```
import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
froi Insert code cell below (Ctrl+M B) accuracy_score
heart_data = pd.read_csv('/content/heart_disease_dataset.csv')
heart_data
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     303 rows × 14 columns
 Next steps:
               Generate code with heart_data
                                                   View recommended plots
                                                                                     New interactive sheet
heart_data.head()
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 Next steps:
               Generate code with heart_data
                                                   View recommended plots
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# print last 5 rows of the dataset
heart_data.tail()
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# number of rows and columns in the dataset
heart_data.shape
→ (303, 14)
# getting some info about the data
heart_data.info()
    <class 'pandas.core.frame.DataFrame'>
     RangeIndex: 303 entries, 0 to 302
```

Data columns (total 14 columns):

Non-Null Count Dtype

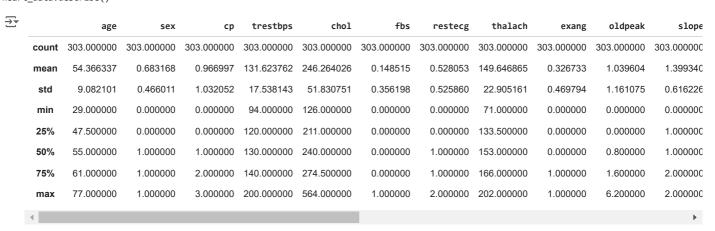
Column

```
0
     age
                303 non-null
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 1
                303 non-null
                                 int64
     sex
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Insert code cell below (Ctrl+M B) 1ull
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 12
     thal
                303 non-null
                                 int64
                303 non-null
 13 target
                                 int64
dtypes: float64(1), int64(13)
memory usage: 33.3 KB
```

# checking for missing values
heart\_data.isnull().sum()



# statistical measures about the data
heart data.describe()



# checking the distribution of Target Variable
heart\_data['target'].value\_counts()



```
10/19/24, 4:12 PM
                                                                      heart disease prediction.ipynb - Colab
    1 --> Defective Heart
    0 --> Healthy Heart
    Splitting the Features and Target
         Insert code cell below (Ctrl+M B)
    X = heart_data.drop(columns='target', axis=1)
    Y = heart_data['target']
    print(X)
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         [303 rows x 13 columns]
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         302
         Name: target, Length: 303, dtype: int64
    Splitting the Data into Training data & Test Data
    X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size=0.2, stratify=Y, random_state=2)
    print(X.shape, X_train.shape, X_test.shape)
    → (303, 13) (242, 13) (61, 13)
    Model Training
```

Logistic Regression

```
model = LogisticRegression()
```

# training the LogisticRegression model with Training data model.fit(X\_train, Y\_train)

/usr/local/lib/python3.10/dist-packages/sklearn/linear\_model/\_logistic.py:469: ConvergenceWarning: lbfgs failed to converge (status-STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max\_iter) or scale the data as shown in:
 <a href="https://scikit-learn.org/stable/modules/preprocessing.html">https://scikit-learn.org/stable/modules/preprocessing.html</a>

```
https://scikit-learn.org/stable/modules/preprocessing.html

Place also refer to the documentation for alternative solver options:
Insert code cell below (Ctrl+M B) 1.org/stable/modules/linear_model.html#logistic-regression

n_iter_i = _check_optimize_result(

v    LogisticRegression () ?

LogisticRegression()
```

## Model Evaluation

## Accuracy Score

# accuracy on training data

```
X_train_prediction = model.predict(X_train)
training_data_accuracy = accuracy_score(X_train_prediction, Y_train)

print('Accuracy on Training data : ', training_data_accuracy)

Accuracy on Training data : 0.8512396694214877

Building a Predictive System

input_data = (62,0,0,140,268,0,0,160,0,3.6,0,2,2)

# change the input data to a numpy array
input_data_as_numpy_array= np.asarray(input_data)

# reshape the numpy array as we are predicting for only on instance input_data_reshaped = input_data_as_numpy_array.reshape(1,-1)

prediction = model.predict(input_data_reshaped)
print(prediction)

if (prediction[0]== 0):
    print('The Person does not have a Heart Disease')
else:
```

## **→** [0]

4

print('The Person has Heart Disease')

The Person does not have a Heart Disease /usr/local/lib/python3.10/dist-packages/sklearn/base.py:493: UserWarning: X does not have valid feature names, but LogisticRegressic warnings.warn(