```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.impute import SimpleImputer
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, confusion_matrix, classification_report
```

```
df = pd.read_csv('titanic.csv')
df
```

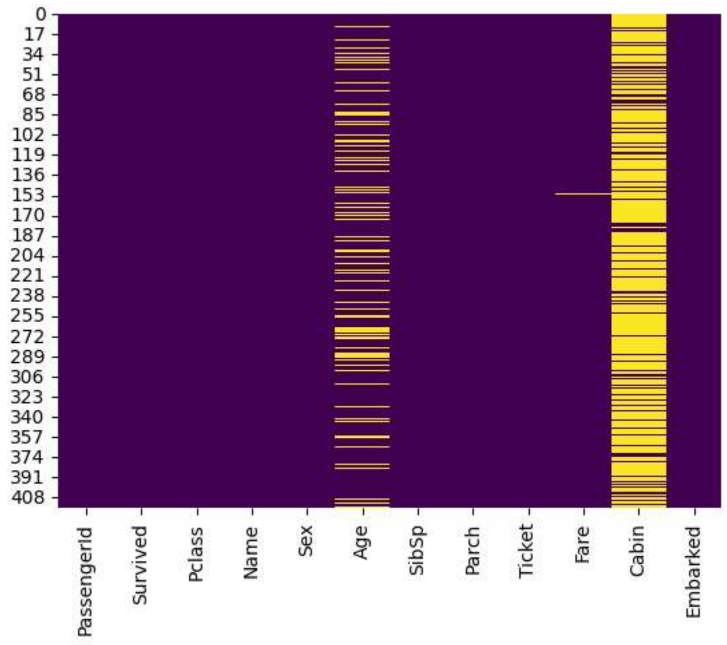
	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket
0	892	0	3	Kelly, Mr. James	male	34.5	0	0	330911
1	893	1	3	Wilkes, Mrs. James (Ellen Needs)	female	47.0	1	0	363272
2	894	0	2	Myles, Mr. Thomas Francis	male	62.0	0	0	240276
3	895	0	3	Wirz, Mr. Albert	male	27.0	0	0	315154
4	896	1	3	Hirvonen, Mrs. Alexander (Helga E	female	22.0	1	1	3101298

```
print(df.info())
print(df.describe())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 418 entries, 0 to 417
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  418 non-null    int64  
 1   Survived     418 non-null    int64  
 2   Pclass       418 non-null    int64  
 3   Name         418 non-null    object 
 4   Sex          418 non-null    object 
 5   Age          332 non-null    float64
 6   SibSp        418 non-null    int64  
 7   Parch        418 non-null    int64  
 8   Ticket       418 non-null    object 
 9   Fare         417 non-null    float64
 10  Cabin        91 non-null     object 
 11  Embarked     418 non-null    object 
dtypes: float64(2), int64(5), object(5)
memory usage: 39.3+ KB
None
       PassengerId    Survived      Pclass         Age       SibSp  \
count   418.000000  418.000000  418.000000  332.000000  418.000000   
mean   1100.500000    0.363636    2.265550   30.272590    0.447368   
std     120.810458    0.481622    0.841838   14.181209    0.896760   
min     892.000000    0.000000    1.000000    0.170000    0.000000   
25%     996.250000    0.000000    1.000000   21.000000    0.000000   
50%    1100.500000    0.000000    3.000000   27.000000    0.000000   
75%    1204.750000    1.000000    3.000000   39.000000    1.000000   
max    1309.000000    1.000000    3.000000   76.000000    8.000000   

            Parch        Fare  
count  418.000000  417.000000  
mean     0.392344   35.627188  
std      0.981429   55.907576  
min      0.000000    0.000000  
25%      0.000000    7.895800  
50%      0.000000   14.454200  
75%      0.000000   31.500000  
max      9.000000  512.329200  
```

```
sns.heatmap(df.isnull(), cbar=False, cmap='viridis')
plt.show()
```



```
df['Age'].fillna(df['Age'].median(), inplace=True)
if 'Sex' in df.columns:
    df = pd.get_dummies(df, columns=['Sex'], drop_first=True)
scaler = StandardScaler()
df[['Age', 'Fare']] = scaler.fit_transform(df[['Age', 'Fare']])
print(df.head())
```

```
   Survived  Pclass       Age  SibSp  Parch      Fare  Sex_male  Embarked_Q  \
0         0       3  0.386231      0      0 -0.497811         1           1
1         1       3  1.371370      1      0 -0.512660         0           0
2         0       2  2.553537      0      0 -0.464532         1           1
3         0       3 -0.204852      0      0 -0.482888         1           0
4         1       3 -0.598908      1      1 -0.417971         0           0

   Embarked_S
0           0
1           1
2           0
3           1
4           1
```

```
X = df.drop('Survived', axis=1)
y = df['Survived']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
X_train
```

	Pclass	Age	SibSp	Parch	Fare	Sex_male	Embarked_Q	Embarked_S
336	2	0.189203	0	0	-0.405211	1	0	1
31	2	-0.441286	2	0	-0.073910	1	0	1
84	2	-0.204852	0	0	-0.446251	1	1	0
287	1	-0.441286	1	0	0.835227	1	0	1
317	2	-0.835341	0	0	-0.449981	1	0	1
...	...	...	...	...	...	...	...	...
71	3	-0.677719	0	0	-0.496618	1	0	1
106	3	-0.677719	0	0	-0.497961	1	1	0
270	1	1.292559	0	0	0.709423	1	0	0
348	2	-0.441286	0	0	-0.396257	1	0	1
102	3	-0.204852	0	0	-0.499229	1	1	0

334 rows × 8 columns

```
y_test
```

```
321    0
324    1
388    0
56     0
153    1
      ..
57     0
126    0
24     1
17     0
66     1
Name: Survived, Length: 84, dtype: int64
```

```
from sklearn.impute import SimpleImputer
imputer = SimpleImputer(strategy='median')
X_train_imputed = imputer.fit_transform(X_train)
X_test_imputed = imputer.transform(X_test)
```

```
X_train.dropna(inplace=True)
y_train = y_train[X_train.index]

X_test.dropna(inplace=True)
y_test = y_test[X_test.index]
```

```
model = RandomForestClassifier(random_state=42)
model.fit(X_train, y_train)
y_pred = model.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
conf_matrix = confusion_matrix(y_test, y_pred)
classification_rep = classification_report(y_test, y_pred)
```

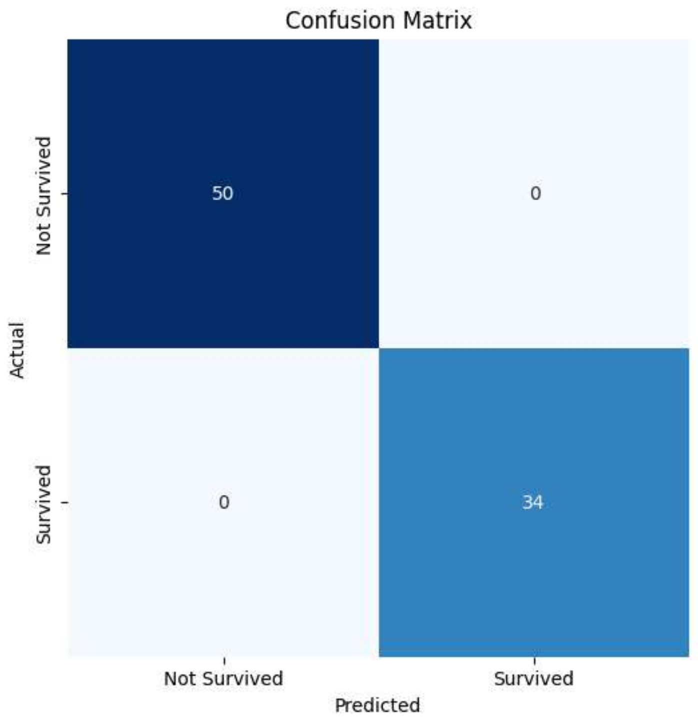
```
print(f"Accuracy: {accuracy:.2f}")
print(f"Confusion Matrix:\n{conf_matrix}")
print(f"Classification Report:\n{classification_rep}")
```

```
Accuracy: 1.00
Confusion Matrix:
[[50  0]
 [ 0 34]]
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
```

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


Confusion Matrix
Actual
Not Survived
Survived
Not Survived
Survived
Predicted