from sklearn.metrics import accuracy_score

In [50]:
```
# importing libraries
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
```

data collection and processing

In [51]:
```
#load the data from csv file to pandas dataframe
titanic_data=pd.read_csv('train.csv')
```

In [52]:
```
#print first 5 rows from the dataframe
titanic_data.head()
```

Out[52]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN

In [53]:
```
#number of rows and columns
titanic_data.shape
```

Out[53]:
```
(891, 12)
```

In [54]:
```
# getting some information about the data
titanic_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  891 non-null    int64  
 1   Survived     891 non-null    int64  
 2   Pclass       891 non-null    int64  
 3   Name         891 non-null    object 
 4   Sex          891 non-null    object 
 5   Age          714 non-null    float64
 6   SibSp        891 non-null    int64  
 7   Parch        891 non-null    int64  
 8   Ticket       891 non-null    object 
 9   Fare         891 non-null    float64
 10  Cabin        204 non-null    object 
 11  Embarked     889 non-null    object 
dtypes: float64(2), int64(5), object(5)
memory usage: 83.7+ KB
```

In [55]:
```
#check the number of missing values in each row
titanic_data.isnull().sum()
```

Out[55]:
```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
```

handling the missing values

In [56]:
```
#drop the "cabin" column from thhe dataset
titanic_data=titanic_data.drop(columns='Cabin',axis=1)
```

In [57]:
```
#replacing the missing vales in "age " column with the mean value
titanic_data['Age'].fillna(titanic_data['Age'].mean(),inplace=True)
```

In [58]:
```
#finding the mode value of "Embared" column
print(titanic_data['Embarked'].mode())
```

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

In [59]:
```
print(titanic_data['Embarked'].mode()[0])
```

```
S
```

In [60]:
```
#replacing the missing vales in "Embarked" column with mode value
titanic_data['Embarked'].fillna(titanic_data['Embarked'].mode()[0],inplace=True)
```

In [61]:
```
#check the number of missing valesin each column
titanic_data.isnull().sum()
```

Out[61]:
```
PassengerId    0
Survived       0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Embarked       0
dtype: int64
```

data analysis

In [62]:
```
#getting some statistical measurs about the data
titanic_data.describe()
```

Out[62]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	891.000000	891.000000	891.000000	891.000000
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.204208
std	257.353842	0.486592	0.836071	13.002015	1.102743	0.806057	49.693429
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.000000	0.000000
25%	223.500000	0.000000	2.000000	22.000000	0.000000	0.000000	7.910400
50%	446.000000	0.000000	3.000000	29.699118	0.000000	0.000000	14.454200
75%	668.500000	1.000000	3.000000	35.000000	1.000000	0.000000	31.000000
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329200

In [63]:
```
#finding the number of people survived or not survived
titanic_data['Survived'].value_counts()
```

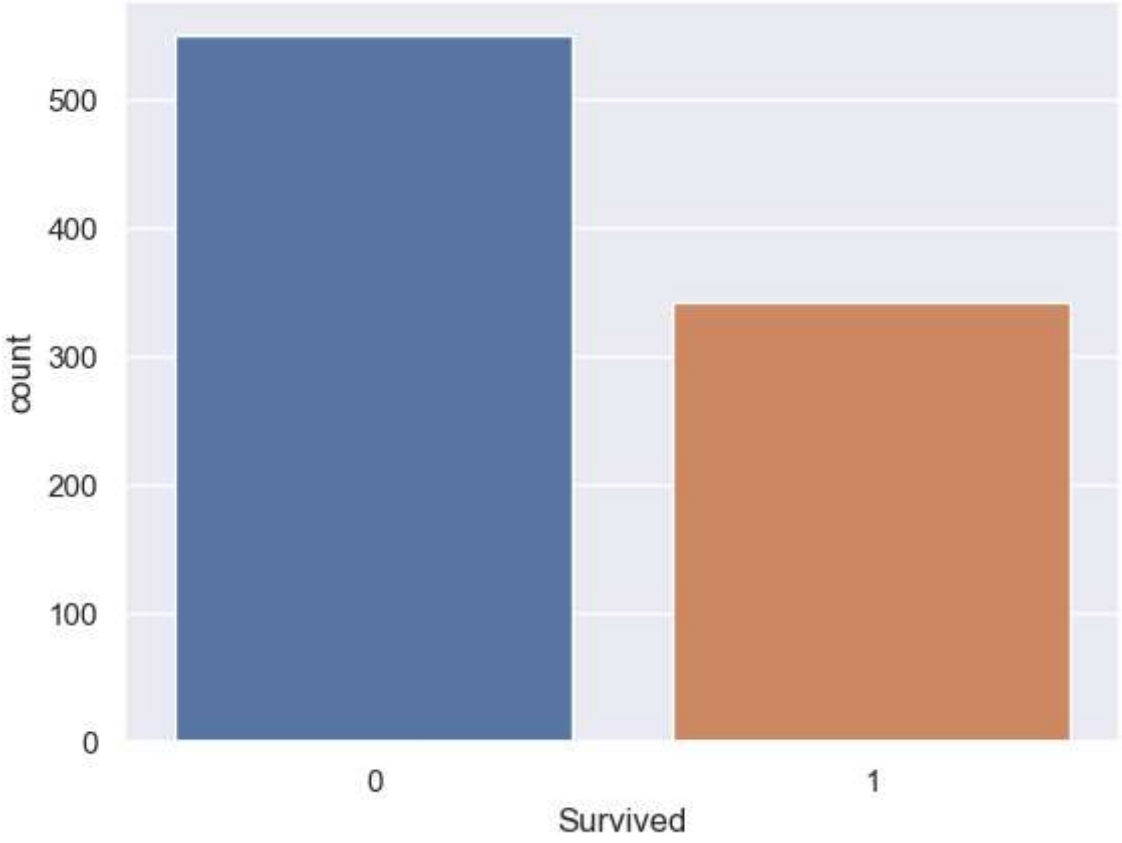
Out[63]:
```
0    549
1    342
Name: Survived, dtype: int64
```

data visualization

In [64]:
```
sns.set()
```

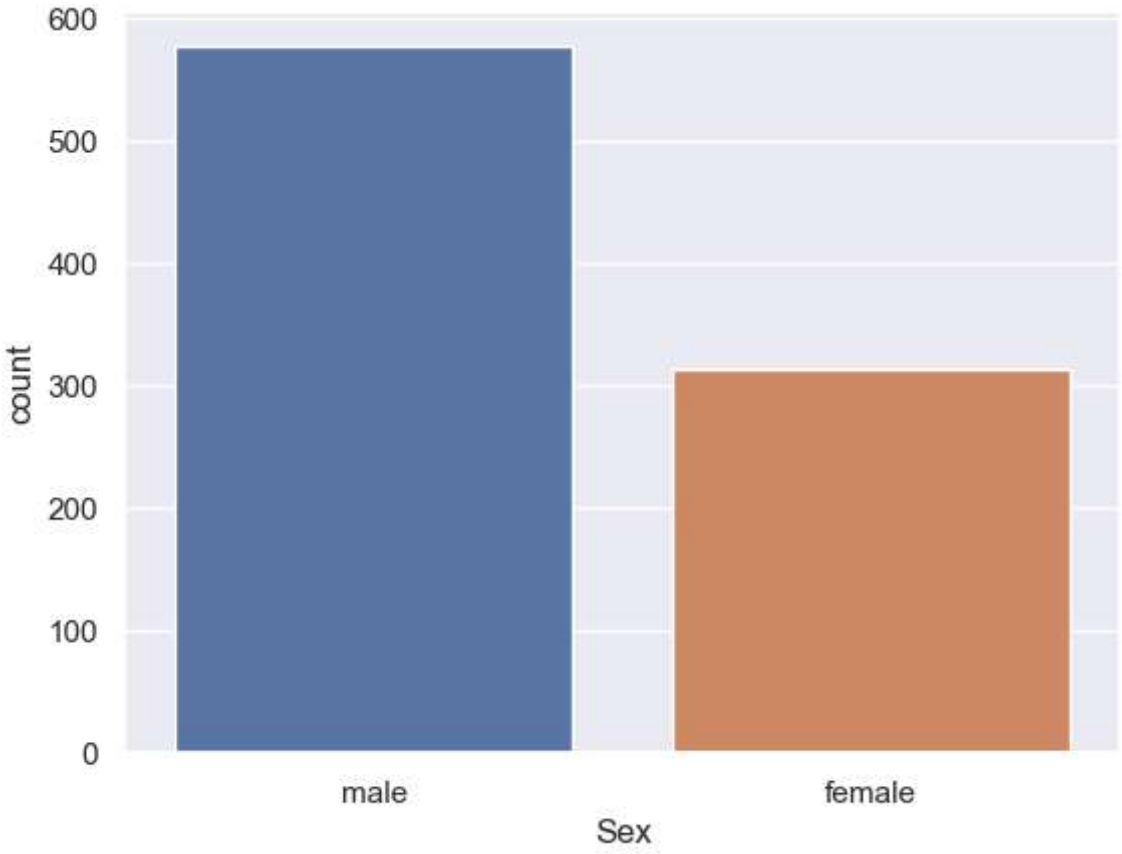
In [65]:
```
#waking a cont plot for the "survived" column
sns.countplot(x='Survived',data=titanic_data)
```

Out[65]:
```
<Axes: xlabel='Survived', ylabel='count'>
```



In [66]:
```
#maing a count plot for "sex" column
sns.countplot(x='Sex',data=titanic_data)
```

Out[66]:
```
<Axes: xlabel='Sex', ylabel='count'>
```

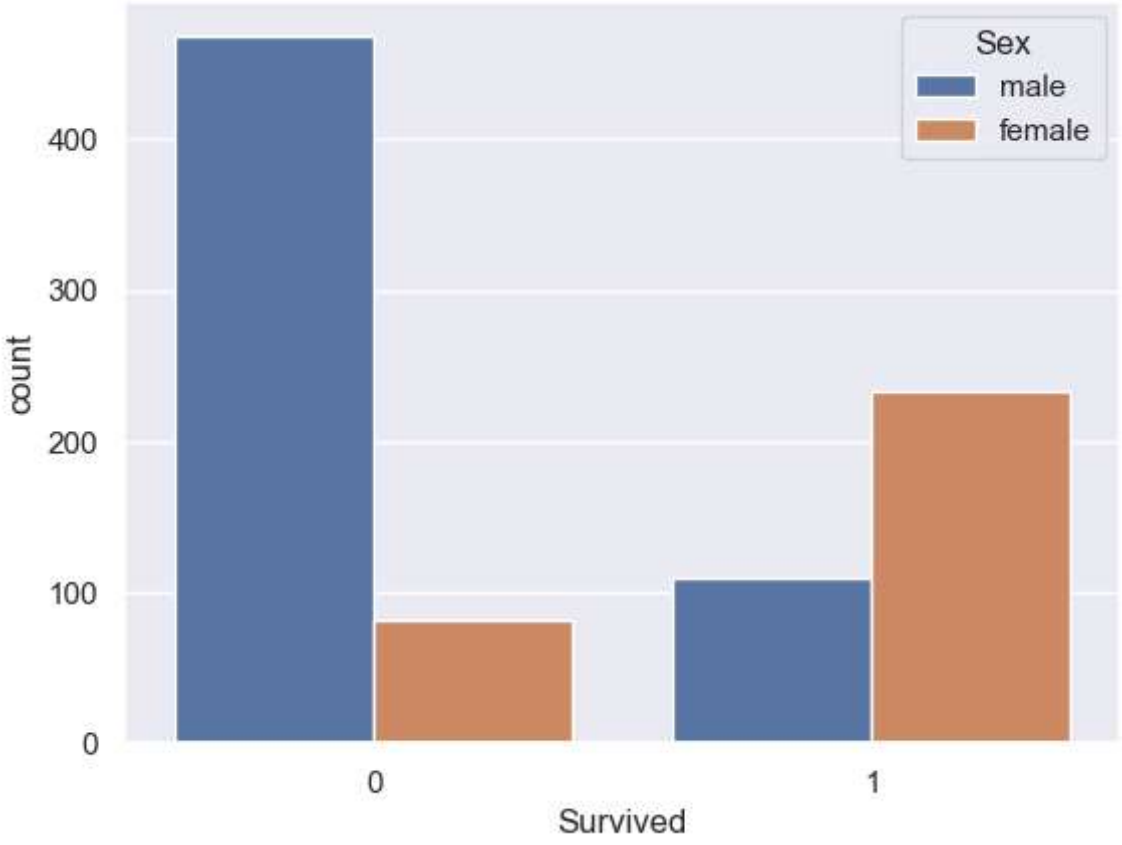


In [67]:
```
titanic_data['Sex'].value_counts()
```

Out[67]:
```
male      577
female    314
Name: Sex, dtype: int64
```

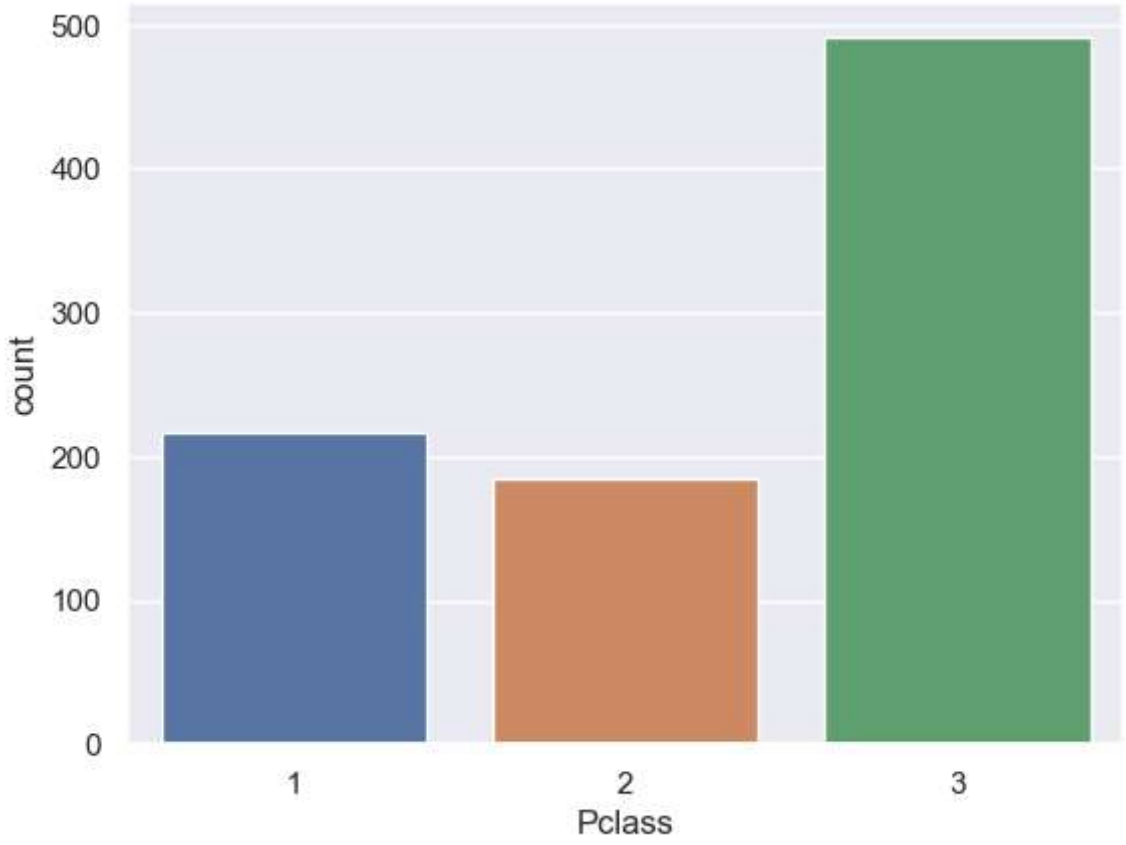
In [68]:
```
#number of survivors gender wise
sns.countplot(x='Survived',hue='Sex',data=titanic_data)
```

Out[68]:
```
<Axes: xlabel='Survived', ylabel='count'>
```



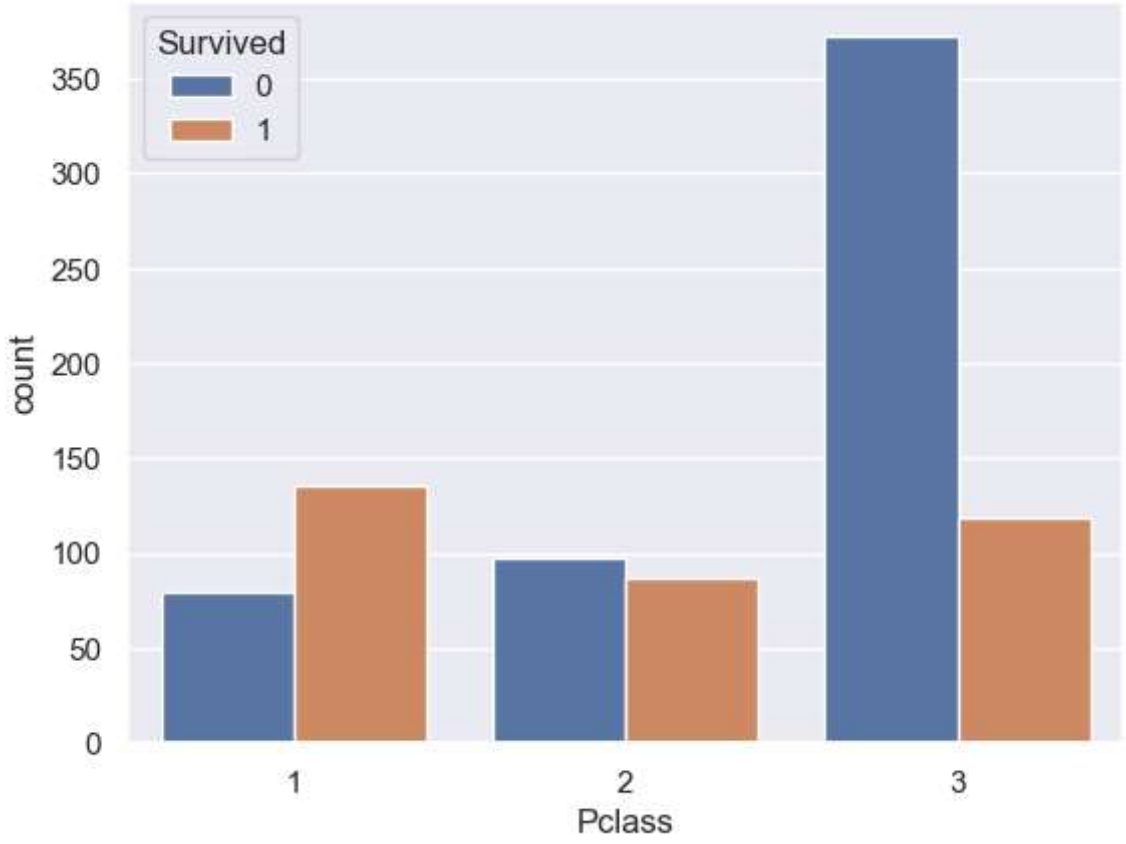
In [69]:
```
#maing a count plot for sex column
sns.countplot(x='Pclass',data=titanic_data)
```

Out[69]:
```
<Axes: xlabel='Pclass', ylabel='count'>
```



In [70]:
```
sns.countplot(x='Pclass',hue='Survived',data=titanic_data)
```

Out[70]:
```
<Axes: xlabel='Pclass', ylabel='count'>
```



encoding the categorical colums

In [71]:
```
titanic_data['Sex'].value_counts()
```

Out[71]:
```
male      577
female    314
Name: Sex, dtype: int64
```

In [72]:
```
titanic_data['Embarked'].value_counts()
```

Out[72]:
```
S    646
C    168
Q     77
Name: Embarked, dtype: int64
```

In [73]:
```
#converting categorical columns
titanic_data.replace({'Sex' :{'male':0,'female':1},'Embarked':{'S':0,'C':1,'Q':2}}
```

In [74]:
```
titanic_data.head()
```

Out[74]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Embark
0	1	0	3	Braund, Mr. Owen Harris	0	22.0	1	0	A/5 21171	7.2500	
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	1	38.0	1	0	PC 17599	71.2833	
2	3	1	3	Heikkinen, Miss. Laina	1	26.0	0	0	STON/O2. 3101282	7.9250	
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	1	35.0	1	0	113803	53.1000	
4	5	0	3	Allen, Mr. William Henry	0	35.0	0	0	373450	8.0500	

In [75]:
```
X=titanic_data.drop(columns=['PassengerId','Name','Ticket','Survived'],axis=1)
Y=titanic_data['Survived']
```

In [76]:
```
print(X)
```

```
     Pclass  Sex        Age  SibSp  Parch     Fare  Embarked
0         3    0  22.000000      1      0   7.2500         0
1         1    1  38.000000      1      0  71.2833         1
2         3    1  26.000000      0      0   7.9250         0
3         1    1  35.000000      1      0  53.1000         0
4         3    0  35.000000      0      0   8.0500         0
..      ...  ...        ...    ...    ...      ...       ...
886       2    0  27.000000      0      0  13.0000         0
887       1    1  19.000000      0      0  30.0000         0
888       3    1  29.699118      1      2  23.4500         0
889       1    0  26.000000      0      0  30.0000         1
890       3    0  32.000000      0      0   7.7500         2

[891 rows x 7 columns]
```

In [77]:
```
print(Y)
```

```
0      0
1      1
2      1
3      1
4      0
      ..
886    0
887    1
888    0
889    1
890    0
Name: Survived, Length: 891, dtype: int64
```

splitting data into training data and test data

In [78]:
```
X_train,X_test,Y_train,Y_test=train_test_split(X,Y,test_size=0.2,random_state=2)
```

In [79]:
```
print(X.shape,X_train.shape,X_test.shape)
```

```
(891, 7) (712, 7) (179, 7)
```

model training

logistic regression

In [80]:
```
model=LogisticRegression()
```

In [81]:
```
model.fit(X_train,Y_train)
```

```
C:\Users\PALWAI MEGHNA\anaconda3\Lib\site-packages\sklearn\linear_model\_logistic.
py:460: ConvergenceWarning: lbfgs failed to converge (status=1):
STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html
Please also refer to the documentation for alternative solver options:
    https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression
  n_iter_i = _check_optimize_result(
```

Out[81]:
```
▾ LogisticRegression
LogisticRegression()
```

model evaluation

accuracy score

In [82]:
```
#accuracy on train data
X_train_prediction=model.predict(X_train)
```

In [83]:
```
print(X_train_prediction)
```

```
[0 1 0 0 0 0 0 1 0 0 0 1 0 0 1 0 1 0 0 0 0 0 1 0 0 1 0 0 1 0 1 1 0 0 1 0 1
 0 0 0 0 0 0 1 1 0 0 1 0 1 0 1 0 0 0 0 0 0 1 0 1 0 0 1 1 0 0 1 1 0 1 0 0 1
 0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 0 1 0 0 0 1 1 1 0 1 0 0 0 0 0 1 0 0 0
 1 1 0 0 1 0 0 1 0 0 1 0 0 1 0 1 0 1 0 1 0 1 1 1 1 1 1 0 0 1 1 1 0 0 1 0 0
 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 1 0 1 1 1
 0 0 0 1 0 0 0 1 0 0 1 0 0 0 1 1 0 1 0 0 0 0 0 1 1 0 1 1 1 1 0 0 0 0 0 0 0
 0 1 0 0 1 1 1 0 0 1 0 1 1 1 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 1 0 0 0
 0 0 0 0 0 0 1 0 1 0 0 1 0 0 1 0 1 0 1 1 0 0 0 0 1 0 1 0 0 1 0 0 0 1 0 0 0
 0 1 1 0 0 0 0 0 0 1 0 1 0 0 0 0 0 1 1 1 0 0 0 1 0 1 0 0 0 0 0 0 1 1 0 1 1
 0 1 1 1 0 0 0 0 0 0 0 0 0 1 0 0 1 1 1 0 1 0 0 0 0 1 1 0 0 0 1 0 1 1 1 0 0
 0 0 1 0 0 0 1 1 0 0 1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 1 0 1 1 1 0 1 1 0 0 0
 0 1 0 1 0 0 1 1 0 0 0 0 1 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 1 0 0 0 0 1 1 0 0
 1 0 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 1 0 0 1 0 0 0 1 1 0 1 0
 0 0 0 0 1 0 0 1 0 1 1 0 0 1 0 0 1 0 0 0 1 0 1 1 0 0 1 1 0 1 0 1 1 1 0 1 0
 0 1 0 0 1 0 0 1 0 0 0 0 1 1 0 0 1 0 1 0 0 0 0 0 0 1 1 1 0 0 1 1 0 0 0 0 0
 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0
 0 0 1 0 0 0 0 0 1 0 1 0 1 0 0 0 1 0 1 1 1 0 0 0 1 0 1 0 0 0 1 1 1 0 0 1 1
 0 0 0 1 0 1 0 0 0 0 0 1 1 0 1 1 1 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 1 0 0 0 0
 1 0 0 1 0 1 0 0 0 1 1 1 1 1 0 0 1 1 0 1 1 1 1 0 0 0 1 1 0 0 1 0 0 0 0 0 0
 0 0 0 1 1 0 0 1 0]
```

In [84]:
```
training_data_accuracy=accuracy_score(Y_train,X_train_prediction)
```

In [85]:
```
print('accuracy score of training data:',training_data_accuracy)
```

```
accuracy score of training data: 0.8075842696629213
```

In [86]:
```
X_test_prediction=model.predict(X_test)
```

In [87]:
```
print(X_test_prediction)
```

```
[0 0 1 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 0 1 1 0 1 0 1 1 0 0 0 0 0 0 0 0 1 1
 0 0 0 0 0 1 0 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 0 0 1 0 1 0
 1 0 0 0 1 0 1 0 0 0 1 1 0 0 1 0 0 0 0 0 0 1 0 1 0 0 1 0 1 1 0 1 1 0 0 0 0
 0 0 0 1 1 0 1 0 0 1 0 0 0 0 0 0 1 0 0 0 0 1 1 0 0 0 0 0 0 1 1 1 1 0 1 0 0
 0 1 0 0 0 0 1 0 0 1 1 0 1 0 0 0 1 1 0 0 1 0 0 1 1 1 0 0 0 0 1 0 0 1 0 0 0]
```

In [88]:
```
test_data_accuracy=accuracy_score(Y_test,X_test_prediction)
```

In [89]:
```
print('accuracy score of training data:',test_data_accuracy)
```

```
accuracy score of training data: 0.7821229050279329
```