

[illegible]

```
age      0
sex      0
cp       0
trtbps   0
chol     0
fbs      0
restecg  0
thalachh 0
exng     0
oldpeak  0
slp      0
caa      0
thall    0
output   0
dtype: int64
```

```
array([[63., 1., 3., ..., 0., 0., 1.],
       [37., 1., 2., ..., 0., 0., 2.],
       [41., 0., 1., ..., 2., 0., 2.],
       ...,
       [68., 1., 0., ..., 1., 2., 3.],
       [57., 1., 0., ..., 1., 1., 3.],
       [57., 0., 1., ..., 1., 1., 2.]])
```

[illegible]

```
array([[39., 0., 2., ..., 2., 0., 2.],
       [29., 1., 1., ..., 2., 0., 2.],
       [50., 0., 2., ..., 1., 0., 2.],
       ...,
       [ 0., 0., 0., ..., 0., 0., 0.]])
```

```
[69., 1., 3., ..., 1., 1., 2.],
[46., 1., 0., ..., 2., 0., 3.],
[63., 0., 1., ..., 2., 2., 2.]])
```

y_train

```
array([1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1, 1, 1, 1, 0, 1, 0, 0,
1, 0, 1, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 1, 0, 0, 0, 1,
1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1, 0, 1, 1, 1,
0, 1, 0, 0, 1, 0, 1, 0, 1, 1, 1, 1, 0, 1, 0, 1, 1, 0, 0, 0, 1, 1,
0, 1, 1, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 1, 1, 1, 0, 0, 0, 1, 0,
0, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1, 1, 0,
1, 1, 1, 0, 0, 1, 1, 0, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0, 0,
0, 0, 1, 1, 0, 1, 0, 0, 0, 1, 1, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1,
1, 0, 0, 1, 0, 0, 1, 1, 0, 0, 0, 0, 1, 1, 0, 0, 0, 1, 1, 0, 0, 0,
1, 1, 1, 1, 1, 0, 1, 0, 1, 0, 1, 1, 0, 1])
```

```
# preprocessing
```

```
from sklearn.preprocessing import StandardScaler
```

```
scaler=StandardScaler()
```

```
scaler.fit(x_train)
```

```
x_train=scaler.fit_transform(x_train)
```

```
x_test=scaler.fit_transform(x_test)
```

x_test

```
array([[ 0.29414409,  0.5985056 , -0.84722571, ..., -0.58445999,
         0.0575118 , -1.97484177],
       [ 0.52098403,  0.5985056 ,  2.11806429, ..., -0.58445999,
        -0.81475054,  1.09713431],
       [ 0.29414409,  0.5985056 ,  1.12963429, ...,  1.0272327 ,
         0.0575118 ,  1.09713431],
       ...,
       [ 1.42834376, -1.67082814, -0.84722571, ...,  1.0272327 ,
        0.92977415, -0.43885373],
       [ 0.40756406,  0.5985056 ,  1.12963429, ..., -0.58445999,
        -0.81475054,  1.09713431],
       [ 2.44912347, -1.67082814,  1.12963429, ..., -0.58445999,
        -0.81475054, -0.43885373]])
```

```
from sklearn.neighbors import KNeighborsClassifier
```

```
model=KNeighborsClassifier(n_neighbors=5)
```

```
model.fit(x_train,y_train)
```

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

y_pred

```
array([0, 0, 1, 0, 1, 1, 1, 0, 0, 1, 1, 0, 1, 0, 1, 1, 1, 0, 0, 0, 1, 0,
       0, 1, 1, 1, 1, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1, 1, 1, 1, 1,
       1, 0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 1, 1, 0,
       1, 1, 1, 1, 1, 1, 0, 1, 0, 1, 1, 1, 0, 0, 1, 0, 1, 1, 1, 1, 0, 1,
       1, 1, 1])
```

```
from sklearn.metrics import confusion_matrix, accuracy_score, ConfusionMatrixDisplay
```

```
result=confusion matrix(y test,y pred)
```

```
result
```

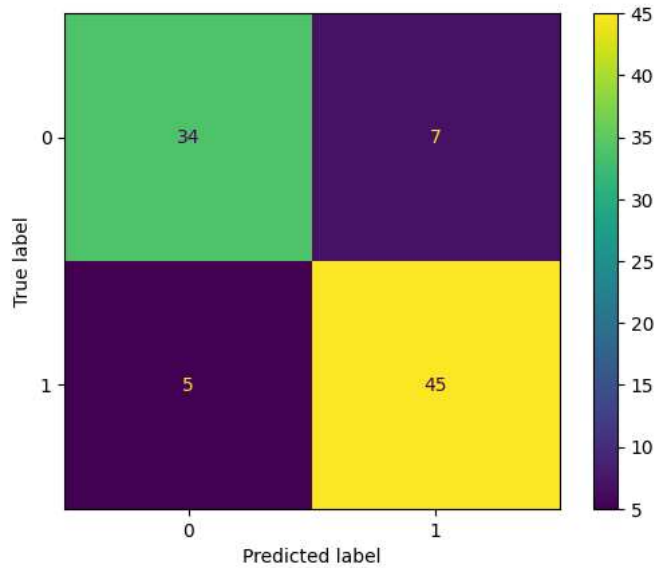
```
array([[34, 7],
       [ 5, 45]])
```

$$cm=[0,1]$$

```
cmd=ConfusionMatrixDisplay(result,display_labels=cm)
```

```
cmd.plot()
```

<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7d7011165de0>



```
score=accuracy_score(y_test,y_pred)
score
```

0.8681318681318682