Implement Decision Tree in Python

Step 1: Install Required Library (If you don't have this library write the command in command prompt otherwise skip this step)

If you haven't installed scikit-learn, install it using:

```
pip install scikit-learn
```

Step 2: Import Required Libraries

```
from sklearn.tree import DecisionTreeClassifier
from sklearn import datasets
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
```

- DecisionTreeClassifier: Creates the decision tree model.
- datasets: Provides sample datasets.
- train_test_split: Splits data into training and testing.
- accuracy_score: Measures how good the model is.

Step 3: Load Dataset

```
iris = datasets.load_iris()
X = iris.data  # Features (flower measurements)
y = iris.target  # Labels (flower species)
```

- We use the **Iris dataset**, which contains measurements of different flowers.
- X stores the features (size, petal length, etc.).
- y stores the target class (flower species).

Step 4: Split Data into Training and Testing

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

- 80% of the data is used for training.
- 20% is used for testing.

Step 5: Create and Train the Model

```
model = DecisionTreeClassifier()
model.fit(X_train, y_train)
```

- Creates a Decision Tree model.
- Trains it using the training data.

Step 6: Make Predictions

```
y_pred = model.predict(X_test)
```

- The model predicts the species for the test data.

Step 7: Check Accuracy

```
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)
```

- Compares predictions with actual labels.
- Prints accuracy (how many predictions were correct).

Full Code Together

```
from sklearn.tree import DecisionTreeClassifier
from sklearn import datasets
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
```

```
# Load dataset
iris = datasets.load_iris()
X, y = iris.data, iris.target

# Split dataset
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Create and train model
model = DecisionTreeClassifier()
model.fit(X_train, y_train)

# Make predictions
y_pred = model.predict(X_test)

# Calculate accuracy
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)
```

Simplest Explanation of Steps

1. Load **Iris dataset** (flower data).
2. Split the data into **training (80%) and testing (20%)**.
3. Create a **Decision Tree model**.
4. Train the model using training data.
5. Make predictions using test data.
6. Check how accurate the model is.