In [ ]:

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

Read Dataset

In [ ]:

```
dataset = pd.read_csv("Social_Network_Ads.csv")
```

In [ ]:

```
dataset.head()
```

Out[ ]:

	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	Male	19	19000	0
1	15810944	Male	35	20000	0
2	15668575	Female	26	43000	0
3	15603246	Female	27	57000	0
4	15804002	Male	19	76000	0

Explore Dataset

In [ ]:

```
dataset.isnull().sum()
```

Out[ ]:

```
User ID            0
Gender             0
Age                0
EstimatedSalary    0
Purchased          0
dtype: int64
```

In [ ]:

```
dataset.duplicated().sum()
```

Out[ ]:

```
0
```

In [ ]:

```
mapi = {'Male':1, 'Female':0}
dataset = dataset.replace(mapi)
dataset.head()
```

Out[ ]:

	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	1	19	19000	0
1	15810944	1	35	20000	0
2	15668575	0	26	43000	0
3	15603246	0	27	57000	0
4	15804002	1	19	76000	0

In [ ]:

```
dataset.drop(['User ID'], axis=1, inplace=True)
dataset.head()
```

Out[ ]:

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

Train test split

In [ ]:

```
x, y = dataset.drop(['Purchased'], axis=1), dataset['Purchased']
```

In [ ]:

```
from sklearn.model_selection import train_test_split
xtrain, xtest, ytrain, ytest = train_test_split(x, y, test_size = 0.25, random_state = 0)
```

Standard Scaler

In [ ]:

```
from sklearn.preprocessing import StandardScaler
sc_scale = StandardScaler()

xtrain = sc_scale.fit_transform(xtrain)
xtest = sc_scale.transform(xtest)
```

In [ ]:

```
from sklearn.linear_model import LogisticRegression
classifier = LogisticRegression(random_state = 0)
```

```
classifier.fit(xtrain, ytrain)
```

Out[ ]:

```
LogisticRegression(random_state=0)
```

In [ ]:

```
y_pred = classifier.predict(xtest)
```

In [ ]:

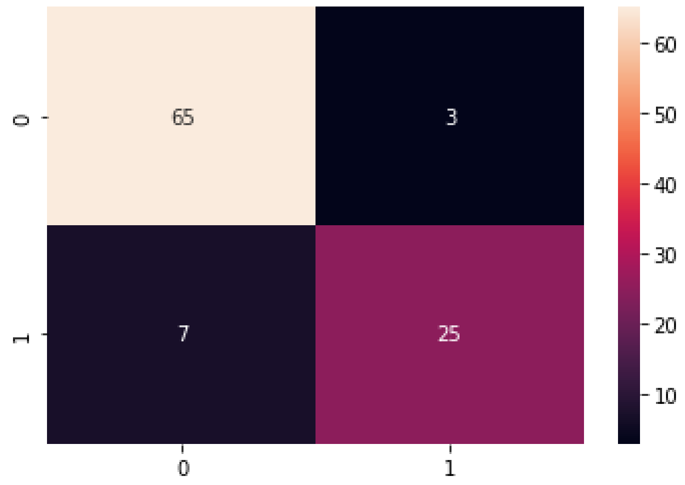
```
from sklearn.metrics import confusion_matrix
cm = confusion_matrix(ytest, y_pred)

print ("Confusion Matrix : \n", cm)
```

```
Confusion Matrix :
 [[65  3]
 [ 7 25]]
```

In [ ]:

```
import seaborn as sns
import matplotlib.pyplot as plt
sns.heatmap(cm, annot=True)
plt.show()
```



In [ ]:

```
from sklearn.metrics import accuracy_score
print ("Accuracy : ", accuracy_score(ytest, y_pred)*100, '%')
```

```
Accuracy :  90.0 %
```

In [ ]:

```
from sklearn.metrics import precision_score
from sklearn.metrics import recall_score
from sklearn.metrics import f1_score
```

In [ ]:

```
# precision tp / (tp + fp)
precision = precision_score(ytest, y_pred)
print('Precision: %f' % precision)
# recall: tp / (tp + fn)
recall = recall_score(ytest, y_pred)
print('Recall: %f' % recall)
# f1: 2 tp / (2 tp + fp + fn)
f1 = f1_score(ytest, y_pred)
print('F1 score: %f' % f1)
```

```
Precision: 0.892857
Recall: 0.781250
F1 score: 0.833333
```