Data Wrangling - 2 | DSBDA Practical | Student DataBase

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

df = pd.read_csv("/content/Academic-Student.csv")
df
```

	rollno	marks	gender	age	phd
0	1	22.0	0	22.0	yes
1	2	45.0	0	23.0	no
2	3	66.0	0	NaN	no
3	4	77.0	0	34.0	NaN
4	5	33.0	0	22.0	no
...	...	...	...	...	...
95	96	15.0	0	23.0	yes
96	97	20.0	1	22.0	no
97	98	30.0	1	21.0	NaN
98	99	30.0	1	21.0	no
99	100	20.0	1	22.0	yes

100 rows × 5 columns

Data Cleaning -> Replacing NaN value with Mean

```
df.isnull()
```

	rollno	marks	gender	age	phd
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	True	False
3	False	False	False	False	True
4	False	False	False	False	False
...	...	...	...	...	...
95	False	False	False	False	False
96	False	False	False	False	False
97	False	False	False	False	True
98	False	False	False	False	False
99	False	False	False	False	False

100 rows × 5 columns

```
df.isnull().sum()
```

```
rollno    0
marks     0
gender    0
age       5
phd       8
dtype: int64
```

```
df.describe()
```

	rollno	marks	gender	age
count	100.000000	100.000000	100.000000	95.000000

```
df['age'] = df['age'].replace(np.NaN, df['age'].mean())
df['age'][:10]
```

```
0    22.000000
1    23.000000
2    23.126316
3    34.000000
4    22.000000
5    21.000000
6    23.126316
7    24.000000
8    26.000000
9    21.000000
Name: age, dtype: float64
```

Replacing unexpected/error value from 'phd' column with NULL

```
cnt = 0
for row in df['phd']:
  try:
    int(row)
    df.loc[cnt, 'phd'] = np.nan
  except ValueError:
      pass
  cnt+=1
```

```
df['phd'][:10]
```

```
0    yes
1     no
2     no
3    NaN
4     no
5     no
6     no
7     no
8    yes
9    yes
Name: phd, dtype: object
```

```
df['phd'].isnull().sum()
```

```
8
```

```
df.isnull().sum()
```

```
rollno    0
marks     0
gender    0
age       0
phd       0
dtype: int64
```

Detecting Outlier

Inter Quantile Range (IQR)

75% - 25% values in a dataset

Steps:

1. **Arrange the data increasing order**
2. **Calculate first(q1) quartile and third quartile(q3)**
3. **Find interqurtile range (q3-q1)**
4. **Find lower bound q1*1.5 and upper bound q*21.5**

1.5 value is based on distribution pattern and it is most proven value. Anything that lies outside of lower and upper bound is an outlier

```
sorted_age = sorted(df['age'])
sorted_age
```

```
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.0,
 23.126315789473683,
 23.126315789473683,
 23.126315789473683,
 23.126315789473683,
 23.126315789473683,
 24.0,
 24.0,
 24.0,
 24.0,
 24.0,
 24.0,
 24.0,
 24.0,
 24.0,
 24.0,
 24.0,
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 24.0,
 25.0,
 25.0,
 25.0,
 25.0,
 25.0,
 25.0,
 25.0,
 25.0,
 25.0,
 25.0,
 25.0,
 26.0,
 26.0,
 26.0,
 26.0,
 26.0,
 26.0,
 27.0]
```

```
q1 = np.percentile(sorted_age, 25)
q2 = np.percentile(sorted_age, 75)
print(q1, q2)
```

```
22.0 24.0
```

```
IQR = q2-q1
print(IQR)
```

```
9.25
```

```
lwr_bound = q1-(1.5*IQR)
upr_bound = q2+(1.5*IQR)
print(lwr_bound, upr_bound)
```

```
6.875 43.875
```

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

```
[]
```

if there is outlier is present, then follwing technique is used to remove it

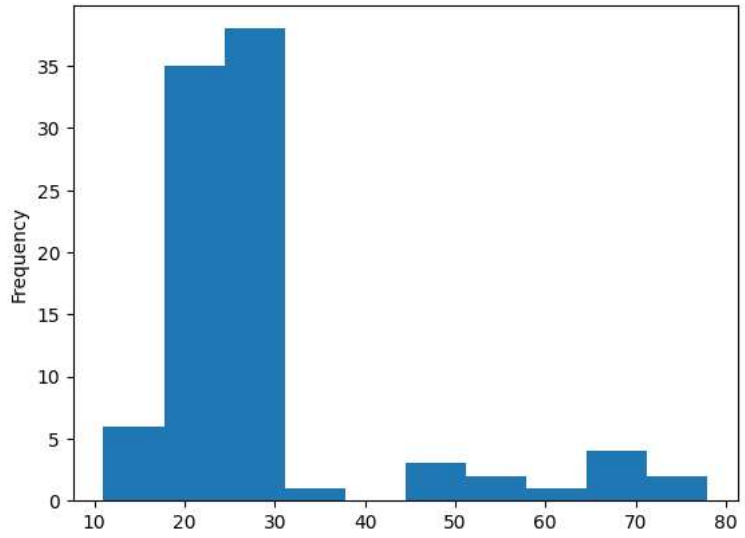
```
new_df = df
for i in r_outliers:
  new_df.drop(i, inplace=True)
new_df
```

	rollno	marks	gender	age	phd
0	1	22.0	0	22.000000	yes
1	2	45.0	0	23.000000	no
2	3	66.0	0	23.126316	no
4	5	33.0	0	22.000000	no
5	6	22.4	10	21.000000	no
...	...	...	...	...	...
93	94	17.0	0	25.000000	yes
95	96	15.0	0	23.000000	yes
96	97	20.0	1	22.000000	no
98	99	30.0	1	21.000000	no
99	100	20.0	1	22.000000	yes

Data transformation **is the process of converting raw data into a format or structure that would be more suitable for model building**

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

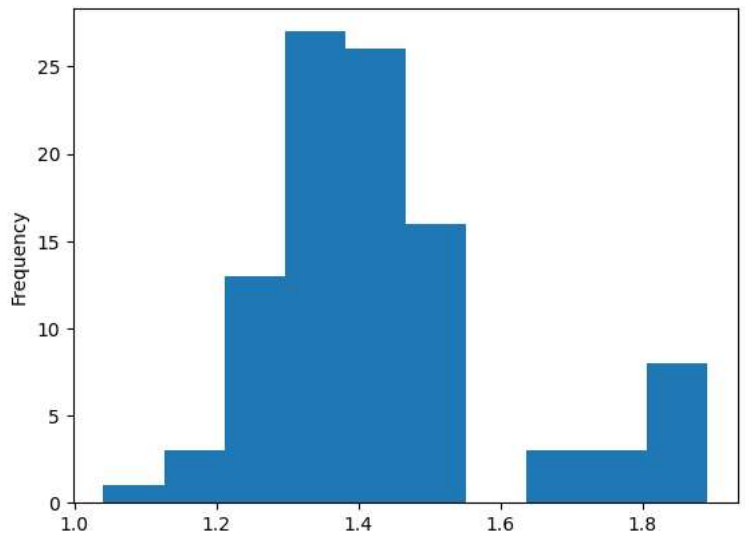
```
<Axes: ylabel='Frequency'>
```




```
#Convert the variables to logarithm at the scale 10.
df['log_marks'] = np.log10(df['marks'])

df['log_marks'].plot(kind = 'hist')
```

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



It is observed that skewness is reduced at some level.