In [17]:
```
import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score
from sklearn import tree
import seaborn as sns
import matplotlib.pyplot as plt
```

In [18]:
```
balance_data = pd.read_csv("balance.csv")
#Returns the first 5 entries of the Dataframe -Bank
balance_data.head()
```

Out[18]:

	B	1	1.1	1.2	1.3
0	R	1	1	1	2
1	R	1	1	1	3
2	R	1	1	1	4
3	R	1	1	1	5
4	R	1	1	2	1

In [19]:
```
print ("Dataset Length:: ", len(balance_data))
print ("Dataset Shape:: ", balance_data.shape)
```

```
Dataset Length::  624
Dataset Shape::  (624, 5)
```

In [20]:
```
balance_data.head()
```

Out[20]:

	B	1	1.1	1.2	1.3
0	R	1	1	1	2
1	R	1	1	1	3
2	R	1	1	1	4
3	R	1	1	1	5
4	R	1	1	2	1

In [21]:
```
X = balance_data.values[:, 1:5]
Y = balance_data.values[:,0]
```

In [22]:
```
X_train, X_test, y_train, y_test = train_test_split( X, Y, test_size =
0.3, random_state = 100)
```

In [23]:
```
clf=DecisionTreeClassifier(criterion = 'entropy',random_state=20)
```

In [24]:

```
clf.fit(X_train,y_train)
```

Out[24]:

```
DecisionTreeClassifier(class_weight=None, criterion='entropy', max_dept
h=None,
            max_features=None, max_leaf_nodes=None,
            min_impurity_decrease=0.0, min_impurity_split=None,
            min_samples_leaf=1, min_samples_split=2,
            min_weight_fraction_leaf=0.0, presort=False, random_state=2
0,
            splitter='best')
```

In [25]:

```
predict=clf.predict(X_test)
accuracy_test=round(clf.score(X_test,y_test)*100,2)
accuracy_train=round(clf.score(X_train,y_train)*100,2)

print('Training accuracy of decision tree classifier',accuracy_train)
print('Testing accuracy of decision tree classifier',accuracy_test)
```

```
Training accuracy of decision tree classifier 100.0
Testing accuracy of decision tree classifier 78.19
```

In [26]:

```
from sklearn.metrics import accuracy_score, confusion_matrix, precision_
recall_fscore_support
cm = confusion_matrix(y_test, predict)
```

In [27]:

```
cm
```

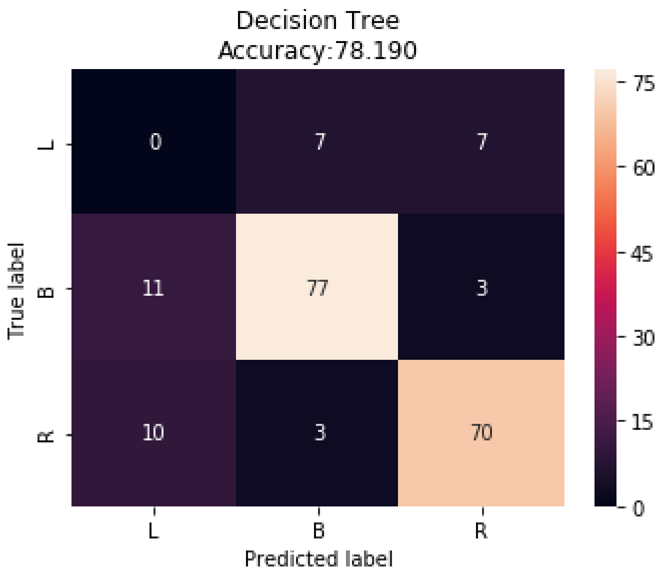
Out[27]:

```
array([[ 0,  7,  7],
       [11, 77,  3],
       [10,  3, 70]])
```

In [28]:

```
cm_df = pd.DataFrame(cm,
                     index = ['L','B','R'],
                     columns = ['L','B','R'])
```

In [29]:
```
plt.figure(figsize=(5.5,4))
sns.heatmap(cm_df, annot=True)
plt.title(' Decision Tree \nAccuracy:{0:.3f}'.format(accuracy_test))
plt.ylabel('True label')
plt.xlabel('Predicted label')
plt.show()
```



In [ ]:
```
```