Q.2) Dataset Name: winequality-red.csv Write a program in python to perform following tasks

a. Rescaling: Normalised the dataset using MinMaxScaler class

b. Standardizing Data (transform them into a standard Gaussian distribution with a mean of 0 and a standard deviation of 1)

c. Normalizing Data (rescale each observation to a length of 1 (a unit norm). For this, use the Normalizer class.)

In [1]:
```
import pandas as pd
from sklearn.preprocessing import MinMaxScaler, StandardScaler, Normalizer

df = pd.read_csv('winequality-red.csv')

# a. Rescaling
min_max = MinMaxScaler()
norm_df = pd.DataFrame(min_max.fit_transform(df), columns=df.columns)
print("Normalized Data:")
print(norm_df.head())

# b. Standardizing
std = StandardScaler()
std_df = pd.DataFrame(std.fit_transform(df), columns=df.columns)
print("\nStandardized Data:")
print(std_df.head())

# c. Normalizing
norm_len = Normalizer()
norm_len_df = pd.DataFrame(norm_len.fit_transform(df), columns=df.columns)
print("\nNormalized Length Data:")
print(norm_len_df.head())
```

```
Normalized Data:
   fixed acidity  volatile acidity  citric acid  residual sugar  chlorides  \
0       0.247788          0.397260         0.00        0.068493   0.106845
1       0.283186          0.520548         0.00        0.116438   0.143573
2       0.283186          0.438356         0.04        0.095890   0.133556
3       0.584071          0.109589         0.56        0.068493   0.105175
4       0.247788          0.397260         0.00        0.068493   0.106845

   free sulfur dioxide  total sulfur dioxide   density        pH  sulphates  \
0             0.140845              0.098940  0.567548  0.606299   0.137725
1             0.338028              0.215548  0.494126  0.362205   0.209581
2             0.197183              0.169611  0.508811  0.409449   0.191617
3             0.225352              0.190813  0.582232  0.330709   0.149701
4             0.140845              0.098940  0.567548  0.606299   0.137725

    alcohol  quality
0  0.153846      0.4
1  0.215385      0.4
2  0.215385      0.4
3  0.215385      0.6
4  0.153846      0.4

Standardized Data:
   fixed acidity  volatile acidity  citric acid  residual sugar  chlorides  \
0      -0.528360          0.961877    -1.391472       -0.453218  -0.243707
1      -0.298547          1.967442    -1.391472        0.043416   0.223875
2      -0.298547          1.297065    -1.186070       -0.169427   0.096353
3       1.654856         -1.384443     1.484154       -0.453218  -0.264960
4      -0.528360          0.961877    -1.391472       -0.453218  -0.243707

   free sulfur dioxide  total sulfur dioxide   density        pH  sulphates  \
0            -0.466193             -0.379133  0.558274  1.288643  -0.579207
1             0.872638              0.624363  0.028261 -0.719933   0.128950
2            -0.083669              0.229047  0.134264 -0.331177  -0.048089
3             0.107592              0.411500  0.664277 -0.979104  -0.461180
4            -0.466193             -0.379133  0.558274  1.288643  -0.579207

    alcohol   quality
0 -0.960246 -0.787823
1 -0.584777 -0.787823
2 -0.584777 -0.787823
3 -0.584777  0.450848
4 -0.960246 -0.787823

Normalized Length Data:
   fixed acidity  volatile acidity  citric acid  residual sugar  chlorides  \
0       0.193478          0.018302     0.000000        0.049677   0.001987
1       0.106989          0.012071     0.000000        0.035663   0.001344
2       0.134949          0.013149     0.000692        0.039793   0.001592
3       0.173611          0.004340     0.008681        0.029452   0.001163
4       0.193478          0.018302     0.000000        0.049677   0.001987

   free sulfur dioxide  total sulfur dioxide   density        pH  sulphates  \
0             0.287602              0.888952  0.026088  0.091771   0.014642
1             0.342913              0.919006  0.013673  0.043893   0.009327
2             0.259517              0.934261  0.017249  0.056402   0.011246
3             0.263517              0.930059  0.015470  0.048983   0.008991
4             0.287602              0.888952  0.026088  0.091771   0.014642

    alcohol   quality
0  0.245769  0.130728
1  0.134422  0.068583
2  0.169551  0.086506
3  0.151910  0.093006
4  0.245769  0.130728
```