```
import pandas as pd
```

```
pd.__version__
```

```
'2.2.2'
```

```
df=pd.read_csv(r"C:\Users\Admin\Downloads\data.csv")
```

```
df
```

```
              CountryName CountryCode  BirthRate  InternetUsers  \
0                   Aruba         ABW     10.244           78.9
1             Afghanistan         AFG     35.253            5.9
2                  Angola         AGO     45.985           19.1
3                 Albania         ALB     12.877           57.2
4    United Arab Emirates         ARE     11.044           88.0
..                    ...         ...        ...            ...
190           Yemen, Rep.         YEM     32.947           20.0
191          South Africa         ZAF     20.850           46.5
192      Congo, Dem. Rep.         COD     42.394            2.2
193                Zambia         ZMB     40.471           15.4
194              Zimbabwe         ZWE     35.715           18.5

             IncomeGroup
0            High income
1             Low income
2    Upper middle income
3    Upper middle income
4            High income
..                    ...
190  Lower middle income
191  Upper middle income
192           Low income
193  Lower middle income
194           Low income

[195 rows x 5 columns]
```

```
id(df)
```

```
2312354809040
```

```
len(df)
```

```
195
```

```
df.columns
```

```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

```
len(df.columns)
```

```
5
```

```
df.isnull()
```

```
     CountryName  CountryCode  BirthRate  InternetUsers  IncomeGroup
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          False        False      False          False        False
..           ...          ...        ...            ...          ...
190        False        False      False          False        False
191        False        False      False          False        False
192        False        False      False          False        False
193        False        False      False          False        False
194        False        False      False          False        False

[195 rows x 5 columns]
```

```
df.isna()
```

```
     CountryName  CountryCode  BirthRate  InternetUsers  IncomeGroup
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          False        False      False          False        False
..           ...          ...        ...            ...          ...
190        False        False      False          False        False
191        False        False      False          False        False
192        False        False      False          False        False
193        False        False      False          False        False
194        False        False      False          False        False

[195 rows x 5 columns]
```

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

```
CountryName      0
CountryCode      0
BirthRate        0
InternetUsers    0
IncomeGroup      0
dtype: int64
```

```
df.isna().sum()
```

```
CountryName      0
CountryCode      0
```

```
BirthRate        0
InternetUsers    0
IncomeGroup      0
dtype: int64
```

```
df.head()
```

```
             CountryName CountryCode  BirthRate  InternetUsers  \
0                  Aruba         ABW     10.244           78.9
1            Afghanistan         AFG     35.253            5.9
2                 Angola         AGO     45.985           19.1
3                Albania         ALB     12.877           57.2
4  United Arab Emirates         ARE     11.044           88.0

           IncomeGroup
0          High income
1           Low income
2  Upper middle income
3  Upper middle income
4          High income
```

```
df.tail()
```

```
          CountryName CountryCode  BirthRate  InternetUsers  \
190       Yemen, Rep.         YEM     32.947           20.0
191      South Africa         ZAF     20.850           46.5
192  Congo, Dem. Rep.         COD     42.394            2.2
193            Zambia         ZMB     40.471           15.4
194          Zimbabwe         ZWE     35.715           18.5

             IncomeGroup
190  Lower middle income
191  Upper middle income
192           Low income
193  Lower middle income
194           Low income
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 5 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   CountryName    195 non-null    object
 1   CountryCode    195 non-null    object
 2   BirthRate      195 non-null    float64
 3   InternetUsers  195 non-null    float64
 4   IncomeGroup    195 non-null    object
dtypes: float64(2), object(3)
memory usage: 7.7+ KB
```

```
df[:]
```

```
              CountryName CountryCode  BirthRate  InternetUsers  \
0                   Aruba         ABW     10.244           78.9
1             Afghanistan         AFG     35.253            5.9
2                  Angola         AGO     45.985           19.1
3                 Albania         ALB     12.877           57.2
4    United Arab Emirates         ARE     11.044           88.0
..                    ...         ...        ...            ...
190           Yemen, Rep.         YEM     32.947           20.0
191          South Africa         ZAF     20.850           46.5
192      Congo, Dem. Rep.         COD     42.394            2.2
193                Zambia         ZMB     40.471           15.4
194              Zimbabwe         ZWE     35.715           18.5

             IncomeGroup
0            High income
1             Low income
2    Upper middle income
3    Upper middle income
4            High income
..                   ...
190  Lower middle income
191  Upper middle income
192           Low income
193  Lower middle income
194           Low income

[195 rows x 5 columns]
```

```
df[1:11]
```

```
              CountryName CountryCode  BirthRate  InternetUsers  \
1             Afghanistan         AFG     35.253         5.9000
2                  Angola         AGO     45.985        19.1000
3                 Albania         ALB     12.877        57.2000
4   United Arab Emirates         ARE     11.044        88.0000
5              Argentina         ARG     17.716        59.9000
6                Armenia         ARM     13.308        41.9000
7    Antigua and Barbuda         ATG     16.447        63.4000
8              Australia         AUS     13.200        83.0000
9                Austria         AUT      9.400        80.6188
10            Azerbaijan         AZE     18.300        58.7000

             IncomeGroup
1             Low income
2   Upper middle income
3   Upper middle income
4           High income
5           High income
```

```
6   Lower middle income
7            High income
8            High income
9            High income
10  Upper middle income
```

```
df[::-1]    # Reversing the data frame
```

```
              CountryName CountryCode  BirthRate  InternetUsers  \
194              Zimbabwe         ZWE     35.715           18.5
193                Zambia         ZMB     40.471           15.4
192      Congo, Dem. Rep.         COD     42.394            2.2
191          South Africa         ZAF     20.850           46.5
190           Yemen, Rep.         YEM     32.947           20.0
..                    ...         ...        ...            ...
4    United Arab Emirates         ARE     11.044           88.0
3                 Albania         ALB     12.877           57.2
2                  Angola         AGO     45.985           19.1
1             Afghanistan         AFG     35.253            5.9
0                   Aruba         ABW     10.244           78.9

             IncomeGroup
194           Low income
193  Lower middle income
192           Low income
191  Upper middle income
190  Lower middle income
..                   ...
4            High income
3    Upper middle income
2    Upper middle income
1             Low income
0            High income

[195 rows x 5 columns]
```

```
df[1:100:10]    #Slicing the dataframe to get every 10th row from
index 1 to 100
```

```
         CountryName CountryCode  BirthRate  InternetUsers  \
1        Afghanistan         AFG     35.253         5.9000
11           Burundi         BDI     44.151         1.3000
21            Belize         BLZ     23.092        33.6000
31       Switzerland         CHE     10.200        86.3400
41              Cuba         CUB     10.400        27.9300
51  Egypt, Arab Rep.         EGY     28.032        29.4000
61    United Kingdom         GBR     12.200        89.8441
71         Guatemala         GTM     27.465        19.7000
81           Ireland         IRL     15.000        78.2477
91             Kenya         KEN     35.194        39.0000
```

```
             IncomeGroup
1             Low income
11            Low income
21  Upper middle income
31           High income
41  Upper middle income
51  Lower middle income
61           High income
71  Lower middle income
81           High income
91  Lower middle income
```

```
df[10:21]     #Slicing the dataframe to get rows from index 10 to 20
```

```
                CountryName CountryCode  BirthRate  InternetUsers  \
10               Azerbaijan         AZE     18.300       58.70000
11                  Burundi         BDI     44.151        1.30000
12                  Belgium         BEL     11.200       82.17020
13                    Benin         BEN     36.440        4.90000
14             Burkina Faso         BFA     40.551        9.10000
15               Bangladesh         BGD     20.142        6.63000
16                 Bulgaria         BGR      9.200       53.06150
17                  Bahrain         BHR     15.040       90.00004
18             Bahamas, The         BHS     15.339       72.00000
19  Bosnia and Herzegovina         BIH      9.062       57.79000
20                  Belarus         BLR     12.500       54.17000

             IncomeGroup
10  Upper middle income
11            Low income
12           High income
13            Low income
14            Low income
15  Lower middle income
16  Upper middle income
17           High income
18           High income
19  Upper middle income
20  Upper middle income
```

```
df
```

```
                CountryName CountryCode  BirthRate  InternetUsers  \
0                     Aruba         ABW     10.244           78.9
1               Afghanistan         AFG     35.253            5.9
2                    Angola         AGO     45.985           19.1
3                   Albania         ALB     12.877           57.2
4    United Arab Emirates         ARE     11.044           88.0
..                    ...         ...        ...            ...
```

```
190           Yemen, Rep.          YEM     32.947           20.0
191          South Africa          ZAF     20.850           46.5
192      Congo, Dem. Rep.          COD     42.394            2.2
193                Zambia          ZMB     40.471           15.4
194              Zimbabwe          ZWE     35.715           18.5
```

```
             IncomeGroup
0            High income
1             Low income
2    Upper middle income
3    Upper middle income
4            High income
..                   ...
190  Lower middle income
191  Upper middle income
192           Low income
193  Lower middle income
194           Low income

[195 rows x 5 columns]
```

```
df.describe()   #describe function gives numeric values only
```

```
        BirthRate  InternetUsers
count  195.000000     195.000000
mean    21.469928      42.076471
std     10.605467      29.030788
min      7.900000       0.900000
25%     12.120500      14.520000
50%     19.680000      41.000000
75%     29.759500      66.225000
max     49.661000      96.546800
```

```
df.head(2)
```

```
   CountryName CountryCode  BirthRate  InternetUsers  IncomeGroup
0        Aruba         ABW     10.244           78.9  High income
1  Afghanistan         AFG     35.253            5.9   Low income
```

```
df['CountryName']
```

```
0                    Aruba
1              Afghanistan
2                   Angola
3                  Albania
4      United Arab Emirates
               ...
190            Yemen, Rep.
191           South Africa
192      Congo, Dem. Rep.
193                 Zambia
```

```
194                Zimbabwe
Name: CountryName, Length: 195, dtype: object
```

```
df['CountryCode']
```

```
0      ABW
1      AFG
2      AGO
3      ALB
4      ARE
      ...
190    YEM
191    ZAF
192    COD
193    ZMB
194    ZWE
Name: CountryCode, Length: 195, dtype: object
```

```
df[['CountryName','CountryCode']]
```

```
              CountryName CountryCode
0                   Aruba         ABW
1             Afghanistan         AFG
2                  Angola         AGO
3                 Albania         ALB
4    United Arab Emirates         ARE
..                    ...         ...
190           Yemen, Rep.         YEM
191          South Africa         ZAF
192      Congo, Dem. Rep.         COD
193                Zambia         ZMB
194              Zimbabwe         ZWE

[195 rows x 2 columns]
```

```
df[['CountryName','CountryCode','IncomeGroup']]
```

```
              CountryName CountryCode          IncomeGroup
0                   Aruba         ABW          High income
1             Afghanistan         AFG           Low income
2                  Angola         AGO  Upper middle income
3                 Albania         ALB  Upper middle income
4    United Arab Emirates         ARE          High income
..                    ...         ...                  ...
190           Yemen, Rep.         YEM  Lower middle income
191          South Africa         ZAF  Upper middle income
192      Congo, Dem. Rep.         COD           Low income
193                Zambia         ZMB  Lower middle income
194              Zimbabwe         ZWE           Low income

[195 rows x 3 columns]
```

```
df_cat=df[['CountryName','CountryCode','IncomeGroup']]
df_cat
```

```
              CountryName CountryCode          IncomeGroup
0                   Aruba         ABW          High income
1             Afghanistan         AFG           Low income
2                  Angola         AGO  Upper middle income
3                 Albania         ALB  Upper middle income
4    United Arab Emirates         ARE          High income
..                    ...         ...                  ...
190           Yemen, Rep.         YEM  Lower middle income
191          South Africa         ZAF  Upper middle income
192      Congo, Dem. Rep.         COD           Low income
193                Zambia         ZMB  Lower middle income
194              Zimbabwe         ZWE           Low income

[195 rows x 3 columns]
```

```
print(len(df.columns))
print(len(df_cat.columns))
```

```
5
3
```

```
print(df.columns)
```

```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

```
print(df_cat.columns)
```

```
Index(['CountryName', 'CountryCode', 'IncomeGroup'], dtype='object')
```

```
df_cat.describe()
```

```
       CountryName CountryCode  IncomeGroup
count          195         195          195
unique         195         195            4
top          Aruba         ABW  High income
freq             1           1           67
```

```
df_num=df[['BirthRate','InternetUsers']]
df_num
```

```
     BirthRate  InternetUsers
0       10.244           78.9
1       35.253            5.9
2       45.985           19.1
3       12.877           57.2
4       11.044           88.0
```

```
..          ...             ...
190     32.947            20.0
191     20.850            46.5
192     42.394             2.2
193     40.471            15.4
194     35.715            18.5

[195 rows x 2 columns]
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 5 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   CountryName    195 non-null    object 
 1   CountryCode    195 non-null    object 
 2   BirthRate      195 non-null    float64
 3   InternetUsers  195 non-null    float64
 4   IncomeGroup    195 non-null    object 
dtypes: float64(2), object(3)
memory usage: 7.7+ KB
```

```
df_cat.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 3 columns):
 #   Column       Non-Null Count  Dtype 
---  ------       --------------  ----- 
 0   CountryName  195 non-null    object
 1   CountryCode  195 non-null    object
 2   IncomeGroup  195 non-null    object
dtypes: object(3)
memory usage: 4.7+ KB
```

```
df_num.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 2 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   BirthRate      195 non-null    float64
 1   InternetUsers  195 non-null    float64
dtypes: float64(2)
memory usage: 3.2 KB
```

```
df.describe()
```

```
        BirthRate  InternetUsers
count  195.000000     195.000000
mean    21.469928      42.076471
std     10.605467      29.030788
min      7.900000       0.900000
25%     12.120500      14.520000
50%     19.680000      41.000000
75%     29.759500      66.225000
max     49.661000      96.546800
```

```
df.describe().transpose()
```

```
                count       mean        std  min      25%    50%  \
BirthRate       195.0  21.469928  10.605467  7.9  12.1205  19.68
29.7595
InternetUsers   195.0  42.076471  29.030788  0.9  14.5200  41.00
66.2250

                    max
BirthRate       49.6610
InternetUsers   96.5468
```

```
df.describe().T
```

```
                count       mean        std  min      25%    50%  \
BirthRate       195.0  21.469928  10.605467  7.9  12.1205  19.68
29.7595
InternetUsers   195.0  42.076471  29.030788  0.9  14.5200  41.00
66.2250

                    max
BirthRate       49.6610
InternetUsers   96.5468
```

```
df.columns
```

```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

```
df.columns=['a','b','c','d','e']
```

```
df.columns
```

```
Index(['a', 'b', 'c', 'd', 'e'], dtype='object')
```

```
df.head(1)
```

```
       a    b       c     d            e
0  Aruba  ABW  10.244  78.9  High income
```

```
df.columns=['CountryName', 'CountryCode', 'BirthRate',
'InternetUsers',
       'IncomeGroup']

df.columns
```

```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

```
df.head(1)
```

```
  CountryName CountryCode  BirthRate  InternetUsers  IncomeGroup
0       Aruba         ABW     10.244           78.9  High income
```

```
df[['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers']][4:8]
#subset dataframe
```

```
            CountryName CountryCode  BirthRate  InternetUsers
4  United Arab Emirates         ARE     11.044           88.0
5             Argentina         ARG     17.716           59.9
6               Armenia         ARM     13.308           41.9
7   Antigua and Barbuda         ATG     16.447           63.4
```

```
df[4:8][['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers']]
```

```
            CountryName CountryCode  BirthRate  InternetUsers
4  United Arab Emirates         ARE     11.044           88.0
5             Argentina         ARG     17.716           59.9
6               Armenia         ARM     13.308           41.9
7   Antigua and Barbuda         ATG     16.447           63.4
```

```
df.columns
```

```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

```
df.BirthRate*df.InternetUsers
```

```
0      808.2516
1      207.9927
2      878.3135
3      736.5644
4      971.8720
         ...
190    658.9400
191    969.5250
192     93.2668
193    623.2534
194    660.7275
Length: 195, dtype: float64
```

```
df.head(2)
```

```
   CountryName CountryCode  BirthRate  InternetUsers  IncomeGroup
0        Aruba         ABW     10.244           78.9  High income
1  Afghanistan         AFG     35.253            5.9   Low income
```

```
df['product of BR and IU']=df.BirthRate*df.InternetUsers
df.head(2)
```

```
   CountryName CountryCode  BirthRate  InternetUsers  IncomeGroup  \
0        Aruba         ABW     10.244           78.9  High income
1  Afghanistan         AFG     35.253            5.9   Low income

   product of BR and IU
0              808.2516
1              207.9927
```

```
df['newcolumn']=df.BirthRate*df.InternetUsers   #add a column
```

```
df.head(5)
```

```
            CountryName CountryCode  BirthRate  InternetUsers  \
0                 Aruba         ABW     10.244           78.9
1           Afghanistan         AFG     35.253            5.9
2                Angola         AGO     45.985           19.1
3               Albania         ALB     12.877           57.2
4  United Arab Emirates         ARE     11.044           88.0

           IncomeGroup  newcolumn
0          High income   808.2516
1           Low income   207.9927
2  Upper middle income   878.3135
3  Upper middle income   736.5644
4          High income   971.8720
```

```
len(df.columns)
```

```
6
```

```
df=df.drop('newcolumn',axis=1)
```

```
df.head(1)
```

```
  CountryName CountryCode  BirthRate  InternetUsers  IncomeGroup
0       Aruba         ABW     10.244           78.9  High income
```

```
df=df.drop('product',axis=1)
df.head(2)
```

```
df.InternetUsers<2
```

```
0      False
1      False
```

```
2      False
3      False
4      False
       ...
190    False
191    False
192    False
193    False
194    False
Name: InternetUsers, Length: 195, dtype: bool
```

```
df[df.InternetUsers<1.5]
```

```
     CountryName CountryCode  BirthRate  InternetUsers
IncomeGroup  \
11       Burundi         BDI     44.151            1.3           Low
income
52       Eritrea         ERI     34.800            0.9           Low
income
172  Timor-Leste         TLS     35.755            1.1  Lower middle
income

     product of BR and IU
11                57.3963
52                31.3200
172               39.3305
```

```
df[df.InternetUsers<2]
```

```
      CountryName CountryCode  BirthRate  InternetUsers
IncomeGroup
11        Burundi         BDI     44.151            1.3           Low
income
52        Eritrea         ERI     34.800            0.9           Low
income
55       Ethiopia         ETH     32.925            1.9           Low
income
64         Guinea         GIN     37.337            1.6           Low
income
117       Myanmar         MMR     18.119            1.6  Lower middle
income
127         Niger         NER     49.661            1.7           Low
income
154  Sierra Leone         SLE     36.729            1.7           Low
income
156       Somalia         SOM     43.891            1.5           Low
income
172   Timor-Leste         TLS     35.755            1.1  Lower middle
income
```

```
len(df[df.InternetUsers<2])
```

```
9
```

```
df.BirthRate>40
```

```
0      False
1      False
2       True
3      False
4      False
       ...
190    False
191    False
192     True
193     True
194    False
Name: BirthRate, Length: 195, dtype: bool
```

```
df[df.BirthRate>40]
```

	CountryName	CountryCode	BirthRate	InternetUsers	\
2	Angola	AGO	45.985	19.1	
11	Burundi	BDI	44.151	1.3	
14	Burkina Faso	BFA	40.551	9.1	
65	Gambia, The	GMB	42.525	14.0	
115	Mali	MLI	44.138	3.5	
127	Niger	NER	49.661	1.7	
128	Nigeria	NGA	40.045	38.0	
156	Somalia	SOM	43.891	1.5	
167	Chad	TCD	45.745	2.3	
178	Uganda	UGA	43.474	16.2	
192	Congo, Dem. Rep.	COD	42.394	2.2	
193	Zambia	ZMB	40.471	15.4	

	IncomeGroup
2	Upper middle income
11	Low income
14	Low income
65	Low income
115	Low income
127	Low income
128	Lower middle income
156	Low income
167	Low income
178	Low income
192	Low income
193	Lower middle income

```
f1=df.InternetUsers<2
f2=df.BirthRate>40
df[f1 & f2]
```

```
    CountryName CountryCode  BirthRate  InternetUsers IncomeGroup  \
11      Burundi         BDI     44.151            1.3  Low income
127       Niger         NER     49.661            1.7  Low income
156     Somalia         SOM     43.891            1.5  Low income

     product of BR and IU
11                57.3963
127               84.4237
156               65.8365
```

```
df[df.IncomeGroup=='High income']
```

```
                CountryName CountryCode  BirthRate  InternetUsers
IncomeGroup  \
0                     Aruba         ABW     10.244          78.90  High
income
4     United Arab Emirates         ARE     11.044          88.00  High
income
5                 Argentina         ARG     17.716          59.90  High
income
7       Antigua and Barbuda         ATG     16.447          63.40  High
income
8                 Australia         AUS     13.200          83.00  High
income
..                      ...         ...        ...            ...
...
174    Trinidad and Tobago         TTO     14.590          63.80  High
income
180               Uruguay         URY     14.374          57.69  High
income
181         United States         USA     12.500          84.20  High
income
184         Venezuela, RB         VEN     19.842          54.90  High
income
185  Virgin Islands (U.S.)         VIR     10.700          45.30  High
income

     product of BR and IU
0               808.25160
4               971.87200
5              1061.18840
7              1042.73980
8              1095.60000
..                    ...
174             930.84200
180             829.23606
```

```
181            1052.50000
184            1089.32580
185             484.71000

[67 rows x 6 columns]
```

```
df=df.drop('product of BR and IU', axis=1)
```

```
df[df.IncomeGroup=='High income']
```

```
               CountryName CountryCode  BirthRate  InternetUsers
IncomeGroup
0                    Aruba         ABW     10.244          78.90  High
income
4     United Arab Emirates         ARE     11.044          88.00  High
income
5                Argentina         ARG     17.716          59.90  High
income
7      Antigua and Barbuda         ATG     16.447          63.40  High
income
8                Australia         AUS     13.200          83.00  High
income
..                     ...         ...        ...            ...
...
174    Trinidad and Tobago         TTO     14.590          63.80  High
income
180                Uruguay         URY     14.374          57.69  High
income
181          United States         USA     12.500          84.20  High
income
184          Venezuela, RB         VEN     19.842          54.90  High
income
185  Virgin Islands (U.S.)         VIR     10.700          45.30  High
income

[67 rows x 5 columns]
```

```
df[df.IncomeGroup=='Low income']
```

```
                  CountryName CountryCode  BirthRate  InternetUsers  \
1                 Afghanistan         AFG     35.253           5.90
11                    Burundi         BDI     44.151           1.30
13                      Benin         BEN     36.440           4.90
14               Burkina Faso         BFA     40.551           9.10
29   Central African Republic         CAF     34.076           3.50
38                    Comoros         COM     34.326           6.50
52                    Eritrea         ERI     34.800           0.90
55                   Ethiopia         ETH     32.925           1.90
64                     Guinea         GIN     37.337           1.60
65               Gambia, The         GMB     42.525          14.00
66              Guinea-Bissau         GNB     37.503           3.10
```

77	Haiti	HTI	25.345	10.60
93	Cambodia	KHM	24.462	6.80
99	Liberia	LBR	35.521	3.20
111	Madagascar	MDG	34.686	3.00
115	Mali	MLI	44.138	3.50
120	Mozambique	MOZ	39.705	5.40
123	Malawi	MWI	39.459	5.05
127	Niger	NER	49.661	1.70
132	Nepal	NPL	20.923	13.30
148	Rwanda	RWA	32.689	9.00
154	Sierra Leone	SLE	36.729	1.70
156	Somalia	SOM	43.891	1.50
158	South Sudan	SSD	37.126	14.10
167	Chad	TCD	45.745	2.30
168	Togo	TGO	36.080	4.50
177	Tanzania	TZA	39.518	4.40
178	Uganda	UGA	43.474	16.20
192	Congo, Dem. Rep.	COD	42.394	2.20
194	Zimbabwe	ZWE	35.715	18.50

	IncomeGroup
1	Low income
11	Low income
13	Low income
14	Low income
29	Low income
38	Low income
52	Low income
55	Low income
64	Low income
65	Low income
66	Low income
77	Low income
93	Low income
99	Low income
111	Low income
115	Low income
120	Low income
123	Low income
127	Low income
132	Low income
148	Low income
154	Low income
156	Low income
158	Low income
167	Low income
168	Low income
177	Low income
178	Low income

```
192  Low income
194  Low income
```

```
df.IncomeGroup.unique()
```

```
array(['High income', 'Low income', 'Upper middle income',
       'Lower middle income'], dtype=object)
```

```
df.IncomeGroup.nunique()
```

```
4
```

```
len(df[df.BirthRate>40])
```

```
12
```

```
low_educat= df[df.InternetUsers<2]
low_educat
```

```
      CountryName CountryCode  BirthRate  InternetUsers
IncomeGroup
11        Burundi         BDI     44.151            1.3           Low
income
52        Eritrea         ERI     34.800            0.9           Low
income
55       Ethiopia         ETH     32.925            1.9           Low
income
64         Guinea         GIN     37.337            1.6           Low
income
117       Myanmar         MMR     18.119            1.6  Lower middle
income
127         Niger         NER     49.661            1.7           Low
income
154  Sierra Leone         SLE     36.729            1.7           Low
income
156       Somalia         SOM     43.891            1.5           Low
income
172   Timor-Leste         TLS     35.755            1.1  Lower middle
income
```

```
low_internetuser_country= df[df.InternetUsers<2]
low_internetuser_country
```

```
      CountryName CountryCode  BirthRate  InternetUsers
IncomeGroup
11        Burundi         BDI     44.151            1.3           Low
income
52        Eritrea         ERI     34.800            0.9           Low
income
55       Ethiopia         ETH     32.925            1.9           Low
income
```

```
64         Guinea          GIN     37.337             1.6           Low
income
117       Myanmar          MMR     18.119             1.6  Lower middle
income
127         Niger          NER     49.661             1.7           Low
income
154  Sierra Leone          SLE     36.729             1.7           Low
income
156       Somalia          SOM     43.891             1.5           Low
income
172   Timor-Leste          TLS     35.755             1.1  Lower middle
income
```

```
high_birth_rate=df[df.BirthRate<40]
high_birth_rate
```

```
               CountryName CountryCode  BirthRate  InternetUsers  \
0                    Aruba         ABW     10.244           78.9
1              Afghanistan         AFG     35.253            5.9
3                  Albania         ALB     12.877           57.2
4    United Arab Emirates          ARE     11.044           88.0
5                Argentina         ARG     17.716           59.9
..                     ...         ...        ...            ...
188    West Bank and Gaza          PSE     30.394           46.6
189                  Samoa         WSM     26.172           15.3
190           Yemen, Rep.          YEM     32.947           20.0
191          South Africa          ZAF     20.850           46.5
194              Zimbabwe          ZWE     35.715           18.5

              IncomeGroup
0             High income
1              Low income
3    Upper middle income
4             High income
5             High income
..                    ...
188  Lower middle income
189  Lower middle income
190  Lower middle income
191  Upper middle income
194           Low income

[183 rows x 5 columns]
```

```
Filter=df.InternetUsers<2

Filter2=df.BirthRate>40

df[Filter & Filter2]
```

```
    CountryName CountryCode  BirthRate  InternetUsers IncomeGroup
11      Burundi         BDI     44.151            1.3  Low income
127       Niger         NER     49.661            1.7  Low income
156     Somalia         SOM     43.891            1.5  Low income
```

```
df=pd.read_csv(r"C:\Users\Admin\Downloads\data.csv")
```

```
df
```

```
               CountryName CountryCode  BirthRate  InternetUsers  \
0                    Aruba         ABW     10.244           78.9
1              Afghanistan         AFG     35.253            5.9
2                   Angola         AGO     45.985           19.1
3                  Albania         ALB     12.877           57.2
4    United Arab Emirates         ARE     11.044           88.0
..                    ...         ...        ...            ...
190           Yemen, Rep.         YEM     32.947           20.0
191          South Africa         ZAF     20.850           46.5
192      Congo, Dem. Rep.         COD     42.394            2.2
193                Zambia         ZMB     40.471           15.4
194              Zimbabwe         ZWE     35.715           18.5

              IncomeGroup
0             High income
1              Low income
2    Upper middle income
3    Upper middle income
4             High income
..                     ...
190  Lower middle income
191  Upper middle income
192           Low income
193  Lower middle income
194           Low income

[195 rows x 5 columns]
```

```
df[df.IncomeGroup == 'High income']
```

```
                CountryName CountryCode  BirthRate  InternetUsers
IncomeGroup
0                     Aruba         ABW     10.244          78.90  High
income
4      United Arab Emirates         ARE     11.044          88.00  High
income
5                 Argentina         ARG     17.716          59.90  High
income
7       Antigua and Barbuda         ATG     16.447          63.40  High
income
8                 Australia         AUS     13.200          83.00  High
income
```

```
..                    ...         ...        ...              ...
...
174    Trinidad and Tobago         TTO     14.590           63.80  High
income
180                Uruguay         URY     14.374           57.69  High
income
181          United States         USA     12.500           84.20  High
income
184          Venezuela, RB         VEN     19.842           54.90  High
income
185  Virgin Islands (U.S.)         VIR     10.700           45.30  High
income

[67 rows x 5 columns]
```

```
df[df.IncomeGroup == 'Low income']
```

```
                  CountryName CountryCode  BirthRate  InternetUsers  \
1                 Afghanistan         AFG     35.253           5.90
11                    Burundi         BDI     44.151           1.30
13                      Benin         BEN     36.440           4.90
14               Burkina Faso         BFA     40.551           9.10
29   Central African Republic         CAF     34.076           3.50
38                    Comoros         COM     34.326           6.50
52                    Eritrea         ERI     34.800           0.90
55                   Ethiopia         ETH     32.925           1.90
64                     Guinea         GIN     37.337           1.60
65               Gambia, The         GMB     42.525          14.00
66              Guinea-Bissau         GNB     37.503           3.10
77                      Haiti         HTI     25.345          10.60
93                   Cambodia         KHM     24.462           6.80
99                    Liberia         LBR     35.521           3.20
111                Madagascar         MDG     34.686           3.00
115                      Mali         MLI     44.138           3.50
120                Mozambique         MOZ     39.705           5.40
123                    Malawi         MWI     39.459           5.05
127                     Niger         NER     49.661           1.70
132                     Nepal         NPL     20.923          13.30
148                    Rwanda         RWA     32.689           9.00
154              Sierra Leone         SLE     36.729           1.70
156                   Somalia         SOM     43.891           1.50
158               South Sudan         SSD     37.126          14.10
167                      Chad         TCD     45.745           2.30
168                      Togo         TGO     36.080           4.50
177                  Tanzania         TZA     39.518           4.40
178                    Uganda         UGA     43.474          16.20
192          Congo, Dem. Rep.         COD     42.394           2.20
194                  Zimbabwe         ZWE     35.715          18.50

    IncomeGroup
```

```
1     Low income
11    Low income
13    Low income
14    Low income
29    Low income
38    Low income
52    Low income
55    Low income
64    Low income
65    Low income
66    Low income
77    Low income
93    Low income
99    Low income
111   Low income
115   Low income
120   Low income
123   Low income
127   Low income
132   Low income
148   Low income
154   Low income
156   Low income
158   Low income
167   Low income
168   Low income
177   Low income
178   Low income
192   Low income
194   Low income
```

```
df.IncomeGroup.unique()
```

```
array(['High income', 'Low income', 'Upper middle income',
       'Lower middle income'], dtype=object)
```

```
df.IncomeGroup.nunique()
```

```
4
```

##we analysis python dataset or dataframe

```
import matplotlib.pyplot as plt     #visualization
import seaborn as sns              #stats visualization,advance
visualization

%matplotlib inline
#plot the graph in the line
plt.rcParams['figure.figsize']=6,2    #rcparam means a parameter comes
from plt library where fig size width=6,height=2
```

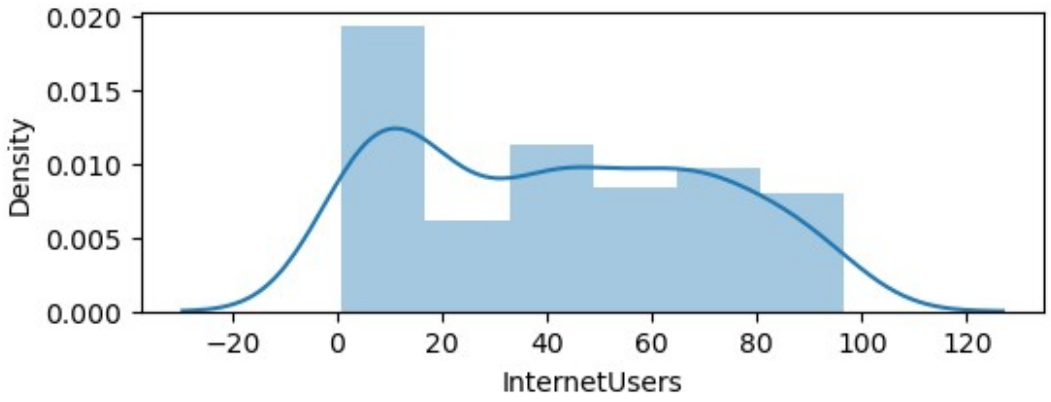
```
import warnings
warnings.filterwarnings('ignore')     #when ever os will update.
ignore the os error using ignore warning mesage

df.columns
```

```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

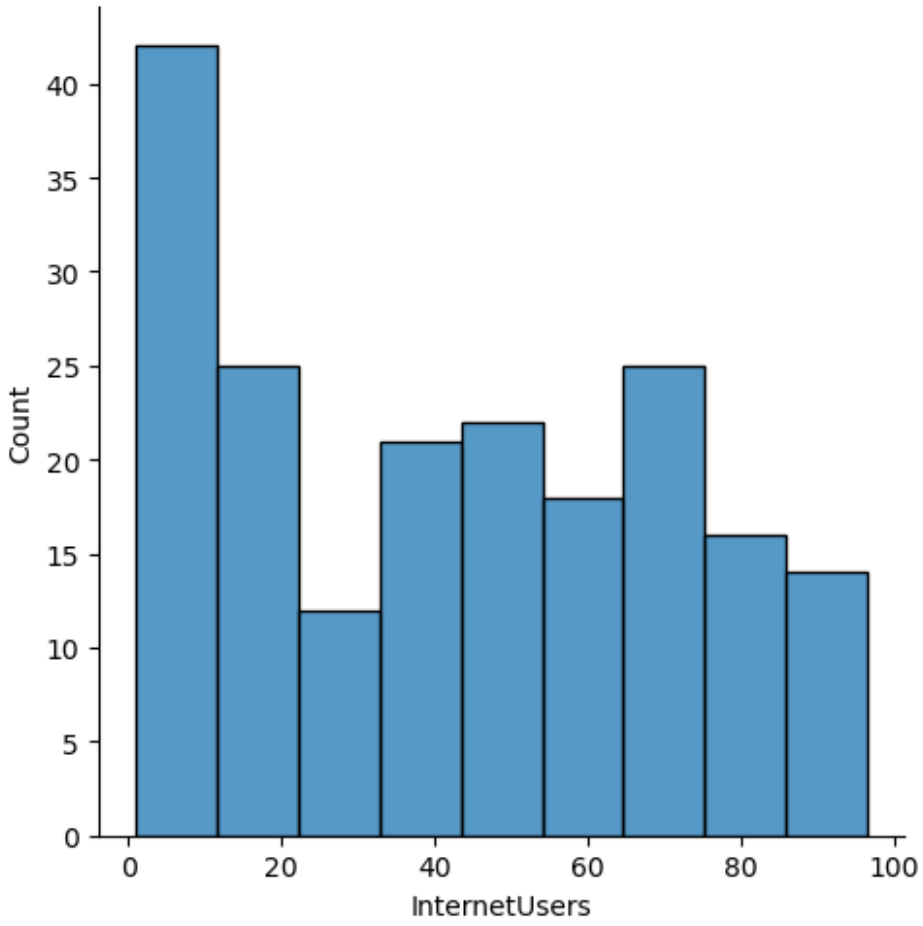
```
df['InternetUsers']
```

```
0       78.9
1        5.9
2       19.1
3       57.2
4       88.0
        ...
190     20.0
191     46.5
192      2.2
193     15.4
194     18.5
Name: InternetUsers, Length: 195, dtype: float64
```

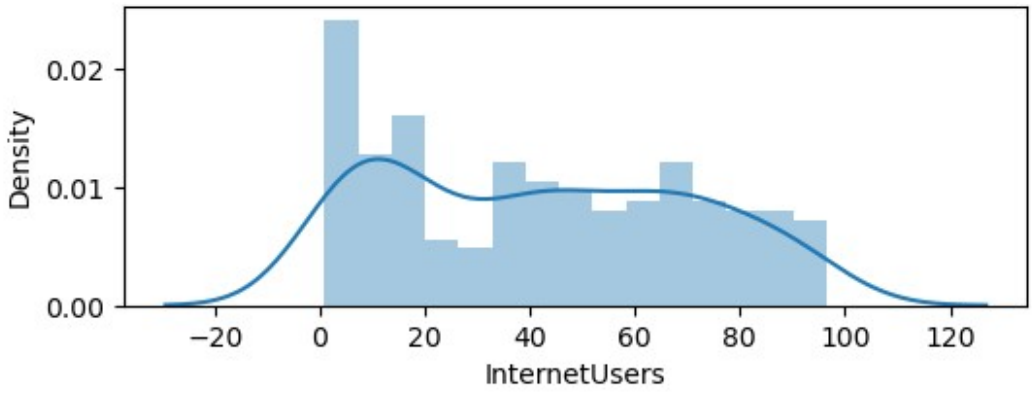
```
vis1=sns.distplot(df["InternetUsers"])

plt.show(vis1)       #plot the graph using 1 variable is calles
univariate analysis(univariate analysis)
```




```
vis2=sns.displot(df["InternetUsers"])

plt.show(vis2)
```

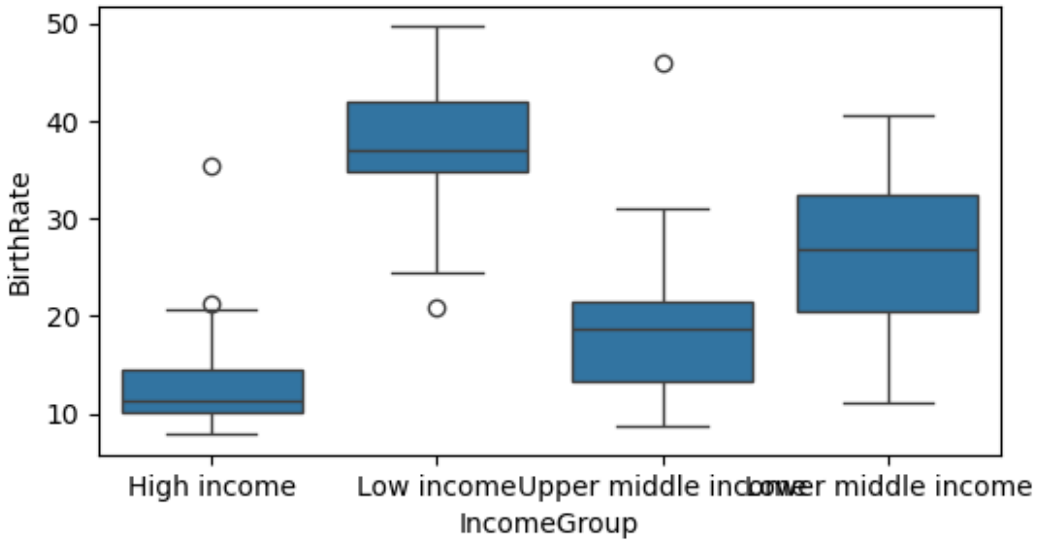



```
vis3=sns.distplot(df["InternetUsers"], bins=15)
plt.show(vis3)
```

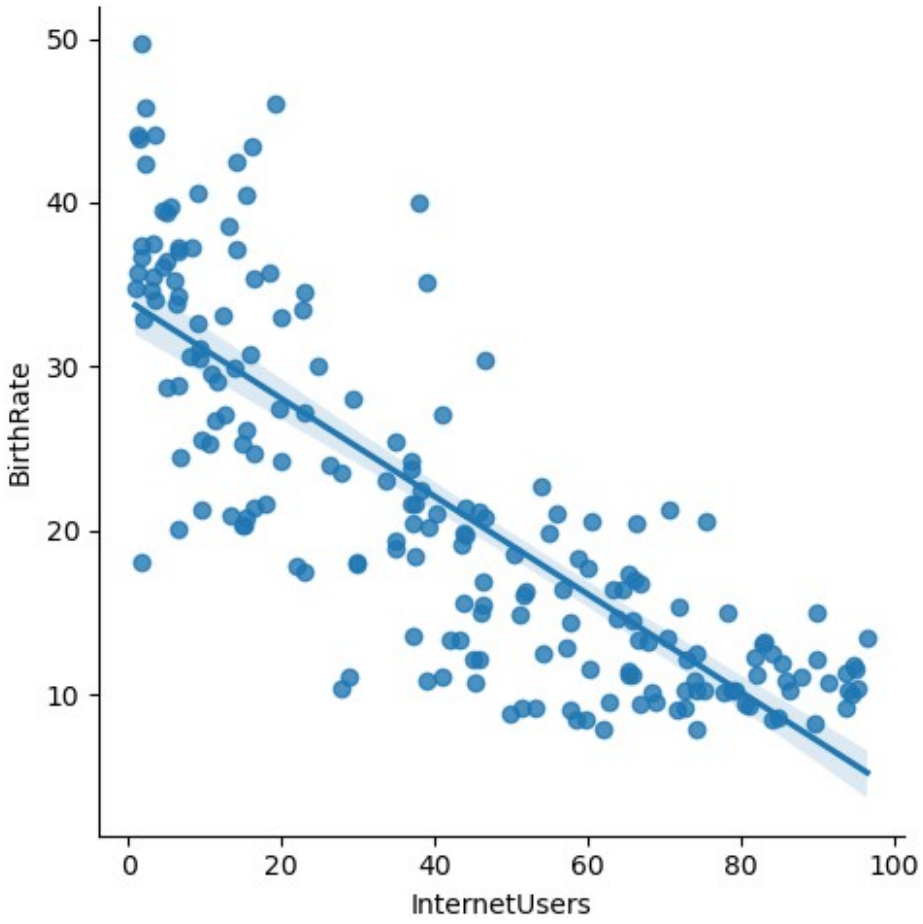



```
plt.rcParams['figure.figsize']=6,3
vis4=sns.boxplot(data=df,x="IncomeGroup",y="BirthRate")
```

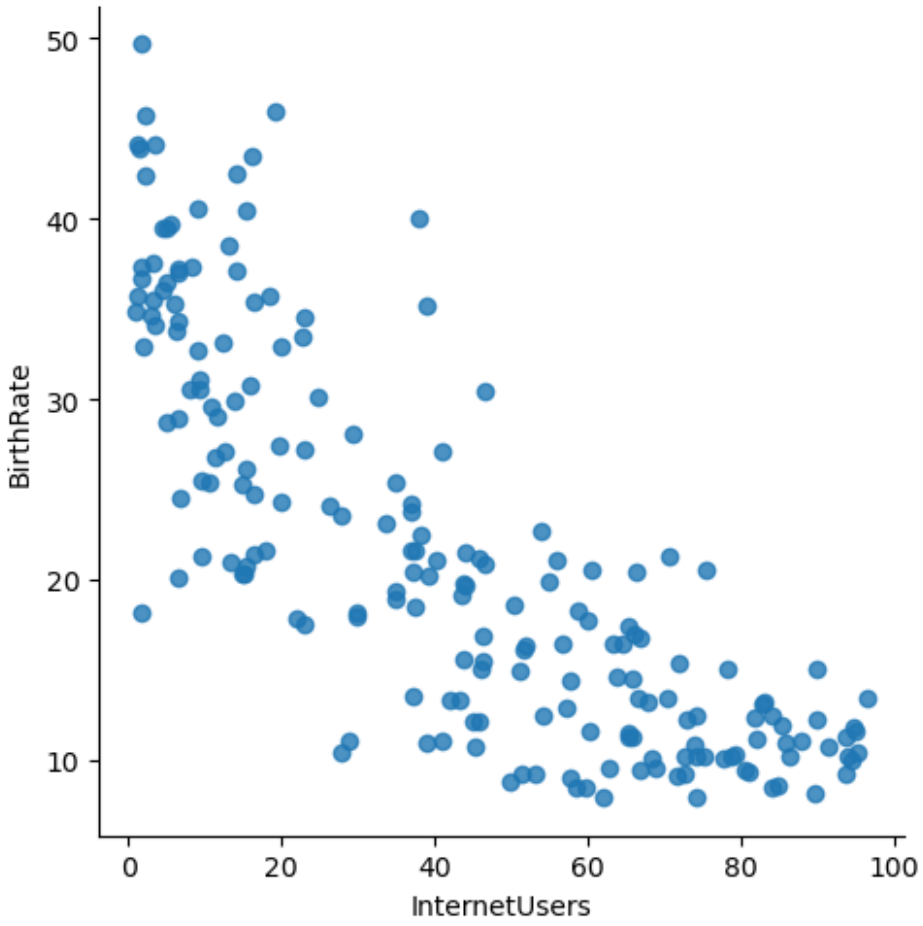
```
plt.show(vis4)
```



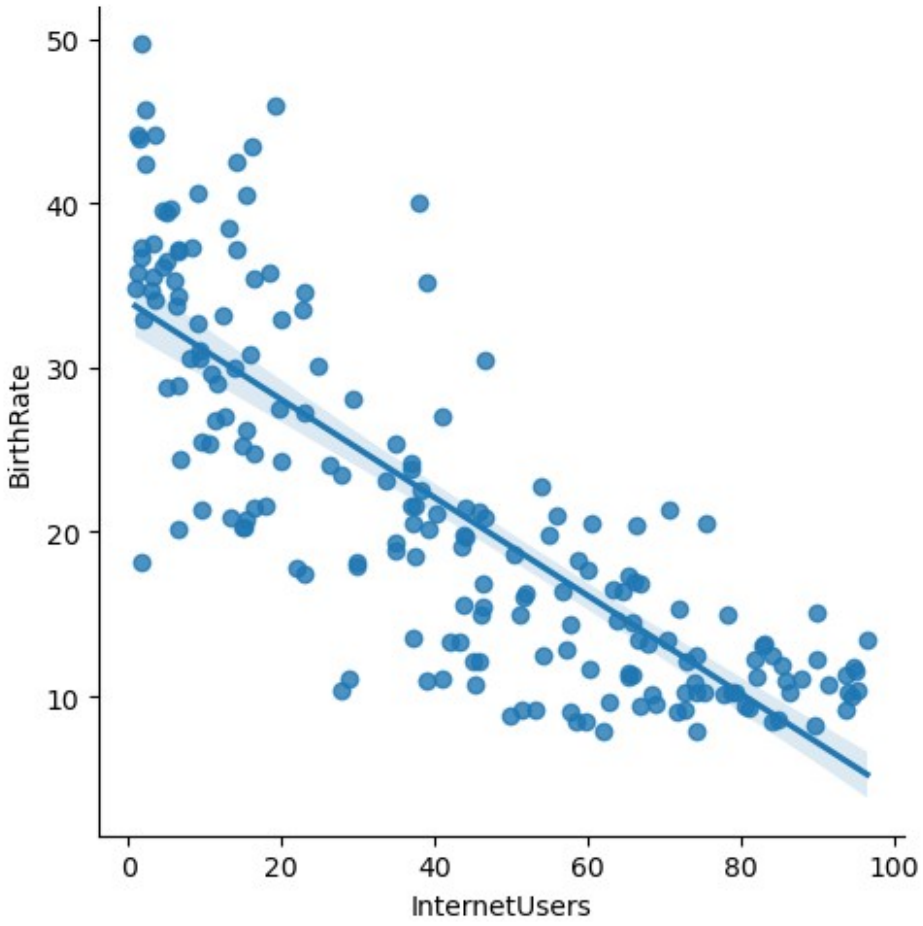

```
###plot the graph using 2 variable is called bivariate
analysis(bvariate analysis)

vis5=sns.lmplot(data=df,x='InternetUsers',y='BirthRate')

plt.show(vis5)
```



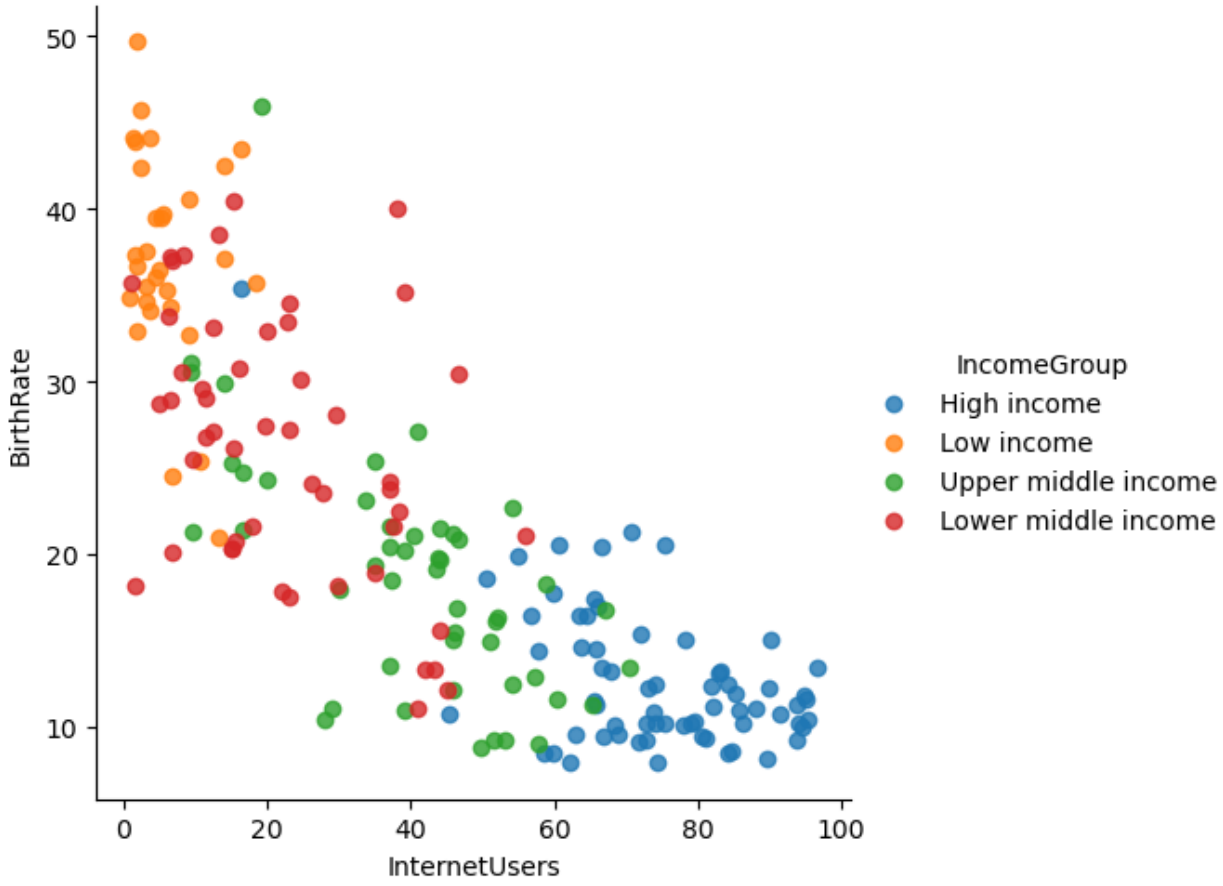

```
vis6=sns.lmplot(data=df,x='InternetUsers',y='BirthRate',fit_reg=False)
plt.show(vis6)
```



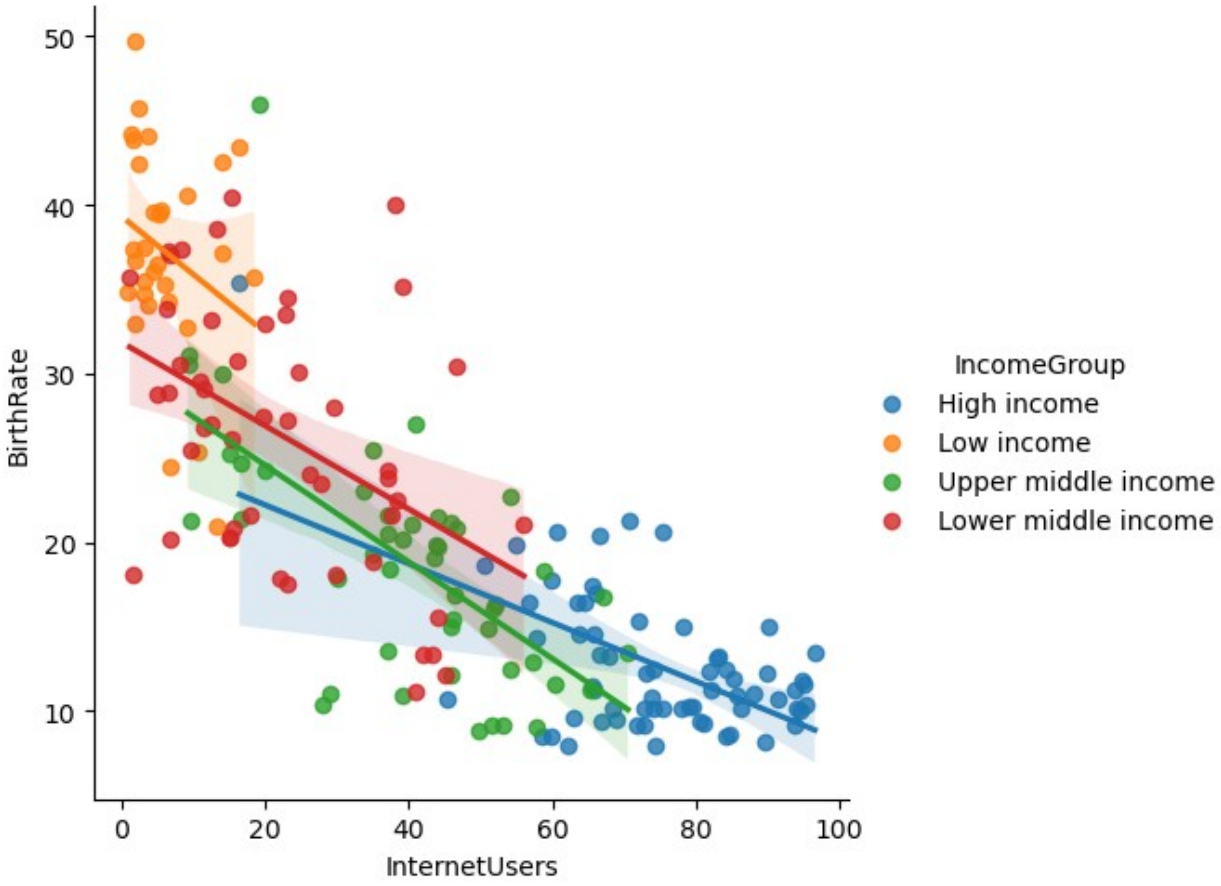

```
vis7=sns.lmplot(data=df,x='InternetUsers',y='BirthRate',fit_reg=True)
plt.show(vis7)
```




```
vis8=sns.lmplot(data=df,x='InternetUsers',y='BirthRate',fit_reg=False,
hue='IncomeGroup')
plt.show(vis8)
```




```
vis9=sns.lmplot(data=df,x='InternetUsers',y='BirthRate',fit_reg=True,h
ue='IncomeGroup')
plt.show(vis9)
```


50
40
30
20
10
BirthRate
0
20
40
60
80
100
InternetUsers
IncomeGroup
High income
Low income
Upper middle income
Lower middle income