

## ▼ CART

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```
from time import time
import numpy as np
import pandas as pd
from sklearn.metrics import accuracy_score
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report
from sklearn import metrics
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn import tree
from sklearn.metrics import accuracy_score, confusion_matrix
```

```
df = pd.read_csv('heart.csv')
```

```
df.shape
```

```
(14, 4)
```

```
df.describe
```

	<bound	method	NDFrame.describe	of	highbp	highcholesterol	FBPS	Target
0		1	1	1	1			
1		1	1	0	1			
2		1	1	0	1			
3		0	1	0	0			
4		0	1	0	0			
5		1	0	0	0			
6		1	1	0	1			
7		0	1	0	0			
8		1	0	1	1			
9		1	0	0	0			
10		1	1	0	1			
11		1	1	0	1			
12		1	1	0	1			
13		0	1	0	0>			

```
X = df.drop(columns=['Target'])
y = df['Target']
print(X.shape)
print(y.shape)
```

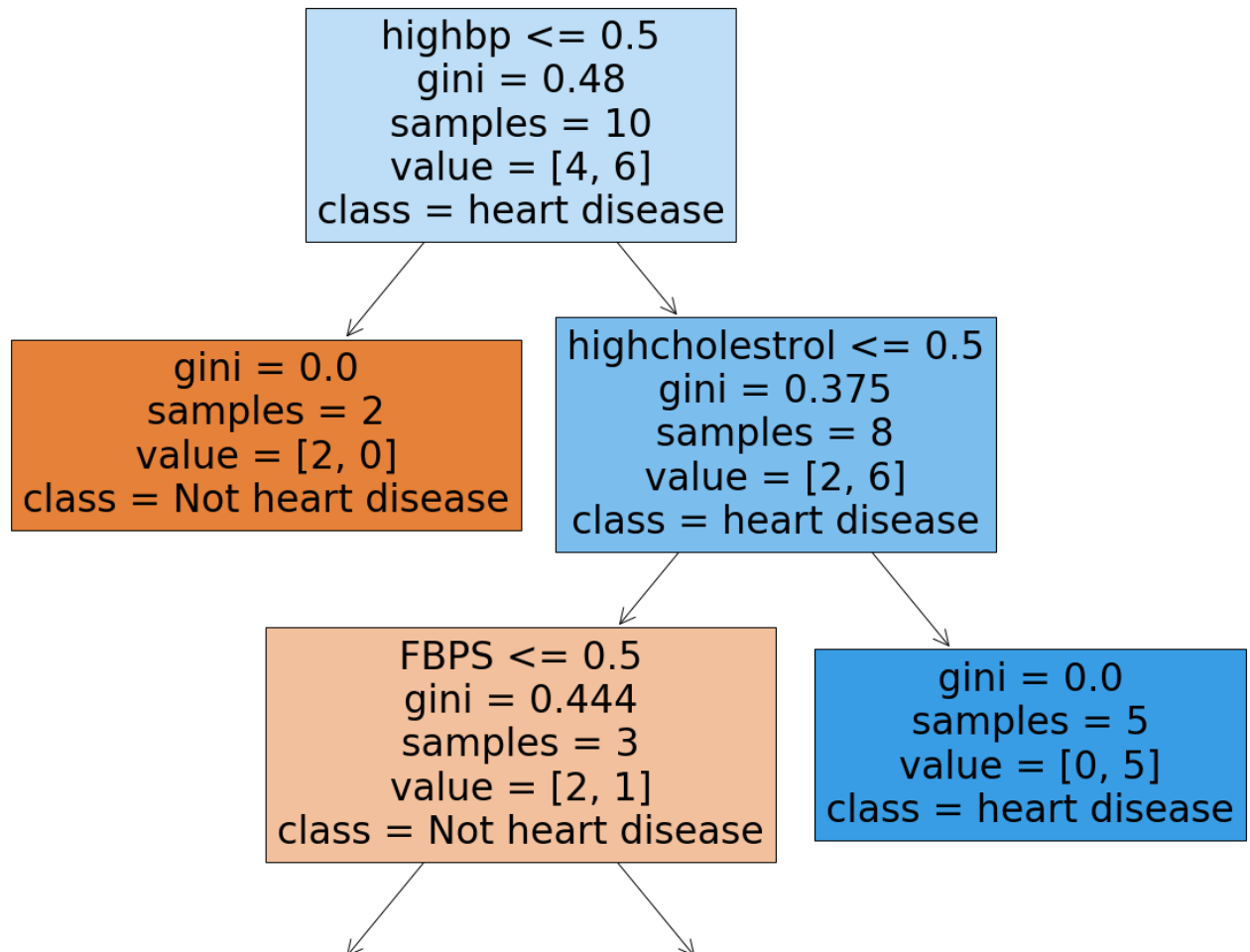
```
(14, 3)
(14,)
```

```
x_train,x_test,y_train,y_test = train_test_split(X,y,stratify=y)
print(x_train.shape)
print(x_test.shape)
```

```
(10, 3)
(4, 3)
```

```
clf = tree.DecisionTreeClassifier(random_state=0)
clf.fit(x_train,y_train)
y_train_pred = clf.predict(x_train)
y_test_pred = clf.predict(x_test)
```

```
plt.figure(figsize=(20,20))
features = df.columns
classes = ['Not heart disease','heart disease']
tree.plot_tree(clf,feature_names=features,class_names=classes,filled=True)
plt.show()
```

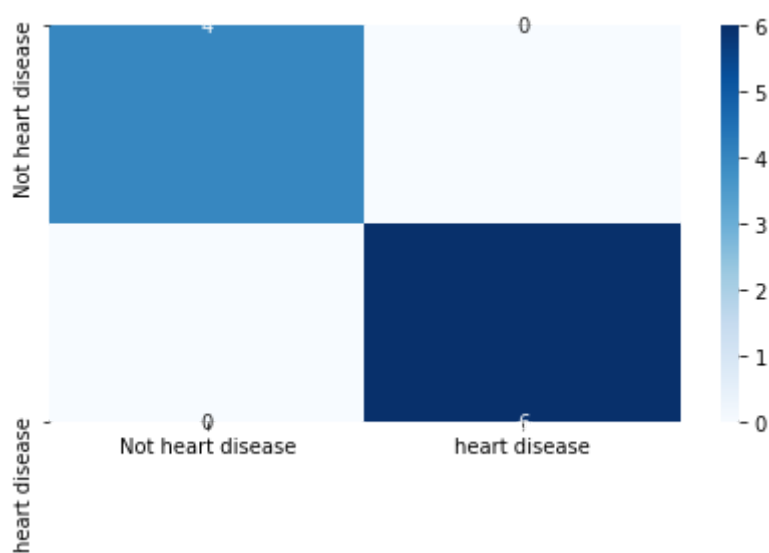


# helper function

```
def plot_confusionmatrix(y_train_pred,y_train,dom):
    print(f'{dom} Confusion matrix')
    cf = confusion_matrix(y_train_pred,y_train)
    sns.heatmap(cf,annot=True,yticklabels=classes
                ,xticklabels=classes,cmap='Blues', fmt='g')
    plt.tight_layout()
    plt.show()
```

```
print(f'Train score {accuracy_score(y_train_pred,y_train)}')
print(f'Test score {accuracy_score(y_test_pred,y_test)}')
plot_confusionmatrix(y_train_pred,y_train,dom='Train')
plot_confusionmatrix(y_test_pred,y_test,dom='Test')
```

Train score 1.0  
Test score 1.0  
Train Confusion matrix



Test Confusion matrix

