## *ASSIGNMENT 7*

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DOMAIN:DATA SCIENCE

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```python
import numpy as np

arr=np.array([[1,2,3,4],[5,6,7,8],[9,10,11,12]])
print(arr)
```

```
[[ 1  2  3  4]

 [ 5  6  7  8]

 [ 9 10 11 12]]
```

```python
#Finding the size of each array element
#finding the size of each item in the array
import numpy as np
a = np.array([[1,2,3]])
print("Each item contains",a.itemsize,"bytes")
```

```
Each item contains 8 bytes
```

```python
#finding the data type of each array item
import numpy as np
a = np.array([[1,2,3]])
print("Each item is of the type",a.dtype)
```

```
Each item is of the type int64
```

```python
#finding the data type of each array item
import numpy as np
a = np.array([[1,'A',3]])
print("Each item is of the type",a.dtype)
```

```
Each item is of the type
<U21
```

```python
import numpy as np
a = np.array([[1,2,3,4,5,6,7]])
print("Array Size:",a.size)
print("Shape:",a.shape)
import numpy as np
a = np.array([[1,2,3,4],[8,5,6,7]])
print("Array Size:",a.size)
print("Shape:",a.shape)
```

```
Array Size: 7

Shape: (1, 7)

Array Size: 8

Shape: (2, 4)
```

```python
import numpy as np
a = np.array([[1,2],[3,4],[5,6]])
print("printing the original array..")
print(a)
a=a.reshape(2,3)
print("printing the reshaped array..")
print(a)
```

```
printing the original array..

[[1 2]

 [3 4]

 [5 6]]

printing the reshaped array..

[[1 2 3]
```

```python
import numpy as np
a = np.array([1,2,3,10,15,4])
print("The array:",a)
print("The maximum element:",a.max())
print("The minimum element:",a.min())
print("The sum of the elements:",a.sum())
a = np.array([[1,2,30],[10,15,4]])
print(np.sqrt(a))
print(np.std(a))
```

```
The array: [ 1  2  3 10 15  4]

The maximum element: 15

The minimum element: 1

The sum of the elements: 35

[[1.        1.41421356 5.47722558]

 [3.16227766 3.87298335 2.        ]]

10.044346115546242
```

#Arithmetic operations on the array

#The numpy module allows us to perform the arithmetic operations on multi-dimensional arrays directly.

```python
import numpy as np
a = np.array([[1,2,30],[10,15,4]])
b = np.array([[1,2,3],[12, 19, 29]])
print("Sum of array a and b\n",a+b)
print("Product of array a and b\n",a*b)
print("Division of array a and b\n",a/b)
```

```
Sum of array a and b

 [[ 2  4 33]

 [22 34 33]]

Product of array a and b

 [[  1   4  90]

 [120 285 116]]

Division of array a and b

 [[ 1.         1.        10.       ]

 [ 0.83333333 0.78947368 0.13793103]]
```

#Array Concatenation
#The numpy provides us with the vertical stacking and horizontal stacking which allows us to concatenate two multi-dimensional arrays vertically or horizontally.

```python
import numpy as np
a = np.array([[1,2,30],[10,15,4]])
b = np.array([[1,2,3],[12, 19, 29]])
print("Arrays vertically concatenated\n",np.vstack((a,b)));
print("Arrays horizontally concatenated\n",np.hstack((a,b)))
```

```
Arrays vertically concatenated

 [[ 1  2 30]

 [10 15  4]

 [ 1  2  3]

 [12 19 29]]

Arrays horizontally concatenated

 [[ 1  2 30  1  2  3]

 [10 15  4 12 19 29]]
```

#Numpy array from existing data
#creating numpy array using the list

import numpy as np
l=[1,2,3,4,5,6,7]
a = np.asarray(l);
print(type(a))
print(a)

```
<class 'numpy.ndarray'>

[1 2 3 4 5 6 7]
```

#creating a numpy array using Tuple
import numpy as np
l=(1,2,3,4,5,6,7)
a = np.asarray(l);
print(type(a))
print(a)

```
<class 'numpy.ndarray'>

[1 2 3 4 5 6 7]
```

#creating a numpy array using more than one list
import numpy as np
l=[1,2,3,4,5,6,7]
a = np.asarray(l);
print(type(a))

```
<class 'numpy.ndarray'>

[1 2 3 4 5 6 7]
```

```
print(a)

#BROADCASTING
import numpy as np
a = np.array([[1,2,3,4],[2,4,5,6],[10,20,39,3]])
b = np.array([2,4,6,8])
print("\nprinting array a..")
print(a)
print("\nprinting array b..")
print(b)
print("\nAdding arrays a and b ..")
c = a + b;
print(c)

#NumPy String Functions
#numpy.char.add() method

import numpy as np
print("Concatenating two string arrays:")
print(np.char.add(['welcome','Hi'], [' to CYRSTAL', ' read python'] ))
```

```
printing array a..

[[ 1  2  3  4]

 [ 2  4  5  6]

 [10 20 39  3]]
```

```
Concatenating two string arrays:

['welcome to CYRSTAL' 'Hi read python']
```

```
#numpy.char.multiply() method
import numpy as np
print("Printing a string multiple times:")
print(np.char.multiply("hello ",3))
```

```
Printing a string multiple times:

hello hello hello
```

#numpy.char.center() method

```python
import numpy as np
print("Padding the string through left and right with the fill char *");
#np.char.center(string, width, fillchar)
print(np.char.center("CRYSTAL", 20, '*'))
```

```
Padding the string through left and right
with the fill char *

******CRYSTAL*******
```

```python
#numpy.char.capitalize() method
import numpy as np
print("Capitalizing the string using capitalize()...")
print(np.char.capitalize("welcome to crystal"))
```

```
Capitalizing the string using
capitalize()...

Welcome to crystal
```

```python
#numpy.char.title() method
import numpy as np
print("Converting string into title cased version...")
print(np.char.title("welcome to crystal"))
```

```
Converting string into title cased version...

Welcome To Crystal
```

```python
#numpy.char.lower() method
import numpy as np
print("Converting all the characters of the string into lowercase...")
print(np.char.lower("WELCOME TO CRYSTAL"))
```

```
Converting all the characters of the string into lowercase...

welcome to crystal
```

```
#numpy.char.upper() method
import numpy as np
print("Converting all the characters of the string into uppercase...")
print(np.char.upper("welcome to crystal"))
```

```
Converting all the characters of the string into
uppercase...

WELCOME TO CRYSTAL
```