Name: Ankit Sharma

Email: kumarankitx022@gmail.com

Mob no.: +91-7677241423

ASSIGNMENT – 01

MEAN: Mean is the most commonly used measure of central tendency. There are different types of mean, viz. arithmetic mean, weighted mean, geometric mean (GM) and harmonic mean (HM).

1. Arithmetic mean (or, simply, "mean") is nothing but the average. It is computed by adding all the values in the data set divided by the number of observations in it.

$$\bar{X} = \frac{X_1 + X_2 + X_3 + \cdots\cdots X_n}{n} = \frac{\sum X}{n}$$

2. Weighted mean: When the values are not of equal importance, we assign them certain numerical values to express their relative importance. These numerical values are called weights. **If X_1, X_2, ……, X_k have weights W_1, W_2, ……, W_3,** then **the weighted arithmetic mean** or **the weighted $\bar{X}_w$ mean**, which is denoted as , is calculated by the following formula;

$$\bar{X}_w = \frac{W_1X_1 + W_2X_2 + \cdots\cdots + W_kX_k}{W_1 + W_2 + \cdots\cdots + W_k} = \frac{\sum WX}{\sum W}$$

3. Geometric mean: The geometric mean, G, of a set of *n* positive values X_1, X_2, ……, X_n is the nth root of the product of the values. Mathematically the formula for geometric mean will be as follows;

$$G = \sqrt[n]{X_1, X_2, \ldots\ldots, X_n}$$

$$= (X_1, X_2, \ldots\ldots, X_n)^{1/n}$$

In practice, it is difficult to extract higher roots. The geometric mean is, therefore, computed using logarithms. Mathematically, it will be represented as follows;

$$Log\ G = \frac{\log X_1 + \log X_2 + \cdots\cdots + \log X_n}{n} = \frac{\log \sum X}{n}$$

4. Harmonic mean: The harmonic mean, **H, of a set of n values X_1, X_2, ……, X_n** is the reciprocal of the arithmetic mean of the reciprocals of the values. Mathematically, the formula for harmonic mean will be as follows;

$$H = \frac{n}{\frac{1}{X_1} + \frac{1}{X_2} + \cdots\cdots + \frac{1}{X_n}}$$

$$= \frac{n}{\sum\left(\frac{1}{X}\right)}$$

CENTRAL TENDENCY ¶

In [6]:

```
import statistics as st
import random as rd
```

In [43]:

```
#Mean
nums = rd.sample(range(30),9)
print(nums)
print('Mean: ',st.mean(nums))
```

```
[10, 4, 0, 24, 1, 20, 27, 5, 8]
Mean:  11
```

In [44]:

```
#Meadian
print('Median: ', st.median(nums))
```

```
Median:  8
```

In [31]:

```
#Mode
alps = ['A','D','X','D','D','X','Y','Z']
print('Mode: ',st.mode(alps))
```

```
Mode:  D
```

DISPERSION

In [45]:

```
#Variance
print(nums)
print('Variance: ', st.variance(nums))
```

```
[10, 4, 0, 24, 1, 20, 27, 5, 8]
Variance:  102.75
```

In [47]:

```
#Standard deviation
print('St. Deviation: ', st.stdev(nums))
```

```
St. Deviation:  10.136567466356647
```

In [48]:

```
#Population variance and standard deviation
print('Pop Variance: ', st.pvariance(nums))
print('Pop St. Deviation: ', st.pstdev(nums))
```

```
Pop Variance:  91.33333333333333
Pop St. Deviation:  9.556847457887633
```