Statistics Assignment

```python
In [55]:  import numpy as np
          import pandas as pd
          from scipy import stats
```

1. Ravikiran wants to join a health club in an activity that has others in the same age group as him. He is 23 years old. Mean ages for Yoga, Power Workout and Swimming classes are: 15 years, 20 years and17 years respectively

Yoga class composition

Age (years)	13	15	17
Frequency, f	1	3	2

Power workout class composition

Age (years)	13	15	17	90
Frequency, f	4	6	3	1

Swimming class composition

Age (years)	1	2	3	30	31	32	33
Frequency, f	3	4	3	1	3	2	4

```python
In [120]  yoga_freq = pd.Series([13,15,15,15,17,17])
          power_freq = pd.Series([13,13,13,13,15,15,15,15,15,17,17,16,90])
          swimming_freq = pd.Series([1,1,1,2,2,2,2,3,3,3,30,31,31,31,32,32,33,33,33,33])
          print(f'mean of yoga class is {yoga_freq.mean()}, mean of power workout class is {power_freq.mean()} and swimming class mena is {swimming_freq.mean()}')
          print('\n    As we observe that the mean age of the each class are much lower than the age of the Ravi Kiran (23), so he is unable to join in any of the activity in health club.')

          mean of yoga class is 15.333333333333334, mean of power workout class is 20.142857142857142 and swimming class mena is 16.95

              As we observe that the mean age of the each class are much lower than the age of the Ravi Kiran (23), so he is unable to join in any of the activity in health club.
```

2. Ravikiran is disturbed and wants some relaxation. He joins the swimming class. He didn't understand why they were asking where his kid

Age (years)	1	2	3	30	31	32	33
Frequency, f	3	4	3	1	3	2	4

What happens to Median if another kid or adult is added?

```python
In [122]  Frequency = pd.Series([1,1,1,2,2,2,2,3,3,3,30,31,31,31,32,32,33,33,33,33])
          print(f"As the mean age of swimming class is {Frequency.mean()} which is much lower than Ravi kiran's age, so the trainee asked him for his kid.")

          As the mean age of swimming class is 16.95 which is much lower than Ravi kiran's age, so the trainee asked him for his kid.
```

```python
In [106]  Frequency1 = pd.Series([1,1,1,1,2,2,2,2,3,3,3,30,31,31,31,32,32,33,33,33,33])  ## Adding another kid of age 1
          print(f'Median before adding a kid is {Frequency.median()}, after adding a kid is: {Frequency1.median()}')
          print()
          Frequency2 = pd.Series([1,1,1,2,2,2,2,3,3,3,30,31,31,31,32,32,33,33,33,33,33])   ## adding another adult of age 33
          print(f'Median before adding a kid is {Frequency.median()}, after adding an adult is: {Frequency2.median()}')

          Median before adding a kid is 16.5, after adding a kid is: 3.0

          Median before adding a kid is 16.5, after adding an adult is: 30.0
```

3. The management of Good Heart Inc. wants to give all its employees a raise. They are unable to decide if they should give a straight Rs.2000 to everyone or to increase salaries by 10% across the board. The mean salary is Rs.50,000, the median is Rs.20,000 and the mode is Rs.10,000. How do these central tendencies change in both cases?

```python
In [114]  original_mean = 50000
          original_median = 20000
          original_mode = 10000

          New_mean_2000 = 50000+2000 ## If all observations are increased by x times then mean also increases by x
          New_mean_10 = 50000+(50000*10/100) ## If all observations are increased by x% then mean aslo increases by x%

          New_median_2000 = 20000+2000   ## If all observations are increased by x times then the position of median does not effect but the value will affect by x
          New_median_10 = 20000+(20000*10/100) ## If all observations are increased by x% then the position of median does not effect but the median value will affect by x

          New_mode_2000 = 10000+2000 ## If all observations are increased by x times then the most repeated term will also change by x
          New_mode_10 = 10000+(10000*10/100) ## If all observations are increased by x% then the most repeated term will also increase by x%

          print(f'Original mean is: {original_mean}, if each observations is increased by 2000 then the mean is {New_mean_2000} and if each observation is increased by 10% then the mean is {New_mean_10}')
          print(f'Original median is: {original_median}, if each observations is increased by 2000 then the median value is {New_median_2000} and if each observation is increased by 10% then the median value is {New_median_10}')
          print(f'Original mode is: {original_mode}, if each observations is increased by 2000 then the mode is {New_mode_2000} and if each observation is increased by 10% then the mode is {New_mode_10}')
          print(f'\nAs we observer that:\nwhen each observations are increased by 10% then the mean will be {New_mean_10}\nwhereas each observation are increased by 2000 then the mean is {New_mean_2000}.\n So the management should consider

          Original mean is: 50000, if each observations is increased by 2000 then the mean is increased by 10% then the mean is 55000.0
          Original median is: 20000, if each observations is increased by 2000 then the median value is 22000 and if each observation is increased by 10% then the median value is 22000.0
          Original mode is: 10000, if each observations is increased by 2000 then the mode is 12000 and if each observation is increased by 10% then the mode is 11000.0

          As we observer that:
          when each observations are increased by 10% then the mean will be 55000.0
          whereas each observation are increased by 2000 then the mean is 52000.
           So the management should consider a stright Rs.2000 to everyone
```

4. Basketball coach is in a dilemma choosing between 3 players all having the same average scores

Points scored per game	7	8	9	10	11	12	13
Frequency, f	1	1	2	2	2	1	1

Points scored per game	7	9	10	11	13
Frequency, f	1	2	4	2	1

Points scored per game	3	6	7	10	11	13	30
Frequency, f	2	1	2	3	1	1	1

Mean = Median = Mode = 10 for all 3.

```python
In [34]:  player_1 = pd.Series([7,8,9,9,10,10,11,11,12,13])
          player_2 = pd.Series([7,9,9,10,10,10,10,11,11,13])
          player_3 = pd.Series([3,3,6,7,10,10,10,11,13,30])
          print('Mean of the players are: ',player_1.mean(),player_2.mean(),player_3.mean())
          print('Median of the players are: ',player_1.median(),player_2.median(),player_3.median())
          print('\nAs the mean and median of three players are equal we should calculate the standard deviation(SD) of the players.\n')
          print('SD of the players are: ',player_1.std(),player_2.std(),player_3.std())
          print(f'As the standard deviation of the player two {player_2.std()} is nearer to the mean so the player two will be selected')

          Mean of the players are:  10.0 10.0 10.0
          Median of the players are:  10.0 10.0 10.0

          As the mean and median of three players are equal we should calculate the standard deviation(SD) of the players.

          SD of the players are:  1.8257418583505538 1.5634719199411433 7.362064927722384
          As the standard deviation of the player two 1.5634719199411433 is nearer to the mean so the player two will be selected
```