In [1]:
```
import numpy as np
```

In [2]:
```
np.__version__
```

Out[2]:
```
'2.1.3'
```

In [3]:
```
my_list = [0,1,2,3,4,5]
my_list
```

Out[3]:
```
[0, 1, 2, 3, 4, 5]
```

In [4]:
```
type(my_list)
```

Out[4]:
```
list
```

In [5]:
```
my_list
```

Out[5]:
```
[0, 1, 2, 3, 4, 5]
```

In [6]:
```
arr = np.array(my_list)
arr
```

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

In [7]:
```
print(type(arr))
```

```
<class 'numpy.ndarray'>
```

In [8]:
```
np.arange(10)
```

Out[8]:
```
array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])
```

In [9]:
```
np.arange(10,20)
```

Out[9]:
```
array([10, 11, 12, 13, 14, 15, 16, 17, 18, 19])
```

In [10]:
```
np.arange(10,50,5)
```

Out[10]:
```
array([10, 15, 20, 25, 30, 35, 40, 45])
```

In [11]:
```
np.arange(20,10)  #1st arg < 2nd arg
```

Out[11]:
```
array([], dtype=int64)
```

In [12]:
```
np.arange(-20,10)
```

Out[12]:
```
array([-20, -19, -18, -17, -16, -15, -14, -13, -12, -11, -10,  -9,  -8,
        -7,  -6,  -5,  -4,  -3,  -2,  -1,   0,   1,   2,   3,   4,   5,
         6,   7,   8,   9])
```

In [13]:
```
np.zeros(5) #parameter tunning
```

Out[13]:
```
array([0., 0., 0., 0., 0.])
```

In [14]:
```
np.zeros(5, dtype=int) #hyperparameter tunning
```

Out[14]:
```
array([0, 0, 0, 0, 0])
```

In [15]:
```
np.zeros([2,2])
```

Out[15]:
```
array([[0., 0.],
       [0., 0.]])
```

In [16]:
```
np.zeros([5,4])
```

Out[16]:
```
array([[0., 0., 0., 0.],
       [0., 0., 0., 0.],
       [0., 0., 0., 0.],
       [0., 0., 0., 0.],
       [0., 0., 0., 0.]])
```

In [17]:
```
np.zeros((10,10),dtype = int)
```

Out[17]:
```
array([[0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0, 0, 0, 0, 0, 0]])
```

In [19]:
```
np.ones(2)
```

Out[19]:
```
array([1., 1.])
```

In [28]:
```
np.ones(2, dtype=int)
```

Out[28]:
```
array([1, 1])
```

In [21]:
```
np.ones([2,2])
```

Out[21]:
```
array([[1., 1.],
       [1., 1.]])
```

In [28]:
```
np.ones([4,5])
```

Out[28]:
```
array([[1., 1., 1., 1., 1.],
       [1., 1., 1., 1., 1.],
       [1., 1., 1., 1., 1.],
       [1., 1., 1., 1., 1.]])
```

In [29]:
```
arr
```

Out[29]:
```
array([0, 1, 2, 3, 4, 5])
```

In [30]:
```
rand(3,2)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[30], line 1
----> 1 rand(3,2)

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

In [31]:
```
random.rand(3,2)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[31], line 1
----> 1 random.rand(3,2)

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

In [32]:
```
np.random.rand(3,2)
```

Out[32]:
```
array([[0.00502388, 0.51486781],
       [0.56196513, 0.80332465],
       [0.77374567, 0.22948239]])
```

In [33]:
```
np.random.rand(3)
```

Out[33]:
```
array([0.20614626, 0.30608736, 0.29481357])
```

In [34]:
```
np.random.randint(4,6)
```

Out[34]:
```
5
```

In [35]:
```
np.random.randint(0,10)
```

Out[35]:
```
1
```

In [47]:
```
print (np.random.randint(0,10,4))
```

```
[2 9 5 4]
```

In [48]:
```
print (np.random.randint(0,10,5))
```

```
[2 9 1 7 7]
```

In [38]:
```
n = np.random.randint(10,40,(8,10))
```

In [41]:
```
print (n)
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [11 18 28 34 16 11 24 11 24 35]
 [37 21 36 10 37 33 13 22 32 35]
 [27 25 11 10 21 15 10 20 16 28]
 [13 36 28 18 30 11 31 23 21 14]
 [19 18 36 23 12 37 29 29 19 16]
 [27 12 36 10 31 22 36 29 29 24]
 [31 30 14 23 37 10 31 12 17 37]]
```

In [43]:
```
print (n[5])
```

```
[19 18 36 23 12 37 29 29 19 16]
```

In [45]:
```
print (n)
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [11 18 28 34 16 11 24 11 24 35]
 [37 21 36 10 37 33 13 22 32 35]
 [27 25 11 10 21 15 10 20 16 28]
 [13 36 28 18 30 11 31 23 21 14]
 [19 18 36 23 12 37 29 29 19 16]
 [27 12 36 10 31 22 36 29 29 24]
 [31 30 14 23 37 10 31 12 17 37]]
```

In [46]:
```
print (n[0:6])
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [11 18 28 34 16 11 24 11 24 35]
 [37 21 36 10 37 33 13 22 32 35]
 [27 25 11 10 21 15 10 20 16 28]
 [13 36 28 18 30 11 31 23 21 14]
 [19 18 36 23 12 37 29 29 19 16]]
```

In [49]:
```
print (n)
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [11 18 28 34 16 11 24 11 24 35]
 [37 21 36 10 37 33 13 22 32 35]
 [27 25 11 10 21 15 10 20 16 28]
 [13 36 28 18 30 11 31 23 21 14]
 [19 18 36 23 12 37 29 29 19 16]
 [27 12 36 10 31 22 36 29 29 24]
 [31 30 14 23 37 10 31 12 17 37]]
```

In [50]:
```
print (n[::-1])
```

```
[[31 30 14 23 37 10 31 12 17 37]
 [27 12 36 10 31 22 36 29 29 24]
 [19 18 36 23 12 37 29 29 19 16]
 [13 36 28 18 30 11 31 23 21 14]
 [27 25 11 10 21 15 10 20 16 28]
 [37 21 36 10 37 33 13 22 32 35]
 [11 18 28 34 16 11 24 11 24 35]
 [16 37 19 31 15 16 12 33 39 34]]
```

In [52]:
```
print (n)
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [11 18 28 34 16 11 24 11 24 35]
 [37 21 36 10 37 33 13 22 32 35]
 [27 25 11 10 21 15 10 20 16 28]
 [13 36 28 18 30 11 31 23 21 14]
 [19 18 36 23 12 37 29 29 19 16]
 [27 12 36 10 31 22 36 29 29 24]
 [31 30 14 23 37 10 31 12 17 37]]
```

In [51]:
```
type (n)
```

Out[51]:
```
numpy.ndarray
```

In [54]:
```
print (n[::2]) # pull out every other rows- 2nd
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [37 21 36 10 37 33 13 22 32 35]
 [13 36 28 18 30 11 31 23 21 14]
 [27 12 36 10 31 22 36 29 29 24]]
```

In [55]:
```
print (n)
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [11 18 28 34 16 11 24 11 24 35]
 [37 21 36 10 37 33 13 22 32 35]
 [27 25 11 10 21 15 10 20 16 28]
 [13 36 28 18 30 11 31 23 21 14]
 [19 18 36 23 12 37 29 29 19 16]
 [27 12 36 10 31 22 36 29 29 24]
 [31 30 14 23 37 10 31 12 17 37]]
```

In [56]:
```
print (n[0])
```

```
[16 37 19 31 15 16 12 33 39 34]
```

In [75]:
```
print (n)
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [11 18 28 34 16 11 24 11 24 35]
 [37 21 36 10 37 33 13 22 32 35]
 [27 25 11 10 21 15 10 20 16 28]
 [13 36 28 18 30 11 31 23 21 14]
 [19 18 36 23 12 37 29 29 19 16]
 [27 12 36 10 31 22 36 29 29 24]
 [31 30 14 23 37 10 31 12 17 37]]
```

In [76]:
```
print (n[0:5])
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [11 18 28 34 16 11 24 11 24 35]
 [37 21 36 10 37 33 13 22 32 35]
 [27 25 11 10 21 15 10 20 16 28]
 [13 36 28 18 30 11 31 23 21 14]]
```

In [66]:
```
print (n[0,4])
```

```
15
```

In [67]:
```
print (n)
```

```
[[16 37 19 31 15 16 12 33 39 34]
 [11 18 28 34 16 11 24 11 24 35]
 [37 21 36 10 37 33 13 22 32 35]
 [27 25 11 10 21 15 10 20 16 28]
 [13 36 28 18 30 11 31 23 21 14]
 [19 18 36 23 12 37 29 29 19 16]
 [27 12 36 10 31 22 36 29 29 24]
 [31 30 14 23 37 10 31 12 17 37]]
```

In [68]:
```
print (n[5,-3])
```

```
29
```

In [77]:
```
import numpy as np

x = np.int32(10)
print(x)        # Output: 10
#print(type(x))
```

```
10
```

In [84]:
```
np.arange(1,13).reshape(6,2)
```

Out[84]:
```
array([[ 1,  2],
       [ 3,  4],
       [ 5,  6],
       [ 7,  8],
       [ 9, 10],
       [11, 12]])
```

In [85]:
```
np.arange(1,13).reshape(5,5)
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Cell In[85], line 1
----> 1 np.arange(1,13).reshape(5,5)

ValueError: cannot reshape array of size 12 into shape (5,5)
```

In [ ]: