

Homework

1. Write a function `get_max()` that takes a list of numbers and returns its maximum value.

Example:

```
list1 = [3, 1, 4, 1, 5, 9]
ans = get_max(list1)
print(ans)
```

Output:

9

2. Write a function `get_unique()` that takes a list of numbers and returns the number of unique values and a list containing all unique values.

Example:

```
list1 = [3, 1, 4, 1, 5, 9]
n_unique, list_unique = get_unique(list1)
print(n_unique)
print(list_unique)
```

Output:

5
[1, 3, 4, 5, 9] (The order does not matter)

3. Write a class named `DataHandler` that achieves the following:

- Its `__init__()` method assigns a list to `self.list`
- Its `shape()` method returns the number of values in the list.
- Its `mean()` method returns the average of the values in the list.
- Its `variance()` method returns the variance of the values in the list.
- Its `std()` method returns the standard deviation of the values in the list.

Formulae: Denote the list as $[x_1, x_2, \dots, x_n]$,

- The mean value is calculated as

$$mean = \frac{x_1 + x_2 + \dots + x_n}{n}.$$

- The variance is calculated as

$$variance = \frac{(x_1 - mean)^2 + (x_2 - mean)^2 + \dots + (x_n - mean)^2}{n}.$$

- The standard deviation is calculated as

$$std = \sqrt{variance}.$$

Example:

```
list1 = [3, 1, 4, 1, 5, 9]
data = DataHandler(list1)
print(data.shape())
print(data.mean())
print(data.variance())
print(data.std())
```

Output:

```
6
3.8333333333333335
7.472222222222221
2.733536577809454
```

Write the programs in Jupyter Notebook. Make sure that you execute your code on the example and show correct results. Submit the PDF file to Blackboard by Wednesday, Sep. 09th.

In []: