National University of Modern Languages

Artificial Intelligence - LAB

Lab # 9

BSSE 5(M)

Submitted By:

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Submitted To:

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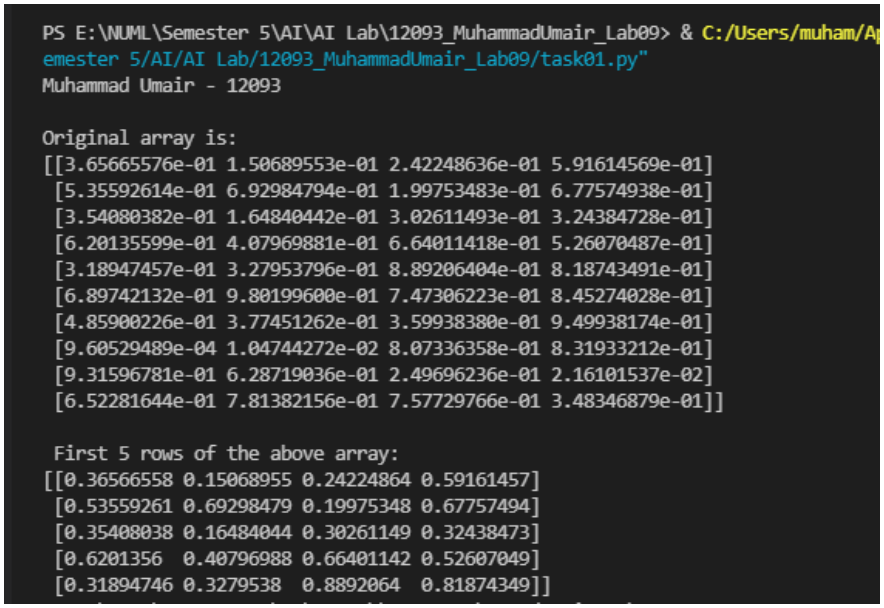
TASK 1

Write a NumPy program to create a random 10x4 array and extract the first five rows of the array and store them into a variable.

Code:

```
print("Muhammad Umair - 12093")
import numpy as np
arr1 = np.random.rand(10, 4)
print("Original array is: ")
print(arr1)
arr2= arr1[:5, :]
print("\n First 5 rows of the above array:")
print(arr2)
```



```
PS E:\NUML\Semester 5\AI\AI Lab\12093_MuhammadUmair_Lab09> & C:/Users/muham/A
emester 5/AI/AI Lab/12093_MuhammadUmair_Lab09/task01.py"
Muhammad Umair - 12093

Original array is:
[[3.65665576e-01 1.50689553e-01 2.42248636e-01 5.91614569e-01]
 [5.35592614e-01 6.92984794e-01 1.99753483e-01 6.77574938e-01]
 [3.54080382e-01 1.64840442e-01 3.02611493e-01 3.24384728e-01]
 [6.20135599e-01 4.07969881e-01 6.64011418e-01 5.26070487e-01]
 [3.18947457e-01 3.27953796e-01 8.89206404e-01 8.18743491e-01]
 [6.89742132e-01 9.80199600e-01 7.47306223e-01 8.45274028e-01]
 [4.85900226e-01 3.77451262e-01 3.59938380e-01 9.49938174e-01]
 [9.60529489e-04 1.04744272e-02 8.07336358e-01 8.31933212e-01]
 [9.31596781e-01 6.28719036e-01 2.49696236e-01 2.16101537e-02]
 [6.52281644e-01 7.81382156e-01 7.57729766e-01 3.48346879e-01]]

 First 5 rows of the above array:
[[0.36566558 0.15068955 0.24224864 0.59161457]
 [0.53559261 0.69298479 0.19975348 0.67757494]
 [0.35408038 0.16484044 0.30261149 0.32438473]
 [0.6201356  0.40796988 0.66401142 0.52607049]
 [0.31894746 0.3279538  0.8892064  0.81874349]]
```

TASK 2

Write a Pandas program to select the rows where the number of attempts in the examination is greater than 2.
Sample Python dictionary data and list labels:
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j'] Expected
Output:
Number of attempts in the examination is greater than 2: name score
attempts qualify
b Dima 9.0 3 no
d James NaN 3 no
f Michael 20.0 3 yes

Code:

```
print("Muhammad Umair - 12093")
import pandas as pd
import numpy as np
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laur
a', 'Kevin', 'Jonas'],
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
df = pd.DataFrame(exam_data , index=labels)
print("Number of attempts in the examination is greater than 2 :")
print(df[(df['attempts'] > 2)])
```

```
PS E:\NUML\Semester 5\AI\AI Lab\12093_MuhammadUmair_Lab09>
emester 5/AI/AI Lab/12093_MuhammadUmair_Lab09/task02.py"
Muhammad Umair - 12093
Number of attempts in the examination is greater than 2 :
      name  score  attempts qualify
b     Dima    9.0         3      no
d    James    NaN         3      no
f  Michael   20.0         3     yes
```

TASK 3

From the sample data given in TASK 2; write a program to calculate the average of the scores. The program should be able to ignore NaN values.
Expected Output:
The average score is : 13.56

Code:

```
print("Muhammad Umair - 12093")
import pandas as pd
import numpy as np
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laur
a', 'Kevin', 'Jonas'],
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
df = pd.DataFrame(exam_data , index=labels)
print(df.score.dropna())
print("The average score is:", df.score.mean())
```