```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
import warnings
warnings.filterwarnings('ignore')
```

```
df=sns.load_dataset("titanic")
```

```
df.head()
```

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who	adul
0	0	3	male	22.0	1	0	7.2500	S	Third	man	
1	1	1	female	38.0	1	0	71.2833	C	First	woman	
2	1	3	female	26.0	0	0	7.9250	S	Third	woman	
3	1	1	female	35.0	1	0	53.1000	S	First	woman	
4	0	3	male	35.0	0	0	8.0500	S	Third	man	

```
df.shape
```

```
(891, 15)
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 15 columns):
 #   Column       Non-Null Count  Dtype   
---  ------       --------------  -----   
 0   survived     891 non-null    int64   
 1   pclass       891 non-null    int64   
 2   sex          891 non-null    object  
 3   age          714 non-null    float64 
 4   sibsp        891 non-null    int64   
 5   parch        891 non-null    int64   
 6   fare         891 non-null    float64 
 7   embarked     889 non-null    object  
 8   class        891 non-null    category
 9   who          891 non-null    object  
 10  adult_male   891 non-null    bool    
 11  deck         203 non-null    category
 12  embark_town  889 non-null    object  
 13  alive        891 non-null    object  
 14  alone        891 non-null    bool    
dtypes: bool(2), category(2), float64(2), int64(4), object(5)
memory usage: 80.7+ KB
```

```
df.isnull().sum()
```

```
survived         0
pclass           0
sex              0
age            177
sibsp            0
parch            0
fare             0
embarked         2
class            0
who              0
adult_male       0
deck           688
embark_town      2
alive            0
alone            0
dtype: int64
```

```
df.head()
```

	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

```
columns = ['alive', 'alone', 'embark_town', 'who', 'adult_male', 'deck']
data = df.drop(columns, axis=1)
```

```
data.head()
```

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class
0	0	3	male	22.0	1	0	7.2500	S	Third
1	1	1	female	38.0	1	0	71.2833	C	First
2	1	3	female	26.0	0	0	7.9250	S	Third
3	1	1	female	35.0	1	0	53.1000	S	First
4	0	3	male	35.0	0	0	8.0500	S	Third

```
data
```

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class
0	0	3	male	22.0	1	0	7.2500	S	Third
1	1	1	female	38.0	1	0	71.2833	C	First
2	1	3	female	26.0	0	0	7.9250	S	Third
3	1	1	female	35.0	1	0	53.1000	S	First
4	0	3	male	35.0	0	0	8.0500	S	Third
...	...	...	...	...	...	...	...	...	...
886	0	2	male	27.0	0	0	13.0000	S	Second
887	1	1	female	19.0	0	0	30.0000	S	First
888	0	3	female	NaN	1	2	23.4500	S	Third
889	1	1	male	26.0	0	0	30.0000	C	First
890	0	3	male	32.0	0	0	7.7500	Q	Third

891 rows × 9 columns

```
df['age'].fillna(df['age'].mean(), inplace=True)
```

```
print(df['embarked'].mode())
```

```
0    S
Name: embarked, dtype: object
```

```
print(df['embarked'].mode()[0])
```

```
df['embarked'].fillna(df['embarked'].mode()[0], inplace=True)
```

```
df.isnull().sum()
```

```
survived         0
pclass           0
sex              0
age              0
sibsp            0
parch            0
fare             0
embarked         0
class            0
who              0
adult_male       0
deck           688
embark_town      2
alive            0
alone            0
dtype: int64
```

Data Analysis

```
df.describe()
```

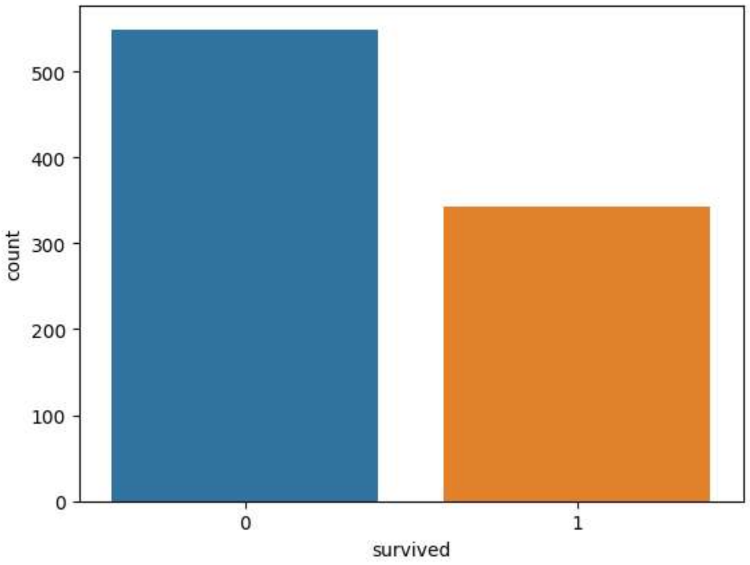
	survived	pclass	age	sibsp	parch	fare
count	891.000000	891.000000	891.000000	891.000000	891.000000	891.000000
mean	0.383838	2.308642	29.699118	0.523008	0.381594	32.204208
std	0.486592	0.836071	13.002015	1.102743	0.806057	49.693429
min	0.000000	1.000000	0.420000	0.000000	0.000000	0.000000
25%	0.000000	2.000000	22.000000	0.000000	0.000000	7.910400
50%	0.000000	3.000000	29.699118	0.000000	0.000000	14.454200
75%	1.000000	3.000000	35.000000	1.000000	0.000000	31.000000
max	1.000000	3.000000	80.000000	8.000000	6.000000	512.329200

```
df['survived'].value_counts()
```

```
0    549
1    342
Name: survived, dtype: int64
```

```
sns.countplot(x='survived', data=df)
```

```
<Axes: xlabel='survived', ylabel='count'>
```

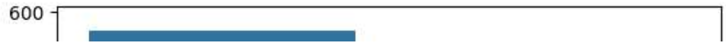


```
df['sex'].value_counts()
```

```
male      577
female    314
Name: sex, dtype: int64
```

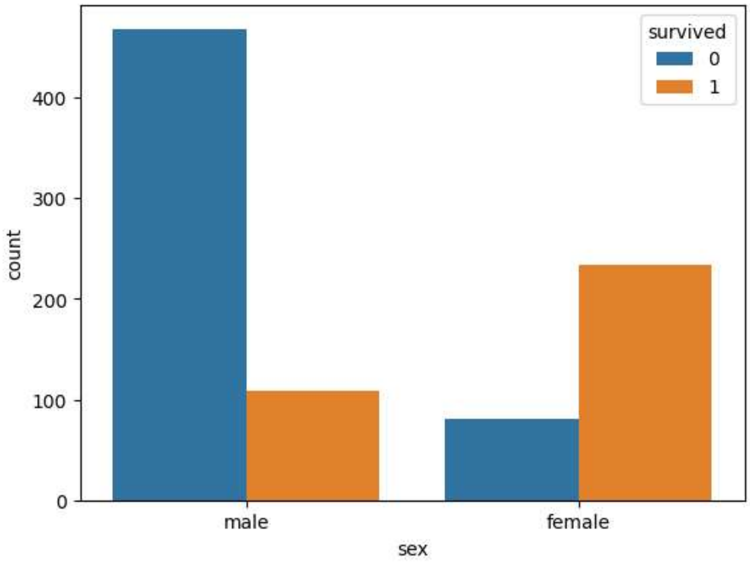
```
sns.countplot(x='sex', data=df)
```

```
<Axes: xlabel='sex', ylabel='count'>
```



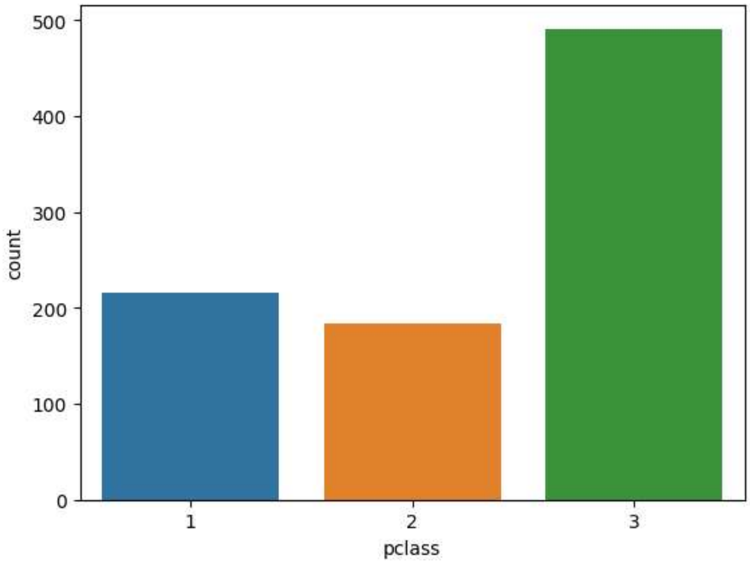
```
sns.countplot(x='sex', hue='survived', data=df)
```

```
<Axes: xlabel='sex', ylabel='count'>
```



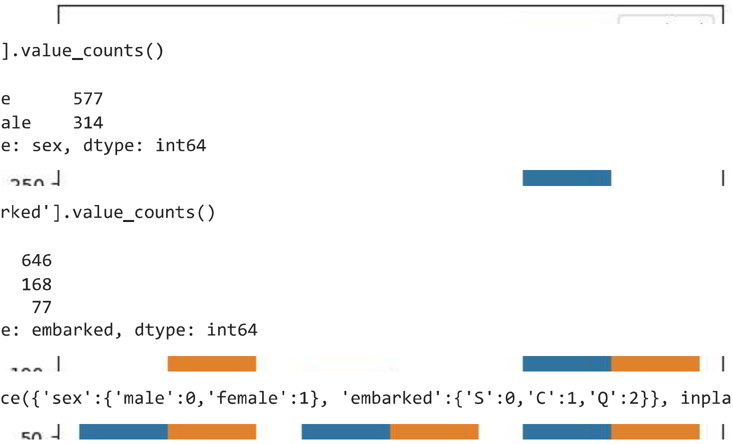
```
sns.countplot(x='pclass', data=df)
```

```
<Axes: xlabel='pclass', ylabel='count'>
```



```
sns.countplot(x='pclass', hue='survived', data=df)
```

```
<Axes: xlabel='pclass', ylabel='count'>
```



```
df['sex'].value_counts()
```

```
male      577
female    314
Name: sex, dtype: int64
```

```
df['embarked'].value_counts()
```

```
S    646
C    168
Q     77
Name: embarked, dtype: int64
```

```
df.replace({'sex':{'male':0,'female':1}, 'embarked':{'S':0,'C':1,'Q':2}}, inplace=True)
```

```
df.head()
```

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

```
data[data['sex'].str.match("female")].count()
```

```
survived    314
pclass      314
sex         314
age         261
sibsp       314
parch       314
fare        314
embarked    312
class       314
dtype: int64
```

```
data[data['sex'].str.match("male")].count()
```

```
survived    577
pclass      577
sex         577
age         453
sibsp       577
parch       577
fare        577
embarked    577
class       577
dtype: int64
```

```
gender = pd.get_dummies(data['sex'], drop_first=True)
```

```
data['gender'] = gender
```

```
data.drop('sex', axis=1,inplace=True)
```

```
data.head()
```

	survived	pclass	age	sibsp	parch	fare	embarked	class	gender
0	0	3	22.0	1	0	7.2500	S	Third	1
1	1	1	38.0	1	0	71.2833	C	First	0
2	1	3	26.0	0	0	7.9250	S	Third	0
3	1	1	35.0	1	0	53.1000	S	First	0
4	0	3	35.0	0	0	8.0500	S	Third	1

```
change = {'First':1 ,'Second':2,'Third':3}
data['class'] = data['class'].replace(change)
```

```
change = {'C':1 ,'Q':2,'S':3}
data['embarked'] = data['embarked'].replace(change)
```

```
data.head()
```

	survived	pclass	age	sibsp	parch	fare	embarked	class	gender
0	0	3	22.0	1	0	7.2500	3.0	3	1
1	1	1	38.0	1	0	71.2833	1.0	1	0
2	1	3	26.0	0	0	7.9250	3.0	3	0
3	1	1	35.0	1	0	53.1000	3.0	1	0
4	0	3	35.0	0	0	8.0500	3.0	3	1

```
column_name = 'embarked'
data = data.dropna(subset = [column_name],axis = 0)
```

```
data['age'].fillna(data['age'].mean() , inplace=True)
```

```
x=data.iloc[:,1:]
y=data.iloc[:,0]
```

```
x
```

	pclass	age	sibsp	parch	fare	embarked	class	gender
0	3	22.000000	1	0	7.2500	3.0	3	1
1	1	38.000000	1	0	71.2833	1.0	1	0
2	3	26.000000	0	0	7.9250	3.0	3	0
3	1	35.000000	1	0	53.1000	3.0	1	0
4	3	35.000000	0	0	8.0500	3.0	3	1
...	...	...	...	...	...	...	...	...
886	2	27.000000	0	0	13.0000	3.0	2	1
887	1	19.000000	0	0	30.0000	3.0	1	0
888	3	29.642093	1	2	23.4500	3.0	3	0
889	1	26.000000	0	0	30.0000	1.0	1	1
890	3	32.000000	0	0	7.7500	2.0	3	1

889 rows × 8 columns

```
y
```

```
0      0
1      1
2      1
3      1
4      0
      ..
886    0
887    1
888    0
889    1
890    0
Name: survived, Length: 889, dtype: int64
```

```
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, confusion_matrix,classification_report
```

```
X_train, X_test, Y_train , Y_test = train_test_split(x , y,test_size = 0.2 , random_state=1)
```

```
model = LogisticRegression()
```

```
print(X_train.shape , Y_train.shape)
```

```
(711, 8) (711,)
```

```
model.fit(X_train , Y_train)
```

```
▾ LogisticRegression
LogisticRegression()
```

```
y_pred = model.predict(X_test)
```

```
accuracy = accuracy_score(Y_test,y_pred)
print(f"Accuracy:{accuracy:.2f}")
```

```
Accuracy:0.84
```