NumPy

Introduction:

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NumPy Is a Python Third-Party Module to Deal with Arrays & Matrices

NumPy Stand for Numerical Python

NumPy Is Open Source

NumPy Has Many Mathematical Functions To Deal With This Elements
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Why NumPy?

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Consume Less Memory

Very Fast Compared to Python List

Easy To Use

Support Element Wise Operation

Elements Are Stored Contiguous
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Python Lists

Homogeneous => Can Contains the Same Type of Objects

Heterogeneous => Can Contains Different Types of Objects.
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The Items in The Array Have to Be of The Same Type

You Can Be Sure What's The Storage Size Needed for The Array
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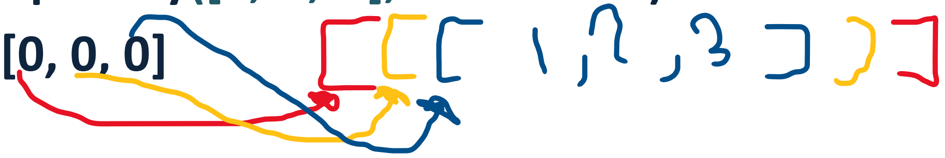
Methods:

- **The tybe of numpy arrays is {numpy.tybe}**
- **The tybe is chosen by the general tybe of all of the data in the array**
- **d = np.array([[[5, 6], [7, 9]], [[1, 3], [4, 8]]])**

d is a three a diminsional array u can figure this from the three square bracket if u want to access it :
d[1][1][1] => the first number is to express the first bracket and the second for the second one and so on
NOTICE: d[1, 1, 1] == d[1][1][1]

- If u want to know the number of dimensions u can use (ndim) => d.ndim
- If u want to change the dimension of an array u can use ndimn => np.array([1, 2, 3], ndmin = 3) and u can access it like (d) => [0, 0, 0]



- Unlike lists np.arrays have the same memory place
- U can use arange to make an array of a specified array
- Slicing is same as list but there is a little different as u are dealing with dimensional array u can slice it many times to get a specified numbers [2: , 1:5:2] (every slice is representing every dimension)

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• b = np.array([["A", "B", "X"], ["C", "D", "Y"], ["E", "F", "Z"],
                                    ["M", "N", "O"]])
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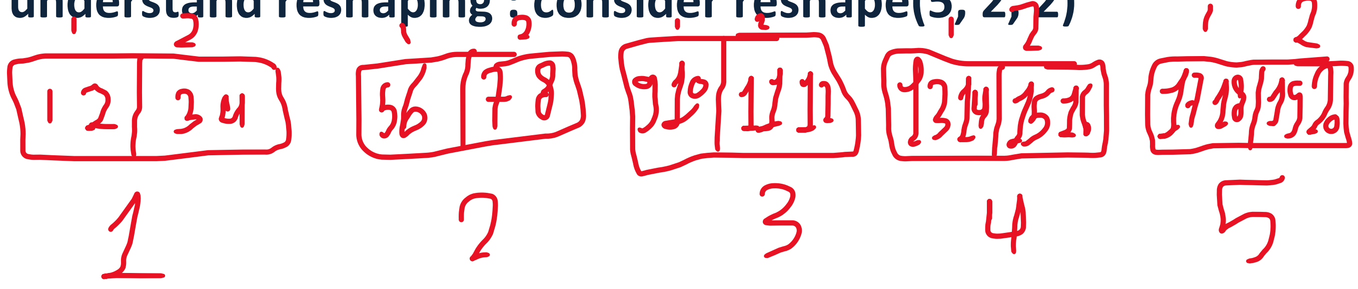
- print(b[2:, :2]) # [['E' 'F'] ['M' 'N']]
- print(b[2:, :2:2]) # [['E'] ['M']]
- print(b[2:, 0]) # ['E' 'M']
- data tybe : '?' boolean -- 'b' (signed) byte --'B' unsigned byte 'i' (signed) integer -- 'u' unsigned integer -- f' floating-point 'c' complex-floating point -- 'm' timedelta -- 'M' datetime

'O' (Python) objects-- 'S', 'a' zero-terminated bytes (not recommended) -- 'U' Unicode string -- 'V' raw data (void)

- np.array([1, 2, 3], dtype=float) # float Or 'float' Or 'f'
  to create an Array With Specific Data Type
- To change the tybe of an existing array we use (astybe)
- my_array7.astype('float')
- if we change it to boolean it will change every number into true except zero will change to false
- (my_array1 + my_array2) # to sum to arrays (u can also change + with – or / or *)
- my_array5.min() or max() or sum()
- my_array7.ravel() # to merge arrays into one dimension
- my_array4.reshape(3, 4) # to reshape an array into specified shape
- to understand reshaping : consider reshape(5, 2, 2)



- [[[1 2] [3 4]] [[5 6] [7 8]] [[9 10] [11 12]] [[13 14] [15 16]] [[17 18] [19 20]]]
- from here u can see the the first number 5 expresses the main five arrays inside each of them there is two arrays which is the express of the second number 2 inside them there is two numbers which is the express of the third number 2