In [1]:

```
import pandas as pd
```

In [2]:

```
df = pd.read_csv("train.csv")
```

In [3]:

```
df.head()
```

Out[3]:

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

In [4]:

```
df.head(10)
```

Out[4]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S
5	6	0	3	Moran, Mr. James	male	NaN	0	0	330877	8.4583	NaN	Q
6	7	0	1	McCarthy, Mr. Timothy J	male	54.0	0	0	17463	51.8625	E46	S
7	8	0	3	Palsson, Master. Gosta Leonard	male	2.0	3	1	349909	21.0750	NaN	S
8	9	1	3	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	female	27.0	0	2	347742	11.1333	NaN	S
9	10	1	2	Nasser, Mrs. Nicholas (Adele Achem)	female	14.0	1	0	237736	30.0708	NaN	C

In [5]:

```
df.head(30)
```

Out[5]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S
5	6	0	3	Moran, Mr. James	male	NaN	0	0	330877	8.4583	NaN	Q
6	7	0	1	McCarthy, Mr. Timothy J	male	54.0	0	0	17463	51.8625	E46	S
7	8	0	3	Palsson, Master. Gosta Leonard	male	2.0	3	1	349909	21.0750	NaN	S
8	9	1	3	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	female	27.0	0	2	347742	11.1333	NaN	S
9	10	1	2	Nasser, Mrs. Nicholas (Adele Achem)	female	14.0	1	0	237736	30.0708	NaN	C
10	11	1	3	Sandstrom, Miss. Marguerite Rut	female	4.0	1	1	PP 9549	16.7000	G6	S
11	12	1	1	Bonnell, Miss. Elizabeth	female	58.0	0	0	113783	26.5500	C103	S
12	13	0	3	Saundercock, Mr. William Henry	male	20.0	0	0	A/5. 2151	8.0500	NaN	S
13	14	0	3	Andersson, Mr. Anders Johan	male	39.0	1	5	347082	31.2750	NaN	S
14	15	0	3	Vestrom, Miss. Hulda Amanda Adolfina	female	14.0	0	0	350406	7.8542	NaN	S
15	16	1	2	Hewlett, Mrs. (Mary D Kingcome)	female	55.0	0	0	248706	16.0000	NaN	S
16	17	0	3	Rice, Master. Eugene	male	2.0	4	1	382652	29.1250	NaN	Q
17	18	1	2	Williams, Mr. Charles Eugene	male	NaN	0	0	244373	13.0000	NaN	S
18	19	0	3	Vander Planke, Mrs. Julius (Emelia Maria Vande...	female	31.0	1	0	345763	18.0000	NaN	S
19	20	1	3	Masselmani, Mrs. Fatima	female	NaN	0	0	2649	7.2250	NaN	C
20	21	0	2	Fynney, Mr. Joseph J	male	35.0	0	0	239865	26.0000	NaN	S
21	22	1	2	Beesley, Mr. Lawrence	male	34.0	0	0	248698	13.0000	D56	S
22	23	1	3	McGowan, Miss. Anna "Annie"	female	15.0	0	0	330923	8.0292	NaN	Q
23	24	1	1	Sloper, Mr. William Thompson	male	28.0	0	0	113788	35.5000	A6	S
24	25	0	3	Palsson, Miss. Torborg Danira	female	8.0	3	1	349909	21.0750	NaN	S
25	26	1	3	Asplund, Mrs. Carl Oscar (Selma Augusta Emilia...	female	38.0	1	5	347077	31.3875	NaN	S
26	27	0	3	Emir, Mr. Farred Chehab	male	NaN	0	0	2631	7.2250	NaN	C
27	28	0	1	Fortune, Mr. Charles Alexander	male	19.0	3	2	19950	263.0000	C23 C25 C27	S
28	29	1	3	O'Dwyer, Miss. Ellen "Nellie"	female	NaN	0	0	330959	7.8792	NaN	Q
29	30	0	3	Todoroff, Mr. Lalio	male	NaN	0	0	349216	7.8958	NaN	S

In [6]:

```
df.tail(10)
```

Out[6]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
881	882	0	3	Markun, Mr. Johann	male	33.0	0	0	349257	7.8958	NaN	S
882	883	0	3	Dahlberg, Miss. Gerda Ulrika	female	22.0	0	0	7552	10.5167	NaN	S
883	884	0	2	Banfield, Mr. Frederick James	male	28.0	0	0	C.A./SOTON 34068	10.5000	NaN	S
884	885	0	3	Sutehall, Mr. Henry Jr	male	25.0	0	0	SOTON/OQ 392076	7.0500	NaN	S
885	886	0	3	Rice, Mrs. William (Margaret Norton)	female	39.0	0	5	382652	29.1250	NaN	Q
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	NaN	S
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42	S
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	NaN	S
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148	C
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	NaN	Q

In [7]:

```
len(df)
```

Out[7]:

```
891
```

In [8]:

```
import matplotlib.pyplot as plt
```

In [9]:

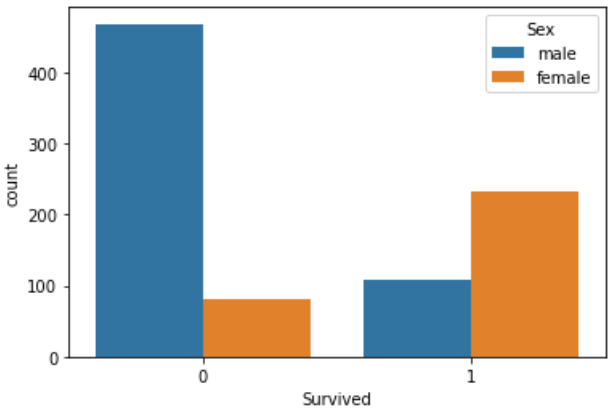
```
import seaborn as sns
```

In [13]:

```
sns.countplot(x="Survived", hue ="Sex", data = df)
```

Out[13]:

```
<AxesSubplot:xlabel='Survived', ylabel='count'>
```



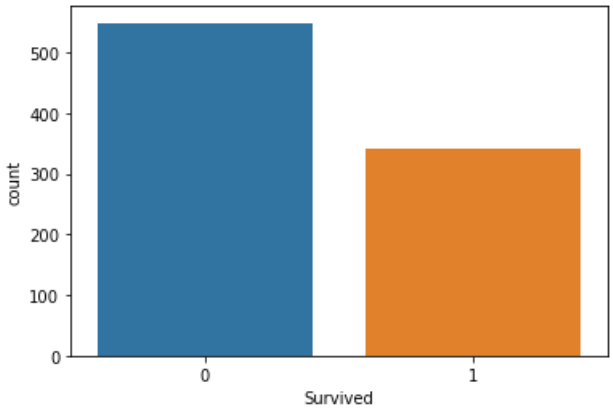
In [11]:

```
sns.countplot(df["Survived"])
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following
variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and
passing other arguments without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```

Out[11]:

```
<AxesSubplot:xlabel='Survived', ylabel='count'>
```

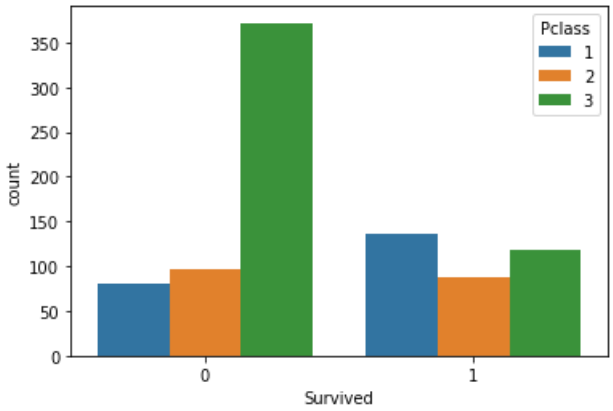


In [14]:

```
sns.countplot(x="Survived", hue ="Pclass", data = df)
```

Out[14]:

```
<AxesSubplot:xlabel='Survived', ylabel='count'>
```

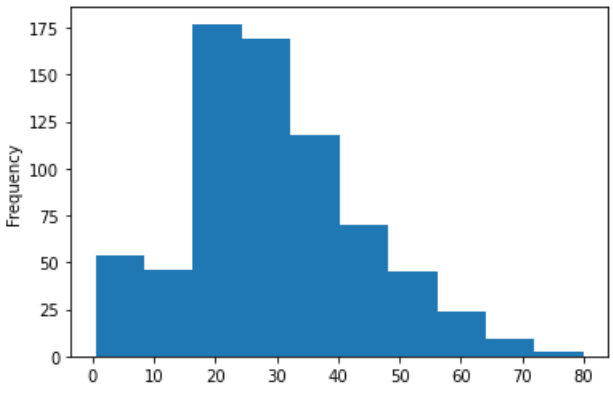


In [16]:

```
df["Age"].plot.hist()
```

Out[16]:

```
<AxesSubplot:ylabel='Frequency'>
```

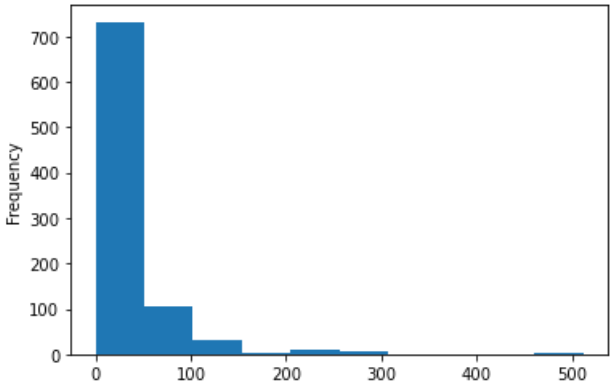


In [17]:

```
df["Fare"].plot.hist()
```

Out[17]:

```
<AxesSubplot:ylabel='Frequency'>
```

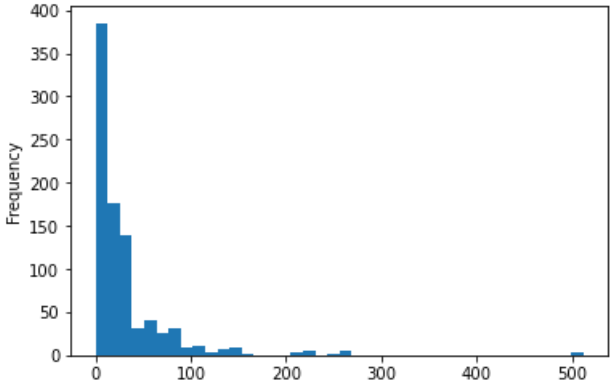


In [18]:

```
df["Fare"].plot.hist(bins=40)
```

Out[18]:

```
<AxesSubplot:ylabel='Frequency'>
```



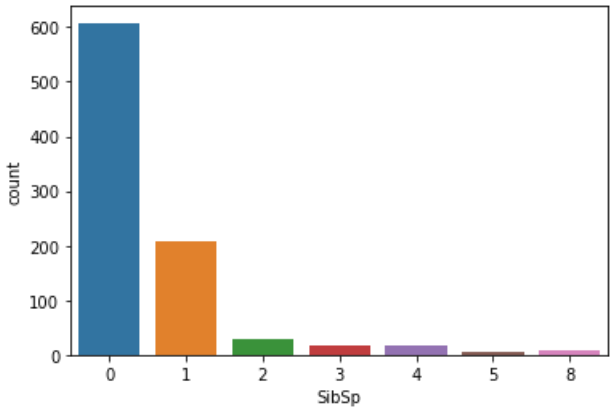
In [19]:

```
sns.countplot(df["SibSp"])
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following
variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and
passing other arguments without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```

Out[19]:

```
<AxesSubplot:xlabel='SibSp', ylabel='count'>
```



In [20]:

```
df.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 [21]:

```
df.head()
```

Out[21]:

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

In [22]:

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

Out[22]:

```
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
```

In [ ]:

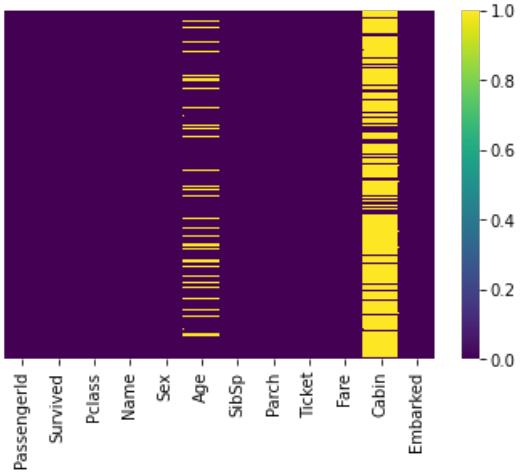
```
#Pclass 1 their age will marked as 37
#Pclass 2 their age will marked as 29
#Pclass 1 their age will marked as 24
```

In [23]:

```
sns.heatmap(df.isnull(),yticklabels=False, cmap='viridis')
```

Out[23]:

```
<AxesSubplot:>
```



In [30]:

```
def input_age(cols):
    Age = cols[0]
    Pclass=cols[1]
    if pd.isnull(Age):
        if Pclass ==1:
            return 37
        elif Pclass == 2:
            return 29
        else:
            return 24
    else:
            return Age
```

In [31]:

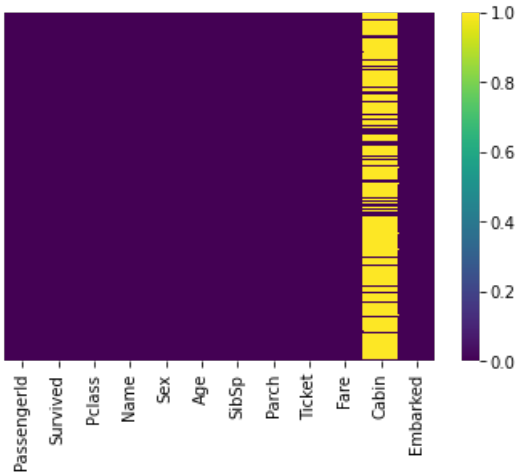
```
df['Age']=df[['Age', 'Pclass']].apply(input_age,axis =1)
```

In [32]:

```
sns.heatmap(df.isnull(),yticklabels=False, cmap='viridis')
```

Out[32]:

```
<AxesSubplot:>
```



In [34]:

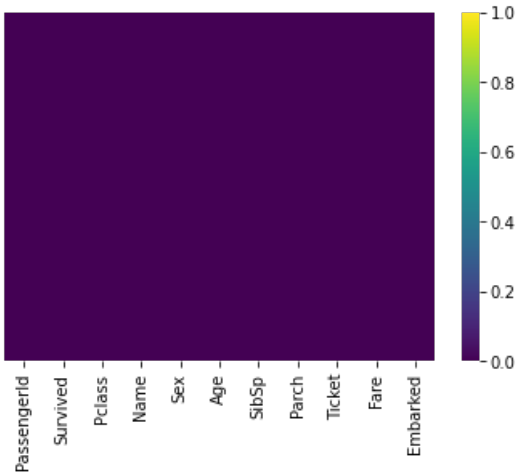
```
df.drop('Cabin', axis=1,inplace=True)
```

In [35]:

```
sns.heatmap(df.isnull(),yticklabels=False, cmap='viridis')
```

Out[35]:

```
<AxesSubplot:>
```



In [36]:

```
df.head()
```

Out[36]:

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

In [37]:

```
sex = pd.get_dummies(df['Sex'],drop_first=True)
```

In [38]:

```
df.head()
```

Out[38]:

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

In [44]:

```
Embark = pd.get_dummies(df['Embarked'],drop_first=True)
```

In [45]:

```
Embark
```

Out[45]:

	Q	S
0	0	1
1	0	0
2	0	1
3	0	1
4	0	1
...	...	...
886	0	1
887	0	1
888	0	1
889	0	0
890	1	0

891 rows × 2 columns

In [46]:

```
sex
```

Out[46]:

	male
0	1
1	0
2	0
3	0
4	1
...	...
886	1
887	0
888	0
889	1
890	1

891 rows × 1 columns

In [49]:

```
df.drop(['Sex', 'Embarked', 'Name', 'Ticket', 'PassengerId','Pclass'], axis=1, inplace=True)
```

In [51]:

```
df=pd.concat([df,sex,Embark], axis=1)
```

In [52]:

```
df.head()
```

Out[52]:

	Survived	Age	SibSp	Parch	Fare	male	Q	S
0	0	22.0	1	0	7.2500	1	0	1
1	1	38.0	1	0	71.2833	0	0	0
2	1	26.0	0	0	7.9250	0	0	1
3	1	35.0	1	0	53.1000	0	0	1
4	0	35.0	0	0	8.0500	1	0	1

In [53]:

```
from sklearn.model_selection import train_test_split
```

In [54]:

```
x=df.drop('Survived', axis=1)
y = df['Survived']
```

In [55]:

```
x
```

Out[55]:

	Age	SibSp	Parch	Fare	male	Q	S
0	22.0	1	0	7.2500	1	0	1
1	38.0	1	0	71.2833	0	0	0
2	26.0	0	0	7.9250	0	0	1
3	35.0	1	0	53.1000	0	0	1
4	35.0	0	0	8.0500	1	0	1
...	...	...	...	...	...	...	...
886	27.0	0	0	13.0000	1	0	1
887	19.0	0	0	30.0000	0	0	1
888	24.0	1	2	23.4500	0	0	1
889	26.0	0	0	30.0000	1	0	0
890	32.0	0	0	7.7500	1	1	0

891 rows × 7 columns

In [56]:

```
y
```

Out[56]:

```
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
```

In [58]:

```
x_train, x_test, y_train, y_test = train_test_split(x,y, test_size=0.30,random_state=101)
```

In [59]:

```
from sklearn.linear_model import LogisticRegression
```

In [61]:

```
logmodel=LogisticRegression()
logmodel.fit(x_train,y_train)
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\linear_model\_logistic.py:762: 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[61]:

```
LogisticRegression()
```

In [62]:

```
x_test
```

Out[62]:

	Age	SibSp	Parch	Fare	male	Q	S
331	45.5	0	0	28.5000	1	0	1
700	18.0	1	0	227.5250	0	0	0
748	19.0	1	0	53.1000	1	0	1
751	6.0	0	1	12.4750	1	0	1
481	29.0	0	0	0.0000	1	0	1
...	...	...	...	...	...	...	...
388	24.0	0	0	7.7292	1	1	0
416	34.0	1	1	32.5000	0	0	1
407	3.0	1	1	18.7500	1	0	1
482	50.0	0	0	8.0500	1	0	1
829	62.0	0	0	80.0000	0	0	0

268 rows × 7 columns

In [63]:

```
prediction=logmodel.predict(x_test)
```

In [64]:

```
from sklearn.metrics import classification_report
```

In [65]:

```
classification_report(y_test, prediction)
```

Out[65]:

```
'              precision    recall  f1-score   support\n\n           0       0.77      0.86      0.81
154\n           1       0.78      0.65      0.71       114\n\n    accuracy                           0.77
268\n   macro avg       0.77      0.76      0.76       268\nweighted avg       0.77      0.77      0.77
268\n'
```

In [66]:

```
from sklearn.metrics import accuracy_score
```

In [67]:

```
accuracy_score(y_test,prediction)
```

Out[67]:

```
0.7723880597014925
```

In [ ]: