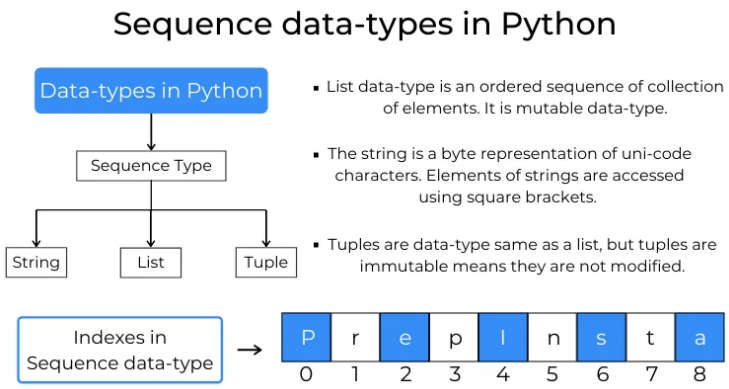
In Python programming, sequences are a generic term for an ordered set which means that the order in which we input the items will be the same when we access them.

Python supports six different types of sequences (Do not confuse with Python RegEx Special Sequences (w3schools.com)

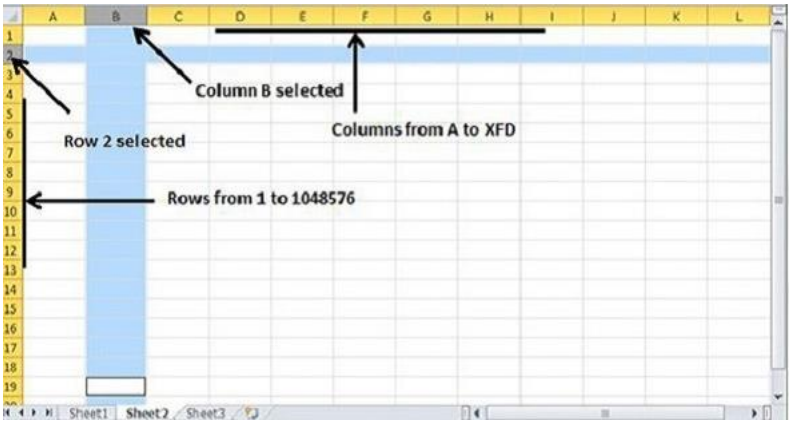
• Strings • Lists • Tuples	• Byte sequences • Byte arrays • Range objects



They store a finite collection of objects

Whose *ordering* matters (e.g. "cat" and "tac" should be considered *distinct* strings – no duplicates).

What corresponds to column or row?

1. Row runs horizontally while Column runs vertically.
2. Each row is identified by row number, which runs vertically at the left side of the sheet.
3. Each column is identified by column header, which runs horizontally at the top of the sheet.
4. 

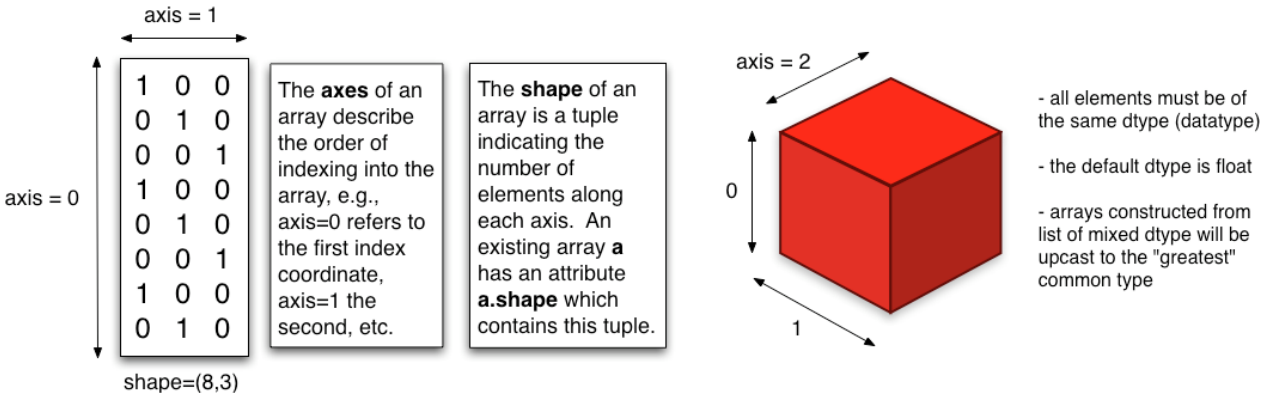
5. The number of rows and columns that a matrix has is called its dimension or its order. By convention, rows are listed first; and columns, second.
6. In a table;
    a. Columns are called fields
    b. Rows are called records.
7. An entity in DBMS (Database management System) is a real-world thing or a real-world object which is distinguishable from other objects in the real world.

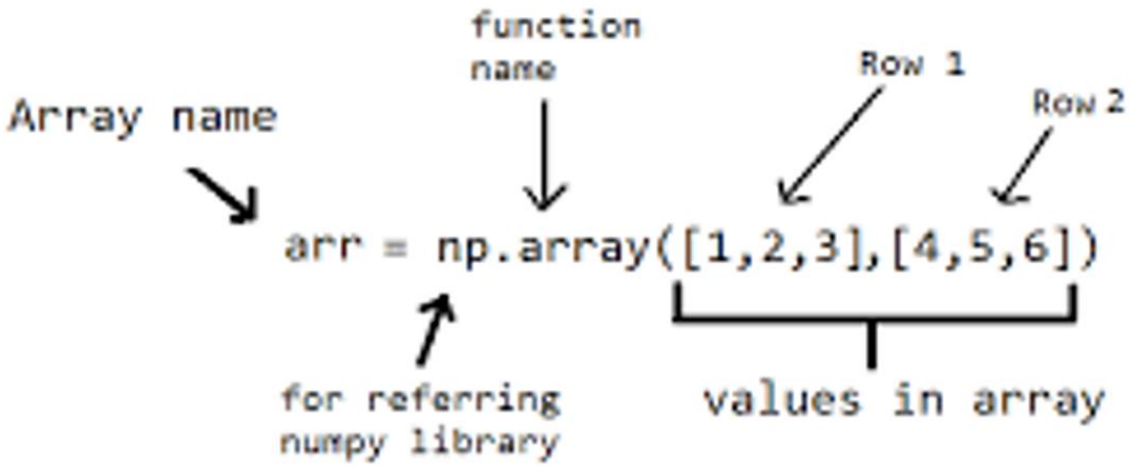
   a. Example; a car is an entity. (Table)
   b. An attribute of an entity gives us information about the characteristic features of an entity. (Row)
8. In OOP the car is an object (or a "class") (Table)
   a. Has properties like weight and color. (Row)
   b. Methods like start and stop.
9.

A multi-dimensional array is **an array with more than one level or dimension**. For example, a 2D array, or two-dimensional array, is an array of arrays, meaning it is a matrix of rows and columns (think of a table).

A 3D array adds another dimension, turning it into **an array of arrays of arrays**.

Anatomy of an array





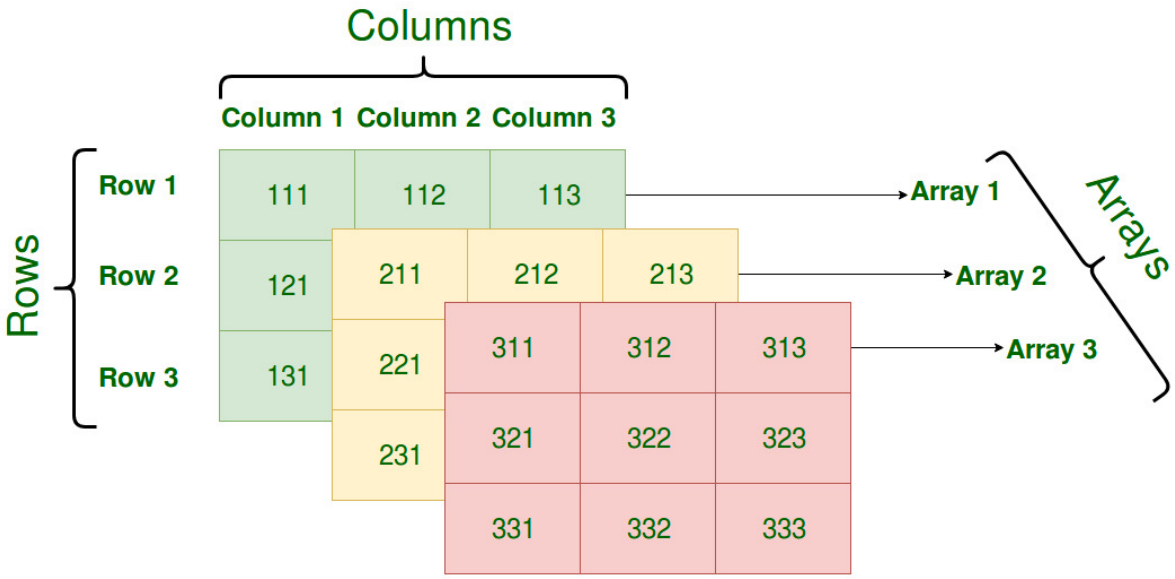
```
x represents the 2-D array:
[[1 2 3]
 [4 5 6]]
```

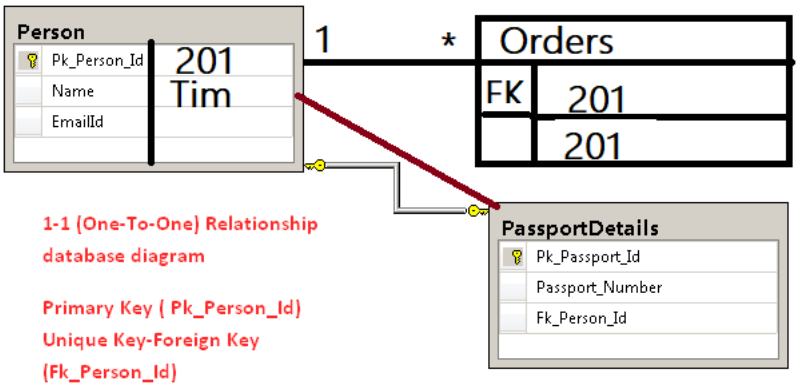
2 Dimensional Array

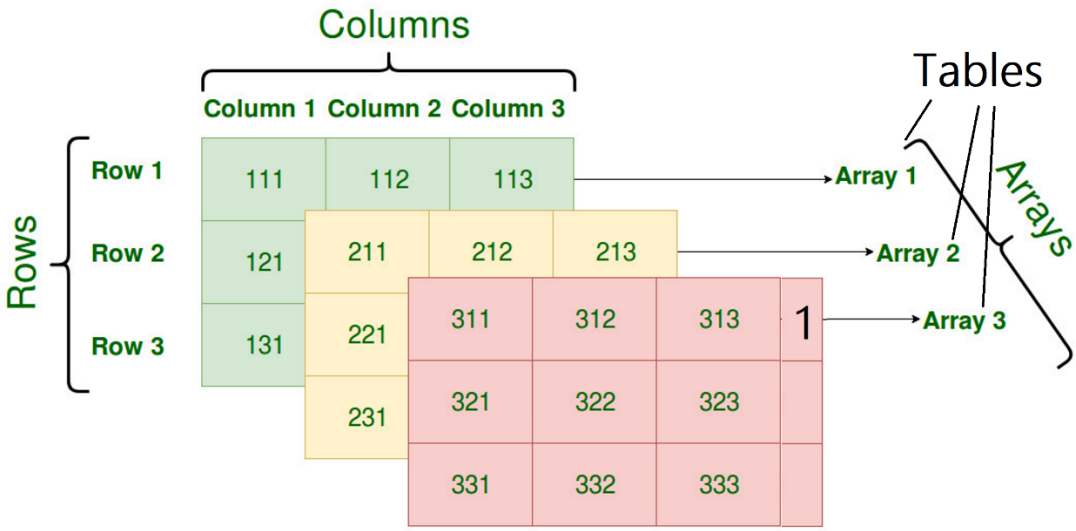
```
x represents the 2-D array:
[[ 7  8  9]
 [10 11 12]]
```

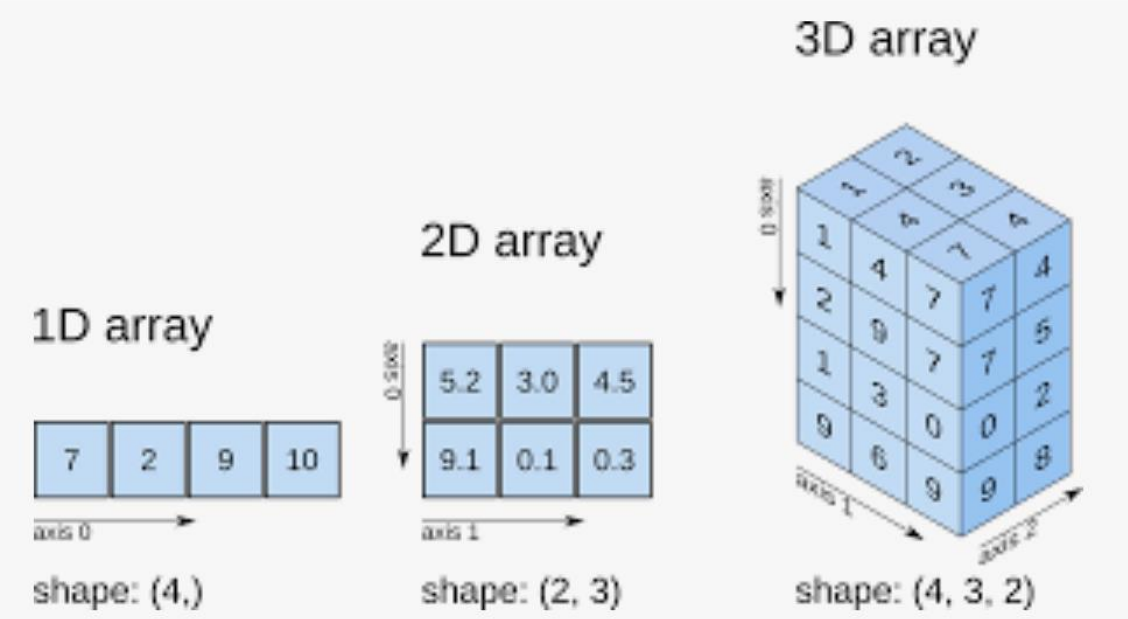
Note Two]] braces

```
import numpy as np

arr = np.array([[[1, 2, 3], [4, 5, 6]],

[[7, 8, 9], [10, 11, 12]]])

for x in arr:
  print("x represents the 2-D array:")
  print(x)
```

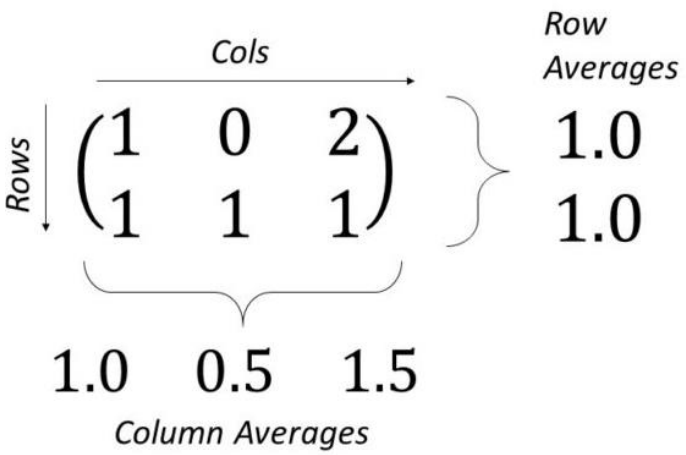



Person
Pk_Person_Id
Name
EmailId
201
Tim
1
*
Orders
FK
201
201
PassportDetails
Pk_Passport_Id
Passport_Number
Fk_Person_Id
1-1 (One-To-One) Relationship
database diagram
Primary Key (Pk_Person_Id)
Unique Key-Foreign Key
(Fk_Person_Id)

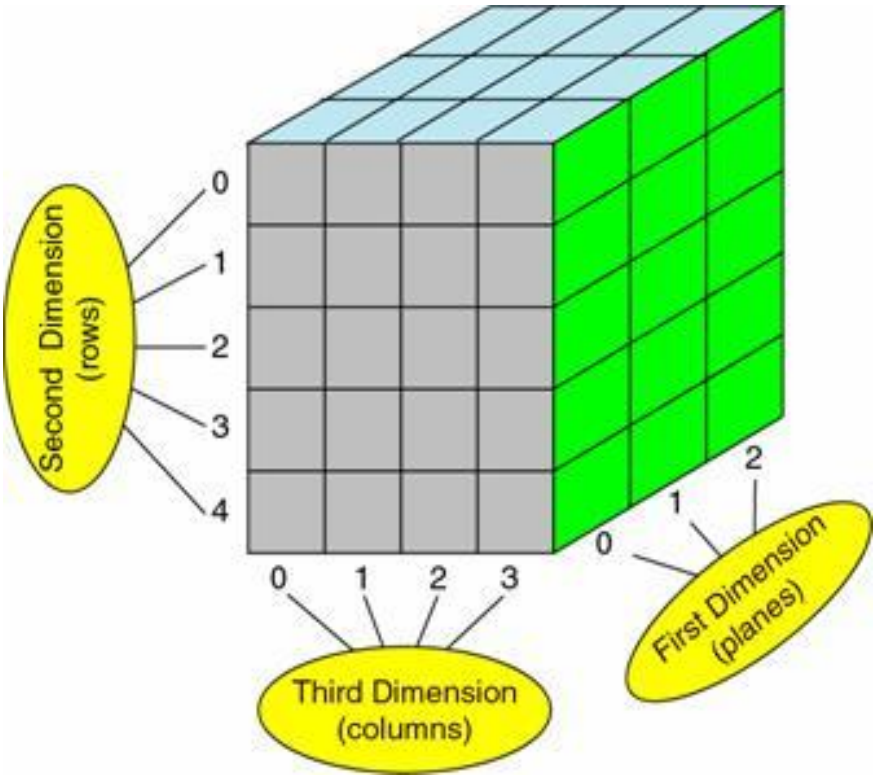

Columns
Column 1 Column 2 Column 3
Rows
Row 1
Row 2
Row 3
111
112
113
121
211
212
213
131
221
231
311
312
313
321
322
323
331
332
333
1
Tables
Array 1
Array 2
Array 3
Arrays


1D array
7
2
9
10
axis 0
shape: (4,)
2D array
axis 0
5.2
3.0
4.5
9.1
0.1
0.3
axis 1
shape: (2, 3)
3D array
axis 0
axis 1
axis 2
shape: (4, 3, 2)

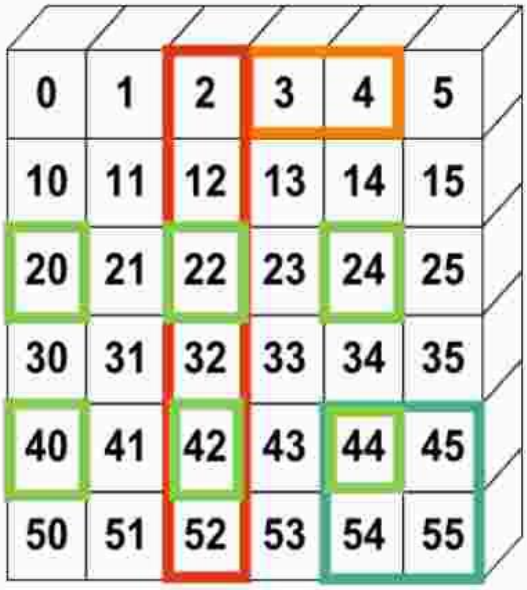
Average of 2D NumPy Array

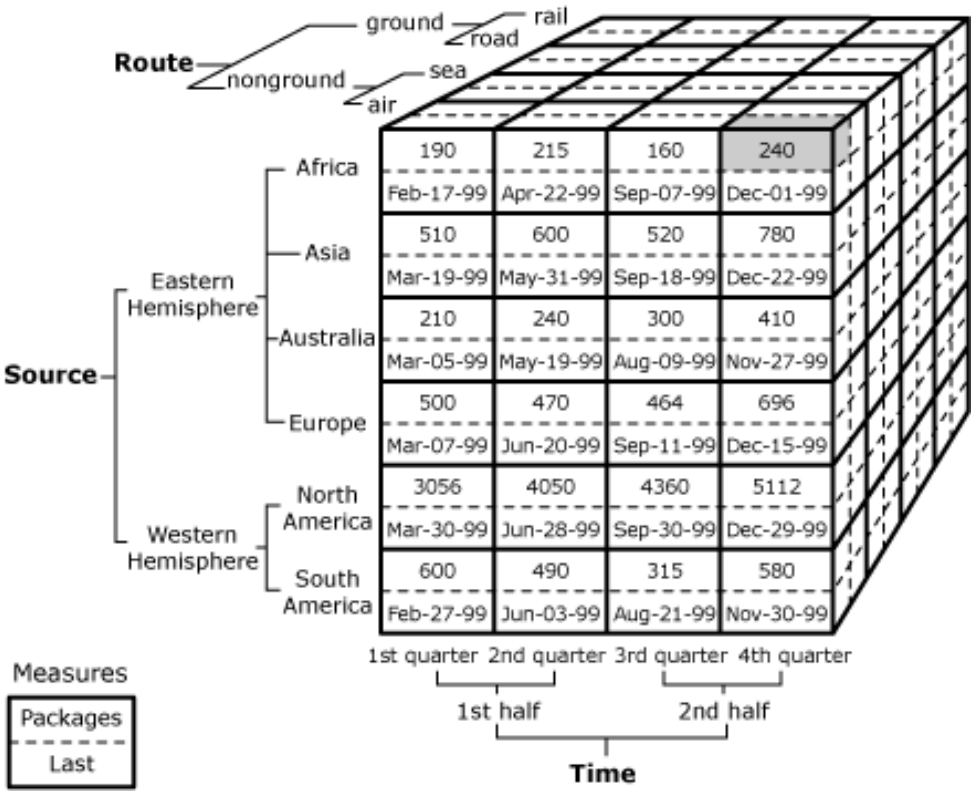



```
import numpy as np

matrix = [[1, 0, 2],
          [1, 1, 1]]

# Average of Flattened Array
print(np.average(matrix))
# 1.0

# Column Average
print(np.average(matrix, axis=0))
# [1.0 0.5 1.5]

# Row Average
print(np.average(matrix, axis=1))
# [1.0 1.0]
```



```
>>> a[0,3:5]
array([3,4])

>>> a[4:,4:]
array([[44, 45],
       [54, 55]])

>>> a[:,2]
array([2,12,22,32,42,52])

>>> a[2::2,::2]
array([[20,22,24]
       [40,42,44]])
```





Warehousing, Multi Dimensional Arrays,

content - data:

examine it by diffent (dimensions) - points of view..

View a Sales Report: numbers - (Fact Table) -

By: (dimensions) - points of view..

Date

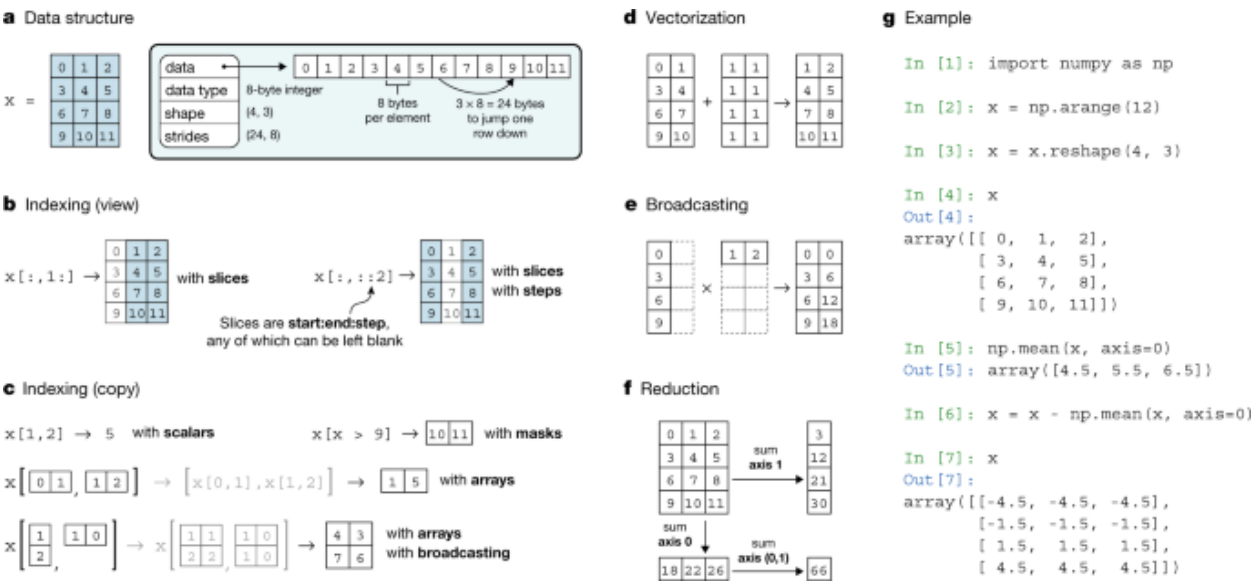
Time

Location

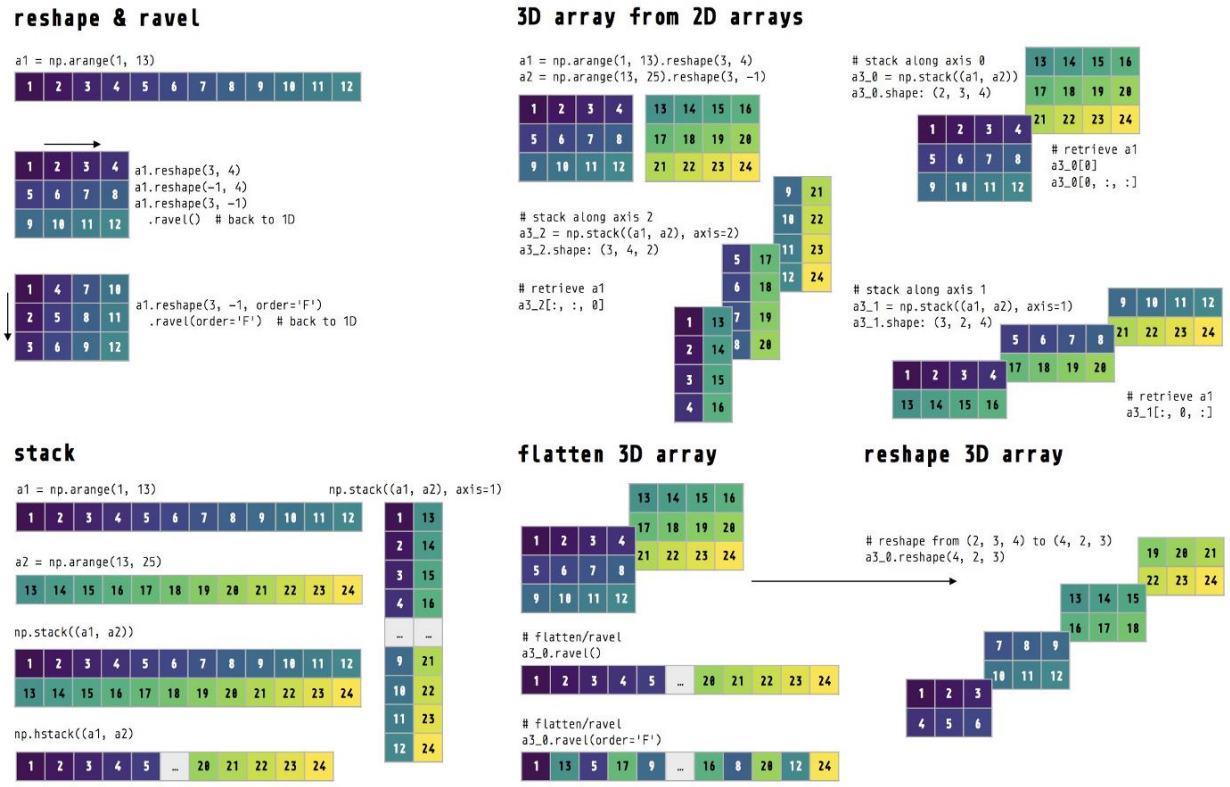
Product

By Purchaser

Drill down - show more details - filter by points of view..



Python numpy reshape and stack cheatsheet



References

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23. Space

Junk