Assignment No-04 :- Assignment based on calculations of the Measures of Variation (such as range, variance, and standard deviation, etc.)

Without Using Inbuilt Functions

In [4]:
```
import pandas as pd
import numpy as np
```

In [5]:
```
data = pd.read_csv('student_marks.csv')
```

In [6]:
```
# Range
def calc_range(data):
    return np.max(data) - np.min(data)

print ("Range:", calc_range(data['Marks']))
```

```
Range: 27
```

In [8]:
```
# Variance
def calc_variance(data):
    mean = sum(data) / len(data)
    squared_diffs = [(x - mean) ** 2 for x in data]
    variance = sum(squared_diffs) / (len(data) - 1)  # sample variance
    return variance

print ("Variance:", calc_variance(data['Marks']))
```

```
Variance: 78.4
```

In [ ]:
```
# Standard Deviation
def calculate_std_dev(data):
    variance = calc_variance(data)
    return np.sqrt(variance)

print("Standard Deviation:", calculate_std_dev(data['Marks']))
```

```
Standard Deviation: 8.854377448471462
```

In [16]:
```
print("\nWithout Using Inbuilt Functions:")
print("Range:", calc_range(data['Marks']))
print("Variance:", calc_variance(data['Marks']))
print("Standard Deviation:", calculate_std_dev(data['Marks']))
```

```
Without Using Inbuilt Functions:
Range: 27
Variance: 78.4
Standard Deviation: 8.854377448471462
```

Using Inbuilt Functions

In [17]:
```
# Program to calculate Range, Variance, and Standard Deviation using inbuilt f

import statistics as stats
```

```python
import pandas as pd

data = pd.read_csv('student_marks.csv')
marks = data['Marks']

# Range
range_value = max(marks) - min(marks)

# Variance
variance_value = stats.variance(marks)

# Standard Deviation
std_dev_value = stats.stdev(marks)

print("Using Inbuilt Functions:")
print("Range:", range_value)
print("Variance:", variance_value)
print("Standard Deviation:", std_dev_value)
```

```
Using Inbuilt Functions:
Range: 27
Variance: 78.4
Standard Deviation: 8.854377448471462
```

In [ ]: