```
#Prediction using Decision Tree Algorithm

#importing libraries
import sklearn.datasets as datasets
import pandas as pd

#importing data sets

iris=datasets.load_iris()

# Loading the iris dataset

iris=datasets.load_iris()

# Formatting the irisframe

X = pd.DataFrame(iris.data, columns=iris.feature_names)

X.head()

   sepal length (cm)  sepal width (cm)  petal length (cm)  petal width (cm)
0                5.1               3.5                1.4               0.2
1                4.9               3.0                1.4               0.2
2                4.7               3.2                1.3               0.2
3                4.6               3.1                1.5               0.2
4                5.0               3.6                1.4               0.2

X.tail()

     sepal length (cm)  sepal width (cm)  petal length (cm)  petal width (cm)
145                6.7               3.0                5.2               2.3
146                6.3               2.5                5.0               1.9
147                6.5               3.0                5.2               2.0
148                6.2               3.4                5.4               2.3
149                5.9               3.0                5.1               1.8

#information about the dataframe

X.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 4 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   sepal length (cm)  150 non-null    float64
 1   sepal width (cm)   150 non-null    float64
 2   petal length (cm)  150 non-null    float64
 3   petal width (cm)   150 non-null    float64
dtypes: float64(4)
memory usage: 4.8 KB
```

```
X.describe()
```

```
       sepal length (cm)  sepal width (cm)  petal length (cm)  \
count         150.000000        150.000000         150.000000   
mean            5.843333          3.057333           3.758000   
std             0.828066          0.435866           1.765298   
min             4.300000          2.000000           1.000000   
25%             5.100000          2.800000           1.600000   
50%             5.800000          3.000000           4.350000   
75%             6.400000          3.300000           5.100000   
max             7.900000          4.400000           6.900000   

       petal width (cm)  
count        150.000000  
mean           1.199333  
std            0.762238  
min            0.100000  
25%            0.300000  
50%            1.300000  
75%            1.800000  
max            2.500000  
```

```
X.isnull().sum()
```

```
sepal length (cm)    0
sepal width (cm)     0
petal length (cm)    0
petal width (cm)     0
dtype: int64
```

```
Y = iris.target
Y
```

```
array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2])
```

```
# Traning and testing our data sets.
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, Y, test_size=0.33, ran
dom_state=42)
```

```
# Performing the Decision Tree Algorithm on data sets..
from sklearn.tree import DecisionTreeClassifier
dtc = DecisionTreeClassifier()
dtc.fit(X_train,y_train)
```

```
print('Decision Tree Algo. Successfully Created')
```

```
Decision Tree Algo. Successfully Created
```

```
y_predict = dtc.predict(X_test)
```

```
# Constructing the matrix

from sklearn.metrics import confusion_matrix
confusion_matrix(y_test, y_predict)
```

```
array([[19,  0,  0],
       [ 0, 15,  0],
       [ 0,  0, 16]], dtype=int64)
```

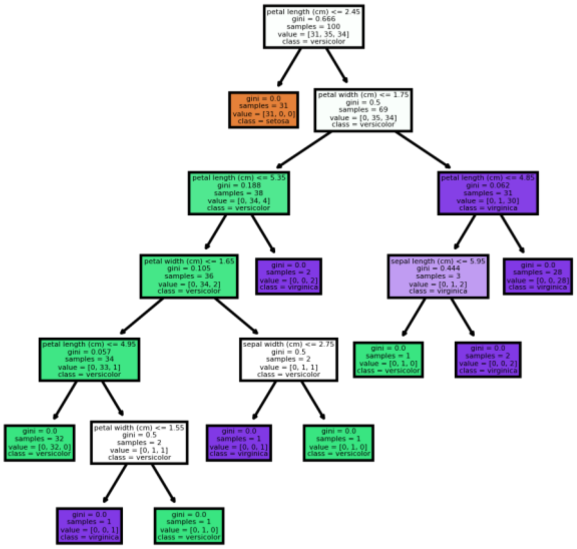
```
# visulizing the Tree

from sklearn import tree
import matplotlib.pyplot as plt

fn=['sepal length (cm)','sepal width (cm)','petal length (cm)','petal width (
cm)']
cn=['setosa','versicolor','virginica']

fig, axes = plt.subplots(nrows = 1, ncols = 1, figsize = (4,4), dpi = 300)

tree.plot_tree(dtc, feature_names = fn, class_names = cn, filled = True);
```


petal length (cm) <= 2.45
gini = 0.666
samples = 100
value = [31, 35, 34]
class = versicolor
gini = 0.0
samples = 31
value = [31, 0, 0]
class = setosa
petal width (cm) <= 1.75
gini = 0.5
samples = 69
value = [0, 35, 34]
class = versicolor
petal length (cm) <= 5.35
gini = 0.188
samples = 38
value = [0, 34, 4]
class = versicolor
petal length (cm) <= 4.85
gini = 0.062
samples = 31
value = [0, 1, 30]
class = virginica
petal width (cm) <= 1.65
gini = 0.105
samples = 36
value = [0, 34, 2]
class = versicolor
gini = 0.0
samples = 2
value = [0, 0, 2]
class = virginica
sepal length (cm) <= 5.95
gini = 0.444
samples = 3
value = [0, 1, 2]
class = virginica
gini = 0.0
samples = 28
value = [0, 0, 28]
class = virginica
petal length (cm) <= 4.95
gini = 0.057
samples = 34
value = [0, 33, 1]
class = versicolor
sepal width (cm) <= 2.75
gini = 0.5
samples = 2
value = [0, 1, 1]
class = versicolor
gini = 0.0
samples = 1
value = [0, 1, 0]
class = versicolor
gini = 0.0
samples = 2
value = [0, 0, 2]
class = virginica
gini = 0.0
samples = 32
value = [0, 32, 0]
class = versicolor
petal width (cm) <= 1.55
gini = 0.5
samples = 2
value = [0, 1, 1]
class = versicolor
gini = 0.0
samples = 1
value = [0, 0, 1]
class = virginica
gini = 0.0
samples = 1
value = [0, 1, 0]
class = versicolor
gini = 0.0
samples = 1
value = [0, 0, 1]
class = virginica
gini = 0.0
samples = 1
value = [0, 1, 0]
class = versicolor