

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

```
In [2]: df = pd.read_csv(r'C:\Users\91939\Desktop\AI&DS\6th Aug\data.csv')
```

```
In [3]: df.head()
```

```
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

```
In [4]: df.head(2)
```

```
Out[4]:
```

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

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

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

```
In [6]: df.isnull().sum()
```

```
Out[6]: CountryName      0
CountryCode      0
BirthRate      0
InternetUsers      0
IncomeGroup      0
dtype: int64
```

```
In [7]: df.columns
```

```
Out[7]: Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
              'IncomeGroup'],
              dtype='object')
```

```
In [8]: df.describe()
```

Out[8]:

	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 [9]:

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

Out[9]:

	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 [10]:

```
df.tail()
```

Out[10]:

	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 [11]:

```
df.tail().transpose()
```

Out[11]:

	190	191	192	193	194
CountryName	Yemen, Rep.	South Africa	Congo, Dem. Rep.	Zambia	Zimbabwe
CountryCode	YEM	ZAF	COD	ZMB	ZWE
BirthRate	32.947	20.85	42.394	40.471	35.715
InternetUsers	20.0	46.5	2.2	15.4	18.5
IncomeGroup	Lower middle income	Upper middle income	Low income	Lower middle income	Low income

In [12]:

```
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
```

```
In [13]: df.columns
```

```
Out[13]: Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',  
              'IncomeGroup'],  
             dtype='object')
```

```
In [14]: len(df)
```

```
Out[14]: 195
```

```
In [15]: len(df.columns)
```

```
Out[15]: 5
```

```
In [16]: df.tail(1)
```

```
Out[16]:
```

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
194	Zimbabwe	ZWE	35.715	18.5	Low income

```
In [17]: df.head(2)
```

```
Out[17]:
```

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

```
In [18]: df.tail(3)
```

```
Out[18]:
```

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
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 [19]: df[::-1]
```

Out[19]:

	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 [20]: df[:5]

Out[20]:

	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 [21]: df[6:]

Out[21]:

	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 [22]:

df[0:200:10]

Out[22]:

	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 [23]: df.columns

Out[23]: Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',  
'IncomeGroup'],  
dtype='object')

In [24]: df['CountryName']

Out[24]: 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

```
In [25]: df['CountryName'].head()
```

```
Out[25]: 0          Aruba
1    Afghanistan
2          Angola
3          Albania
4  United Arab Emirates
Name: CountryName, dtype: object
```

```
In [26]: df[['CountryName', 'BirthRate']].head()
```

```
Out[26]:
```

	CountryName	BirthRate
0	Aruba	10.244
1	Afghanistan	35.253
2	Angola	45.985
3	Albania	12.877
4	United Arab Emirates	11.044

```
In [27]: df.head()
```

```
Out[27]:
```

	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 [28]: df.head(3)
```

```
Out[28]:
```

	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

```
In [29]: df[4:8][['CountryName', 'BirthRate']]
```

```
Out[29]:
```

	CountryName	BirthRate
4	United Arab Emirates	11.044
5	Argentina	17.716
6	Armenia	13.308
7	Antigua and Barbuda	16.447

```
In [30]: df[['CountryName', 'BirthRate']][4:8]
```

```
Out[30]:
```

	CountryName	BirthRate
4	United Arab Emirates	11.044
5	Argentina	17.716
6	Armenia	13.308
7	Antigua and Barbuda	16.447

```
In [31]: df.columns = ['a', 'b', 'c', 'd', 'e']
```

```
In [32]: df.columns
```

```
Out[32]: Index(['a', 'b', 'c', 'd', 'e'], dtype='object')
```

```
In [33]: df.head()
```

```
Out[33]:
```

	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 [ ]:
```

```
In [34]: df.columns = ['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers', 'IncomeGro
```

```
In [35]: df.columns
```

```
Out[35]: Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',  
               'IncomeGroup'],  
              dtype='object')
```

```
In [36]: df[:]
```



Out[36]:

	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 [37]:

df

Out[37]:

	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 [38]:

df[:,10]

Out[38]:

	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 [39]: df.columns

Out[39]: Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',  
'IncomeGroup'],  
dtype='object')

In [40]: df.dtypes

Out[40]: CountryName        object  
CountryCode        object  
BirthRate        float64  
InternetUsers     float64  
IncomeGroup       object  
dtype: object

In [41]: df\_categorical = df[['CountryName', 'CountryCode', 'IncomeGroup']]

In [42]: df\_categorical

Out[42]:

	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 × 3 columns

In [43]: df\_categorical.describe()

Out[43]:

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

In [44]: df\_num = df[['BirthRate', 'InternetUsers']]

In [45]: df\_num

Out[45]:

	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 [46]: `df_num.describe()`

Out[46]:

	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 [47]: `df.columns`Out[47]: Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',  
                  'IncomeGroup'],  
              dtype='object')In [48]: `df['BirthRate']`

```
Out[48]: 0      10.244
          1      35.253
          2      45.985
          3      12.877
          4      11.044
          ...
          190    32.947
          191    20.850
          192    42.394
          193    40.471
          194    35.715
          Name: BirthRate, Length: 195, dtype: float64
```

```
In [49]: cat = df[['CountryName', 'CountryCode', 'IncomeGroup']]
```

```
In [50]: cat.head()
```

```
Out[50]:
```

	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

```
In [51]: num = df[['BirthRate', 'InternetUsers']]
```

```
In [52]: num.head()
```

```
Out[52]:
```

	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

```
In [53]: df.head(1)
```

```
Out[53]:
```

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

```
In [54]: df.columns
```

```
Out[54]: Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
               'IncomeGroup'],
              dtype='object')
```

```
In [55]: df
```

Out[55]:

	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 [56]: df1 = df[['CountryName', 'BirthRate']]

In [57]: df1

Out[57]:

	CountryName	BirthRate
0	Aruba	10.244
1	Afghanistan	35.253
2	Angola	45.985
3	Albania	12.877
4	United Arab Emirates	11.044
...	...	...
190	Yemen, Rep.	32.947
191	South Africa	20.850
192	Congo, Dem. Rep.	42.394
193	Zambia	40.471
194	Zimbabwe	35.715

195 rows × 2 columns

```
In [58]: df1.head()
```

```
Out[58]:
```

	CountryName	BirthRate
0	Aruba	10.244
1	Afghanistan	35.253
2	Angola	45.985
3	Albania	12.877
4	United Arab Emirates	11.044

```
In [59]: df1.columns
```

```
Out[59]: Index(['CountryName', 'BirthRate'], dtype='object')
```

```
In [60]: df2 = df[4:8]
```

```
In [61]: df2
```

```
Out[61]:
```

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

```
In [62]: df[['CountryCode', 'BirthRate', 'InternetUsers']][4:8]
```

```
Out[62]:
```

	CountryCode	BirthRate	InternetUsers
4	ARE	11.044	88.0
5	ARG	17.716	59.9
6	ARM	13.308	41.9
7	ATG	16.447	63.4

```
In [63]: df.BirthRate * df.InternetUsers
```

```
Out[63]:
```

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 [ ]:

In [ ]:

In [ ]:

In [64]: `df['myCalc'] = df.BirthRate * df.InternetUsers`In [65]: `df`

Out[65]:

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

195 rows × 6 columns

In [66]: `len(df)`

Out[66]: 195

In [67]: `df = df.drop('myCalc',axis = 1)`In [68]: `df`

Out[68]:

	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 [69]: `df.columns`

Out[69]: Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers', 'IncomeGroup'], dtype='object')

In [70]: `df.columns[3:4]`

Out[70]: Index(['InternetUsers'], dtype='object')

In [71]: `df.shape`

Out[71]: (195, 5)

In [72]: `df1.head()`

Out[72]:

	CountryName	BirthRate
0	Aruba	10.244
1	Afghanistan	35.253
2	Angola	45.985
3	Albania	12.877
4	United Arab Emirates	11.044

In [106... `InternetUsers<2`

```
-----
NameError                                Traceback (most recent call last)
Cell In[106], line 1
----> 1 InternetUsers<2

NameError: name 'InternetUsers' is not defined
```

In [105... `df.InternetUsers<2`

Out[105... `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 [108... `df.InternetUsers.head()<2`

Out[108... `0 False`  
`1 False`  
`2 False`  
`3 False`  
`4 False`  
Name: InternetUsers, dtype: bool

In [74]: `df[df.InternetUsers<2]`

Out[74]:

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

In [75]: `Filter = df.InternetUsers<2`

In [76]: `Filter`

```
Out[76]: 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 [77]: df[Filter]
```

```
Out[77]:
```

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

```
In [78]: df.BirthRate>40
```

```
Out[78]: 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
```

```
In [79]: Filter2 = df.BirthRate>40
```

```
In [80]: Filter2
```

```
Out[80]: 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
```

```
In [81]: df[Filter2]
```

```
Out[81]:
```

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

```
In [82]: Filter & Filter2
```

```
Out[82]: 0      False
         1      False
         2      False
         3      False
         4      False
         ...
        190     False
        191     False
        192     False
        193     False
        194     False
        Length: 195, dtype: bool
```

```
In [83]: df[Filter & Filter2]
```

Out[83]:

	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

In [84]: `df[(df.BirthRate>40) & (df.InternetUsers<2)]`

Out[84]:

	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

In [85]: `df.IncomeGroup == 'Low income'`

```
Out[85]: 0      False
1       True
2      False
3      False
4      False
...
190    False
191    False
192     True
193    False
194     True
Name: IncomeGroup, Length: 195, dtype: bool
```

In [86]: `df[df.IncomeGroup == 'Low income']`

Out[86]:

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

In [87]: df.CountryName.unique()

```
Out[87]: array(['Aruba', 'Afghanistan', 'Angola', 'Albania',
               'United Arab Emirates', 'Argentina', 'Armenia',
               'Antigua and Barbuda', 'Australia', 'Austria', 'Azerbaijan',
               'Burundi', 'Belgium', 'Benin', 'Burkina Faso', 'Bangladesh',
               'Bulgaria', 'Bahrain', 'Bahamas, The', 'Bosnia and Herzegovina',
               'Belarus', 'Belize', 'Bermuda', 'Bolivia', 'Brazil', 'Barbados',
               'Brunei Darussalam', 'Bhutan', 'Botswana',
               'Central African Republic', 'Canada', 'Switzerland', 'Chile',
               'China', 'Cote d'Ivoire', 'Cameroon', 'Congo, Rep.', 'Colombia',
               'Comoros', 'Cabo Verde', 'Costa Rica', 'Cuba', 'Cayman Islands',
               'Cyprus', 'Czech Republic', 'Germany', 'Djibouti', 'Denmark',
               'Dominican Republic', 'Algeria', 'Ecuador', 'Egypt, Arab Rep.',
               'Eritrea', 'Spain', 'Estonia', 'Ethiopia', 'Finland', 'Fiji',
               'France', 'Micronesia, Fed. Sts.', 'Gabon', 'United Kingdom',
               'Georgia', 'Ghana', 'Guinea', 'Gambia, The', 'Guinea-Bissau',
               'Equatorial Guinea', 'Greece', 'Grenada', 'Greenland', 'Guatemala',
               'Guam', 'Guyana', 'Hong Kong SAR, China', 'Honduras', 'Croatia',
               'Haiti', 'Hungary', 'Indonesia', 'India', 'Ireland',
               'Iran, Islamic Rep.', 'Iraq', 'Iceland', 'Israel', 'Italy',
               'Jamaica', 'Jordan', 'Japan', 'Kazakhstan', 'Kenya',
               'Kyrgyz Republic', 'Cambodia', 'Kiribati', 'Korea, Rep.', 'Kuwait',
               'Lao PDR', 'Lebanon', 'Liberia', 'Libya', 'St. Lucia',
               'Liechtenstein', 'Sri Lanka', 'Lesotho', 'Lithuania', 'Luxembourg',
               'Latvia', 'Macao SAR, China', 'Morocco', 'Moldova', 'Madagascar',
               'Maldives', 'Mexico', 'Macedonia, FYR', 'Mali', 'Malta', 'Myanmar',
               'Montenegro', 'Mongolia', 'Mozambique', 'Mauritania', 'Mauritius',
               'Malawi', 'Malaysia', 'Namibia', 'New Caledonia', 'Niger',
               'Nigeria', 'Nicaragua', 'Netherlands', 'Norway', 'Nepal',
               'New Zealand', 'Oman', 'Pakistan', 'Panama', 'Peru', 'Philippines',
               'Papua New Guinea', 'Poland', 'Puerto Rico', 'Portugal',
               'Paraguay', 'French Polynesia', 'Qatar', 'Romania',
               'Russian Federation', 'Rwanda', 'Saudi Arabia', 'Sudan', 'Senegal',
               'Singapore', 'Solomon Islands', 'Sierra Leone', 'El Salvador',
               'Somalia', 'Serbia', 'South Sudan', 'Sao Tome and Principe',
               'Suriname', 'Slovak Republic', 'Slovenia', 'Sweden', 'Swaziland',
               'Seychelles', 'Syrian Arab Republic', 'Chad', 'Togo', 'Thailand',
               'Tajikistan', 'Turkmenistan', 'Timor-Leste', 'Tonga',
               'Trinidad and Tobago', 'Tunisia', 'Turkey', 'Tanzania', 'Uganda',
               'Ukraine', 'Uruguay', 'United States', 'Uzbekistan',
               'St. Vincent and the Grenadines', 'Venezuela, RB',
               'Virgin Islands (U.S.)', 'Vietnam', 'Vanuatu',
               'West Bank and Gaza', 'Samoa', 'Yemen, Rep.', 'South Africa',
               'Congo, Dem. Rep.', 'Zambia', 'Zimbabwe'], dtype=object)
```

```
In [88]: df.CountryName.nunique()
```

```
Out[88]: 195
```

```
In [89]: df.IncomeGroup.unique()
```

```
Out[89]: array(['High income', 'Low income', 'Upper middle income',
               'Lower middle income'], dtype=object)
```

```
In [90]: df.IncomeGroup.nunique()
```

```
Out[90]: 4
```

```
In [114... import matplotlib.pyplot as plt
import numpy as np
```



```
import seaborn as sns
%matplotlib inline
plt.rcParams['figure.figsize'] = 6,2
import warnings
warnings.filterwarnings('ignore')
```

In [115... df.head()

Out[115...

	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 [116... df['InternetUsers']

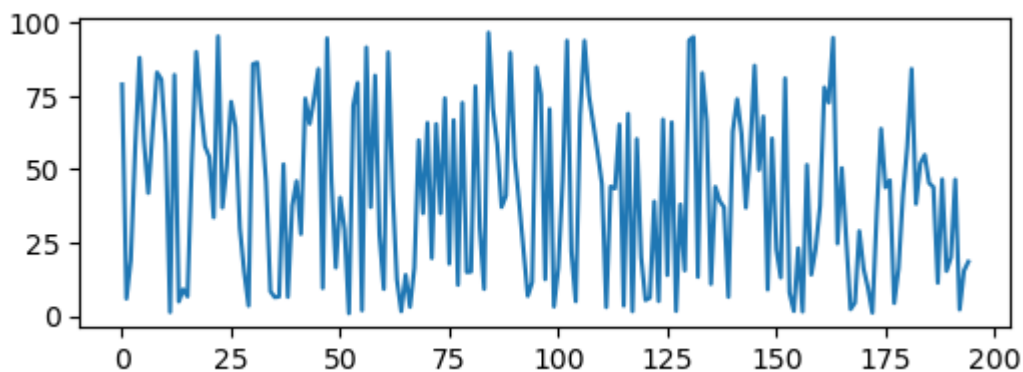
Out[116...

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

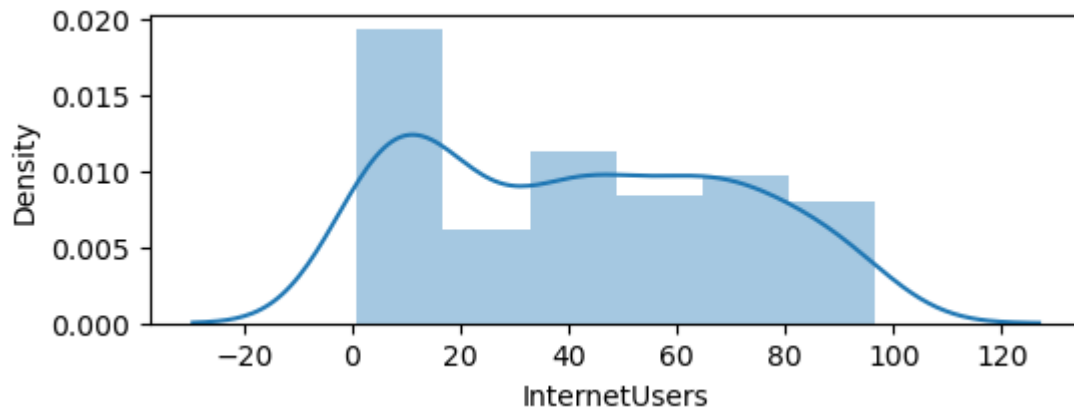
Name: InternetUsers, Length: 195, dtype: float64

In [117... plt.plot(df['InternetUsers']) #matplotlib cant be used without importing numpy

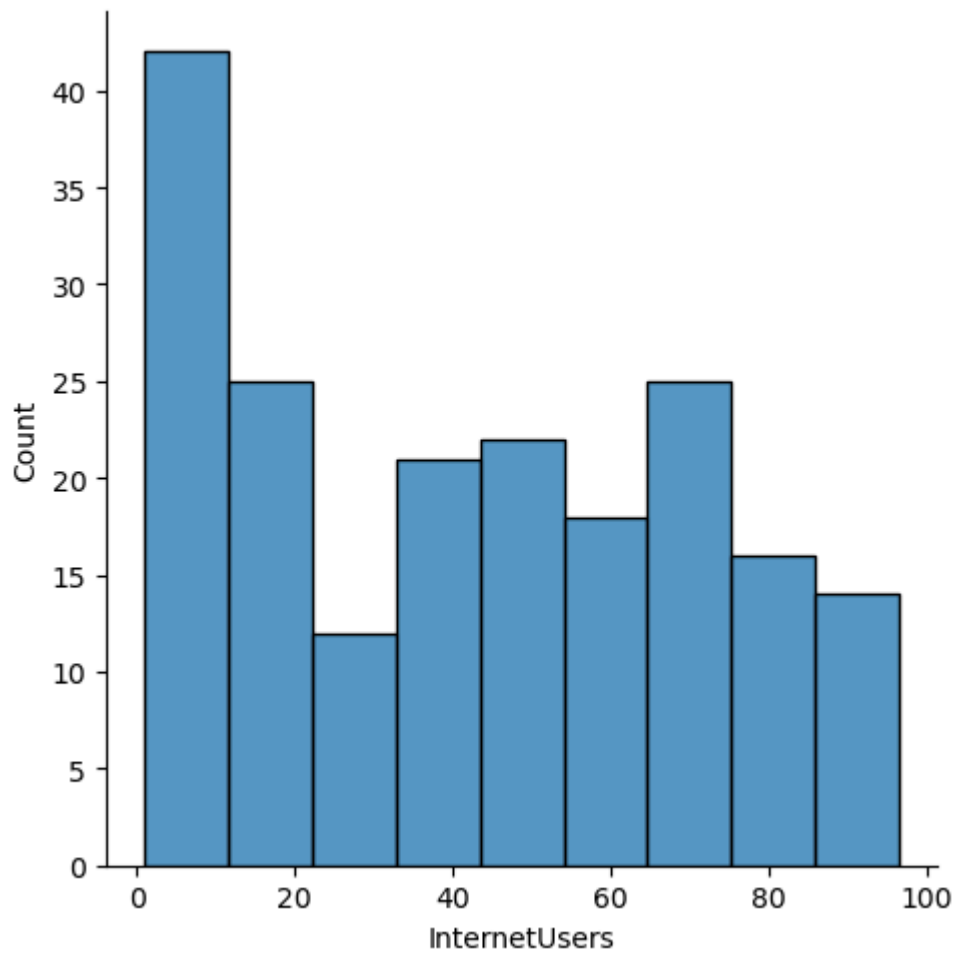
Out[117... [<matplotlib.lines.Line2D at 0x1bb1f1ac830>]



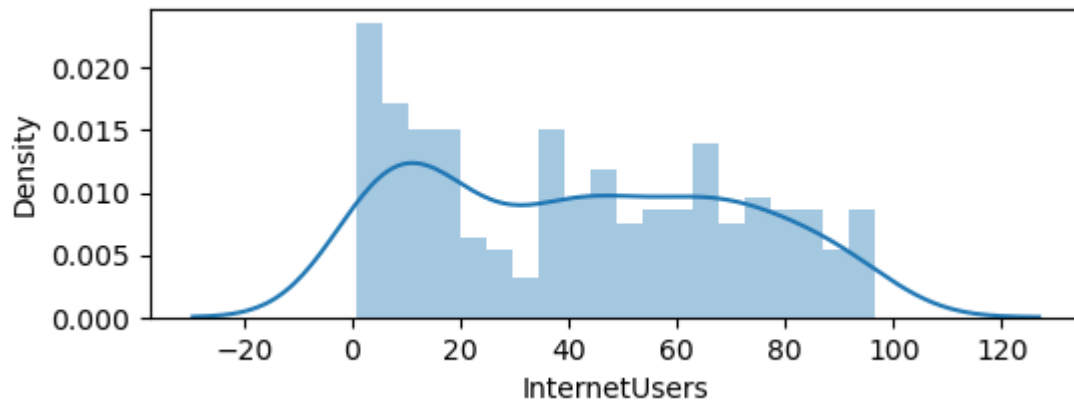
In [94]: vis1 = sns.distplot(df["InternetUsers"])



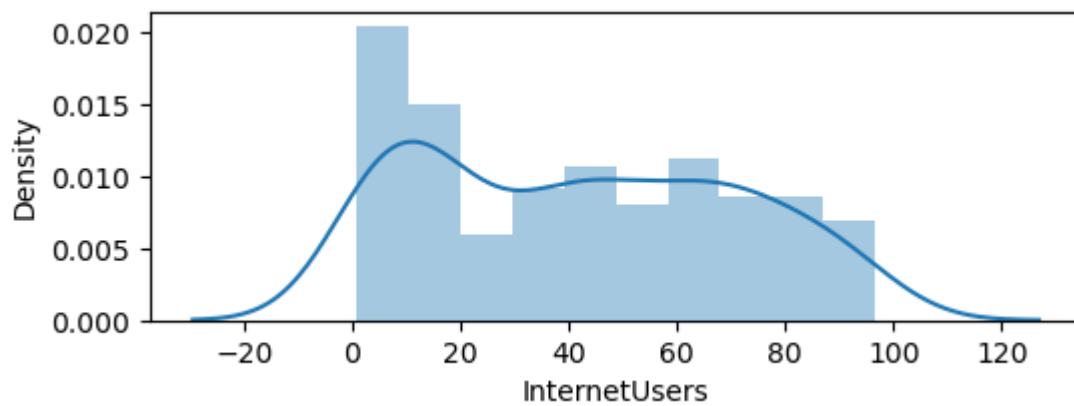
```
In [95]: vis2 = sns.displot(df["InternetUsers"])
```



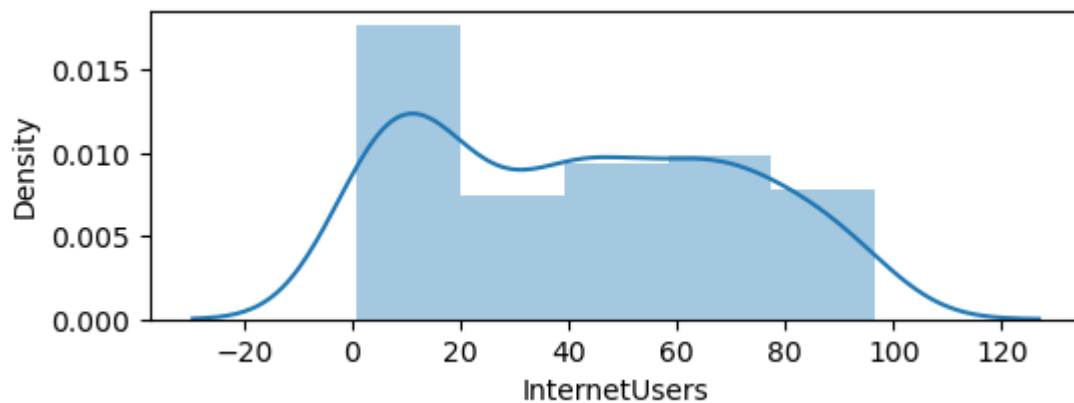
```
In [96]: vis3 = sns.distplot(df["InternetUsers"], bins = 20)
```



```
In [97]: vis3 = sns.distplot(df["InternetUsers"], bins = 10)
```

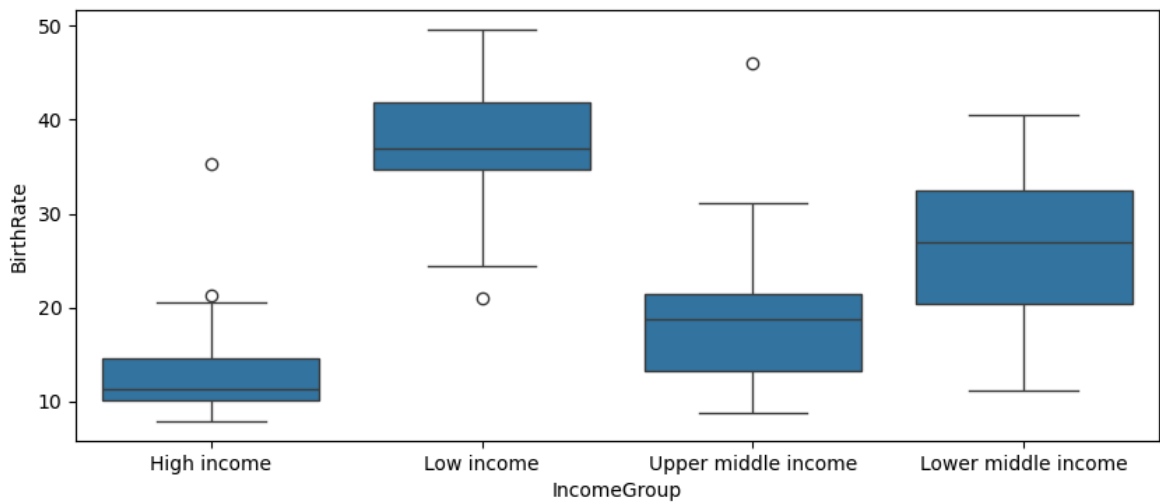


```
In [98]: vis3 = sns.distplot(df["InternetUsers"], bins = 5)
```

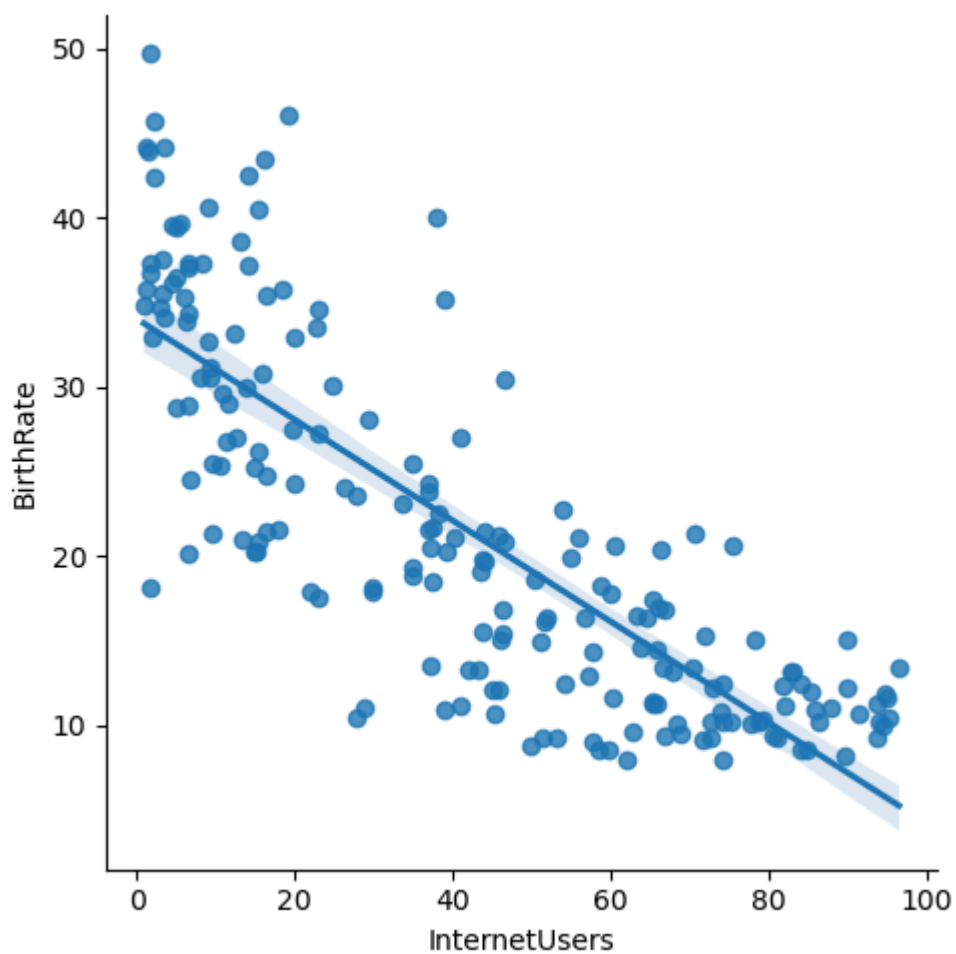


```
In [99]: plt.rcParams['figure.figsize']=10,4
```

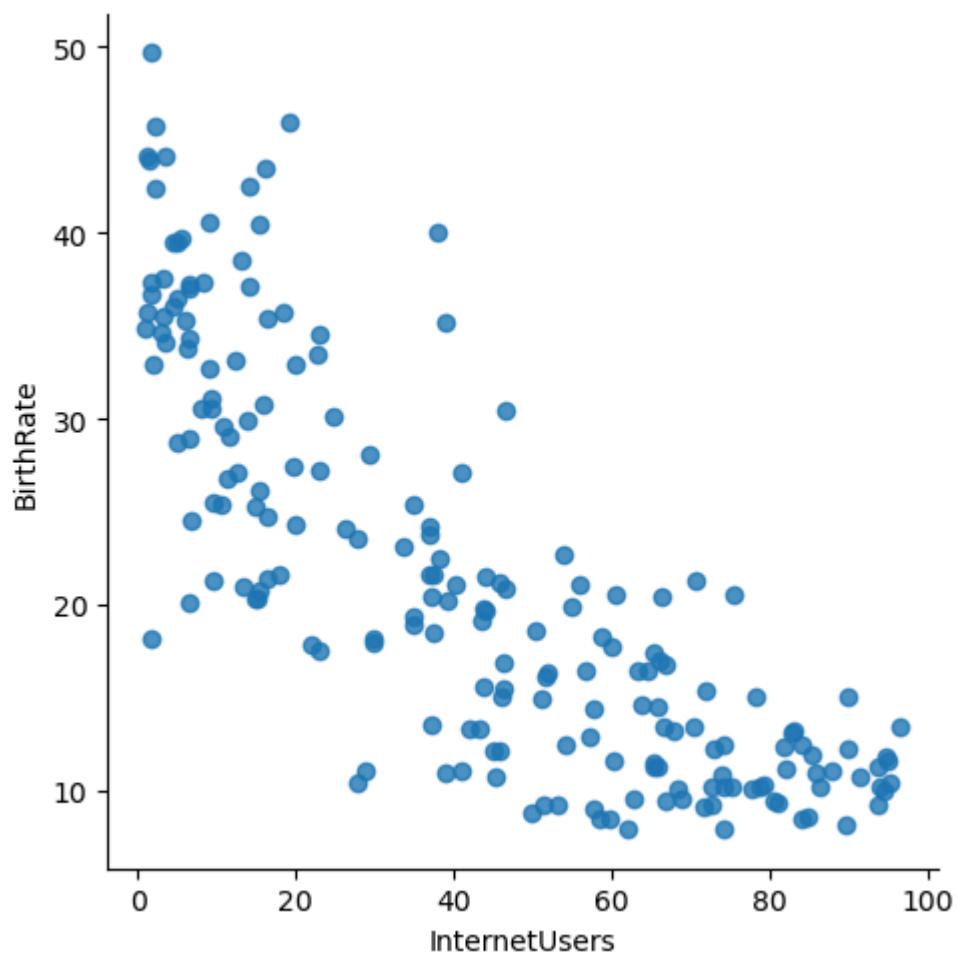
```
In [100]: vis4 = sns.boxplot(data=df, x = 'IncomeGroup', y = 'BirthRate')
```



```
In [101... vis5 = sns.lmplot(data=df, x = 'InternetUsers', y = 'BirthRate')
```

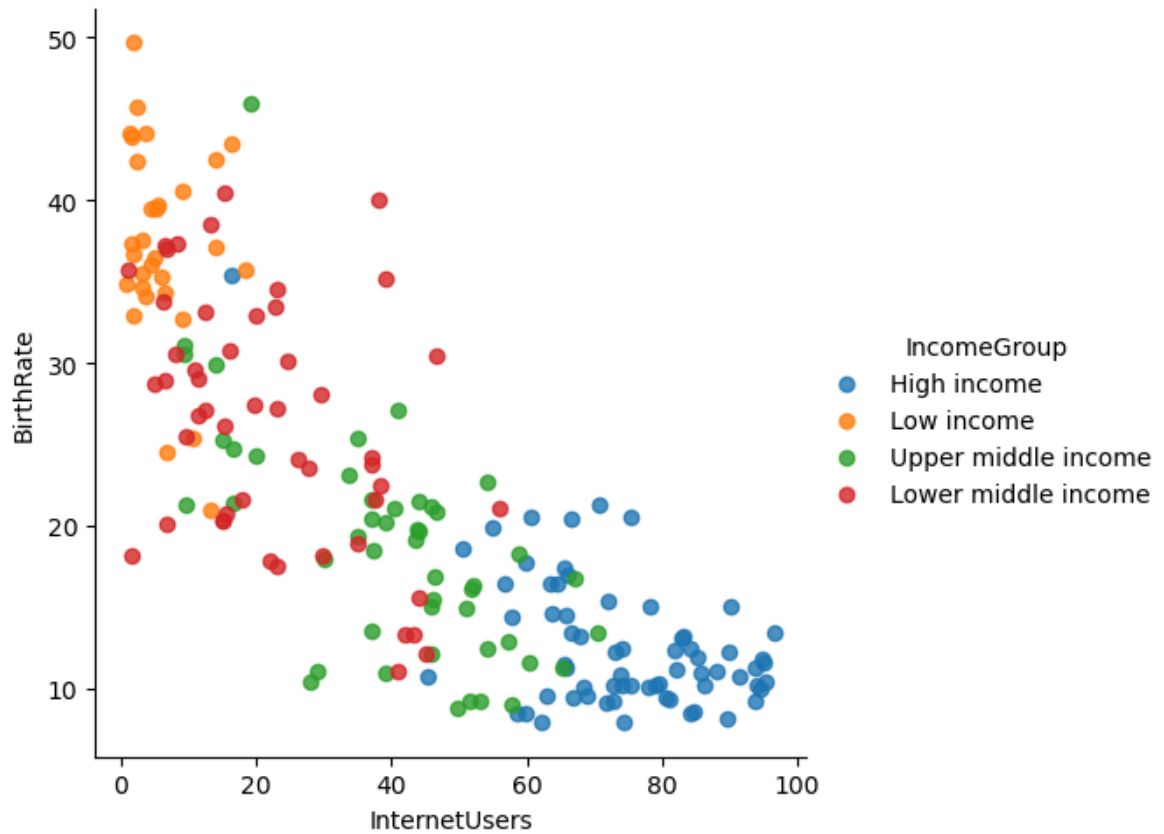


```
In [102... vis6 = sns.lmplot(data = df,x = 'InternetUsers', y = 'BirthRate', fit_reg = Fals
```



```
In [119... %matplotlib inline  
plt.rcParams['figure.figsize'] = 5,5
```

```
In [123... vis5 = sns.lmplot(data = df,x = 'InternetUsers', y = 'BirthRate',  
                  fit_reg = False,hue = 'IncomeGroup')
```



In [129...

```
vis13 = sns.lmplot(data = df,x = 'InternetUsers', y = 'BirthRate',  
                    fit_reg = False,hue = 'IncomeGroup',height = 10)
```

