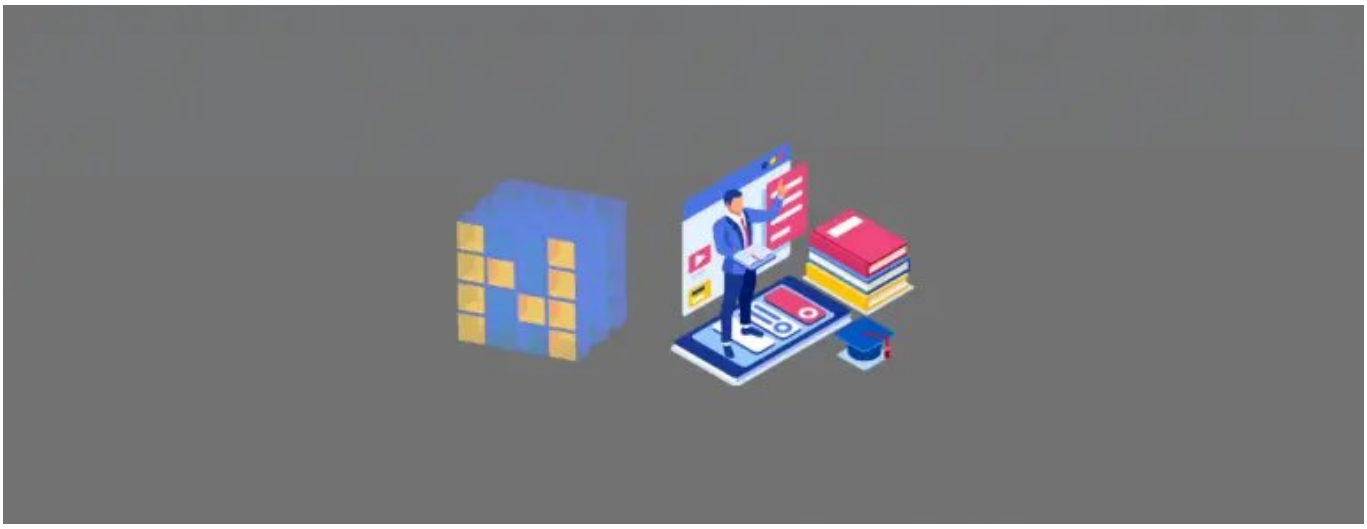
P — PROGRAMMING

7 Numpy Practical Examples: Sample Code for Beginners

by **Amiya Rout** · June 8, 2020



In the previous tutorial, we have discussed some basic concepts of NumPy in Python Numpy Tutorial For Beginners With Examples. In this tutorial, we are going to discuss some problems and the solution with NumPy practical examples and code.

As you might know, NumPy is one of the important Python modules used in the field of data science and machine learning. As a beginner, it is very important to know about a few NumPy practical examples.

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Numpy Practical Examples

Let's have a look at 7 NumPy sample solutions covering some key NumPy concepts. Each example has code with a relevant NumPy library and its output.

How to search the maximum and minimum element in the given array using NumPy?

Searching is a technique that helps finds the place of a given element or value in the list. In Numpy, one can perform various searching operations using the various functions that are provided in the library like **argmax**, **argmin**, etc.

numpy.argmax( )

This function returns indices of the maximum element of the array in a particular axis.

Example:

```
import numpy as np


# Creating 5x4 array
array = np.arange(20).reshape(5, 4)
print(array)
print()
```

```
# If no axis mentioned, then it works on the entire array
print(np.argmax(array))

# If axis=1, then it works on each row
print(np.argmax(array, axis=1))

# If axis=0, then it works on each column
print(np.argmax(array, axis=0))
```

Output:

```
[[ 0 1 2 3]
[ 4 5 6 7]
[ 8 9 10 11]
[12 13 14 15]
[16 17 18 19]]

19
[3 3 3 3 3]
[4 4 4 4]
```

Similarly one can use `numpy.argmin(` **)** to return indices of the minimum element of the array in a particular axis.

How to sort the elements in the given array using Numpy?

Sorting refers to arrange data in a particular format. Sorting algorithm specifies the way to arrange data in a particular order. In Numpy, one can perform various sorting operations using the various functions that are provided in the library like **sort**, **argsort,** etc.

numpy.sort( )

This function returns a sorted copy of an array.

Example:

```
import numpy as np

array = np.array([
    [3, 7, 1],
    [10, 3, 2],
    [5, 6, 7]
])
print(array)
print()

# Sort the whole array
print(np.sort(array, axis=None))

# Sort along each row
print(np.sort(array, axis=1))

# Sort along each column
print(np.sort(array, axis=0))
```

Output:

```
[[ 3 7 1]
[10 3 2]
[ 5 6 7]]

[ 1 2 3 3 5 6 7 7 10]
```

```
[[ 1 3 7]
[ 2 3 10]
[ 5 6 7]]

[[ 3 3 1]
[ 5 6 2]
[10 7 7]]
```

numpy.argsort( )

This function returns the indices that would sort an array.

Example:

```
import numpy as np

array = np.array([28, 13, 45, 12, 4, 8, 0])
print(array)

print(np.argsort(array))
```

Output:

```
[28 13 45 12 4 8 0]
[6 4 5 3 1 0 2]
```

How to find the mean of every NumPy array in the given list?

The problem statement is given a list of NumPy array, the task is to find mean of every NumPy array.

Using np.mean( )

```
import numpy as np

list = [
    np.array([3, 2, 8, 9]),
    np.array([4, 12, 34, 25, 78]),
    np.array([23, 12, 67])
]

result = []
for i in range(len(list)):
    result.append(np.mean(list[i]))
print(result)
```

Output:

```
[5.5, 30.6, 34.0]
```

How to add rows and columns in NumPy array?

The problem statement is given NumPy array, the task is to add rows/columns basis on requirements to numpy array.

Adding Row using numpy.vstack( )

```
import numpy as np

array = np.array([
    [3, 2, 8],
```

```
    [4, 12, 34],
    [23, 12, 67]
])

newRow = np.array([2, 1, 8])
newArray = np.vstack((array, newRow))
print(newArray)
```

Output:

```
[[ 3 2 8]
[ 4 12 34]
[23 12 67]
[ 2 1 8]]
```

> Adding Column using numpy.column_stack( )

```
import numpy as np

array = np.array([
    [3, 2, 8],
    [4, 12, 34],
    [23, 12, 67]
])

newColumn = np.array([2, 1, 8])
newArray = np.column_stack((array, newColumn))
print(newArray)
```

Output:

```
[[ 3 2 8 2]
[ 4 12 34 1]
[23 12 67 8]]
```

How to reverse a NumPy array?

The problem statement is given NumPy array, the task is to reverse the NumPy array.

> Using numpy.flipud( )

```
import numpy as np

array = np.array([3, 6, 7, 2, 5, 1, 8])
reversedArray = np.flipud(array)
print(reversedArray)
```

Output:

```
[8 1 5 2 7 6 3]
```

How to multiply two matrices in a single line using NumPy?

The problem statement is given two matrices and one has to multiply those two matrices in a single line using NumPy.

> Using numpy.dot( )

```
import numpy as np

matrix1 = [
```

```
    [3, 4, 2],
    [5, 1, 8],
    [3, 1, 9]
]

matrix2 = [
    [3, 7, 5],
    [2, 9, 8],
    [1, 5, 8]
]

result = np.dot(matrix1, matrix2)
print(result)
```

Output:

```
[[19 67 63]
[25 84 97]
[20 75 95]]
```

How to print the checkerboard pattern of nxn using NumPy?

The problem statement is given n, print the checkerboard pattern for a nxn matrix considering that 0 for black and 1 for white.

Solution:

```
import numpy as np

n = 8

# Create a nxn matrix filled with 0
```

```
matrix = np.zeros((n, n), dtype=int)

# fill 1 with alternate rows and column
matrix[::2, 1::2] = 1
matrix[1::2, ::2] = 1

# Print the checkerboard pattern
for i in range(n):
    for j in range(n):
        print(matrix[i][j], end=" ")
    print()
```

Output:

```
0 1 0 1 0 1 0 1
1 0 1 0 1 0 1 0
0 1 0 1 0 1 0 1
1 0 1 0 1 0 1 0
0 1 0 1 0 1 0 1
1 0 1 0 1 0 1 0
0 1 0 1 0 1 0 1
1 0 1 0 1 0 1 0
```


Amiya Rout

A tech blogger, data science enthusiast, and android developer. In leisure time love to read about cutting edge technology and share my knowledge with other geeks by writing an article on that topic.

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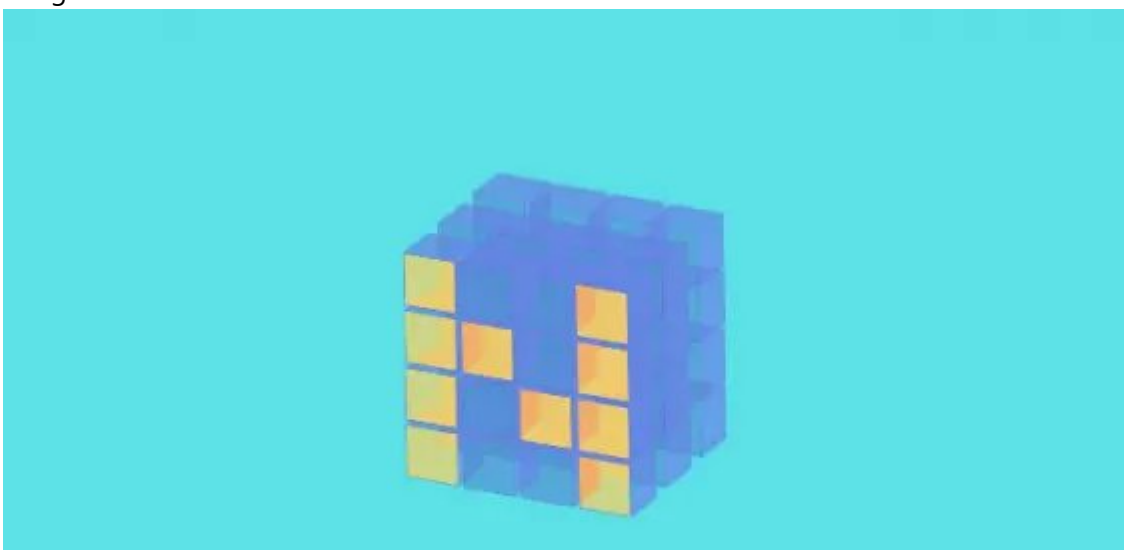

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