Practical No:6

In [2]:

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns
df = pd.read_csv('Desktop/Iris.csv')
df.head()
```

Out[2]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

In [3]:

```
df.describe()
```

Out[3]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	150.000000	150.000000	150.000000	150.000000	150.000000
mean	75.500000	5.843333	3.054000	3.758667	1.198667
std	43.445368	0.828066	0.433594	1.764420	0.763161
min	1.000000	4.300000	2.000000	1.000000	0.100000
25%	38.250000	5.100000	2.800000	1.600000	0.300000
50%	75.500000	5.800000	3.000000	4.350000	1.300000
75%	112.750000	6.400000	3.300000	5.100000	1.800000
max	150.000000	7.900000	4.400000	6.900000	2.500000

In [4]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Id             150 non-null    int64  
 1   SepalLengthCm  150 non-null    float64
 2   SepalWidthCm   150 non-null    float64
 3   PetalLengthCm  150 non-null    float64
 4   PetalWidthCm   150 non-null    float64
 5   Species        150 non-null    object 
dtypes: float64(4), int64(1), object(1)
memory usage: 7.2+ KB
```

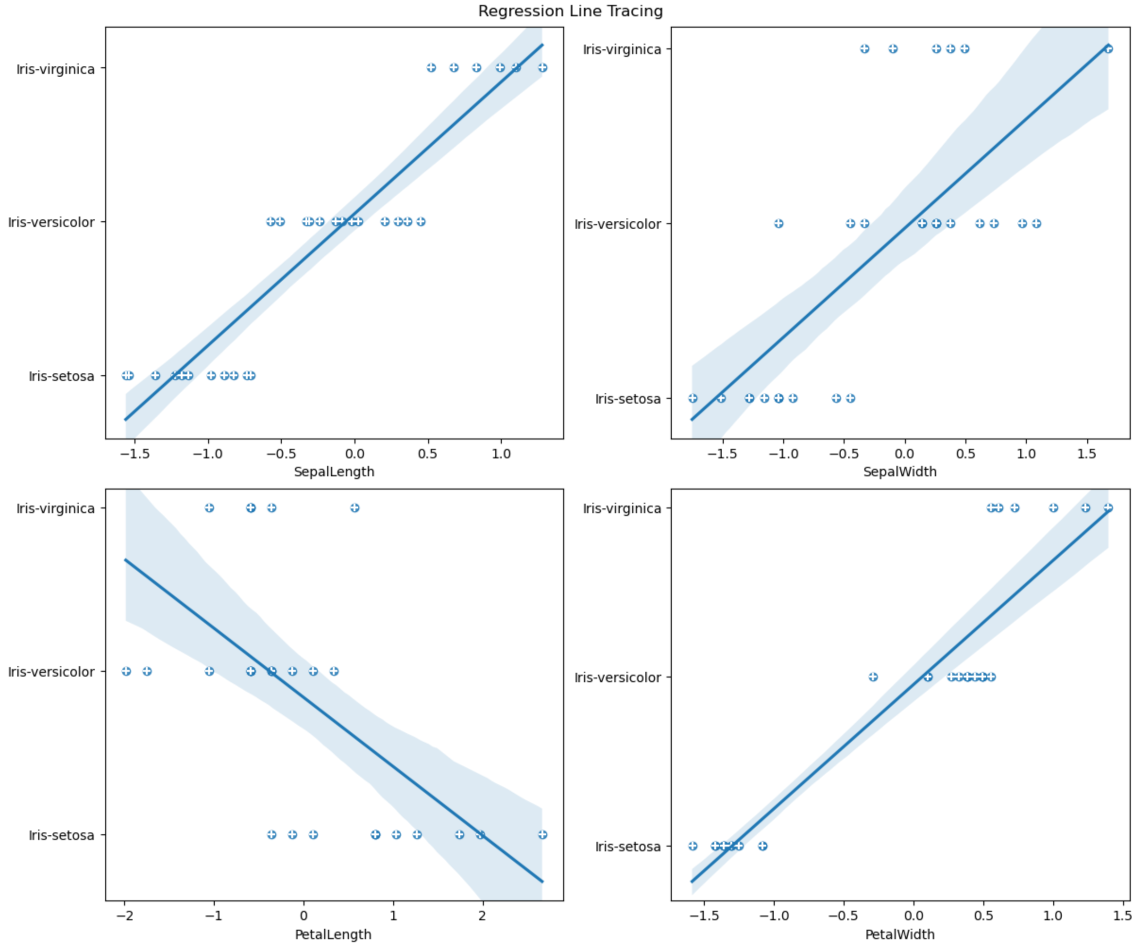
In [6]:

```
X = df.iloc[:, :4].values
Y = df['Species'].values
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size = 0.2, random_state=
sc_X = StandardScaler()
X_train = sc_X.fit_transform(X_train)
X_test = sc_X.transform(X_test)
print(f'Train Dataset Size - X: {X_train.shape}, Y: {Y_train.shape}')
print(f'Test Dataset Size - X: {X_test.shape}, Y: {Y_test.shape}')
```

```
Train Dataset Size - X: (120, 4), Y: (120,)
Test Dataset Size - X: (30, 4), Y: (30,)
```

In [7]:

```
from sklearn.naive_bayes import GaussianNB
classifier = GaussianNB()
classifier.fit(X_train, Y_train)
predictions = classifier.predict(X_test)
mapper = {'Iris-setosa': 0, 'Iris-versicolor': 1, 'Iris-virginica': 2}
predictions_ = [mapper[i] for i in predictions]
fig, axs = plt.subplots(2, 2, figsize = (12, 10), constrained_layout = True)
fig.suptitle('Regression Line Tracing')
for i in range(4):
 x, y = i // 2, i % 2
 sns.regplot(x = X_test[:, i], y = predictions_, ax=axs[x, y])
 axs[x, y].scatter(X_test[:, i][::-1], Y_test[::-1], marker = '+', color="white")
 axs[x, y].set_xlabel(df.columns[i + 1][:-2])
```



In [8]:

```
from sklearn.metrics import confusion_matrix
from sklearn.metrics import classification_report
cm = confusion_matrix(Y_test, predictions)
print(f'''Confusion matrix :\n
| Positive Prediction\t| Negative Prediction
---------------+------------------------+----------------------
Positive Class | True Positive (TP) {cm[0, 0]}\t| False Negative (FN) {cm[0, 1]}
---------------+------------------------+----------------------
Negative Class | False Positive (FP) {cm[1, 0]}\t| True Negative (TN) {cm[1, 1]}\n''')
cm = classification_report(Y_test, predictions)
print('Classification report : \n', cm)
```

```
Confusion matrix :

| Positive Prediction   | Negative Prediction
---------------+------------------------+----------------------
Positive Class | True Positive (TP) 11  | False Negative (FN) 0
---------------+------------------------+----------------------
Negative Class | False Positive (FP) 0  | True Negative (TN) 13

Classification report : 
                  precision    recall  f1-score   support

    Iris-setosa       1.00      1.00      1.00        11
Iris-versicolor       1.00      1.00      1.00        13
 Iris-virginica       1.00      1.00      1.00         6

       accuracy                           1.00        30
      macro avg       1.00      1.00      1.00        30
   weighted avg       1.00      1.00      1.00        30
```

In [ ]: