ASSIGNMENT NO:2

Aim:
1. Creation of Dataset using Microsoft Excel.
3. Identification and Handling of Outliers
4. Data Transformation for the purpose of :
a. To change the scale for better understanding
b. To decrease the skewness and convert distribution into normal distribution

```
import pandas as pd

import seaborn as sns

import numpy as py

df= pd.read_csv("C:/Users/Welcome/Music/Book1.csv")

df
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0         60.0           63.0           76.0             95.0
2021
1         75.0           70.0           64.0             85.0
2020
2         74.0           50.0           55.0             91.0
2020
3         68.0           76.0           78.0             97.0
2020
4          NaN           67.0           71.0             93.0
2020
5         70.0           64.0           80.0             98.0
2018
6         61.0           78.0           92.0             94.0
2021
7         61.0           74.0           78.0              NaN
2021
8         64.0           76.0           79.0             76.0
2019
9         65.0           95.0           75.0             90.0
2020
10        66.0           76.0            NaN            100.0
2019
11        84.0           67.0           71.0             92.0
2020
12        69.0            NaN           70.0             86.0
2021
13        74.0           65.0           65.0             80.0
2021
14        74.0           63.0           72.0             96.0
```

```
2018
15        76.0           64.0           80.0           96.0
2020
16        60.0           64.0           54.0           91.0
2021
17        77.0           70.0           72.0           99.0
2020
18        67.0           95.0            NaN           87.0
2018
19        71.0           53.0           78.0           75.0
2018
20        58.0           65.0           56.0            NaN
2019
21        68.0           63.0           62.0           94.0
2021
22        77.0           63.0           68.0           97.0
2021
23        80.0            NaN           86.0           85.0
2018
24        84.0           63.0           67.0           83.0
2018
25        68.0           67.0           73.0           88.0
2019
26        76.0           64.0           68.0           96.0
2021
27        92.0           96.0           61.0           83.0
2018
28        60.0           68.0           59.0           93.0
2020
```

```
    placement offer count  gender
0                       3  female
1                       3    male
2                       3    male
3                       3  female
4                       3    male
5                       3  female
6                       3    male
7                       2    male
8                       2    male
9                       3  female
10                      1    male
11                      3    male
12                      3  female
13                      2    male
14                      3    male
15                      3    male
16                      3  female
17                      3    male
```

```
18                      3  female
19                      2  female
20                      3  female
21                      3    male
22                      3  female
23                      3  female
24                      1    male
25                      3  female
26                      3  female
27                      2    male
28                      3    male
```

```
df.isnull()
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0        False          False          False             False
False
1        False          False          False             False
False
2        False          False          False             False
False
3        False          False          False             False
False
4         True          False          False             False
False
5        False          False          False             False
False
6        False          False          False             False
False
7        False          False          False              True
False
8        False          False          False             False
False
9        False          False          False             False
False
10       False          False           True             False
False
11       False          False          False             False
False
12       False           True          False             False
False
13       False          False          False             False
False
14       False          False          False             False
False
15       False          False          False             False
False
16       False          False          False             False
False
```

```
17       False           False           False             False
False
18       False           False            True             False
False
19       False           False           False             False
False
20       False           False           False              True
False
21       False           False           False             False
False
22       False           False           False             False
False
23       False            True           False             False
False
24       False           False           False             False
False
25       False           False           False             False
False
26       False           False           False             False
False
27       False           False           False             False
False
28       False           False           False             False
False
```

```
    placement offer count  gender
0                   False   False
1                   False   False
2                   False   False
3                   False   False
4                   False   False
5                   False   False
6                   False   False
7                   False   False
8                   False   False
9                   False   False
10                  False   False
11                  False   False
12                  False   False
13                  False   False
14                  False   False
15                  False   False
16                  False   False
17                  False   False
18                  False   False
19                  False   False
20                  False   False
21                  False   False
22                  False   False
```

```
23                   False   False
24                   False   False
25                   False   False
26                   False   False
27                   False   False
28                   False   False
```

```
series = pd.isnull(df["math score"])
df[series]
```

```
   math score  reading score  writing score  placememt score  club
join year  \
4         NaN           67.0           71.0              93.0
2020

   placement offer count gender
4                      3   male
```

```
df.notnull()
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0         True           True           True             True
True
1         True           True           True             True
True
2         True           True           True             True
True
3         True           True           True             True
True
4        False           True           True             True
True
5         True           True           True             True
True
6         True           True           True             True
True
7         True           True           True            False
True
8         True           True           True             True
True
9         True           True           True             True
True
10        True           True          False             True
True
11        True           True           True             True
True
12        True          False           True             True
True
13        True           True           True             True
True
```

```
14         True            True             True              True
True
15         True            True             True              True
True
16         True            True             True              True
True
17         True            True             True              True
True
18         True            True            False              True
True
19         True            True             True              True
True
20         True            True             True             False
True
21         True            True             True              True
True
22         True            True             True              True
True
23         True           False             True              True
True
24         True            True             True              True
True
25         True            True             True              True
True
26         True            True             True              True
True
27         True            True             True              True
True
28         True            True             True              True
True

    placement offer count  gender
0                     True    True
1                     True    True
2                     True    True
3                     True    True
4                     True    True
5                     True    True
6                     True    True
7                     True    True
8                     True    True
9                     True    True
10                    True    True
11                    True    True
12                    True    True
13                    True    True
14                    True    True
15                    True    True
16                    True    True
```

```
17                    True    True
18                    True    True
19                    True    True
20                    True    True
21                    True    True
22                    True    True
23                    True    True
24                    True    True
25                    True    True
26                    True    True
27                    True    True
28                    True    True
```

```
series1 = pd.notnull(df["math score"])
df[series1]
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0         60.0           63.0           76.0             95.0
2021
1         75.0           70.0           64.0             85.0
2020
2         74.0           50.0           55.0             91.0
2020
3         68.0           76.0           78.0             97.0
2020
5         70.0           64.0           80.0             98.0
2018
6         61.0           78.0           92.0             94.0
2021
7         61.0           74.0           78.0              NaN
2021
8         64.0           76.0           79.0             76.0
2019
9         65.0           95.0           75.0             90.0
2020
10        66.0           76.0            NaN            100.0
2019
11        84.0           67.0           71.0             92.0
2020
12        69.0            NaN           70.0             86.0
2021
13        74.0           65.0           65.0             80.0
2021
14        74.0           63.0           72.0             96.0
2018
15        76.0           64.0           80.0             96.0
2020
16        60.0           64.0           54.0             91.0
2021
```

```
17         77.0           70.0           72.0           99.0
2020
18         67.0           95.0            NaN           87.0
2018
19         71.0           53.0           78.0           75.0
2018
20         58.0           65.0           56.0            NaN
2019
21         68.0           63.0           62.0           94.0
2021
22         77.0           63.0           68.0           97.0
2021
23         80.0            NaN           86.0           85.0
2018
24         84.0           63.0           67.0           83.0
2018
25         68.0           67.0           73.0           88.0
2019
26         76.0           64.0           68.0           96.0
2021
27         92.0           96.0           61.0           83.0
2018
28         60.0           68.0           59.0           93.0
2020
```

	placement offer count	gender
0	3	female
1	3	male
2	3	male
3	3	female
5	3	female
6	3	male
7	2	male
8	2	male
9	3	female
10	1	male
11	3	male
12	3	female
13	2	male
14	3	male
15	3	male
16	3	female
17	3	male
18	3	female
19	2	female
20	3	female
21	3	male
22	3	female
23	3	female

```
24                      1    male
25                      3  female
26                      3  female
27                      2    male
28                      3    male
```

```
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
df['gender'] = le.fit_transform(df['gender'])
newdf = df
df
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0         60.0           63.0           76.0             95.0
2021
1         75.0           70.0           64.0             85.0
2020
2         74.0           50.0           55.0             91.0
2020
3         68.0           76.0           78.0             97.0
2020
4          NaN           67.0           71.0             93.0
2020
5         70.0           64.0           80.0             98.0
2018
6         61.0           78.0           92.0             94.0
2021
7         61.0           74.0           78.0              NaN
2021
8         64.0           76.0           79.0             76.0
2019
9         65.0           95.0           75.0             90.0
2020
10        66.0           76.0            NaN            100.0
2019
11        84.0           67.0           71.0             92.0
2020
12        69.0            NaN           70.0             86.0
2021
13        74.0           65.0           65.0             80.0
2021
14        74.0           63.0           72.0             96.0
2018
15        76.0           64.0           80.0             96.0
2020
16        60.0           64.0           54.0             91.0
2021
17        77.0           70.0           72.0             99.0
2020
```

```
18         67.0            95.0             NaN             87.0
2018
19         71.0            53.0            78.0             75.0
2018
20         58.0            65.0            56.0              NaN
2019
21         68.0            63.0            62.0             94.0
2021
22         77.0            63.0            68.0             97.0
2021
23         80.0             NaN            86.0             85.0
2018
24         84.0            63.0            67.0             83.0
2018
25         68.0            67.0            73.0             88.0
2019
26         76.0            64.0            68.0             96.0
2021
27         92.0            96.0            61.0             83.0
2018
28         60.0            68.0            59.0             93.0
2020
```

	placement offer count	gender
0	3	0
1	3	1
2	3	1
3	3	0
4	3	1
5	3	0
6	3	1
7	2	1
8	2	1
9	3	0
10	1	1
11	3	1
12	3	0
13	2	1
14	3	1
15	3	1
16	3	0
17	3	1
18	3	0
19	2	0
20	3	0
21	3	1
22	3	0
23	3	0
24	1	1

```
25                      3       0
26                      3       0
27                      2       1
28                      3       1
```

```
missing_values = ["Na","na"]
df = pd.read_csv("C:/Users/Welcome/Music/Book1.csv", na_values =
missing_values)
df
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0         60.0           63.0           76.0              95.0
2021
1         75.0           70.0           64.0              85.0
2020
2         74.0           50.0           55.0              91.0
2020
3         68.0           76.0           78.0              97.0
2020
4          NaN           67.0           71.0              93.0
2020
5         70.0           64.0           80.0              98.0
2018
6         61.0           78.0           92.0              94.0
2021
7         61.0           74.0           78.0               NaN
2021
8         64.0           76.0           79.0              76.0
2019
9         65.0           95.0           75.0              90.0
2020
10        66.0           76.0            NaN             100.0
2019
11        84.0           67.0           71.0              92.0
2020
12        69.0            NaN           70.0              86.0
2021
13        74.0           65.0           65.0              80.0
2021
14        74.0           63.0           72.0              96.0
2018
15        76.0           64.0           80.0              96.0
2020
16        60.0           64.0           54.0              91.0
2021
17        77.0           70.0           72.0              99.0
2020
18        67.0           95.0            NaN              87.0
2018
```

```
19         71.0            53.0            78.0             75.0
2018
20         58.0            65.0            56.0              NaN
2019
21         68.0            63.0            62.0             94.0
2021
22         77.0            63.0            68.0             97.0
2021
23         80.0             NaN            86.0             85.0
2018
24         84.0            63.0            67.0             83.0
2018
25         68.0            67.0            73.0             88.0
2019
26         76.0            64.0            68.0             96.0
2021
27         92.0            96.0            61.0             83.0
2018
28         60.0            68.0            59.0             93.0
2020
```

	placement offer count	gender
0	3	female
1	3	male
2	3	male
3	3	female
4	3	male
5	3	female
6	3	male
7	2	male
8	2	male
9	3	female
10	1	male
11	3	male
12	3	female
13	2	male
14	3	male
15	3	male
16	3	female
17	3	male
18	3	female
19	2	female
20	3	female
21	3	male
22	3	female
23	3	female
24	1	male
25	3	female
26	3	female

```
27                      2    male
28                      3    male

ndf = df
ndf.fillna(0)

    math score  reading score  writing score  placememt score  club
join year  \
0         60.0           63.0           76.0             95.0
2021
1         75.0           70.0           64.0             85.0
2020
2         74.0           50.0           55.0             91.0
2020
3         68.0           76.0           78.0             97.0
2020
4          0.0           67.0           71.0             93.0
2020
5         70.0           64.0           80.0             98.0
2018
6         61.0           78.0           92.0             94.0
2021
7         61.0           74.0           78.0              0.0
2021
8         64.0           76.0           79.0             76.0
2019
9         65.0           95.0           75.0             90.0
2020
10        66.0           76.0            0.0            100.0
2019
11        84.0           67.0           71.0             92.0
2020
12        69.0            0.0           70.0             86.0
2021
13        74.0           65.0           65.0             80.0
2021
14        74.0           63.0           72.0             96.0
2018
15        76.0           64.0           80.0             96.0
2020
16        60.0           64.0           54.0             91.0
2021
17        77.0           70.0           72.0             99.0
2020
18        67.0           95.0            0.0             87.0
2018
19        71.0           53.0           78.0             75.0
2018
20        58.0           65.0           56.0              0.0
2019
```

```
21         68.0            63.0            62.0              94.0
2021
22         77.0            63.0            68.0              97.0
2021
23         80.0             0.0            86.0              85.0
2018
24         84.0            63.0            67.0              83.0
2018
25         68.0            67.0            73.0              88.0
2019
26         76.0            64.0            68.0              96.0
2021
27         92.0            96.0            61.0              83.0
2018
28         60.0            68.0            59.0              93.0
2020
```

	placement offer count	gender
0	3	female
1	3	male
2	3	male
3	3	female
4	3	male
5	3	female
6	3	male
7	2	male
8	2	male
9	3	female
10	1	male
11	3	male
12	3	female
13	2	male
14	3	male
15	3	male
16	3	female
17	3	male
18	3	female
19	2	female
20	3	female
21	3	male
22	3	female
23	3	female
24	1	male
25	3	female
26	3	female
27	2	male
28	3	male

```
m_v=df['math score'].mean()
df['math score'].fillna(value = m_v, inplace = True)
df
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0    60.000000           63.0           76.0             95.0
2021
1    75.000000           70.0           64.0             85.0
2020
2    74.000000           50.0           55.0             91.0
2020
3    68.000000           76.0           78.0             97.0
2020
4    70.678571           67.0           71.0             93.0
2020
5    70.000000           64.0           80.0             98.0
2018
6    61.000000           78.0           92.0             94.0
2021
7    61.000000           74.0           78.0              NaN
2021
8    64.000000           76.0           79.0             76.0
2019
9    65.000000           95.0           75.0             90.0
2020
10   66.000000           76.0            NaN            100.0
2019
11   84.000000           67.0           71.0             92.0
2020
12   69.000000            NaN           70.0             86.0
2021
13   74.000000           65.0           65.0             80.0
2021
14   74.000000           63.0           72.0             96.0
2018
15   76.000000           64.0           80.0             96.0
2020
16   60.000000           64.0           54.0             91.0
2021
17   77.000000           70.0           72.0             99.0
2020
18   67.000000           95.0            NaN             87.0
2018
19   71.000000           53.0           78.0             75.0
2018
20   58.000000           65.0           56.0              NaN
2019
21   68.000000           63.0           62.0             94.0
2021
```

```
22   77.000000           63.0           68.0              97.0
2021
23   80.000000            NaN           86.0              85.0
2018
24   84.000000           63.0           67.0              83.0
2018
25   68.000000           67.0           73.0              88.0
2019
26   76.000000           64.0           68.0              96.0
2021
27   92.000000           96.0           61.0              83.0
2018
28   60.000000           68.0           59.0              93.0
2020

    placement offer count  gender
0                       3  female
1                       3    male
2                       3    male
3                       3  female
4                       3    male
5                       3  female
6                       3    male
7                       2    male
8                       2    male
9                       3  female
10                      1    male
11                      3    male
12                      3  female
13                      2    male
14                      3    male
15                      3    male
16                      3  female
17                      3    male
18                      3  female
19                      2  female
20                      3  female
21                      3    male
22                      3  female
23                      3  female
24                      1    male
25                      3  female
26                      3  female
27                      2    male
28                      3    male

ndf.replace(to_replace = py.nan, value = -99)

    math score  reading score  writing score  placememt score  club
join year  \
```

0	60.000000	63.0	76.0	95.0	2021
1	75.000000	70.0	64.0	85.0	2020
2	74.000000	50.0	55.0	91.0	2020
3	68.000000	76.0	78.0	97.0	2020
4	70.678571	67.0	71.0	93.0	2020
5	70.000000	64.0	80.0	98.0	2018
6	61.000000	78.0	92.0	94.0	2021
7	61.000000	74.0	78.0	-99.0	2021
8	64.000000	76.0	79.0	76.0	2019
9	65.000000	95.0	75.0	90.0	2020
10	66.000000	76.0	-99.0	100.0	2019
11	84.000000	67.0	71.0	92.0	2020
12	69.000000	-99.0	70.0	86.0	2021
13	74.000000	65.0	65.0	80.0	2021
14	74.000000	63.0	72.0	96.0	2018
15	76.000000	64.0	80.0	96.0	2020
16	60.000000	64.0	54.0	91.0	2021
17	77.000000	70.0	72.0	99.0	2020
18	67.000000	95.0	-99.0	87.0	2018
19	71.000000	53.0	78.0	75.0	2018
20	58.000000	65.0	56.0	-99.0	2019
21	68.000000	63.0	62.0	94.0	2021
22	77.000000	63.0	68.0	97.0	2021
23	80.000000	-99.0	86.0	85.0	2018
24	84.000000	63.0	67.0	83.0	

```
2018
25   68.000000           67.0           73.0              88.0
2019
26   76.000000           64.0           68.0              96.0
2021
27   92.000000           96.0           61.0              83.0
2018
28   60.000000           68.0           59.0              93.0
2020

    placement offer count  gender
0                       3  female
1                       3    male
2                       3    male
3                       3  female
4                       3    male
5                       3  female
6                       3    male
7                       2    male
8                       2    male
9                       3  female
10                      1    male
11                      3    male
12                      3  female
13                      2    male
14                      3    male
15                      3    male
16                      3  female
17                      3    male
18                      3  female
19                      2  female
20                      3  female
21                      3    male
22                      3  female
23                      3  female
24                      1    male
25                      3  female
26                      3  female
27                      2    male
28                      3    male

ndf.dropna()

    math score  reading score  writing score  placememt score  club
join year  \
0    60.000000           63.0           76.0              95.0
2021
1    75.000000           70.0           64.0              85.0
2020
2    74.000000           50.0           55.0              91.0
```

```
2020
3    68.000000           76.0           78.0           97.0
2020
4    70.678571           67.0           71.0           93.0
2020
5    70.000000           64.0           80.0           98.0
2018
6    61.000000           78.0           92.0           94.0
2021
8    64.000000           76.0           79.0           76.0
2019
9    65.000000           95.0           75.0           90.0
2020
11   84.000000           67.0           71.0           92.0
2020
13   74.000000           65.0           65.0           80.0
2021
14   74.000000           63.0           72.0           96.0
2018
15   76.000000           64.0           80.0           96.0
2020
16   60.000000           64.0           54.0           91.0
2021
17   77.000000           70.0           72.0           99.0
2020
19   71.000000           53.0           78.0           75.0
2018
21   68.000000           63.0           62.0           94.0
2021
22   77.000000           63.0           68.0           97.0
2021
24   84.000000           63.0           67.0           83.0
2018
25   68.000000           67.0           73.0           88.0
2019
26   76.000000           64.0           68.0           96.0
2021
27   92.000000           96.0           61.0           83.0
2018
28   60.000000           68.0           59.0           93.0
2020

    placement offer count  gender
0                       3  female
1                       3    male
2                       3    male
3                       3  female
4                       3    male
5                       3  female
```

```
6                         3    male
8                         2    male
9                         3  female
11                        3    male
13                        2    male
14                        3    male
15                        3    male
16                        3  female
17                        3    male
19                        2  female
21                        3    male
22                        3  female
24                        1    male
25                        3  female
26                        3  female
27                        2    male
28                        3    male
```

```
ndf.dropna(how = 'all')
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0    60.000000           63.0           76.0             95.0
2021
1    75.000000           70.0           64.0             85.0
2020
2    74.000000           50.0           55.0             91.0
2020
3    68.000000           76.0           78.0             97.0
2020
4    70.678571           67.0           71.0             93.0
2020
5    70.000000           64.0           80.0             98.0
2018
6    61.000000           78.0           92.0             94.0
2021
7    61.000000           74.0           78.0              NaN
2021
8    64.000000           76.0           79.0             76.0
2019
9    65.000000           95.0           75.0             90.0
2020
10   66.000000           76.0            NaN            100.0
2019
11   84.000000           67.0           71.0             92.0
2020
12   69.000000            NaN           70.0             86.0
2021
13   74.000000           65.0           65.0             80.0
2021
```

```
14   74.000000           63.0           72.0           96.0
2018
15   76.000000           64.0           80.0           96.0
2020
16   60.000000           64.0           54.0           91.0
2021
17   77.000000           70.0           72.0           99.0
2020
18   67.000000           95.0            NaN           87.0
2018
19   71.000000           53.0           78.0           75.0
2018
20   58.000000           65.0           56.0            NaN
2019
21   68.000000           63.0           62.0           94.0
2021
22   77.000000           63.0           68.0           97.0
2021
23   80.000000            NaN           86.0           85.0
2018
24   84.000000           63.0           67.0           83.0
2018
25   68.000000           67.0           73.0           88.0
2019
26   76.000000           64.0           68.0           96.0
2021
27   92.000000           96.0           61.0           83.0
2018
28   60.000000           68.0           59.0           93.0
2020
```

	placement offer count	gender
0	3	female
1	3	male
2	3	male
3	3	female
4	3	male
5	3	female
6	3	male
7	2	male
8	2	male
9	3	female
10	1	male
11	3	male
12	3	female
13	2	male
14	3	male
15	3	male
16	3	female

```
17                       3    male
18                       3  female
19                       2  female
20                       3  female
21                       3    male
22                       3  female
23                       3  female
24                       1    male
25                       3  female
26                       3  female
27                       2    male
28                       3    male
```

```
ndf.dropna(axis = 1)
```

```
    math score  club join year  placement offer count  gender
0    60.000000             2021                      3  female
1    75.000000             2020                      3    male
2    74.000000             2020                      3    male
3    68.000000             2020                      3  female
4    70.678571             2020                      3    male
5    70.000000             2018                      3  female
6    61.000000             2021                      3    male
7    61.000000             2021                      2    male
8    64.000000             2019                      2    male
9    65.000000             2020                      3  female
10   66.000000             2019                      1    male
11   84.000000             2020                      3    male
12   69.000000             2021                      3  female
13   74.000000             2021                      2    male
14   74.000000             2018                      3    male
15   76.000000             2020                      3    male
16   60.000000             2021                      3  female
17   77.000000             2020                      3    male
18   67.000000             2018                      3  female
19   71.000000             2018                      2  female
20   58.000000             2019                      3  female
21   68.000000             2021                      3    male
22   77.000000             2021                      3  female
23   80.000000             2018                      3  female
24   84.000000             2018                      1    male
25   68.000000             2019                      3  female
26   76.000000             2021                      3  female
27   92.000000             2018                      2    male
28   60.000000             2020                      3    male
```

```
new_data = ndf.dropna(axis = 0, how='any')
new_data
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0    60.000000           63.0           76.0             95.0
2021
1    75.000000           70.0           64.0             85.0
2020
2    74.000000           50.0           55.0             91.0
2020
3    68.000000           76.0           78.0             97.0
2020
4    70.678571           67.0           71.0             93.0
2020
5    70.000000           64.0           80.0             98.0
2018
6    61.000000           78.0           92.0             94.0
2021
8    64.000000           76.0           79.0             76.0
2019
9    65.000000           95.0           75.0             90.0
2020
11   84.000000           67.0           71.0             92.0
2020
13   74.000000           65.0           65.0             80.0
2021
14   74.000000           63.0           72.0             96.0
2018
15   76.000000           64.0           80.0             96.0
2020
16   60.000000           64.0           54.0             91.0
2021
17   77.000000           70.0           72.0             99.0
2020
19   71.000000           53.0           78.0             75.0
2018
21   68.000000           63.0           62.0             94.0
2021
22   77.000000           63.0           68.0             97.0
2021
24   84.000000           63.0           67.0             83.0
2018
25   68.000000           67.0           73.0             88.0
2019
26   76.000000           64.0           68.0             96.0
2021
27   92.000000           96.0           61.0             83.0
2018
28   60.000000           68.0           59.0             93.0
2020

    placement offer count  gender
```

```
0                         3  female
1                         3    male
2                         3    male
3                         3  female
4                         3    male
5                         3  female
6                         3    male
8                         2    male
9                         3  female
11                        3    male
13                        2    male
14                        3    male
15                        3    male
16                        3  female
17                        3    male
19                        2  female
21                        3    male
22                        3  female
24                        1    male
25                        3  female
26                        3  female
27                        2    male
28                        3    male
```

```
import matplotlib.pyplot as plt

df1= pd.read_csv("C:/Users/Welcome/Music/Book3.csv")
df1
```

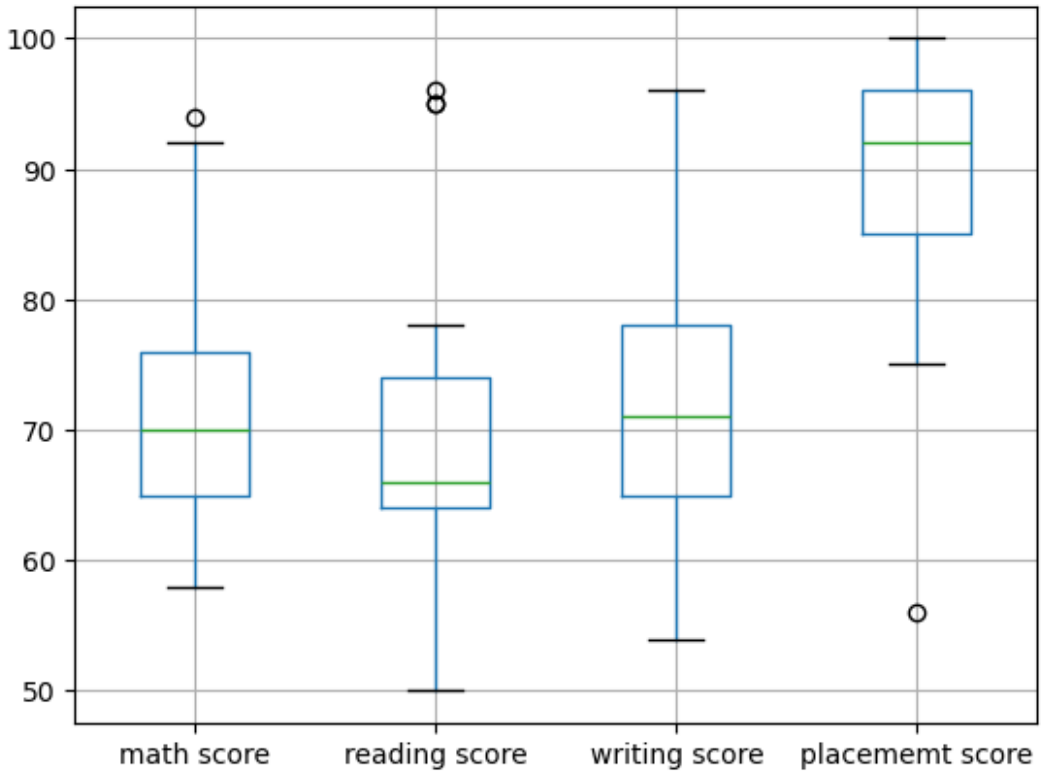
```
    math score  reading score  writing score  placememt score  club
join year  \
0           60             63             76               95
2021
1           75             70             64               85
2020
2           74             50             55               91
2020
3           68             76             78               97
2020
4           94             67             71               93
2020
5           70             64             80               98
2018
6           61             78             92               94
2021
7           61             74             78               80
2021
8           64             76             79               76
2019
9           65             95             75               90
```

```
2020
10          66              76              67              100
2019
11          84              67              71               92
2020
12          69              66              70               56
2021
13          74              65              65               80
2021
14          74              63              72               96
2018
15          76              64              80               96
2020
16          60              64              54               91
2021
17          77              70              72               99
2020
18          67              95              64               87
2018
19          71              65              78               75
2018
20          58              65              96               92
2019
21          68              63              62               94
2021
22          77              63              68               97
2021
23          80              64              86               85
2018
24          84              63              67               83
2018
25          68              67              73               88
2019
26          76              64              68               96
2021
27          92              96              61               83
2018
28          60              68              59               93
2020

    placement offer count  gender
0                       3  female
1                       3    male
2                       3    male
3                       3  female
4                       3    male
5                       3  female
6                       3    male
7                       2    male
```

```
8                          2    male
9                          3  female
10                         1    male
11                         3    male
12                         3  female
13                         2    male
14                         3    male
15                         3    male
16                         3  female
17                         3    male
18                         3  female
19                         2  female
20                         3  female
21                         3    male
22                         3  female
23                         3  female
24                         1    male
25                         3  female
26                         3  female
27                         2    male
28                         3    male
```

```
col = ['math score', 'reading score', 'writing score', 'placememt
score']
df1.boxplot(col)
```

```
<Axes: >
```




```
print(py.where(df1['math score']>90))
print(py.where(df1['reading score']<25))
print(py.where(df1['writing score']<30))
```

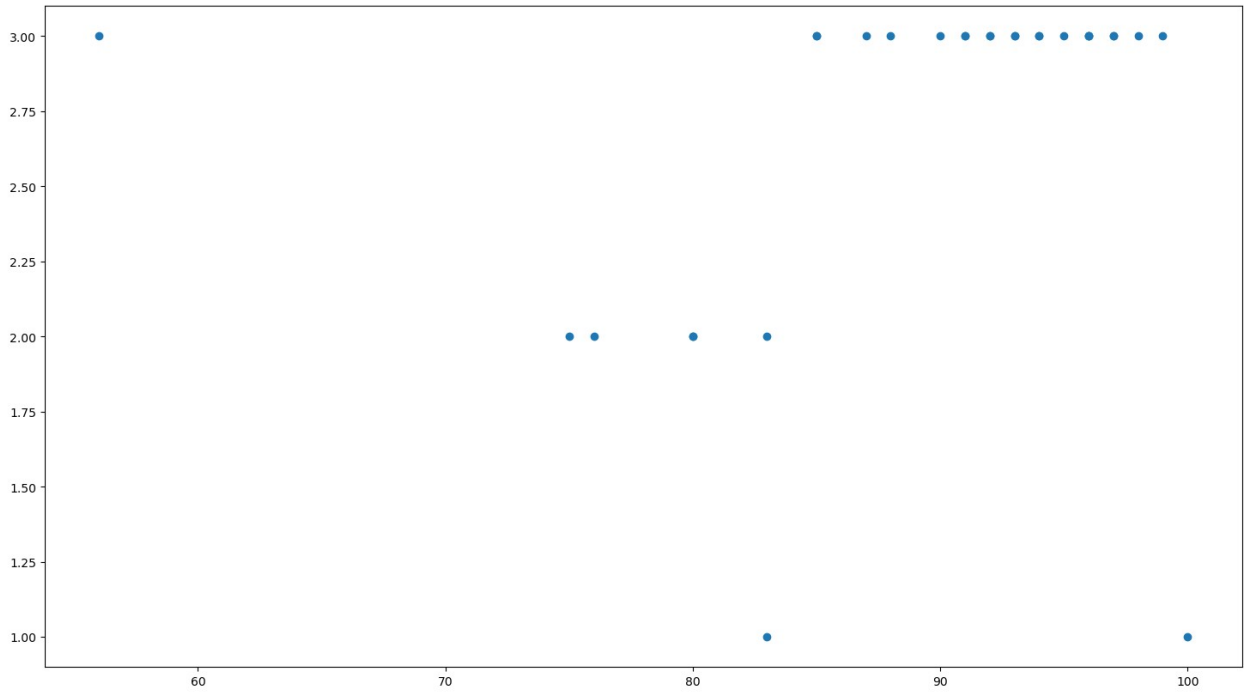
```
(array([ 4, 27], dtype=int64),)
(array([], dtype=int64),)
(array([], dtype=int64),)
```

```
pip install matplotlib
```

```
Requirement already satisfied: matplotlib in c:\users\welcome\
anaconda3\lib\site-packages (3.8.0)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\welcome\
anaconda3\lib\site-packages (from matplotlib) (1.2.0)
Requirement already satisfied: cycler>=0.10 in c:\users\welcome\
anaconda3\lib\site-packages (from matplotlib) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\welcome\
anaconda3\lib\site-packages (from matplotlib) (4.25.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\welcome\
anaconda3\lib\site-packages (from matplotlib) (1.4.4)
Requirement already satisfied: numpy<2,>=1.21 in c:\users\welcome\
anaconda3\lib\site-packages (from matplotlib) (1.26.4)
Requirement already satisfied: packaging>=20.0 in c:\users\welcome\
anaconda3\lib\site-packages (from matplotlib) (23.1)
```

```
Requirement already satisfied: pillow>=6.2.0 in c:\users\welcome\
anaconda3\lib\site-packages (from matplotlib) (10.2.0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\welcome\
anaconda3\lib\site-packages (from matplotlib) (3.0.9)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\
welcome\anaconda3\lib\site-packages (from matplotlib) (2.8.2)
Requirement already satisfied: six>=1.5 in c:\users\welcome\anaconda3\
lib\site-packages (from python-dateutil>=2.7->matplotlib) (1.16.0)
Note: you may need to restart the kernel to use updated packages.
```

```
fig, ax= plt.subplots(figsize = (18, 10))
ax.scatter(df1['placememt score'], df1['placement offer count'])
plt.show()
ax.set_xlabel('(Proportion non-retail business acres)/(town)')
ax.set_ylabel('(Full-value property-tax rate)/($10,000)')
```




```
Text(4.444444444444452, 0.5, '(Full-value property-tax
rate)/($10,000)')
```

```
print(py.where((df1['placememt score']<50) & (df1['placement offer
count']>1)))
print(py.where((df1['placememt score']>85) & (df1['placement offer
count']<3)))
```

```
(array([], dtype=int64),)
(array([10], dtype=int64),)
```

```
from scipy import stats
```

```
z = py.abs(stats.zscore(df1['math score']))

print(z)
```

```
0     1.252553
1     0.383665
2     0.274584
3     0.379903
4     2.456207
5     0.161741
6     1.143471
7     1.143471
8     0.816228
9     0.707147
10    0.598066
11    1.365395
12    0.270822
13    0.274584
14    0.274584
15    0.492746
16    1.252553
17    0.601827
18    0.488984
19    0.052660
20    1.470715
21    0.379903
22    0.601827
23    0.929071
24    1.365395
25    0.379903
26    0.492746
27    2.238044
28    1.252553
Name: math score, dtype: float64
```

```
threshold = 0.18

sample_outliers = py.where(z<threshold)
sample_outliers
```

```
(array([ 5, 19], dtype=int64),)
```

```
sorted_rscore = sorted(df1['reading score'])

sorted_rscore
```

```
[50,
 63,
 63,
 63,
 63,
```

```
 63,
 64,
 64,
 64,
 64,
 64,
 65,
 65,
 65,
 66,
 67,
 67,
 67,
 68,
 70,
 70,
 74,
 76,
 76,
 76,
 78,
 95,
 95,
 96]
```

```
q1 = py.percentile(sorted_rscore, 25)
q3 = py.percentile(sorted_rscore, 75)
print(q1, q3)
```

```
64.0 74.0
```

```
IQR = q3-q1
```

```
lwr_bound = q1-(1.5*IQR)
upr_bound = q3+(1.5*IQR)
print(lwr_bound, upr_bound)
```

```
49.0 89.0
```

```
r_outliers = []
for i in sorted_rscore:
    if(i<lwr_bound or i>upr_bound):
        r_outliers.append(i)
print(r_outliers)
```

```
[95, 95, 96]
```

```
new_df = df1
for i in sample_outliers:
    new_df.drop(i,inplace=True)
new_df
```

```
    math score  reading score  writing score  placememt score  club
join year  \
0           60              63              76               95
2021
1           75              70              64               85
2020
2           74              50              55               91
2020
3           68              76              78               97
2020
4           94              67              71               93
2020
6           61              78              92               94
2021
7           61              74              78               80
2021
8           64              76              79               76
2019
9           65              95              75               90
2020
10          66              76              67              100
2019
11          84              67              71               92
2020
12          69              66              70               56
2021
13          74              65              65               80
2021
14          74              63              72               96
2018
15          76              64              80               96
2020
16          60              64              54               91
2021
17          77              70              72               99
2020
18          67              95              64               87
2018
20          58              65              96               92
2019
21          68              63              62               94
2021
22          77              63              68               97
2021
23          80              64              86               85
2018
24          84              63              67               83
2018
25          68              67              73               88
2019
```

```
26          76              64              68              96
2021
27          92              96              61              83
2018
28          60              68              59              93
2020
```

```
    placement offer count  gender
0                       3  female
1                       3    male
2                       3    male
3                       3  female
4                       3    male
6                       3    male
7                       2    male
8                       2    male
9                       3  female
10                      1    male
11                      3    male
12                      3  female
13                      2    male
14                      3    male
15                      3    male
16                      3  female
17                      3    male
18                      3  female
20                      3  female
21                      3    male
22                      3  female
23                      3  female
24                      1    male
25                      3  female
26                      3  female
27                      2    male
28                      3    male
```

```
df_stud = df1
ninetieth_percentile = py.percentile(df_stud['math score'], 90)
b = py.where(df_stud['math
score']>ninetieth_percentile,ninetieth_percentile, df_stud['math
score'])
print("New array:" ,b)
```

```
New array: [60. 75. 74. 68. 84. 61. 61. 64. 65. 66. 84. 69. 74. 74.
76. 60. 77. 67.
 58. 68. 77. 80. 84. 68. 76. 84. 60.]
```

```
df_stud.insert(1, "m score" , b, True)
df_stud
```

	math score	m score	reading score	writing score	placememt score
0	60	60.0	63	76	95
1	75	75.0	70	64	85
2	74	74.0	50	55	91
3	68	68.0	76	78	97
4	94	84.0	67	71	93
6	61	61.0	78	92	94
7	61	61.0	74	78	80
8	64	64.0	76	79	76
9	65	65.0	95	75	90
10	66	66.0	76	67	100
11	84	84.0	67	71	92
12	69	69.0	66	70	56
13	74	74.0	65	65	80
14	74	74.0	63	72	96
15	76	76.0	64	80	96
16	60	60.0	64	54	91
17	77	77.0	70	72	99
18	67	67.0	95	64	87
20	58	58.0	65	96	92
21	68	68.0	63	62	94
22	77	77.0	63	68	97
23	80	80.0	64	86	85
24	84	84.0	63	67	83
25	68	68.0	67	73	88
26	76	76.0	64	68	96

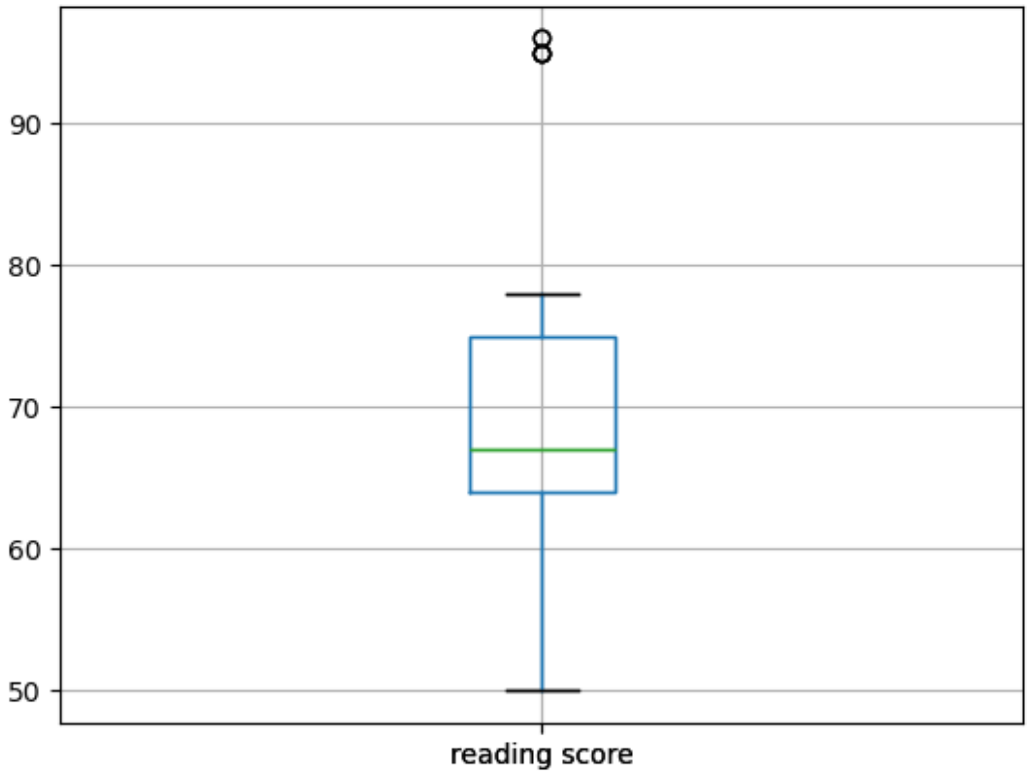
```
27          92     84.0              96              61                  83

28          60     60.0              68              59                  93
```

```
    club join year  placement offer count  gender
0              2021                      3  female
1              2020                      3    male
2              2020                      3    male
3              2020                      3  female
4              2020                      3    male
6              2021                      3    male
7              2021                      2    male
8              2019                      2    male
9              2020                      3  female
10             2019                      1    male
11             2020                      3    male
12             2021                      3  female
13             2021                      2    male
14             2018                      3    male
15             2020                      3    male
16             2021                      3  female
17             2020                      3    male
18             2018                      3  female
20             2019                      3  female
21             2021                      3    male
22             2021                      3  female
23             2018                      3  female
24             2018                      1    male
25             2019                      3  female
26             2021                      3  female
27             2018                      2    male
28             2020                      3    male
```

```
col1 = ['reading score']
df1.boxplot(col1)
```

```
<Axes: >
```

```
plt.show()
```




```
median = py.median(sorted_rscore)
median

66.0

refined_df = df1
refined_df['reading score'] = py.where(refined_df['reading
score']>upr_bound, median, refined_df['reading score'])

refined_df
```

	math score	m score	reading score	writing score	placememt score
0	60	60.0	63.0	76	95
1	75	75.0	70.0	64	85
2	74	74.0	50.0	55	91
3	68	68.0	76.0	78	97
4	94	84.0	67.0	71	93
6	61	61.0	78.0	92	94
7	61	61.0	74.0	78	80

8	64	64.0	76.0	79	76
9	65	65.0	66.0	75	90
10	66	66.0	76.0	67	100
11	84	84.0	67.0	71	92
12	69	69.0	66.0	70	56
13	74	74.0	65.0	65	80
14	74	74.0	63.0	72	96
15	76	76.0	64.0	80	96
16	60	60.0	64.0	54	91
17	77	77.0	70.0	72	99
18	67	67.0	66.0	64	87
20	58	58.0	65.0	96	92
21	68	68.0	63.0	62	94
22	77	77.0	63.0	68	97
23	80	80.0	64.0	86	85
24	84	84.0	63.0	67	83
25	68	68.0	67.0	73	88
26	76	76.0	64.0	68	96
27	92	84.0	66.0	61	83
28	60	60.0	68.0	59	93

	club join year	placement offer count	gender
0	2021	3	female
1	2020	3	male
2	2020	3	male
3	2020	3	female
4	2020	3	male
6	2021	3	male
7	2021	2	male
8	2019	2	male
9	2020	3	female

```
10             2019                        1    male
11             2020                        3    male
12             2021                        3  female
13             2021                        2    male
14             2018                        3    male
15             2020                        3    male
16             2021                        3  female
17             2020                        3    male
18             2018                        3  female
20             2019                        3  female
21             2021                        3    male
22             2021                        3  female
23             2018                        3  female
24             2018                        1    male
25             2019                        3  female
26             2021                        3  female
27             2018                        2    male
28             2020                        3    male
```

```
refined_df['reading score'] = py.where(refined_df['reading
score']<lwr_bound, median, refined_df['reading score'])
refined_df
```

```
    math score  m score  reading score  writing score  placememt score
\
0           60     60.0           63.0             76                95

1           75     75.0           70.0             64                85

2           74     74.0           50.0             55                91

3           68     68.0           76.0             78                97

4           94     84.0           67.0             71                93

6           61     61.0           78.0             92                94

7           61     61.0           74.0             78                80

8           64     64.0           76.0             79                76

9           65     65.0           66.0             75                90

10          66     66.0           76.0             67               100

11          84     84.0           67.0             71                92

12          69     69.0           66.0             70                56

13          74     74.0           65.0             65                80
```

14	74	74.0	63.0	72	96
15	76	76.0	64.0	80	96
16	60	60.0	64.0	54	91
17	77	77.0	70.0	72	99
18	67	67.0	66.0	64	87
20	58	58.0	65.0	96	92
21	68	68.0	63.0	62	94
22	77	77.0	63.0	68	97
23	80	80.0	64.0	86	85
24	84	84.0	63.0	67	83
25	68	68.0	67.0	73	88
26	76	76.0	64.0	68	96
27	92	84.0	66.0	61	83
28	60	60.0	68.0	59	93

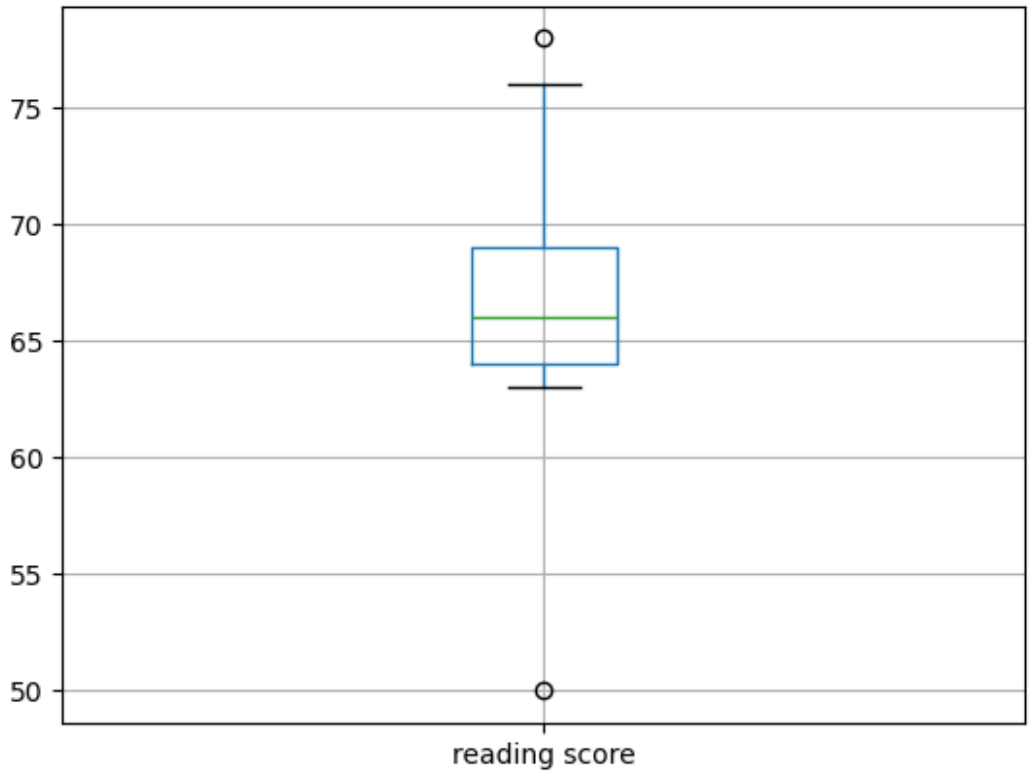
	club join year	placement offer count	gender
0	2021	3	female
1	2020	3	male
2	2020	3	male
3	2020	3	female
4	2020	3	male
6	2021	3	male
7	2021	2	male
8	2019	2	male
9	2020	3	female
10	2019	1	male
11	2020	3	male
12	2021	3	female
13	2021	2	male
14	2018	3	male
15	2020	3	male
16	2021	3	female
17	2020	3	male
18	2018	3	female
20	2019	3	female
21	2021	3	male
22	2021	3	female

```
23              2018                          3  female
24              2018                          1    male
25              2019                          3  female
26              2021                          3  female
27              2018                          2    male
28              2020                          3    male
```

```
col2 = ['reading score']
refined_df.boxplot(col2)
```

```
<Axes: >
```

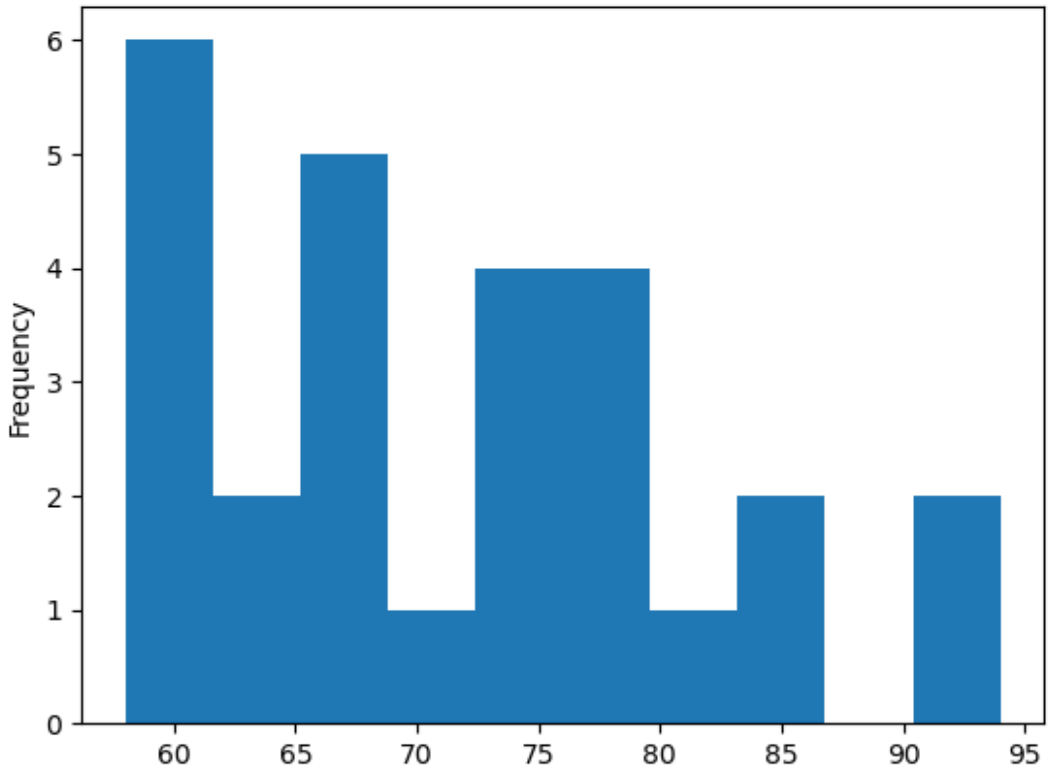
```
plt.show()
```



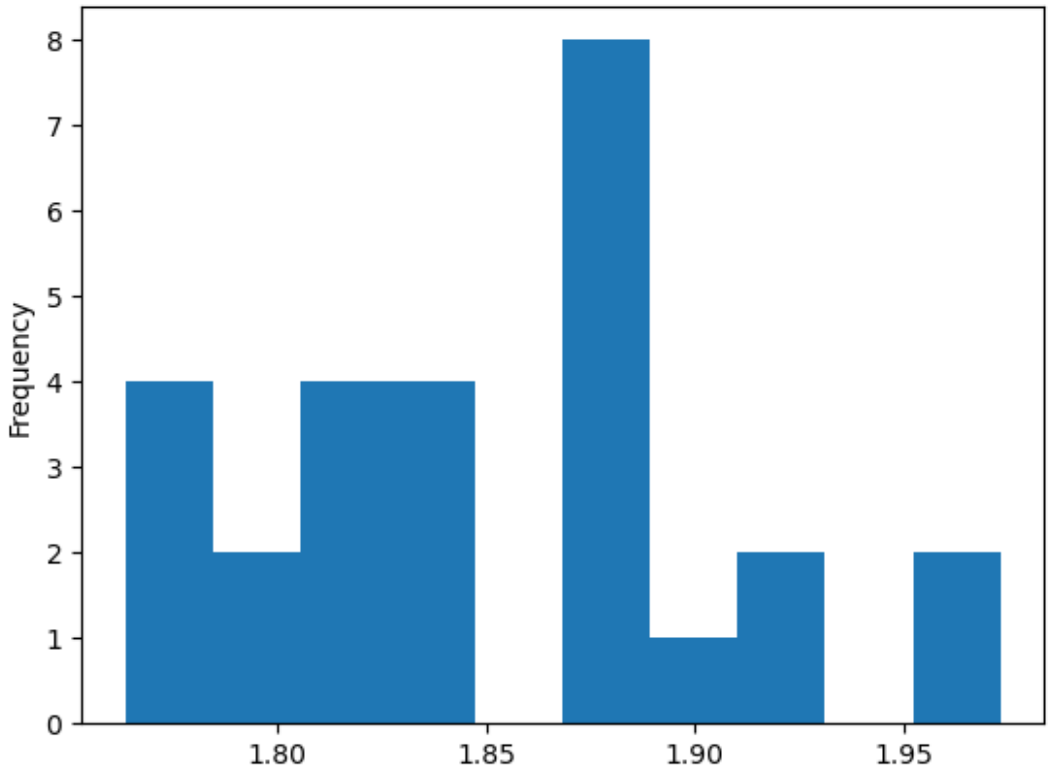

```
new_df['math score'].plot(kind = 'hist')
```

```
<Axes: ylabel='Frequency'>
```

```
plt.show()
```




```
df1['log_math'] = py.log10(df1['math score'])
df1['log_math'].plot(kind = 'hist')
<Axes: ylabel='Frequency'>
plt.show()
```



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B3