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ROLL NO: 08

PRACTICAL: 6

```
import pandas as pd
from sklearn.datasets import load_wine
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score, classification_report,
confusion_matrix
from sklearn import tree
import matplotlib.pyplot as plt

# Load the Wine dataset
wine = load_wine()
X = wine.data
y = wine.target

# Split the data into training and testing sets (80% training, 20%
testing)
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

# Instantiate the Decision Tree classifier
classifier = DecisionTreeClassifier()

# Train the classifier on the training set
classifier.fit(X_train, y_train)

# Make predictions on the testing set
y_pred = classifier.predict(X_test)

# Evaluate the classifier
accuracy = accuracy_score(y_test, y_pred)
conf_matrix = confusion_matrix(y_test, y_pred)
classification_rep = classification_report(y_test, y_pred)

# Display the results
print(f"Wine Dataset - Accuracy: {accuracy:.4f}")
print("\nConfusion Matrix:\n", conf_matrix)
print("\nClassification Report:\n", classification_rep)
```

```
# Visualize the decision tree
plt.figure(figsize=(16, 10))
tree.plot_tree(classifier, feature_names=wine.feature_names,
class_names=wine.target_names,
               filled=True)
plt.title("Decision Tree Visualization - Wine Dataset")
plt.show()
```

```
Wine Dataset - Accuracy: 0.9444

Confusion Matrix:
 [[13  1  0]
 [ 0 14  0]
 [ 0  1  7]]

Classification Report:
              precision    recall  f1-score   support

           0       1.00      0.93      0.96        14
           1       0.88      1.00      0.93        14
           2       1.00      0.88      0.93         8

    accuracy                           0.94        36
   macro avg       0.96      0.93      0.94        36
weighted avg       0.95      0.94      0.94        36
```