

```
In [1]: from sklearn.tree import DecisionTreeClassifier
import pandas as pd
from sklearn.preprocessing import LabelEncoder
from sklearn.metrics import confusion_matrix
from sklearn import tree
import numpy
```

```
In [2]: df = pd.read_csv("playtennis.csv")
df
```

```
Out[2]:
```

	Outlook	Temperature	Humidity	Wind	Play Tennis
0	Sunny	Hot	High	Weak	No
1	Sunny	Hot	High	Strong	No
2	Overcast	Hot	High	Weak	Yes
3	Rain	Mild	High	Weak	Yes
4	Rain	Cool	Normal	Weak	Yes
5	Rain	Cool	Normal	Strong	No
6	Overcast	Cool	Normal	Strong	Yes
7	Sunny	Mild	High	Weak	No
8	Sunny	Cool	Normal	Weak	Yes
9	Rain	Mild	Normal	Weak	Yes
10	Sunny	Mild	Normal	Strong	Yes
11	Overcast	Mild	High	Strong	Yes
12	Overcast	Hot	Normal	Weak	Yes
13	Rain	Mild	High	Strong	No

```
In [3]: encoder = LabelEncoder()
df = df.apply(encoder.fit_transform)
df
```

```
Out[3]:
```

	Outlook	Temperature	Humidity	Wind	Play Tennis
0	2	1	0	1	0
1	2	1	0	0	0
2	0	1	0	1	1
3	1	2	0	1	1
4	1	0	1	1	1
5	1	0	1	0	0
6	0	0	1	0	1
7	2	2	0	1	0
8	2	0	1	1	1
9	1	2	1	1	1
10	2	2	1	0	1
11	0	2	0	0	1
12	0	1	1	1	1
13	1	2	0	0	0

```
In [4]: X = df.iloc[:, :-1].to_numpy()
Y = df.iloc[:, -1].to_numpy()
```

```
In [5]: model_cart = DecisionTreeClassifier(criterion = 'gini', max_depth =
model_id3 = DecisionTreeClassifier(criterion = 'entropy', max_depth
```

```
In [6]: model_cart.fit(X,Y)
model_id3.fit(X,Y)
```

```
Out[6]: DecisionTreeClassifier(criterion='entropy', max_depth=2)
```

**In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.**

**On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.**

```
In [7]: pred_cart = model_cart.predict(X)
pred_id3 = model_id3.predict(X)
```

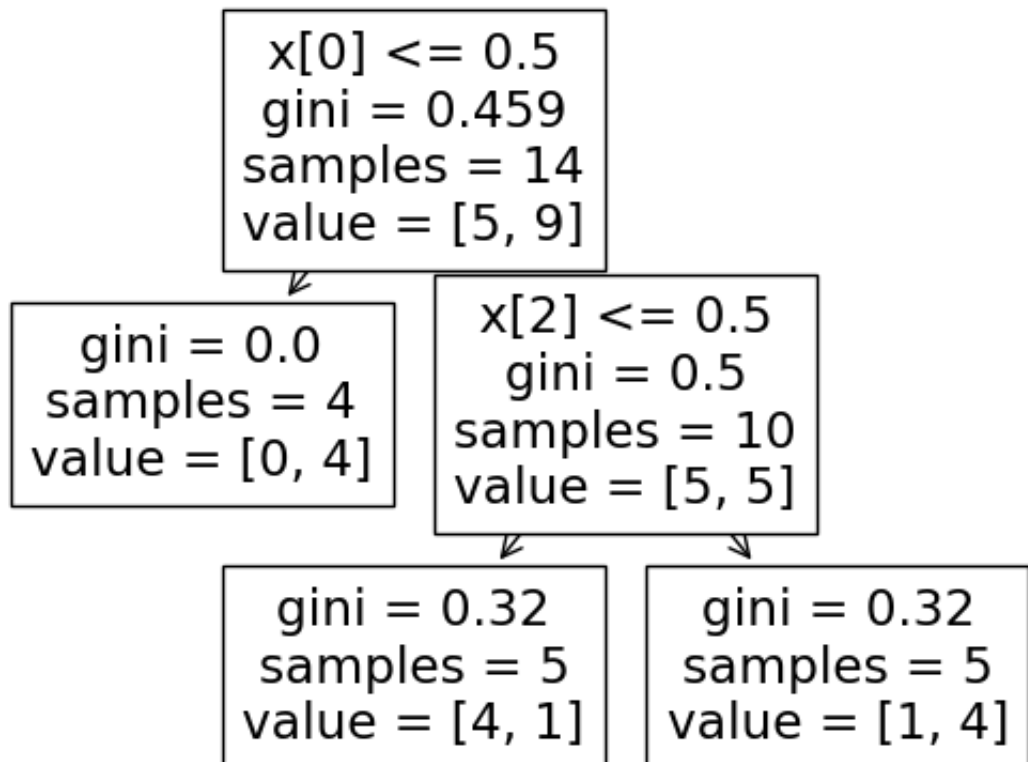
```
In [8]: cm_cart = confusion_matrix(Y, pred_cart)
cm_id3 = confusion_matrix(Y, pred_id3)
```

```
In [9]: print(cm_cart)
        print(cm_id3)
```

```
[[4 1]
 [1 8]]
[[4 1]
 [1 8]]
```

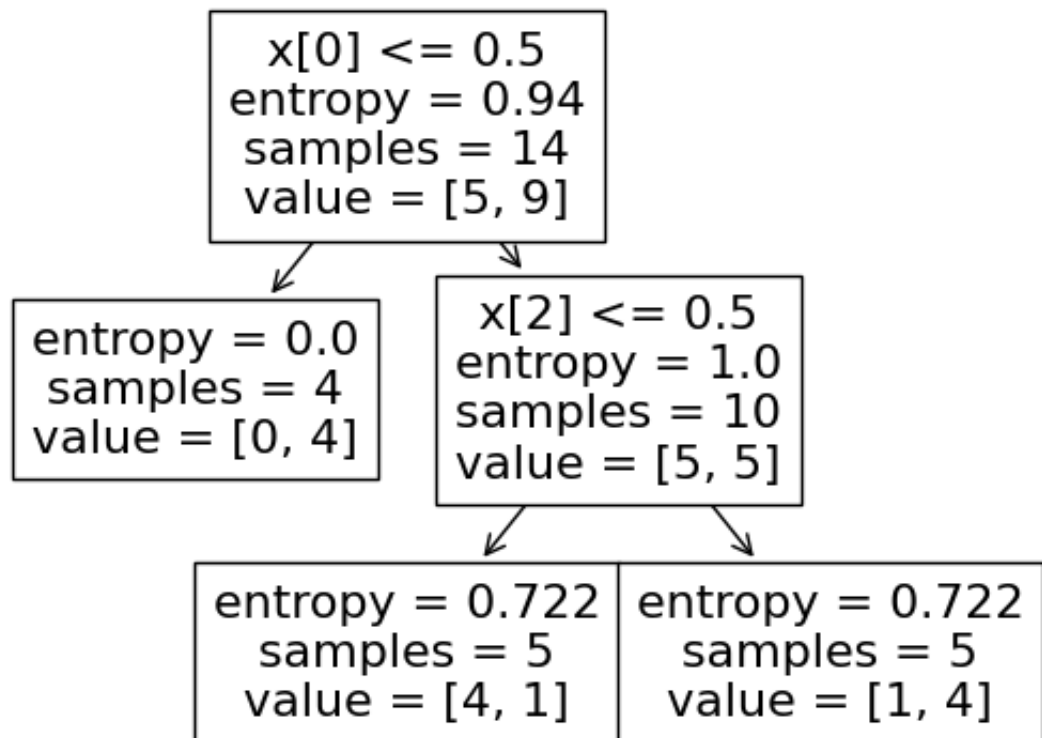
```
In [10]: tree.plot_tree(model_cart)
```

```
Out[10]: [Text(0.4, 0.8333333333333334, 'x[0] <= 0.5\ngini = 0.459\nsamples = 14\nvalue = [5, 9]'),
          Text(0.2, 0.5, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
          Text(0.6, 0.5, 'x[2] <= 0.5\ngini = 0.5\nsamples = 10\nvalue = [5, 5]'),
          Text(0.4, 0.16666666666666666, 'gini = 0.32\nsamples = 5\nvalue = [4, 1]'),
          Text(0.8, 0.16666666666666666, 'gini = 0.32\nsamples = 5\nvalue = [1, 4]')]
```



```
In [11]: tree.plot_tree(model_id3)
```

```
Out[11]: [Text(0.4, 0.8333333333333334, 'x[0] <= 0.5\nentropy = 0.94\nsamples = 14\nvalue = [5, 9]'),  
Text(0.2, 0.5, 'entropy = 0.0\nsamples = 4\nvalue = [0, 4]'),  
Text(0.6, 0.5, 'x[2] <= 0.5\nentropy = 1.0\nsamples = 10\nvalue = [5, 5]'),  
Text(0.4, 0.16666666666666666, 'entropy = 0.722\nsamples = 5\nvalue = [4, 1]'),  
Text(0.8, 0.16666666666666666, 'entropy = 0.722\nsamples = 5\nvalue = [1, 4]')]
```



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In [ ]:
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