

Summer 2023: CS5710 – Machine Learning

In-Class Programming Assignment-1

Github link: <https://github.com/arunkumar2601/Assignment-1.git>

1. NumPy:

a. Using NumPy create random vector of size 15 having only Integers in the range 1-20.

1. Reshape the array to 3 by 5
2. Print array shape.
3. Replace the max in each row by 0

Create a 2-dimensional array of size 4 x 3 (composed of 4-byte integer elements), also print the shape, type, and data type of the array.



```
import numpy as np

# In[14]:

#Using NumPy create random vector of size 15 having only Integers in the range 1-20.
random_vector = np.random.randint(low=1, high=17, size=15)
arr_3x5 = random_vector.reshape(3, 5)
print(arr_3x5)
print(arr_3x5.shape)
arr_3x5[np.arange(3), arr_3x5.argmax(axis=1)] = 0
print(arr_3x5)
```

```
[[12  4  9  3  1]
 [ 4  6 16 10 13]
 [ 4  3 11  8 14]]
(3, 5)
[[ 0  4  9  3  1]
 [ 4  6 16 10 13]
 [ 4  3 11  8  0]]
```

b. Write a program to compute the eigenvalues and right eigenvectors of a given square array given below:

```
[[ 3 -2]
 [ 1  0]]
```



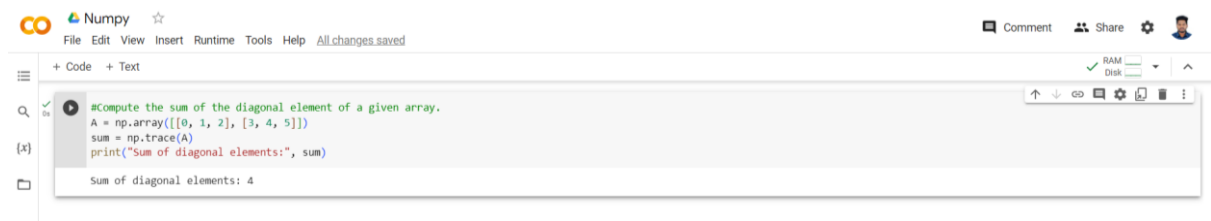
```
import numpy as np

#program to compute the eigenvalues and right eigenvectors of a given square array given below:
A = np.array([[3, -2], [1, 0]])
eigenvalues, eigenvectors = np.linalg.eig(A)
print("Eigenvalues:", eigenvalues)
print("Right eigenvectors:\n", eigenvectors)
```

```
Eigenvalues: [2. 1.]
Right eigenvectors:
[[0.89442719 0.70710678]
 [0.4472136  0.70710678]]
```

- c. Compute the sum of the diagonal element of a given array.

```
[[0 1 2]
 [3 4 5]]
```

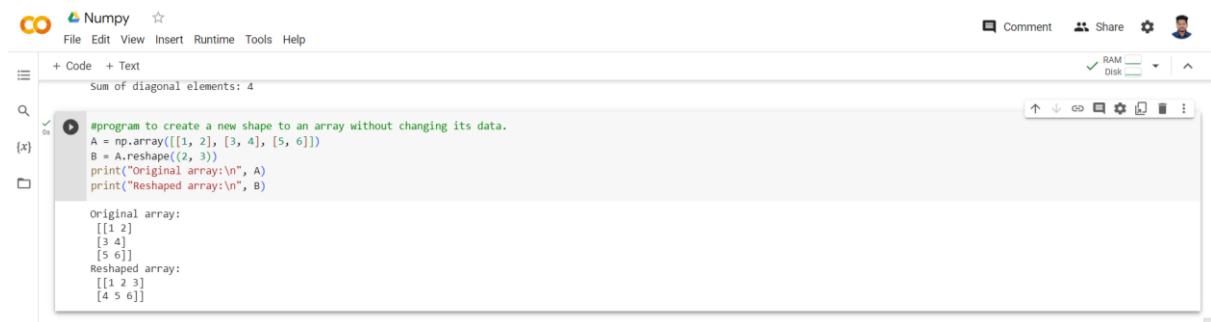


```
#Compute the sum of the diagonal element of a given array.
A = np.array([[0, 1, 2], [3, 4, 5]])
sum = np.trace(A)
print("Sum of diagonal elements:", sum)
```

Sum of diagonal elements: 4

- d. Write a NumPy program to create a new shape to an array without changing its data. Reshape 3x2:

```
[[1 2]
 [3 4]
 [5 6]]
Reshape 2x3:
[[1 2 3]
 [4 5 6]]
```



```
#program to create a new shape to an array without changing its data.
A = np.array([[1, 2], [3, 4], [5, 6]])
B = A.reshape((2, 3))
print("Original array:\n", A)
print("Reshaped array:\n", B)
```

Original array:
[[1 2]
 [3 4]
 [5 6]]
Reshaped array:
[[1 2 3]
 [4 5 6]]

2. Matplotlib

1. Write a Python programming to create a below chart of the popularity of programming Languages.
2. Sample data: Programming languages: Java, Python, PHP, JavaScript, C#, C++ Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

