Experiment 3.1

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1. **Aim:** Write a Python program to compute Mean, Median, Mode, Variance, and Standard Deviation using Datasets

2. **Objective:** The objective of this experiment is to perform statistical analysis and gain insights into the characteristics of the data.

3. **Sample Code-**

```
import numpy as np
from statistics import mean, median, mode, variance, stdev

dataset = [12, 15, 18, 21, 24, 27, 30, 33, 36, 39]

mean_value = np.mean(dataset)
print(f"Mean: {mean_value}")

median_value = np.median(dataset)
print(f"Median: {median_value}")

try:
    mode_value = mode(dataset)
print(f"Mode: {mode_value}") except
statistics.StatisticsError:    print("No
```

unique mode found") variance_value = np.var(dataset)
print(f"Variance: {variance_value}")

std_deviation_value = np.std(dataset)
print(f"Standard Deviation: {std_deviation_value}")

4. Outcome-

```
C:\Users\Manish\PycharmProjects\pythonProject2\venv\Scripts\
Mean: 25.5
Median: 25.5
Mode: 12
Variance: 74.25
Standard Deviation: 8.616843969807043

Process finished with exit code 0
```

5. <u>Code Explanation-</u>

1. Initialize the dataset with your data.

2. Compute the mean:

- Calculate the sum of all values in the dataset.

- Divide the sum by the number of data points in the dataset to obtain the mean.

3. Compute the median:

- Sort the dataset in ascending order.

- If the number of data points is odd, the median is the middle value.

- If the number of data points is even, the median is the average of the two middle values.

4. Compute the mode:

- Count the frequency of each value in the dataset.

- Identify the value(s) with the highest frequency (mode).

5. Compute the variance:

- Calculate the mean (step 2).

- For each data point in the dataset, subtract the mean, square the result, and sum all the squared differences.

- Divide the sum of squared differences by the number of data points to obtain the variance.

6. Compute the standard deviation:

   - Take the square root of the variance (computed in step 5) to get the standard deviation.

7. Display or use the calculated mean, median, mode, variance, and standard deviation as needed.