Practical No:5

In [1]:
```
import pandas as pd
df=pd.read_csv("/home/student/Downloads/archive/IRIS.csv")
df
```

Out[1]:

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 5 columns

In [2]:
```
df.shape
```

Out[2]:
```
(150, 5)
```

In [3]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns
df = pd.read_csv('/home/student/Downloads/archive(1)/Social_Network_A
df.head()
```

Out[3]:

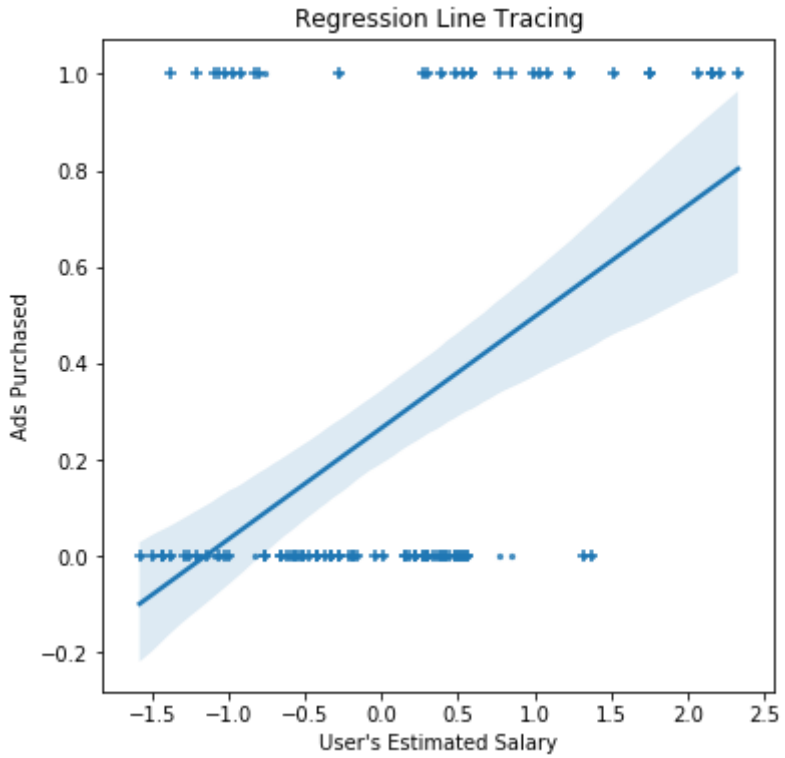
	Age	EstimatedSalary	Purchased
0	19	19000	0
1	35	20000	0
2	26	43000	0
3	27	57000	0
4	19	76000	0

In [4]:
```
X = df[['Age', 'EstimatedSalary']]
Y = df['Purchased']
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 =
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: (300, 2), Y: (300,)
Test Dataset Size - X: (100, 2), Y: (100,)
```

In [5]:
```
from sklearn.linear_model import LogisticRegression
lm = LogisticRegression(random_state = 0, solver='lbfgs' )
lm.fit(X_train, Y_train)
predictions = lm.predict(X_test)
plt.figure(figsize=(6, 6))
sns.regplot(x = X_test[:, 1], y = predictions, scatter_kws={'s':5})
plt.scatter(X_test[:, 1], Y_test, marker = '+')
plt.xlabel("User's Estimated Salary")
plt.ylabel('Ads Purchased')
plt.title('Regression Line Tracing')
```

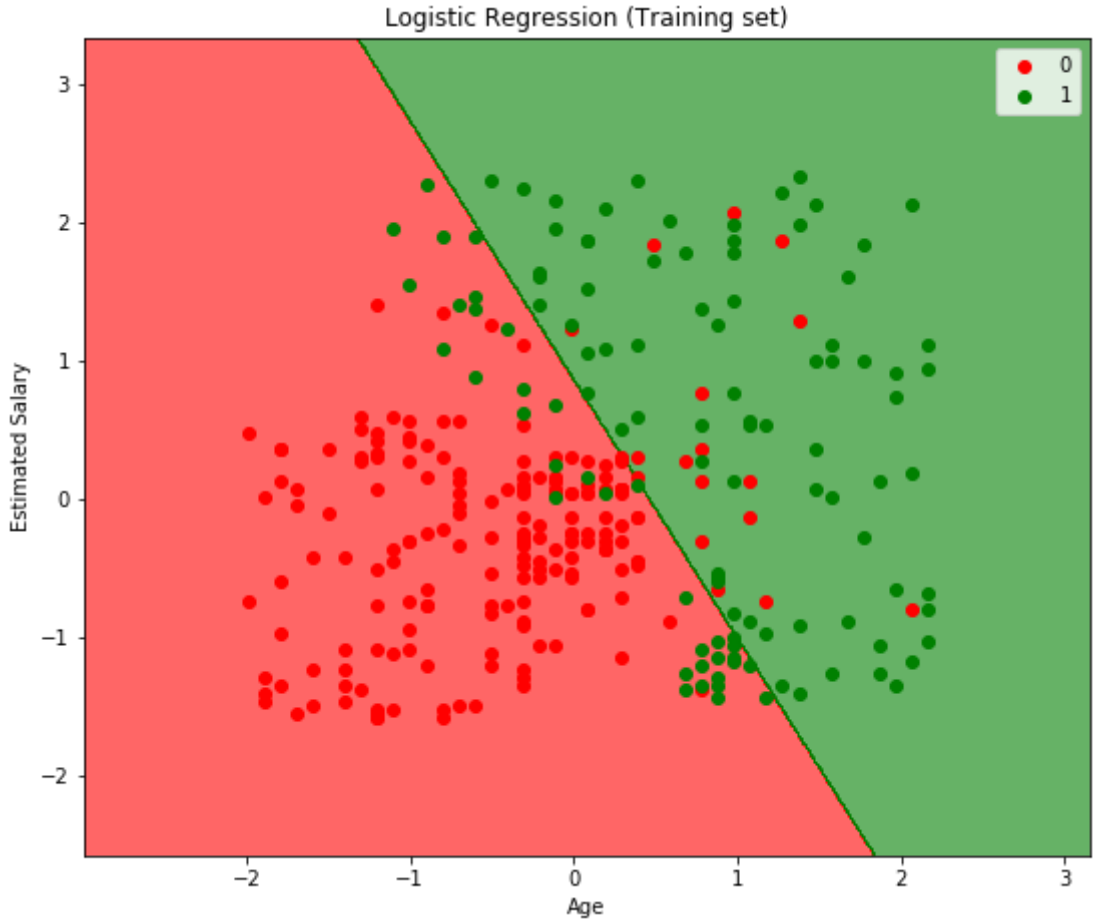
Out[5]: Text(0.5, 1.0, 'Regression Line Tracing')



In [6]:
```
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)
---------------+------------------------+----------------------
Negative Class | False Positive (FP) {cm[1, 0]}\t| True Negative (TN)
cr = classification_report(Y_test, predictions)
print('Classification report : \n', cr)
```

```
Confusion matrix :

| Positive Prediction   | Negative Prediction
---------------+------------------------+----------------------
Positive Class | True Positive (TP) 65  | False Negative (FN) 3
---------------+------------------------+----------------------
Negative Class | False Positive (FP) 8  | True Negative (TN) 24

Classification report :
               precision    recall  f1-score   support

           0       0.89      0.96      0.92        68
           1       0.89      0.75      0.81        32

    accuracy                           0.89       100
   macro avg       0.89      0.85      0.87       100
weighted avg       0.89      0.89      0.89       100
```

In [7]:
```
from matplotlib.colors import ListedColormap
X_set, y_set = X_train, Y_train
X1, X2 = np.meshgrid(np.arange(start = X_set[:, 0].min() - 1, stop =
np.arange(start = X_set[:, 1].min() - 1, stop = X_set[:, 1].max() + 1
plt.figure(figsize=(9, 7.5))
plt.contourf(X1, X2, lm.predict(np.array([X1.ravel(), X2.ravel()]).T)
alpha = 0.6, cmap = ListedColormap(('red', 'green')))
plt.xlim(X1.min(), X1.max())
plt.ylim(X2.min(), X2.max())
for i, j in enumerate(np.unique(y_set)):
    plt.scatter(X_set[y_set == j, 0], X_set[y_set == j, 1],
color = ListedColormap(('red', 'green'))(i), label = j)
plt.title('Logistic Regression (Training set)')
plt.xlabel('Age')
plt.ylabel('Estimated Salary')
plt.legend()
plt.show()
```



In [ ]: