

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier, plot_tree
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix
```

```
iris = load_iris()

X = iris.data
y = iris.target

print("Feature names:", iris.feature_names)
print("Target names:", iris.target_names)
```

```
Feature names: ['sepal length (cm)', 'sepal width (cm)', 'petal length (cm)', 'petal width (cm)']
Target names: ['setosa' 'versicolor' 'virginica']
```

```
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.2, random_state=42
)
```

```
dt = DecisionTreeClassifier(criterion="gini", max_depth=3, random_state=42)
dt.fit(X_train, y_train)

y_pred_dt = dt.predict(X_test)

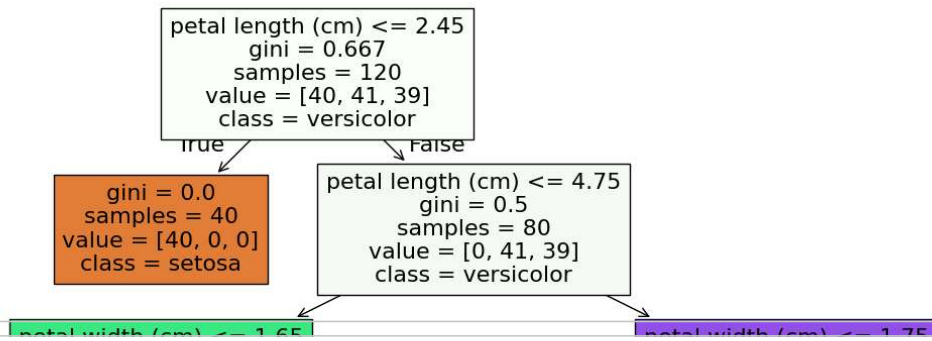
print("Decision Tree Accuracy:", accuracy_score(y_test, y_pred_dt))
print(classification_report(y_test, y_pred_dt))
```

```
Decision Tree Accuracy: 1.0
      precision    recall  f1-score   support

     0         1.00      1.00      1.00        10
     1         1.00      1.00      1.00         9
     2         1.00      1.00      1.00        11

 accuracy          1.00
macro avg          1.00      1.00      1.00        30
weighted avg          1.00      1.00      1.00        30
```

```
plt.figure(figsize=(16,8))
plot_tree(
    dt,
    feature_names=iris.feature_names,
    class_names=iris.target_names,
    filled=True
)
plt.show()
```



```

rf = RandomForestClassifier(
    n_estimators=100,
    random_state=42
)
rf.fit(X_train, y_train)

y_pred_rf = rf.predict(X_test)

print("Random Forest Accuracy:", accuracy_score(y_test, y_pred_rf))
print(classification_report(y_test, y_pred_rf))

```

```

Random Forest Accuracy: 1.0
precision    recall  f1-score   support

     0         1.00      1.00      1.00        10
     1         1.00      1.00      1.00         9
     2         1.00      1.00      1.00        11

 accuracy          1.00
 macro avg          1.00
weighted avg          1.00

```

```

print("Decision Tree Accuracy:", accuracy_score(y_test, y_pred_dt))
print("Random Forest Accuracy:", accuracy_score(y_test, y_pred_rf))

```

```

Decision Tree Accuracy: 1.0
Random Forest Accuracy: 1.0

```