

GROUP B

PDS Assignment No.- 01

Group (B)

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Assignment No. (1)

AIM — Create 2D numpy array of 6 soccer team players with their [height (meters), weights (kgs)] 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 print the bmis > 25 .
- (v) Create two arrays by checking the bmis
 - (a) Arr1 : bmi > 25
 - (b) Arr2 : bmi < 25 and print both the arrays.

Theory →

* What are Numpy arrays?

— Numpy arrays are commonly used scientific data structure in python, that stores data as grid or a matrix. In python data structure are objects that provide ability to divide, organise and Manipulate the data by defining relationship between data values stored within the data structure and by providing a set of functionality that can be executed on the data structure.

— Arrays in Numpy is a table of elements, all of the same type, indexed by a tuple of positive integers. In Numpy, number of dimensions of the array is called rank of the array.

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A tuple of integers giving the size of the array along each dimension is known as shape of the array.

- An array class in Numpy is called as ndarray.
- Elements in numpy arrays are accessed using square brackets and can be initialized using nested python lists.

* Creating a Numpy Array.

- Arrays in numpy can be created by multiple ways, with various numbers of Ranks, defining the size of the array.
- Arrays can also be created with the various use of data types such as lists, tuples, etc.
The type of resultant array is deduced from the type of elements in the sequences.

Note →

Functions used in the program to perform operations on the player details of soccer team.

`np.reshape()` - To reshape the array.

`np.mean()` - To calculate the mean.

`np.std()` - To calculate the standard deviation.

`np.median()` - To calculate the median.

Program code:

```
import numpy as np

print("_____SCOB86_Rudraksh Karpe_____")

playerdetails = [1.5,90.8,2.1,90.7,2.1,77.8,1.4,80.4]

soccer = np.array(playerdetails)

# Reshaping from 1D to 2D Numpy array

np_soccer = soccer.reshape(4,2)

print (np_soccer)

print(np_soccer.shape)

avg = np.mean(np_soccer[:,0])

print('Average:',avg)

med = np.median(np_soccer[:,0])

print("Median: " ,med)

stddev = np.std(np_soccer[:,0])

print("Standard Deviation: ",stddev)

np_height = np_soccer[:,0]

np_weight = np_soccer[:,1]

body_mass_ratio = np_weight/np_height**2

print (body_mass_ratio)

arr_overweight = body_mass_ratio[body_mass_ratio>25]

print ("Overweight players")

print (arr_overweight)

normal = body_mass_ratio[body_mass_ratio<=25]

print ("players whose bmi is normal ",normal)
```

Output:

```
SCOB86_Rudraksh Karpe
[[ 1.5 90.8]
 [ 2.1 90.7]
 [ 2.1 77.8]
 [ 1.4 80.4]]
(4, 2)
Average: 1.775
Median: 1.8
Standard Deviation: 0.3269174207655506
[40.35555556 20.56689342 17.64172336 41.02040816]
Overweight players
[40.35555556 41.02040816]
players whose bmi is normal [20.56689342 17.64172336]
```