In [1]:

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

In [3]:

```
df = pd.read_csv('Iris.csv')
df.head(7)
```

Out[3]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
5	6	5.4	3.9	1.7	0.4	Iris-setosa
6	7	4.6	3.4	1.4	0.3	Iris-setosa

In [4]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Id             150 non-null    int64  
 1   SepalLengthCm  150 non-null    float64
 2   SepalWidthCm   150 non-null    float64
 3   PetalLengthCm  150 non-null    float64
 4   PetalWidthCm   150 non-null    float64
 5   Species        150 non-null    object 
dtypes: float64(4), int64(1), object(1)
memory usage: 7.2+ KB
```

In [6]:

```
y = df['Species']
x = df.copy()
x = x.drop('Species', axis =1)
y
```

Out[6]:

```
0         Iris-setosa
1         Iris-setosa
2         Iris-setosa
3         Iris-setosa
4         Iris-setosa
            ...      
145    Iris-virginica
146    Iris-virginica
147    Iris-virginica
148    Iris-virginica
```

```
149    Iris-virginica
Name: Species, Length: 150, dtype: object
```

In [7]:

```
#label encoding
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
y = le.fit_transform(y)
y
```

Out[7]:

```
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])
```

In [8]:

```
# Splitting the dataset to Train and test
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(x, y, test_size = 0.2, random_state
print("Training split input- ", X_train.shape)
print("Testing split input- ", X_test.shape)
```

```
Training split input-  (120, 5)
Testing split input-  (30, 5)
```

In [9]:

```
#Create DecisionTreeClassifier
from sklearn.tree import DecisionTreeClassifier
dtree=DecisionTreeClassifier(criterion="entropy", max_depth=3)
dtree.fit(X_train,y_train)
print('Decision Tree Classifier Created')
```

```
Decision Tree Classifier Created
```

In [10]:

```
#Testing the model using X_test and storing the output in y_pred
y_pred = dtree.predict(X_test)
```

In [11]:

```
from sklearn import metrics
print("ID3 model accuracy:", metrics.accuracy_score(y_test, y_pred))
```

```
ID3 model accuracy: 1.0
```

In [12]:

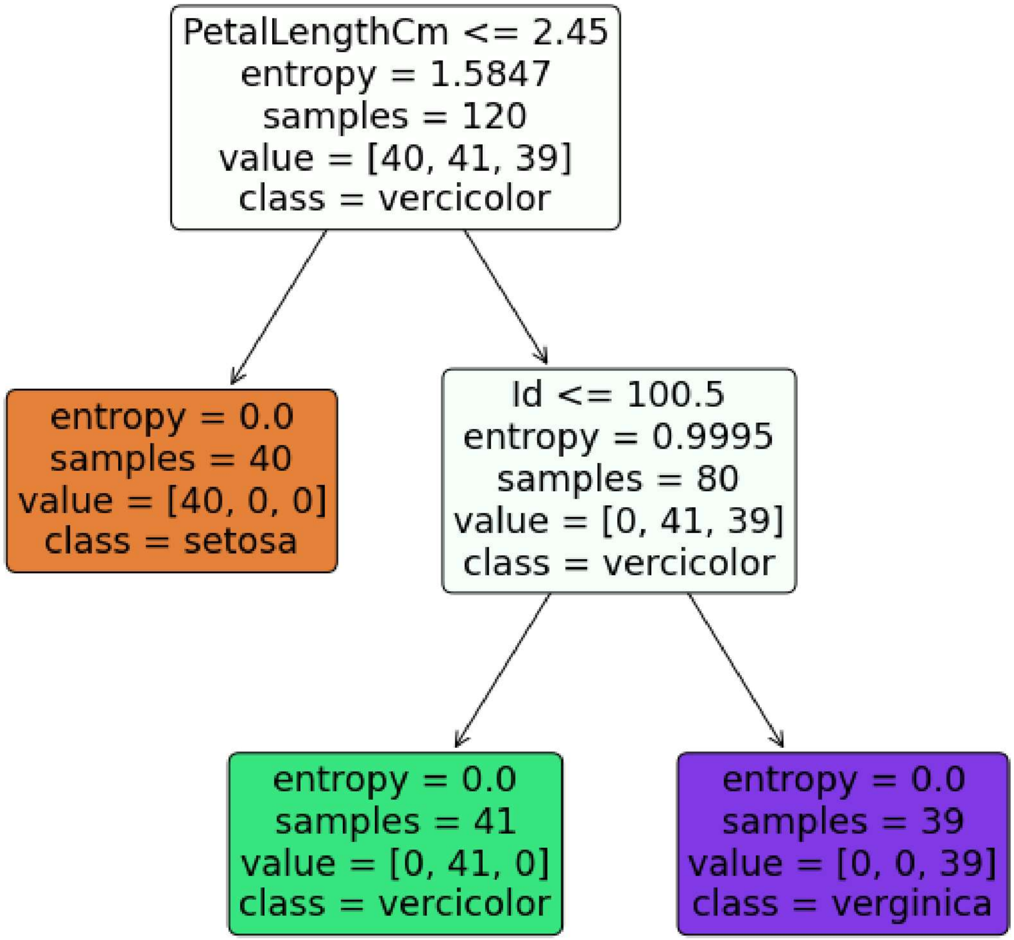
```
# Creating  a confusion matrix,which compares the y_test and y_pred
from sklearn.metrics import confusion_matrix
confusion_matrix(y_test, y_pred)
```

Out[12]:

```
array([[10,  0,  0],
       [ 0,  9,  0],
       [ 0,  0, 11]], dtype=int64)
```

In [13]:

```
# Visualising the graph, matplotlib - allows us to produce figure of the tree, plot the
import matplotlib.pyplot as plt
from sklearn.tree import plot_tree
plt.figure(figsize = (10,10))
dec_tree = plot_tree(decision_tree=dtree, feature_names = df.columns,
                          class_names =["setosa", "vercicolor", "verginica"] , filled = True
```



```
In [ ]:
```