In [1]:
```
import pandas as pd
```

In [2]:
```
df=pd.read_csv(r"C:\Users\Admin\Downloads\data.csv")
```

In [3]:
```
df
```

Out[3]:

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

195 rows × 5 columns

In [4]:
```
len(df)
```

Out[4]:
```
195
```

In [5]:
```
df.shape
```

Out[5]:
```
(195, 5)
```

In [6]:
```
df.columns
```

Out[6]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

In [7]:
```
type(df)
```

Out[7]:
```
pandas.core.frame.DataFrame
```

In [8]:
```
df
```

Out[8]:

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

195 rows × 5 columns

In [9]:
```
df.info
```

Out[9]:
```
<bound method DataFrame.info of              CountryName CountryCode  BirthRat
e  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]>
```

In [10]:
```
df_num=df[['BirthRate', 'InternetUsers']]
df_num
```

Out[10]:

	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 × 2 columns

In [11]:
```
df.tail()
```

Out[11]:

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

In [12]:
```
df.head()
```

Out[12]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
0	Aruba	ABW	10.244	78.9	High income
1	Afghanistan	AFG	35.253	5.9	Low income
2	Angola	AGO	45.985	19.1	Upper middle income
3	Albania	ALB	12.877	57.2	Upper middle income
4	United Arab Emirates	ARE	11.044	88.0	High income

In [13]:
```
df.tail(2)
```

Out[13]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
193	Zambia	ZMB	40.471	15.4	Lower middle income
194	Zimbabwe	ZWE	35.715	18.5	Low income

In [14]:
```
df.head(2)
```

Out[14]:

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

In [15]:
```
df[::-1]
```

Out[15]:

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

195 rows × 5 columns

In [16]:
```
df[6:]
```

Out[16]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
6	Armenia	ARM	13.308	41.9000	Lower middle income
7	Antigua and Barbuda	ATG	16.447	63.4000	High income
8	Australia	AUS	13.200	83.0000	High income
9	Austria	AUT	9.400	80.6188	High income
10	Azerbaijan	AZE	18.300	58.7000	Upper middle income
...	...	...	...	...	...
190	Yemen, Rep.	YEM	32.947	20.0000	Lower middle income
191	South Africa	ZAF	20.850	46.5000	Upper middle income
192	Congo, Dem. Rep.	COD	42.394	2.2000	Low income
193	Zambia	ZMB	40.471	15.4000	Lower middle income
194	Zimbabwe	ZWE	35.715	18.5000	Low income

189 rows × 5 columns

In [17]:
```
df[0:200:10]
```

Out[17]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
0	Aruba	ABW	10.244	78.900000	High income
10	Azerbaijan	AZE	18.300	58.700000	Upper middle income
20	Belarus	BLR	12.500	54.170000	Upper middle income
30	Canada	CAN	10.900	85.800000	High income
40	Costa Rica	CRI	15.022	45.960000	Upper middle income
50	Ecuador	ECU	21.070	40.353684	Upper middle income
60	Gabon	GAB	30.555	9.200000	Upper middle income
70	Greenland	GRL	14.500	65.800000	High income
80	India	IND	20.291	15.100000	Lower middle income
90	Kazakhstan	KAZ	22.730	54.000000	Upper middle income
100	Libya	LBY	21.425	16.500000	Upper middle income
110	Moldova	MDA	12.141	45.000000	Lower middle income
120	Mozambique	MOZ	39.705	5.400000	Low income
130	Netherlands	NLD	10.200	93.956400	High income
140	Poland	POL	9.600	62.849200	High income
150	Sudan	SDN	33.477	22.700000	Lower middle income
160	Suriname	SUR	18.455	37.400000	Upper middle income
170	Tajikistan	TJK	30.792	16.000000	Lower middle income
180	Uruguay	URY	14.374	57.690000	High income
190	Yemen, Rep.	YEM	32.947	20.000000	Lower middle income

In [18]:
```
df.describe() #describes the statistical data of the data set
              #this function always print numerical data
```

Out[18]:

	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

In [19]:
```
df.describe().transpose() #this function will convert rows to columns
```

Out[19]:

	count	mean	std	min	25%	50%	75%	max
BirthRate	195.0	21.469928	10.605467	7.9	12.1205	19.68	29.7595	49.6610
InternetUsers	195.0	42.076471	29.030788	0.9	14.5200	41.00	66.2250	96.5468

In [20]:
```
df.columns
```

Out[20]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

In [21]:
```
df.columns=['a','b','c','d','e'] #as list is mutable we  can change the columns
                                 #renaming the atributes
```

In [22]:
```
df.columns
```

Out[22]:
```
Index(['a', 'b', 'c', 'd', 'e'], dtype='object')
```

In [23]:
```
df.head()
```

Out[23]:

	a	b	c	d	e
0	Aruba	ABW	10.244	78.9	High income
1	Afghanistan	AFG	35.253	5.9	Low income
2	Angola	AGO	45.985	19.1	Upper middle income
3	Albania	ALB	12.877	57.2	Upper middle income
4	United Arab Emirates	ARE	11.044	88.0	High income

In [24]:
```
df.columns=['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup']
```

In [25]:
```
df.columns
```

Out[25]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

In [26]:
```
df.head()
```

Out[26]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
0	Aruba	ABW	10.244	78.9	High income
1	Afghanistan	AFG	35.253	5.9	Low income
2	Angola	AGO	45.985	19.1	Upper middle income
3	Albania	ALB	12.877	57.2	Upper middle income
4	United Arab Emirates	ARE	11.044	88.0	High income

In [27]:
```
df.columns
```

Out[27]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup'],
      dtype='object')
```

In [28]:
```
df[['CountryName', 'CountryCode', 'BirthRate']]
```

Out[28]:

	CountryName	CountryCode	BirthRate
0	Aruba	ABW	10.244
1	Afghanistan	AFG	35.253
2	Angola	AGO	45.985
3	Albania	ALB	12.877
4	United Arab Emirates	ARE	11.044
...	...	...	...
190	Yemen, Rep.	YEM	32.947
191	South Africa	ZAF	20.850
192	Congo, Dem. Rep.	COD	42.394
193	Zambia	ZMB	40.471
194	Zimbabwe	ZWE	35.715

195 rows × 3 columns

In [29]:
```
df.isnull
```

Out[29]:
```
<bound method DataFrame.isnull of              CountryName CountryCode  BirthR
ate  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]>
```

In [30]:
```
df_cate=df[['CountryName', 'CountryCode']]
df_cate.head()
```

Out[30]:

	CountryName	CountryCode
0	Aruba	ABW
1	Afghanistan	AFG
2	Angola	AGO
3	Albania	ALB
4	United Arab Emirates	ARE

In [31]:
```
df.describe()
```

Out[31]:

	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

In [32]:
```
df_cate.describe()
```

Out[32]:

	CountryName	CountryCode
count	195	195
unique	195	195
top	Aruba	ABW
freq	1	1

In [33]:
```
df_num=df[['BirthRate', 'InternetUsers']]
```

In [34]:
```
df_num
```

Out[34]:

	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 × 2 columns

In [35]:
```
df_num.transpose
```

Out[35]:
```
<bound method DataFrame.transpose of      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]>
```

In [36]:
```
df.head
```

Out[36]:
```
<bound method NDFrame.head of              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]>
```

In [37]:
```
df.BirthRate*df.InternetUsers
```

Out[37]:
```
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
```

In [38]:
```
df['mycalc']=df.BirthRate*df.InternetUsers #adding a column
```

In [39]:
```
df
```

Out[39]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup	mycalc
0	Aruba	ABW	10.244	78.9	High income	808.2516
1	Afghanistan	AFG	35.253	5.9	Low income	207.9927
2	Angola	AGO	45.985	19.1	Upper middle income	878.3135
3	Albania	ALB	12.877	57.2	Upper middle income	736.5644
4	United Arab Emirates	ARE	11.044	88.0	High income	971.8720
...	...	...	...	...	...	...
190	Yemen, Rep.	YEM	32.947	20.0	Lower middle income	658.9400
191	South Africa	ZAF	20.850	46.5	Upper middle income	969.5250
192	Congo, Dem. Rep.	COD	42.394	2.2	Low income	93.2668
193	Zambia	ZMB	40.471	15.4	Lower middle income	623.2534
194	Zimbabwe	ZWE	35.715	18.5	Low income	660.7275

195 rows × 6 columns

In [40]:
```
df.columns
```

Out[40]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup', 'mycalc'],
      dtype='object')
```

In [41]:
```
len(df.columns)
```

Out[41]:
```
6
```

In [42]:
```
df.drop('mycalc',axis=1) #dropping the particular column
```

Out[42]:

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

195 rows × 5 columns

In [43]:
```
df['InternetUsers']
```

Out[43]:
```
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
```

In [44]:
```
df['InternetUsers']<2
```

Out[44]:
```
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
```

In [45]:
```
filter=df['InternetUsers']<2
filter
```

Out[45]:
```
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
```

In [46]:
```
df[filter] #filtering the data
```

Out[46]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup	mycalc
11	Burundi	BDI	44.151	1.3	Low income	57.3963
52	Eritrea	ERI	34.800	0.9	Low income	31.3200
55	Ethiopia	ETH	32.925	1.9	Low income	62.5575
64	Guinea	GIN	37.337	1.6	Low income	59.7392
117	Myanmar	MMR	18.119	1.6	Lower middle income	28.9904
127	Niger	NER	49.661	1.7	Low income	84.4237
154	Sierra Leone	SLE	36.729	1.7	Low income	62.4393
156	Somalia	SOM	43.891	1.5	Low income	65.8365
172	Timor-Leste	TLS	35.755	1.1	Lower middle income	39.3305

In [47]:
```
len(df[filter])
```

Out[47]:
```
9
```

In [48]:
```
df
```

Out[48]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup	mycalc
0	Aruba	ABW	10.244	78.9	High income	808.2516
1	Afghanistan	AFG	35.253	5.9	Low income	207.9927
2	Angola	AGO	45.985	19.1	Upper middle income	878.3135
3	Albania	ALB	12.877	57.2	Upper middle income	736.5644
4	United Arab Emirates	ARE	11.044	88.0	High income	971.8720
...	...	...	...	...	...	...
190	Yemen, Rep.	YEM	32.947	20.0	Lower middle income	658.9400
191	South Africa	ZAF	20.850	46.5	Upper middle income	969.5250
192	Congo, Dem. Rep.	COD	42.394	2.2	Low income	93.2668
193	Zambia	ZMB	40.471	15.4	Lower middle income	623.2534
194	Zimbabwe	ZWE	35.715	18.5	Low income	660.7275

195 rows × 6 columns

In [49]:
```
df[filter]
```

Out[49]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup	mycalc
11	Burundi	BDI	44.151	1.3	Low income	57.3963
52	Eritrea	ERI	34.800	0.9	Low income	31.3200
55	Ethiopia	ETH	32.925	1.9	Low income	62.5575
64	Guinea	GIN	37.337	1.6	Low income	59.7392
117	Myanmar	MMR	18.119	1.6	Lower middle income	28.9904
127	Niger	NER	49.661	1.7	Low income	84.4237
154	Sierra Leone	SLE	36.729	1.7	Low income	62.4393
156	Somalia	SOM	43.891	1.5	Low income	65.8365
172	Timor-Leste	TLS	35.755	1.1	Lower middle income	39.3305

In [50]:
```
df
```

Out[50]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup	mycalc
0	Aruba	ABW	10.244	78.9	High income	808.2516
1	Afghanistan	AFG	35.253	5.9	Low income	207.9927
2	Angola	AGO	45.985	19.1	Upper middle income	878.3135
3	Albania	ALB	12.877	57.2	Upper middle income	736.5644
4	United Arab Emirates	ARE	11.044	88.0	High income	971.8720
...	...	...	...	...	...	...
190	Yemen, Rep.	YEM	32.947	20.0	Lower middle income	658.9400
191	South Africa	ZAF	20.850	46.5	Upper middle income	969.5250
192	Congo, Dem. Rep.	COD	42.394	2.2	Low income	93.2668
193	Zambia	ZMB	40.471	15.4	Lower middle income	623.2534
194	Zimbabwe	ZWE	35.715	18.5	Low income	660.7275

195 rows × 6 columns

In [51]:
```
filter1=df['BirthRate']>40
```

In [52]:
```
df.IncomeGroup.unique()
```

Out[52]:
```
array(['High income', 'Low income', 'Upper middle income',
       'Lower middle income'], dtype=object)
```

In [53]:
```
df.IncomeGroup.nunique()
```

Out[53]:
```
4
```

In [54]:
```
df.CountryName.nunique() #we have taken data of 195 countries to analze the data
```

Out[54]:
```
195
```

In [55]:
```
df.columns
```

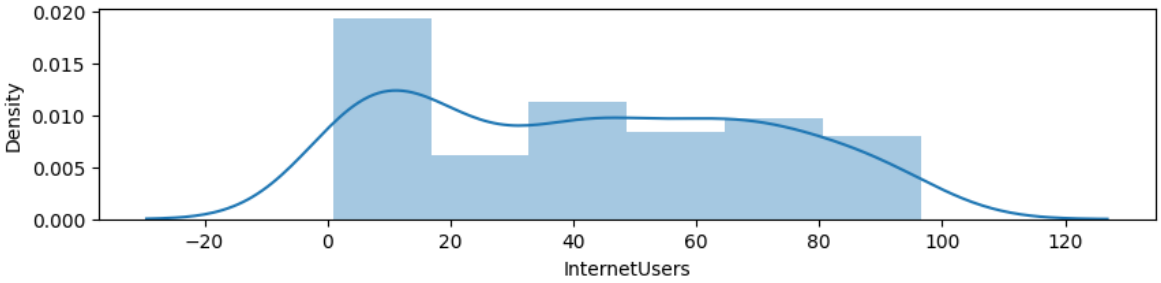
Out[55]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup', 'mycalc'],
      dtype='object')
```

In [56]:
```
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
plt.rcParams['figure.figsize']=10,2
import warnings
warnings.filterwarnings('ignore') #ignoring os errors
```

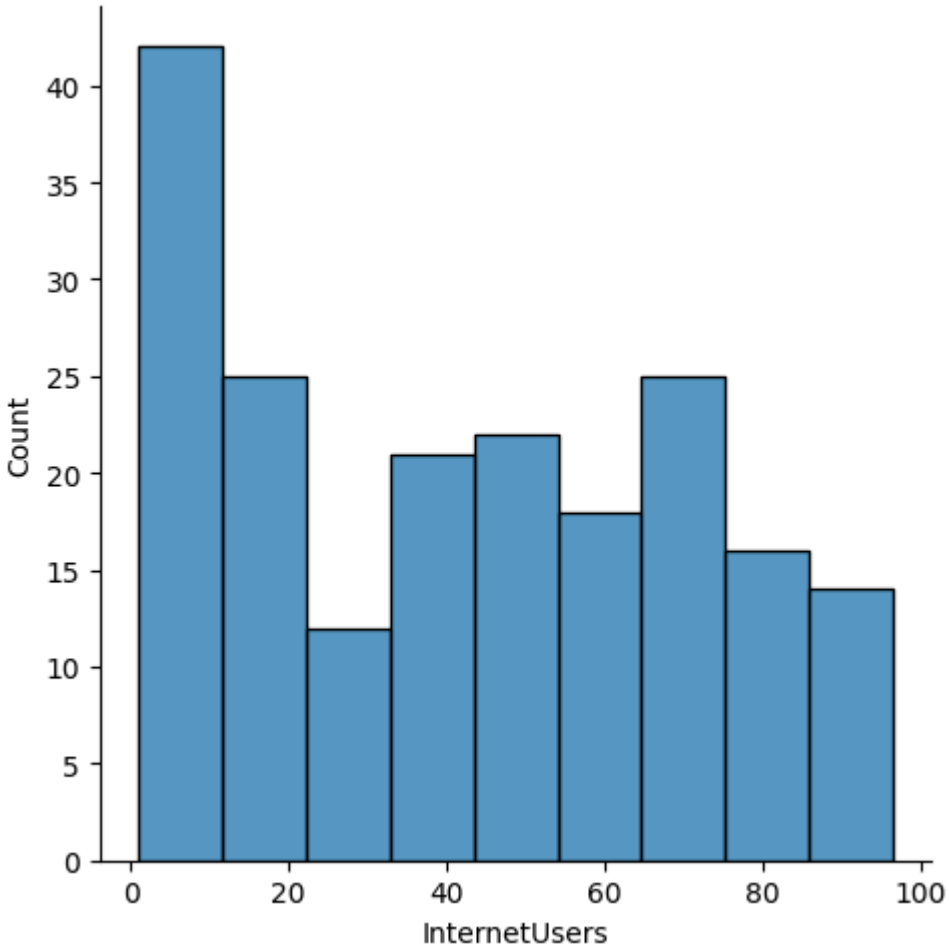
In [57]:
```
df.columns
```

Out[57]:
```
Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
       'IncomeGroup', 'mycalc'],
      dtype='object')
```

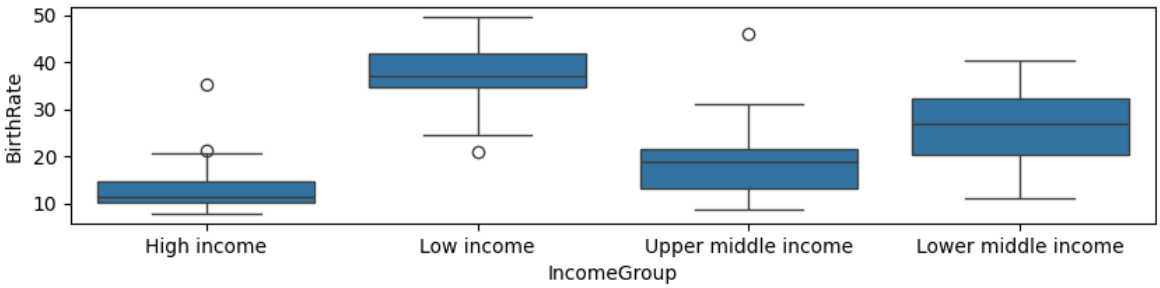
In [58]:
```
vis1=sns.distplot(df['InternetUsers'])
plt.show()
```



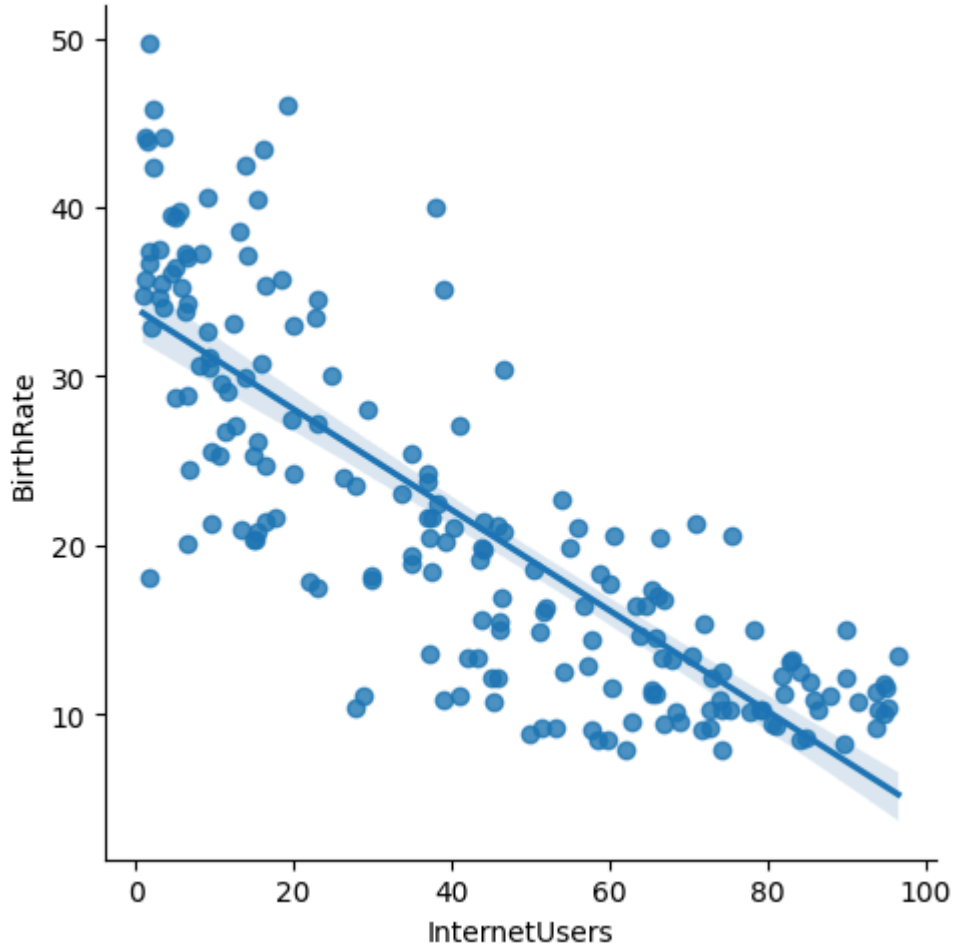
In [59]:
```
vis2=sns.displot(df['InternetUsers'])
plt.show()
```



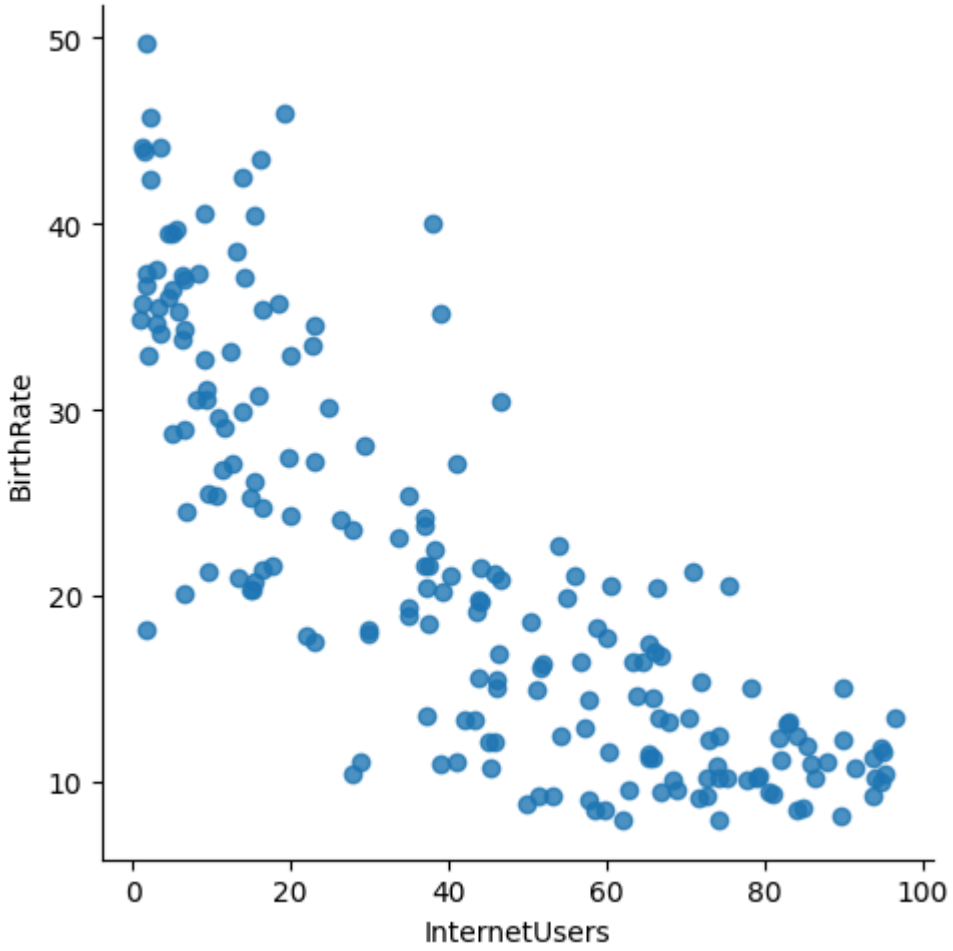
In [60]:
```
vis3=sns.boxplot(data=df,x='IncomeGroup',y='BirthRate')
plt.show()
```



In [61]:
```
vis4=sns.lmplot(data=df,x='InternetUsers',y='BirthRate')
plt.show()
```



In [62]:
```
vis5=sns.lmplot(data=df,x='InternetUsers',y='BirthRate',fit_reg=False)
plt.show()
```



In [63]:
```
vis6=sns.lmplot(data=df,x='InternetUsers',y='BirthRate',hue='IncomeGroup',fit_re
plt.show()
```