NAVODAYA INSTITUTE OF TECHNOLOGY

MACHINE LEARNING LAB (BCSL606)

Program 8

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.

PROGRAM:

```
# 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()
```

OUTPUT: