

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

```
df = pd.read_csv('Heart.csv')
df.head()
```

	Unnamed: 0	Age	Sex	ChestPain	RestBP	Chol	Fbs	RestECG	MaxHR	ExAng	Oldpeak	Slope
0	1	63	1	typical	145	233	1	2	150	0	2.3	
1	2	67	1	asymptomatic	160	286	0	2	108	1	1.5	
2	3	67	1	asymptomatic	120	229	0	2	129	1	2.6	
3	4	37	1	nonanginal	130	250	0	0	187	0	3.5	

```
df.shape
```

(303, 15)

```
df.isnull().sum()
```

Unnamed: 0 0
Age 0
Sex 0
ChestPain 0
RestBP 0
Chol 0
Fbs 0
RestECG 0
MaxHR 0
ExAng 0
Oldpeak 0
Slope 0
Ca 4
Thal 2
AHD 0
dtype: int64

```
df.count()
```

Unnamed: 0 303
Age 303
Sex 303
ChestPain 303
RestBP 303
Chol 303
Fbs 303
RestECG 303
MaxHR 303
ExAng 303
Oldpeak 303
Slope 303
Ca 299
Thal 301
AHD 303
dtype: int64

```
df.info()
```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 303 entries, 0 to 302
Data columns (total 15 columns):
Column Non-Null Count Dtype

0 Unnamed: 0 303 non-null int64
1 Age 303 non-null int64
2 Sex 303 non-null int64
3 ChestPain 303 non-null object

```
4 RestBP      303 non-null    int64
5 Chol        303 non-null    int64
6 Fbs         303 non-null    int64
7 RestECG     303 non-null    int64
8 MaxHR       303 non-null    int64
9 ExAng       303 non-null    int64
10 Oldpeak    303 non-null    float64
11 Slope      303 non-null    int64
12 Ca         299 non-null    float64
13 Thal       301 non-null    object
14 AHD        303 non-null    object
dtypes: float64(2), int64(10), object(3)
memory usage: 35.6+ KB
```

df.dtypes

```
Unnamed: 0      int64
Age             int64
Sex             int64
ChestPain       object
RestBP          int64
Chol            int64
Fbs            int64
RestECG         int64
MaxHR           int64
ExAng           int64
Oldpeak        float64
Slope           int64
Ca             float64
Thal            object
AHD             object
dtype: object
```

df==0

	Unnamed: 0	Age	Sex	ChestPain	RestBP	Chol	Fbs	RestECG	MaxHR	ExAng	Oldpeak
0	False	False	False	False	False	False	False	False	False	True	False
1	False	False	False	False	False	False	True	False	False	False	False
2	False	False	False	False	False	False	True	False	False	False	False
3	False	False	False	False	False	False	True	True	False	True	False
4	False	False	True	False	False	False	True	False	False	True	False
...
298	False	False	False	False	False	False	True	True	False	True	False
299	False	False	False	False	False	False	False	True	False	True	False
300	False	False	False	False	False	False	True	True	False	False	False
301	False	False	True	False	False	False	True	False	False	True	True
302	False	False	False	False	False	False	True	True	False	True	True

df[df==0]

[illegible]

[illegible]

```
predicted = np.concatenate((np.ones(100),np.zeros(400)))
predicted
```

[illegible]

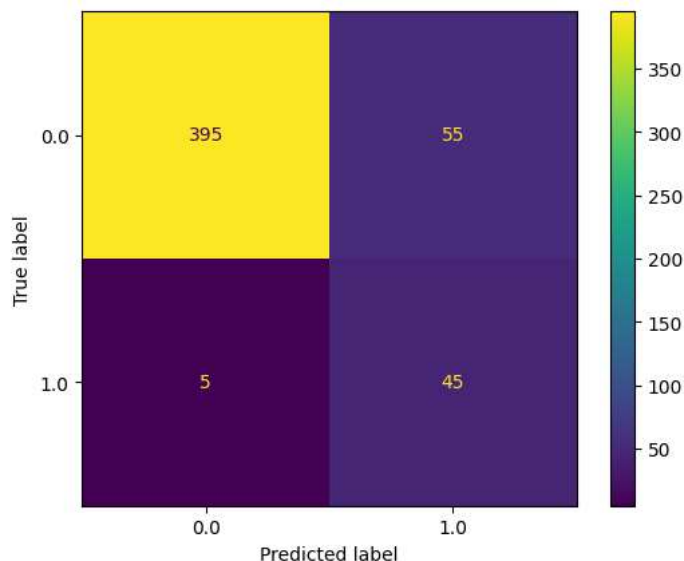
```
type(predicted)
```

numpy.ndarray

```
from sklearn.metrics import ConfusionMatrixDisplay
```

```
ConfusionMatrixDisplay.from_predictions(actual,predicted)
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7c68c805d360>
```



```
from sklearn.metrics import classification_report
from sklearn.metrics import accuracy_score
```

```
print(classification_report(actual,predicted))
```

	precision	recall	f1-score	support
0.0	0.99	0.88	0.93	450
1.0	0.45	0.90	0.60	50
accuracy			0.88	500
macro avg	0.72	0.89	0.76	500
weighted avg	0.93	0.88	0.90	500

```
accuracy_score(actual,predicted)
```

0.88