

Experiment 12 - Statistical Operations using NumPy (Mean, Median, Variance, and Standard Deviation)

Name: Mohammad Sayeed

1. Marks of 30 students

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Marks of 30 students.

Code:

```
import numpy as np
data = np.array([60, 43, 80, 71, 55, 92, 76, 53, 81, 40, 46, 86, 92,
88, 70, 43, 75, 79, 43, 77, 68, 49, 93, 78, 90, 44, 58, 73, 84, 72])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 68.63
Median -> 72.50
Variance -> 288.30
Standard Deviation -> 16.98
```

2. Daily temperatures (15 days)

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Daily temperatures (15 days).

Code:

```
import numpy as np
data = np.array([34.84, 21.96, 25.88, 26.43, 18.24, 36.96, 33.01,
16.99, 37.87, 36.4, 16.04, 32.78, 32.9, 17.17, 31.28])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 27.92
Median -> 31.28
Variance -> 59.86
Standard Deviation -> 7.74
```

3. Monthly sales (12 months)

Section: NumPy Statistics

Compute mean, median, variance, and standard deviation for the dataset: Monthly sales (12 months).

Code:

```
import numpy as np
data = np.array([37194.68, 30313.44, 68343.95, 28135.45, 109026.09,
58760.47, 24833.12, 68024.68, 26749.44, 108238.97, 97945.68, 76820.85])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 61198.90
Median -> 63392.57
Variance -> 944225799.71
Standard Deviation -> 30728.26
```

4. Exam scores (20 students)

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Exam scores (20 students).

Code:

```
import numpy as np
data = np.array([46, 6, 90, 75, 0, 30, 76, 14, 62, 87, 10, 100, 95, 79,
62, 100, 41, 19, 0, 37])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 51.45
Median -> 54.00
Variance -> 1192.05
Standard Deviation -> 34.53
```

5. Heights (cm) of 25 people

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Heights (cm) of 25 people.

Code:

```
import numpy as np
data = np.array([180.6, 158.98, 154.38, 167.97, 170.06, 166.88, 175.14,
168.95, 183.98, 170.16, 167.21, 172.81, 158.93, 163.81, 175.12, 173.22,
164.94, 158.87, 167.84, 169.99, 164.74, 171.88, 174.44, 166.93,
181.78])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
```

```
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 169.18
Median -> 168.95
Variance -> 50.58
Standard Deviation -> 7.11
```

6. Weights (kg) of 25 people

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Weights (kg) of 25 people.

Code:

```
import numpy as np
data = np.array([65.39, 81.47, 46.9, 85.45, 77.25, 59.28, 45.71, 65.65,
54.12, 68.26, 75.53, 65.4, 82.99, 47.37, 63.45, 61.38, 71.07, 64.35,
65.79, 47.9, 68.0, 67.33, 44.98, 79.19, 63.31])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 64.70
Median -> 65.40
Variance -> 136.40
Standard Deviation -> 11.68
```

7. Stock closing prices (10 days)

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Stock closing prices (10 days).

Code:

```
import numpy as np
data = np.array([122.51, 118.71, 353.95, 332.1, 112.4, 471.63, 315.32,
348.14, 263.72, 442.25])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 288.07
Median -> 323.71
Variance -> 15564.13
Standard Deviation -> 124.76
```

8. Rainfall (mm) 12 months

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Rainfall (mm) 12 months.

Code:

```
import numpy as np
data = np.array([129.09, 74.08, 67.68, 111.64, 289.11, 91.59, 194.82,
25.05, 230.99, 60.5, 178.24, 206.51])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
```

```
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 138.28
Median -> 120.37
Variance -> 5978.72
Standard Deviation -> 77.32
```

9. Electricity consumption (kWh) 12 months

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Electricity consumption (kWh) 12 months.

Code:

```
import numpy as np
data = np.array([375.04, 691.63, 215.7, 587.97, 348.85, 391.33, 693.35,
445.68, 459.26, 674.56, 532.2, 420.58])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 486.35
Median -> 452.47
Variance -> 21094.23
Standard Deviation -> 145.24
```

10. Ages of group (30 people)

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Ages of group (30 people).

Code:

```
import numpy as np
data = np.array([62, 23, 31, 19, 51, 64, 37, 29, 61, 26, 43, 23, 66,
64, 31, 21, 54, 39, 32, 57, 66, 58, 63, 30, 20, 24, 28, 57, 42, 45])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 42.20
Median -> 40.50
Variance -> 263.43
Standard Deviation -> 16.23
```

11. Car mileage (km/l) sample 15

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Car mileage (km/l) sample 15.

Code:

```
import numpy as np
data = np.array([21.07, 10.01, 14.06, 24.54, 20.81, 18.66, 24.67,
17.46, 9.96, 10.93, 23.22, 23.83, 18.36, 21.28, 19.07])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
```

```
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 18.53
Median -> 19.07
Variance -> 24.56
Standard Deviation -> 4.96
```

12. Cricket runs by player in 10 matches

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Cricket runs by player in 10 matches.

Code:

```
import numpy as np
data = np.array([118, 78, 91, 87, 135, 130, 137, 14, 72, 99])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 96.10
Median -> 95.00
Variance -> 1258.09
Standard Deviation -> 35.47
```

13. Salaries (in ₹) of 20 employees

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Salaries (in ₹) of 20 employees.

Code:

```
import numpy as np
data = np.array([41015.49, 101771.22, 86966.27, 134431.8, 103368.09,
26235.33, 125423.95, 114800.98, 145471.18, 82924.66, 50372.07,
25927.39, 106488.83, 23428.88, 57815.76, 135760.95, 144381.58,
46481.31, 80794.86, 127763.08])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 88081.18
Median -> 94368.74
Variance -> 1678033308.93
Standard Deviation -> 40963.80
```

14. House prices (in 000s) sample 12

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: House prices (in 000s) sample 12.

Code:

```
import numpy as np
data = np.array([10176.28, 2618.34, 6816.71, 3683.04, 11845.15,
7190.52, 5901.99, 9496.71, 4892.49, 4675.75, 11907.99, 10999.92])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 7517.07
Median -> 7003.61
Variance -> 9833129.58
Standard Deviation -> 3135.78
```

15. Blood pressure systolic readings (15)

Section: NumPy Statistics

Problem Statement:

Compute mean, median, variance, and standard deviation for the dataset: Blood pressure systolic readings (15).

Code:

```
import numpy as np
data = np.array([111.15, 114.28, 115.08, 131.96, 102.9, 119.35, 119.39,
139.98, 100.47, 121.6, 114.55, 122.13, 128.18, 122.67, 146.41])
mean = np.mean(data)
median = np.median(data)
var = np.var(data, ddof=0)
std = np.std(data, ddof=0)
print('Mean ->', format(mean, '.2f'))
print('Median ->', format(median, '.2f'))
print('Variance ->', format(var, '.2f'))
print('Standard Deviation ->', format(std, '.2f'))
```

Output:

```
PS C:\Users\Mohammad Sayeed> python file.py
Mean -> 120.67
Median -> 119.39
Variance -> 143.58
Standard Deviation -> 11.98
```