In [ ]:

```
pip install mysql-connector-python
```

In [53]:

```
import pandas as pd
import mysql.connector as sql
import seaborn as sns
import numpy as np
import matplotlib.pyplot as plt

from sklearn.linear_model import LinearRegression
from sklearn.model_selection import train_test_split
from sklearn.metrics import r2_score,mean_squared_error
```

In [7]:

```
db_connection = sql.connect(host='127.0.0.0', database='db', user='root', password='passwo
db_cursor = db_connection.cursor()
db_cursor.execute('SELECT * FROM dataset')

table_rows = db_cursor.fetchall()
file = pd.DataFrame(table_rows) '''
```

Reading the file

Copying the file to prevent accidental changes.

In [64]:

```
data = file.copy()
data.info()
data.head()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 707 entries, 0 to 706
Data columns (total 11 columns):
 #   Column                  Non-Null Count  Dtype  
---  ------                  --------------  -----  
 0   Country                 707 non-null    object 
 1   Year                    707 non-null    int64  
 2   Life_Expectancy         707 non-null    float64
 3   Adult_Mortality         707 non-null    int64  
 4   Alcohol                 707 non-null    float64
 5   Percentage_Expenditure  707 non-null    float64
 6   BMI                     707 non-null    float64
 7   Total_Expenditure       707 non-null    float64
 8   GDP                     707 non-null    float64
 9   Population              707 non-null    int64  
 10  Schooling               707 non-null    float64
dtypes: float64(7), int64(3), object(1)
memory usage: 60.9+ KB
```

Out[64]:

	Country	Year	Life_Expectancy	Adult_Mortality	Alcohol	Percentage_Expenditure	BMI	Total_Expenditure	
0	Afghanistan	2010	58.8	279	0.01	79.679367	16.7	9.20	553
1	Afghanistan	2011	59.2	275	0.01	7.097109	17.2	7.87	63
2	Afghanistan	2012	59.5	272	0.01	78.184215	17.6	8.52	669
3	Afghanistan	2013	59.9	268	0.01	73.219243	18.1	8.13	631
4	Afghanistan	2014	59.9	271	0.01	73.523582	18.6	8.18	612

Plotting the Corelation Matrix to get better insights.

Based on our observation on the Corelation Matrix obtained we will choose various variables for our model.

In [16]:

```
data.corr()
#Plotting the Corelation Matrix to get better insights.
#Based on our observation on the Corelation Matrix obtained we will choose various variab
```

Out[16]:

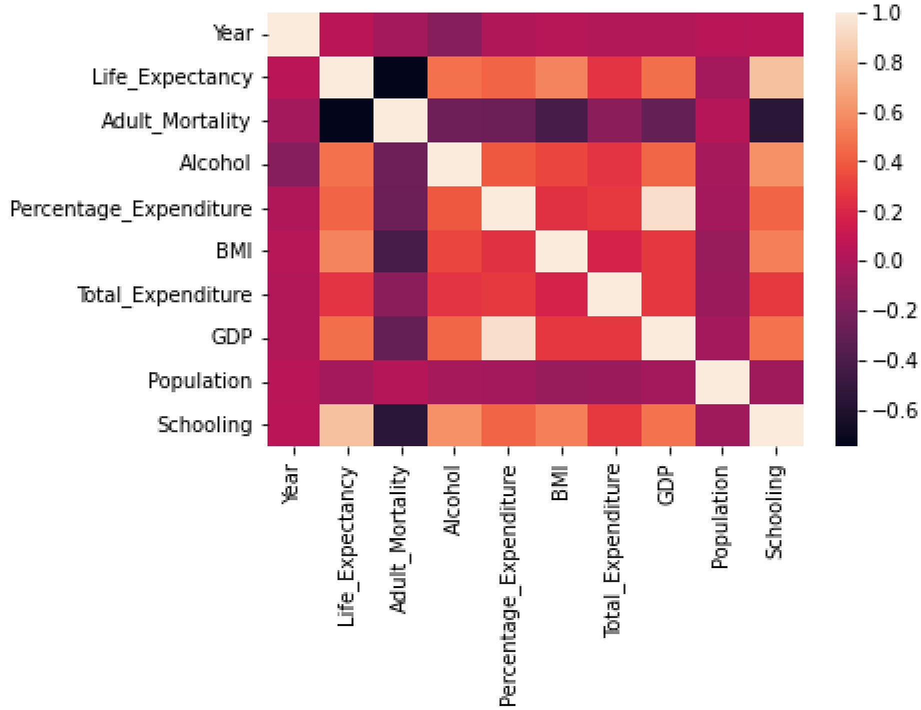
	Year	Life_Expectancy	Adult_Mortality	Alcohol	Percentage_Expenditure	BMI	T
Year	1.000000	0.055936	-0.035259	-0.160970	0.013894	0.036295	
Life_Expectancy	0.055936	1.000000	-0.751148	0.478888	0.427136	0.548947	
Adult_Mortality	-0.035259	-0.751148	1.000000	-0.253955	-0.270039	-0.416356	
Alcohol	-0.160970	0.478888	-0.253955	1.000000	0.387217	0.324022	
Percentage_Expenditure	0.013894	0.427136	-0.270039	0.387217	1.000000	0.242853	
BMI	0.036295	0.548947	-0.416356	0.324022	0.242853	1.000000	
Total_Expenditure	0.018778	0.257310	-0.148852	0.257711	0.277196	0.177937	
GDP	0.020748	0.471575	-0.298142	0.436485	0.940297	0.273065	
Population	0.048307	-0.034404	0.024392	-0.032376	-0.033992	-0.083094	
Schooling	0.055423	0.801730	-0.558152	0.599283	0.425707	0.534159	

In [19]:

```
#Plotting the heatmap to have a visual representatin of our Coorelation Matrix
corr = data.corr()
sns.heatmap(corr,
        xticklabels=corr.columns,
        yticklabels=corr.columns)
```

Out[19]:

```
<AxesSubplot:>
```



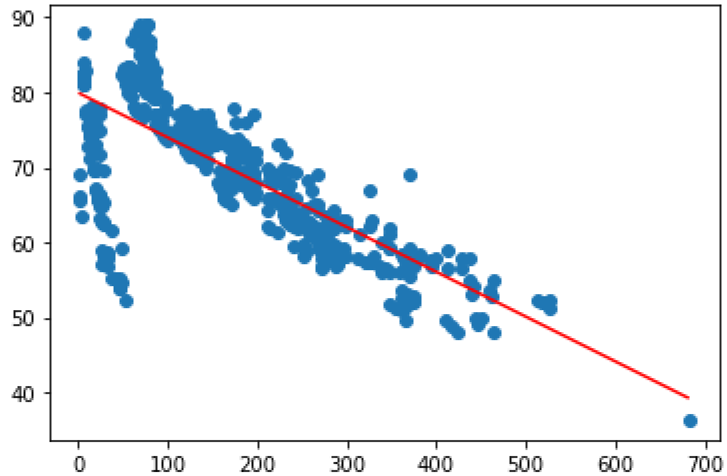
HEATMAP

In [57]:

```
#Created a Linear Model from sklearn libary

lin_reg_model = LinearRegression()
y = data['Life_Expectancy'].values.reshape(-1,1)
```

In [78]:

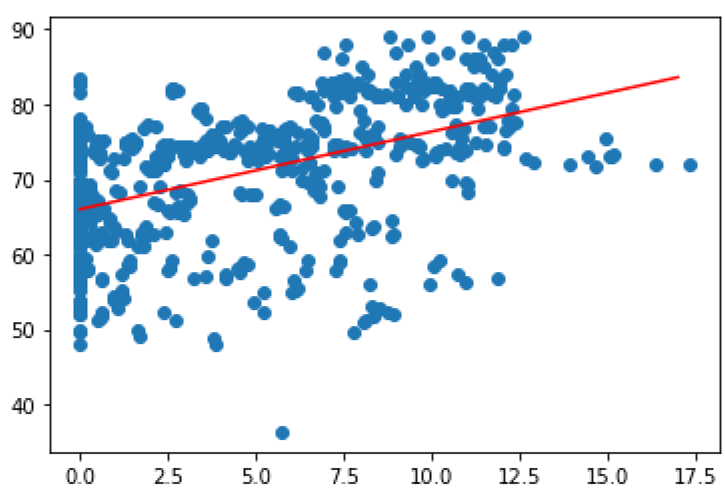
```
#X = Adult Mortality
x = data.Adult_Mortality.values.reshape(-1,1)
lin_reg_model.fit(x,y)

#Predicted Line info
x_array = np.arange(min(data.Adult_Mortality),max(data.Adult_Mortality)).reshape(-1,1)
plt.scatter(x,y)
y_head = lin_reg_model.predict(x_array)
plt.plot(x_array,y_head,color="red")
plt.show()

#Printing the various metrics
print("Mean Squared Error: ", mean_squared_error(x_array,y_head))
print("Root Mean Squared Error: ", np.sqrt(metrics.mean_squared_error(x_array, y_head)))
print("R2 Score " ,r2_score(y, lin_reg_model.predict(x)))
print("Model Equation : y =",lin_reg_model.coef_[0][0],"x +",*lin_reg_model.intercept_)
print("Where Slope =",lin_reg_model.coef_[0][0], "\nIntercept =",*lin_reg_model.intercept_
```




```
Mean Squared Error:  122764.170538361
Root Mean Squared Error:  350.3771832445158
R2 Score  0.5642234434438707
Model Equation : y = -0.059759966142484564 x + 79.97218981181695
Where Slope = -0.059759966142484564
Intercept = 79.97218981181695
```

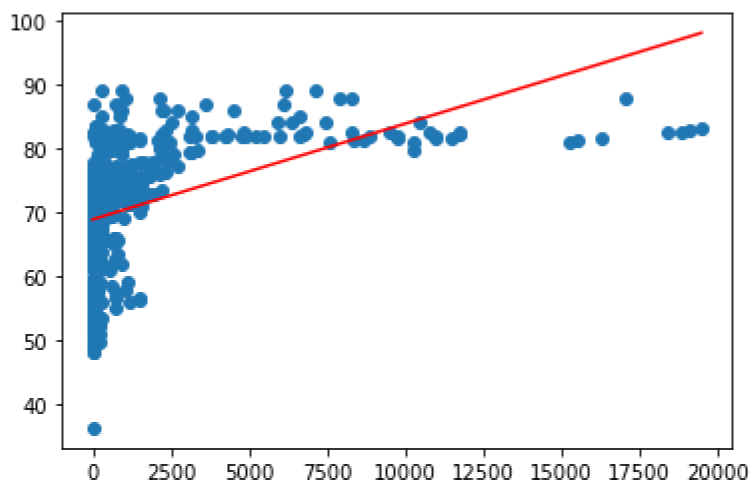
In [79]:

```
#X = Alcohol
x = data.Alcohol.values.reshape(-1,1)
lin_reg_model.fit(x,y)

#Predicted Line info
x_array = np.arange(min(data.Alcohol),max(data.Alcohol)).reshape(-1,1)
plt.scatter(x,y)
y_head = lin_reg_model.predict(x_array)
plt.plot(x_array,y_head,color="red")
plt.show()


#Printing the various metrics
print("Mean Squared Error: ", mean_squared_error(x_array,y_head))
print("Root Mean Squared Error: ", np.sqrt(metrics.mean_squared_error(x_array, y_head)))
print("R2 Score " ,r2_score(y, lin_reg_model.predict(x)))
print("Model Equation : y =",lin_reg_model.coef_[0][0],"x +",*lin_reg_model.intercept_)
print("Where Slope =",lin_reg_model.coef_[0][0], "\nIntercept =",*lin_reg_model.intercept_
```



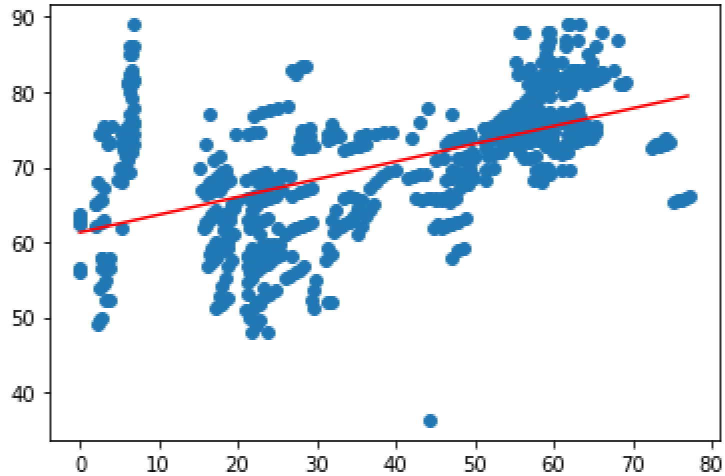

```
Mean Squared Error:  4397.267282761441
Root Mean Squared Error:  66.31189397658191
R2 Score  0.22933384569354576
Model Equation : y = 1.035864310383005 x + 66.00678628713952
Where Slope = 1.035864310383005
Intercept = 66.00678628713952
```

In [80]:
```
#X = Percentage_Expenditure
x = data.Percentage_Expenditure.values.reshape(-1,1)
lin_reg_model.fit(x,y)

#Predicted Line info
x_array = np.arange(min(data.Percentage_Expenditure),max(data.Percentage_Expenditure)).res
plt.scatter(x,y)
y_head = lin_reg_model.predict(x_array)
plt.plot(x_array,y_head,color="red")
plt.show()


#Printing the various metrics
print("Mean Squared Error: ", mean_squared_error(x_array,y_head))
print("Root Mean Squared Error: ", np.sqrt(metrics.mean_squared_error(x_array, y_head)))
print("R2 Score " ,r2_score(y, lin_reg_model.predict(x)))
print("Model Equation : y =",lin_reg_model.coef_[0][0],"x +",*lin_reg_model.intercept_)
print("Where Slope =",lin_reg_model.coef_[0][0], "\nIntercept =",*lin_reg_model.intercept_
```




```
Mean Squared Error:  124767590.63668308
Root Mean Squared Error:  11169.941389133744
R2 Score  0.18244520340149972
Model Equation : y = 0.0015007079679564452 x + 68.91083837385924
Where Slope = 0.0015007079679564452
Intercept = 68.91083837385924
```

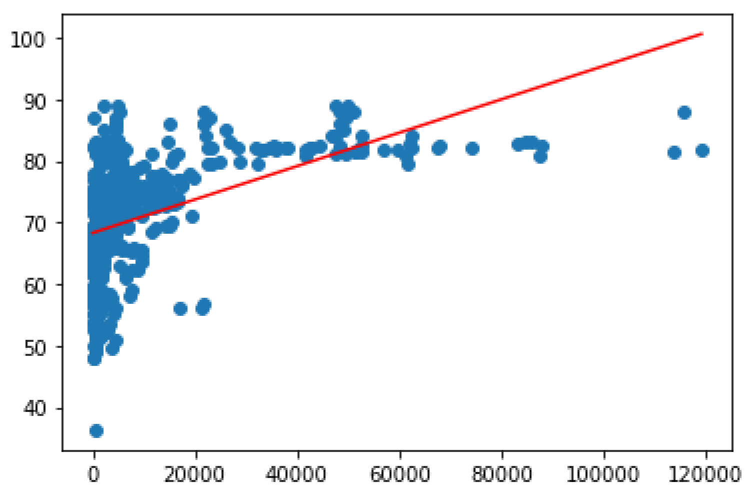
In [81]:
```
#X = BMI
x = data.BMI.values.reshape(-1,1)
lin_reg_model.fit(x,y)

#Predicted Line info
x_array = np.arange(min(data.BMI ),max(data.BMI )).reshape(-1,1)
plt.scatter(x,y)
y_head = lin_reg_model.predict(x_array)
plt.plot(x_array,y_head,color="red")
plt.show()


#Printing the various metrics
print("Mean Squared Error: ", mean_squared_error(x_array,y_head))
print("Root Mean Squared Error: ", np.sqrt(metrics.mean_squared_error(x_array, y_head)))
print("R2 Score " ,r2_score(y, lin_reg_model.predict(x)))
print("Model Equation : y =",lin_reg_model.coef_[0][0],"x +",*lin_reg_model.intercept_)
print("Where Slope =",lin_reg_model.coef_[0][0], "\nIntercept =",*lin_reg_model.intercept_
```




```
Mean Squared Error:  1311.7473230203739
Root Mean Squared Error:  36.21805244654072
R2 Score  0.301343087099337
Model Equation : y = 0.23624568858648645 x + 61.28011728908278
Where Slope = 0.23624568858648645
Intercept = 61.28011728908278
```

In [82]:

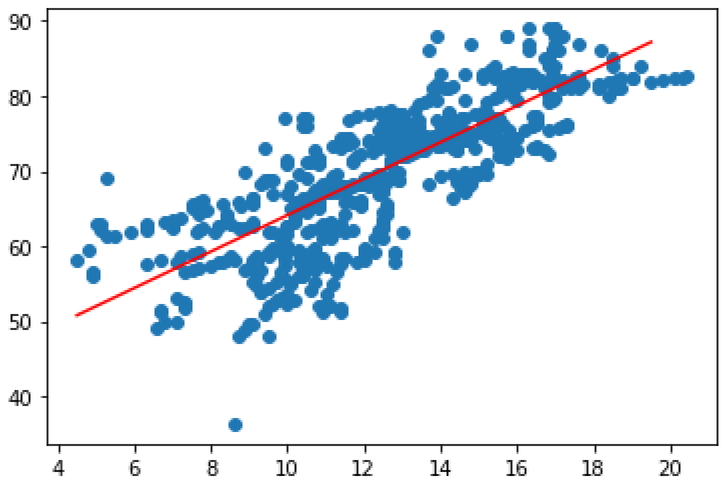
```
#X = GDP
x = data.GDP.values.reshape(-1,1)
lin_reg_model.fit(x,y)

#Predicted Line info
x_array = np.arange(min(data.GDP  ),max(data.GDP  )).reshape(-1,1)
plt.scatter(x,y)
y_head = lin_reg_model.predict(x_array)
plt.plot(x_array,y_head,color="red")
plt.show()


#Printing the various metrics
print("Mean Squared Error: ", mean_squared_error(x_array,y_head))
print("Root Mean Squared Error: ", np.sqrt(metrics.mean_squared_error(x_array, y_head)))
print("R2 Score " ,r2_score(y, lin_reg_model.predict(x)))
print("Model Equation : y =",lin_reg_model.coef_[0][0],"x +",*lin_reg_model.intercept_)
print("Where Slope =",lin_reg_model.coef_[0][0], "\nIntercept =",*lin_reg_model.intercept_
```




```
Mean Squared Error:  4723670841.625562
Root Mean Squared Error:  68728.96653977537
R2 Score  0.222382925948318
Model Equation : y = 0.00027124291132882343 x + 68.29218749386874
Where Slope = 0.00027124291132882343
Intercept = 68.29218749386874
```

In [77]:

```
#X = Schooling
x = data.Schooling.values.reshape(-1,1)
lin_reg_model.fit(x,y)

#Predicted Line info
x_array = np.arange(min(data.Schooling),max(data.Schooling)).reshape(-1,1)
plt.scatter(x,y)
y_head = lin_reg_model.predict(x_array)
plt.plot(x_array,y_head,color="red")
plt.show()


#Printing the various metrics
print("Mean Squared Error: ", mean_squared_error(x_array,y_head))
print("Root Mean Squared Error: ", np.sqrt(metrics.mean_squared_error(x_array, y_head)))
print("R2 Score " ,r2_score(y, lin_reg_model.predict(x)))
print("Model Equation : y =",lin_reg_model.coef_[0][0],"x +",*lin_reg_model.intercept_)
print("Where Slope =",lin_reg_model.coef_[0][0], "\nIntercept =",*lin_reg_model.intercept_
```




```
Mean Squared Error:  3290.175489513466
Root Mean Squared Error:  57.36005133813485
R2 Score  0.6427713989793805
Model Equation : y = 2.428981465040257 x + 39.832773872890975
Where Slope = 2.428981465040257
Intercept = 39.832773872890975
```

In [ ]: