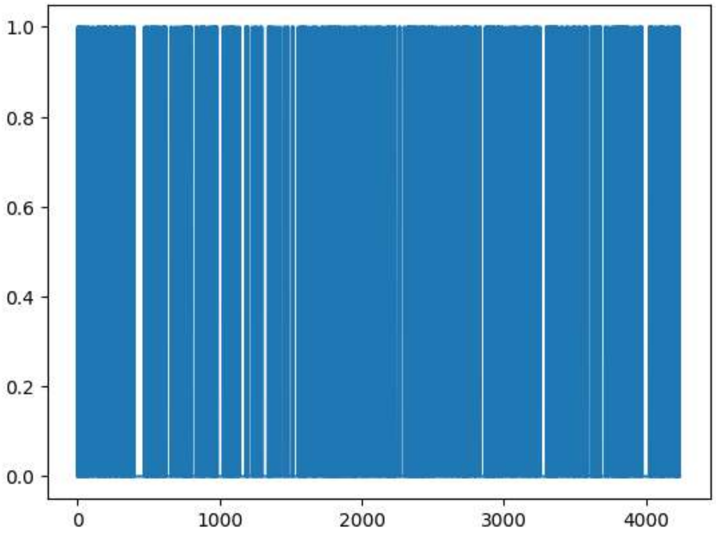
```
import pandas as pd
import pylab as pl
import numpy as np
import scipy.optimize as opt
import statsmodels.api as sm
from sklearn import preprocessing
'exec(% matplotlib inline)'
import matplotlib.pyplot as plt
import matplotlib.mlab as mlab
import seaborn as sn
```

```
# dataset
disease_df = pd.read_csv("/content/framingham.csv")
disease_df.drop(['education'], inplace = True, axis = 1)
disease_df.rename(columns ={'male':'Sex_male'}, inplace = True)

# removing NaN / NULL values
disease_df.dropna(axis = 0, inplace = True)
print(disease_df.head(), disease_df.shape)
print(disease_df.TenYearCHD.value_counts())
```

```
   Sex_male  age  currentSmoker  cigsPerDay  BPMeds  prevalentStroke  \
0         1   39              0         0.0     0.0                0
1         0   46              0         0.0     0.0                0
2         1   48              1        20.0     0.0                0
3         0   61              1        30.0     0.0                0
4         0   46              1        23.0     0.0                0

   prevalentHyp  diabetes  totChol  sysBP  diaBP    BMI  heartRate  glucose  \
0             0         0    195.0  106.0   70.0  26.97       80.0     77.0
1             0         0    250.0  121.0   81.0  28.73       95.0     76.0
2             0         0    245.0  127.5   80.0  25.34       75.0     70.0
3             1         0    225.0  150.0   95.0  28.58       65.0    103.0
4             0         0    285.0  130.0   84.0  23.10       85.0     85.0

   TenYearCHD
0           0
1           0
2           0
3           1
4           0   (3751, 15)
0    3179
1     572
Name: TenYearCHD, dtype: int64
```

```
# counting no. of patients affected with CHD
plt.figure(figsize=(7, 5))
sn.countplot(x='TenYearCHD', data=disease_df,
            palette="BuGn_r")
plt.show()
```

```
laste = disease_df['TenYearCHD'].plot()
plt.show(laste)
```



```
X = np.asarray(disease_df[['age', 'Sex_male', 'cigsPerDay',
                          'totChol', 'sysBP', 'glucose']])
y = np.asarray(disease_df['TenYearCHD'])

# normalization of the dataset
X = preprocessing.StandardScaler().fit(X).transform(X)

# Train-and-Test -Split
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(
        X, y, test_size = 0.3, random_state = 4)


print ('Train set:', X_train.shape, y_train.shape)
print ('Test set:', X_test.shape, y_test.shape)
```

```
Train set: (2625, 6) (2625,)
Test set: (1126, 6) (1126,)
```

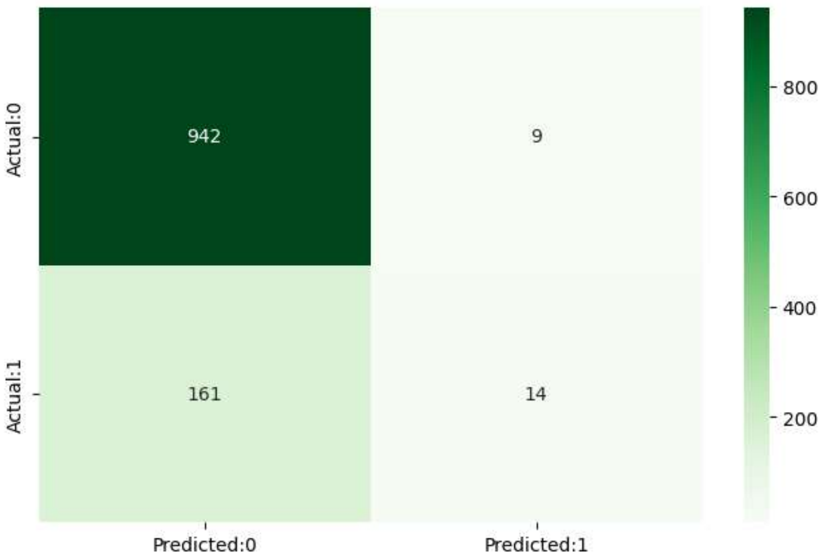
```
from sklearn.linear_model import LogisticRegression

logreg = LogisticRegression()
logreg.fit(X_train, y_train)
y_pred = logreg.predict(X_test)

# Evaluation and accuracy
from sklearn.metrics import jaccard_score

print('')
print('Accuracy of the model in jaccard similarity score is = ',
    jaccard_score(y_test, y_pred))
```

```
Accuracy of the model in jaccard similarity score is =  0.07608695652173914
```

```
# This code is contributed by @amartajisce
from sklearn.ensemble import RandomForestClassifier

rf = RandomForestClassifier()
rf.fit(X_train, y_train)

score = rf.score(X_test,y_test)*100
print('Accuracy of the model is = ', score)
```

```
    Accuracy of the model is =  84.01420959147424
```

```
# Confusion matrix
from sklearn.metrics import confusion_matrix, classification_report

cm = confusion_matrix(y_test, y_pred)
conf_matrix = pd.DataFrame(data = cm,
                        columns = ['Predicted:0', 'Predicted:1'],
                        index =['Actual:0', 'Actual:1'])

plt.figure(figsize = (8, 5))
sn.heatmap(conf_matrix, annot = True, fmt = 'd', cmap = "Greens")

plt.show()

print('The details for confusion matrix is =')
print (classification_report(y_test, y_pred))

# This code is contributed by parna_28
```



```
    The details for confusion matrix is =
                  precision    recall  f1-score   support

               0       0.85      0.99      0.92       951
               1       0.61      0.08      0.14       175

        accuracy                           0.85      1126
       macro avg       0.73      0.54      0.53      1126
    weighted avg       0.82      0.85      0.80      1126
```