Experiment - 1

Aim-To predict Bicarbonate(ppm) present in the well water of Northwest Texas data via Linear Regression Machine learning moodel.

```
cd /content/drive/MyDrive/Machine Learning/Colab Notebooks/ML
Practicals/1_Practical/Linear regression P1

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Practicals/1_Practical/Linear regression P1

ls

 edcCO2.csv      'Ground Water Survey.csv'
 fruitohms.csv  'Linear regression_1.ipynb'
```

Importing Required Libraries

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

#import data set
dataset = pd.read_csv('Ground Water Survey.csv')
X= dataset.iloc[:,:-1].values
Y= dataset.iloc[:,1].values
dataset.head()

      X     Y
0   7.6   157
1   7.1   174
2   8.2   175
3   7.5   188
4   7.4   171
```

In the following data

X = pH of well water

Y = Bicarbonate (parts per million) of well water

The data is by water well from a random sample of wells in Northwest Texas. Reference: Union Carbide Technical Report K/UR-1

```
dataset.tail()

       X     Y
29   8.5    48
30   7.8   147
31   6.7   117
```

```
32   7.1   182
33   7.3    87
```

Bicarbonate can be found in water with a pH between 4.3 and 12.3. Above a pH of 8.3, carbonate is also present.

```python
#Splitting the data
from sklearn.model_selection import train_test_split
X_train, X_test, Y_train, Y_test= train_test_split(X,Y,test_size= 0.7)

#Fitting Simple Linear Regression ipynb
#This is called Model
from sklearn.linear_model import LinearRegression
regressor= LinearRegression()
regressor.fit(X_train,Y_train)

LinearRegression()

##Predicting the test results
Y_pred= regressor.predict(X_test)

#Visualising the training set Results

plt.scatter(X_train, Y_train, color='Purple')
plt.plot(X_train, regressor.predict(X_train), color='black')
plt.title('Bicarbonate(ppm) vs pH(Training set)')
plt.xlabel('pH')
plt.ylabel('Bicarbonate(ppm)')
plt.show()

plt.scatter(X_test, Y_test, color='red')
plt.plot(X_test, regressor.predict(X_test), color='black')
plt.title('Bicarbonate(ppm) vs pH(Test set)')
plt.xlabel('pH')
plt.ylabel('Bicarbonate(ppm)')
plt.show()
```
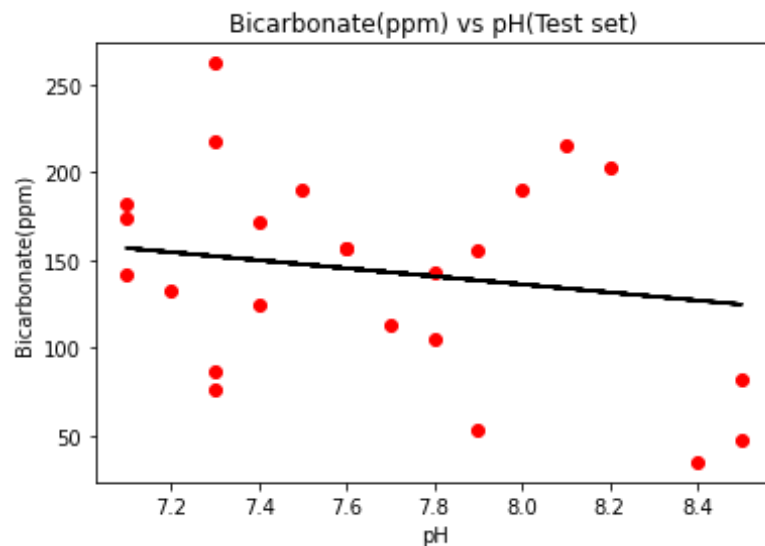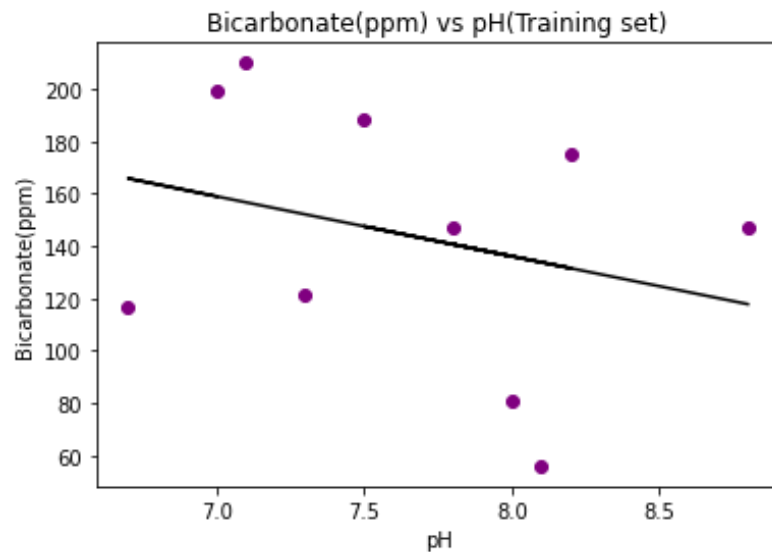
Bicarbonate(ppm) vs pH(Training set)

Bicarbonate(ppm) vs pH(Test set)

```
print(regressor.predict([[7.6]]))
```

```
[145.2435247]
```

Now we will perform the prediction of Bicarbonate(ppm) Present in the well water.

```
a=float(input("What is the pH of your well water? "))
print('The Bicarbonate (parts per million) in your well water',
regressor.predict([[a]]))
```

```
What is the pH of your well water? 7.1
The Bicarbonate (parts per million) in your well water [156.6787717]
```

Conclusion- Hence we are able to predict the Bicarbonate(ppm) present in the well water of Northeast Texas by training the Linear Regression model with the Water Survey Dataset.