EDS Assignment 4

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Code:-

```
import pandas as pd

wine=pd.read_csv("/content/winequalityN.csv")

# 1) print all records of dataset
print(wine)

# 2) print types of wine
print(wine['type'])

# 3) print mean of fixed acidity
print("Mean of fixed acidity is:",wine['fixed acidity'].mean())

# 4)print median of residual sugar
print("Median of residual sugar is:",wine['residual sugar'].median())

# 5)print maximum  % of alcohol
print("Max % of alcohol:",wine['alcohol'].max())

# 6)print aggregation of citric acid present in wine(groupby)
print("The aggregation is :",wine.groupby('citric acid').agg(['min']))

# 7)print correlation
print("The correlation is:",wine.corr())

# 8)print type of wine in uppercase
wine['type'].str.upper()

# 9)print reviews of wine in lowercase
#wine['reviews'].str.lower()

# 10)print description of the dataset
print("The description of the dataset is:",wine.describe())
```

```
# 11)print fixed acidity of 7.0
neutral=wine.groupby('fixed acidity').get_group(7.0)
print("The wine with fixed acidity 7 is:", neutral)
d=neutral.count()
print (neutral)

# 12) Display record of first 20 wines
print("The record of first 20 wines is:",wine.iloc[1:20])

# 13) Display missing value in chlorides
miss=wine['chlorides']
print("The missing values in chlorides is:",miss.isnull())

# 14) Display maximum volatile acidity in wine
print(" maximum volatile acidity in wine:",wine['volatile
acidity'].max())

# 15) Display records of wine with quality 9
a=wine['quality']
b=wine.groupby('quality').get_group(9.0)
print("The records of wine with quality 9:",b)

# 16) Display minimum of sulphates
print(" minimum of sulphates in wine:",wine['sulphates'].min())

# 17) drouping of missing wine
print(wine.dropna())

# 18) Display varience of pH in wine
j=wine['pH']
k=j.var()
print("variance of pH in wine:",k)

# 19) Display mean of density
print("Mean of density is:",wine['density'].mean())

# 20) DIsplay median of sulphates
print("Median of sulphates is:",wine['sulphates'].median())
C
```

Output:-

```
     type  fixed acidity  volatile acidity  citric acid  residual sugar
\
0     white            7.0             0.270         0.36
20.7
1     white            6.3             0.300         0.34
1.6
2     white            8.1             0.280         0.40
6.9
3     white            7.2             0.230         0.32
8.5
4     white            7.2             0.230         0.32
8.5
...     ...            ...               ...          ...
...
6492    red            6.2             0.600         0.08
2.0
6493    red            5.9             0.550         0.10
2.2
6494    red            6.3             0.510         0.13
2.3
6495    red            5.9             0.645         0.12
2.0
6496    red            6.0             0.310         0.47
3.6

      chlorides  free sulfur dioxide  total sulfur dioxide  density
pH  \
0         0.045                 45.0                 170.0  1.00100
3.00
1         0.049                 14.0                 132.0  0.99400
3.30
2         0.050                 30.0                  97.0  0.99510
3.26
3         0.058                 47.0                 186.0  0.99560
3.19
4         0.058                 47.0                 186.0  0.99560
3.19
...         ...                  ...                   ...      ...
...
6492      0.090                 32.0                  44.0  0.99490
3.45
```

```
6493      0.062                 39.0                  51.0  0.99512
3.52
6494      0.076                 29.0                  40.0  0.99574
3.42
6495      0.075                 32.0                  44.0  0.99547
3.57
6496      0.067                 18.0                  42.0  0.99549
3.39

      sulphates  alcohol  quality
0          0.45      8.8        6
1          0.49      9.5        6
2          0.44     10.1        6
3          0.40      9.9        6
4          0.40      9.9        6
...         ...      ...      ...
6492       0.58     10.5        5
6493        NaN     11.2        6
6494       0.75     11.0        6
6495       0.71     10.2        5
6496       0.66     11.0        6

[6497 rows x 13 columns]
0       white
1       white
2       white
3       white
4       white
       ...
6492      red
6493      red
6494      red
6495      red
6496      red
Name: type, Length: 6497, dtype: object
Mean of fixed acidity is: 7.2165793124710955
Median of residual sugar is: 3.0
Max % of alcohol: 14.9
The aggregation is :              type fixed acidity volatile acidity
residual sugar chlorides  \
              min           min              min            min
min
citric acid
```

```
0.00            red            4.6              0.26            0.8
0.020
0.01            red            5.0              0.38            1.5
0.017
0.02            red            3.8              0.31            0.8
0.031
0.03            red            5.3              0.35            1.2
0.043
0.04            red            5.0              0.35            0.8
0.031
...             ...            ...               ...            ...
...
0.91          white            6.3              0.30            8.2
0.034
0.99          white            6.6              0.19            1.2
0.122
1.00            red            7.2              0.21            1.1
0.030
1.23          white            7.6              0.25            4.6
0.035
1.66          white            7.4              0.20            2.1
0.022

            free sulfur dioxide total sulfur dioxide  density    pH
sulphates  \
                           min                  min      min   min
min
citric acid
0.00                       3.0                  8.0  0.98918  3.10
0.34
0.01                       3.0                 13.0  0.98940  3.15
0.30
0.02                       4.0                 11.0  0.98960  3.10
0.32
0.03                       4.0                  8.0  0.99080  3.02
0.33
0.04                       4.0                  9.0  0.98940  3.14
0.32
...                        ...                  ...      ...   ...
...
0.91                      50.0                199.0  0.99394  3.39
0.49
```

```
0.99                      45.0                 129.0  0.99360  3.09
0.31
1.00                      28.0                  69.0  0.99310  2.74
0.38
1.23                      51.0                 294.0  0.99018  3.03
0.43
1.66                      34.0                 113.0  0.99165  3.26
0.55

            alcohol quality
                min     min
citric acid
0.00            8.8       3
0.01            9.5       4
0.02            9.0       3
0.03            9.0       4
0.04            9.2       4
...             ...     ...
0.91           11.7       6
0.99            8.7       6
1.00            9.2       4
1.23           13.1       6
1.66           12.2       6

[89 rows x 12 columns]
The corelation is:                      fixed acidity  volatile
acidity  citric acid  \
fixed acidity             1.000000          0.220172     0.323736
volatile acidity          0.220172          1.000000    -0.378061
citric acid               0.323736         -0.378061     1.000000
residual sugar           -0.112319         -0.196702     0.142486
chlorides                 0.298421          0.377167     0.039315
free sulfur dioxide      -0.283317         -0.353230     0.133437
total sulfur dioxide     -0.329747         -0.414928     0.195218
density                   0.459204          0.271193     0.096320
pH                       -0.251814          0.260660    -0.328689
sulphates                 0.300380          0.225476     0.057613
alcohol                  -0.095603         -0.038248    -0.010433
quality                  -0.077031         -0.265953     0.085706

                    residual sugar  chlorides  free sulfur dioxide  \
fixed acidity             -0.112319   0.298421            -0.283317
volatile acidity          -0.196702   0.377167            -0.353230
```

```
citric acid                0.142486   0.039315              0.133437
residual sugar             1.000000  -0.128902              0.403439
chlorides                 -0.128902   1.000000             -0.195042
free sulfur dioxide        0.403439  -0.195042              1.000000
total sulfur dioxide       0.495820  -0.279580              0.720934
density                    0.552498   0.362594              0.025717
pH                        -0.267050   0.044806             -0.145191
sulphates                 -0.185745   0.395332             -0.188489
alcohol                   -0.359706  -0.256861             -0.179838
quality                   -0.036825  -0.200886              0.055463

                     total sulfur dioxide   density        pH
sulphates  \
fixed acidity                  -0.329747  0.459204 -0.251814
0.300380
volatile acidity               -0.414928  0.271193  0.260660
0.225476
citric acid                     0.195218  0.096320 -0.328689
0.057613
residual sugar                  0.495820  0.552498 -0.267050
-0.185745
chlorides                      -0.279580  0.362594  0.044806
0.395332
free sulfur dioxide             0.720934  0.025717 -0.145191
-0.188489
total sulfur dioxide            1.000000  0.032395 -0.237687
-0.275381
density                         0.032395  1.000000  0.011920
0.259454
pH                             -0.237687  0.011920  1.000000
0.191248
sulphates                      -0.275381  0.259454  0.191248
1.000000
alcohol                        -0.265740 -0.686745  0.121002
-0.003261
quality                        -0.041385 -0.305858  0.019366
0.038729

                      alcohol   quality
fixed acidity        -0.095603 -0.077031
volatile acidity     -0.038248 -0.265953
citric acid          -0.010433  0.085706
residual sugar       -0.359706 -0.036825
```

```
chlorides            -0.256861 -0.200886
free sulfur dioxide  -0.179838  0.055463
total sulfur dioxide -0.265740 -0.041385
density              -0.686745 -0.305858
pH                    0.121002  0.019366
sulphates            -0.003261  0.038729
alcohol               1.000000  0.444319
quality               0.444319  1.000000
The description of the dataset is:        fixed acidity  volatile
acidity  citric acid  residual sugar  \
count    6487.000000       6489.000000  6494.000000     6495.000000
mean        7.216579          0.339691     0.318722        5.444326
std         1.296750          0.164649     0.145265        4.758125
min         3.800000          0.080000     0.000000        0.600000
25%         6.400000          0.230000     0.250000        1.800000
50%         7.000000          0.290000     0.310000        3.000000
75%         7.700000          0.400000     0.390000        8.100000
max        15.900000          1.580000     1.660000       65.800000

         chlorides  free sulfur dioxide  total sulfur dioxide
density  \
count  6495.000000          6497.000000           6497.000000
6497.000000
mean      0.056042            30.525319            115.744574
0.994697
std       0.035036            17.749400             56.521855
0.002999
min       0.009000             1.000000              6.000000
0.987110
25%       0.038000            17.000000             77.000000
0.992340
50%       0.047000            29.000000            118.000000
0.994890
75%       0.065000            41.000000            156.000000
0.996990
max       0.611000           289.000000            440.000000
1.038980

                pH    sulphates      alcohol      quality
count  6488.000000  6493.000000  6497.000000  6497.000000
mean      3.218395     0.531215    10.491801     5.818378
std       0.160748     0.148814     1.192712     0.873255
min       2.720000     0.220000     8.000000     3.000000
```

```
25%       3.110000     0.430000     9.500000     5.000000
50%       3.210000     0.510000    10.300000     6.000000
75%       3.320000     0.600000    11.300000     6.000000
max       4.010000     2.000000    14.900000     9.000000
The wine with fixed acidity 7 is:        type  fixed acidity  volatile
acidity  citric acid  residual sugar  \
0     white            7.0              0.27         0.36
20.7
7     white            7.0              0.27         0.36
20.7
25    white            7.0              0.25         0.32
9.0
27    white            7.0              0.28         0.39
8.7
37    white            7.0              0.33         0.32
1.2
...     ...            ...               ...          ...
...
6393    red            7.0              0.43         0.02
1.9
6433    red            7.0              0.55         0.13
2.2
6444    red            7.0              0.57         0.02
2.0
6453    red            7.0              0.56         0.17
1.7
6466    red            7.0              0.56         0.13
1.6

      chlorides  free sulfur dioxide  total sulfur dioxide  density
pH  \
0         0.045                 45.0                 170.0  1.00100
3.00
7         0.045                 45.0                 170.0  1.00100
3.00
25        0.046                 56.0                 245.0  0.99550
3.25
27        0.051                 32.0                 141.0  0.99610
3.38
37        0.053                 38.0                 138.0  0.99060
3.13
...         ...                  ...                   ...      ...
...
```

```
6393      0.080                 15.0                  28.0  0.99492
3.35
6433      0.075                 15.0                  35.0  0.99590
3.36
6444      0.072                 17.0                  26.0  0.99575
3.36
6453      0.065                 15.0                  24.0  0.99514
3.44
6466      0.077                 25.0                  42.0  0.99629
3.34

      sulphates  alcohol  quality
0          0.45     8.80        6
7          0.45     8.80        6
25         0.50    10.40        6
27         0.53    10.50        6
37         0.28    11.20        6
...         ...      ...      ...
6393       0.81    10.60        6
6433       0.59     9.70        6
6444       0.61    10.20        5
6453       0.68    10.55        7
6466       0.59     9.20        5

[282 rows x 13 columns]
       type  fixed acidity  volatile acidity  citric acid  residual
sugar  \
0     white            7.0              0.27         0.36
20.7
7     white            7.0              0.27         0.36
20.7
25    white            7.0              0.25         0.32
9.0
27    white            7.0              0.28         0.39
8.7
37    white            7.0              0.33         0.32
1.2
...     ...            ...               ...          ...
...
6393    red            7.0              0.43         0.02
1.9
6433    red            7.0              0.55         0.13
2.2
```

```
6444    red            7.0              0.57         0.02
2.0
6453    red            7.0              0.56         0.17
1.7
6466    red            7.0              0.56         0.13
1.6

      chlorides  free sulfur dioxide  total sulfur dioxide  density
pH  \
0         0.045                 45.0                 170.0  1.00100
3.00
7         0.045                 45.0                 170.0  1.00100
3.00
25        0.046                 56.0                 245.0  0.99550
3.25
27        0.051                 32.0                 141.0  0.99610
3.38
37        0.053                 38.0                 138.0  0.99060
3.13
...         ...                  ...                   ...      ...
...
6393      0.080                 15.0                  28.0  0.99492
3.35
6433      0.075                 15.0                  35.0  0.99590
3.36
6444      0.072                 17.0                  26.0  0.99575
3.36
6453      0.065                 15.0                  24.0  0.99514
3.44
6466      0.077                 25.0                  42.0  0.99629
3.34

      sulphates  alcohol  quality
0          0.45     8.80        6
7          0.45     8.80        6
25         0.50    10.40        6
27         0.53    10.50        6
37         0.28    11.20        6
...         ...      ...      ...
6393       0.81    10.60        6
6433       0.59     9.70        6
6444       0.61    10.20        5
6453       0.68    10.55        7
```

```
6466       0.59     9.20        5

[282 rows x 13 columns]
The record of first 20 wines is:      type  fixed acidity  volatile
acidity  citric acid  residual sugar  \
1   white            6.3             0.30         0.34            1.60
2   white            8.1             0.28         0.40            6.90
3   white            7.2             0.23         0.32            8.50
4   white            7.2             0.23         0.32            8.50
5   white            8.1             0.28         0.40            6.90
6   white            6.2             0.32         0.16            7.00
7   white            7.0             0.27         0.36           20.70
8   white            6.3             0.30         0.34            1.60
9   white            8.1             0.22         0.43            1.50
10  white            8.1             0.27         0.41            1.45
11  white            8.6             0.23         0.40            4.20
12  white            7.9             0.18         0.37            1.20
13  white            6.6             0.16         0.40            1.50
14  white            8.3             0.42         0.62           19.25
15  white            6.6             0.17         0.38            1.50
16  white            6.3             0.48         0.04            1.10
17  white            NaN             0.66         0.48            1.20
18  white            7.4             0.34         0.42            1.10
19  white            6.5             0.31         0.14            7.50

    chlorides  free sulfur dioxide  total sulfur dioxide  density    pH
\
1       0.049                 14.0                 132.0   0.9940  3.30
2       0.050                 30.0                  97.0   0.9951  3.26
3       0.058                 47.0                 186.0   0.9956  3.19
4       0.058                 47.0                 186.0   0.9956  3.19
5       0.050                 30.0                  97.0   0.9951  3.26
6       0.045                 30.0                 136.0   0.9949  3.18
7       0.045                 45.0                 170.0   1.0010  3.00
8       0.049                 14.0                 132.0   0.9940  3.30
9       0.044                 28.0                 129.0   0.9938  3.22
10      0.033                 11.0                  63.0   0.9908  2.99
11      0.035                 17.0                 109.0   0.9947  3.14
12      0.040                 16.0                  75.0   0.9920  3.18
13      0.044                 48.0                 143.0   0.9912  3.54
14      0.040                 41.0                 172.0   1.0002  2.98
15      0.032                 28.0                 112.0   0.9914  3.25
16      0.046                 30.0                  99.0   0.9928  3.24
```

```
17      0.029                 29.0                   75.0   0.9892  3.33
18      0.033                 17.0                  171.0   0.9917  3.12
19      0.044                 34.0                  133.0   0.9955  3.22

    sulphates  alcohol  quality
1        0.49      9.5        6
2        0.44     10.1        6
3        0.40      9.9        6
4        0.40      9.9        6
5        0.44     10.1        6
6        0.47      9.6        6
7        0.45      8.8        6
8        0.49      9.5        6
9        0.45     11.0        6
10       0.56     12.0        5
11       0.53      9.7        5
12       0.63     10.8        5
13       0.52     12.4        7
14       0.67      9.7        5
15       0.55     11.4        7
16       0.36      9.6        6
17       0.39     12.8        8
18       0.53     11.3        6
19       0.50      9.5        5
The missing values in chlorides is: 0       False
1       False
2       False
3       False
4       False
        ...
6492    False
6493    False
6494    False
6495    False
6496    False
Name: chlorides, Length: 6497, dtype: bool
 maximum volatile acidity in wine: 1.58
The records of wine with quality 9:        type  fixed acidity
volatile acidity  citric acid  residual sugar  \
774   white            9.1             0.27         0.45
10.6
820   white            6.6             0.36         0.29
1.6
```

```
827   white            7.4               0.24         0.36
2.0
876   white            6.9               0.36         0.34
4.2
1605  white            7.1               0.26         0.49
2.2

      chlorides  free sulfur dioxide  total sulfur dioxide  density
pH  \
774       0.035                 28.0                 124.0  0.99700
3.20
820       0.021                 24.0                  85.0  0.98965
3.41
827       0.031                 27.0                 139.0  0.99055
3.28
876       0.018                 57.0                 119.0  0.98980
3.28
1605      0.032                 31.0                 113.0  0.99030
3.37

      sulphates  alcohol  quality
774        0.46     10.4        9
820        0.61     12.4        9
827        0.48     12.5        9
876        0.36     12.7        9
1605       0.42     12.9        9
 minimum of sulphates in wine: 0.22
       type  fixed acidity  volatile acidity  citric acid  residual
sugar  \
0     white            7.0             0.270         0.36
20.7
1     white            6.3             0.300         0.34
1.6
2     white            8.1             0.280         0.40
6.9
3     white            7.2             0.230         0.32
8.5
4     white            7.2             0.230         0.32
8.5
...     ...            ...               ...          ...
...
6491    red            6.8             0.620         0.08
1.9
```

```
6492    red            6.2             0.600         0.08
2.0
6494    red            6.3             0.510         0.13
2.3
6495    red            5.9             0.645         0.12
2.0
6496    red            6.0             0.310         0.47
3.6

      chlorides  free sulfur dioxide  total sulfur dioxide  density
pH  \
0         0.045                 45.0                 170.0  1.00100
3.00
1         0.049                 14.0                 132.0  0.99400
3.30
2         0.050                 30.0                  97.0  0.99510
3.26
3         0.058                 47.0                 186.0  0.99560
3.19
4         0.058                 47.0                 186.0  0.99560
3.19
...         ...                  ...                   ...      ...
...
6491      0.068                 28.0                  38.0  0.99651
3.42
6492      0.090                 32.0                  44.0  0.99490
3.45
6494      0.076                 29.0                  40.0  0.99574
3.42
6495      0.075                 32.0                  44.0  0.99547
3.57
6496      0.067                 18.0                  42.0  0.99549
3.39

      sulphates  alcohol  quality
0          0.45      8.8        6
1          0.49      9.5        6
2          0.44     10.1        6
3          0.40      9.9        6
4          0.40      9.9        6
...         ...      ...      ...
6491       0.82      9.5        6
6492       0.58     10.5        5
```

```
6494       0.75     11.0        6
6495       0.71     10.2        5
6496       0.66     11.0        6

[6463 rows x 13 columns]
varience of pH in wine: 0.025840018058976722
Mean of density is: 0.9946966338309989
Median of sulphates is: 0.51
<ipython-input-13-e439a4fe355a>:25: FutureWarning: The default value of
numeric_only in DataFrame.corr is deprecated. In a future version, it
will default to False. Select only valid columns or specify the value
of numeric_only to silence this warning.
  print("The corelation is:",wine.corr())
```