Python Numpy Array Slicing

In [ ]:
```
import numpy as np
```

In [ ]:
```
mx = np.arange(1,101).reshape(10,10)
mx
```

Out[ ]:
```
array([[  1,  2,  3,  4,  5,  6,  7,  8,  9, 10],
       [ 11, 12, 13, 14, 15, 16, 17, 18, 19, 20],
       [ 21, 22, 23, 24, 25, 26, 27, 28, 29, 30],
       [ 31, 32, 33, 34, 35, 36, 37, 38, 39, 40],
       [ 41, 42, 43, 44, 45, 46, 47, 48, 49, 50],
       [ 51, 52, 53, 54, 55, 56, 57, 58, 59, 60],
       [ 61, 62, 63, 64, 65, 66, 67, 68, 69, 70],
       [ 71, 72, 73, 74, 75, 76, 77, 78, 79, 80],
       [ 81, 82, 83, 84, 85, 86, 87, 88, 89, 90],
       [ 91, 92, 93, 94, 95, 96, 97, 98, 99, 100]])
```

In [ ]:
```
## Access specific value from matrix using index
mx[0,0]
```

Out[ ]:
```
1
```

In [ ]:
```
## Dimension type
mx[0,0].ndim
```

Out[ ]:
```
0
```

In [ ]:
```
## Print specific row or column
mx[0]
```

Out[ ]:
```
array([ 1,  2,  3,  4,  5,  6,  7,  8,  9, 10])
```

In [ ]:
```
mx[:,0]
```

Out[ ]:
```
array([ 1, 11, 21, 31, 41, 51, 61, 71, 81, 91])
```

In [ ]:
```
mx[:,0:1]
```

Out[ ]:
```
array([[ 1],
       [11],
       [21],
       [31],
       [41],
       [51],
       [61],
       [71],
       [81],
       [91]])
```

In [ ]:
```
mx[:,0:1].ndim
```

Out[ ]:
```
2
```

In [ ]:
```
mx
```

Out[ ]:
```
array([[  1,  2,  3,  4,  5,  6,  7,  8,  9, 10],
       [ 11, 12, 13, 14, 15, 16, 17, 18, 19, 20],
       [ 21, 22, 23, 24, 25, 26, 27, 28, 29, 30],
       [ 31, 32, 33, 34, 35, 36, 37, 38, 39, 40],
       [ 41, 42, 43, 44, 45, 46, 47, 48, 49, 50],
       [ 51, 52, 53, 54, 55, 56, 57, 58, 59, 60],
       [ 61, 62, 63, 64, 65, 66, 67, 68, 69, 70],
       [ 71, 72, 73, 74, 75, 76, 77, 78, 79, 80],
       [ 81, 82, 83, 84, 85, 86, 87, 88, 89, 90],
       [ 91, 92, 93, 94, 95, 96, 97, 98, 99, 100]])
```

In [ ]:
```
mx[1,4:3,4]
```

Out[ ]:
```
array([[12, 13, 14],
       [22, 23, 24],
       [32, 33, 34]])
```

In [ ]:
```
mx[1,4:1,4].ndim
```

Out[ ]:
```
2
```

In [ ]:
```
mx[:,2:4]
```

Out[ ]:
```
array([[  3,  4],
       [ 13, 14],
       [ 23, 24],
       [ 33, 34],
       [ 43, 44],
       [ 53, 54],
       [ 63, 64],
       [ 73, 74],
       [ 83, 84],
       [ 93, 94]])
```

In [ ]:
```
## size in byte
mx.itemsize
```

Out[ ]:
```
4
```

In [ ]:
```
mx.dtype
```

Out[ ]:
```
dtype('int32')
```

Python Numpy Conctination and Split

In [ ]:
```
import numpy as np
```

In [ ]:
```
m_1 = np.arange(1,17).reshape(4,4)
m_2 = np.arange(17,33).reshape(4,4)
```

In [ ]:
```
print(m_1, m_2)
```

```
[[ 1  2  3  4]
 [ 5  6  7  8]
 [ 9 10 11 12]
 [13 14 15 16]] [[17 18 19 20]
 [21 22 23 24]
 [25 26 27 28]
 [29 30 31 32]]
```

In [ ]:
```
## conccination of list VS Array
list1=[2,4,6,8]
list2=[7,9,10]
list1 + list2
```

Out[ ]:
```
[2, 4, 6, 8, 7, 8, 9, 10]
```

In [ ]:
```
## See the Difference
m_1 + m_2
```

Out[ ]:
```
array([[18, 20, 22, 24],
       [26, 28, 30, 32],
       [34, 36, 38, 40],
       [42, 44, 46, 48]])
```

In [ ]:
```
np.concatenate((m_1, m_2))
```

Out[ ]:
```
array([[ 1,  2,  3,  4],
       [ 5,  6,  7,  8],
       [ 9, 10, 11, 12],
       [13, 14, 15, 16],
       [17, 18, 19, 20],
       [21, 22, 23, 24],
       [25, 26, 27, 28],
       [29, 30, 31, 32]])
```

In [ ]:
```
## Column vise Concat
np.concatenate((m_1,m_2), axis= 1 )
```

Out[ ]:
```
array([[ 1,  2,  3,  4, 17, 18, 19, 20],
       [ 5,  6,  7,  8, 21, 22, 23, 24],
       [ 9, 10, 11, 12, 25, 26, 27, 28],
       [13, 14, 15, 16, 29, 30, 31, 32]])
```

In [ ]:
```
## Row vise Concat or virtival concatenate
np.vstack((m_1,m_2))
```

Out[ ]:
```
array([[ 1,  2,  3,  4],
       [ 5,  6,  7,  8],
       [ 9, 10, 11, 12],
       [13, 14, 15, 16],
       [17, 18, 19, 20],
       [21, 22, 23, 24],
       [25, 26, 27, 28],
       [29, 30, 31, 32]])
```

In [ ]:
```
np.hstack((m_1,m_2))
```

Out[ ]:
```
array([[ 1,  2,  3,  4, 17, 18, 19, 20],
       [ 5,  6,  7,  8, 21, 22, 23, 24],
       [ 9, 10, 11, 12, 25, 26, 27, 28],
       [13, 14, 15, 16, 29, 30, 31, 32]])
```

In [ ]:
```
## Multiple array concatination
np.hstack((m_1,m_2,m_1))
```

Out[ ]:
```
array([[ 1,  2,  3,  4, 17, 18, 19, 20,  1,  2,  3,  4],
       [ 5,  6,  7,  8, 21, 22, 23, 24,  5,  6,  7,  8],
       [ 9, 10, 11, 12, 25, 26, 27, 28,  9, 10, 11, 12],
       [13, 14, 15, 16, 29, 30, 31, 32, 13, 14, 15, 16]])
```

Split Array

In [ ]:
```
np.split(m_1,2)
#see difference
```

Out[ ]:
```
[array([[1, 2, 3, 4],
        [5, 6, 7, 8]]),
 array([[ 9, 10, 11, 12],
        [13, 14, 15, 16]])]
```

In [ ]:
```
## Original Array
m_1
```

Out[ ]:
```
array([[ 1,  2,  3,  4],
       [ 5,  6,  7,  8],
       [ 9, 10, 11, 12],
       [13, 14, 15, 16]])
```

In [ ]:
```
list1 = np.split(m_1,2)
type(list1)
```

Out[ ]:
```
list
```

In [ ]:
```
list1[0]
```

Out[ ]:
```
array([[1, 2, 3, 4],
       [5, 6, 7, 8]])
```

In [ ]:
```
type(list1[0])
```

Out[ ]:
```
numpy.ndarray
```

In [ ]:
```
m_1
```

Out[ ]:
```
array([[ 1,  2,  3,  4],
       [ 5,  6,  7,  8],
       [ 9, 10, 11, 12],
       [13, 14, 15, 16]])
```

In [ ]:
```
## Column vise Split
np.split(m_1, 3, axis= 1)
```

Out[ ]:
```
[array([[ 1,  2],
        [ 5,  6],
        [ 9, 10],
        [13, 14]]),
 array([[ 3,  4],
        [ 7,  8],
        [11, 12],
        [15, 16]])]
```

In [ ]:
```
d1 = np.array([1,2,2,4,4])
```

In [ ]:
```
## [:,3] DESCRIBE ABOUT PICK VALUE FOR ARRAY 1 BEFORE 1ST INDEX & AFTER THAT PICK VALUE BEFORE 3 INDEX
np.split(d1,[1,3])
```

Out[ ]:
```
[array([1]), array([2, 2]), array([4, 4])]
```

In [ ]:
```
import numpy as np
```

In [ ]:
```
a=np.arange(1,101)
a
```

Out[ ]:
```
array([  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13,
        14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26,
        27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39,
        40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52,
        53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65,
        66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78,
        79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91,
        92, 93, 94, 95, 96, 97, 98, 99, 100])
```

In [ ]:
```
a=a.reshape(10,10)
```

In [ ]:
```
a.ndim
```

Out[ ]:
```
2
```

In [ ]:
```
a
```

Out[ ]:
```
array([[  1,  2,  3,  4,  5,  6,  7,  8,  9, 10],
       [ 11, 12, 13, 14, 15, 16, 17, 18, 19, 20],
       [ 21, 22, 23, 24, 25, 26, 27, 28, 29, 30],
       [ 31, 32, 33, 34, 35, 36, 37, 38, 39, 40],
       [ 41, 42, 43, 44, 45, 46, 47, 48, 49, 50],
       [ 51, 52, 53, 54, 55, 56, 57, 58, 59, 60],
       [ 61, 62, 63, 64, 65, 66, 67, 68, 69, 70],
       [ 71, 72, 73, 74, 75, 76, 77, 78, 79, 80],
       [ 81, 82, 83, 84, 85, 86, 87, 88, 89, 90],
       [ 91, 92, 93, 94, 95, 96, 97, 98, 99, 100]])
```

In [ ]:
```
## b=np.array(a[1:4,1:4])
# b
```

In [ ]:
```
b=a[1:4,1:4]
b
```

Out[ ]:
```
array([[12, 13, 14],
       [22, 23, 24],
       [32, 33, 34]])
```

In [ ]:
```
c=b*5
c
```

Out[ ]:
```
array([[ 60,  65,  70],
       [110, 115, 120],
       [160, 165, 170]])
```

In [ ]:
```
a
```

Out[ ]:
```
array([[ 575,  600],
       [ 825, 4250]])
```

In [ ]:
```
a[1:4,1:4]=a[1:4,1:4]*5
a
```

Out[ ]:
```
array([[  1,  2,  3,  4,  5,  6,  7,  8,  9, 10],
       [ 11,  60,  65,  70,  15,  16,  17,  18,  19,  20],
       [ 21, 110, 115, 120,  25,  26,  27,  28,  29,  30],
       [ 31, 160, 165, 170,  35,  36,  37,  38,  39,  40],
       [ 41,  42,  43,  44,  45,  46,  47,  48,  49,  50],
       [ 51,  52,  53,  54,  55,  56,  57,  58,  59,  60],
       [ 61,  62,  63,  64,  65,  66,  67,  68,  69,  70],
       [ 71,  72,  73,  74,  75,  76,  77,  78,  79,  80],
       [ 81,  82,  83,  84,  85,  86,  87,  88,  89,  90],
       [ 91,  92,  93,  94,  95,  96,  97,  98,  99, 100]])
```

In [ ]:
```
a[1:4,1:4]=0
b=a.mean()
b
```

Out[ ]:
```
49.43
```

In [ ]:
```
a[1:4,1:4]=b
a
```

Out[ ]:
```
array([[  1,  2,  3,  4,  5,  6,  7,  8,  9, 10],
       [ 11,  49,  49,  49,  15,  16,  17,  18,  19,  20],
       [ 21,  49,  49,  49,  25,  26,  27,  28,  29,  30],
       [ 31,  49,  49,  49,  35,  36,  37,  38,  39,  40],
       [ 41,  42,  43,  44,  45,  46,  47,  48,  49,  50],
       [ 51,  52,  53,  54,  55,  56,  57,  58,  59,  60],
       [ 61,  62,  63,  64,  65,  66,  67,  68,  69,  70],
       [ 71,  72,  73,  74,  75,  76,  77,  78,  79,  80],
       [ 81,  82,  83,  84,  85,  86,  87,  88,  89,  90],
       [ 91,  92,  93,  94,  95,  96,  97,  98,  99, 100]])
```

In [ ]:
```
a.max()
```

Out[ ]:
```
100
```

In [ ]:
```
a.min()
```

Out[ ]:
```
1
```

In [ ]:
```
a.put
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
C:\Users\MN295-5.TAN\AppData\Local\Temp/ipykernel_2620/3378500945.py in <module>
----> 1 a.put

NameError: name 'a' is not defined
```

In [ ]:
```

```