# Experiment-5

## 5a) Consider Titanic dataset & handle the missing values using different methods.

## b) Consider Titanic (or any other dataset) & detect the outliers & handle the outerliers

## c)Consider any relevant dataset and perform data transformation operations

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
df=pd.read_csv('C:/Users/Guru Kiran/All CSV files/titanic.csv')
df.head(5)
```

Out[1]:

| | survived | pclass | sex | age | sibsp | parch | fare | embarked | class | who | adul |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 3 | male | 22.0 | 1 | 0 | 7.2500 | S | Third | man | |
| **1** | 1 | 1 | female | 38.0 | 1 | 0 | 71.2833 | C | First | woman | |
| **2** | 1 | 3 | female | 26.0 | 0 | 0 | 7.9250 | S | Third | woman | |
| **3** | 1 | 1 | female | 35.0 | 1 | 0 | 53.1000 | S | First | woman | |
| **4** | 0 | 3 | male | 35.0 | 0 | 0 | 8.0500 | S | Third | man | |

In [2]:
```
df.isnull().sum()
```

Out[2]:
```
survived         0
pclass           0
sex              0
age            177
sibsp            0
parch            0
fare             0
embarked         2
class            0
who              0
adult_male       0
deck           688
embark_town      2
alive            0
alone            0
dtype: int64
```

## ->Replacing the missing values with arbitrary value

In [3]:
```
df['deck'] =df['deck'].fillna('A')
```

## ->Replacing the missing values for numerical columns with mean

In [4]:
```
mean = df['age'].mean()
df['age'] = df['age'].fillna(mean)
```

In [5]:
```
mode = df['deck'].mode()[0]
mode
```

Out[5]:
```
'A'
```

## ->Replacing the missing values for categorical columns with mode

In [6]:
```
mode = df['deck'].mode()[0]
df['deck'] = df['deck'].fillna(mode)
```

## ->Replacing the missing values for numerical columns with median

In [7]:
```
median = df['age'].median()
df['age']= df['age'].fillna(median)
```

In [8]:
```
df.isnull().sum()
```

Out[8]:
```
survived       0
pclass         0
sex            0
age            0
sibsp          0
parch          0
fare           0
embarked       2
class          0
who            0
adult_male     0
deck           0
embark_town    2
alive          0
alone          0
dtype: int64
```

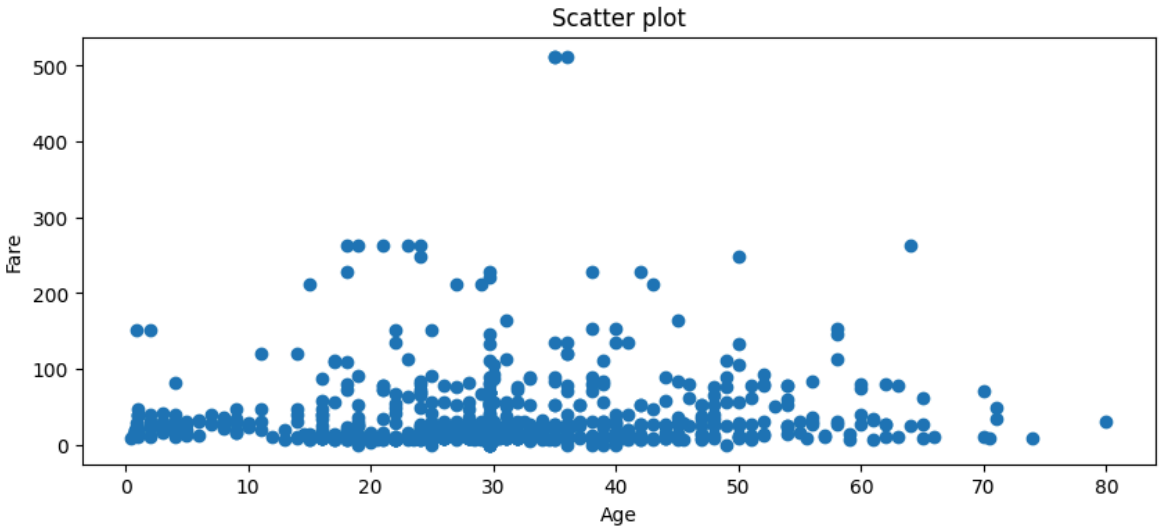
## ->Update the csv file

In [9]:
```
df.to_csv('Cleaned_Titanic.csv', index=False)
```

# b) Consider Titanic (or any other dataset) & detect the outliers & handle the outerliers

## ->Scatter plot to detect outliers

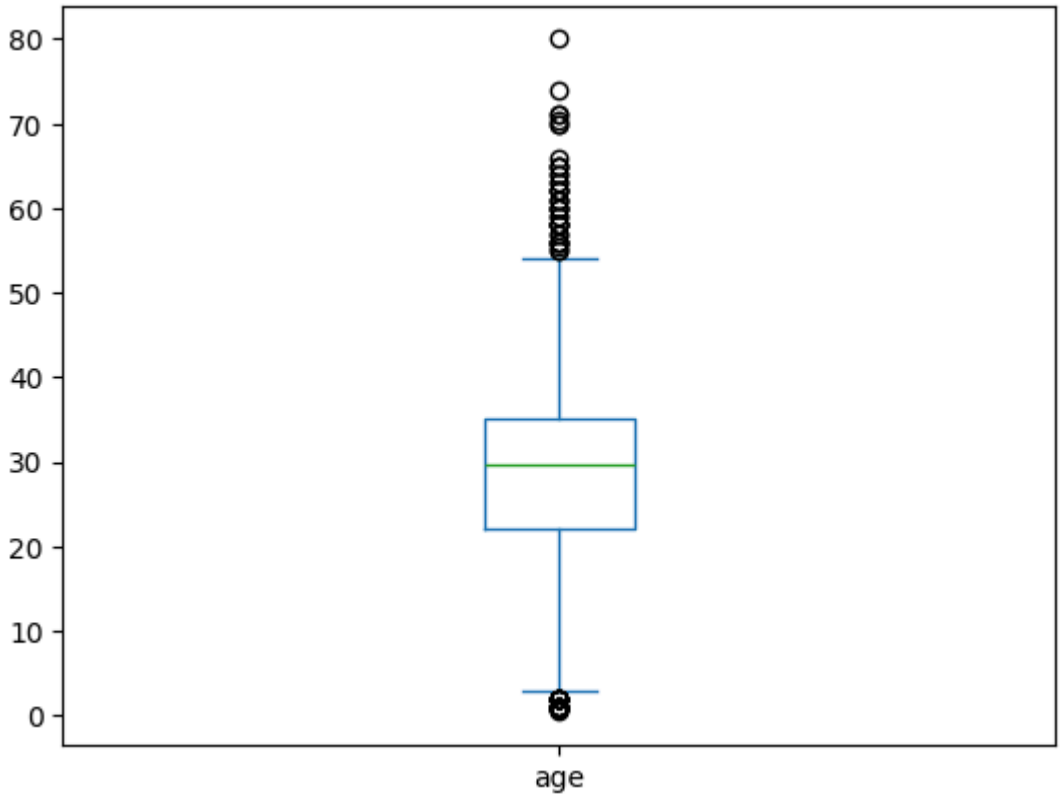
In [10]:
```
fig,ax = plt.subplots(figsize=(10,4))
ax.scatter(df['age'],df['fare'])
ax.set_xlabel('Age')
ax.set_ylabel('Fare')
plt.title("Scatter plot")
plt.show()
```




## ->Box plot to detect outliers

In [11]:
```
df['age'].plot(kind='box')
```

Out[11]:
```
<Axes: >
```




## ->Handle the outerliers using IQR method

In [12]:
```
# finding the 1st quartile
q1 = df["age"].quantile(0.25)
# finding the 3rd quartile
q3 = df['age'].quantile(0.75)
# finding the iqr region
iqr = q3-q1
# finding upper and lower whiskers
upper_bound = q3+(1.5*iqr)
lower_bound = q1-(1.5*iqr)
```

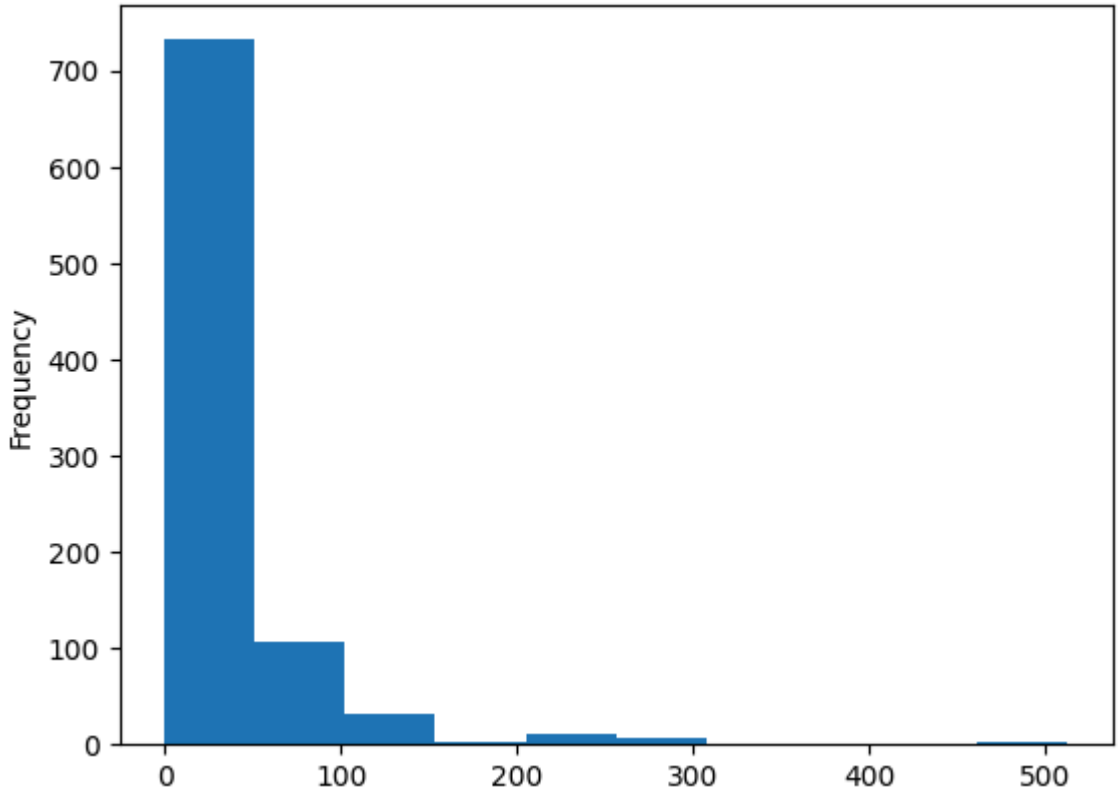
In [13]:
```
age_arr = df["age"]
outliers = age_arr[(age_arr <= lower_bound) | (age_arr >= upper_bound)]
print('The following are the outliers in the boxplot of age:\n',outliers)
```

```
The following are the outliers in the boxplot of age:
 7       2.00
11     58.00
15     55.00
16      2.00
33     66.00
       ...
827     1.00
829    62.00
831     0.83
851    74.00
879    56.00
Name: age, Length: 66, dtype: float64
```

## ->Histogram plot to detect outliers

In [14]:
```
df['fare'].plot(kind='hist')
```

Out[14]: <Axes: ylabel='Frequency'>




## ->Remove data objects with outliers

In [15]:
```
upperIndex = df[df['age']>upper_bound].index
df.drop(upperIndex,inplace=True)
lowerIndex = df[df['age']<lower_bound].index
df.drop(lowerIndex,inplace=True)
df.info()
```

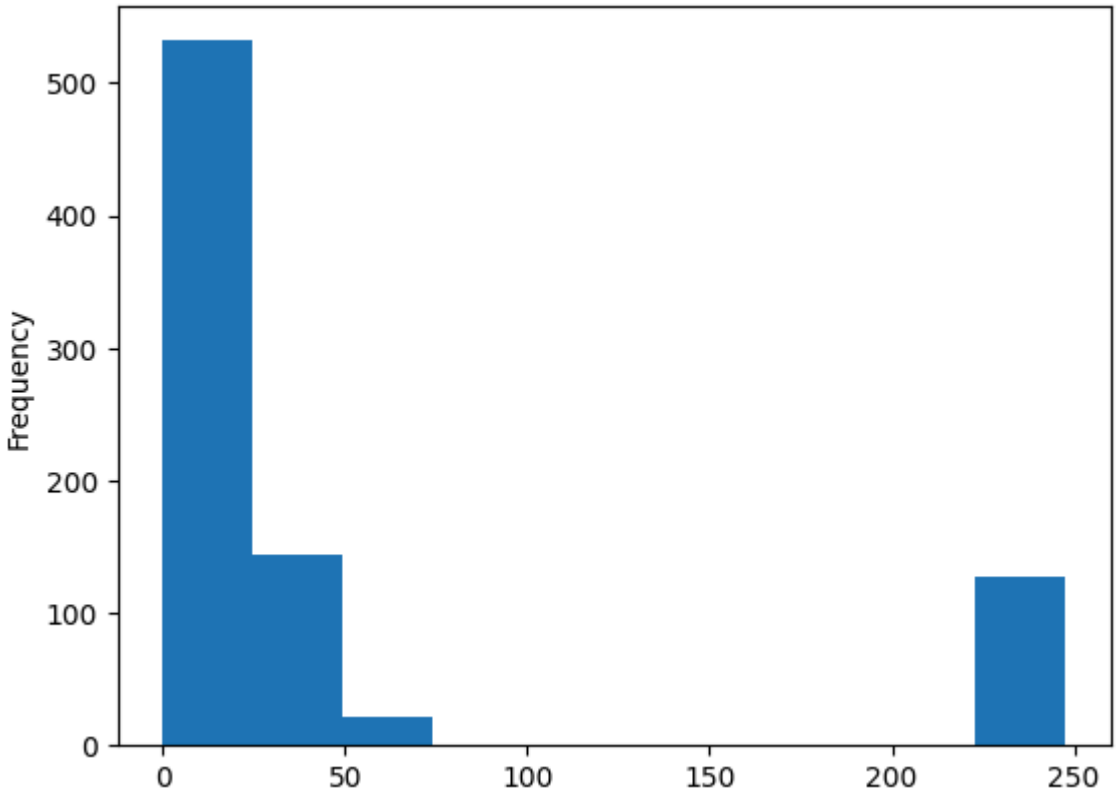
```
<class 'pandas.core.frame.DataFrame'>
Index: 825 entries, 0 to 890
Data columns (total 15 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   survived     825 non-null    int64
 1   pclass       825 non-null    int64
 2   sex          825 non-null    object
 3   age          825 non-null    float64
 4   sibsp        825 non-null    int64
 5   parch        825 non-null    int64
 6   fare         825 non-null    float64
 7   embarked     824 non-null    object
 8   class        825 non-null    object
 9   who          825 non-null    object
 10  adult_male   825 non-null    bool
 11  deck         825 non-null    object
 12  embark_town  824 non-null    object
 13  alive        825 non-null    object
 14  alone        825 non-null    bool
dtypes: bool(2), float64(2), int64(4), object(7)
memory usage: 91.8+ KB
```

## ->Replacing outliers with upper and lower cap

In [16]:
```
fare_arr = df["fare"]
lower_cap = np.percentile(fare_arr,1)
upper_cap = np.percentile(fare_arr,99)
```

In [17]:
```
for i in df['fare']:
    if i<lower_bound :
        df['fare'] = df['fare'].replace(i,lower_cap)
    elif i>upper_bound :
        df['fare'] = df['fare'].replace(i,upper_cap)
df['fare'].plot(kind='hist')
```

Out[17]:
```
<Axes: ylabel='Frequency'>
```




## ->Replacing outliers with Mean

In [18]:
```
m = np.mean(df['age'])
print('mean:',m)
for i in df['age']:
    if i<lower_bound or i>upper_bound :
       df['age'] = df['age'].replace(i,m)
```

```
mean: 28.879689483065953
```

## ->Replacing outliers with median

In [19]:
```
m1 = df['age'].median()
print(m)
for i in df['age']:
    if i<lower_bound or i>upper_bound :
        df['age'] = df['age'].replace(i,m1)
```

```
28.879689483065953
```

## c)Consider any relevant dataset and perform data transformation operations

In [5]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

### 1.Given the event dataset which contains Day,Event,Cost columns

In [6]:
```
df=pd.read_csv('C:/Users/Guru Kiran/All CSV files/cmp.csv')
df.head()
```

Out[6]:

| | date | event | cost |
|---|---|---|---|
| **0** | 12-09-2010 | game | 10000 |
| **1** | 13-08-2012 | dance | 12000 |
| **2** | 14-03-2003 | songs | 3000 |
| **3** | 15-07-2010 | drawing | 10000 |
| **4** | 16-02-2006 | songs | 6000 |

## 1.Given the event dataset which contains Day,Event,Cost columns

In [7]:
```
#Discount
df['discount']=df.apply(lambda x: (x.cost*0.1),axis=1)
print(df)
```

```
         date    event   cost  discount
0  12-09-2010     game  10000    1000.0
1  13-08-2012    dance  12000    1200.0
2  14-03-2003    songs   3000     300.0
3  15-07-2010  drawing  10000    1000.0
4  16-02-2006    songs   6000     600.0
5  17-01-2007    dance   7000     700.0
6  18-06-2006  drawing   6000     600.0
7  19-11-2002     game   2111     211.1
8  20-05-2015    dance  15000    1500.0
9  21-12-2009     game   9111     911.1
```

In [8]:
```
#discount_prize
df['discount_prize']=df.apply(lambda x: x.cost-(x.cost*0.1),axis=1)
print(df)
```

```
         date    event   cost  discount  discount_prize
0  12-09-2010     game  10000    1000.0          9000.0
1  13-08-2012    dance  12000    1200.0         10800.0
2  14-03-2003    songs   3000     300.0          2700.0
3  15-07-2010  drawing  10000    1000.0          9000.0
4  16-02-2006    songs   6000     600.0          5400.0
5  17-01-2007    dance   7000     700.0          6300.0
6  18-06-2006  drawing   6000     600.0          5400.0
7  19-11-2002     game   2111     211.1          1899.9
8  20-05-2015    dance  15000    1500.0         13500.0
9  21-12-2009     game   9111     911.1          8199.9
```

## -> Add two more events data-objects to the dataset

In [9]:
```
df.loc[len(df.index)]=['12-01-2007','songs',6000,600.0,5400.0]
print(df)
```

```
          date    event   cost  discount  discount_prize
0   12-09-2010     game  10000    1000.0          9000.0
1   13-08-2012    dance  12000    1200.0         10800.0
2   14-03-2003    songs   3000     300.0          2700.0
3   15-07-2010  drawing  10000    1000.0          9000.0
4   16-02-2006    songs   6000     600.0          5400.0
5   17-01-2007    dance   7000     700.0          6300.0
6   18-06-2006  drawing   6000     600.0          5400.0
7   19-11-2002     game   2111     211.1          1899.9
8   20-05-2015    dance  15000    1500.0         13500.0
9   21-12-2009     game   9111     911.1          8199.9
10  12-01-2007    songs   6000     600.0          5400.0
```

In [10]:
```
df1=pd.read_csv('C:/Users/Guru Kiran/All CSV files/cmp1.csv')
print(df1)
```

```
         date    event   cost
0  11-05-2006     game  10000
1  12-04-2007    dance  12000
2  13-03-2008    songs   3000
3  14-12-2012  drawing  10000
4  15-05-2020    songs   6000
5  16-08-2015    dance   7000
6  17-11-2004  drawing   6000
7  18-05-2019     game   2111
8  19-01-2006    dance  15000
9  20-09-2016     game   9111
```

In [11]:
```
df1['discount']=df1.apply(lambda x: (x.cost*0.1),axis=1)
print(df1)
```

```
         date    event   cost  discount
0  11-05-2006     game  10000    1000.0
1  12-04-2007    dance  12000    1200.0
2  13-03-2008    songs   3000     300.0
3  14-12-2012  drawing  10000    1000.0
4  15-05-2020    songs   6000     600.0
5  16-08-2015    dance   7000     700.0
6  17-11-2004  drawing   6000     600.0
7  18-05-2019     game   2111     211.1
8  19-01-2006    dance  15000    1500.0
9  20-09-2016     game   9111     911.1
```

In [12]:
```
df['discount_prize']=df.apply(lambda x: x.cost-(x.cost*0.1),axis=1)
print(df)
```

```
          date    event   cost  discount  discount_prize
0   12-09-2010     game  10000    1000.0          9000.0
1   13-08-2012    dance  12000    1200.0         10800.0
2   14-03-2003    songs   3000     300.0          2700.0
3   15-07-2010  drawing  10000    1000.0          9000.0
4   16-02-2006    songs   6000     600.0          5400.0
5   17-01-2007    dance   7000     700.0          6300.0
6   18-06-2006  drawing   6000     600.0          5400.0
7   19-11-2002     game   2111     211.1          1899.9
8   20-05-2015    dance  15000    1500.0         13500.0
9   21-12-2009     game   9111     911.1          8199.9
10  12-01-2007    songs   6000     600.0          5400.0
```

## ->Consider the same dataset from another csv file merge the two csv file and save it to 3rd csv file

In [13]:
```
df=pd.read_csv('C:/Users/Guru Kiran/All CSV files/cmp.csv')
df3=pd.concat([df,df1],ignore_index=True)
df3
```

Out[13]:

| | date | event | cost | discount |
|---|---|---|---|---|
| **0** | 12-09-2010 | game | 10000 | NaN |
| **1** | 13-08-2012 | dance | 12000 | NaN |
| **2** | 14-03-2003 | songs | 3000 | NaN |
| **3** | 15-07-2010 | drawing | 10000 | NaN |
| **4** | 16-02-2006 | songs | 6000 | NaN |
| **5** | 17-01-2007 | dance | 7000 | NaN |
| **6** | 18-06-2006 | drawing | 6000 | NaN |
| **7** | 19-11-2002 | game | 2111 | NaN |
| **8** | 20-05-2015 | dance | 15000 | NaN |
| **9** | 21-12-2009 | game | 9111 | NaN |
| **10** | 11-05-2006 | game | 10000 | 1000.0 |
| **11** | 12-04-2007 | dance | 12000 | 1200.0 |
| **12** | 13-03-2008 | songs | 3000 | 300.0 |
| **13** | 14-12-2012 | drawing | 10000 | 1000.0 |
| **14** | 15-05-2020 | songs | 6000 | 600.0 |
| **15** | 16-08-2015 | dance | 7000 | 700.0 |
| **16** | 17-11-2004 | drawing | 6000 | 600.0 |
| **17** | 18-05-2019 | game | 2111 | 211.1 |
| **18** | 19-01-2006 | dance | 15000 | 1500.0 |
| **19** | 20-09-2016 | game | 9111 | 911.1 |

## 2.Read two csv files given below and perform the following

In [14]:
```
import pandas as ps
df4=pd.read_csv('C:/Users/Guru Kiran/All CSV files/s1.csv')
df4
```

Out[14]:

| | sid | maths | science |
|---|---|---|---|
| **0** | 1 | 52 | 52 |
| **1** | 2 | 65 | 62 |
| **2** | 3 | 64 | 89 |
| **3** | 4 | 98 | 97 |
| **4** | 5 | 62 | 85 |

In [15]:
```
df5=pd.read_csv('C:/Users/Guru Kiran/All CSV files/s2.csv')
df5
```

Out[15]:

| | sid | maths | science |
|---|---|---|---|
| **0** | 0 | 52 | 52 |
| **1** | 1 | 65 | 62 |
| **2** | 2 | 64 | 89 |
| **3** | 3 | 98 | 97 |
| **4** | 4 | 62 | 85 |

## ->Add a new attribute called total by summing maths and science

In [16]:
```
df5['total']=df5[['maths','science']].sum(axis=1)
df5
```

Out[16]:

| | sid | maths | science | total |
|---|---|---|---|---|
| **0** | 0 | 52 | 52 | 104 |
| **1** | 1 | 65 | 62 | 127 |
| **2** | 2 | 64 | 89 | 153 |
| **3** | 3 | 98 | 97 | 195 |
| **4** | 4 | 62 | 85 | 147 |

## ->Add a new object to the final dataframe

In [17]:
```
df5.loc[len(df5.index)]=[6,65,68,133]
df5
```

Out[17]:

| | sid | maths | science | total |
|---|---|---|---|---|
| **0** | 0 | 52 | 52 | 104 |
| **1** | 1 | 65 | 62 | 127 |
| **2** | 2 | 64 | 89 | 153 |
| **3** | 3 | 98 | 97 | 195 |
| **4** | 4 | 62 | 85 | 147 |
| **5** | 6 | 65 | 68 | 133 |

## ->Merge the two dataframes on sid

In [18]:
```
df_meargе=pd.merge(df4,df5,on='sid',how='outer')
df_meargе
```

Out[18]:

| | sid | maths_x | science_x | maths_y | science_y | total |
|---|---|---|---|---|---|---|
| **0** | 0 | NaN | NaN | 52.0 | 52.0 | 104.0 |
| **1** | 1 | 52.0 | 52.0 | 65.0 | 62.0 | 127.0 |
| **2** | 2 | 65.0 | 62.0 | 64.0 | 89.0 | 153.0 |
| **3** | 3 | 64.0 | 89.0 | 98.0 | 97.0 | 195.0 |
| **4** | 4 | 98.0 | 97.0 | 62.0 | 85.0 | 147.0 |
| **5** | 5 | 62.0 | 85.0 | NaN | NaN | NaN |
| **6** | 6 | NaN | NaN | 65.0 | 68.0 | 133.0 |

In [19]:
```
#droping null values
df_meargе.dropna(inplace=True,axis=0)
df_meargе.head(5)
```

Out[19]:

| | sid | maths_x | science_x | maths_y | science_y | total |
|---|---|---|---|---|---|---|
| **1** | 1 | 52.0 | 52.0 | 65.0 | 62.0 | 127.0 |
| **2** | 2 | 65.0 | 62.0 | 64.0 | 89.0 | 153.0 |
| **3** | 3 | 64.0 | 89.0 | 98.0 | 97.0 | 195.0 |
| **4** | 4 | 98.0 | 97.0 | 62.0 | 85.0 | 147.0 |