In [6]:
```
import numpy as np
import sys
```

In [5]:
```
random.rand(3,2)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[5], line 1
----> 1 random.rand(3,2)

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

In [7]:
```
np.random.rand(3,2)
```

Out[7]:
```
array([[0.76784242, 0.85778839],
       [0.39580662, 0.98381011],
       [0.9398948 , 0.73064399]])
```

In [12]:
```
np.random.rand(3)
```

Out[12]:
```
array([0.96984504, 0.06463451, 0.75044966])
```

In [14]:
```
np.random.rand(2,5)
```

Out[14]:
```
array([[0.64987463, 0.9723779 , 0.66574739, 0.73859926, 0.38793415],
       [0.90873871, 0.67462959, 0.45099515, 0.14118046, 0.81908214]])
```

In [15]:
```
np.random.rand(2,5)[0]
```

Out[15]:
```
array([0.83384052, 0.54242005, 0.78119129, 0.71039408, 0.92701563])
```

In [21]:
```
np.random.randint(70024)
```

Out[21]:
```
22802
```

In [22]:
```
np.random.randint(25)
```

Out[22]:
```
20
```

In [24]:
```
np.random.randint(2,5)
```

Out[24]:
```
3
```

In [26]:
```
np.random.randint(2,5,90)
```

Out[26]:
```
array([3, 4, 3, 2, 2, 4, 4, 4, 4, 4, 2, 4, 3, 3, 2, 3, 2, 2, 4, 3, 2, 3,
       2, 2, 2, 3, 2, 2, 2, 3, 3, 4, 4, 3, 2, 4, 4, 2, 2, 2, 3, 4, 2, 4,
       4, 2, 4, 3, 4, 4, 3, 2, 3, 2, 2, 3, 2, 3, 2, 2, 3, 2, 2, 3, 4, 4,
       2, 3, 4, 2, 4, 3, 2, 4, 2, 3, 4, 3, 3, 3, 3, 3, 2, 3, 2, 2, 2, 3,
       4, 3])
```

In [27]:
```
np.random.randint(-2,5,46)
```

Out[27]:
```
array([-1,  3,  2, -2,  3,  2,  3,  2, -2, -1, -1,  0,  2, -1,  1, -1, -2,
        2,  0,  1,  4, -2, -2,  0,  1,  2, -1,  3,  4,  1, -1,  2, -1,  3,
        2, -1, -1,  3, -1, -2,  2,  1,  2,  3,  1, -1])
```

In [29]:
```
np.random.randint(2,50,(10,4))
```

Out[29]:
```
array([[ 5, 22, 29, 26],
       [36, 32, 35, 27],
       [ 3, 47, 33, 45],
       [ 5, 29, 29,  9],
       [11, 47, 23, 18],
       [ 7, 42, 47, 34],
       [27,  4, 13, 14],
       [33,  8, 31,  8],
       [39, 25, 36, 13],
       [47, 20, 26, 27]])
```

In [30]:
```
# this creates a array with 10 rows and 4 colomn and with the values from 2 and
np.random.randint(2,50,(10,4))
```

Out[30]:
```
array([[44, 29, 37, 17],
       [11, 36,  2, 14],
       [43, 23,  4, 14],
       [38,  9, 14, 35],
       [19, 37, 19, 16],
       [41, 35, 29, 27],
       [34,  8, 32, 27],
       [15, 13, 40, 25],
       [46, 33, 17, 25],
       [38, 42, 49, 23]])
```

In [31]:
```
matr=np.random.randint(2,50,(10,4))
matr
```

Out[31]:
```
array([[ 2,  7,  9, 26],
       [22, 24, 16, 24],
       [25, 29, 11, 13],
       [25, 49,  9, 44],
       [18, 19, 19, 28],
       [49,  2, 48,  7],
       [ 6, 14, 20, 10],
       [32, 49, 41, 48],
       [39, 46,  4, 49],
       [28, 39,  5,  7]])
```

In [37]:
```
#slicing
my_list=[20,14,627,38,4,50]
arr=np.array(my_list)
arr
```

Out[37]:
```
array([ 20,  14, 627,  38,   4,  50])
```

In [38]:
```
arr.reshape(2,3)
```

Out[38]:
```
array([[ 20,  14, 627],
       [ 38,   4,  50]])
```

In [39]:
```
arr.reshape(1,6)
```

Out[39]:
```
array([[ 20,  14, 627,  38,   4,  50]])
```

In [43]:
```
arr.reshape(6,1)
```

Out[43]:
```
array([[ 20],
       [ 14],
       [627],
       [ 38],
       [  4],
       [ 50]])
```

In [45]:
```
h=np.random.randint(10,40,(5,4))
h
```

Out[45]:
```
array([[12, 27, 29, 34],
       [13, 32, 13, 37],
       [10, 37, 38, 12],
       [35, 21, 14, 24],
       [15, 12, 18, 36]])
```

In [46]:
```
type(h)
```

Out[46]:
```
numpy.ndarray
```

In [48]:
```
h[:]
```

Out[48]:
```
array([[12, 27, 29, 34],
       [13, 32, 13, 37],
       [10, 37, 38, 12],
       [35, 21, 14, 24],
       [15, 12, 18, 36]])
```

In [49]:
```
h[:2]
```

Out[49]:
```
array([[12, 27, 29, 34],
       [13, 32, 13, 37]])
```

In [50]:
```
h[1:4]
```

Out[50]:
```
array([[13, 32, 13, 37],
       [10, 37, 38, 12],
       [35, 21, 14, 24]])
```

In [51]:
```
h[-1:]
```

Out[51]:
```
array([[15, 12, 18, 36]])
```

In [52]:
```
h[:-1]
```

Out[52]:
```
array([[12, 27, 29, 34],
       [13, 32, 13, 37],
       [10, 37, 38, 12],
       [35, 21, 14, 24]])
```

In [53]:
```
h[:-2]
```

Out[53]:
```
array([[12, 27, 29, 34],
       [13, 32, 13, 37],
       [10, 37, 38, 12]])
```

In [54]:
```
h
```

Out[54]:
```
array([[12, 27, 29, 34],
       [13, 32, 13, 37],
       [10, 37, 38, 12],
       [35, 21, 14, 24],
       [15, 12, 18, 36]])
```

In [58]:
```
h[3,3]
```

Out[58]:
```
24
```

In [59]:
```
h[1,0]
```

Out[59]:
```
13
```

In [60]:
```
h
```

Out[60]:
```
array([[12, 27, 29, 34],
       [13, 32, 13, 37],
       [10, 37, 38, 12],
       [35, 21, 14, 24],
       [15, 12, 18, 36]])
```

In [61]:
```
h[1,-1]
```

Out[61]:
```
37
```

In [62]:
```
#numpy operations
arr
```

Out[62]:
```
array([ 20,  14, 627,  38,   4,  50])
```

In [63]:
```
arr.max()
```

Out[63]:
```
627
```

In [64]:
```
arr.min()
```

Out[64]:
```
4
```

In [67]:
```
from numpy import *
c=median(arr)
c
```

Out[67]:
```
29.0
```

In [70]:
```
arr[:3]
```

Out[70]:
```
array([ 20,  14, 627])
```

In [72]:
```
mat=np.arange(0,50).reshape(10,5)
mat
```

Out[72]:
```
array([[ 0,  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]])
```

In [76]:
```
row=4
col=3
```

In [77]:
```
col
```

Out[77]:
```
3
```

In [78]:
```
mat[row,col]
```

Out[78]:
```
23
```

In [79]:
```
mat[6,4]
```

Out[79]:
```
34
```

In [85]:
```
mat[:,col]
```

Out[85]:
```
array([ 3,  8, 13, 18, 23, 28, 33, 38, 43, 48])
```

In [87]:
```
mat[row,:]
```

Out[87]:
```
array([20, 21, 22, 23, 24])
```

In [88]:
```
mat[:,row]
```

Out[88]:
```
array([ 4,  9, 14, 19, 24, 29, 34, 39, 44, 49])
```

In [89]:
```
mat[:,2]
```

Out[89]:
```
array([ 2,  7, 12, 17, 22, 27, 32, 37, 42, 47])
```

In [90]:
```
mat[2,:]
```

Out[90]:
```
array([10, 11, 12, 13, 14])
```

In [91]:
```
# to print a specific row and column matrix from a big matrix
mat[::-1]
```

Out[91]:
```
array([[45, 46, 47, 48, 49],
       [40, 41, 42, 43, 44],
       [35, 36, 37, 38, 39],
       [30, 31, 32, 33, 34],
       [25, 26, 27, 28, 29],
       [20, 21, 22, 23, 24],
       [15, 16, 17, 18, 19],
       [10, 11, 12, 13, 14],
       [ 5,  6,  7,  8,  9],
       [ 0,  1,  2,  3,  4]])
```

In [92]:
```
mat[::-2]
```

Out[92]:
```
array([[45, 46, 47, 48, 49],
       [35, 36, 37, 38, 39],
       [25, 26, 27, 28, 29],
       [15, 16, 17, 18, 19],
       [ 5,  6,  7,  8,  9]])
```

In [93]:
```
mat[2:6,2:4]
```

Out[93]:
```
array([[12, 13],
       [17, 18],
       [22, 23],
       [27, 28]])
```

In [95]:
```
mat
```

Out[95]:
```
array([[ 0,  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]])
```

In [94]:
```
mat[1:2,2:4]# mat[row,column]
```

Out[94]:
```
array([[7, 8]])
```

In [96]:
```
mat[3:5,2:4]
```

Out[96]:
```
array([[17, 18],
       [22, 23]])
```

masking on filter

In [97]:
```
mat
```

Out[97]:
```
array([[ 0,  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]])
```

In [98]:
```
#to print that mat condition satisfy or not
mat>50
```

Out[98]:
```
array([[False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False]])
```

In [99]:
```
mat<4
```

Out[99]:
```
array([[ True,  True,  True,  True, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False],
       [False, False, False, False, False]])
```

In [100…
```
mat[mat<4]
```

Out[100…
```
array([0, 1, 2, 3])
```

In [101…
```
mat[mat>50]
```

Out[101…
```
array([], dtype=int32)
```

In [102…
```
mat[mat>7]
```

Out[102…
```
array([ 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])
```

In [103…
```
mat[mat>=7]
```

Out[103…
```
array([ 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])
```

In [104…
```
mat[mat!=7]
```

Out[104…

```
array([ 0,  1,  2,  3,  4,  5,  6,  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])
```

In [ ]: