

# Numpy Crash Course

```
In [5]: import numpy as np
```

## Creating Arrays

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

```
In [3]: arr = np.array(my_list)
```

```
In [4]: arr
```

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

```
In [6]: np.arange(0,10)
```

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

```
In [7]: np.arange(0,10,2)
```

```
Out[7]: array([0, 2, 4, 6, 8])
```

```
In [8]: np.zeros((5,5))
```

```
Out[8]: 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.]])
```

```
In [11]: np.ones((2,4))
```

```
Out[11]: array([[ 1.,  1.,  1.,  1.],
               [ 1.,  1.,  1.,  1.]])
```

```
In [12]: np.random.randint(0,10)
```

```
Out[12]: 7
```

```
In [13]: np.random.randint(0,10,(3,3))
```

```
Out[13]: array([[9, 7, 8],
               [0, 3, 5],
               [2, 6, 7]])
```

```
In [14]: np.linspace(0,10,6)
```

```
Out[14]: array([ 0.,  2.,  4.,  6.,  8., 10.])
```

```
In [16]: np.linspace(0,10,101)
```

```
Out[16]: array([ 0. ,  0.1,  0.2,  0.3,  0.4,  0.5,  0.6,  0.7,  0.8,
 0.9,  1. ,  1.1,  1.2,  1.3,  1.4,  1.5,  1.6,  1.7,
 1.8,  1.9,  2. ,  2.1,  2.2,  2.3,  2.4,  2.5,  2.6,
 2.7,  2.8,  2.9,  3. ,  3.1,  3.2,  3.3,  3.4,  3.5,
 3.6,  3.7,  3.8,  3.9,  4. ,  4.1,  4.2,  4.3,  4.4,
 4.5,  4.6,  4.7,  4.8,  4.9,  5. ,  5.1,  5.2,  5.3,
 5.4,  5.5,  5.6,  5.7,  5.8,  5.9,  6. ,  6.1,  6.2,
 6.3,  6.4,  6.5,  6.6,  6.7,  6.8,  6.9,  7. ,  7.1,
 7.2,  7.3,  7.4,  7.5,  7.6,  7.7,  7.8,  7.9,  8. ,
 8.1,  8.2,  8.3,  8.4,  8.5,  8.6,  8.7,  8.8,  8.9,
 9. ,  9.1,  9.2,  9.3,  9.4,  9.5,  9.6,  9.7,  9.8,
 9.9, 10. ])
```

## Operations

```
In [17]: np.random.seed(101) # watch video for details
arr = np.random.randint(0,100,10)
```

```
In [18]: arr
```

```
Out[18]: array([95, 11, 81, 70, 63, 87, 75,  9, 77, 40])
```

```
In [19]: arr2 = np.random.randint(0,100,10)
```

```
In [20]: arr2
```

```
Out[20]: array([ 4, 63, 40, 60, 92, 64,  5, 12, 93, 40])
```

```
In [21]: arr.max()
```

```
Out[21]: 95
```

```
In [22]: arr.min()
```

```
Out[22]: 9
```

```
In [26]: arr.mean()
```

```
Out[26]: 60.799999999999997
```

```
In [27]: arr.argmax()
```

```
Out[27]: 7
```

```
In [28]: arr.argmax()
```

```
Out[28]: 0
```

```
In [25]: arr.reshape(2,5)
```

```
Out[25]: array([[95, 11, 81, 70, 63],  
               [87, 75, 9, 77, 40]])
```

## Indexing

```
In [29]: mat = np.arange(0,100).reshape(10,10)
```

```
In [30]: mat
```

```
Out[30]: array([[ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9],  
               [10, 11, 12, 13, 14, 15, 16, 17, 18, 19],  
               [20, 21, 22, 23, 24, 25, 26, 27, 28, 29],  
               [30, 31, 32, 33, 34, 35, 36, 37, 38, 39],  
               [40, 41, 42, 43, 44, 45, 46, 47, 48, 49],  
               [50, 51, 52, 53, 54, 55, 56, 57, 58, 59],  
               [60, 61, 62, 63, 64, 65, 66, 67, 68, 69],  
               [70, 71, 72, 73, 74, 75, 76, 77, 78, 79],  
               [80, 81, 82, 83, 84, 85, 86, 87, 88, 89],  
               [90, 91, 92, 93, 94, 95, 96, 97, 98, 99]])
```

```
In [32]: row = 0  
        col = 1
```

```
In [33]: mat[row,col]
```

```
Out[33]: 1
```

```
In [34]: # With Slices  
        mat[:,col]
```

```
Out[34]: array([ 1, 11, 21, 31, 41, 51, 61, 71, 81, 91])
```

```
In [35]: mat[row,:]
```

```
Out[35]: array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])
```

```
In [36]: mat[0:3,0:3]
```

```
Out[36]: array([[ 0,  1,  2],  
               [10, 11, 12],  
               [20, 21, 22]])
```

## Masking

```
In [37]: mat > 50
```

```
Out[37]: array([[False, False, False, False, False, False, False, False, False, False,
                False],
                [False, False, False, False, False, False, False, False, False, False,
                False],
                [False, False, False, False, False, False, False, False, False, False,
                False],
                [False, False, False, False, False, False, False, False, False, False,
                False],
                [False, False, False, False, False, False, False, False, False, False,
                False],
                [False, True,  True,  True,  True,  True,  True,  True,  True,  True,
                True],
                [ True,  True,  True,  True,  True,  True,  True,  True,  True,  True,
                True],
                [ True,  True,  True,  True,  True,  True,  True,  True,  True,  True,
                True],
                [ True,  True,  True,  True,  True,  True,  True,  True,  True,  True,
                True],
                [ True,  True,  True,  True,  True,  True,  True,  True,  True,  True,
                True]])
```

```
In [38]: mat[mat>50]
```

```
Out[38]: array([51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66,
                67,
                68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83,
                84,
                85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99])
```

## Great Job!