

Experiment - 15

Aim: Computation on NumPy arrays using Universal Functions and Mathematical methods.

Objective: Applying statistical functions on NumPy array

Program:

```
import numpy as np

# construct a NumPy array
weight = np.array([50.7, 52.5, 50, 58, 55.63, 73.25, 49.5, 45])

# minimum and maximum
print('Minimum and maximum weight of the students: ')
print(np.amin(weight), np.amax(weight))

# percentile
print('Weight below which 70 % student fall: ')
print(np.percentile(weight, 70))

# mean
print('Mean weight of the students: ')
print(np.mean(weight))

# median
print('Median weight of the students: ')
print(np.median(weight))

# standard deviation
print('Standard deviation of weight of the students: ')
print(np.std(weight))

# variance
print('Variance of weight of the students: ')
print(np.var(weight))

# average
print('Average weight of the students: ')
print(np.average(weight))
```

Output:

Minimum and maximum weight of the students:
45.0 73.25

Weight below which 70 % student fall:
55.317

Mean weight of the students:
54.3225

Median weight of the students:
51.6

Standard deviation of weight of the students:
8.05277397857

Variance of weight of the students:
64.84716875

Average weight of the students:
54.3225

Objective: Applying mathematical functions on NumPy array

Program:

```
import numpy as np

# Apply arithmetic operations on numpy arrays

arr1 = np.arange(16).reshape(4,4)
arr2 = np.array([1, 3, 2, 4])

add_arr = np.add(arr1,arr2)
sub_arr=np.subtract(arr1,arr2)
mul_arr = np.multiply(arr1, arr2)
div_arr = np.divide(arr1, arr2)
mod_arr = np.mod(arr1, arr2)
mod_arr = np.remainder(arr1, arr2)

print("Adding two arrays:\n",add_arr)
print("Subtracting two arrays:\n",sub_arr)
print("Multiplying the two arrays:\n",mul_arr)
print("Dividing the two arrays:\n",div_arr)
print("Applying mod() function:\n",mod_arr)
print("Applying remainder() function \n:",mod_arr)
```

Output:

Adding two arrays:

```
[[ 1  4  4  7]
 [ 5  8  8 11]
 [ 9 12 12 15]
 [13 16 16 19]]
```

Subtracting two arrays:

```
[[ -1  -2   0  -1]
 [  3   2   4   3]
 [  7   6   8   7]
 [11 10 12 11]]
```

Multiplying the two arrays:

```
[[  0   3   4 12]
 [  4 15 12 28]
 [  8 27 20 44]
 [12 39 28 60]]
```

Dividing the two arrays:

```
[[ 0.          0.33333333  1.          0.75         ]
 [ 4.          1.66666667  3.          1.75         ]
 [ 8.           3.          5.          2.75         ]
 [12.          4.33333333  7.          3.75         ]]
```

Applying mod() function:

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

Applying remainder() function:

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