NumPy Exercises

Now that we've learned about NumPy let's test your knowledge. We'll start off with a few simple tasks, and then you'll be asked some more complicated questions.

Import NumPy as np

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

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

In [5]:
```
array=np.array(list)
```

In [7]:
```
array
```

Out[7]:
```
array([1, 2, 3, 4, 5])
```

Create an array of 10 zeros

In [17]:
```
x=np.zeros(10)
```

In [18]:
```
x
```

Out[18]:
```
array([0., 0., 0., 0., 0., 0., 0., 0., 0., 0.])
```

Create an array of 10 ones

In [19]:
```
y=np.ones(10)
```

In [20]:
```
y
```

Out[20]:
```
array([1., 1., 1., 1., 1., 1., 1., 1., 1., 1.])
```

Create an array of 10 fives

In [5]:
```
one=np.ones(10)*5
```

In [6]:
```
one
```

Out[6]:
```
array([5., 5., 5., 5., 5., 5., 5., 5., 5., 5.])
```

Create an array of the integers from 10 to 50

In [73]:
```
a=np.arange(10,50)
```

In [74]:
```
a
```

Out[74]:
```
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])
```

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

In [31]:
```
c=np.arange(10,50,2)
```

In [32]:
```
c
```

Out[32]:
```
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

In [37]:
```
x=np.arange(0,9).reshape(3,3)
```

In [38]:
```
x
```

Out[38]:
```
array([[0, 1, 2],
       [3, 4, 5],
       [6, 7, 8]])
```

Create a 3x3 identity matrix

In [42]:
```
x=[[1,0,0],[0,1,0],[0,0,1]]
```

In [44]:
```
arr2d=np.array(x)
```

In [45]:
```
arr2d
```

Out[45]:
```
array([[1, 0, 0],
       [0, 1, 0],
       [0, 0, 1]])
```

Use NumPy to generate a random number between 0 and 1

In [56]:
```
a=np.random.rand(1)
```

In [57]:
```
a
```

Out[57]:
```
array([0.4969775])
```

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

In [105]:
```
b=np.arange(25,50)
```

In [106]:
```
flatten=b.flatten()
```

In [107]:
```
flatten
```

Out[107]:
```
array([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])
```

Create the following matrix:

In [97]:
```
a=np.arange(1,17).reshape(4,4)
```

In [98]:
```
a
```

Out[98]:
```
array([[ 1,  2,  3,  4],
       [ 5,  6,  7,  8],
       [ 9, 10, 11, 12],
       [13, 14, 15, 16]])
```

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

In [65]:
```
np.linspace(0,1,20)
```

Out[65]:
```
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:

In [4]:
```
mat = np.arange(1,26).reshape(5,5)
mat
```

Out[4]:
```
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]])
```

In [ ]:
```
# WRITE CODE HERE THAT REPRODUCES THE OUTPUT OF THE CELL BELOW
# BE CAREFUL NOT TO RUN THE CELL BELOW, OTHERWISE YOU WON'T
# BE ABLE TO SEE THE OUTPUT ANY MORE
```

In [6]:
```
list=[[12,13,14,15],[17,18,19,20],[22,23,24,25]]
arr=np.array(list)
arr
```

Out[6]:
```
array([[12, 13, 14, 15],
       [17, 18, 19, 20],
       [22, 23, 24, 25]])
```

In [ ]:
```
# WRITE CODE HERE THAT REPRODUCES THE OUTPUT OF THE CELL BELOW
# BE CAREFUL NOT TO RUN THE CELL BELOW, OTHERWISE YOU WON'T
# BE ABLE TO SEE THE OUTPUT ANY MORE
```

In [7]:
```
np.random.randint(20,21)
```

Out[7]:
```
20
```

In [ ]:
```
# WRITE CODE HERE THAT REPRODUCES THE OUTPUT OF THE CELL BELOW
# BE CAREFUL NOT TO RUN THE CELL BELOW, OTHERWISE YOU WON'T
# BE ABLE TO SEE THE OUTPUT ANY MORE
```

In [8]:
```
list1=[[2],[7],[12],[17],[22]]
arr1=np.array(list1)
arr1
```

Out[8]:
```
array([[ 2],
       [ 7],
       [12],
       [17],
       [22]])
```

In [ ]:
```
# WRITE CODE HERE THAT REPRODUCES THE OUTPUT OF THE CELL BELOW
# BE CAREFUL NOT TO RUN THE CELL BELOW, OTHERWISE YOU WON'T
# BE ABLE TO SEE THE OUTPUT ANY MORE
```

In [9]:
```
m=np.arange(21,26)
m
```

Out[9]:
```
array([21, 22, 23, 24, 25])
```

In [ ]:
```
# WRITE CODE HERE THAT REPRODUCES THE OUTPUT OF THE CELL BELOW
# BE CAREFUL NOT TO RUN THE CELL BELOW, OTHERWISE YOU WON'T
# BE ABLE TO SEE THE OUTPUT ANY MORE
```

In [10]:
```
a=np.arange(16,26).reshape(2,5)
a
```

Out[10]:
```
array([[16, 17, 18, 19, 20],
       [21, 22, 23, 24, 25]])
```