Experiment No: 06

Code:

```
# Import libraries

import sys

import matplotlib

matplotlib.use('Agg')

import pandas as pd

from sklearn import tree

from sklearn.tree import DecisionTreeClassifier

import matplotlib.pyplot as plt


# Load the data

df =
pd.read_csv(r"D:\[Current_Learning]\TY_NOTES\ML\Practical\Exp_No_06\Experiment6.cs
v")


# Map categorical variables to numerical values

nationality_map = {'UK': 1, 'USA': 0, 'N': 2}

df['Nationality'] = df['Nationality'].map(nationality_map)

go_map = {'YES': 1, 'NO': 0}

df['Go'] = df['Go'].map(go_map)


# Define all possible feature pairs to explore

feature_combinations = [

    ['Age', 'Experience'],

    ['Age', 'Rank'],
```
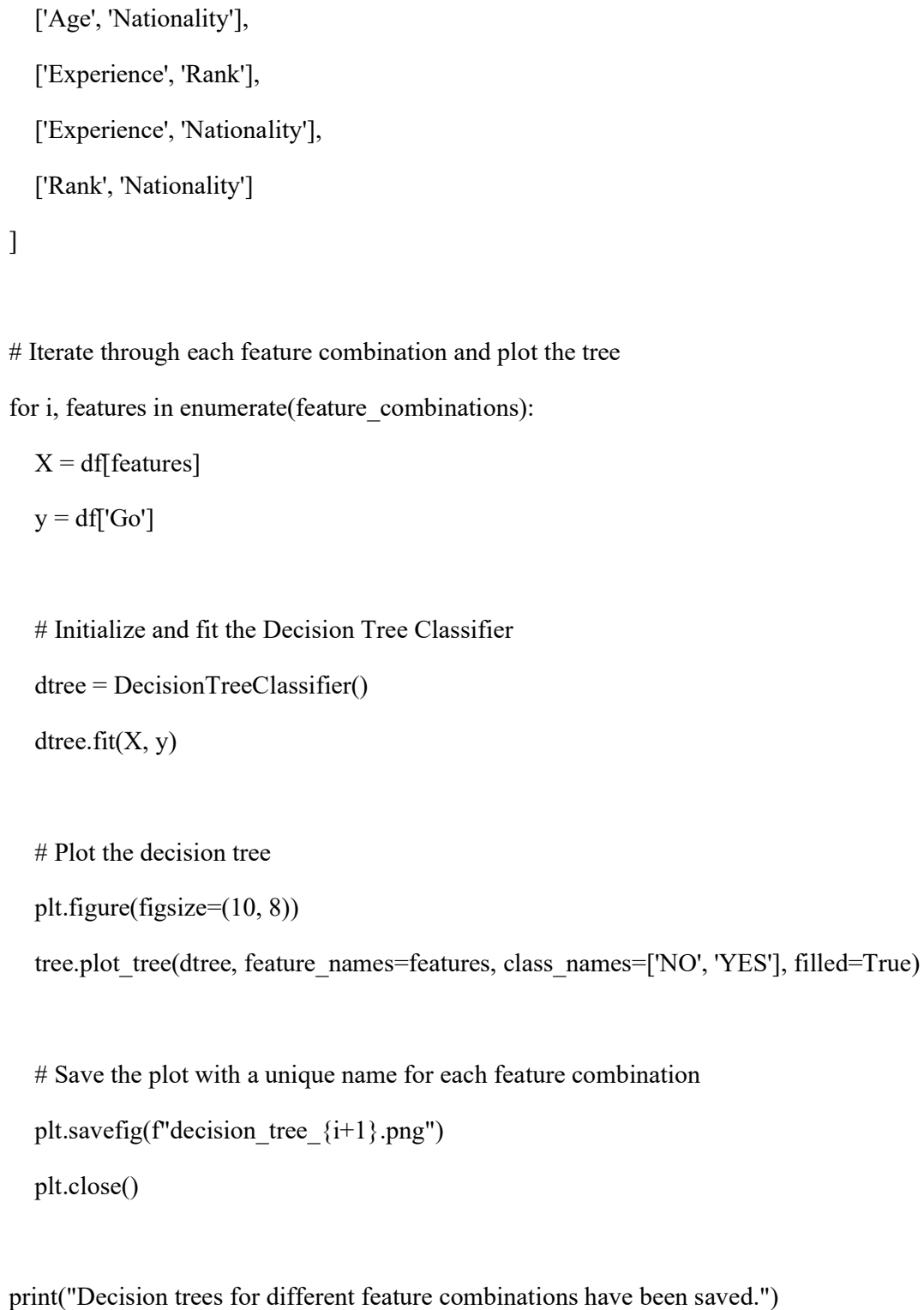

```python
    ['Age', 'Nationality'],

    ['Experience', 'Rank'],

    ['Experience', 'Nationality'],

    ['Rank', 'Nationality']

]


# Iterate through each feature combination and plot the tree

for i, features in enumerate(feature_combinations):

    X = df[features]

    y = df['Go']


    # Initialize and fit the Decision Tree Classifier

    dtree = DecisionTreeClassifier()

    dtree.fit(X, y)


    # Plot the decision tree

    plt.figure(figsize=(10, 8))

    tree.plot_tree(dtree, feature_names=features, class_names=['NO', 'YES'], filled=True)


    # Save the plot with a unique name for each feature combination

    plt.savefig(f"decision_tree_{i+1}.png")

    plt.close()


print("Decision trees for different feature combinations have been saved.")
```

Output:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

Microsoft Windows [Version 10.0.26100.2314]
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D:\Current_Learning\TY_NOTES\ML\Practical>python -u "d:\Current_Learning\TY_NOTES\ML\Practical\Exp_No_06\ML_06_01.py
Decision trees for different feature combinations have been saved.

D:\Current_Learning\TY_NOTES\ML\Practical>
```