In [40]:
```
import pandas as pd
data=pd.read_csv(r"C:\Users\prasa\OneDrive\Desktop\Book1.csv")# if I give the path as C
data
```

Out[40]:

	outlook	temp	humidity	windy	play
0	sunny	hot	high	False	no
1	sunny	hot	high	True	no
2	overcast	hot	high	False	yes
3	rainy	mild	high	False	yes
4	rainy	cool	normal	False	yes
5	rainy	cool	normal	True	no
6	overcast	cool	normal	True	yes
7	sunny	mild	high	False	no
8	sunny	cool	normal	False	yes
9	rainy	mild	normal	False	yes
10	sunny	mild	normal	True	yes
11	overcast	mild	high	True	yes
12	overcast	hot	normal	False	yes
13	rainy	mild	high	True	no

In [41]:
```
from sklearn import tree
data2=data.copy()    # if i wrte just data without copy()  then later in cell 33 , i am
y=data2.pop("play")
y
```

Out[41]:
```
0      no
1      no
2     yes
3     yes
4     yes
5      no
6     yes
7      no
8     yes
9     yes
10    yes
11    yes
12    yes
13     no
Name: play, dtype: object
```

In [42]:
```
X=data2
X
```

Out[42]:

	outlook	temp	humidity	windy
0	sunny	hot	high	False
1	sunny	hot	high	True

	outlook	temp	humidity	windy
2	overcast	hot	high	False
3	rainy	mild	high	False
4	rainy	cool	normal	False
5	rainy	cool	normal	True
6	overcast	cool	normal	True
7	sunny	mild	high	False
8	sunny	cool	normal	False
9	rainy	mild	normal	False
10	sunny	mild	normal	True
11	overcast	mild	high	True
12	overcast	hot	normal	False
13	rainy	mild	high	True

In [43]:
```
#dt=tree.DecisionTreeClassifier()
#dt.fit(X,y)
#dt

#  do encoding before fitting the model on data
```

The Decision Tree Classifier in scikit learn does not take Strings as input.

If we have categorical variables in the data, then we must do encoding either one hot encoding or ordinal encoding

In [44]:
```
from sklearn.preprocessing import LabelEncoder
en=LabelEncoder()
data=data.apply(en.fit_transform)
data
```

Out[44]:

	outlook	temp	humidity	windy	play
0	2	1	0	0	0
1	2	1	0	1	0
2	0	1	0	0	1
3	1	2	0	0	1
4	1	0	1	0	1
5	1	0	1	1	0
6	0	0	1	1	1
7	2	2	0	0	0

	outlook	temp	humidity	windy	play
8	2	0	1	0	1
9	1	2	1	0	1
10	2	2	1	1	1
11	0	2	0	1	1
12	0	1	1	0	1
13	1	2	0	1	0

In [45]:
```
X=data.loc[0:2]
X
```

Out[45]:

	outlook	temp	humidity	windy	play
0	2	1	0	0	0
1	2	1	0	1	0
2	0	1	0	0	1

In [ ]:
```
```

In [46]:
```
X=data.iloc[0:2]
X
```

Out[46]:

	outlook	temp	humidity	windy	play
0	2	1	0	0	0
1	2	1	0	1	0

In [47]:
```
X=data.iloc[0:2,3:8] # even if i write 8 has higher limit, it does not return any error
X
```

Out[47]:

	windy	play
0	0	0
1	1	0

In [48]:
```
X=data.iloc[0:,0:4]
X
```

Out[48]:

	outlook	temp	humidity	windy
0	2	1	0	0
1	2	1	0	1
2	0	1	0	0
3	1	2	0	0

	outlook	temp	humidity	windy
4	1	0	1	0
5	1	0	1	1
6	0	0	1	1
7	2	2	0	0
8	2	0	1	0
9	1	2	1	0
10	2	2	1	1
11	0	2	0	1
12	0	1	1	0
13	1	2	0	1

In [49]:
```
y=data.iloc[0:,-1]
y
```

Out[49]:
```
0     0
1     0
2     1
3     1
4     1
5     0
6     1
7     0
8     1
9     1
10    1
11    1
12    1
13    0
Name: play, dtype: int32
```

In [50]:
```
from sklearn import tree
dt=tree.DecisionTreeClassifier()
dt
```

Out[50]:
```
DecisionTreeClassifier()
```

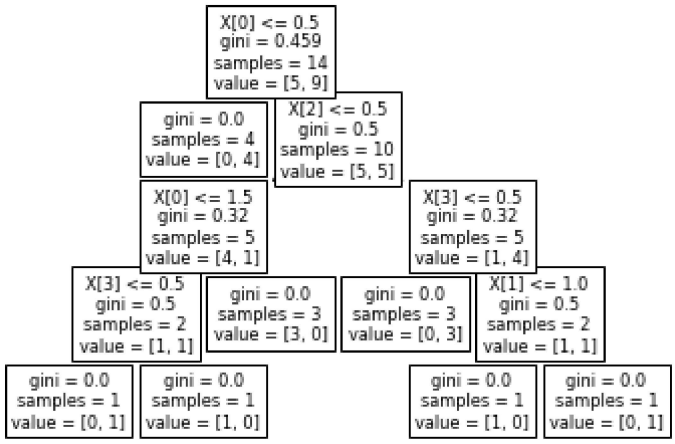
In [51]:
```
a=dt.fit(X,y)
a
```

Out[51]:
```
DecisionTreeClassifier()
```

In [52]:
```
tree.plot_tree(a,)
```

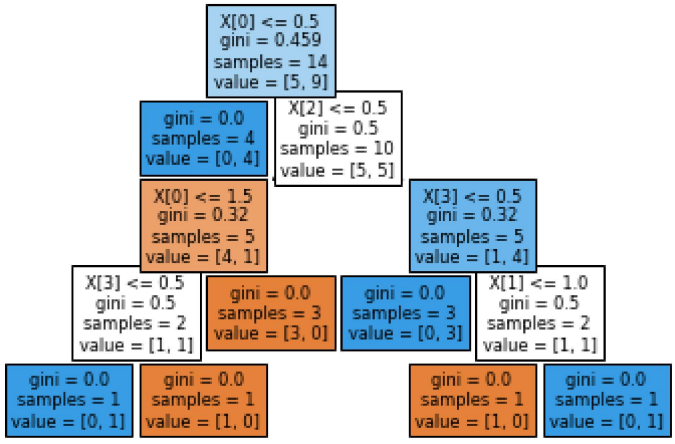
Out[52]:
```
[Text(133.92000000000002, 195.696, 'X[0] <= 0.5\ngini = 0.459\nsamples = 14\nvalue = [5,
9]'),
 Text(100.44000000000001, 152.208, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
 Text(167.40000000000003, 152.208, 'X[2] <= 0.5\ngini = 0.5\nsamples = 10\nvalue = [5,
5]'),
 Text(100.44000000000001, 108.72, 'X[0] <= 1.5\ngini = 0.32\nsamples = 5\nvalue = [4,
1]'),
 Text(66.96000000000001, 65.232, 'X[3] <= 0.5\ngini = 0.5\nsamples = 2\nvalue = [1,
```

```
1]'),
 Text(33.480000000000004, 21.744, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(100.44000000000001, 21.744, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(133.92000000000002, 65.232, 'gini = 0.0\nsamples = 3\nvalue = [3, 0]'),
 Text(234.36, 108.72, 'X[3] <= 0.5\ngini = 0.32\nsamples = 5\nvalue = [1, 4]'),
 Text(200.88000000000002, 65.232, 'gini = 0.0\nsamples = 3\nvalue = [0, 3]'),
 Text(267.84000000000003, 65.232, 'X[1] <= 1.0\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(234.36, 21.744, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(301.32000000000005, 21.744, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]')]
```



In [53]:
```
tree.plot_tree(a,filled=True)
```

Out[53]:
```
[Text(133.92000000000002, 195.696, 'X[0] <= 0.5\ngini = 0.459\nsamples = 14\nvalue = [5,
9]'),
 Text(100.44000000000001, 152.208, 'gini = 0.0\nsamples = 4\nvalue = [0, 4]'),
 Text(167.40000000000003, 152.208, 'X[2] <= 0.5\ngini = 0.5\nsamples = 10\nvalue = [5,
5]'),
 Text(100.44000000000001, 108.72, 'X[0] <= 1.5\ngini = 0.32\nsamples = 5\nvalue = [4,
1]'),
 Text(66.96000000000001, 65.232, 'X[3] <= 0.5\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(33.480000000000004, 21.744, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]'),
 Text(100.44000000000001, 21.744, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(133.92000000000002, 65.232, 'gini = 0.0\nsamples = 3\nvalue = [3, 0]'),
 Text(234.36, 108.72, 'X[3] <= 0.5\ngini = 0.32\nsamples = 5\nvalue = [1, 4]'),
 Text(200.88000000000002, 65.232, 'gini = 0.0\nsamples = 3\nvalue = [0, 3]'),
 Text(267.84000000000003, 65.232, 'X[1] <= 1.0\ngini = 0.5\nsamples = 2\nvalue = [1,
1]'),
 Text(234.36, 21.744, 'gini = 0.0\nsamples = 1\nvalue = [1, 0]'),
 Text(301.32000000000005, 21.744, 'gini = 0.0\nsamples = 1\nvalue = [0, 1]')]
```

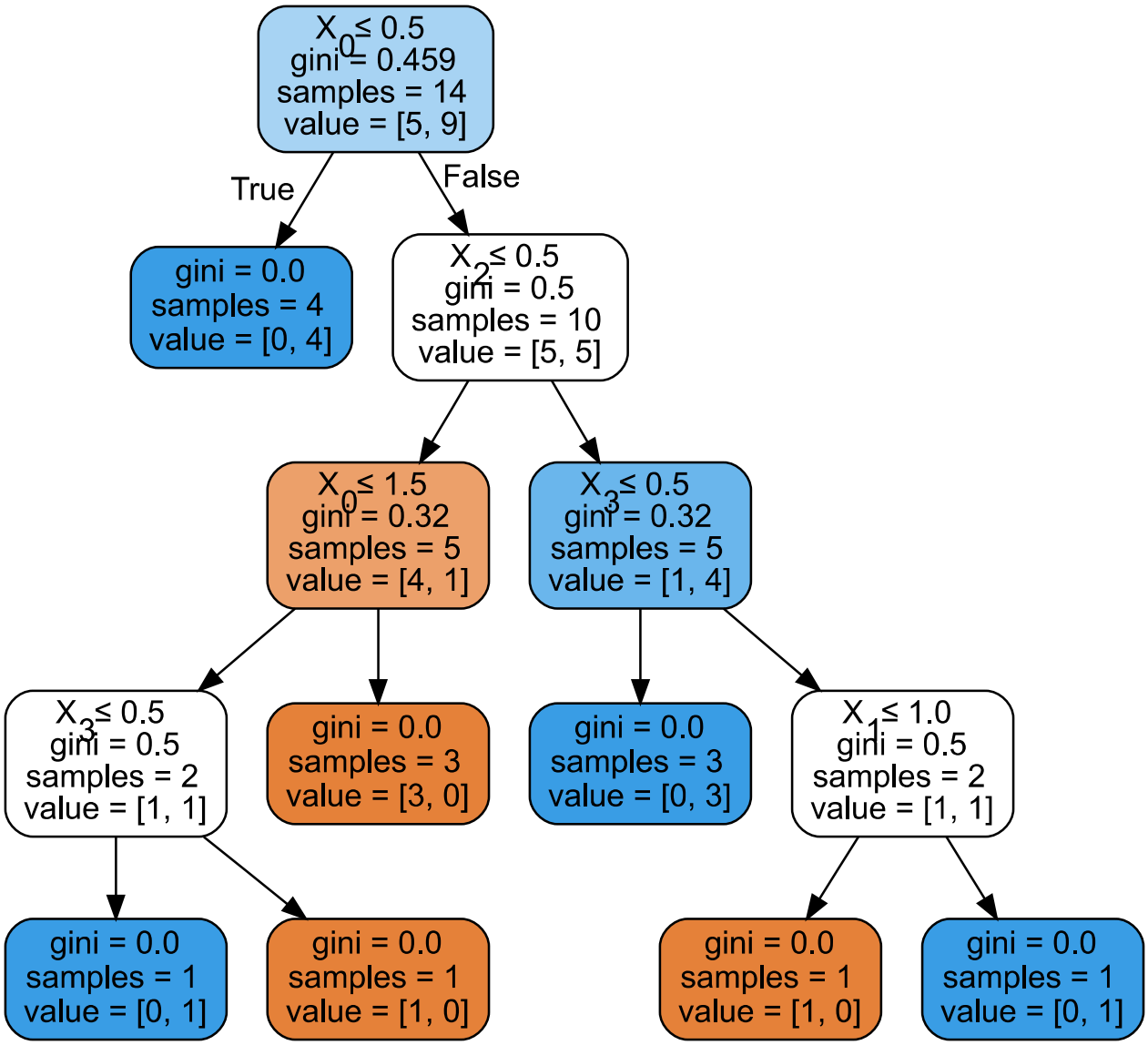


In [54]:
```
import os
```

```
os.environ["PATH"] += os.pathsep + 'D:/Program Files (x86)/Graphviz2.38/bin/'
import graphviz

b=tree.export_graphviz(a,out_file=None,feature_names=None,class_names=None,
                       filled=True,rounded=True,special_characters=True)
graph=graphviz.Source(b)
graph
```

Out[54]:



In [ ]:

In [ ]: