In [1]: ▶|
```python
import numpy as np
```

1

In [11]: ▶|
```python
a=np.array([1,2,3,4,5,6,7,8,9])
print(a)
b=a.reshape(3,3)
print(b)
```

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

2

In [9]: ▶|
```python
b=np.arange(5,14)
print(b)
x=b.reshape(3,3)
print(x)
```

```
[ 5  6  7  8  9 10 11 12 13]
[[ 5  6  7]
 [ 8  9 10]
 [11 12 13]]
```

3

In [3]: ▶|
```python
a = np.array([1, 2])
b = np.array([3, 4])
mul = a @ b

print(a)
print(b)
print(mul)
```

```
[1 2]
[3 4]
11
```

4

In [6]:

```python
a = np.array([[1, 2], [3, 4]])
b = np.array([[5, 6], [7, 8]])

row = a[0, :]
column = b[:, 0]

dot_product = np.dot(row,column)

print(a)
print(b)
print("row of a : ",row)
print("colomn of b : ",column)

print("Dot product of the first row of a and the first column of b:",dot_pr
```

```
[[1 2]
 [3 4]]
[[5 6]
 [7 8]]
row of a :  [1 2]
colomn of b :  [5 7]
Dot product of the first row of a and the first column of b: 19
19
```

5

In [14]:

```python
a=np.array([1,2,3,4,5,6,7,8,9,10])
b=np.sum(a)
print(b)
```

```
55
```

6

In [32]:

```python
b=np.array([1,2,3,4])
b=np.product(b)
print(b)
```

```
24
```

7

In [29]: ▶|
```python
c=np.array([1,2,3,4,5])
c=np.insert(c,2,0)
print(c)
```

[1 2 0 3 4 5]

8

In [31]: ▶|
```python
d=np.array([1,2,3,4,5])
d=np.delete(d,3)
print(d)
```

[1 2 3 5]

9

In [39]: ▶|
```python
e=np.array([[1,2,3,4],[5,6,7,8],[9,10,11,12]])
five_up=9e>5]
print(five_up)
```

[6 7 8 9 10 11 12]

10

In [12]: ▶|
```python
f=np.array([[1,2,3,4,5],
            [6,7,8,9,10],
            [11,12,13,14,15],
            [16,17,18,19,20]])
index=np.array([[0,0],
        [1,2],
        [2,4]])
x=f[index[:,0],index[:,1]]
print(x)
```

[1 8 15]

11

In [3]: ▶|
```python
a = 0.5 * np.eye(5)
print(a)
```

```
[[0.5 0.  0.  0.  0. ]
 [0.  0.5 0.  0.  0. ]
 [0.  0.  0.5 0.  0. ]
 [0.  0.  0.  0.5 0. ]
 [0.  0.  0.  0.  0.5]]
```

12

In [6]: ▶|
```python
b = np.random.randint(0, 11, size=(3, 3, 3))
print(b)
```

```
[[[ 2  1  1]
  [ 6  2  0]
  [ 0  4  0]]

 [[ 0  8  7]
  [ 3  9  8]
  [ 1  9 10]]

 [[ 5  3  8]
  [ 6  3  7]
  [ 5  5  2]]]
```

13

In [10]: ▶|
```python
b = np.random.randint(0, 11, size=(3, 3, 3))
row_means = np.mean(b, axis=2)
print(row_means)
```

```
[[5.33333333 4.33333333 7.33333333]
 [2.66666667 3.66666667 4.66666667]
 [5.33333333 5.66666667 3.        ]]
```

14

```python
a=np.array([[1,2,3,4],
            [5,6,7,8],
            [9,10,11,12]])

column_sd = np.std(a, axis=0)
print(column_sd)
```

```
[3.26598632 3.26598632 3.26598632 3.26598632]
```

15

In [26]:
```python
a=np.array([[1,2,3,4],
            [5,6,7,8],
            [9,10,11,12]])
b=np.dot(a,a.T)
print(b)
```

```
[[ 30  70 110]
 [ 70 174 278]
 [110 278 446]]
```

16

In [28]:
```python
c = np.eye(6)
c = np.roll(c, 1, axis=1)

print(c)
```

```
[[0. 1. 0. 0. 0. 0.]
 [0. 0. 1. 0. 0. 0.]
 [0. 0. 0. 1. 0. 0.]
 [0. 0. 0. 0. 1. 0.]
 [0. 0. 0. 0. 0. 1.]
 [1. 0. 0. 0. 0. 0.]]
```

17

```
In [38]:    d = np.eye(4)
            x= d / d.sum(axis=1,)

            print(x)
```

```
[[1. 0. 0. 0.]
 [0. 1. 0. 0.]
 [0. 0. 1. 0.]
 [0. 0. 0. 1.]]
```

18

```
In [40]:    e=np.array([[1,2,3],
                        [4,5,6],
                        [7,8,9]])
            e=np.flipud(e)
            print(e)
```

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

19

```
In [45]:    f=np.array([[1,2,0,3],
                        [5,4,6,7],
                        [8,9,10,4],
                        [2,6,4,8]])
            x=np.sort(f,axis=1)
            print(x)
```

```
[[ 0  1  2  3]
 [ 4  5  6  7]
 [ 4  8  9 10]
 [ 2  4  6  8]]
```

20

In [48]:

```python
g = np.eye(5)
x= np.linalg.inv(g)
print(g)
print(x)
```

```
[[1. 0. 0. 0. 0.]
 [0. 1. 0. 0. 0.]
 [0. 0. 1. 0. 0.]
 [0. 0. 0. 1. 0.]
 [0. 0. 0. 0. 1.]]
[[ 1.  0.  0.  0.  0.]
 [ 0.  1.  0.  0.  0.]
 [ 0.  0.  1.  0.  0.]
 [-0. -0. -0.  1. -0.]
 [ 0.  0.  0.  0.  1.]]
```