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Task :

1. **Create model for given dataset using decision tree classification algorithm?**

Answer :

Implementation of Decision tree Agorithm

In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

In [2]:
```
path = "https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data"
```

In [3]:
```
headernames = ['sepal-length', 'sepal-width', 'petal-length', 'petal-width', 'Class']
```

In [4]:
```
dataset = pd.read_csv(path, names = headernames)
dataset.head()
```

Out[4]:

	sepal-length	sepal-width	petal-length	petal-width	Class
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [5]:
```
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, 4].values
```

In [6]:
```
!pip install scikit-learn
```

```
Requirement already satisfied: scikit-learn in c:\users\12-10-2021\anaconda3\lib\site-packages (1.0.2)
Requirement already satisfied: scipy>=1.1.0 in c:\users\12-10-2021\anaconda3\lib\site-packages (from scikit-learn) (1.9.1)
Requirement already satisfied: joblib>=0.11 in c:\users\12-10-2021\anaconda3\lib\site-packages (from scikit-learn) (1.1.0)
Requirement already satisfied: numpy>=1.14.6 in c:\users\12-10-2021\anaconda3\lib\site-packages (from scikit-learn) (1.21.5)
Requirement already satisfied: threadpoolctl>=2.0.0 in c:\users\12-10-2021\anaconda3\lib\site-packages (from scikit-learn) (2.
2.0)
```

In [7]:
```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.40)
```

In [8]:
```
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
scaler.fit(X_train)
X_train = scaler.transform(X_train)
X_test = scaler.transform(X_test)
```

In [9]:
```
from sklearn.tree import DecisionTreeClassifier
classifier= DecisionTreeClassifier(criterion='entropy', random_state=0)
classifier.fit(X_train, y_train)
```

Out[9]:
```
DecisionTreeClassifier(criterion='entropy', random_state=0)
```

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In [10]:
```
y_pred= classifier.predict(X_test)
```

In [11]:
```
from sklearn.metrics import classification_report , confusion_matrix, accuracy_score
result= confusion_matrix(y_test, y_pred)
print("Confusion Matrix:")
print(result)
```

```
Confusion Matrix:
[[19  0  0]
 [ 0 17  2]
 [ 0  3 19]]
```

In [12]:
```
result1 = classification_report(y_test, y_pred)
print("Classification Report:",)
print (result1)
```

```
Classification Report:
                 precision    recall  f1-score   support

    Iris-setosa       1.00      1.00      1.00        19
Iris-versicolor       0.85      0.89      0.87        19
 Iris-virginica       0.90      0.86      0.88        22

       accuracy                           0.92        60
      macro avg       0.92      0.92      0.92        60
   weighted avg       0.92      0.92      0.92        60
```

In [13]:
```
result2 = accuracy_score(y_test,y_pred)
print("Accuracy:",result2)
```

```
Accuracy: 0.9166666666666666
```