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21BRS1304

import NUMPY as np

```
import numpy as np
```

Create an array of 10 zeros

```
import numpy as np
a=np.zeros(10)
a
```

```
array([0., 0., 0., 0., 0., 0., 0., 0., 0., 0.])
```

Create an array of 10 ones

```
import numpy as np
a=np.ones(10)
a
```

```
array([1., 1., 1., 1., 1., 1., 1., 1., 1., 1.])
```

Create an array of 10 fives

```
import numpy as np
a=np.ones(10)*5
a
```

```
array([5., 5., 5., 5., 5., 5., 5., 5., 5., 5.])
```

Create an array of the integers from 10 to 50

```
import numpy as np
np.linspace(10,50,41)
```

```
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.])
```

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

```
import numpy as np
np.arange(10,50,2)
```

```
array([10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42,
       44, 46, 48])
```

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

```
import numpy as np
a= np.arange(0,9).reshape(3,3)
a
```

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

Create a 3x3 identity matrix

```
import numpy as np
a=np.eye(3)
```

```
a
```

```
array([[1., 0., 0.],
       [0., 1., 0.],
       [0., 0., 1.]])
```

Use NumPy to generate a random number between 0 and 1

```
import numpy as np
import random
a=np.random.random()
a
```

```
0.12290188596996798
```

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

```
import numpy as np
import random
np.random.normal(0,1,25)
```

```
array([ 0.73078569, -0.92823444,  0.83005527,  0.44348081, -2.72221453,
       -0.66463952, -0.43258254, -0.80244631,  0.57080228, -1.44011304,
        1.83659929, -0.87350762, -1.20564058,  0.27320123, -0.97282506,
        0.01384343,  0.75275607, -0.47425464, -2.02017754,  0.33313046,
       -1.37420981,  1.95546149, -0.09124874,  0.50347668, -1.5416263 ])
```

Create the following matrix:

```
import numpy as np
a= np.arange(0.01,1.01,0.01).reshape(10,10)
a
```

```
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.  ]])
```

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

```
import numpy as np
num_line = np.linspace(0,1,20)
num_line
```

```
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

Now you will be given a few matrices, and be asked to replicate the resulting matrix outputs:

```
mat = np.arange(1,26).reshape(5,5)
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]])
```

```
import numpy as np
mat = np.arange(1,26).reshape(5,5)
```

```
mat1=mat[2:,1:]
mat1
```

```
array([[12, 13, 14, 15],
       [17, 18, 19, 20],
       [22, 23, 24, 25]])
```

```
import numpy as np
mat = np.arange(1,26).reshape(5,5)
mat1=mat[3:4,4:]
print(mat1)
```

```
[[20]]
```

```
import numpy as np
mat = np.arange(1,26).reshape(5,5)
mat1=mat[0:3,1:2]
mat1
```

```
array([[ 2],
       [ 7],
       [12]])
```

```
import numpy as np
mat = np.arange(1,26).reshape(5,5)
mat1=mat[4:,0:]
mat1
```

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

```
import numpy as np
mat = np.arange(1,26).reshape(5,5)
mat1=mat[3:,0:]
mat1
```

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

Now do the following *Get the sum of all the values in mat *

```
import numpy as np
mat = np.arange(1,26).reshape(5,5)
mat1= np.sum(mat)
mat1
```

```
325
```

Get the standard deviation of the values in mat

```
import numpy as np
mat = np.arange(1,26).reshape(5,5)
mat1= np.std(mat)
mat1
```

```
7.211102550927978
```

Get the sum of all the columns in mat

```
import numpy as np
mat = np.arange(1,26).reshape(5,5)
mat1= sum(mat)
mat1
```

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

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