In [2]:
```
import numpy as np
```

In [4]:
```
arr_1=np.array([1,2,3,4,5])
print("1d array:",arr_1)
```

```
1d array: [1 2 3 4 5]
```

In [6]:
```
arr_2=np.array([[1,2,3],[4,5,6]])
print("2D array:\n",arr_2)
```

```
2D array:
 [[1 2 3]
 [4 5 6]]
```

In [8]:
```
arr_3=np.array([[[1,2],[3,4]],[[5,6],[7,8]]])
print("3D array:\n",arr_3)
```

```
3D array:
 [[[1 2]
  [3 4]]

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

In [10]:
```
print("array props:")
print("shape:",arr_3.shape)
print("size:",arr_3.size)
print("data type:",arr_3.dtype)
```

```
array props:
shape: (2, 2, 2)
size: 8
data type: int32
```

In [12]:
```
zeros=np.zeros((2,3))
print("Zeros Array:\n",zeros)
```

```
Zeros Array:
 [[0. 0. 0.]
 [0. 0. 0.]]
```

In [14]:
```
ones=np.ones((2,3))
print("Oness Array:\n",ones)
```

```
Oness Array:
 [[1. 1. 1.]
 [1. 1. 1.]]
```

In [16]:
```
identity=np.eye(4)
print("Identity matrix:\n",identity)
```

```
Identity matrix:
 [[1. 0. 0. 0.]
 [0. 1. 0. 0.]
 [0. 0. 1. 0.]
 [0. 0. 0. 1.]]
```

In [18]:
```
lins_arr=np.linspace(0,10,5)
print("Linspace:\n",lins_arr)
```

```
Linspace:
 [ 0.   2.5  5.   7.5 10. ]
```

In [20]:
```
avg_arr=np.arange(0,100,20)
print("Average Array:\n",avg_arr)
```

```
Average Array:
 [ 0 20 40 60 80]
```

In [22]:
```
arr1=np.array([1,2,3])
arr2=np.array([4,5,6])
print("Addition:\n",arr1+arr2)
print("Multiplication:\n",arr1*arr2)
```

```
Addition:
 [5 7 9]
Multiplication:
 [ 4 10 18]
```

In [24]:
```
print("Scalar multiplication:\n",2*arr1)
```

```
Scalar multiplication:
 [2 4 6]
```

In [26]:
```
print("matrix multiplication:\n",np.dot(arr1,arr2))
```

```
matrix multiplication:
 32
```

In [28]:
```
print("element at index 1:",arr1[1])
```

```
print("elements from index 1 to 3:",arr1[1:4])
```

```
element at index 1: 2
elements from index 1 to 3: [2 3]
```

In [30]:
```
arr=np.arange(1,10)
print("sum:",arr.sum())
print("mean:",arr.mean())
print("standard deviation:",arr.std())
print("max:",arr.max())
print("min:",arr.min())
```

```
sum: 45
mean: 5.0
standard deviation: 2.581988897471611
max: 9
min: 1
```

In [32]:
```
print("Reshaped array:\n",arr.reshape(3,3))
```

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

In [34]:
```
print("Random array:\n",np.random.random((2,3)))
```

```
Random array:
 [[0.58864374 0.25869165 0.45110288]
 [0.52911867 0.94209095 0.85006316]]
```

In [36]:
```
print("Random array:\n",np.random.randint(1,13,size=(2,3)))
```

```
Random array:
 [[11  8  7]
 [ 8  7 12]]
```

In [45]:
```
arr = np.array([10, 20, 30, 40, 50])
print("Selected Elements:\n", arr[[0, 2, 4]])
```

```
Selected Elements:
 [10 30 50]
```

In [53]:
```
print("Elements > 20:\n", arr[arr > 20])
```

```
Elements > 20:
 [ 30 100 100]
```

In [51]:
```
arr[arr > 30] = 100
print("Updated Array:\n", arr)
```

```
Updated Array:
 [ 10  20  30 100 100]
```

In [57]:
```
arr = np.array([5, 2, 9, 1, 5, 6])

sorted_arr = np.sort(arr)
print("Sorted Array:\n", sorted_arr)
```

```
Sorted Array:
 [1 2 5 5 6 9]
```