

A) Import NumPy as np

✓ [1] import numpy as np
0s

B) Create an array of 10 zeros

✓ [2] np.zeros(10)
0s
array([0., 0., 0., 0., 0., 0., 0., 0., 0., 0.])

C) Create an array of 10 ones

✓ [3] np.ones(10)
0s
array([1., 1., 1., 1., 1., 1., 1., 1., 1., 1.])

D) Create an array of 10 fives

✓ [4] np.ones(10)*5
0s
array([5., 5., 5., 5., 5., 5., 5., 5., 5., 5.])

E) Create an array of the integers from 10 to 50

✓ [5] np.arange(10,51)
0s
array([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])

F) Create an array of all the even integers from 10 to 50

✓ [6] np.arange(10,51,2)
0s
array([10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50])

G) Create a 3x3 matrix with values ranging from 0 to 8

```
✓ [0s] np.arange(0, 9).reshape(3,3)
↳ array([[0, 1, 2],
         [3, 4, 5],
         [6, 7, 8]])
```

H) Create a 3x3 identity matrix

```
✓ [8] np.eye(3)
array([[1., 0., 0.],
       [0., 1., 0.],
       [0., 0., 1.]])
```

I) Use NumPy to generate a random number between 0 and 1

```
✓ [9] np.random.rand(1)
array([0.63995357])
```

J) Use NumPy to generate an array of 25 random numbers sampled from a standard normal distribution

```
✓ [10] np.random.randn(5,5)
↳ array([[ 0.00917627,  2.54296586,  0.05459417, -0.16396732,  0.48492437],
         [ 2.59090973, -0.4354634 ,  0.18801321,  1.21906203, -0.09548617],
         [ 0.10950666,  0.73144329,  1.55376488, -1.65816763, -0.30470597],
         [-0.66117415, -0.14516945, -0.00943456, -0.45216566,  1.15621409],
         [-0.13117192,  3.63209751,  0.67736721, -0.06525428,  0.5618076 ]])
```

K) Create the following matrix:

```
✓ [11] np.arange(0.01, 1.01, 0.01).reshape(10,10)
array([[0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.1 ],
       [0.11, 0.12, 0.13, 0.14, 0.15, 0.16, 0.17, 0.18, 0.19, 0.2 ],
       [0.21, 0.22, 0.23, 0.24, 0.25, 0.26, 0.27, 0.28, 0.29, 0.3 ],
       [0.31, 0.32, 0.33, 0.34, 0.35, 0.36, 0.37, 0.38, 0.39, 0.4 ],
       [0.41, 0.42, 0.43, 0.44, 0.45, 0.46, 0.47, 0.48, 0.49, 0.5 ],
       [0.51, 0.52, 0.53, 0.54, 0.55, 0.56, 0.57, 0.58, 0.59, 0.6 ],
       [0.61, 0.62, 0.63, 0.64, 0.65, 0.66, 0.67, 0.68, 0.69, 0.7 ],
       [0.71, 0.72, 0.73, 0.74, 0.75, 0.76, 0.77, 0.78, 0.79, 0.8 ],
       [0.81, 0.82, 0.83, 0.84, 0.85, 0.86, 0.87, 0.88, 0.89, 0.9 ],
       [0.91, 0.92, 0.93, 0.94, 0.95, 0.96, 0.97, 0.98, 0.99, 1.  ]])
```

L) Create an array of 20 linearly spaced points between 0 and 1:

```
✓ [12] np.linspace(0,1,20)
0s
array([0.          , 0.05263158, 0.10526316, 0.15789474, 0.21052632,
       0.26315789, 0.31578947, 0.36842105, 0.42105263, 0.47368421,
       0.52631579, 0.57894737, 0.63157895, 0.68421053, 0.73684211,
       0.78947368, 0.84210526, 0.89473684, 0.94736842, 1.          ])
```

Numpy Indexing and Selection**M) Now you will be given a few matrices, and be asked to replicate the resulting matrix outputs:**

```
✓ [13] mat = np.arange(1,26).reshape(5,5)
0s
mat
array([[ 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]])
```

```
✓ [15] mat1 = np.array([12,13,14,15,17,18,19,20,22,23,24,25]).reshape(3,4)
0s
mat1
array([[12, 13, 14, 15],
       [17, 18, 19, 20],
       [22, 23, 24, 25]])
```

```
✓ [17] mat1[1][3]
0s
20
```

```
✓ [19] mat2 = np.arange(2,13,5).reshape(3,1)
0s
mat2
array([[ 2],
       [ 7],
       [12]])
```

```
[21] mat3 = np.arange(21,26)
      mat3

array([21, 22, 23, 24, 25])
```

```
✓ [23] mat4 = np.arange(16,26).reshape(2,5)
0s      mat4

array([[16, 17, 18, 19, 20],
       [21, 22, 23, 24, 25]])
```

N) Get the sum of all the values in mat

```
✓ [24] np.sum(mat)
0s

325
```

O) Get the standard deviation of the values in mat

```
✓ [25] np.std(mat)
0s

7.211102550927978
```

P) Get the sum of all the columns in mat

```
✓ [26] np.sum(mat,axis=0)
0s

array([55, 60, 65, 70, 75])
```

CONCLUSION:

From this practical, I have successfully learned about numpy library in python.