. How do you create a record array from a regular NumPy array?
83. How do you raise an array to the power of 3 using different methods?
84. How do you find rows in a matrix containing all elements of another matrix?
85. How do you filter rows in a matrix with at least one differing value?
86. How do you convert integers to their binary matrix representation?
87. How do you extract unique rows from a 2D array?
88. How do you compute inner, outer, sum, and multiplication using einsum?
89. How do you sample a 2D path at regular intervals?
90. How do you filter 2D array rows that sum to a specific number using only integers?



## Additional Practice (Bonus: 91–110)

91. How do you vertically and horizontally stack two arrays?
92. How do you apply a custom function to each element of an array?
93. How do you remove duplicate rows in a 2D array?
94. How do you filter rows based on a specific column value?
95. How do you find column-wise and row-wise minimum/maximum indices?
96. How do you replace NaN values in an array with the column mean?
97. How do you flatten and sort a 2D array?
98. How do you calculate the correlation coefficient between two vectors?
99. How do you extract the top-K values along a specific axis?
100. How do you detect outliers in a dataset using IQR?
101. How do you perform one-hot encoding using NumPy?
102. How do you find the shape and number of elements in an array?
103. How do you reshape an array without changing its data?

- 104.How do you flatten a multi-dimensional array?
- 105.How do you get the cumulative sum along an axis?
- 106.How do you compute element-wise maximum/minimum of two arrays?
- 107.How do you broadcast arrays with different shapes?
- 108.How do you transpose a matrix and perform dot products?
- 109.How do you check for NaN or infinite values in an array?
- 110.How do you extract diagonal, upper, and lower triangles from a matrix?