EX NO: 7
DATE:

A PYTHON PROGRAM TO IMPLEMENT DECISION TREE

AIM:

To implement a decision tree using a python program for the given dataset and plot the trained decision tree.

PROGRAM:

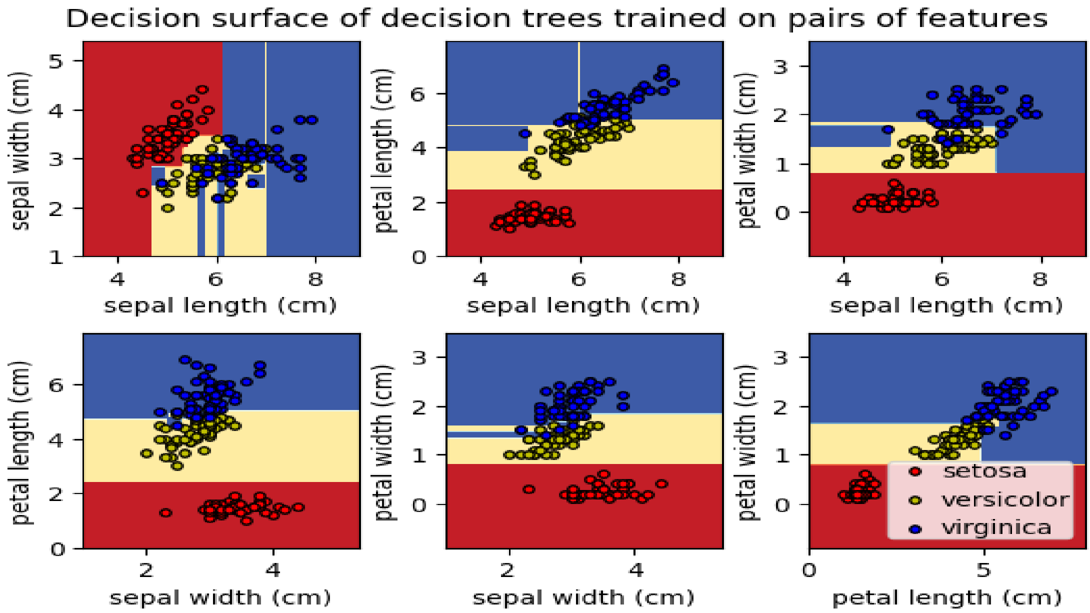
```
from sklearn.datasets import load_iris
iris = load_iris()
import numpy as np
import matplotlib.pyplot as plt
from sklearn.tree import DecisionTreeClassifier

# Parameters
n_classes = 3
plot_colors = "ryb"
plot_step = 0.02

for pairidx, pair in enumerate([[0, 1], [0, 2], [0, 3], [1, 2], [1, 3], [2, 3]]): # We only take the two
corresponding features
   X = iris.data[:, pair]
   y = iris.target
   # Train
   clf = DecisionTreeClassifier().fit(X, y)
   # Plot the decision boundary
   plt.subplot(2, 3, pairidx + 1)
   x_min, x_max = X[:, 0].min() - 1, X[:, 0].max() + 1
   y_min, y_max = X[:, 1].min() - 1, X[:, 1].max() + 1
   xx, yy = np.meshgrid(
   np.arange(x_min, x_max, plot_step), np.arange(y_min, y_max, plot_step)
   )
   plt.tight_layout(h_pad=0.5, w_pad=0.5, pad=2.5)
   Z = clf.predict(np.c_[xx.ravel(), yy.ravel()])
   Z = Z.reshape(xx.shape)
   cs = plt.contourf(xx, yy, Z, cmap=plt.cm.RdYlBu)
   plt.xlabel(iris.feature_names[pair[0]])
   plt.ylabel(iris.feature_names[pair[1]])
   # Plot the training points
   for i, color in zip(range(n_classes), plot_colors):
      idx = np.where(y == i)
      plt.scatter(
      X[idx, 0],
      X[idx, 1], c=color,
      label=iris.target_names[i], edgecolor="black",
      s=15)
plt.suptitle("Decision surface of decision trees trained on pairs of features")
plt.legend(loc="lower right", borderpad=0, handletextpad=0)
plt.axis("tight")
from sklearn.tree import plot_tree
plt.figure()
```

```
clf = DecisionTreeClassifier().fit(iris.data,iris.target)
plot_tree(clf, filled=True)
plt.title("Decision tree trained on all the iris features")
plt.show()
```

OUTPUT:



RESULT:

Thus the python program to implement Decision Tree for the given dataset has been successfully implemented and the results have been verified and analyzed