Task-6 Prediction using Decision Tree Algorithm(Level-Intermediate)

```
import sklearn.datasets as datasets
import pandas as pd

# Loading the iris dataset
iris=datasets.load_iris()

# Forming the iris dataframe
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

```
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, 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])
```

```
X.describe()
```

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.057333	3.758000	1.199333
std	0.828066	0.435866	1.765298	0.762238
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

```
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, random_state=42)


from sklearn.tree import DecisionTreeClassifier
dtree=DecisionTreeClassifier()
dtree.fit(X_train,y_train)


print('Decision Tree Classifer Created Successfully')
```

```
Decision Tree Classifer Created Successfully
```

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

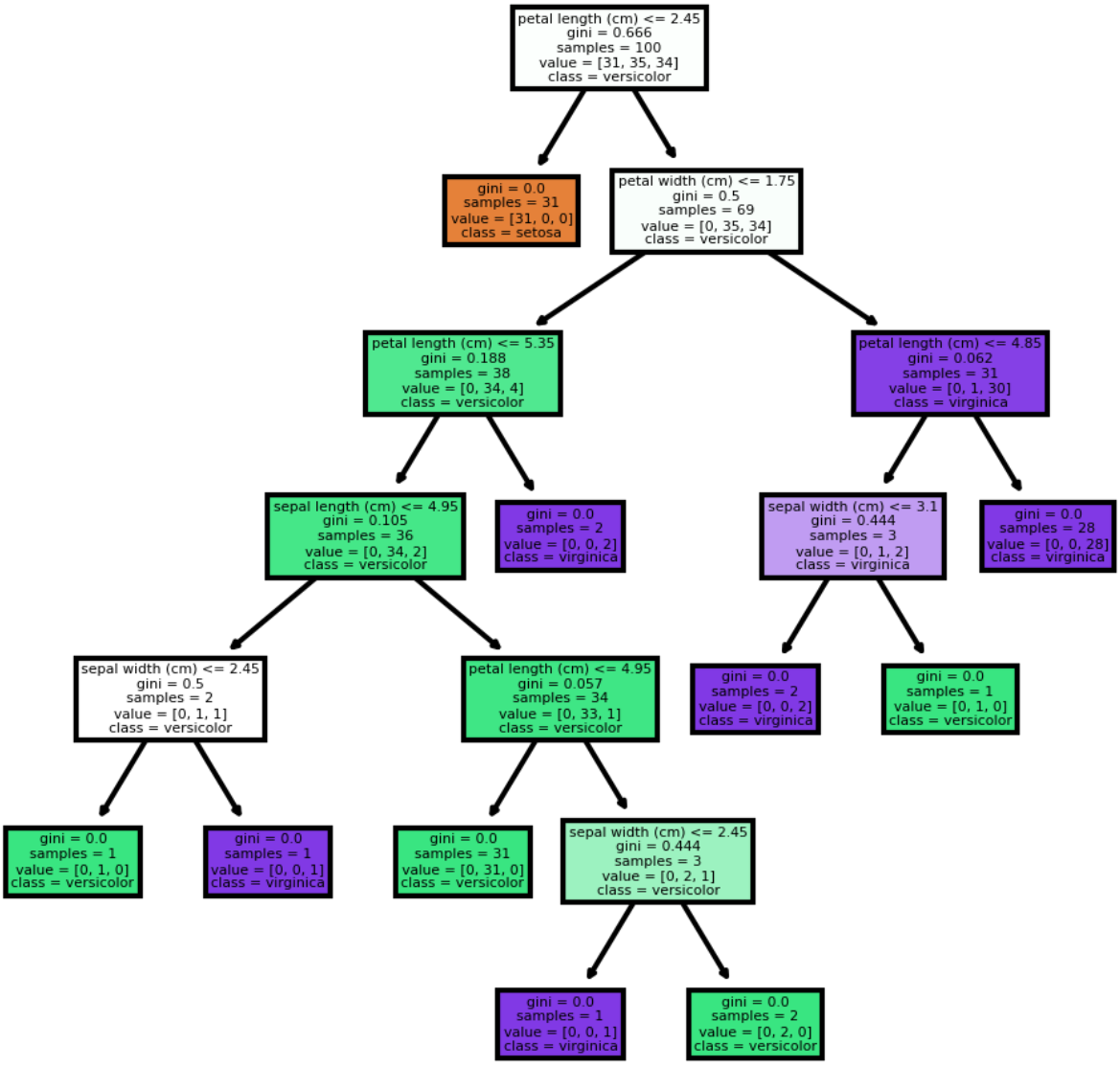
```
array([1, 0, 2, 1, 1, 0, 1, 2, 1, 1, 2, 0, 0, 0, 0, 1, 2, 1, 1, 2, 0, 2,
       0, 2, 2, 2, 2, 2, 0, 0, 0, 0, 1, 0, 0, 2, 1, 0, 0, 0, 2, 1, 1, 0,
       0, 1, 1, 2, 1, 2])
```

```
import matplotlib.pyplot as plt
from sklearn import tree


a=['sepal length (cm)','sepal width (cm)','petal length (cm)','petal width (cm)']
b=['setosa','versicolor','virginica']

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

tree.plot_tree(dtree, feature_names = a, class_names = b, 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
sepal length (cm) <= 4.95
gini = 0.105
samples = 36
value = [0, 34, 2]
class = versicolor
gini = 0.0
samples = 2
value = [0, 0, 2]
class = virginica
sepal width (cm) <= 3.1
gini = 0.444
samples = 3
value = [0, 1, 2]
class = virginica
gini = 0.0
samples = 28
value = [0, 0, 28]
class = virginica
sepal width (cm) <= 2.45
gini = 0.5
samples = 2
value = [0, 1, 1]
class = versicolor
petal length (cm) <= 4.95
gini = 0.057
samples = 34
value = [0, 33, 1]
class = versicolor
gini = 0.0
samples = 2
value = [0, 0, 2]
class = virginica
gini = 0.0
samples = 1
value = [0, 1, 0]
class = versicolor
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 = 31
value = [0, 31, 0]
class = versicolor
sepal width (cm) <= 2.45
gini = 0.444
samples = 3
value = [0, 2, 1]
class = versicolor
gini = 0.0
samples = 1
value = [0, 0, 1]
class = virginica
gini = 0.0
samples = 2
value = [0, 2, 0]
class = versicolor