TASK 2 : PREDICTIVE ANALYSIS USING MACHINE LEARNING

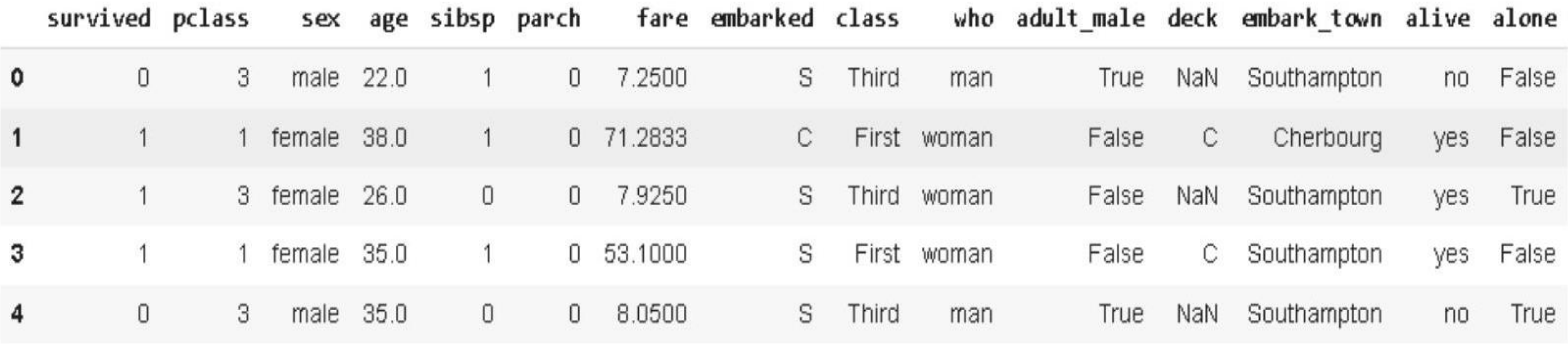
Step 1: Import Libraries

```
import pandas as pd

import numpy as np

import seaborn as sns

import matplotlib.pyplot as plt


from sklearn.model_selection import train_test_split

from sklearn.linear_model import LogisticRegression

from sklearn.metrics import accuracy_score, classification_report, confusion_matrix
```

Step 2: Load Dataset

```
# Load Titanic dataset

df = sns.load_dataset('titanic')

df.head()
```

OUTPUT:

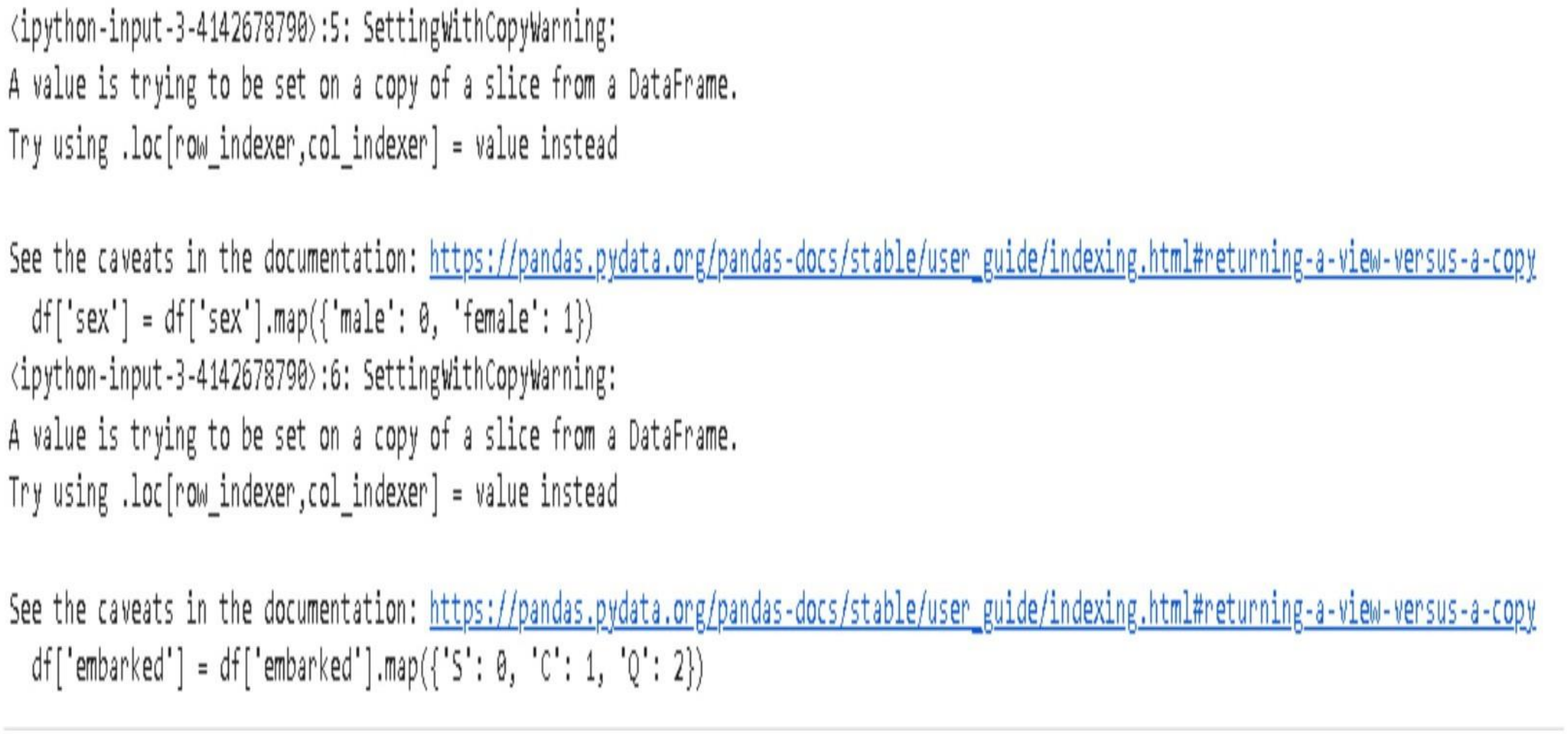


```
   survived  pclass     sex   age  sibsp  parch     fare  embarked  class    who  adult_male  deck  embark_town  alive  alone
0         0       3    male  22.0      1      0   7.2500         S  Third    man        True   NaN  Southampton     no  False
1         1       1  female  38.0      1      0  71.2833         C  First  woman       False     C    Cherbourg    yes  False
2         1       3  female  26.0      0      0   7.9250         S  Third  woman       False   NaN  Southampton    yes   True
3         1       1  female  35.0      1      0  53.1000         S  First  woman       False     C  Southampton    yes  False
4         0       3    male  35.0      0      0   8.0500         S  Third    man        True   NaN  Southampton     no   True
```

Step 3: Data Preprocessing

```
# Drop rows with missing values

df = df.dropna(subset=['age', 'embarked', 'fare'])

# Encode categorical variables
df['sex'] = df['sex'].map({'male': 0, 'female': 1})
df['embarked'] = df['embarked'].map({'S': 0, 'C': 1, 'Q': 2})

# Select features and target
features = ['pclass', 'sex', 'age', 'fare', 'embarked']
X = df[features]
y = df['survived']
```

OUTPUT:



```
<ipython-input-3-4142678790>:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  df['sex'] = df['sex'].map({'male': 0, 'female': 1})
<ipython-input-3-4142678790>:6: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  df['embarked'] = df['embarked'].map({'S': 0, 'C': 1, 'Q': 2})
```

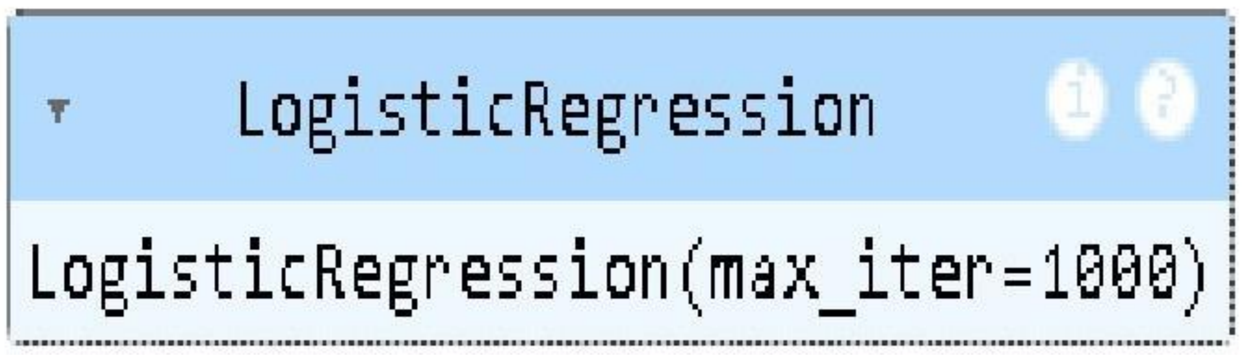
Step 4: Split Data

```
# Split into training and testing

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

Step 5: Build and Train Model

```
# Initialize and train model

model = LogisticRegression(max_iter=1000)

model.fit(X_train, y_train)
```

OUTPUT:

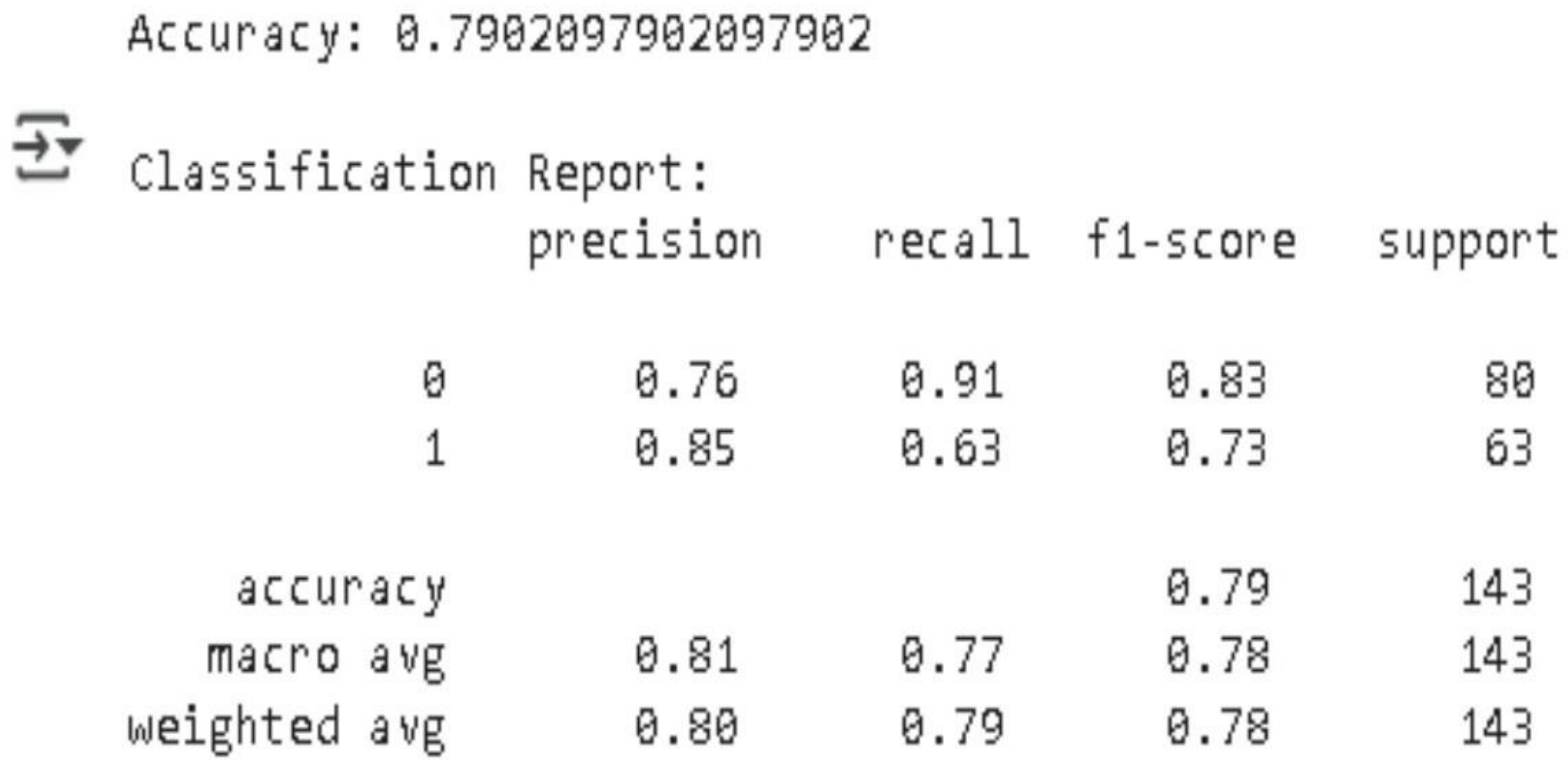


```
LogisticRegression(max_iter=1000)
```

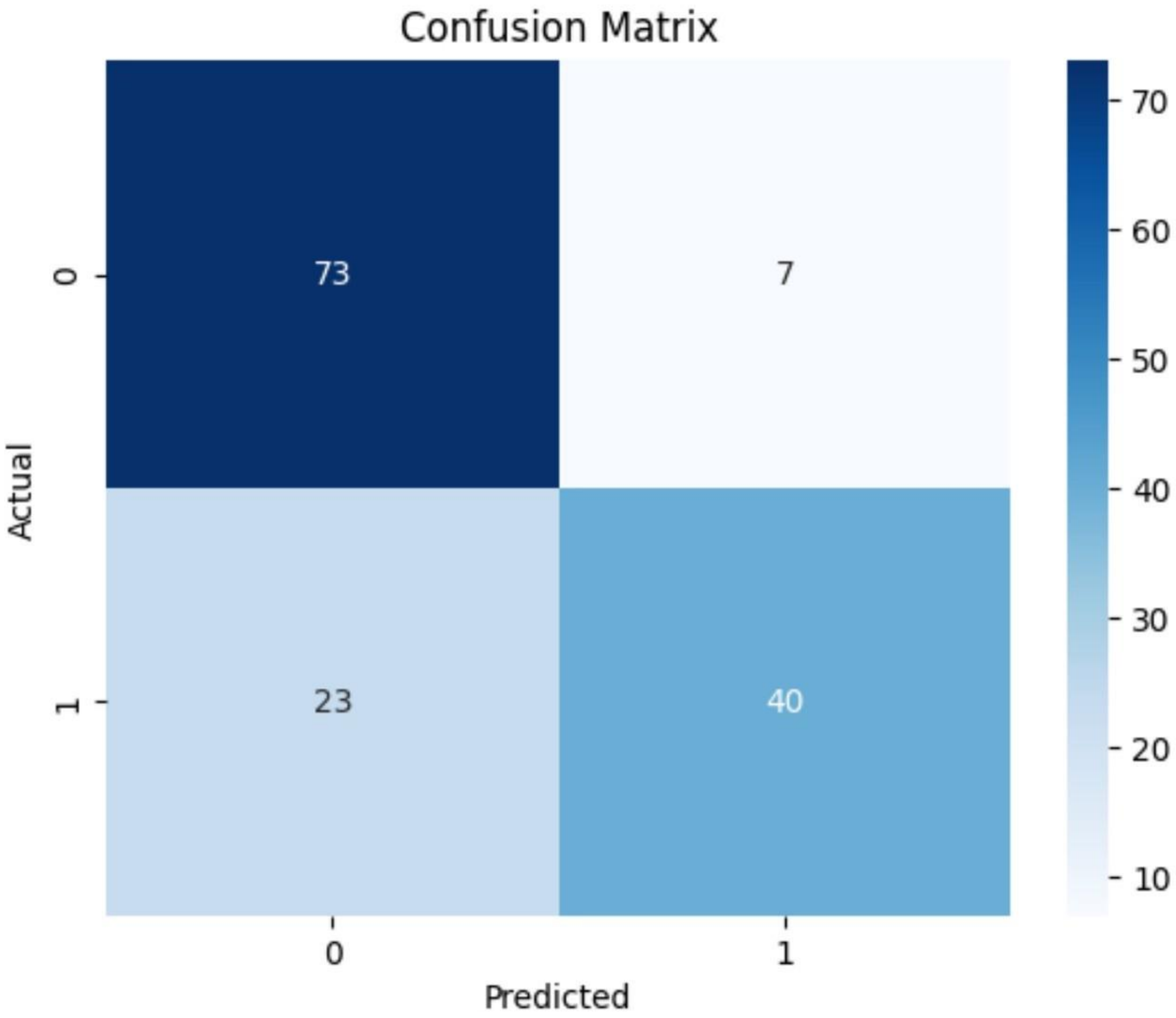
Step 6: Evaluate Model

```
# Make predictions

y_pred = model.predict(X_test)

# Evaluation metrics

print("Accuracy:", accuracy_score(y_test, y_pred))
print("\nClassification Report:\n", classification_report(y_test, y_pred))

# Confusion Matrix

sns.heatmap(confusion_matrix(y_test, y_pred), annot=True, fmt="d",
cmap="Blues")
plt.title("Confusion Matrix")
plt.xlabel("Predicted")
plt.ylabel("Actual")
plt.show()
```

OUTPUT:



```
Accuracy: 0.7902097902097902

Classification Report:
              precision    recall  f1-score   support

           0       0.76      0.91      0.83        80
           1       0.85      0.63      0.73        63

    accuracy                           0.79       143
   macro avg       0.81      0.77      0.78       143
weighted avg       0.80      0.79      0.78       143
```


Confusion Matrix
Actual
Predicted