G. H. Raisoni College Of Engineering And Management, Wagholi Pune

2021- 2022

Group B :-Assignment no :- 1

Department	CE [SUMMER 2022 (Online)]		
Term / Section	III/B	Date Of **submission**	08-10-2021
Subject Name /Code	Python for Data Science / UCSP204		
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Registration Number	2020AC0E1100107		

Group B :> Experiment No 1 (8)

Aim → Write A python program to creat a 2D numpy array of 6 soccer team player, with their [height(meters), weight(kg)] by reshaping an 1D numpy array.

(i) Find out the average height
(ii) Median height
(iii) Standard deviation on height
(iv) Calculate the bmi and pring the bmis
(v) Create two arrays by checking the bmi
    (a) Arr1: bmi > 25
        Arr 2: bmi < 25 and print both the arrays

Theory :→

▶ **Numpy :→**

Numpy is a python library used for working with arrays.

It also has Functions For working in domain of linear algebra, Fourier transform and matrices

Numpy was created in 2005 by Travis E Oliphant. It is an open-soorse project and you can use it Freely. Numpy stands for Numerical values.

In python we have lists that serve that purpose of arrays. but they are slow to process. Numpy aims to provide an array object that is upto 50 times Faster than tradition python lists. The array object in Numpy is called ndarray, it provides a

lot of supporting functions that make working with ndarray very easy. Arrays are very frequently used in data science, where speed and resources are very important.

Numpy arrays are stored at one continuous place in memory unlike lists, so processes can access and manipulate them very efficiently. This is the reason why numpy is faster than lists. Also it is optimized to work with latest CPU architectures.

Install it using command

C:\Users\User Name> pip install numpy

once Numpy is installed, import it in your applications by adding the import keyword:

import numpy

we can create a numpy ndarray by using the array() function

To create an ndarrays, we can pass a list, tuple or any array-like object into the array() method, and it will be converted into an ndarray.

A dimention in array is one level of array depth (nested arrays).

2D-Array

An array that has 1-D arrays as its elements is called a 2-D array.

Array indexing is the same as accessing an array element. you can access an array

element by referring to its index numbers. The indexes in Numpy arrays start with 0, meaning that the first element has index 0, and the second has index 1, etc. To access elements from 2-D arrays we can use comma separated integers representing the dimension and the index of the element.

Ex.

A = {1, 2, 3, 4} , B = [5, 6] , C = [7, 8]

T = [[1,2,3,4], [5,6], [7, 8]]

Numpy array Reshaping

Reshaping means changing the shape of an array. The array is the number of elem in each dimension. By reshaping we can add or remove dimensions or change number of elements in each dimension.

Ex.

convert the following 1-D array with 12 elements into a 2-D array. The outermost dimension will have 4 arrays, each with 3 e

```
import numpy as np

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

newarr = arr.reshape(4,3)

print(newarr)
```

Group B Assignment 1 program code

```
import numpy as np
print("****************************************")
print("SCOB77_Pratham pitty_Group B Assignment 1")
print("****************************************")
print("heig.(m) weig.(kg)")
playerdetails = [1.7 , 78.4, 1.8, 70.5,2.1, 84.5, 1.7, 75.2 , 1.9 , 75.1  , 1.6 , 68.8]
soccer = np.array(playerdetails)
np_soccer = soccer.reshape(6,2)
print (np_soccer)



# Print out the shape of np_soccer
print("\nHear i have reshaped it in ")
print(np_soccer.shape)
print("\n-------------------------------------------------")

#Printing the average of Heights
avg = np.mean(np_soccer[:,0])
print("Average of Heights: " + str(avg))
print("\n-------------------------------------------------")

# Print median height.
med = np.median(np_soccer[:,0])
print("Median height: " + str(med))
print("\n-------------------------------------------------")

# Print out the standard deviation on height.
stddev = np.std(np_soccer[:,0])
```

```
print("Standard Deviation on height: " + str(stddev))
print("\n-------------------------------------------------\n")

#Calculating BMI
np_height = np_soccer[:,0]
np_weight = np_soccer[:,1]
bmi = np_weight/np_height**2
print ("BMI value of players is:- ")
print(bmi)

print("\n-------------------------------------------------")
arr_overweight = bmi[bmi>25]
print ("Overweight players")
print (arr_overweight)
print("\n-------------------------------------------------")
arr_normal = bmi[bmi<=25]

print ("players with NORMAL BMI values ")
print (arr_normal)
print("\n-------------------------------------------------")
```

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Run Code

In [52]:

```
import numpy as np
print("****************************************")
print("SCOB77_Pratham pitty_Group B Assignment 1")
print("****************************************")
print("heig.(m) weig.(kg)")
playerdetails = [1.7 , 78.4, 1.8, 70.5,2.1, 84.5, 1.7, 75.2 , 1.9 , 75.1  , 1.6 , 68.8]
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print ("BMI value of players is:- ")
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print("\n-------------------------------------------------")
arr_overweight = bmi[bmi>25]
print ("Overweight players")
print (arr_overweight)
print("\n-------------------------------------------------")
```

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Run Code

```
print ("overweight players ")
print (arr_overweight)
print("\n-------------------------------------------------")
arr_normal = bmi[bmi<=25]

print ("players with NORMAL BMI values ")
print (arr_normal)
print("\n-------------------------------------------------")
```

```
*****************************************
SCOB77_Pratham pitty_Group B Assignment 1
*****************************************
heig.(m) weig.(kg)
[[ 1.7 78.4]
 [ 1.8 70.5]
 [ 2.1 84.5]
 [ 1.7 75.2]
 [ 1.9 75.1]
 [ 1.6 68.8]]

Hear i have reshaped it in
(6, 2)

--------------------------------------------------
Average of Heights: 1.7999999999999998

--------------------------------------------------
Median height: 1.75

--------------------------------------------------
Standard Deviation on height: 0.16329931618554522

--------------------------------------------------

BMI value of players is:-
[27.12802768 21.75925926 19.16099773 26.02076125 20.8033241  26.875     ]

--------------------------------------------------
Overweight players
[27.12802768 26.02076125 26.875     ]

--------------------------------------------------
players with NORMAL BMI values
[21.75925926 19.16099773 20.8033241 ]

--------------------------------------------------
```