Data Source : https://www.kaggle.com/pankeshpatel/insurance

This project will predict whether a customer buy life insurance or not

Let's import Data

In [79]:

```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
from sklearn.linear_model import LogisticRegression
import seaborn as sns
```

let's read data

In [80]:

```
data = pd.read_csv('insurance_data.csv')
```

In [81]:

```
data.head()
```

Out[81]:

	age	bought_insurance
0	22	0
1	25	0
2	47	1
3	52	0
4	46	1

In [82]:

```
data.columns
```

Out[82]:

```
Index(['age', 'bought_insurance'], dtype='object')
```

In [83]:

```
data['bought_insurance'].value_counts()
```

Out[83]:

```
1    14
0    13
Name: bought_insurance, dtype: int64
```

Observation: 14 customers bought life insurance and 13 customers did not buy life insurance. 1 indicates "Yes" and 0 indicates "NO"

In [84]:

```
data['age'].value_counts()
```

Out[84]:

```
18    2
25    2
55    2
28    1
23    1
54    1
45    1
29    1
50    1
26    1
46    1
47    1
49    1
19    1
62    1
52    1
21    1
22    1
56    1
58    1
27    1
60    1
61    1
40    1
Name: age, dtype: int64
```

In [85]:

```
data.isnull().sum()
```

Out[85]:

```
age                 0
bought_insurance    0
dtype: int64
```

In [86]:

```
print("Is there any null value in dataset:",data.isnull().values.any())
```

```
Is there any null value in dataset: False
```

Data Visiualization

In [87]:

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 27 entries, 0 to 26
Data columns (total 2 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   age               27 non-null     int64
 1   bought_insurance  27 non-null     int64
dtypes: int64(2)
memory usage: 560.0 bytes
```

In [88]:

```
data.describe()
```

Out[88]:

	age	bought_insurance
count	27.000000	27.000000
mean	39.666667	0.518519

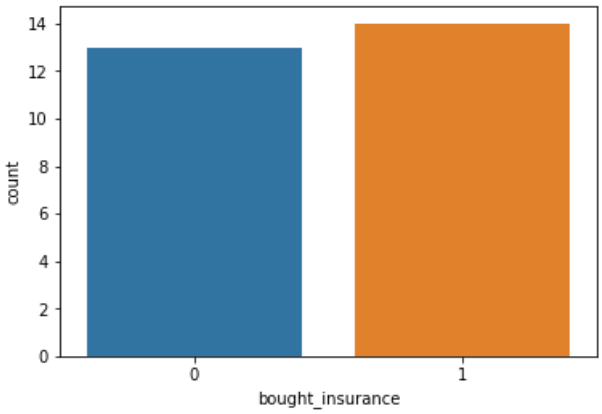
	age	bought_insurance
std	15.745399	0.500176
min	18.000000	0.000000
25%	25.000000	0.000000
50%	45.000000	1.000000
75%	54.500000	1.000000
max	62.000000	1.000000

In [89]:

```
sns.countplot(data['bought_insurance'])
```

Out[89]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x207d1666ba8>
```



Taining the Model

In [90]:

```
X = data.drop(columns = 'bought_insurance')
Y = data['bought_insurance']
```

In [91]:

```
x_train,x_test,y_train,y_test = train_test_split(X,Y,test_size=0.33,random_state=30)
```

In [92]:

```
x_train.shape
```

Out[92]:

```
(18, 1)
```

In [93]:

```
x_test.shape
```

Out[93]:

```
(9, 1)
```

In [94]:

```
y_train.shape
```

Out[94]:

```
(18,)
```

(18,)

In [95]:

```
y_test.shape
```

Out[95]:

(9,)

In [96]:

```
model = LogisticRegression() #initialize the model with model variable
model.fit(x_train,y_train)
```

Out[96]:

LogisticRegression()

Predicting the Model

In [97]:

```
y_pred = model.predict(x_test)
print(y_pred)
print(y_test)
```

```
[1 0 0 0 0 0 1 1 1]
25    1
21    0
11    0
16    1
0     0
18    0
6     0
8     1
4     1
Name: bought_insurance, dtype: int64
```

In [98]:

```
from sklearn import metrics
print("Accuracy=",metrics.accuracy_score(y_test,y_pred))
```

```
Accuracy= 0.7777777777777778
```

Confusion Marix

In [99]:

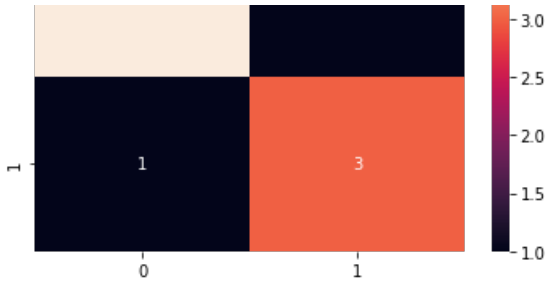
```
from sklearn.metrics import confusion_matrix
from sklearn.metrics import classification_report
cm = confusion_matrix(y_test,y_pred)
```

In [100]:

```
sns.heatmap(cm,annot=True)
```

Out[100]:

<matplotlib.axes._subplots.AxesSubplot at 0x207d1695eb8>



Observation: We found TPR and TNR is high and 2 mis-classified point

In [101]:

```
print(classification_report(y_test,y_pred))
```

```
              precision    recall  f1-score   support

           0       0.80      0.80      0.80         5
           1       0.75      0.75      0.75         4

    accuracy                           0.78         9
   macro avg       0.78      0.78      0.78         9
weighted avg       0.78      0.78      0.78         9
```

Observation : We found model accuracy is 78%

In [ ]:

```

```