

## Exercise 2. Beginner Level NumPy Exercises

1. Create a 1D array with values ranging from 0 to 9.
2. Convert a 1D array to a 2D array with 2 rows.
3. Extract all odd numbers from an array of 1-10.
4. Replace all odd numbers in an array of 1-10 with -1.
5. Convert a 1D array to a boolean array where all positive values become True.
6. Replace all even numbers in a 1D array with their negative.
7. Find the indices of non-zero elements from [1,2,0,0,4,0].
8. Create a 3x3 identity matrix.
9. Reshape a 1D array to a 2D array with 5 rows and 2 columns.
10. Stack two arrays vertically.
11. Find the index of the maximum value in a 1D array.
12. Find the mean of each row in a 2D array.
13. Calculate the exponential of all elements in a 1D array.
14. Concatenate two 1D arrays.
15. Create a 2D array with random values and sort each row.
16. Replace all negative values in an array with 0.
17. Calculate the square root of each element in a 1D array.
18. Convert the data type of an array to float.
19. Output a sequence of equally gapped 5 numbers in the range 0 to 100 (both inclusive).
20. Output a matrix (numpy array) of dimension 2-by-3 with each and every value equal to 5.
21. Output a 5-by-5 array of random integers between 0 (inclusive) and 10 (exclusive).
22. Output a 3-by-3 array of random numbers following normal distribution.
23. Output the transpose of a matrix (as numpy array).
24. Calculate the sine of an array of angles (in radians) using NumPy.
25. Create a one-dimensional NumPy array of the numbers from 10 to 100, counting by 10.

26. Create a ten-element NumPy array object of all zeros.
27. Create a ten-element array of random integers between 1 and 5 (inclusive).
28. Create a two-dimensional, 3 x 4 array (three arrays of four elements each) with random numbers from 1 to 10.
29. Calculate the cumulative sum of elements in a 1D array.
30. Calculate the standard deviation of each column in a 2D array.
31. Create a 10x10 array with random values and find the minimum and maximum values.
32. For this array: `arr = np.array([1, 2, 3, 4, 5, 6, 7])`
- Slice elements from index 1 to index 5 from the following array.
  - Slice elements from index 4 to the end of the array.
  - Slice elements from the beginning to index 4 (not included).
  - Slice from the index 3 from the end to index 1 from the end.
33. For the following array:
- ```
array([[ 1,  2,  3,  4,  5],
       [ 6,  7,  8,  9, 10],
       [11, 12, 13, 14, 15],
       [16, 17, 18, 19, 20]])
```
- Write a statement that prints the first row.
  - Write an expression to print the last row.
  - What does `print(four_by_five[2,3])` display?
  - How could you display the first column?
  - Write an expression to return the last two columns of the middle two rows.