```
import numpy

arr = numpy.array([1, 2, 3, 4, 5])

print(arr)
```

```
[1 2 3 4 5]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5])

print(arr)
```

```
[1 2 3 4 5]
```

```
import numpy as np

print(np.__version__)
```

```
1.21.6
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5])

print(arr)

print(type(arr))
```

```
[1 2 3 4 5]
<class 'numpy.ndarray'>
```

```
import numpy as np

arr = np.array((1, 2, 3, 4, 5))

print(arr)
```

```
[1 2 3 4 5]
```

```
import numpy as np

arr = np.array(42)

print(arr)
```

```
42
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5])

print(arr)
```

```
[1 2 3 4 5]
```

```
import numpy as np

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

print(arr)
print(arr.ndim)
print(arr.shape)
```

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

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

print(arr[0:5,3])
```

```
[4 9]
```

```
import numpy as np

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

print(arr)
print(arr.ndim)
print(arr.shape)
```

```
[[[1 2 3]
  [4 5 6]]

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

```
import numpy as np

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

print(arr)
print(arr.ndim)
print(arr.shape)
```

```
[[[[1 2 3]
   [4 5 6]]

  [[1 2 3]
   [4 5 6]]]


 [[[1 2 3]
   [4 5 6]]

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

```
import numpy as np

arr = np.array([[[[[1, 2, 3], [4, 5, 6]], [[1, 2, 3], [4, 5, 6]]], [[[1, 2, 3], [4, 5, 6]], [[1, 2, 3], [4, 5, 6]]]],[[[[1,

print(arr)
print(arr.ndim)
print(arr.shape)
```

```
[[[[[1 2 3]
    [4 5 6]]

   [[1 2 3]
    [4 5 6]]]


  [[[1 2 3]
    [4 5 6]]

   [[1 2 3]
    [4 5 6]]]]



 [[[[1 2 3]
    [4 5 6]]

   [[1 2 3]
    [4 5 6]]]


  [[[1 2 3]
    [4 5 6]]

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

```
import numpy as np

a = np.array(42)
b = np.array([1, 2, 3, 4, 5])
c = np.array([[1, 2, 3], [4, 5, 6]])
d = np.array([[[1, 2, 3], [4, 5, 6]], [[1, 2, 3], [4, 5, 6]]])

print(a.ndim)
print(b.ndim)
print(c.ndim)
print(d.ndim)
```

```
0
1
2
3
```

```
import numpy as np

arr = np.array([1, 2, 3, 4])

print(arr[0])
```

```
1
```

```
import numpy as np

arr = np.array([1, 2, 3, 4])

print(arr[1])
```

```
2
```

```
import numpy as np

arr = np.array([1, 2, 3, 4])

print(arr[2] + arr[3])
```

```
7
```

```
import numpy as np

arr = np.array([[1,2,3,4,5], [6,7,8,9,10]])

print('2nd element on 1st row: ', arr[0, 1])
```

```
2nd element on 1st row:  2
```

```
import numpy as np

arr = np.array([[1,2,3,4,5], [6,7,8,9,10]])

print('5th element on 2nd row: ', arr[1, 4])
```

```
5th element on 2nd row:  10
```

```
import numpy as np

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

print(arr[0, 1, 2])
```

```
6
```

```
import numpy as np

arr = np.array([[1,2,3,4,5], [6,7,8,9,10]])

print('Last element from 2nd dim: ', arr[1, -1])
```

```
Last element from 2nd dim:  10
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5, 6, 7])

print(arr[1:5])
```

```
[2 3 4 5]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5, 6, 7])

print(arr[4:])
```

```
[5 6 7]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5, 6, 7])

print(arr[:4])
```

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

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5, 6, 7])

print(arr[-3:-1])
```

```
[5 6]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5, 6, 7])

print(arr[1:7:2])
```

```
[2 4 6]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5, 6, 7])

print(arr[::2])
```

```
[1 3 5 7]
```

```
import numpy as np

arr = np.array([[1, 2, 3, 4, 5], [6, 7, 8, 9, 10]])

print(arr[1,1:4])
```

```
[7 8 9]
```

```
import numpy as np

arr = np.array([[1, 2, 3, 4, 5], [6, 7, 8, 9, 10]])

print(arr[0:2,2])
```

```
[3 8]
```

```
import numpy as np

arr = np.array([[1, 2, 3, 4, 5], [6, 7, 8, 9, 10]])

print(arr[0:2, 1:4])
```

```
[[2 3 4]
 [7 8 9]]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4])

print(arr.dtype)
```

```
int64
```

```
import numpy as np

arr = np.array(['apple', 'banana', 'cherry'])

print(arr.dtype)
```

```
<U6
```

```
import numpy as np

arr = np.array([1, 2, 3, 4], dtype='i4')

print(arr)
print(arr.dtype)
```

```
[1 2 3 4]
int32
```

```
import numpy as np

arr = np.array([1, 2, 3, 4], dtype='S')

print(arr)
print(arr.dtype)
```

```
[b'1' b'2' b'3' b'4']
|S1
```

```
import numpy as np

arr = np.array([1.1, 2.1, 3.1])

newarr = arr.astype('i')

print(newarr)
print(newarr.dtype)
```

```
[1 2 3]
int32
```

```
import numpy as np

arr = np.array([1.1, 2.1, 3.1])

newarr = arr.astype(int)

print(newarr)
print(newarr.dtype)
```

```
[1 2 3]
int64
```

```
import numpy as np

arr = np.array([1, 0, 3])

newarr = arr.astype(bool)

print(newarr)
print(newarr.dtype)
```

```
[ True False  True]
bool
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5])
x = arr.copy()
arr[0] = 42

print(arr)
print(x)
```

```
[42  2  3  4  5]
[1 2 3 4 5]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5])
x = arr.view()
arr[0] = 42

print(arr)
print(x)
```

```
[42  2  3  4  5]
[42  2  3  4  5]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5])
x = arr.view()
x[0] = 31

print(arr)
print(x)
```

```
[31  2  3  4  5]
[31  2  3  4  5]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5])

x = arr.copy()
y = arr.view()

print(x.base)
print(y.base)
```

```
None
[1 2 3 4 5]
```

```
import numpy as np

arr = np.array([[1, 2, 3,4], [5, 6, 7, 8]])

print(arr.shape)
```

```
(2, 4)
```

```
import numpy as np

arr = np.array([1, 2, 3, 4,5], ndmin=10)

print(arr)
print('shape of array :', arr.shape)
```

```
[[[[[[[[[[1 2 3 4 5]]]]]]]]]]
shape of array : (1, 1, 1, 1, 1, 1, 1, 1, 1, 5)
```

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

print(arr.shape)
```

```
(1, 5)
```

```
import numpy as np
arr = np.array([1, 2, 3, 4], ndmin=5)
print(arr)
```

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

```
import numpy as np

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

newarr = arr.reshape(4, 3)

print(newarr)
```

```
[[ 1  2  3]
 [ 4  5  6]
 [ 7  8  9]
 [10 11 12]]
```

```
import numpy as np

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

newarr = arr.reshape(2, 3, 2)

print(newarr)
```

```
[[[ 1  2]
  [ 3  4]
  [ 5  6]]

 [[ 7  8]
  [ 9 10]
  [11 12]]]
```

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5, 6, 7, 8])

newarr = arr.reshape(3, 3)

print(newarr)
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-60-79494d80387a> in <module>()
      3 arr = np.array([1, 2, 3, 4, 5, 6, 7, 8])
      4
----> 5 newarr = arr.reshape(3, 3)
      6
      7 print(newarr)

ValueError: cannot reshape array of size 8 into shape (3,3)
```

SEARCH STACK OVERFLOW

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5, 6, 7, 8])

print(arr.reshape(2, 4).base)
```

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

```
import numpy as np

arr = np.array([1, 2, 3, 4, 5, 6, 7, 8])

newarr = arr.reshape(2, 2, -1)

print(newarr)
print(newarr.ndim)
```

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

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

```
import numpy as np

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

newarr = arr.reshape(-1)

print(newarr)
```

```
[1 2 3 4 5 6]
```

```
import numpy as np

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

for x in arr:
  print(x)
```

```
1
2
```

```
3
```

```
import numpy as np

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

for x in arr:
  print(x)
```

```
[1 2 3]
[4 5 6]
```

```
import numpy as np

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

for x in arr:
  for y in x:
    print(y)
```

```
1
2
3
4
5
6
```

```
import numpy as np

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

for x in arr:
  print(x)
```

```
[[1 2 3]
 [4 5 6]]
[[ 7  8  9]
 [10 11 12]]
```

```
import numpy as np

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

for x in arr:
  for y in x:
    for z in y:
      print(z)
```

```
1
2
3
4
5
6
7
8
9
10
11
12
```

```
import numpy as np

arr = np.array([[[1, 2], [3, 4]], [[5, 6], [7, 8]]])

for x in np.nditer(arr):
  print(x)
```

```
1
2
3
4
5
6
7
8
```

```
import numpy as np

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

for x in np.nditer(arr, flags=['buffered'], op_dtypes=['S']):
  print(x)
```

```
    b'1'
    b'2'
    b'3'
```

```
import numpy as np

arr = np.array([[1, 2, 3, 4], [5, 6, 7, 8]])

for x in np.nditer(arr[:, ::2]):
  print(x)
```

```
    1
    3
    5
    7
```

```
import numpy as np

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

for idx, x in np.ndenumerate(arr):
  print(idx, x)
```

```
    (0,) 1
    (1,) 2
    (2,) 3
```

```
import numpy as np

arr = np.array([[1, 2, 3, 4], [5, 6, 7, 8]])

for idx, x in np.ndenumerate(arr):
  print(idx, x)
```

```
    (0, 0) 1
    (0, 1) 2
    (0, 2) 3
    (0, 3) 4
    (1, 0) 5
    (1, 1) 6
    (1, 2) 7
    (1, 3) 8
```

```
import numpy as np

arr1 = np.array([1, 2, 3])

arr2 = np.array([4, 5, 6])

arr = np.concatenate((arr1, arr2))

print(arr)
```

```
    [1 2 3 4 5 6]
```

```
import numpy as np

arr1 = np.array([[1, 2], [3, 4]])

arr2 = np.array([[5, 6], [7, 8]])

arr = np.concatenate((arr1, arr2), axis=1)
print(arr.shape)

print(arr)
```

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

```
import numpy as np

arr1 = np.array([1, 2, 3])

arr2 = np.array([4, 5, 6])

arr = np.stack((arr1, arr2), axis=0)

print(arr)
```

```
[[1 2 3]
 [4 5 6]]
```

```
import numpy as np

arr1 = np.array([1, 2, 3])

arr2 = np.array([4, 5, 6])

arr = np.hstack((arr1, arr2))

print(arr)
```

```
[1 2 3 4 5 6]
```

```
import numpy as np

arr1 = np.array([1, 2, 3])

arr2 = np.array([4, 5, 6])

arr = np.vstack((arr1, arr2))

print(arr)
```

```
[[1 2 3]
 [4 5 6]]
```

```
import numpy as np

arr1 = np.array([1, 2, 3])

arr2 = np.array([4, 5, 6])

arr = np.dstack((arr1, arr2))

print(arr)
```

```
[[[1 4]
  [2 5]
  [3 6]]]
```

```
import numpy as np

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

newarr = np.array_split(arr, 3)

print(newarr)
```

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

```
import numpy as np

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

newarr = np.array_split(arr, 4)

print(newarr)
```

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

```
import numpy as np

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

newarr = np.array_split(arr, 3)
```

```
import numpy as np

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

newarr = np.array_split(arr, 3)

print(newarr)
```

```
    [array([[1, 2],
           [3, 4]]), array([[5, 6],
           [7, 8]]), array([[ 9, 10],
           [11, 12]])]
```

```
import numpy as np

arr = np.array([[1, 2, 3], [4, 5, 6], [7, 8, 9], [10, 11, 12], [13, 14, 15], [16, 17, 18]])

newarr = np.array_split(arr, 3)

print(newarr)
```

```
    [array([[1, 2, 3],
           [4, 5, 6]]), array([[ 7,  8,  9],
           [10, 11, 12]]), array([[13, 14, 15],
           [16, 17, 18]])]
```

```
import numpy as np

arr = np.array([[1, 2, 3], [4, 5, 6], [7, 8, 9], [10, 11, 12], [13, 14, 15], [16, 17, 18]])

newarr = np.array_split(arr, 3, axis=1)

print(newarr)
```

```
    [array([[ 1],
           [ 4],
           [ 7],
           [10],
           [13],
           [16]]), array([[ 2],
           [ 5],
           [ 8],
           [11],
           [14],
           [17]]), array([[ 3],
           [ 6],
           [ 9],
           [12],
           [15],
           [18]])]
```

```
import numpy as np

arr = np.array([[1, 2, 3], [4, 5, 6], [7, 8, 9], [10, 11, 12], [13, 14, 15], [16, 17, 18]])

newarr = np.hsplit(arr, 3)

print(newarr)
```

```
    [array([[ 1],
           [ 4],
           [ 7],
           [10],
           [13],
           [16]]), array([[ 2],
           [ 5],
           [ 8],
           [11],
           [14],
           [17]]), array([[ 3],
           [ 6],
           [ 9],
           [12],
           [15],
           [18]])]
```