Aim: Program to implement decision trees using any standard dataset available in the public domain and find the accuracy of the algorithm.

```
import numpy as np
import pandas as pd
from sklearn import tree
```

In [2]:

```
file='loan1.csv'
df=pd.read_csv(file)
```

In [3]:

```
df.head()
```

Out[3]:

```
   Home Owner  Marital Status  Annual Income  Defaulted Borrower
0         Yes          Single            125                  No
1          No         Married            100                  No
2          No          Single             70                  No
3         Yes         Married            120                  No
4          No        Divorced             95                 Yes
```

In [4]:

```
df.shape
```

Out[4]:

```
(10, 4)
```

In [5]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 10 entries, 0 to 9
Data columns (total 4 columns):
Home Owner          10 non-null object
Marital Status      10 non-null object
Annual Income       10 non-null int64
Defaulted Borrower  10 non-null object
dtypes: int64(1), object(3)
memory usage: 448.0+ bytes
```

In [6]:

```
d={'Yes':1,'No':0}df['Home Owner']=df['Home
Owner'].map(d)df['Defaulted Borrower']=df['Defaulted
Borrower'].map(d)d1={'Single':0,'Married':1,'Divorced':2}df['Marital
Status']=df['Marital Status'].map(d1)df.head()
```

Out[6]:

```
     Home Owner  Marital Status  Annual Income  Defaulted Borrower

0             1               0            125                   0

1             0               1            100                   0

2             0               0             70                   0

3             1               1            120                   0

4             0               2             95                   1
```

In [7]:

```
df.columns
```

Out[7]:

```
Index(['Home Owner', 'Marital Status', 'Annual Income', 'Defaulted Borro
wer'], dtype='object')
```

In [8]:

```
X=df[['Home Owner', 'Marital Status', 'Annual Income']]y=df['Defaulted
Borrower']features=list(df.columns[:3])print(features)
```

```
['Home Owner', 'Marital Status', 'Annual Income']
```

In [9]:

```
model=tree.DecisionTreeClassifier(criterion='entropy',splitter='random')model=model.fit(X,y)
```

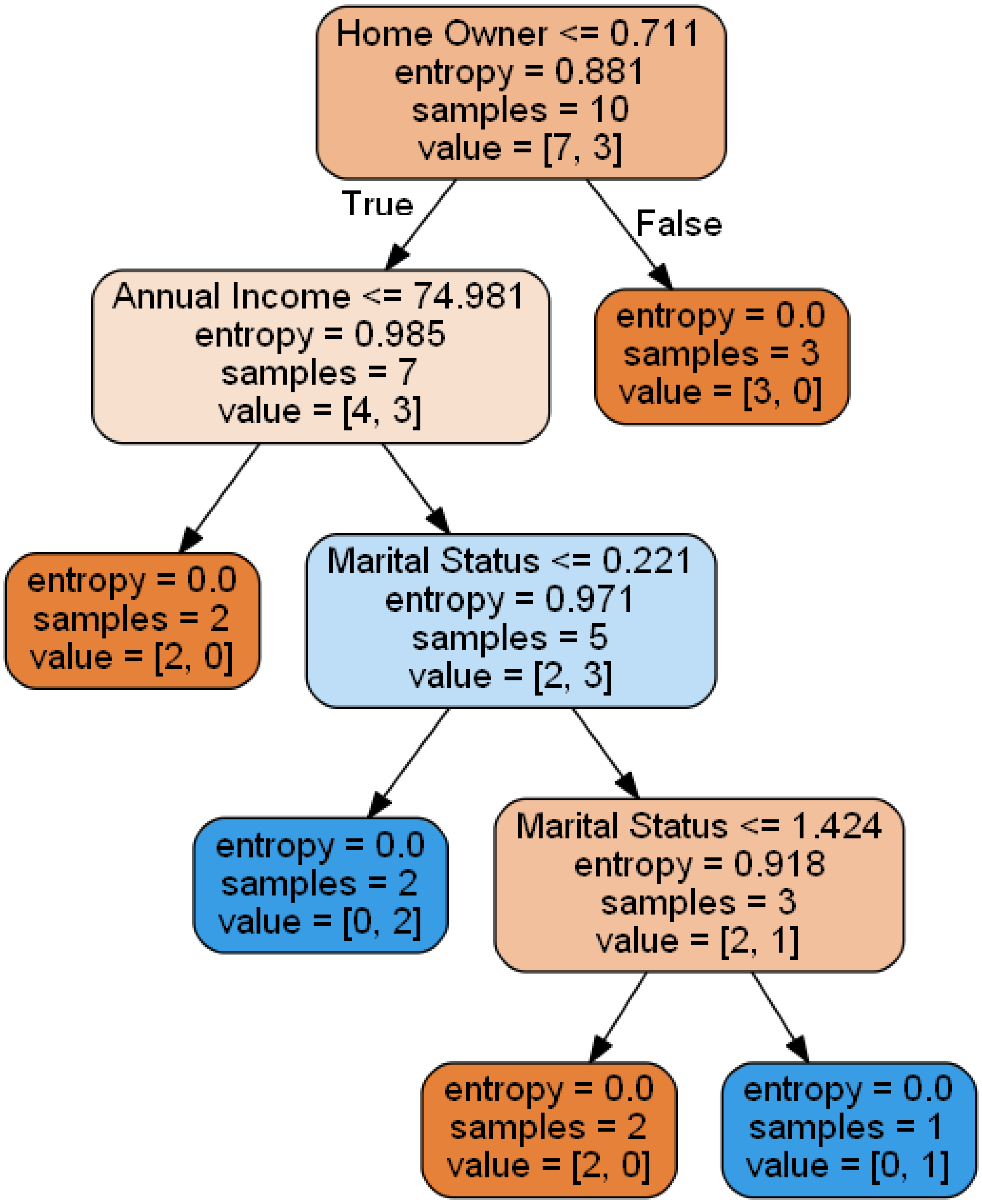
To install pydotplus

pip install pydotplus

In [10]:

```
from IPython.display import Imagefrom sklearn.externals.six import StringIOimport pydotplus



tree.export_graphviz(model,out_file=dot_data,feature_names=features,filled=True,rounded=True)


graph=pydotplus.graph_from_dot_data(dot_data.getvalue())


Image(graph.create_png())
```

Out[10]:



In [11]:

```
from sklearn.tree.export import export_text
r = export_text(model, feature_names=features)print(r)
```

```
|--- Home Owner <= 0.71
|   |--- Annual Income <= 74.98
|   |   |--- class: 0
|   |--- Annual Income >  74.98
|   |   |--- Marital Status <= 0.22
|   |   |   |--- class: 1
|   |   |--- Marital Status >  0.22
|   |   |   |--- Marital Status <= 1.42
|   |   |   |   |--- class: 0
|   |   |   |--- Marital Status >  1.42
|   |   |   |   |--- class: 1
|--- Home Owner >  0.71
|   |--- class: 0
```

In [12]:

```
df.head()
```

Out[12]:

	Home Owner	Marital Status	Annual Income	Defaulted Borrower
0	1	0	125	0
1	0	1	100	0
2	0	0	70	0
3	1	1	120	0
4	0	2	95	1

In [13]:

```
model.predict([[0,0,150]])
```

Out[13]:

```
array([1], dtype=int64)
```

In [14]:

```
model.predict([[1,1,150]])
```

Out[14]:

```
array([0], dtype=int64)
```

In [16]:

```
 model.predict([[0,2,75]])
```

Out[16]:

```
array([1], dtype=int64)
```

In [17]:

```
 model.predict([[1,0,75]])
```

Out[17]:

```
array([0], dtype=int64)
```