**PROGRAM 8 :**

Develop a program to demonstrate the working of the decision tree algorithm. Use Breast Cancer Data set for building the decision tree and apply this knowledge to classify a new sample.

# Importing necessary libraries

import numpy as np

import matplotlib.pyplot as plt

from sklearn.datasets import load\_breast\_cancer

from sklearn.model\_selection import train\_test\_split

from sklearn.tree import DecisionTreeClassifier

from sklearn.metrics import accuracy\_score

from sklearn import tree

data = load\_breast\_cancer()

X = data.data

y = data.target

X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=42)

clf = DecisionTreeClassifier(random\_state=42)

clf.fit(X\_train, y\_train)

y\_pred = clf.predict(X\_test)

accuracy = accuracy\_score(y\_test, y\_pred)

print(f"Model Accuracy: {accuracy \* 100:.2f}%")

new\_sample = np.array([X\_test[0]])

prediction = clf.predict(new\_sample)

prediction\_class = "Benign" if prediction == 1 else "Malignant"

print(f"Predicted Class for the new sample: {prediction\_class}")

plt.figure(figsize=(12,8))

tree.plot\_tree(clf, filled=True, feature\_names=data.feature\_names, class\_names=data.target\_names)

plt.title("Decision Tree - Breast Cancer Dataset")

plt.show()

