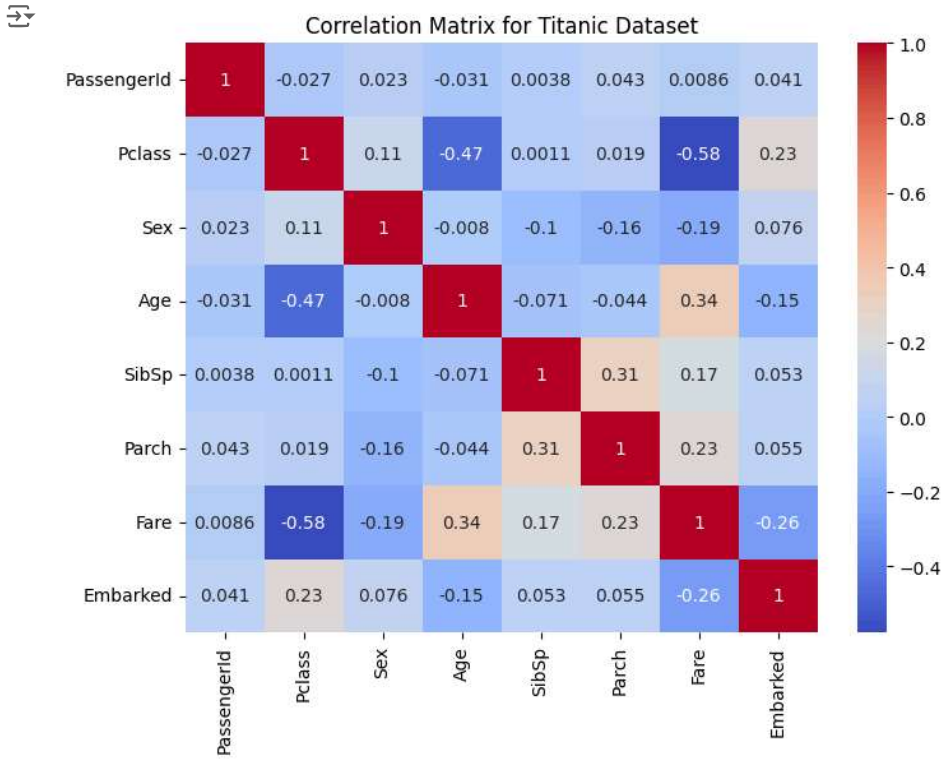
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler, LabelEncoder
from sklearn.metrics import accuracy_score, precision_score, recall_score, f1_score, roc_auc_score, confusion_matrix, classification_report

# Loading the Titanic dataset
df = pd.read_csv('titanic.csv')

# Handling missing values
df['Age'] = df['Age'].fillna(df['Age'].median())
df['Fare'] = df['Fare'].fillna(df['Fare'].median())
df['Embarked'] = df['Embarked'].fillna(df['Embarked'].mode()[0])
df.drop(columns=['Cabin'], inplace=True)

# Encoding categorical features
le = LabelEncoder()
df['Sex'] = le.fit_transform(df['Sex'])
df['Embarked'] = le.fit_transform(df['Embarked'])

df_rel = df.drop(columns=['Name', 'Ticket', 'Survived'])
correlation_matrix = df_rel.corr()
# Visualizing the correlation matrix
plt.figure(figsize=(8,6))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm')
plt.title("Correlation Matrix for Titanic Dataset")
plt.show()
```




```
# Selecting features and target
features = ['Pclass', 'Sex', 'Age', 'SibSp', 'Parch', 'Fare', 'Embarked']
X = df[features]
y = df['Survived']
# Splitting the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
# Standardizing the features
scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)
```

```
# Training a logistic regression model
model = LogisticRegression()
model.fit(X_train_scaled, y_train)
# Making predictions
y_pred = model.predict(X_test_scaled)
y_pred_proba = model.predict_proba(X_test_scaled)[:, 1]
# Evaluating the model
accuracy = accuracy_score(y_test, y_pred)
precision = precision_score(y_test, y_pred)
recall = recall_score(y_test, y_pred)
f1 = f1_score(y_test, y_pred)
roc_auc = roc_auc_score(y_test, y_pred_proba)

# Evaluation metrics
print(f'Accuracy: {accuracy:.2f}')
print(f'Precision: {precision:.2f}')
print(f'Recall: {recall:.2f}')
print(f'F1 Score: {f1:.2f}')
print(f'ROC AUC Score: {roc_auc:.2f}')

# Classification report
print('\nClassification Report:')
print(classification_report(y_test, y_pred))

# Confusion matrix

conf_matrix = confusion_matrix(y_test, y_pred)
plt.figure(figsize=(6,4))
sns.heatmap(conf_matrix, annot=True, fmt='d', cmap='Blues', xticklabels=['Not Survived', 'Survived'], yticklabels=['Not Survived', 'Survived'
plt.xlabel('Predicted')
plt.ylabel('Actual')
plt.title('Confusion Matrix')
plt.show()
```

```
Accuracy: 1.00
Precision: 1.00
Recall: 1.00
F1 Score: 1.00
ROC AUC Score: 1.00

Classification Report:
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        50
           1       1.00      1.00      1.00        34

    accuracy                           1.00        84
   macro avg       1.00      1.00      1.00        84
weighted avg       1.00      1.00      1.00        84
```