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NumPy Exercises, Practice, Solution

Ask

Last update on May 04 2023 14:28:41 (UTC/GMT +8 hours)

NumPy

NumPy is a Python package providing fast, flexible, and expressive data structures designed to make working with 'relationa' or 'labeled' data both easy and intuitive. It aims to be the fundamental high-level building block for doing practical, real world data analysis in Python.

The best way we learn anything is by practice and exercise questions. Here you have the opportunity to practice the NumPy concepts by solving the exercises starting from basic to more complex exercises. A sample solution is provided for each exercise. It is recommended to do these exercises by yourself first before checking the solution.

Hope, these exercises help you to improve your NumPy coding skills. Currently, following sections are available, we are working hard to add more exercises .... Happy Coding!

List of NumPy Exercises:

- NumPy Basic [59 exercises with solution] (/python-exercises/numpy/basic/index.php)

- NumPy arrays [205 exercises with solution] (/python-exercises/numpy/index-array.php)
- NumPy Linear Algebra [19 exercises with solution] (/python-exercises/numpy/linear-algebra/index.php)
- NumPy Random [17 exercises with solution] (/python-exercises/numpy/python-numpy-random.php)
- NumPy Sorting and Searching [9 exercises with solution] (/python-exercises/numpy/python-numpy-sorting-and-searching.php)
- NumPy Mathematics [41 exercises with solution] (/python-exercises/numpy/python-numpy-math.php)
- NumPy Statistics [14 exercises with solution] (/python-exercises/numpy/python-numpy-stat.php)
- NumPy DateTime [7 exercises with solution] (/python-exercises/numpy/python-numpy-datetime.php)
- NumPy String [22 exercises with solution] (/python-exercises/numpy/python-numpy-string.php)
- Advanced NumPy [15 exercises with solution] (/python-exercises/numpy/index-advance.php)
- More to come

Python Project:

- Python Projects Numbers: [11 Projects with solution] (https://www.w3resource.com/projects/python/index.php)
- Python Web Programming: [12 Projects with solution] (https://www.w3resource.com/projects/python/web-programming/index.php)
- Python Projects: Novel Coronavirus (COVID-19) [14 Exercises with Solution] (https://www.w3resource.com/python-exercises/project/covid-19/index.php)
- More to come

NumPy Basics

Operator	Description

np.array([1,2,3])	1d array
np.array([(1,2,3),(4,5,6)])	2d array
np.arange(start,stop,step)	range array

Placeholders

Operator	Description
np.linspace(0,2,9)	Add evenly spaced values btw interval to array of length
np.zeros((1,2))	Create and array filled with zeros
np.ones((1,2))	Creates an array filled with ones
np.random.random((5,5))	Creates random array
np.empty((2,2))	Creates an empty array

Array

Syntax	Description
array.shape	Dimensions (Rows,Columns)
len(array)	Length of Array
array.ndim	Number of Array Dimensions
array.dtype	Data Type
array.astype(type)	Converts to Data Type
type(array)	Type of Array

Copying/Sorting

Operators	Description
np.copy(array)	Creates copy of array
other = array.copy()	Creates deep copy of array
array.sort()	Sorts an array

array.sort(axis=0)	Sorts axis of array

Array Manipulation

Adding or Removing Elements

Operator	Description
np.append(a,b)	Append items to array
np.insert(array, 1, 2, axis)	Insert items into array at axis 0 or 1
np.resize((2,4))	Resize array to shape(2,4)
np.delete(array,1,axis)	Deletes items from array

Combining Arrays

Operator	Description
np.concatenate((a,b),axis=0)	Concatenates 2 arrays, adds to end
np.vstack((a,b))	Stack array row-wise
np.hstack((a,b))	Stack array column wise

Splitting Arrays

Operator	Description
numpy.split()	Split an array into multiple sub-arrays.
np.array_split(array, 3)	Split an array in sub-arrays of (nearly) identical size
numpy.hsplit(array, 3)	Split the array horizontally at 3rd index

More

Operator	Description
other = ndarray.flatten()	Flattens a 2d array to 1d
array = np.transpose(other) array.T	Transpose array
inverse = np.linalg.inv(matrix)	Inverse of a given matrix

Mathematics

Operations

Operator	Description
np.add(x,y) x + y	Addition
np.substract(x,y) x - y	Subtraction
np.divide(x,y) x / y	Division
np.multiply(x,y) x @ y	Multiplication
np.sqrt(x)	Square Root
np.sin(x)	Element-wise sine
np.cos(x)	Element-wise cosine
np.log(x)	Element-wise natural log
np.dot(x,y)	Dot product
np.roots([1,0,-4])	Roots of a given polynomial coefficients

Comparison

Operator	Description
==	Equal
!=	Not equal
<	Smaller than
>	Greater than
<=	Smaller than or equal
>=	Greater than or equal
np.array_equal(x,y)	Array-wise comparison

Basic Statistics

Operator	Description
np.mean(array)	Mean
np.median(array)	Median
array.corrcoef()	Correlation Coefficient
np.std(array)	Standard Deviation

More

Operator	Description
array.sum()	Array-wise sum
array.min()	Array-wise minimum value
array.max(axis=0)	Maximum value of specified axis
array.cumsum(axis=0)	Cumulative sum of specified axis

Slicing and Subsetting

Operator	Description
array[i]	1d array at index i
array[i,j]	2d array at index[i][j]
array[i<4]	Boolean Indexing, see Tricks
array[0:3]	Select items of index 0, 1 and 2
array[0:2,1]	Select items of rows 0 and 1 at column 1
array[:1]	Select items of row 0 (equals array[0:1, :])
array[1:2, :]	Select items of row 1
[comment]: <> (	array[1,...]
array[: :-1]	Reverses array

[Want to contribute to Python Pandas exercises? Send your code (attached with a .zip file) to us at w3resource[at]yahoo[dot]com. Please avoid copyrighted materials.]

Test your Python skills with w3resource's quiz (https://www.w3resource.com/quizzes/python/index.php)

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Python: Tips of the Day

How do I get a substring of a string in Python?

```
>>> x = "Hello World!"
>>> x[2:]
'llo World!'
>>> x[:2]
'He'
>>> x[:-2]
'Hello Worl'
>>> x[-2:]
'd!'
>>> x[2:-2]
'llo Worl'
```

Python calls this concept "slicing" and it works on more than just strings. Take a look here for a comprehensive introduction.

Ref: https://bit.ly/2Y6Xxcl

Python: Quiz of the day

aashishpatankar1@gmail.com Switch accounts

Not shared

What will be the output of the following code? 1 point

```
import random
print(random.seed(5))
print(random.randint(1, 7))
```

- None, 5
- 5, None

What is the value of 2 ^ 4? 1 point

- 16
- 2
- 0.5
- 6

What will be the output of the following code? 1 point

```
nums = [3,28,0,4,3,73]
nums.pop(5)
print(nums)
```

- [3, 28, 0, 4, 3,73]
- [3, 28, 0, 4, 73]