# NAME:ROOPA SUNDAR

## REG NO:21BEC7152

import libraries

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Importing the dataset

In [2]:
```
df=pd.read_csv("Titanic-Dataset.csv")
```

In [3]:
```
df.head()
```

Out[3]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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 [4]:
```
df.describe()
```

Out[4]:

| | PassengerId | Survived | Pclass | Age | SibSp | Parch | Fare |
|---|---|---|---|---|---|---|---|
| **count** | 891.000000 | 891.000000 | 891.000000 | 714.000000 | 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 | 14.526497 | 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 | 20.125000 | 0.000000 | 0.000000 | 7.910400 |
| **50%** | 446.000000 | 0.000000 | 3.000000 | 28.000000 | 0.000000 | 0.000000 | 14.454200 |
| **75%** | 668.500000 | 1.000000 | 3.000000 | 38.000000 | 1.000000 | 0.000000 | 31.000000 |
| **max** | 891.000000 | 1.000000 | 3.000000 | 80.000000 | 8.000000 | 6.000000 | 512.329200 |

In [5]:
```
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 [6]:
```
df.corr()
```

```
C:\Users\chait\AppData\Local\Temp\ipykernel_25736\1134722465.py:1: FutureWarning: The
default value of numeric_only in DataFrame.corr is deprecated. In a future version, i
t will default to False. Select only valid columns or specify the value of numeric_on
ly to silence this warning.
  df.corr()
```

Out[6]:

| | PassengerId | Survived | Pclass | Age | SibSp | Parch | Fare |
|---|---|---|---|---|---|---|---|
| **PassengerId** | 1.000000 | -0.005007 | -0.035144 | 0.036847 | -0.057527 | -0.001652 | 0.012658 |
| **Survived** | -0.005007 | 1.000000 | -0.338481 | -0.077221 | -0.035322 | 0.081629 | 0.257307 |
| **Pclass** | -0.035144 | -0.338481 | 1.000000 | -0.369226 | 0.083081 | 0.018443 | -0.549500 |
| **Age** | 0.036847 | -0.077221 | -0.369226 | 1.000000 | -0.308247 | -0.189119 | 0.096067 |
| **SibSp** | -0.057527 | -0.035322 | 0.083081 | -0.308247 | 1.000000 | 0.414838 | 0.159651 |
| **Parch** | -0.001652 | 0.081629 | 0.018443 | -0.189119 | 0.414838 | 1.000000 | 0.216225 |
| **Fare** | 0.012658 | 0.257307 | -0.549500 | 0.096067 | 0.159651 | 0.216225 | 1.000000 |

In [7]:
```
df.corr().Survived.sort_values(ascending=False)
```

```
C:\Users\chait\AppData\Local\Temp\ipykernel_25736\1717937034.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.
  df.corr().Survived.sort_values(ascending=False)
```

Out[7]:
```
Survived       1.000000
Fare           0.257307
Parch          0.081629
PassengerId   -0.005007
SibSp         -0.035322
Age           -0.077221
Pclass        -0.338481
Name: Survived, dtype: float64
```

null values

In [8]:
```
df.isnull().sum()
```

Out[8]:
```
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 [9]:
```
df['Cabin'].fillna(df['Cabin'].mode()[0], inplace=True)
```

In [10]:
```
df['Embarked'].fillna(df['Embarked'].mode()[0], inplace=True)
```

In [11]:
```
median_age = df['Age'].median()
df['Age'].fillna(median_age, inplace=True)
```

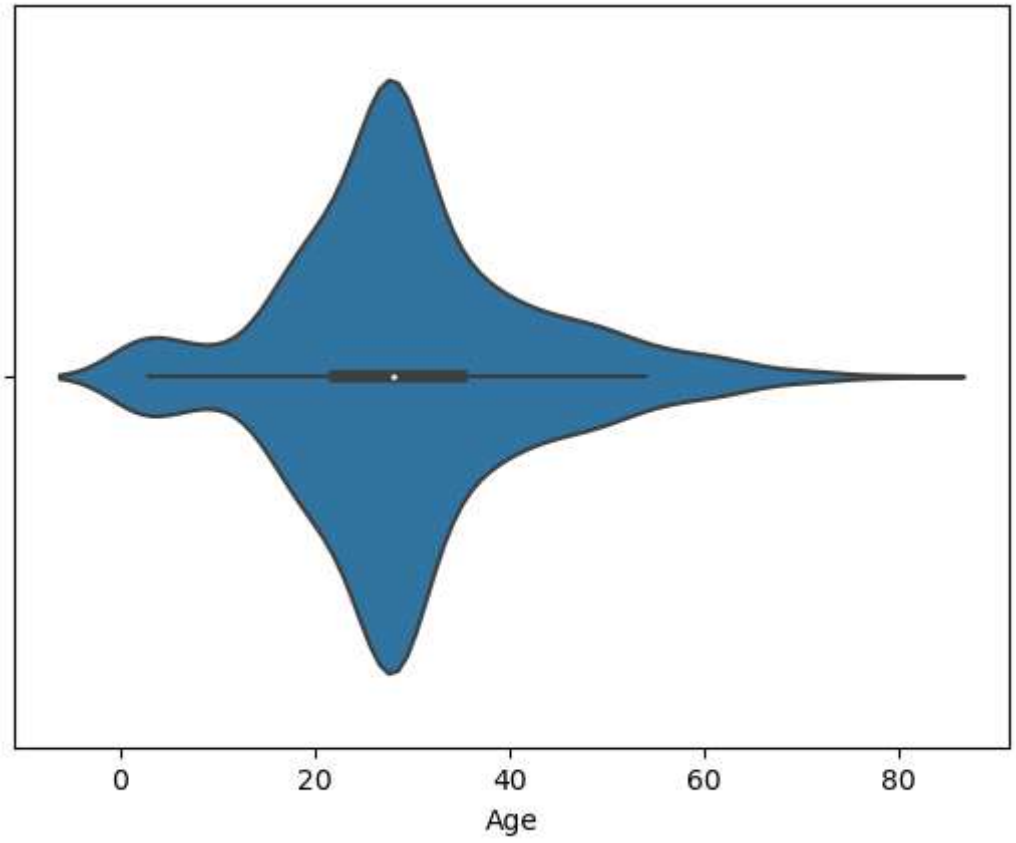
In [12]:
```
df.isnull().sum()
```

Out[12]:
```
PassengerId    0
Survived       0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Cabin          0
Embarked       0
dtype: int64
```

4)data visualization

In [13]:
```
sns.violinplot(data=df, x="Age")
```

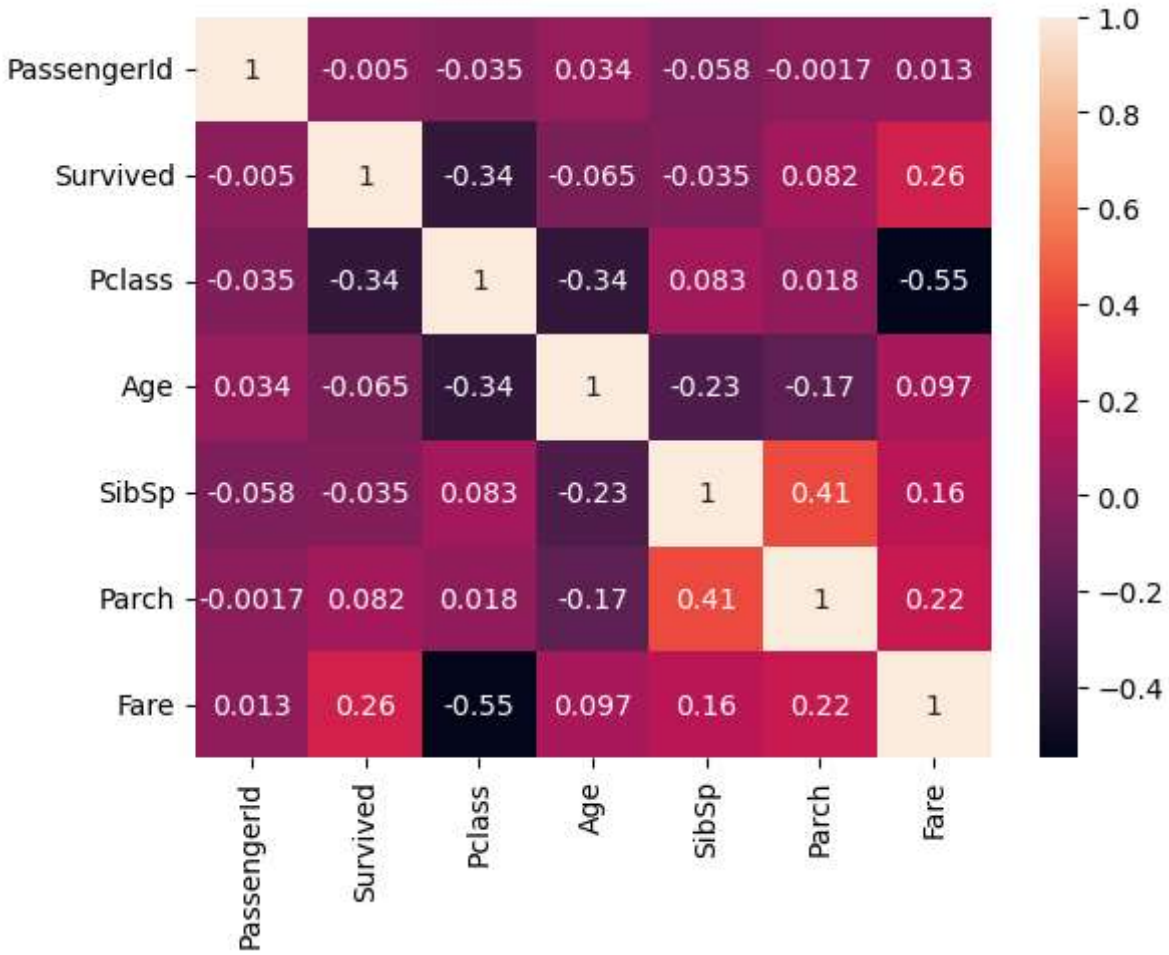
Out[13]:
```
<Axes: xlabel='Age'>
```




In [14]:
```
sns.heatmap(df.corr(),annot=True)
```

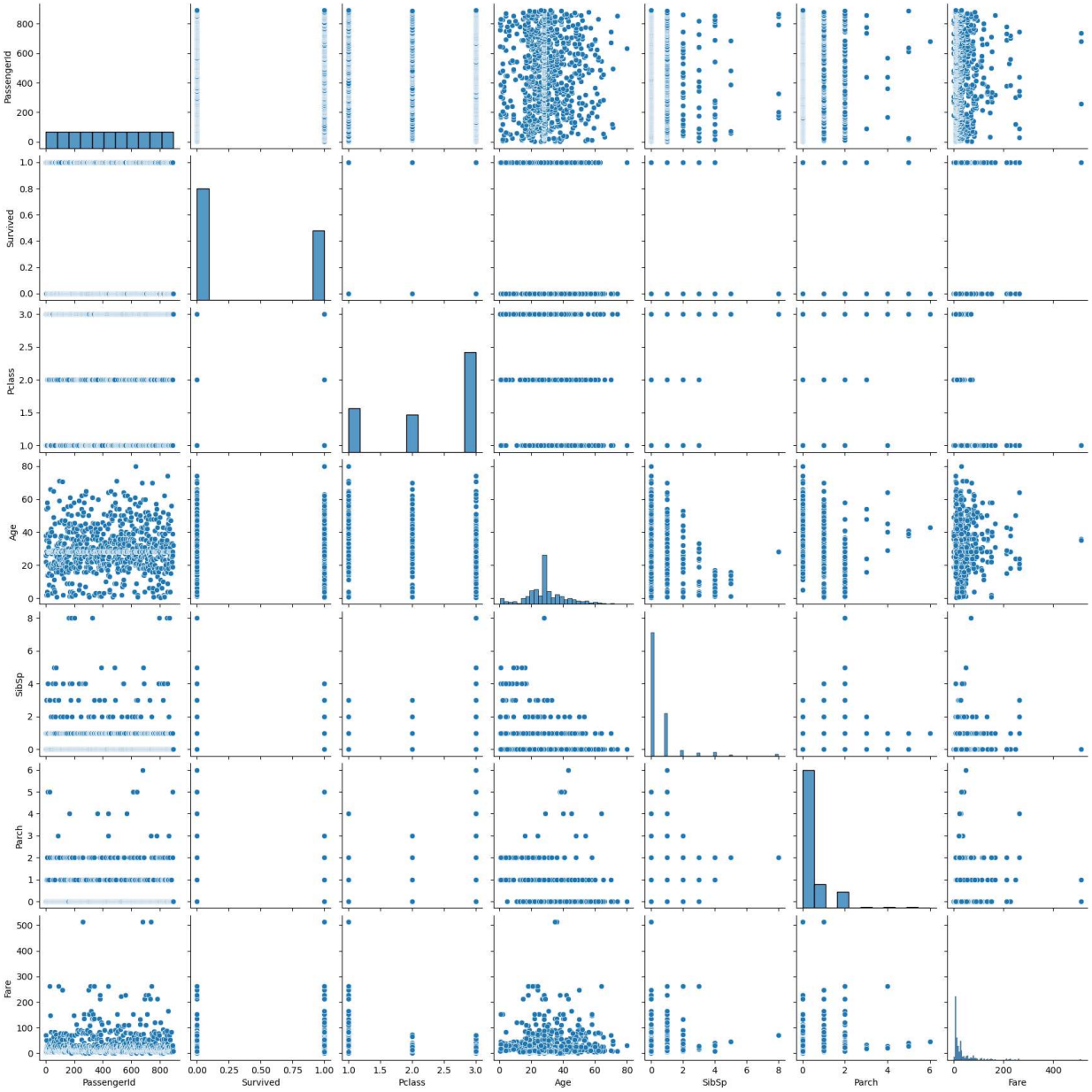
```
C:\Users\chait\AppData\Local\Temp\ipykernel_25736\4277794465.py:1: FutureWarning: The
default value of numeric_only in DataFrame.corr is deprecated. In a future version, i
t will default to False. Select only valid columns or specify the value of numeric_on
ly to silence this warning.
  sns.heatmap(df.corr(),annot=True)
```

Out[14]:
```
<Axes: >
```

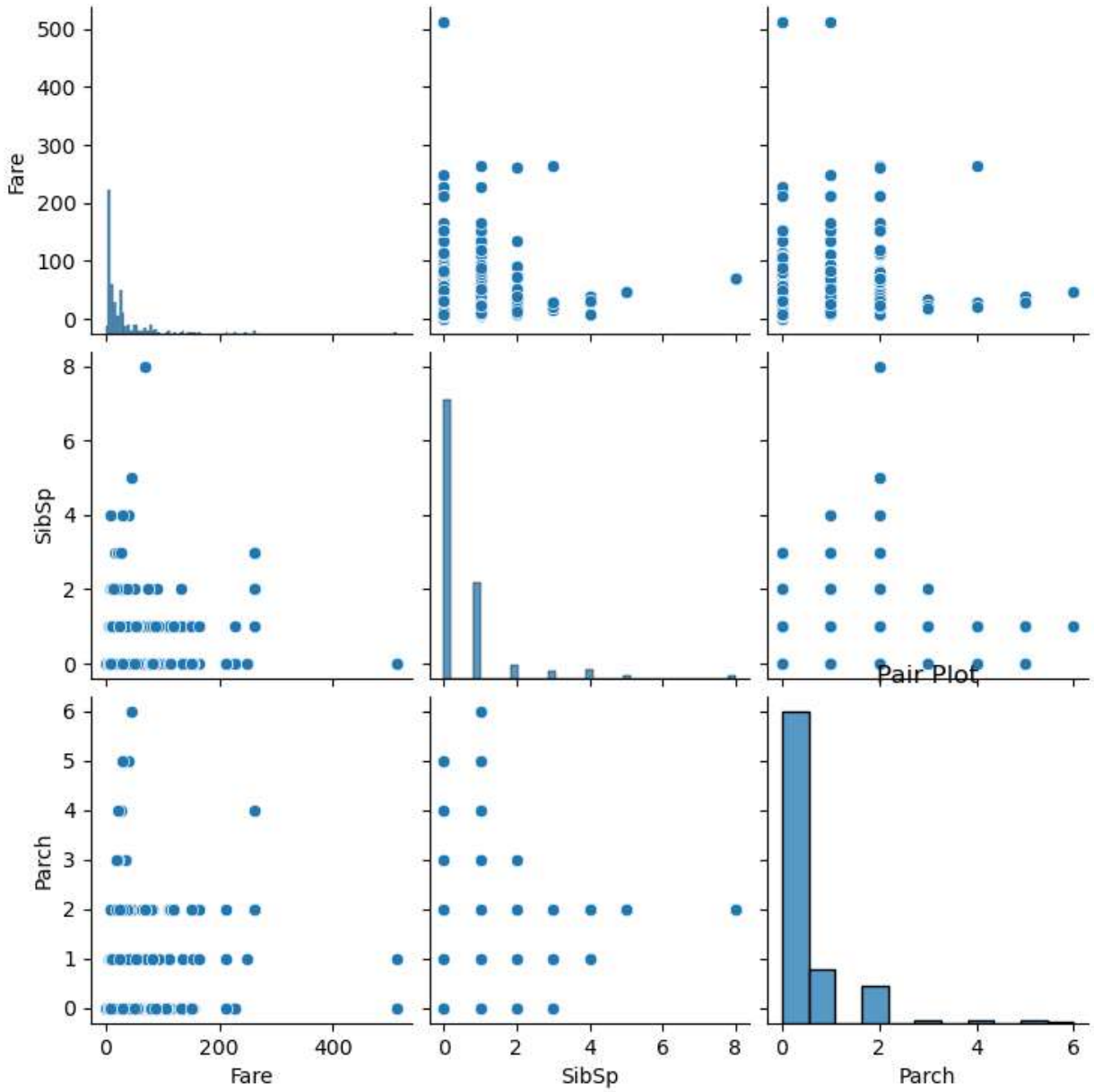



In [15]:
```
sns.pairplot(df)
```

Out[15]:
```
<seaborn.axisgrid.PairGrid at 0x22e7014e410>
```




In [16]:
```
sns.pairplot(data=df[['Fare', 'SibSp', 'Parch']])
plt.title('Pair Plot')
plt.show()
```



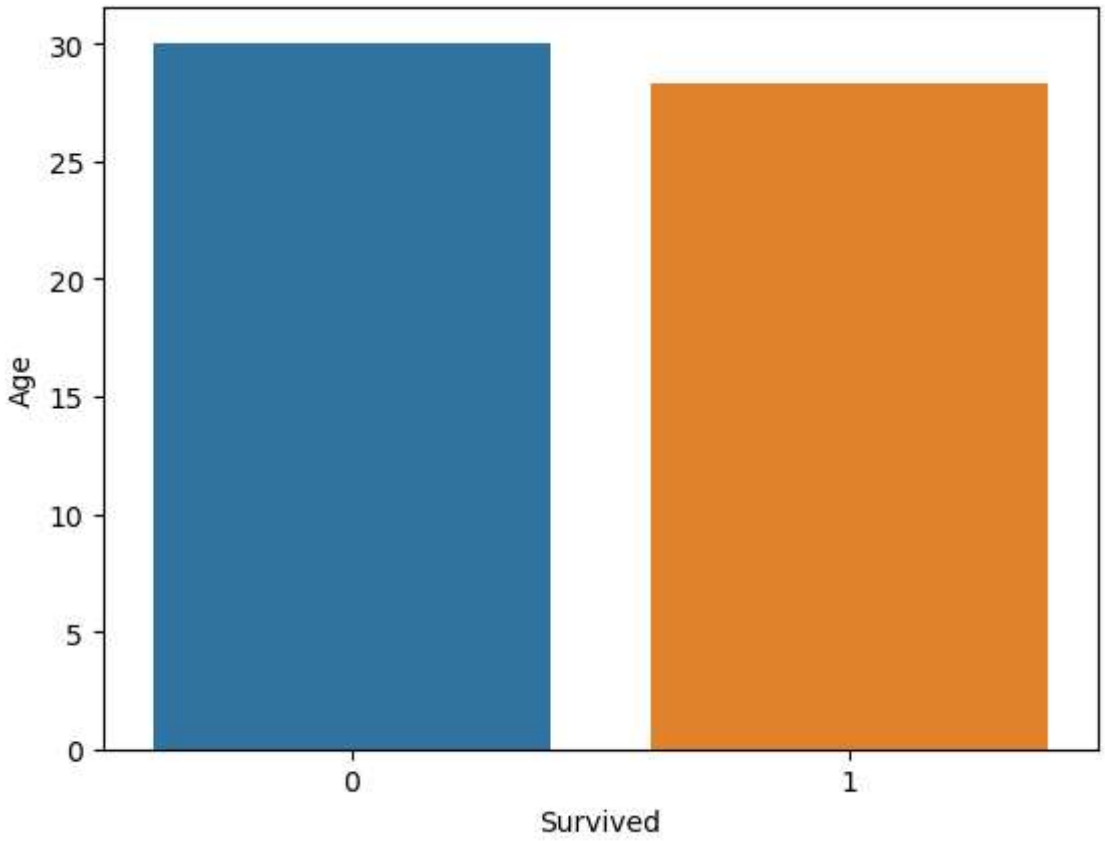

In [17]:
```
sns.barplot(x=df["Survived"],y=df["Age"],ci=0)
```

```
C:\Users\chait\AppData\Local\Temp\ipykernel_25736\332883349.py:1: FutureWarning:

The `ci` parameter is deprecated. Use `errorbar=('ci', 0)` for the same effect.

  sns.barplot(x=df["Survived"],y=df["Age"],ci=0)
```

Out[17]:
```
<Axes: xlabel='Survived', ylabel='Age'>
```




5)outlier detection

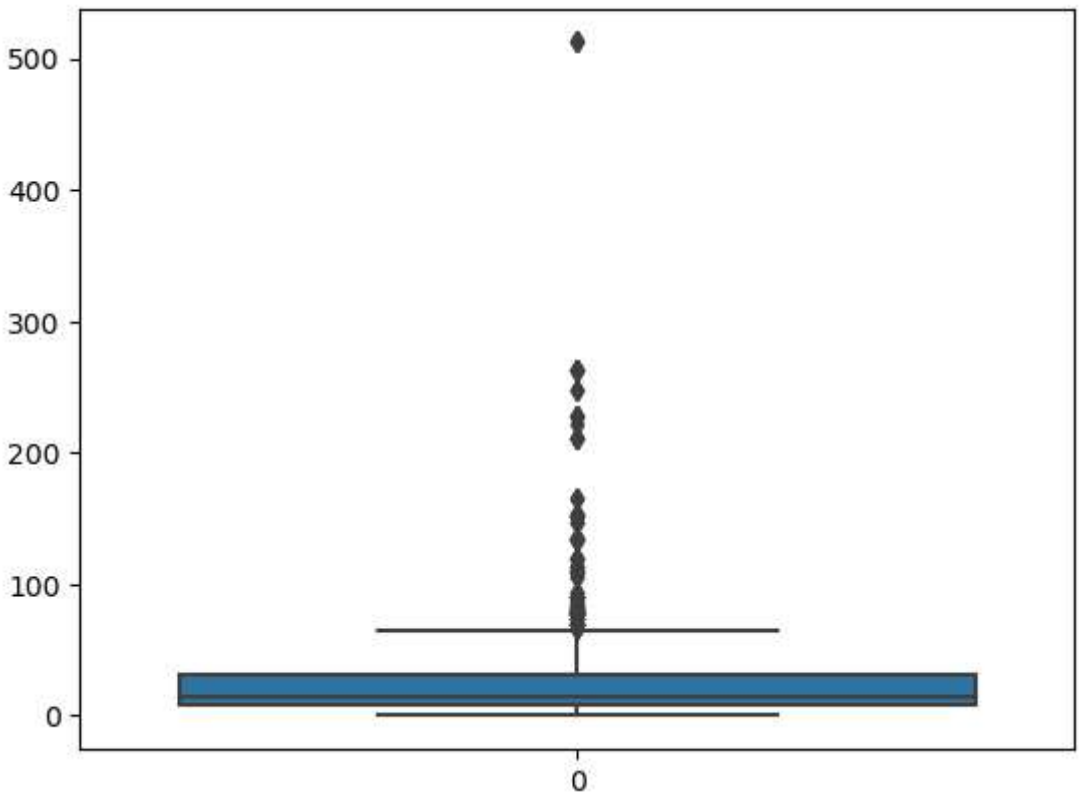
In [18]:
```
df.head()
```

Out[18]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 0 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | B96 B98 | |
| **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 | B96 B98 | |
| **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 | B96 B98 | |

In [19]:
```
sns.boxplot(df["Fare"])
```

Out[19]:
```
<Axes: >
```



In [20]:
```
df.shape
```

Out[20]:
```
(891, 12)
```

In [21]:
```
q1 = df.Fare.quantile(0.25)
q3 = df.Fare.quantile(0.75)
```

In [22]:
```
q1
```

Out[22]:
```
7.9104
```

In [23]:
```
q3
```

Out[23]:
```
31.0
```

In [24]:
```
IQR=q3-q1
```

In [25]:
```
IQR
```

Out[25]:
```
23.0896
```

In [26]:
```
upper_limit = q3+1.5*IQR
```

In [27]:
```
upper_limit
```

Out[27]:
```
65.6344
```

In [28]:
```
lower_limit=q1-1.5*IQR
```

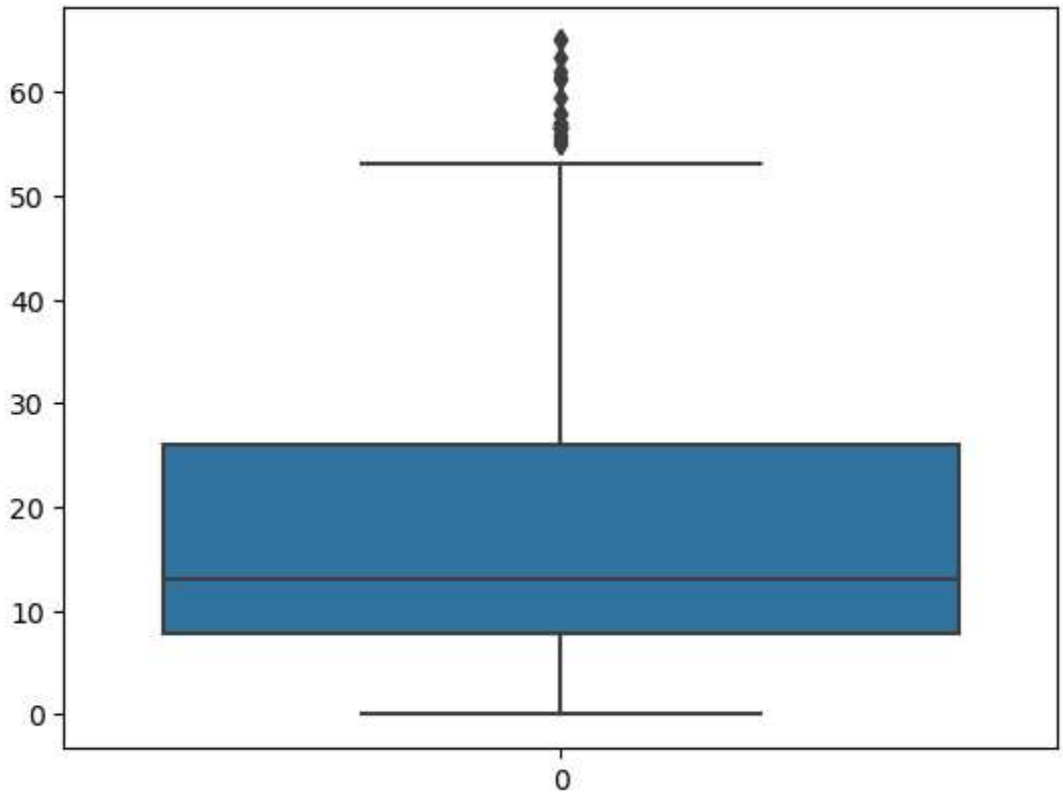
In [29]:
```
lower_limit
```

Out[29]:
```
-26.724
```

In [30]:
```
df = df[df.Fare<upper_limit]
```

In [31]:
```
sns.boxplot(df.Fare)
```

Out[31]:
```
<Axes: >
```

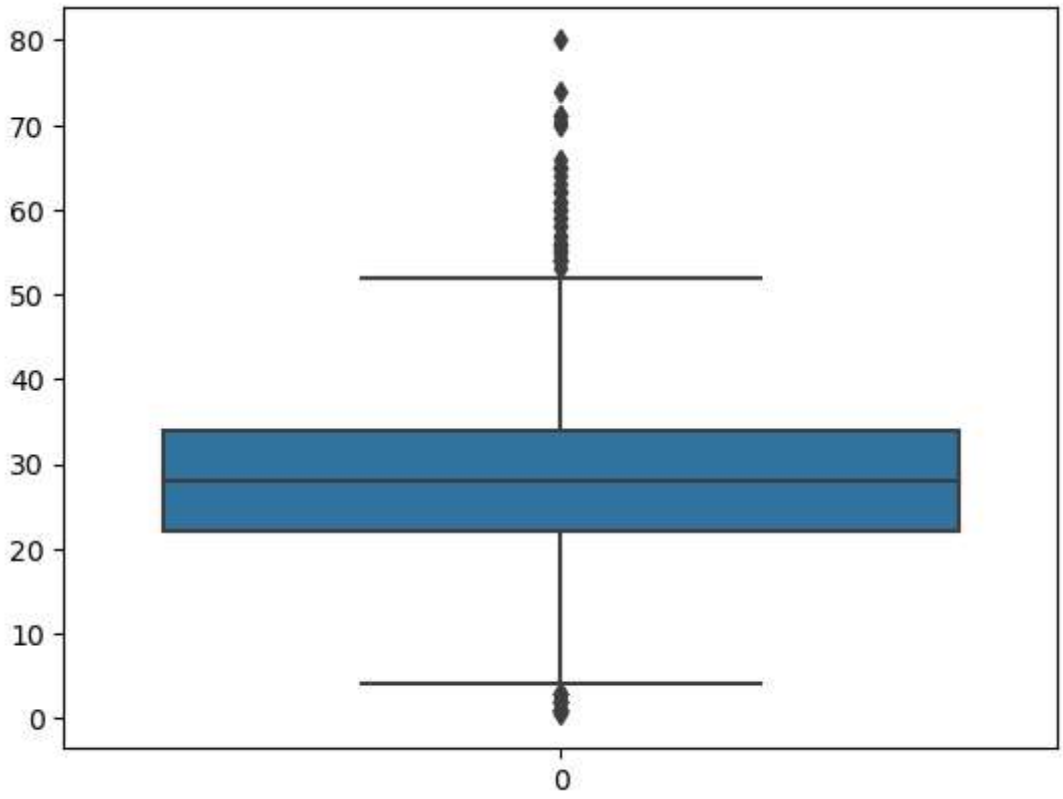



In [32]:
```
df.shape
```

Out[32]:
```
(775, 12)
```

In [33]:
```
sns.boxplot(df["Age"])
```

Out[33]:
```
<Axes: >
```




In [34]:
```
df.shape
```

Out[34]:
```
(775, 12)
```

In [35]:
```
q1 = df.Age.quantile(0.25)
q3 = df.Age.quantile(0.75)
```

In [36]:
```
q1
```

Out[36]:
```
22.0
```

In [37]:
```
q3
```

Out[37]:
```
34.0
```

In [38]:
```
IQR=q3-q1
```

In [39]:
```
IQR
```

Out[39]:
```
12.0
```

In [40]:
```
upper_limit = q3+1.5*IQR
```

In [41]:
```
upper_limit
```

Out[41]:
```
52.0
```

In [42]:
```
lower_limit=q1-1.5*IQR
```

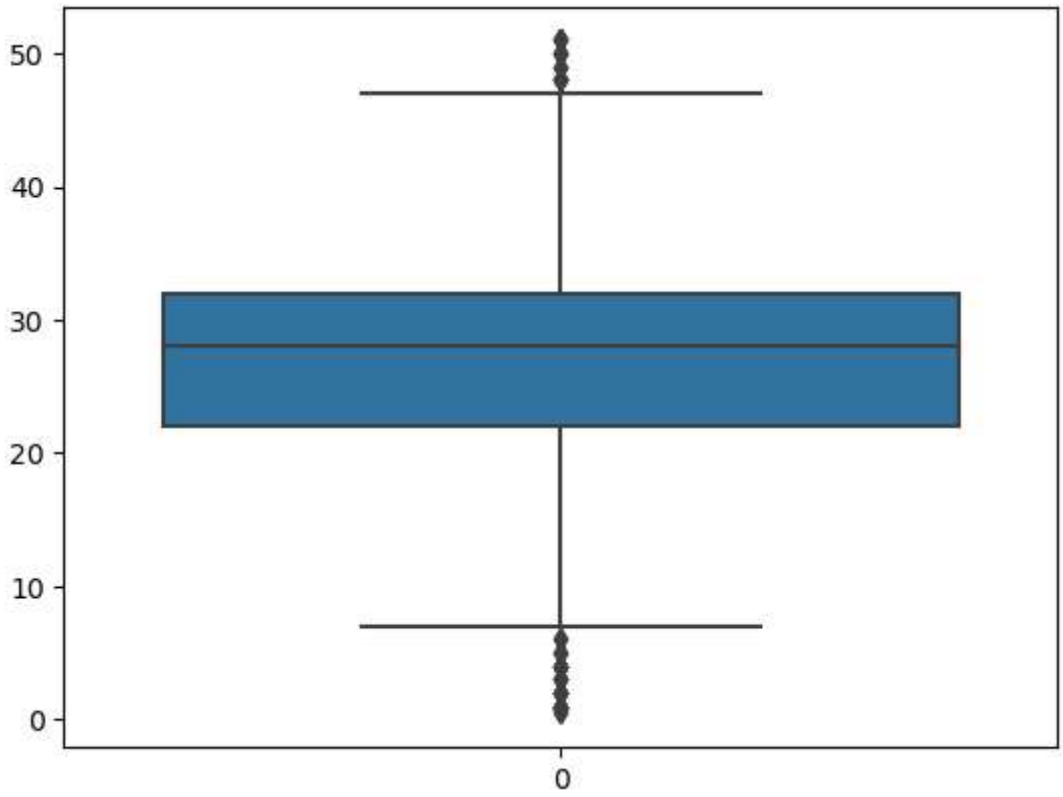
In [43]:
```
lower_limit
```

Out[43]:
```
4.0
```

In [44]:
```
df = df[df.Age<upper_limit]
```

In [45]:
```
sns.boxplot(df.Age)
```

Out[45]:
```
<Axes: >
```




In [46]:
```
df.shape
```

Out[46]:
```
(733, 12)
```

In [47]:
```
df.head()
```

Out[47]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 0 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | B96 B98 | |
| **2** | 3 | 1 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 | B96 B98 | |
| **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 | B96 B98 | |
| **5** | 6 | 0 | 3 | Moran, Mr. James | male | 28.0 | 0 | 0 | 330877 | 8.4583 | B96 B98 | |

In [48]:
```
X=df.drop(columns=["Survived"],axis=1)
X.head()
```

Out[48]:

| | PassengerId | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | B96 B98 | S |
| **2** | 3 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 | B96 B98 | S |
| **3** | 4 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35.0 | 1 | 0 | 113803 | 53.1000 | C123 | S |
| **4** | 5 | 3 | Allen, Mr. William Henry | male | 35.0 | 0 | 0 | 373450 | 8.0500 | B96 B98 | S |
| **5** | 6 | 3 | Moran, Mr. James | male | 28.0 | 0 | 0 | 330877 | 8.4583 | B96 B98 | Q |

In [49]:
```
X.shape
```

Out[49]:
```
(733, 11)
```

In [50]:
```
type(X)
```

Out[50]:
```
pandas.core.frame.DataFrame
```

In [51]:
```
y=df["Survived"]
y.head()
```

Out[51]:
```
0    0
2    1
3    1
4    0
5    0
Name: Survived, dtype: int64
```

encoding

In [52]:
```
X.head()
```

Out[52]:

| | PassengerId | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | B96 B98 | S |
| **2** | 3 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 | B96 B98 | S |
| **3** | 4 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35.0 | 1 | 0 | 113803 | 53.1000 | C123 | S |
| **4** | 5 | 3 | Allen, Mr. William Henry | male | 35.0 | 0 | 0 | 373450 | 8.0500 | B96 B98 | S |
| **5** | 6 | 3 | Moran, Mr. James | male | 28.0 | 0 | 0 | 330877 | 8.4583 | B96 B98 | Q |

In [53]:
```
from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()
```

In [54]:
```
X["Cabi"]=le.fit_transform(X["Cabin"])
```

In [55]:
```
X.head()
```

Out[55]:

| | PassengerId | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | B96 B98 | S |
| **2** | 3 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 | B96 B98 | S |
| **3** | 4 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35.0 | 1 | 0 | 113803 | 53.1000 | C123 | S |
| **4** | 5 | 3 | Allen, Mr. William Henry | male | 35.0 | 0 | 0 | 373450 | 8.0500 | B96 B98 | S |
| **5** | 6 | 3 | Moran, Mr. James | male | 28.0 | 0 | 0 | 330877 | 8.4583 | B96 B98 | Q |

In [56]:
```
print(le.classes_)
```

```
['A10' 'A14' 'A16' 'A19' 'A20' 'A24' 'A31' 'A32' 'A36' 'A6' 'B102' 'B18'
 'B20' 'B38' 'B39' 'B4' 'B42' 'B50' 'B51 B53 B55' 'B71' 'B94' 'B96 B98'
 'C106' 'C110' 'C111' 'C118' 'C123' 'C124' 'C126' 'C128' 'C148' 'C47'
 'C49' 'C52' 'C90' 'D' 'D10 D12' 'D17' 'D19' 'D21' 'D28' 'D30' 'D35' 'D45'
 'D46' 'D47' 'D56' 'D6' 'E10' 'E101' 'E12' 'E121' 'E17' 'E24' 'E25' 'E31'
 'E33' 'E36' 'E44' 'E50' 'E58' 'E63' 'E8' 'F E69' 'F G63' 'F G73' 'F2'
 'F33' 'F38' 'F4' 'G6' 'T']
```

In [57]:
```
X["Embarke"]=le.fit_transform(X["Embarked"])
```

In [58]:
```
X.head()
```

Out[58]:

| | PassengerId | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Cabin | Embarked |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | B96 B98 | S |
| **2** | 3 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 | B96 B98 | S |
| **3** | 4 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35.0 | 1 | 0 | 113803 | 53.1000 | C123 | S |
| **4** | 5 | 3 | Allen, Mr. William Henry | male | 35.0 | 0 | 0 | 373450 | 8.0500 | B96 B98 | S |
| **5** | 6 | 3 | Moran, Mr. James | male | 28.0 | 0 | 0 | 330877 | 8.4583 | B96 B98 | Q |

In [59]:
```
print(le.classes_)
```

```
['C' 'Q' 'S']
```

In [60]:
```
mapping=dict(zip(le.classes_,range(len(le.classes_))))
mapping
```

Out[60]:
```
{'C': 0, 'Q': 1, 'S': 2}
```

scaling

In [61]:
```
from sklearn.preprocessing import StandardScaler
```

In [62]:
```
numerical_columns = ['Age', 'SibSp', 'Parch', 'Fare']
```

In [63]:
```
scaler = StandardScaler()
```

In [64]:
```
df[numerical_columns] = scaler.fit_transform(df[numerical_columns])
```

In [65]:
```
df
```

Out[65]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 0 | 3 | Braund, Mr. Owen Harris | male | -0.471318 | 0.595411 | -0.443400 | A/5 21171 | -0.7 |
| **2** | 3 | 1 | 3 | Heikkinen, Miss. Laina | female | -0.090234 | -0.495680 | -0.443400 | STON/O2. 3101282 | -0.7 |
| **3** | 4 | 1 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 0.767204 | 0.595411 | -0.443400 | 113803 | 2.6 |
| **4** | 5 | 0 | 3 | Allen, Mr. William Henry | male | 0.767204 | -0.495680 | -0.443400 | 373450 | -0.6 |
| **5** | 6 | 0 | 3 | Moran, Mr. James | male | 0.100307 | -0.495680 | -0.443400 | 330877 | -0.6 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| **886** | 887 | 0 | 2 | Montvila, Rev. Juozas | male | 0.005036 | -0.495680 | -0.443400 | 211536 | -0.3 |
| **887** | 888 | 1 | 1 | Graham, Miss. Margaret Edith | female | -0.757131 | -0.495680 | -0.443400 | 112053 | 0.9 |
| **888** | 889 | 0 | 3 | Johnston, Miss. Catherine Helen "Carrie" | female | 0.100307 | 0.595411 | 2.066345 | W./C. 6607 | 0.4 |
| **889** | 890 | 1 | 1 | Behr, Mr. Karl Howell | male | -0.090234 | -0.495680 | -0.443400 | 111369 | 0.9 |
| **890** | 891 | 0 | 3 | Dooley, Mr. Patrick | male | 0.481391 | -0.495680 | -0.443400 | 370376 | -0.7 |

733 rows × 12 columns

data train and test

In [66]:
```
from sklearn.model_selection import train_test_split
```

In [67]:
```
X = df[['Pclass', 'Age', 'SibSp', 'Parch']]  # Use relevant columns as features
y = df['Survived']  # The column you want to predict
```

In [68]:
```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=
```

In [69]:
```
print(X_train.shape)
print(X_test.shape)
print(y_train.shape)
print(y_test.shape)
```

```
(586, 4)
(147, 4)
(586,)
(147,)
```

In [ ]:

In [ ]:

In [ ]: