Vaishnavi Ashok Patil
C07
SPP-II

Experiment 12

1. **Write a NumPy program to store marks of 10 students in an array. Calculate the mean, median, variance, and standard deviation of the marks.**

    ```
    import numpy as np
    marks = np.array([78, 85, 90, 66, 72, 88, 95, 70, 80, 84])
    mean = np.mean(marks)
    median = np.median(marks)
    variance = np.var(marks)
    std_dev = np.std(marks)
    print("Marks of 10 students:", marks)
    print("Mean:", mean)
    print("Median:", median)
    print("Variance:", variance)
    print("Standard Deviation:", std_dev)
    ```

*   **Output**

    ```
    Marks of 10 students: [78 85 90 66 72 88 95 70 80 84]
    Mean: 80.8
    Median: 82.0
    Variance: 78.76
    Standard Deviation: 8.874683092933516
    ```

2. **Store the daily temperature (in °C) of one week in an array. Use NumPy to find the average temperature, the median temperature, the variance, and the standard deviation.**

    ```
    import numpy as np
    temperature = np.array([30.5, 32.0, 31.2, 29.8, 33.5, 34.0, 30.0])
    average_temp = np.mean(temperature)
    median_temp = np.median(temperature)
    variance = np.var(temperature)
    std_dev = np.std(temperature)
    print("Daily temperatures (°C):", temperature)
    print("Average Temperature:", average_temp)
    print("Median Temperature:", median_temp)
    print("Variance:", variance)
    print("Standard Deviation:", std_dev)
    ```

*   **Output**

    ```
    Daily temperatures (°C): [30.5 32.  31.2 29.8 33.5 34.  30. ]
    Average Temperature: 31.571428571428573
    Median Temperature: 31.2
    Variance: 2.384897959183673
    Standard Deviation: 1.544311483860582
    ```

3. **Given monthly sales data of a shop for 12 months, calculate the mean sales, median sales, variance, and standard deviation using NumPy.**

```
import numpy as np
sales = np.array([25000, 27000, 30000, 28000, 35000, 32000, 31000, 40000, 37000, 36000, 39000, 41000])
mean_sales = np.mean(sales)
median_sales = np.median(sales)
variance_sales = np.var(sales)
std_dev_sales = np.std(sales)
print("Monthly Sales Data:", sales)
print("Mean Sales:", mean_sales)
print("Median Sales:", median_sales)
print("Variance:", variance_sales)
print("Standard Deviation:", std_dev_sales)
```

- **Output**

```
Monthly Sales Data: [25000 27000 30000 28000 35000 32000
    31000 40000 37000 36000 39000 41000]
Mean Sales: 33416.666666666664
Median Sales: 33500.0
Variance: 26243055.555555552
Standard Deviation: 5122.797629767894
```

4. **Take the exam scores of students in a class and find: The average score, The median score, Variance and standard deviation (to check how spread out the scores are).**

```
import numpy as np
scores = np.array([85, 78, 92, 88, 76, 95, 89, 84, 91, 73, 87, 90])
average_score = np.mean(scores)
median_score = np.median(scores)
variance = np.var(scores)
std_deviation = np.std(scores)
print("Exam Scores:", scores)
print("Average Score:", average_score)
print("Median Score:", median_score)
print("Variance:", variance)
print("Standard Deviation:", std_deviation)
```

- **Output**

```
Exam Scores: [85 78 92 88 76 95 89 84 91 73 87 90]
Average Score: 85.66666666666667
Median Score: 87.5
Variance: 42.38888888888889
Standard Deviation: 6.51067499487487
```

5. **Create a NumPy array with heights (in cm) of 15 students. Compute mean, median, variance, and standard deviation of heights.**

```
import numpy as np
heights = np.array([160, 165, 170, 155, 172, 168, 174, 169, 162, 158, 176, 180, 166, 171, 164])
mean_height = np.mean(heights)
median_height = np.median(heights)
```

```
variance = np.var(heights)
std_deviation = np.std(heights)
print("Heights of 15 students (cm):", heights)
print("Mean Height:", mean_height)
print("Median Height:", median_height)
print("Variance:", variance)
print("Standard Deviation:", std_deviation)
```

- **Output**

```
Heights of 15 students (cm): [160 165 170 155 172 168 174
     169 162 158 176 180 166 171 164]
Mean Height: 167.33333333333334
Median Height: 168.0
Variance: 44.35555555555556
Standard Deviation: 6.659996663329161
```

6. **Store the weights (in kg) of 12 patients in a NumPy array. Find average, median, variance, and standard deviation.**

```
import numpy as np
weights = np.array([55, 60, 58, 62, 65, 70, 68, 72, 64, 59, 66, 61])
average_weight = np.mean(weights)
median_weight = np.median(weights)
variance = np.var(weights)
std_deviation = np.std(weights)
print("Weights of 12 patients (kg):", weights)
print("Average Weight:", average_weight)
print("Median Weight:", median_weight)
print("Variance:", variance)
print("Standard Deviation:", std_deviation)
```

- **Output**

```
Weights of 12 patients (kg): [55 60 58 62 65 70 68 72 64 59
     66 61]
Average Weight: 63.333333333333336
Median Weight: 63.0
Variance: 23.88888888888889
Standard Deviation: 4.8876260995383936
```

Vaishnavi Ashok Patil
C07
SPP-II

7. **Given stock prices of a company for 7 days, calculate: Average stock price, Median stock price, Variance and standard deviation (to check volatility).**

```
import numpy as np
stock_prices = np.array([250, 255, 260, 245, 270, 265, 275])
average_price = np.mean(stock_prices)
median_price = np.median(stock_prices)
variance = np.var(stock_prices)
std_deviation = np.std(stock_prices)
print("Stock Prices for 7 days:", stock_prices)
print("Average Stock Price:", average_price)
print("Median Stock Price:", median_price)
print("Variance:", variance)
print("Standard Deviation:", std_deviation)
```

- **Output**

```
Stock Prices for 7 days: [250 255 260 245 270 265 275]
Average Stock Price: 260.0
Median Stock Price: 260.0
Variance: 100.0
Standard Deviation: 10.0
```

8. **Store rainfall (in mm) of a city for 10 days. Calculate mean, median, variance, and standard deviation.**

```
import numpy as np
rainfall = np.array([12.5, 15.0, 8.2, 20.1, 18.6, 10.0, 25.4, 22.3, 16.8, 14.7])
mean_rainfall = np.mean(rainfall)
median_rainfall = np.median(rainfall)
variance = np.var(rainfall)
std_deviation = np.std(rainfall)
print("Rainfall (mm) for 10 days:", rainfall)
print("Mean Rainfall:", mean_rainfall)
print("Median Rainfall:", median_rainfall)
print("Variance:", variance)
print("Standard Deviation:", std_deviation)
```

- **Output**

```
Rainfall (mm) for 10 days: [12.5 15.   8.2 20.1 18.6 10.
    25.4 22.3 16.8 14.7]
Mean Rainfall: 16.360000000000003
Median Rainfall: 15.9
Variance: 26.274400000000004
Standard Deviation: 5.125856026070182
```

9. **Given electricity consumption (in kWh) of 8 households, use NumPy to find mean, median, variance, and standard deviation.**

```
import numpy as np
```

```python
consumption = np.array([120, 150, 130, 170, 160, 140, 155, 165])
mean_consumption = np.mean(consumption)
median_consumption = np.median(consumption)
variance = np.var(consumption)
std_deviation = np.std(consumption)
print("Electricity Consumption (kWh):", consumption)
print("Mean Consumption:", mean_consumption)
print("Median Consumption:", median_consumption)
print("Variance:", variance)
print("Standard Deviation:", std_deviation)
```

- **Output**

```
Electricity Consumption (kWh): [120 150 130 170 160 140 155
    165]
Mean Consumption: 148.75
Median Consumption: 152.5
Variance: 267.1875
Standard Deviation: 16.345871038277526
```

10. **Store the ages of 20 people in a NumPy array. Find the mean age, median age, variance, and standard deviation.**

```python
import numpy as np
ages = np.array([18, 20, 22, 25, 27, 30, 19, 21, 24, 26, 28, 23, 29, 31, 33, 35, 32, 34, 36, 38])
mean_age = np.mean(ages)
median_age = np.median(ages)
variance = np.var(ages)
std_deviation = np.std(ages)
print("Ages of 20 people:", ages)
print("Mean Age:", mean_age)
print("Median Age:", median_age)
print("Variance:", variance)
print("Standard Deviation:", std_deviation)
```

- **Output**

```
Ages of 20 people: [18 20 22 25 27 30 19 21 24 26 28 23 29
    31 33 35 32 34 36 38]
Mean Age: 27.55
Median Age: 27.5
Variance: 34.2475
Standard Deviation: 5.8521363620476246
```

11. **Given the mileage (in km/l) of 10 cars, calculate mean, median, variance, and standard deviation.**

```python
import numpy as np
mileage = np.array([15.2, 18.5, 16.8, 14.9, 20.1, 19.3, 17.5, 16.0, 18.0, 15.8])
mean_mileage = np.mean(mileage)
median_mileage = np.median(mileage)
variance = np.var(mileage)
std_deviation = np.std(mileage)
print("Mileage of 10 cars (km/l):", mileage)
print("Mean Mileage:", mean_mileage)
print("Median Mileage:", median_mileage)
print("Variance:", variance)
print("Standard Deviation:", std_deviation)
```

- **Output**

```
Mileage of 10 cars (km/l): [15.2 18.5 16.8 14.9 20.1 19.3
    17.5 16.  18.  15.8]
Mean Mileage: 17.21
Median Mileage: 17.15
Variance: 2.808900000000001
Standard Deviation: 1.6759773268156108
```

12. **Store cricket runs scored by a player in 8 matches. Find average runs, median runs, variance, and standard deviation.**
    import numpy as np
    runs = np.array([45, 60, 75, 32, 90, 55, 80, 70])
    average_runs = np.mean(runs)
    median_runs = np.median(runs)
    variance = np.var(runs)
    std_deviation = np.std(runs)
    print("Runs scored in 8 matches:", runs)
    print("Average Runs:", average_runs)
    print("Median Runs:", median_runs)
    print("Variance:", variance)
    print("Standard Deviation:", std_deviation)

- **Output**

```
Runs scored in 8 matches: [45 60 75 32 90 55 80 70]
Average Runs: 63.375
Median Runs: 65.0
Variance: 320.984375
Standard Deviation: 17.91603681063421
```

13. **Store salaries of 15 employees in an array. Use NumPy to calculate mean salary, median salary, variance, and standard deviation.**
    import numpy as np
    salaries = np.array([25000, 28000, 30000, 27000, 32000, 35000, 31000, 33000, 34000, 36000, 37000, 29000, 26000, 38000, 40000])
    mean_salary = np.mean(salaries)
    median_salary = np.median(salaries)
    variance = np.var(salaries)
    std_deviation = np.std(salaries)
    print("Salaries of 15 employees:", salaries)
    print("Mean Salary:", mean_salary)
    print("Median Salary:", median_salary)
    print("Variance:", variance)
    print("Standard Deviation:", std_deviation)

- **Output**

```
Salaries of 15 employees: [25000 28000 30000 27000 32000
     35000 31000 33000 34000 36000 37000 29000
  26000 38000 40000]
Mean Salary: 32066.666666666668
Median Salary: 32000.0
Variance: 19662222.222222224
Standard Deviation: 4434.210439550904
```

14. **Given prices of 12 houses in a city, calculate: Average house price, Median house price, Variance and standard deviation.**
    import numpy as np
    house_prices = np.array([4500000, 5200000, 4800000, 5000000, 5500000, 4700000, 6000000, 5800000, 4900000, 5300000, 6100000, 5600000])
    average_price = np.mean(house_prices)
    median_price = np.median(house_prices)
    variance = np.var(house_prices)
    std_deviation = np.std(house_prices)
    print("House Prices:", house_prices)
    print("Average House Price:", average_price)
    print("Median House Price:", median_price)
    print("Variance:", variance)
    print("Standard Deviation:", std_deviation)
    - **Output**

```
House Prices: [4500000 5200000 4800000 5000000 5500000
     4700000 6000000 5800000 4900000
  5300000 6100000 5600000]
Average House Price: 5283333.333333333
Median House Price: 5250000.0
Variance: 251388888888.8889
Standard Deviation: 501386.96521637746
```

15. **Take 10 blood pressure readings of a patient. Find mean, median, variance, and standard deviation using NumPy.**
    import numpy as np

    bp_readings = np.array([120, 125, 118, 130, 128, 122, 135, 126, 124, 129])

    mean_bp = np.mean(bp_readings)
    median_bp = np.median(bp_readings)
    variance = np.var(bp_readings)
    std_deviation = np.std(bp_readings)

    print("Blood Pressure Readings:", bp_readings)
    print("Mean:", mean_bp)
    print("Median:", median_bp)
    print("Variance:", variance)
    print("Standard Deviation:", std_deviation)
    - **OUTPUT**

Vaishnavi Ashok Patil
C07
SPP-II

```
Blood Pressure Readings: [120 125 118 130 128 122 135 126
    124 129]
Mean: 125.7
Median: 125.5
Variance: 23.009999999999998
Standard Deviation: 4.796873982084582
```