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

```
In [2]: pd.__version__
```

```
Out[2]: '2.3.0'
```

```
In [3]: df=pd.read_csv(r"D:\Data Science with AI\Data Science With AI\10-july-country gd
```

```
In [4]: df
```

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
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 [5]: df.columns
```

```
Out[5]: Index(['CountryName', 'CountryCode', 'BirthRate', 'InternetUsers',
               'IncomeGroup'],
              dtype='object')
```

```
In [6]: len(df)
```

```
Out[6]: 195
```

```
In [7]: len(df.columns)
```

```
Out[7]: 5
```

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

Out[8]:

	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 × 5 columns

In [9]:
```
df.isna()
```

Out[9]:

	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 × 5 columns

In [10]:
```
df.isnull().sum()
```

Out[10]:
```
CountryName      0
CountryCode      0
BirthRate        0
InternetUsers    0
IncomeGroup      0
dtype: int64
```

In [11]:
```
df.isna().sum()
```

Out[11]:
```
CountryName      0
CountryCode      0
BirthRate        0
InternetUsers    0
IncomeGroup      0
dtype: int64
```

In [12]:
```
id(df)
```

Out[12]:
```
2652211332208
```

In [13]:
```
df.head()
```

Out[13]:

	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 [14]:
```
df.tail()
```

Out[14]:

	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 [15]:
```
df.head(2)
```

Out[15]:

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

In [16]:
```
df.tail(2)
```

Out[16]:

	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 [17]:
```
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 [18]:
```
df[:]
```

Out[18]:

	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 [19]:
```
df[1:99]
```

Out[19]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
1	Afghanistan	AFG	35.253	5.90	Low income
2	Angola	AGO	45.985	19.10	Upper middle income
3	Albania	ALB	12.877	57.20	Upper middle income
4	United Arab Emirates	ARE	11.044	88.00	High income
5	Argentina	ARG	17.716	59.90	High income
...	...	...	...	...	...
94	Kiribati	KIR	29.044	11.50	Lower middle income
95	Korea, Rep.	KOR	8.600	84.77	High income
96	Kuwait	KWT	20.575	75.46	High income
97	Lao PDR	LAO	27.051	12.50	Lower middle income
98	Lebanon	LBN	13.426	70.50	Upper middle income

98 rows × 5 columns

In [20]:

```
df[180:]
```

Out[20]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
180	Uruguay	URY	14.374	57.69	High income
181	United States	USA	12.500	84.20	High income
182	Uzbekistan	UZB	22.500	38.20	Lower middle income
183	St. Vincent and the Grenadines	VCT	16.306	52.00	Upper middle income
184	Venezuela, RB	VEN	19.842	54.90	High income
185	Virgin Islands (U.S.)	VIR	10.700	45.30	High income
186	Vietnam	VNM	15.537	43.90	Lower middle income
187	Vanuatu	VUT	26.739	11.30	Lower middle income
188	West Bank and Gaza	PSE	30.394	46.60	Lower middle income
189	Samoa	WSM	26.172	15.30	Lower middle income
190	Yemen, Rep.	YEM	32.947	20.00	Lower middle income
191	South Africa	ZAF	20.850	46.50	Upper middle income
192	Congo, Dem. Rep.	COD	42.394	2.20	Low income
193	Zambia	ZMB	40.471	15.40	Lower middle income
194	Zimbabwe	ZWE	35.715	18.50	Low income

In [21]:

```
df[1:]
```

Out[21]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
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
5	Argentina	ARG	17.716	59.9	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

194 rows × 5 columns

In [22]:

```
df[::-1]
```

Out[22]:

	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 [23]:

```
df[::-2]
```

Out[23]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
194	Zimbabwe	ZWE	35.715	18.5	Low income
192	Congo, Dem. Rep.	COD	42.394	2.2	Low income
190	Yemen, Rep.	YEM	32.947	20.0	Lower middle income
188	West Bank and Gaza	PSE	30.394	46.6	Lower middle income
186	Vietnam	VNM	15.537	43.9	Lower middle income
...	...	...	...	...	...
8	Australia	AUS	13.200	83.0	High income
6	Armenia	ARM	13.308	41.9	Lower middle income
4	United Arab Emirates	ARE	11.044	88.0	High income
2	Angola	AGO	45.985	19.1	Upper middle income
0	Aruba	ABW	10.244	78.9	High income

98 rows × 5 columns

In [24]:

```
df[1:98:3]
```

Out[24]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
1	Afghanistan	AFG	35.253	5.9000	Low income
4	United Arab Emirates	ARE	11.044	88.0000	High income
7	Antigua and Barbuda	ATG	16.447	63.4000	High income
10	Azerbaijan	AZE	18.300	58.7000	Upper middle income
13	Benin	BEN	36.440	4.9000	Low income
16	Bulgaria	BGR	9.200	53.0615	Upper middle income
19	Bosnia and Herzegovina	BIH	9.062	57.7900	Upper middle income
22	Bermuda	BMU	10.400	95.3000	High income
25	Barbados	BRB	12.188	73.0000	High income
28	Botswana	BWA	25.267	15.0000	Upper middle income
31	Switzerland	CHE	10.200	86.3400	High income
34	Cote d'Ivoire	CIV	37.320	8.4000	Lower middle income
37	Colombia	COL	16.076	51.7000	Upper middle income
40	Costa Rica	CRI	15.022	45.9600	Upper middle income
43	Cyprus	CYP	11.436	65.4548	High income
46	Djibouti	DJI	25.486	9.5000	Lower middle income
49	Algeria	DZA	24.738	16.5000	Upper middle income
52	Eritrea	ERI	34.800	0.9000	Low income
55	Ethiopia	ETH	32.925	1.9000	Low income
58	France	FRA	12.300	81.9198	High income
61	United Kingdom	GBR	12.200	89.8441	High income
64	Guinea	GIN	37.337	1.6000	Low income
67	Equatorial Guinea	GNQ	35.362	16.4000	High income
70	Greenland	GRL	14.500	65.8000	High income
73	Guyana	GUY	18.885	35.0000	Lower middle income
76	Croatia	HRV	9.400	66.7476	High income

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
79	Indonesia	IDN	20.297	14.9400	Lower middle income
82	Iran, Islamic Rep.	IRN	17.900	29.9500	Upper middle income
85	Israel	ISR	21.300	70.8000	High income
88	Jordan	JOR	27.046	41.0000	Upper middle income
91	Kenya	KEN	35.194	39.0000	Lower middle income
94	Kiribati	KIR	29.044	11.5000	Lower middle income
97	Lao PDR	LAO	27.051	12.5000	Lower middle income

In [25]:
```
df[-1]
```

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\indexes\base.p
y:3812, in Index.get_loc(self, key)
   3811 try:
-> 3812     return self._engine.get_loc(casted_key)
   3813 except KeyError as err:

File pandas/_libs/index.pyx:167, in pandas._libs.index.IndexEngine.get_loc()

File pandas/_libs/index.pyx:196, in pandas._libs.index.IndexEngine.get_loc()

File pandas/_libs/hashtable_class_helper.pxi:7088, in pandas._libs.hashtable.PyOb
jectHashTable.get_item()

File pandas/_libs/hashtable_class_helper.pxi:7096, in pandas._libs.hashtable.PyOb
jectHashTable.get_item()

KeyError: -1

The above exception was the direct cause of the following exception:

KeyError                                  Traceback (most recent call last)
Cell In[25], line 1
----> 1 df[-1]

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\frame.py:4107,
in DataFrame.__getitem__(self, key)
   4105 if self.columns.nlevels > 1:
   4106     return self._getitem_multilevel(key)
-> 4107 indexer = self.columns.get_loc(key)
   4108 if is_integer(indexer):
   4109     indexer = [indexer]

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\indexes\base.p
y:3819, in Index.get_loc(self, key)
   3814     if isinstance(casted_key, slice) or (
   3815         isinstance(casted_key, abc.Iterable)
   3816         and any(isinstance(x, slice) for x in casted_key)
   3817     ):
   3818         raise InvalidIndexError(key)
-> 3819     raise KeyError(key) from err
   3820 except TypeError:
   3821     # If we have a listlike key, _check_indexing_error will raise
   3822     #  InvalidIndexError. Otherwise we fall through and re-raise
   3823     #  the TypeError.
   3824     self._check_indexing_error(key)

KeyError: -1
```

In [26]:

```
df[4,2]
```

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\indexes\base.p
y:3812, in Index.get_loc(self, key)
   3811 try:
-> 3812     return self._engine.get_loc(casted_key)
   3813 except KeyError as err:

File pandas/_libs/index.pyx:167, in pandas._libs.index.IndexEngine.get_loc()

File pandas/_libs/index.pyx:196, in pandas._libs.index.IndexEngine.get_loc()

File pandas/_libs/hashtable_class_helper.pxi:7088, in pandas._libs.hashtable.PyOb
jectHashTable.get_item()

File pandas/_libs/hashtable_class_helper.pxi:7096, in pandas._libs.hashtable.PyOb
jectHashTable.get_item()

KeyError: (4, 2)

The above exception was the direct cause of the following exception:

KeyError                                  Traceback (most recent call last)
Cell In[26], line 1
----> 1 df[4,2]

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\frame.py:4107,
in DataFrame.__getitem__(self, key)
   4105 if self.columns.nlevels > 1:
   4106     return self._getitem_multilevel(key)
-> 4107 indexer = self.columns.get_loc(key)
   4108 if is_integer(indexer):
   4109     indexer = [indexer]

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\indexes\base.p
y:3819, in Index.get_loc(self, key)
   3814     if isinstance(casted_key, slice) or (
   3815         isinstance(casted_key, abc.Iterable)
   3816         and any(isinstance(x, slice) for x in casted_key)
   3817     ):
   3818         raise InvalidIndexError(key)
-> 3819     raise KeyError(key) from err
   3820 except TypeError:
   3821     # If we have a listlike key, _check_indexing_error will raise
   3822     #  InvalidIndexError. Otherwise we fall through and re-raise
   3823     #  the TypeError.
   3824     self._check_indexing_error(key)

KeyError: (4, 2)
```

In [27]:

```
df[99:-3]
```

Out[27]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
99	Liberia	LBR	35.521	3.2	Low income
100	Libya	LBY	21.425	16.5	Upper middle income
101	St. Lucia	LCA	15.430	46.2	Upper middle income
102	Liechtenstein	LIE	9.200	93.8	High income
103	Sri Lanka	LKA	17.863	21.9	Lower middle income
...	...	...	...	...	...
187	Vanuatu	VUT	26.739	11.3	Lower middle income
188	West Bank and Gaza	PSE	30.394	46.6	Lower middle income
189	Samoa	WSM	26.172	15.3	Lower middle income
190	Yemen, Rep.	YEM	32.947	20.0	Lower middle income
191	South Africa	ZAF	20.850	46.5	Upper middle income

93 rows × 5 columns

In [28]:

```
df.describe()
```

Out[28]:

	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 [29]:

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

Out[29]:

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

In [30]:
```
df['CountryName']
```

Out[30]:
```
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 [31]:
```
df['CountryCode']
```

Out[31]:
```
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
```

In [32]:
```
df['CountryName','CountryCode','IncomeGroup']
```

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\indexes\base.p
y:3812, in Index.get_loc(self, key)
   3811 try:
-> 3812     return self._engine.get_loc(casted_key)
   3813 except KeyError as err:

File pandas/_libs/index.pyx:167, in pandas._libs.index.IndexEngine.get_loc()

File pandas/_libs/index.pyx:196, in pandas._libs.index.IndexEngine.get_loc()

File pandas/_libs/hashtable_class_helper.pxi:7088, in pandas._libs.hashtable.PyOb
jectHashTable.get_item()

File pandas/_libs/hashtable_class_helper.pxi:7096, in pandas._libs.hashtable.PyOb
jectHashTable.get_item()

KeyError: ('CountryName', 'CountryCode', 'IncomeGroup')

The above exception was the direct cause of the following exception:

KeyError                                  Traceback (most recent call last)
Cell In[32], line 1
----> 1 df['CountryName','CountryCode','IncomeGroup']

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\frame.py:4107,
in DataFrame.__getitem__(self, key)
   4105 if self.columns.nlevels > 1:
   4106     return self._getitem_multilevel(key)
-> 4107 indexer = self.columns.get_loc(key)
   4108 if is_integer(indexer):
   4109     indexer = [indexer]

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\indexes\base.p
y:3819, in Index.get_loc(self, key)
   3814     if isinstance(casted_key, slice) or (
   3815         isinstance(casted_key, abc.Iterable)
   3816         and any(isinstance(x, slice) for x in casted_key)
   3817     ):
   3818         raise InvalidIndexError(key)
-> 3819     raise KeyError(key) from err
   3820 except TypeError:
   3821     # If we have a listlike key, _check_indexing_error will raise
   3822     #  InvalidIndexError. Otherwise we fall through and re-raise
   3823     #  the TypeError.
   3824     self._check_indexing_error(key)

KeyError: ('CountryName', 'CountryCode', 'IncomeGroup')
```

In [33]:

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

Out[33]:

	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 [35]:

```
df[['CountryName','CountryCode','IncomeGroup']][2:98]
```

Out[35]:

	CountryName	CountryCode	IncomeGroup
2	Angola	AGO	Upper middle income
3	Albania	ALB	Upper middle income
4	United Arab Emirates	ARE	High income
5	Argentina	ARG	High income
6	Armenia	ARM	Lower middle income
...	...	...	...
93	Cambodia	KHM	Low income
94	Kiribati	KIR	Lower middle income
95	Korea, Rep.	KOR	High income
96	Kuwait	KWT	High income
97	Lao PDR	LAO	Lower middle income

96 rows × 3 columns

In [37]:

```
df[['CountryName','CountryCode']][2:98:1]
```

Out[37]:

	CountryName	CountryCode
2	Angola	AGO
3	Albania	ALB
4	United Arab Emirates	ARE
5	Argentina	ARG
6	Armenia	ARM
...	...	...
93	Cambodia	KHM
94	Kiribati	KIR
95	Korea, Rep.	KOR
96	Kuwait	KWT
97	Lao PDR	LAO

96 rows × 2 columns

In [38]:
```
df[['CountryName','CountryCode','IncomeGroup']][2:98:-1]
```

Out[38]:

CountryName	CountryCode	IncomeGroup

In [39]:
```
df[['CountryName','CountryCode','IncomeGroup']][2:8]
```

Out[39]:

	CountryName	CountryCode	IncomeGroup
2	Angola	AGO	Upper middle income
3	Albania	ALB	Upper middle income
4	United Arab Emirates	ARE	High income
5	Argentina	ARG	High income
6	Armenia	ARM	Lower middle income
7	Antigua and Barbuda	ATG	High income

In [40]:
```
df_cat=df[['CountryName','CountryCode','IncomeGroup']]
df_cat
```

Out[40]:

	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 [42]:
```
df
```

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_cat
```

Out[43]:

	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 [44]:
```
len(df)
len(df_cat)
```

Out[44]:
```
195
```

In [45]:
```
len(df)
```

Out[45]:
```
195
```

In [46]:
```
len(df_cat)
```

Out[46]:
```
195
```

In [47]:
```
len(df.columns)
```

Out[47]:
```
5
```

In [48]:
```
len(df_cat.columns)
```

Out[48]:
```
3
```

In [49]:
```
print(df.columns)
```

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

In [50]:
```
print(df_cat.columns)
```

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

In [51]:
```
df_cat.describe()
```

Out[51]:

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

In [52]:
```
df_num=df[['BirthRate','InternetUsers']]
```

In [53]:
```
df_num
```

Out[53]:

	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 [54]:
```
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 [55]:
```
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
```

In [56]:

```
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
```

In [57]:

```
df.describe()
```

Out[57]:

	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 [58]:

```
df_cat.describe()
```

Out[58]:

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

In [59]:

```
df_num.describe()
```

Out[59]:

	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 [60]:
```
df.describe().transpose()
```

Out[60]:

	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 [61]:
```
df_cat.transpose()
```

Out[61]:

	0	1	2	3	4	5	6	
CountryName	Aruba	Afghanistan	Angola	Albania	United Arab Emirates	Argentina	Armenia	Antig a Barbu
CountryCode	ABW	AFG	AGO	ALB	ARE	ARG	ARM	A
IncomeGroup	High income	Low income	Upper middle income	Upper middle income	High income	High income	Lower middle income	Hi inco

3 rows × 195 columns

In [62]:
```
df.transpose()
```

Out[62]:

	0	1	2	3	4	5	6	
CountryName	Aruba	Afghanistan	Angola	Albania	United Arab Emirates	Argentina	Armenia	Antig a Barbu
CountryCode	ABW	AFG	AGO	ALB	ARE	ARG	ARM	A
BirthRate	10.244	35.253	45.985	12.877	11.044	17.716	13.308	16.4
InternetUsers	78.9	5.9	19.1	57.2	88.0	59.9	41.9	6
IncomeGroup	High income	Low income	Upper middle income	Upper middle income	High income	High income	Lower middle income	Hi inco

5 rows × 195 columns

In [63]:
```
df.T
```

Out[63]:

	0	1	2	3	4	5	6	
CountryName	Aruba	Afghanistan	Angola	Albania	United Arab Emirates	Argentina	Armenia	Antig a Barbu
CountryCode	ABW	AFG	AGO	ALB	ARE	ARG	ARM	A
BirthRate	10.244	35.253	45.985	12.877	11.044	17.716	13.308	16.4
InternetUsers	78.9	5.9	19.1	57.2	88.0	59.9	41.9	6
IncomeGroup	High income	Low income	Upper middle income	Upper middle income	High income	High income	Lower middle income	Hi inco

5 rows × 195 columns

In [64]:
```
df.columns=['a','b','c','d','e']
```

In [65]:
```
df
```

Out[65]:

	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
...	...	...	...	...	...
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 [66]:
```
df.transpose()
```

Out[66]:

	0	1	2	3	4	5	6	7	8
a	Aruba	Afghanistan	Angola	Albania	United Arab Emirates	Argentina	Armenia	Antigua and Barbuda	Australia
b	ABW	AFG	AGO	ALB	ARE	ARG	ARM	ATG	AUS
c	10.244	35.253	45.985	12.877	11.044	17.716	13.308	16.447	13.2
d	78.9	5.9	19.1	57.2	88.0	59.9	41.9	63.4	83.0
e	High income	Low income	Upper middle income	Upper middle income	High income	High income	Lower middle income	High income	High income

5 rows × 195 columns

In [67]:
```
df.head(1)
```

Out[67]:

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

In [68]:
```
df.columns
```

Out[68]:
```
Index(['a', 'b', 'c', 'd', 'e'], dtype='object')
```

In [69]:
```
df.columns=['CountryName','CountryCode','BirthRate','InternetUsers','IncomeGroup
df.columns
```

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

```
In [70]: df
```

Out[70]:

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

Out[71]:

	CountryName	BirthRate	InternetUsers
4	United Arab Emirates	11.044	88.0
5	Argentina	17.716	59.9
6	Armenia	13.308	41.9
7	Antigua and Barbuda	16.447	63.4

```
In [73]: df[4:8][['CountryName','BirthRate','InternetUsers']]
```

Out[73]:

	CountryName	BirthRate	InternetUsers
4	United Arab Emirates	11.044	88.0
5	Argentina	17.716	59.9
6	Armenia	13.308	41.9
7	Antigua and Barbuda	16.447	63.4

In [74]:

```
df.columns
```

Out[74]:

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

In [75]:

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

Out[75]:

```
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 [76]:

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

Out[76]:

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

In [79]:

```
df['newcolumn']=df.BirthRate*df.InternetUsers
```

In [80]:

```
df
```

Out[80]:

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup	newcolumn
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 [81]:

```
len(df)
```

Out[81]:

```
195
```

In [82]:

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

Out[82]:

```
6
```

In [83]:

```
df=df.drop('newcolumn')
```

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
Cell In[83], line 1
----> 1 df=df.drop('newcolumn')

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\frame.py:5588,
in DataFrame.drop(self, labels, axis, index, columns, level, inplace, errors)
   5440 def drop(
   5441     self,
   5442     labels: IndexLabel | None = None,
   (...)
   5449     errors: IgnoreRaise = "raise",
   5450 ) -> DataFrame | None:
   5451     """
   5452     Drop specified labels from rows or columns.
   5453 
   (...)
   5586             weight  1.0     0.8
   5587     """
-> 5588     return super().drop(
   5589         labels=labels,
   5590         axis=axis,
   5591         index=index,
   5592         columns=columns,
   5593         level=level,
   5594         inplace=inplace,
   5595         errors=errors,
   5596     )

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\generic.py:480
7, in NDFrame.drop(self, labels, axis, index, columns, level, inplace, errors)
   4805 for axis, labels in axes.items():
   4806     if labels is not None:
-> 4807         obj = obj._drop_axis(labels, axis, level=level, errors=errors)
   4809 if inplace:
   4810     self._update_inplace(obj)

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\generic.py:484
9, in NDFrame._drop_axis(self, labels, axis, level, errors, only_slice)
   4847         new_axis = axis.drop(labels, level=level, errors=errors)
   4848     else:
-> 4849         new_axis = axis.drop(labels, errors=errors)
   4850     indexer = axis.get_indexer(new_axis)
   4852 # Case for non-unique axis
   4853 else:

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\indexes\base.p
y:7098, in Index.drop(self, labels, errors)
   7096 if mask.any():
   7097     if errors != "ignore":
-> 7098         raise KeyError(f"{labels[mask].tolist()} not found in axis")
   7099     indexer = indexer[~mask]
   7100 return self.delete(indexer)

KeyError: "['newcolumn'] not found in axis"
```

```
In [84]: df=df.drop('newcolumn',axis=1)
```

```
In [85]: df
```

Out[85]:

	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 [86]:

```
df['newcolumn']=df.CountryName
```

In [87]:

```
df
```

Out[87]:

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

195 rows × 6 columns

In [91]:

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

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
Cell In[91], line 1
----> 1 df=df.drop('newcolumn',axis=1)

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\frame.py:5588,
in DataFrame.drop(self, labels, axis, index, columns, level, inplace, errors)
   5440 def drop(
   5441     self,
   5442     labels: IndexLabel | None = None,
   (...)
   5449     errors: IgnoreRaise = "raise",
   5450 ) -> DataFrame | None:
   5451     """
   5452     Drop specified labels from rows or columns.
   5453 
   (...)
   5586             weight  1.0     0.8
   5587     """
-> 5588     return super().drop(
   5589         labels=labels,
   5590         axis=axis,
   5591         index=index,
   5592         columns=columns,
   5593         level=level,
   5594         inplace=inplace,
   5595         errors=errors,
   5596     )

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\generic.py:480
7, in NDFrame.drop(self, labels, axis, index, columns, level, inplace, errors)
   4805 for axis, labels in axes.items():
   4806     if labels is not None:
-> 4807         obj = obj._drop_axis(labels, axis, level=level, errors=errors)
   4809 if inplace:
   4810     self._update_inplace(obj)

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\generic.py:484
9, in NDFrame._drop_axis(self, labels, axis, level, errors, only_slice)
   4847         new_axis = axis.drop(labels, level=level, errors=errors)
   4848     else:
-> 4849         new_axis = axis.drop(labels, errors=errors)
   4850     indexer = axis.get_indexer(new_axis)
   4852 # Case for non-unique axis
   4853 else:

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\indexes\base.p
y:7098, in Index.drop(self, labels, errors)
   7096 if mask.any():
   7097     if errors != "ignore":
-> 7098         raise KeyError(f"{labels[mask].tolist()} not found in axis")
   7099     indexer = indexer[~mask]
   7100 return self.delete(indexer)

KeyError: "['newcolumn'] not found in axis"
```

```
In [89]: df
```

Out[89]:

	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 [92]:

```
df
```

Out[92]:

	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 [94]:

```
df['newcolumn']=df.BirthRate
```

In [95]:

```
df
```

Out[95]:

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

195 rows × 6 columns

In [97]:

```
df=df.drop('newcolumn',axis=0)
```

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
Cell In[97], line 1
----> 1 df=df.drop('newcolumn',axis=0)

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\frame.py:5588,
in DataFrame.drop(self, labels, axis, index, columns, level, inplace, errors)
   5440 def drop(
   5441     self,
   5442     labels: IndexLabel | None = None,
   (...)
   5449     errors: IgnoreRaise = "raise",
   5450 ) -> DataFrame | None:
   5451     """
   5452     Drop specified labels from rows or columns.
   5453 
   (...)
   5586             weight  1.0     0.8
   5587     """
-> 5588     return super().drop(
   5589         labels=labels,
   5590         axis=axis,
   5591         index=index,
   5592         columns=columns,
   5593         level=level,
   5594         inplace=inplace,
   5595         errors=errors,
   5596     )

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\generic.py:480
7, in NDFrame.drop(self, labels, axis, index, columns, level, inplace, errors)
   4805 for axis, labels in axes.items():
   4806     if labels is not None:
-> 4807         obj = obj._drop_axis(labels, axis, level=level, errors=errors)
   4809 if inplace:
   4810     self._update_inplace(obj)

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\generic.py:484
9, in NDFrame._drop_axis(self, labels, axis, level, errors, only_slice)
   4847         new_axis = axis.drop(labels, level=level, errors=errors)
   4848     else:
-> 4849         new_axis = axis.drop(labels, errors=errors)
   4850     indexer = axis.get_indexer(new_axis)
   4852 # Case for non-unique axis
   4853 else:

File ~\AppData\Roaming\Python\Python312\site-packages\pandas\core\indexes\base.p
y:7098, in Index.drop(self, labels, errors)
   7096 if mask.any():
   7097     if errors != "ignore":
-> 7098         raise KeyError(f"{labels[mask].tolist()} not found in axis")
   7099     indexer = indexer[~mask]
   7100 return self.delete(indexer)

KeyError: "['newcolumn'] not found in axis"
```

In [98]:

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

In [99]:

```
df
```

Out[99]:

	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 [100…  df.head(1)
```

Out[100…

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

```
In [101…  df
```

Out[101…

	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 [102…

```
df.InternetUsers<2
```

Out[102…

```
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 [103…

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

Out[103…

	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

In [106…

```
df[10:56]
```

Out[106…

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
10	Azerbaijan	AZE	18.300	58.700000	Upper middle income
11	Burundi	BDI	44.151	1.300000	Low income
12	Belgium	BEL	11.200	82.170200	High income
13	Benin	BEN	36.440	4.900000	Low income
14	Burkina Faso	BFA	40.551	9.100000	Low income
15	Bangladesh	BGD	20.142	6.630000	Lower middle income
16	Bulgaria	BGR	9.200	53.061500	Upper middle income
17	Bahrain	BHR	15.040	90.000040	High income
18	Bahamas, The	BHS	15.339	72.000000	High income
19	Bosnia and Herzegovina	BIH	9.062	57.790000	Upper middle income
20	Belarus	BLR	12.500	54.170000	Upper middle income
21	Belize	BLZ	23.092	33.600000	Upper middle income
22	Bermuda	BMU	10.400	95.300000	High income
23	Bolivia	BOL	24.236	36.940000	Lower middle income
24	Brazil	BRA	14.931	51.040000	Upper middle income
25	Barbados	BRB	12.188	73.000000	High income
26	Brunei Darussalam	BRN	16.405	64.500000	High income
27	Bhutan	BTN	18.134	29.900000	Lower middle income
28	Botswana	BWA	25.267	15.000000	Upper middle income
29	Central African Republic	CAF	34.076	3.500000	Low income
30	Canada	CAN	10.900	85.800000	High income
31	Switzerland	CHE	10.200	86.340000	High income
32	Chile	CHL	13.385	66.500000	High income
33	China	CHN	12.100	45.800000	Upper middle income
34	Cote d'Ivoire	CIV	37.320	8.400000	Lower middle income

	CountryName	CountryCode	BirthRate	InternetUsers	IncomeGroup
35	Cameroon	CMR	37.236	6.400000	Lower middle income
36	Congo, Rep.	COG	37.011	6.600000	Lower middle income
37	Colombia	COL	16.076	51.700000	Upper middle income
38	Comoros	COM	34.326	6.500000	Low income
39	Cabo Verde	CPV	21.625	37.500000	Lower middle income
40	Costa Rica	CRI	15.022	45.960000	Upper middle income
41	Cuba	CUB	10.400	27.930000	Upper middle income
42	Cayman Islands	CYM	12.500	74.100000	High income
43	Cyprus	CYP	11.436	65.454800	High income
44	Czech Republic	CZE	10.200	74.110400	High income
45	Germany	DEU	8.500	84.170000	High income
46	Djibouti	DJI	25.486	9.500000	Lower middle income
47	Denmark	DNK	10.000	94.629700	High income
48	Dominican Republic	DOM	21.198	45.900000	Upper middle income
49	Algeria	DZA	24.738	16.500000	Upper middle income
50	Ecuador	ECU	21.070	40.353684	Upper middle income
51	Egypt, Arab Rep.	EGY	28.032	29.400000	Lower middle income
52	Eritrea	ERI	34.800	0.900000	Low income
53	Spain	ESP	9.100	71.635000	High income
54	Estonia	EST	10.300	79.400000	High income
55	Ethiopia	ETH	32.925	1.900000	Low income

In [108…

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

Out[108…

```
9
```

In [109…

```
df.BirthRate>40
```

```
Out[109…  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 [111…  df[df.BirthRate>40]
```

Out[111…

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

```
In [112…  len(df[df.BirthRate>40])

Out[112…  12
```

```
In [116…  df['InternetUsers<2' & 'BirthRate>40']
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
Cell In[116], line 1
----> 1 df['InternetUsers<2' & 'BirthRate>40']

TypeError: unsupported operand type(s) for &: 'str' and 'str'
```

```
In [117…  df[df['InternetUsers<2' & 'BirthRate>40']]
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
Cell In[117], line 1
----> 1 df[df['InternetUsers<2' & 'BirthRate>40']]

TypeError: unsupported operand type(s) for &: 'str' and 'str'
```

In [118…

```
Filter=df.InternetUsers<2
```

In [119…

```
Filter
```

Out[119…

```
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 [124…

```
Filter2=df.BirthRate>40
```

In [125…

```
Filter2
```

Out[125…

```
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 [126…

```
df[Filter & Filter2]
```

Out[126…

	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 [ ]: