D15

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
df=pd.read_csv(r"C:\Users\user\Downloads\18_world-data-2023.csv")
df
```

Out[2]:

	Country	Density\n(P/Km2)	Abbreviation	Agricultural Land(%)	Land Area(Km2)	Armed Forces size	Birth Rate	Calling Code
0	Afghanistan	60	AF	58.10%	652,230	323,000	32.49	93.0
1	Albania	105	AL	43.10%	28,748	9,000	11.78	355.0
2	Algeria	18	DZ	17.40%	2,381,741	317,000	24.28	213.0
3	Andorra	164	AD	40.00%	468	NaN	7.20	376.0
4	Angola	26	AO	47.50%	1,246,700	117,000	40.73	244.0
...	...	...	...	...	...	...	...	...
190	Venezuela	32	VE	24.50%	912,050	343,000	17.88	58.0
191	Vietnam	314	VN	39.30%	331,210	522,000	16.75	84.0
192	Yemen	56	YE	44.60%	527,968	40,000	30.45	967.0
193	Zambia	25	ZM	32.10%	752,618	16,000	36.19	260.0
194	Zimbabwe	38	ZW	41.90%	390,757	51,000	30.68	263.0

195 rows × 35 columns

In [3]:
```
df.head(10)
```

Out[3]:

	Country	Density\n(P/Km2)	Abbreviation	Agricultural Land(%)	Land Area(Km2)	Armed Forces size	Birth Rate	Calling Code
0	Afghanistan	60	AF	58.10%	652,230	323,000	32.49	93.0
1	Albania	105	AL	43.10%	28,748	9,000	11.78	355.0
2	Algeria	18	DZ	17.40%	2,381,741	317,000	24.28	213.0
3	Andorra	164	AD	40.00%	468	NaN	7.20	376.0
4	Angola	26	AO	47.50%	1,246,700	117,000	40.73	244.0
5	Antigua and Barbuda	223	AG	20.50%	443	0	15.33	1.0
6	Argentina	17	AR	54.30%	2,780,400	105,000	17.02	54.0
7	Armenia	104	AM	58.90%	29,743	49,000	13.99	374.0
8	Australia	3	AU	48.20%	7,741,220	58,000	12.60	61.0
9	Austria	109	AT	32.40%	83,871	21,000	9.70	43.0

10 rows × 35 columns

In [4]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 35 columns):
 #   Column                                     Non-Null Count  Dtype  
---  ------                                     --------------  -----  
 0   Country                                    195 non-null    object 
 1   Density
(P/Km2)                            195 non-null    object 
 2   Abbreviation                               188 non-null    object 
 3   Agricultural Land( %)                      188 non-null    object 
 4   Land Area(Km2)                             194 non-null    object 
 5   Armed Forces size                          171 non-null    object 
 6   Birth Rate                                 189 non-null    float64
 7   Calling Code                               194 non-null    float64
 8   Capital/Major City                         192 non-null    object 
 9   Co2-Emissions                              188 non-null    object 
 10  CPI                                        178 non-null    object 
 11  CPI Change (%)                             179 non-null    object 
 12  Currency-Code                              180 non-null    object 
 13  Fertility Rate                             188 non-null    float64
 14  Forested Area (%)                          188 non-null    object 
 15  Gasoline Price                             175 non-null    object 
 16  GDP                                        193 non-null    object 
 17  Gross primary education enrollment (%)     188 non-null    object 
 18  Gross tertiary education enrollment (%)    183 non-null    object 
 19  Infant mortality                           189 non-null    float64
 20  Largest city                               189 non-null    object 
 21  Life expectancy                            187 non-null    float64
 22  Maternal mortality ratio                   181 non-null    float64
 23  Minimum wage                               150 non-null    object 
 24  Official language                          194 non-null    object 
 25  Out of pocket health expenditure           188 non-null    object 
 26  Physicians per thousand                    188 non-null    float64
 27  Population                                 194 non-null    object 
 28  Population: Labor force participation (%)  176 non-null    object 
 29  Tax revenue (%)                            169 non-null    object 
 30  Total tax rate                             183 non-null    object 
 31  Unemployment rate                          176 non-null    object 
 32  Urban_population                           190 non-null    object 
 33  Latitude                                   194 non-null    float64
 34  Longitude                                  194 non-null    float64
dtypes: float64(9), object(26)
memory usage: 53.4+ KB
```

In [5]:
```
dff=df.dropna()
```

In [6]:

```
dff.describe()
```

Out[6]:

	Birth Rate	Calling Code	Fertility Rate	Infant mortality	Life expectancy	Maternal mortality ratio	Physicians per thousand	
count	110.000000	110.000000	110.000000	110.000000	110.000000	110.000000	110.000000	11
mean	20.196455	344.290909	2.672182	20.271818	72.671818	137.227273	1.919182	2
std	10.039056	341.231562	1.308142	18.453214	7.000788	201.171462	1.598116	2
min	6.400000	1.000000	0.980000	1.700000	54.300000	2.000000	0.010000	-4
25%	11.075000	70.000000	1.682500	6.100000	67.625000	15.250000	0.467500	
50%	17.830000	239.500000	2.200000	13.600000	74.400000	41.000000	1.640000	2
75%	27.962500	420.750000	3.505000	31.500000	77.350000	176.000000	3.007500	4
max	46.080000	1876.000000	6.910000	78.500000	83.300000	1120.000000	7.120000	6

In [7]:
```
dff.isnull().sum()
```

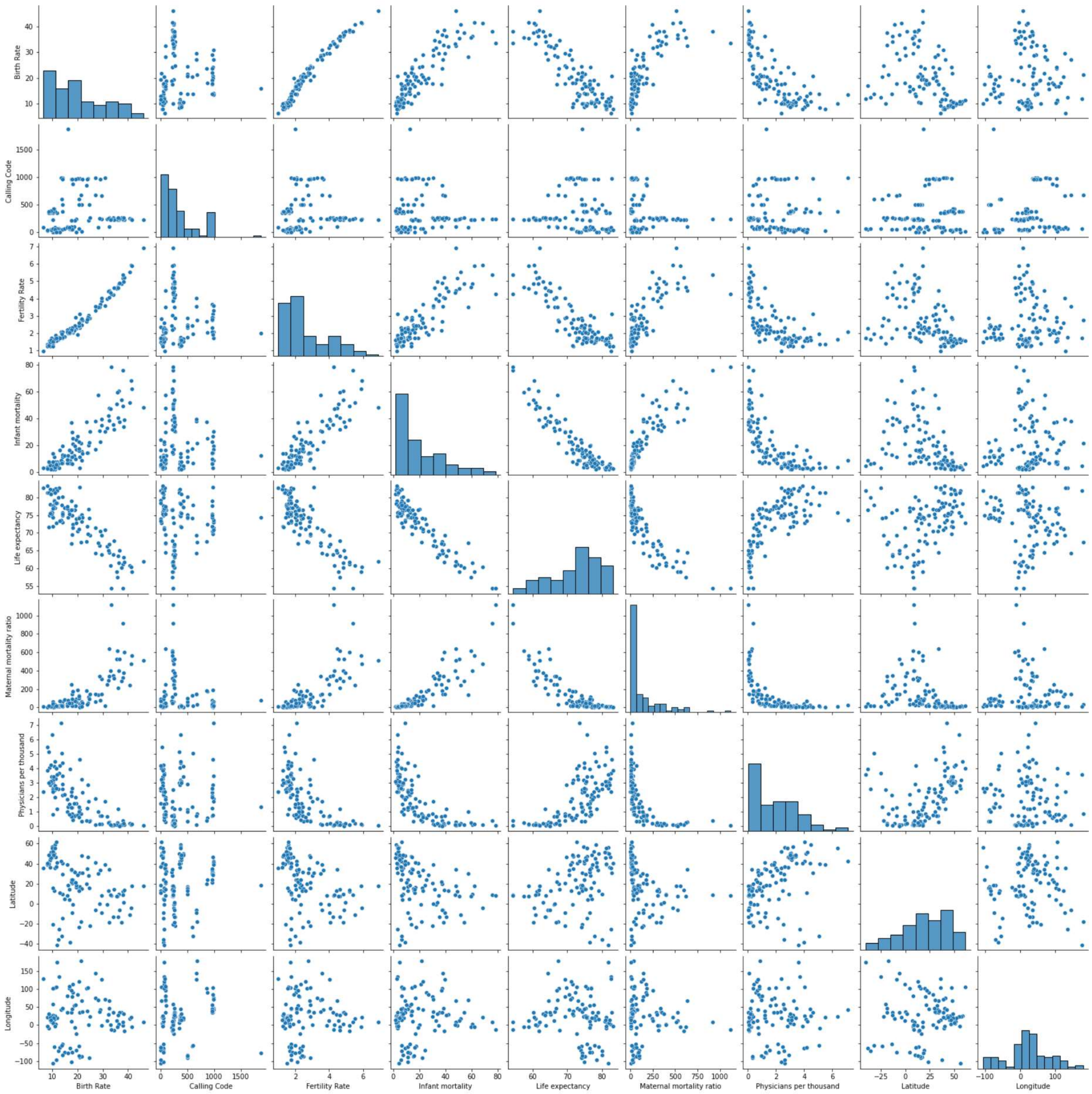
Out[7]:
```
Country                                      0
Density\n(P/Km2)                             0
Abbreviation                                 0
Agricultural Land( %)                        0
Land Area(Km2)                               0
Armed Forces size                            0
Birth Rate                                   0
Calling Code                                 0
Capital/Major City                           0
Co2-Emissions                                0
CPI                                          0
CPI Change (%)                               0
Currency-Code                                0
Fertility Rate                               0
Forested Area (%)                            0
Gasoline Price                               0
GDP                                          0
Gross primary education enrollment (%)       0
Gross tertiary education enrollment (%)      0
Infant mortality                             0
Largest city                                 0
Life expectancy                              0
Maternal mortality ratio                     0
Minimum wage                                 0
Official language                            0
Out of pocket health expenditure             0
Physicians per thousand                      0
Population                                   0
Population: Labor force participation (%)    0
Tax revenue (%)                              0
Total tax rate                               0
Unemployment rate                            0
Urban_population                             0
Latitude                                     0
Longitude                                    0
dtype: int64
```

In [9]:
```
dff.columns
```

Out[9]:
```
Index(['Country', 'Density\n(P/Km2)', 'Abbreviation', 'Agricultural Land(
%)',
       'Land Area(Km2)', 'Armed Forces size', 'Birth Rate', 'Calling Code',
       'Capital/Major City', 'Co2-Emissions', 'CPI', 'CPI Change (%)',
       'Currency-Code', 'Fertility Rate', 'Forested Area (%)',
       'Gasoline Price', 'GDP', 'Gross primary education enrollment (%)',
       'Gross tertiary education enrollment (%)', 'Infant mortality',
       'Largest city', 'Life expectancy', 'Maternal mortality ratio',
       'Minimum wage', 'Official language', 'Out of pocket health expenditur
e',
       'Physicians per thousand', 'Population',
       'Population: Labor force participation (%)', 'Tax revenue (%)',
       'Total tax rate', 'Unemployment rate', 'Urban_population', 'Latitude',
       'Longitude'],
      dtype='object')
```

In [10]:
```
sns.pairplot(dff)
```

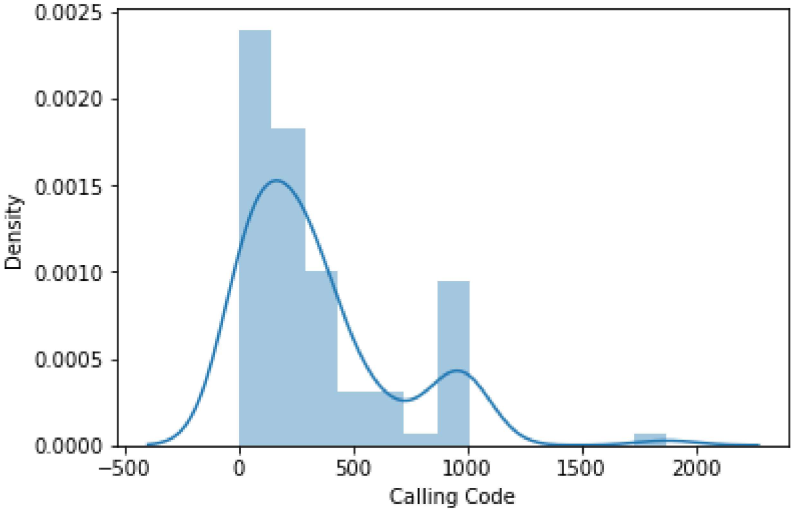
Out[10]:
```
<seaborn.axisgrid.PairGrid at 0x1c2b6bf6340>
```



In [13]:
```
sns.distplot(dff['Calling Code'])
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2557: Fut
ureWarning: `distplot` is a deprecated function and will be removed in a futu
re version. Please adapt your code to use either `displot` (a figure-level fu
nction with similar flexibility) or `histplot` (an axes-level function for hi
stograms).
  warnings.warn(msg, FutureWarning)
```

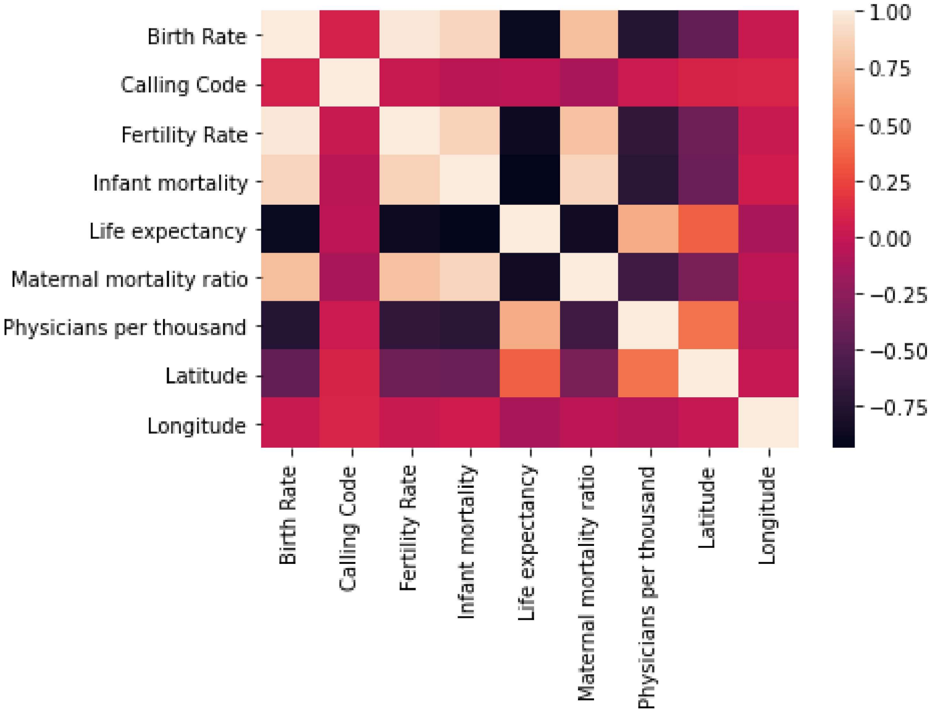
Out[13]:
```
<AxesSubplot:xlabel='Calling Code', ylabel='Density'>
```



In [17]:
```
df1=dff[['Birth Rate','Calling Code','Fertility Rate','Infant mortality','Life
'Physicians per thousand','Latitude','Longitude']]
```

In [18]:
```
sns.heatmap(df1.corr())
```

Out[18]:
```
<AxesSubplot:>
```



In [19]:
```
x=df1[['Birth Rate','Fertility Rate','Infant mortality','Life expectancy','Mat
'Physicians per thousand','Latitude','Longitude']]
y=df1['Calling Code']
```

In [20]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.3)
```

In [21]:
```
from sklearn.linear_model import LinearRegression
lr=LinearRegression()
lr.fit(x_train,y_train)
```

Out[21]:
```
LinearRegression()
```

In [22]:
```
print(lr.intercept_)
```

```
980.8436262970911
```

In [23]:
```
coeff = pd.DataFrame(lr.coef_,x.columns,columns=['Co-efficient'])
coeff
```

Out[23]:

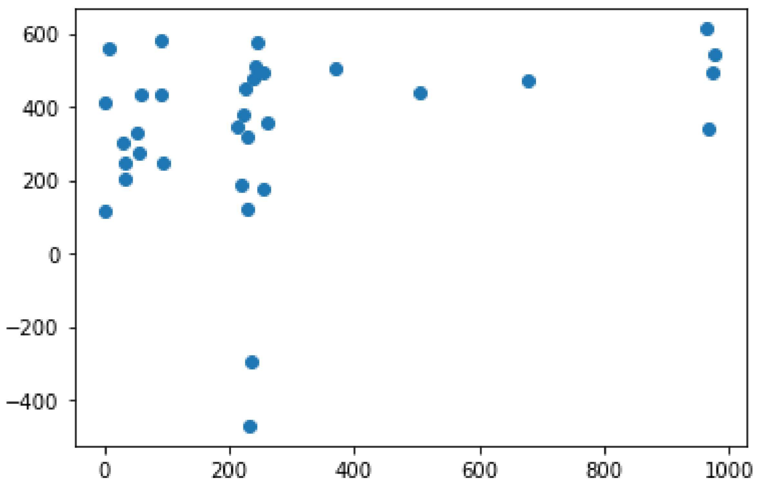
	Co-efficient
Birth Rate	73.869040
Fertility Rate	-378.098105
Infant mortality	-3.134239
Life expectancy	-14.352825
Maternal mortality ratio	-1.164691
Physicians per thousand	56.767870
Latitude	2.552872
Longitude	0.200673

In [24]:

```
prediction=lr.predict(x_test)
plt.scatter(y_test,prediction)
```

Out[24]:

```
<matplotlib.collections.PathCollection at 0x1c2c0b245b0>
```



In [25]:

```
print(lr.score(x_test,y_test))
```

```
-0.2324902885919229
```

In [26]:

```
from sklearn.linear_model import Ridge,Lasso
```

In [27]:

```
rr=Ridge(alpha=10)
rr.fit(x_train,y_train)
```

Out[27]:

```
Ridge(alpha=10)
```

In [28]:

```
rr.score(x_test,y_test)
```

Out[28]:

```
-0.5026733099405858
```

In [29]:

```
la=Lasso(alpha=10)
la.fit(x_train,y_train)
```

Out[29]:

```
Lasso(alpha=10)
```

In [30]:

```
la.score(x_test,y_test)
```

Out[30]:

```
-0.5041645046289172
```

In [ ]: