In [ ]:

```
# Arithmatic operation in Numpy
# 1. Using Scaler
# 2. Array(Arithmatic Opeartions)
```

In [2]:

```
import numpy as np
```

In [4]:

```
a = np.arange(1,5)
a
```

Out[4]:

```
array([1, 2, 3, 4])
```

In [5]:

```
a+2
```

Out[5]:

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

In [6]:

```
a
```

Out[6]:

```
array([1, 2, 3, 4])
```

In [7]:

```
a*3
```

Out[7]:

```
array([ 3,  6,  9, 12])
```

In [8]:

```
a
```

Out[8]:

```
array([1, 2, 3, 4])
```

In [9]:

```
a/2
```

Out[9]:

```
array([0.5, 1. , 1.5, 2. ])
```

In [10]:

```
a-1
```

Out[10]:

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

In [11]:

```
a**2
```

Out[11]:

```
array([ 1,  4,  9, 16], dtype=int32)
```

In [ ]:

```

```

In [12]:

```
# 2d
b = np.array([
         [1,2],[3,4]
])
b
```

Out[12]:

```
array([[1, 2],
       [3, 4]])
```

In [13]:

```
b+2
```

Out[13]:

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

In [14]:

```
b
```

Out[14]:

```
array([[1, 2],
       [3, 4]])
```

In [15]:

```
b*2
```

Out[15]:

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

In [ ]:

```
```

In [16]:

```
# 2arrays addition
a = np.arange(1,5)
b = np.array([10,20,30,40])
```

In [17]:

```
a
```

Out[17]:

```
array([1, 2, 3, 4])
```

In [18]:

```
b
```

Out[18]:

```
array([10, 20, 30, 40])
```

In [19]:

```
a+b
```

Out[19]:

```
array([11, 22, 33, 44])
```

In [20]:

```
a*b
```

Out[20]:

```
array([ 10,  40,  90, 160])
```

In [ ]:

```
```

In [21]:

```
c = np.array([11,12,13,14,15])
c
```

Out[21]:

```
array([11, 12, 13, 14, 15])
```

In [22]:

```
a+c
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-22-e200917bc55f> in <module>
----> 1 a+c

ValueError: operands could not be broadcast together with shapes (4,) (5,)
```

In [ ]:

```

```

In [23]:

```
# 2array with 2D
a = np.array([[1,2,3],[4,5,6]])
b = np.array([[1,2,1],[2,1,1]])
```

In [24]:

```
a
```

Out[24]:

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

In [25]:

```
b
```

Out[25]:

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

In [26]:

```
a+b
```

Out[26]:

```
array([[2, 4, 4],
       [6, 6, 7]])
```

In [27]:

```
a*b
```

Out[27]:

```
array([[1, 4, 3],
       [8, 5, 6]])
```

In [28]:

```
a-b
```

Out[28]:

```
array([[0, 0, 2],
       [2, 4, 5]])
```

In [ ]:

```

```

In [29]:

```
a
```

Out[29]:

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

In [30]:

```
b
```

Out[30]:

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

In [31]:

```
np.add(a,b)
```

Out[31]:

```
array([[2, 4, 4],
       [6, 6, 7]])
```

In [32]:

```
np.subtract(a,b)
```

Out[32]:

```
array([[0, 0, 2],
       [2, 4, 5]])
```

In [33]:

```
np.power(a,b)
```

Out[33]:

```
array([[ 1,  4,  3],
       [16,  5,  6]], dtype=int32)
```

In [ ]:

```
```

In [ ]:

```
# Array in diff size and shape
# use broadcasting
```

In [34]:

```
a = np.array([10,20,30])
b = np.array([1,2,3,4])
```

In [35]:

```
a.shape
```

Out[35]:

```
(3,)
```

In [36]:

```
b.shape
```

Out[36]:

```
(4,)
```

In [37]:

```
a+b
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-37-ca730b97bf8a> in <module>
----> 1 a+b

ValueError: operands could not be broadcast together with shapes (3,) (4,)
```

In [ ]:

```
# broadcast rules

# 1. size of each dimensions should be same
# 2. size of one of the dimension should be one
```

In [38]:

```
a = np.array([
     [1,2],[3,4],[5,6]
])
a
```

Out[38]:

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

In [39]:

```
b = np.array([1,2,3])
b
```

Out[39]:

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

In [40]:

```
c = np.array([11,12])
c
```

Out[40]:

```
array([11, 12])
```

In [41]:

```
a.shape
```

Out[41]:

```
(3, 2)
```

In [42]:

```
b.shape
```

Out[42]:

```
(3,)
```

In [43]:

```
c.shape
```

Out[43]:

```
(2,)
```

In [44]:

```
a+b
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-44-ca730b97bf8a> in <module>
----> 1 a+b

ValueError: operands could not be broadcast together with shapes (3,2) (3,)
```

In [45]:

```
a+c
```

Out[45]:

```
array([[12, 14],
       [14, 16],
       [16, 18]])
```

In [46]:

```
a
```

Out[46]:

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

In [47]:

```
c
```

Out[47]:

```
array([11, 12])
```

In [ ]:

```

```

In [60]:

```
# 2d array
a = np.array([[1],[2],[3]])
a
```

Out[60]:

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

In [61]:

```
b = np.array([[10,20],[30,40]])
b
```

Out[61]:

```
array([[10, 20],
       [30, 40]])
```

In [62]:

```
a+b
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-62-ca730b97bf8a> in <module>
----> 1 a+b

ValueError: operands could not be broadcast together with shapes (3,1) (2,2)
```

In [63]:

```
a
```

Out[63]:

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

In [64]:

```
c = np.array([1,2])
c
```

Out[64]:

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

In [65]:

```
c.shape
```

Out[65]:

```
(2,)
```

In [66]:

```
a.shape
```

Out[66]:

```
(3, 1)
```

In [67]:

```
a+c
```

Out[67]:

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

In [ ]:

```

```

In [68]:

```
# array
a = np.array([
    [1,2],[3,4],[5,6]
])
a
```

Out[68]:

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

In [69]:

```
a.shape
```

Out[69]:

```
(3, 2)
```

In [71]:

```
b = np.array([
    [10,11],[12,13]
])
b
```

Out[71]:

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

In [72]:

```
b.shape
```

Out[72]:

```
(2, 2)
```

In [73]:

```
a+b
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-73-ca730b97bf8a> in <module>
----> 1 a+b

ValueError: operands could not be broadcast together with shapes (3,2) (2,2)
```

In [ ]:

```
```