```
1 import numpy as np
2 arr4=np.random.randint(0,100,(2,5,5))
3 arr4
```

```
array([[[34, 87,  1, 38, 53],
        [68, 65, 20, 89, 90],
        [ 9, 29, 78, 15, 72],
        [51, 44, 36, 83,  1],
        [12, 20, 18, 54, 40]],

       [[ 7, 94, 23, 53, 25],
        [58, 68, 79, 68, 56],
        [50, 47, 88, 77, 16],
        [42, 18, 28,  9, 99],
        [ 9, 94, 32, 93, 49]]])
```

```
1 arr5=arr4
2 arr5[0,0,1]=1997
3 arr5
```

```
array([[[  34, 1997,    1,   38,   53],
        [  68,   65,   20,   89,   90],
        [   9,   29,   78,   15,   72],
        [  51,   44,   36,   83,    1],
        [  12,   20,   18,   54,   40]],

       [[   7,   94,   23,   53,   25],
        [  58,   68,   79,   68,   56],
        [  50,   47,   88,   77,   16],
        [  42,   18,   28,    9,   99],
        [   9,   94,   32,   93,   49]]])
```

Saved successfully!   ✕

```
2 arr5
```

```
array([[[  34, 1997,    1,   38,   53],
        [  68,   65, 1976,   89,   90],
        [   9,   29,   78,   15,   72],
        [  51,   44,   36,   83,    1],
        [  12,   20,   18,   54,   40]],

       [[   7,   94,   23,   53,   25],
        [  58,   68,   79,   68,   56],
        [  50,   47,   88,   77,   16],
        [  42,   18,   28,    9,   99],
        [   9,   94,   32,   93,   49]]])
```

```
1 arr4 # note = updates original array also update
```

```
array([[[  34, 1997,    1,   38,   53],
        [  68,   65, 1976,   89,   90],
        [   9,   29,   78,   15,   72],
        [  51,   44,   36,   83,    1],
        [  12,   20,   18,   54,   40]],
```

```
            [[    7,    94,    23,    53,    25],
             [   58,    68,    79,    68,    56],
             [   50,    47,    88,    77,    16],
             [   42,    18,    28,     9,    99],
             [    9,    94,    32,    93,    49]]])
```

```
1 arr6=np.copy(arr4)
2 arr6
```

```
array([[[  34, 1997,    1,    38,    53],
        [   68,    65, 1976,    89,    90],
        [    9,    29,    78,    15,    72],
        [   51,    44,    36,    83,     1],
        [   12,    20,    18,    54,    40]],

       [[    7,    94,    23,    53,    25],
        [   58,    68,    79,    68,    56],
        [   50,    47,    88,    77,    16],
        [   42,    18,    28,     9,    99],
        [    9,    94,    32,    93,    49]]])
```

```
1 arr6[0,0,0] = 1961
2 arr6
```

```
array([[[1961, 1997,    1,    38,    53],
        [   68,    65, 1976,    89,    90],
        [    9,    29,    78,    15,    72],
        [   51,    44,    36,    83,     1],
        [   12,    20,    18,    54,    40]],

       [[    7,    94,    23,    53,    25],
        [   58,    68,    79,    68,    56],
        [   50,    47,    88,    77,    16],
        [   42,    18,    28,     9,    99],
        [    9,    94,    32,    93,    49]]])
```

Saved successfully!   ✕

```
1 arr4 #note arr4 not changes
```

```
array([[[  34, 1997,    1,    38,    53],
        [   68,    65, 1976,    89,    90],
        [    9,    29,    78,    15,    72],
        [   51,    44,    36,    83,     1],
        [   12,    20,    18,    54,    40]],

       [[    7,    94,    23,    53,    25],
        [   58,    68,    79,    68,    56],
        [   50,    47,    88,    77,    16],
        [   42,    18,    28,     9,    99],
        [    9,    94,    32,    93,    49]]])
```

```
1 t1=(0,1,4)
2 print(t1,type(t1))
3 arr6[t1]
```

```
    (0, 1, 4) <class 'tuple'>
```

```
    90
```

```
1 l1=[0,1,0]
2 l2=[[1],[2],[3]]
3 print(arr6[l1])
```

```
[[[1961 1997    1   38   53]
  [  68   65 1976   89   90]
  [   9   29   78   15   72]
  [  51   44   36   83    1]
  [  12   20   18   54   40]]

 [[   7   94   23   53   25]
  [  58   68   79   68   56]
  [  50   47   88   77   16]
  [  42   18   28    9   99]
  [   9   94   32   93   49]]

 [[1961 1997    1   38   53]
  [  68   65 1976   89   90]
  [   9   29   78   15   72]
  [  51   44   36   83    1]
  [  12   20   18   54   40]]]
```

```
1 print(arr6[l2])
```

```
[77]
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: FutureWarning: Using
  """Entry point for launching an IPython kernel.
```

◄ ▐▐▐▐▐▐▐▐   ►

```
1 ones = np.ones((3,3))
```

Saved successfully!   ✕

```
[[1. 1. 1.]
 [1. 1. 1.]
 [1. 1. 1.]]
[[3. 3. 3.]
 [3. 3. 3.]
 [3. 3. 3.]]
```

```
1 sum = ones+double #similarly -
2 sum
```

```
array([[4., 4., 4.],
       [4., 4., 4.],
       [4., 4., 4.]])
```

```
1 sum = ones*double #similarly /
2 sum
```

```
array([[3., 3., 3.],
       [3., 3., 3.],
```

```
            [3., 3., 3.]])
```

```
1 exp = np.exp(sum)
2 exp
```

```
    array([[20.08553692, 20.08553692, 20.08553692],
           [20.08553692, 20.08553692, 20.08553692],
           [20.08553692, 20.08553692, 20.08553692]])
```

```
1 sinsum = np.sin(sum)
2 sinsum
```

```
    array([[0.14112001, 0.14112001, 0.14112001],
           [0.14112001, 0.14112001, 0.14112001],
           [0.14112001, 0.14112001, 0.14112001]])
```

```
1 sum = sum +100
2 sum
```

```
    array([[103., 103., 103.],
           [103., 103., 103.],
           [103., 103., 103.]])
```

```
1 #broadcasting
2 a1=np.array([1,2,3,4,5])
3 a2=np.array([9,9])
4 a1+a2
```

```
    ---------------------------------------------------------------------------
    ValueError                                Traceback (most recent call last)
    <ipython-input-36-39432b302aa5> in <module>()
```
Saved successfully!   ✕
```
    ----> 3 a1+a2

    ValueError: operands could not be broadcast together with shapes (5,) (2,)
```

    SEARCH STACK OVERFLOW

```
1 a1=np.array([[1,2,3,4,5],[1,2,3,4,5],[1,2,3,4,5]])
2 a2=np.array([9,9,9,9,9])
3 a1+a2
```

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

```
1 a1=np.array([[1,2,3,4,5],[1,2,3,4,5],[1,2,3,4,5]])
2 a2=np.array([9,9,9,9,9]+[9,9,9,9,9])
3 a1+a2
```

```
      ----------------------------------------------------------------------
      TypeError                                Traceback (most recent call last)
      <ipython-input-42-4c1659d5ccc8> in <module>()
            1 a1=np.array([[1,2,3,4,5],[1,2,3,4,5],[1,2,3,4,5]])
      ----> 2 a2=np.array([9,9,9,9,9]+0)
            3 a1+a2

      TypeError: can only concatenate list (not "int") to list
```

```
1 a1=np.array([[1,2,3,4,5],[1,2,3,4,5]])
2 a2=np.array([9,9])
3 a1+a2
```

```
      ----------------------------------------------------------------------
      ValueError                               Traceback (most recent call last)
      <ipython-input-43-c15d830cc24c> in <module>()
            1 a1=np.array([[1,2,3,4,5],[1,2,3,4,5]])
            2 a2=np.array([9,9])
      ----> 3 a1+a2

      ValueError: operands could not be broadcast together with shapes (2,5) (2,)
```

SEARCH STACK OVERFLOW

```
1 a1=np.array([[1,2,3,4,5],[1,2,3,4,5]])
2 a2=np.array([1]) # it treats like[[1,1,1,1,1],[1,1,1,1,1]]
3 a1+a2
```

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

Saved successfully!   ✕   ats like[[1,1,1,1,1],[1,1,1,1,1]]

```
3 a1+a2
4 # in all possible atleast one dimension match , or if each dimension 000
```

```
      array([ 2,  4,  6,  8, 10])
```

```
1 a1=np.arange(4)
2 a1
```

```
      array([0, 1, 2, 3])
```

```
1   a2=np.reshape(a2,4)
2   a2
```

```
      array([0, 1, 2, 3])
```

```
1   arr1=np.array([[1,2,3],[4,5,6],[7,8,9]])
2   arr2=np.array([1,2,3])
3   #022
4   #002
5   print(arr1,arr2)
```

```
6   arr3=arr1+arr2
7   print(arr3)
```

```
[[1 2 3]
 [4 5 6]
 [7 8 9]] [1 2 3]
[[ 2  4  6]
 [ 5  7  9]
 [ 8 10 12]]
```

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Saved successfully!

[[1 2 3]
 [4 5 6]
 [7 8 9]] [1 2 3]
[[2 4 6]
 [5 7 9]
 [8 10 12]]