NAME: DESU VENKATA SAI MANOJ KUMAR

- REG NO: 21BCE8450
- CAMPUS: VIT-AP
- Assignment 3 on sept 15
- Morning Slot (10-12 am)
- Google colab Link: https://colab.research.google.com/drive/16IaM3IN76F-4HyuvBwwZKYUAh9hziiBu?usp=sharing (https://colab.research.google.com/drive/16IaM3IN76F-4HyuvBwwZKYUAh9hziiBu?usp=sharing)

In [1]:

```
#ASSIGNMENT_3
#SAI KRISHNA KOWSHIK
#21BCE9150
#   Data Preprocessing.
# Import the Libraries.
# Import the dataset
# Checking for Null Values.


# Data Visualization.
# Outlier Detection
#   Splitting Dependent and Independent variables
#   Encoding
#   Feature Scaling.
#   Splitting Data into Train and Test.
```

Import the Libraries

In [2]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [5]:

```
from google.colab import files
uploaded = files.upload()
```

Choose Files No file chosen

Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.

```
Saving Titanic-Dataset.csv to Titanic-Dataset.csv
```

In [6]:

```
df = pd.read_csv("/content/Titanic-Dataset.csv")
```

In [7]:

```
df.head()
```

Out[7]:

	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 [8]:

```
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 [9]:
```
df.describe()
```

Out[9]:

	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 [10]:
```
df.corr()
```

```
<ipython-input-10-2f6f6606aa2c>:1: FutureWarning: The default value of numeric_
only in DataFrame.corr is deprecated. In a future version, it will default to F
alse. Select only valid columns or specify the value of numeric_only to silence
this warning.
  df.corr()
```

Out[10]:

	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 [11]:
```
df.corr().Survived.sort_values(ascending = False)
```

```
<ipython-input-11-936bc0a2ea37>:1: FutureWarning: The default value of numeric_
only in DataFrame.corr is deprecated. In a future version, it will default to F
alse. Select only valid columns or specify the value of numeric_only to silence
this warning.
  df.corr().Survived.sort_values(ascending = False)
```

Out[11]:
```
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
```

Handling Missing/Null Values

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

Out[12]:
```
PassengerId    False
Survived       False
Pclass         False
Name           False
Sex            False
Age             True
SibSp          False
Parch          False
Ticket         False
Fare           False
Cabin           True
Embarked        True
dtype: bool
```

In [13]:
```
sum(df.Cabin.isnull())
```

Out[13]:
```
687
```

In [14]:
```
sum(df.Age.isnull())
```

Out[14]:
```
177
```

In [15]:
```
df["Age"].fillna(df["Age"].mean(),inplace=True)
```

In [16]:
```
sum(df.Embarked.isnull())
```

Out[16]:
```
2
```

In [17]:
```
df["Embarked"].fillna(df["Embarked"].mode()[0],inplace=True)
```

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

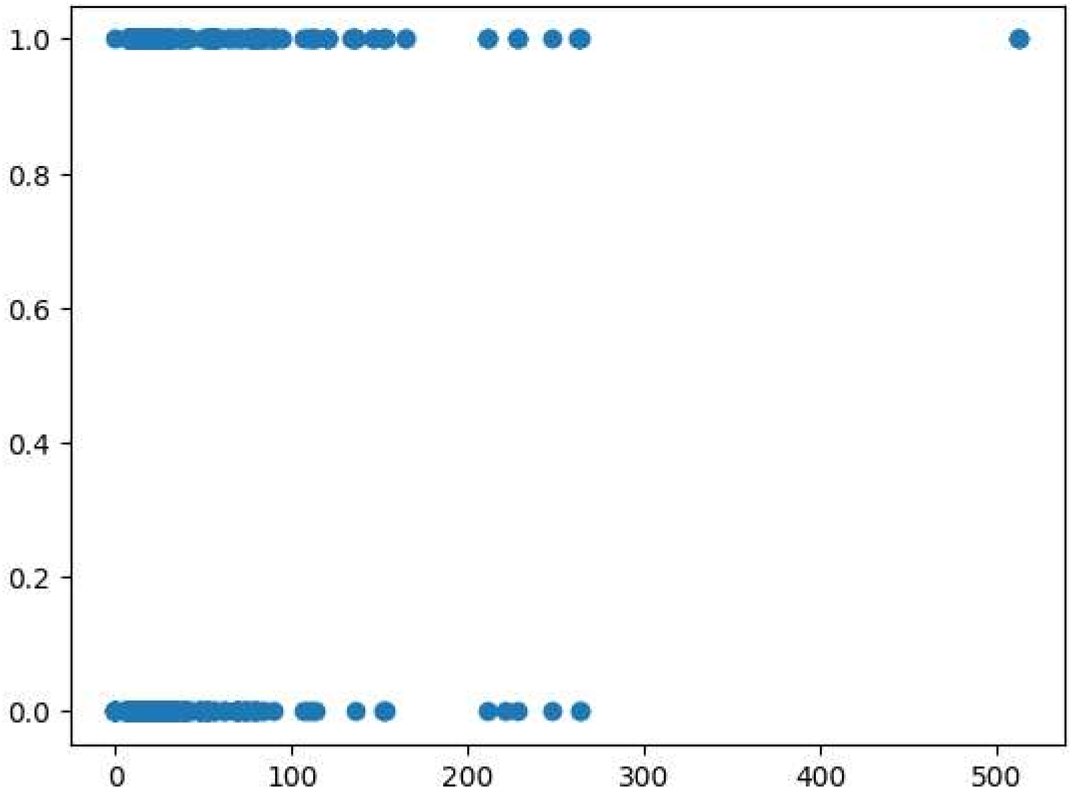
Out[18]:

	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

Data Visualization

In [19]:
```
plt.scatter(df["Fare"],df["Survived"])
```

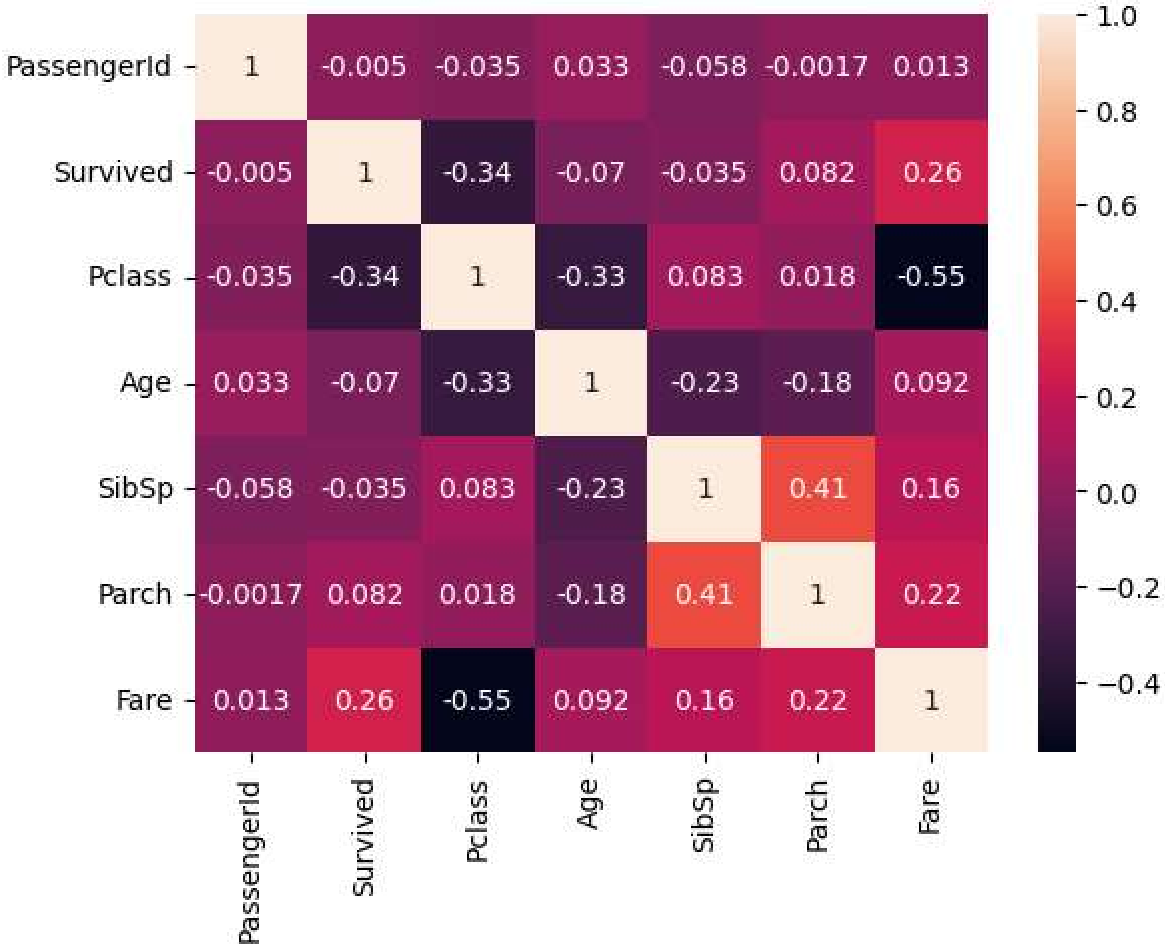
Out[19]:
```
<matplotlib.collections.PathCollection at 0x7b32cd9d3fa0>
```



```
In [20]: sns.heatmap(df.corr(),annot=True)
```

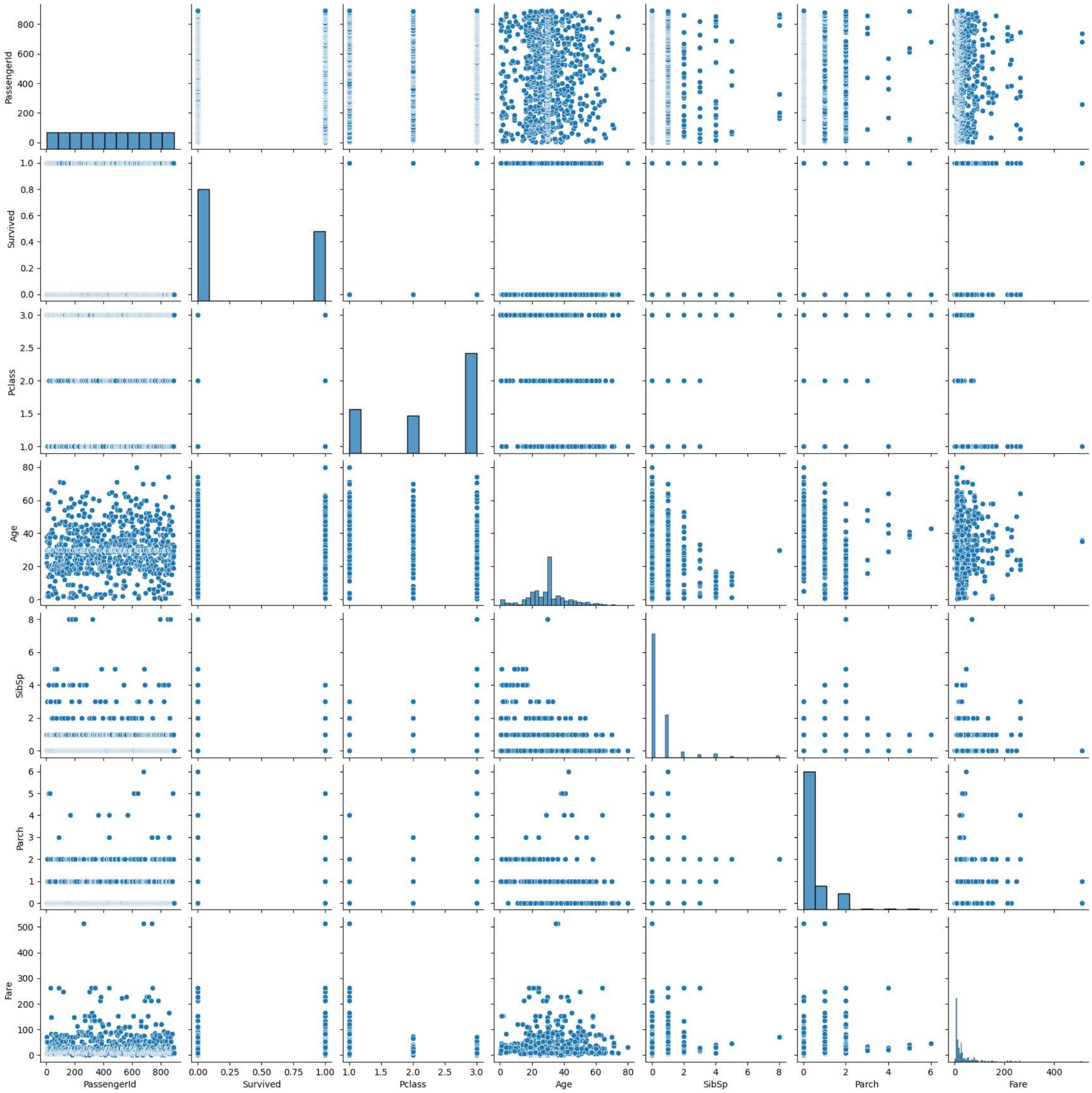
```
<ipython-input-20-8df7bcac526d>:1: FutureWarning: The default value of numeric_
only in DataFrame.corr is deprecated. In a future version, it will default to F
alse. Select only valid columns or specify the value of numeric_only to silence
this warning.
  sns.heatmap(df.corr(),annot=True)
```

```
Out[20]: <Axes: >
```



```
In [21]: sns.pairplot(df)
```

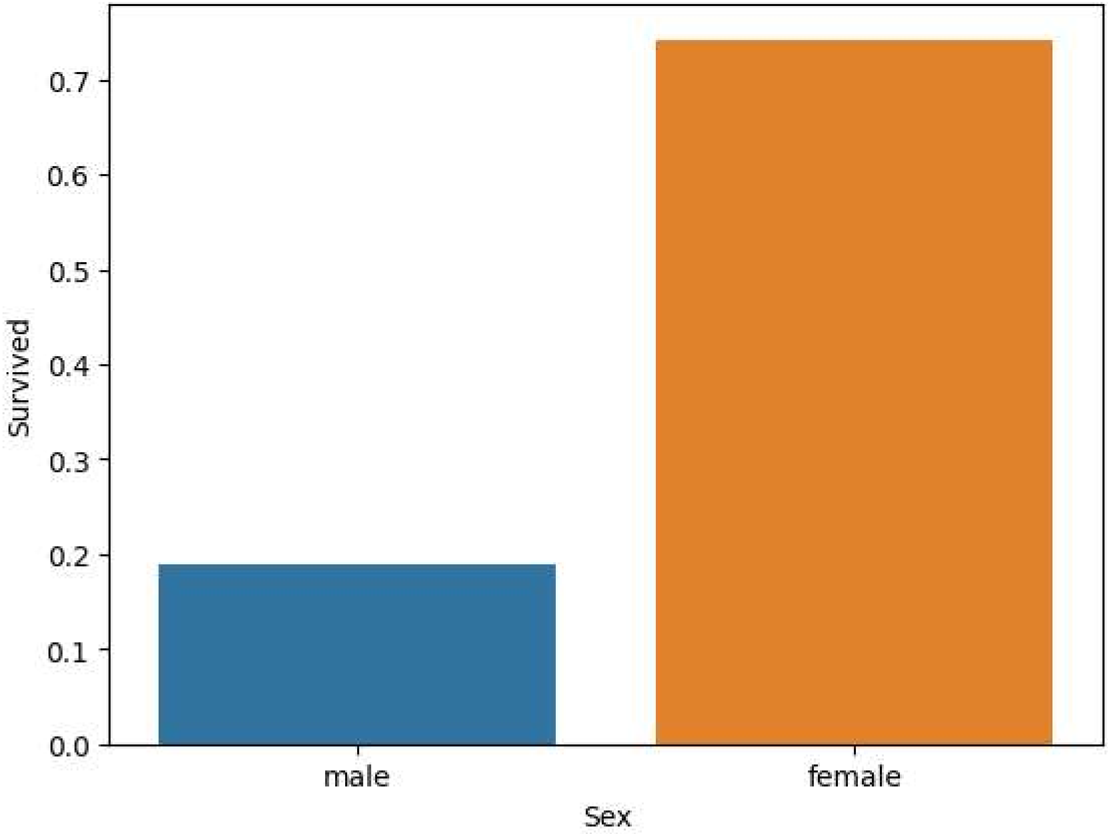
```
Out[21]: <seaborn.axisgrid.PairGrid at 0x7b3295a7bac0>
```



In [22]:
```
sns.barplot(x=df["Sex"],y=df["Survived"],ci=0)
```

```
<ipython-input-22-8ae461271d98>:1: FutureWarning:

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

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

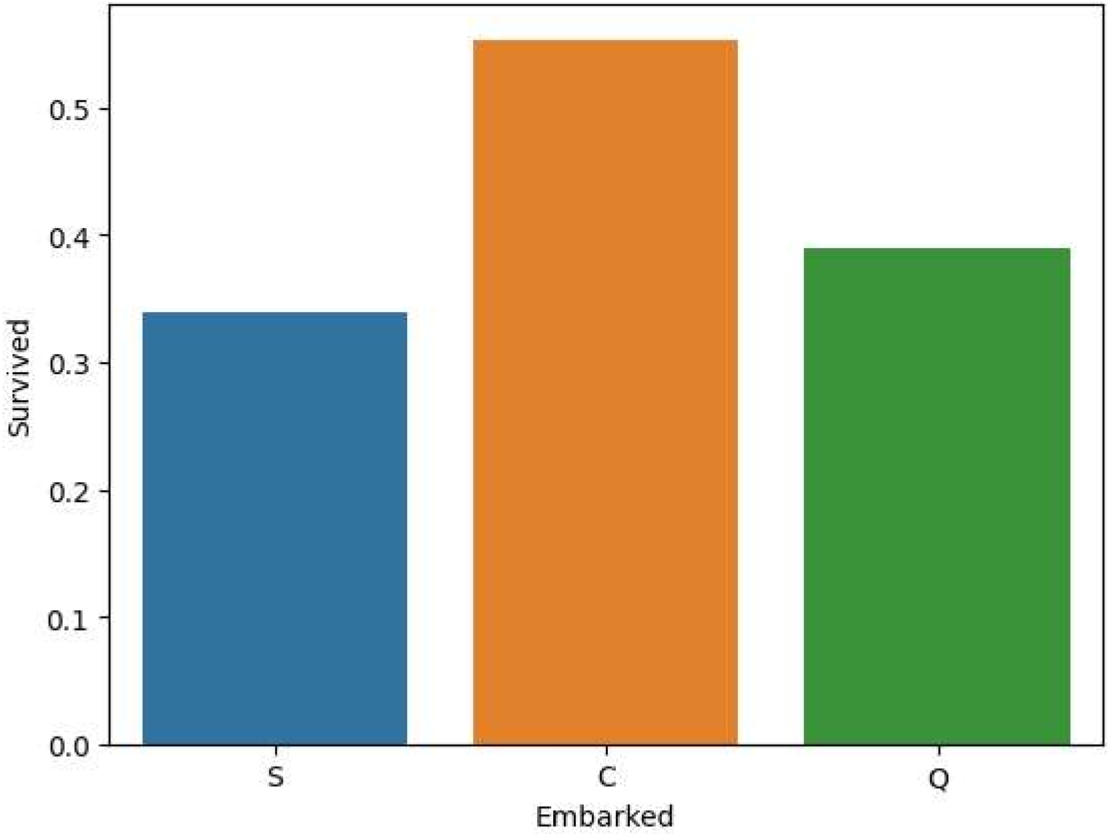
Out[22]:
```
<Axes: xlabel='Sex', ylabel='Survived'>
```



In [23]:
```
sns.barplot(x=df["Embarked"],y=df["Survived"],ci=0)
```

```
<ipython-input-23-d5b0276940a6>:1: FutureWarning:

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

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

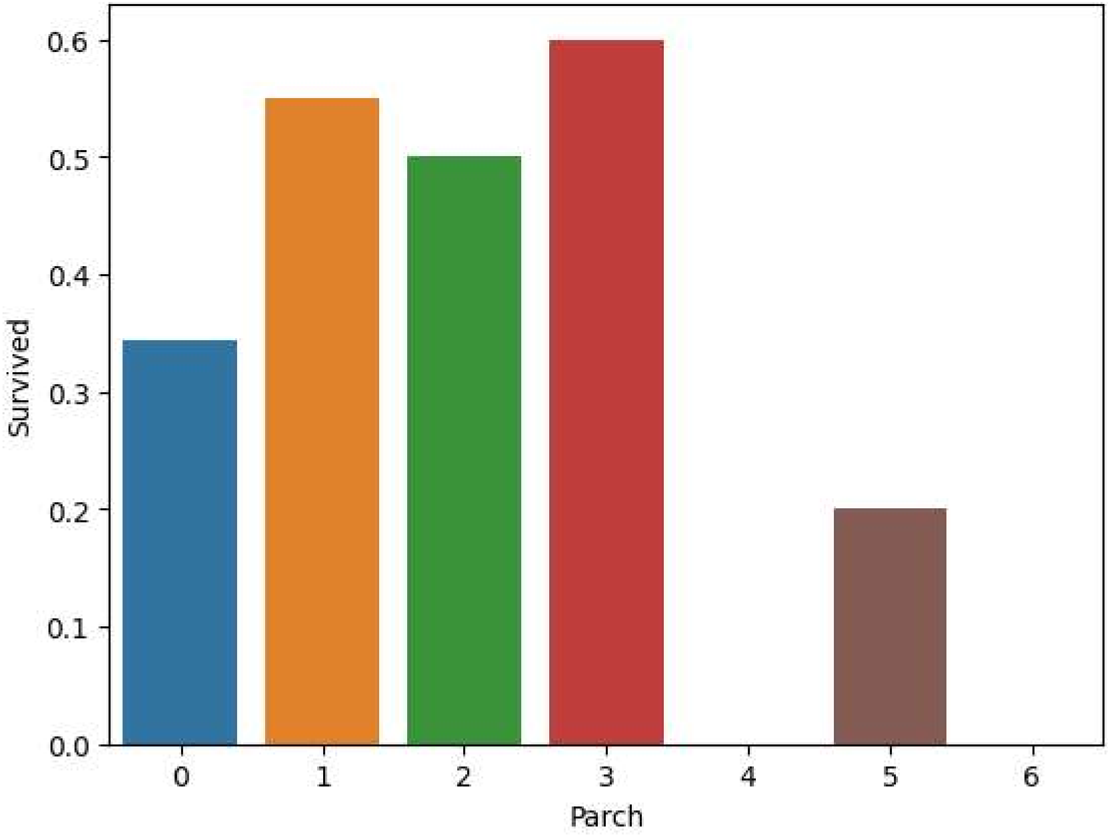
Out[23]:
```
<Axes: xlabel='Embarked', ylabel='Survived'>
```



In [24]:
```
sns.barplot(x=df["Parch"],y=df["Survived"],ci=0)
```

```
<ipython-input-24-a1496fefeaf8>:1: FutureWarning:

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

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

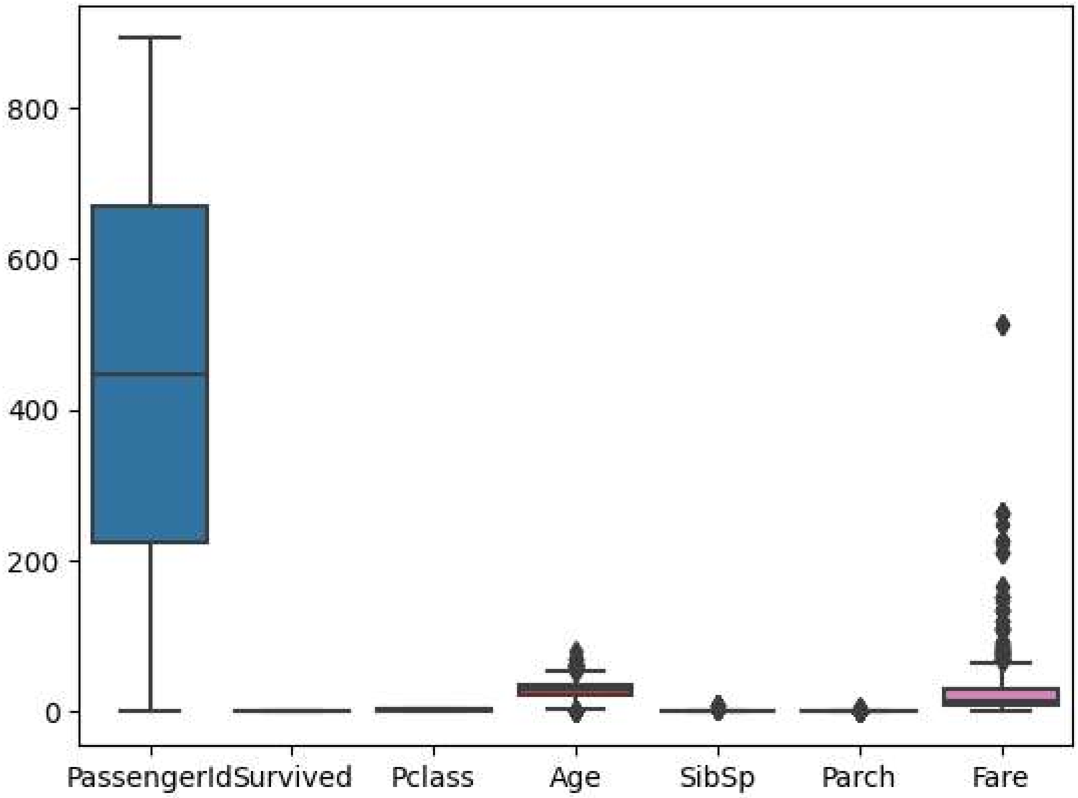
Out[24]:
```
<Axes: xlabel='Parch', ylabel='Survived'>
```



Outlier Detection

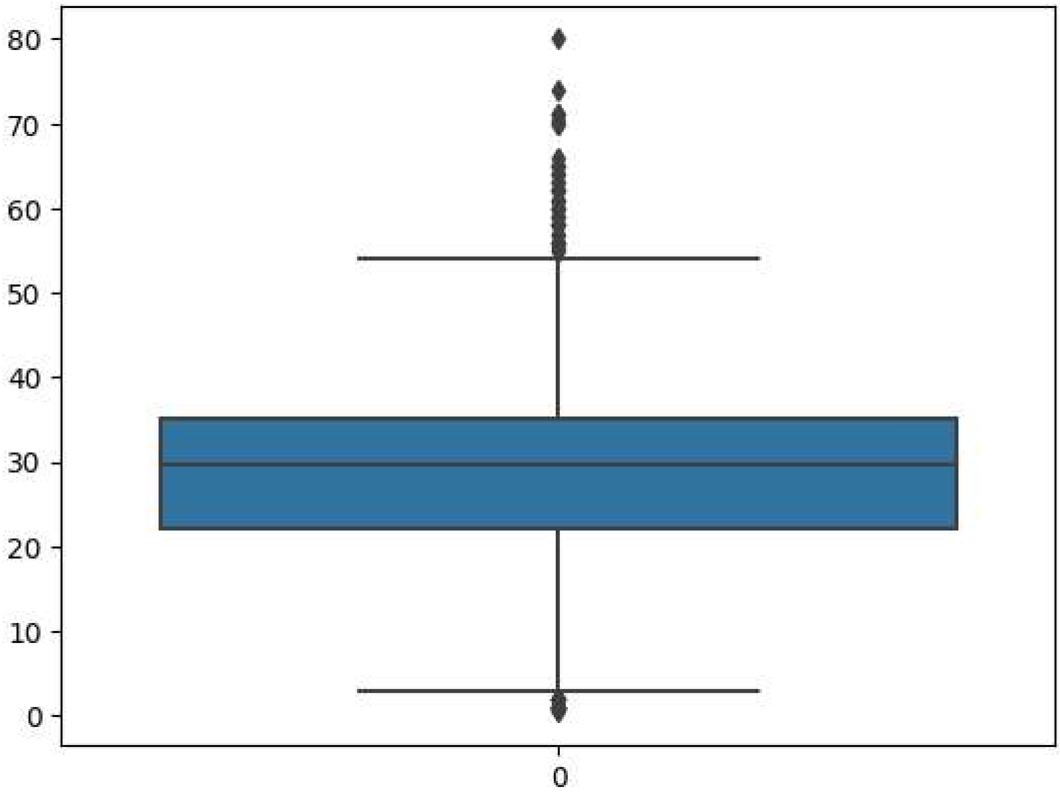
In [25]:
```
sns.boxplot(df)
```

Out[25]:
```
<Axes: >
```



In [26]:
```
sns.boxplot(df.Age)
```

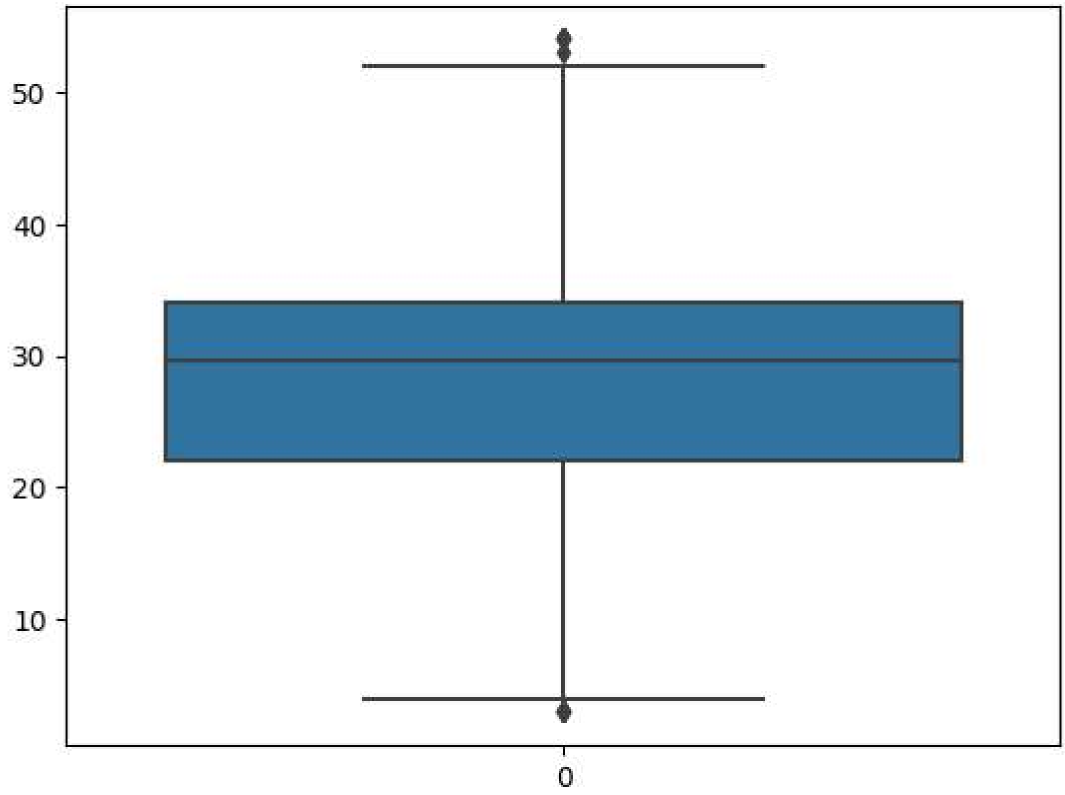
Out[26]:
```
<Axes: >
```



In [27]:
```
Q1 = df['Age'].quantile(0.25)
Q3 = df['Age'].quantile(0.75)

IQR = Q3 - Q1

threshold = 1.5 * IQR

df = df[(df['Age'] >= Q1 - threshold) & (df['Age'] <= Q3 + threshold)]
```

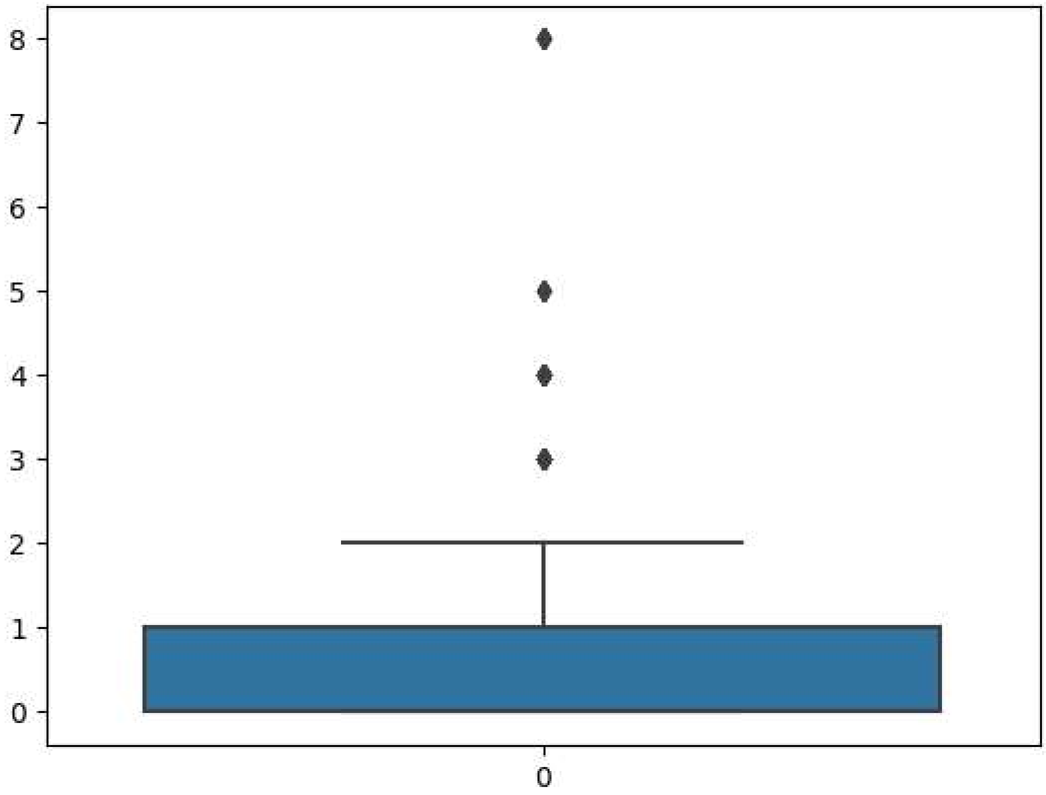
In [28]:
```
sns.boxplot(df.Age)
```

Out[28]:
```
<Axes: >
```



In [29]:
```
sns.boxplot(df.SibSp)
```

Out[29]:
```
<Axes: >
```

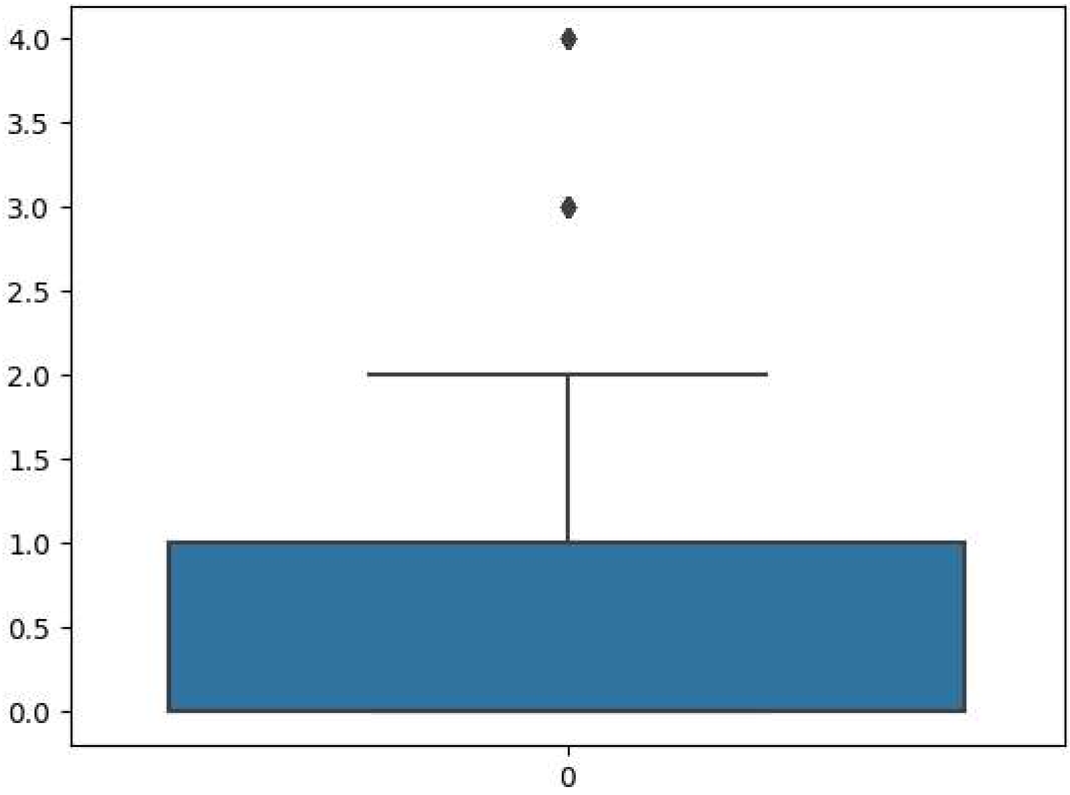


In [30]:
```
p99 = df.SibSp.quantile(0.99)
```

In [31]:
```
df = df[df.SibSp < p99]
```

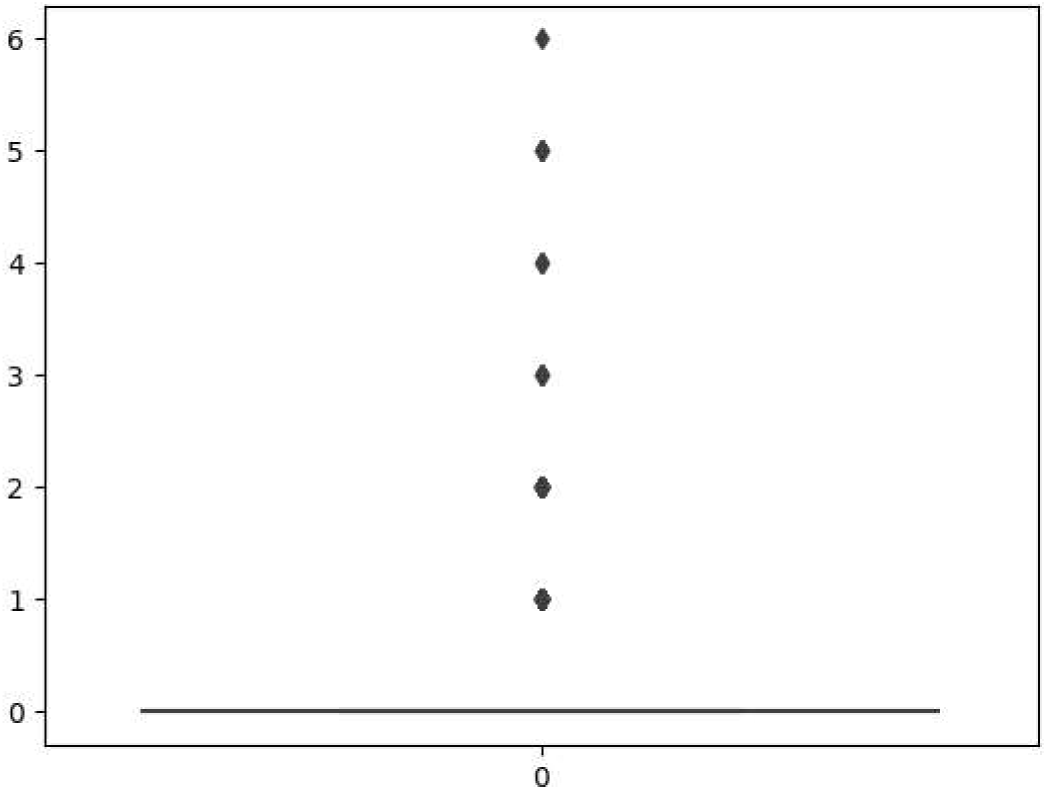
In [32]:
```
sns.boxplot(df.SibSp)
```

Out[32]:
```
<Axes: >
```



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

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

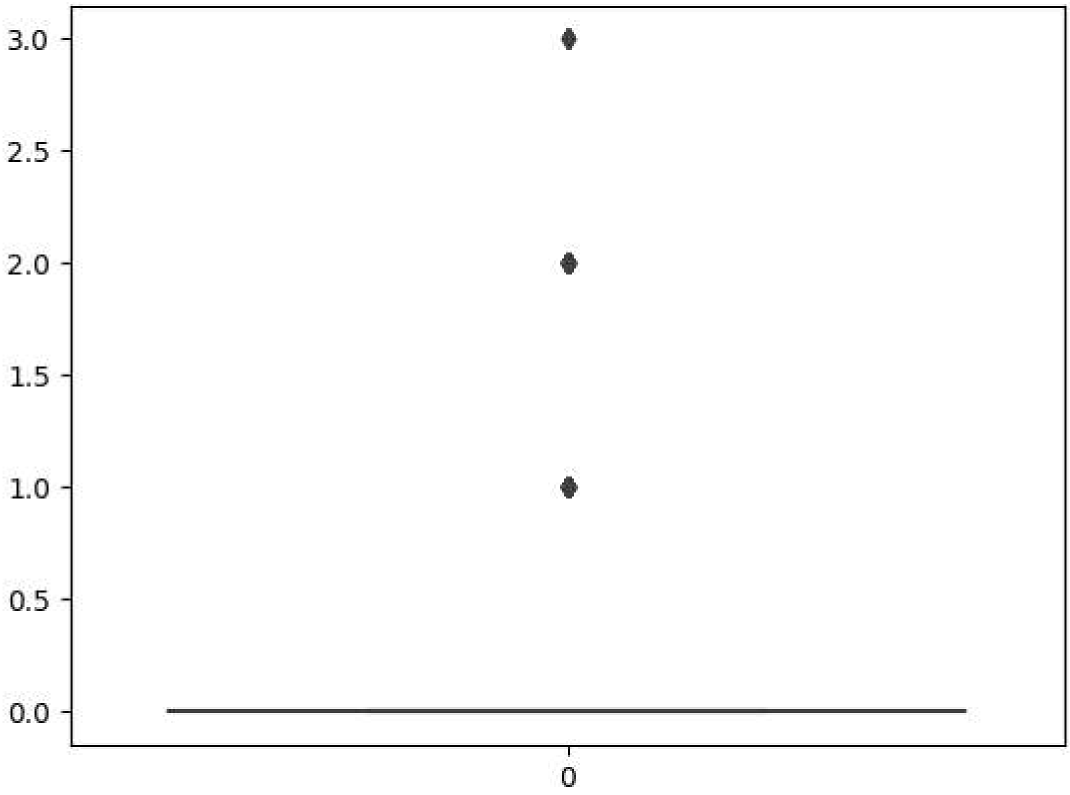


In [34]:
```
p99 = df.Parch.quantile(0.99)
```

In [35]:
```
df = df[df.Parch < p99]
```

In [36]:
```
sns.boxplot(df["Parch"])
```

Out[36]:
```
<Axes: >
```

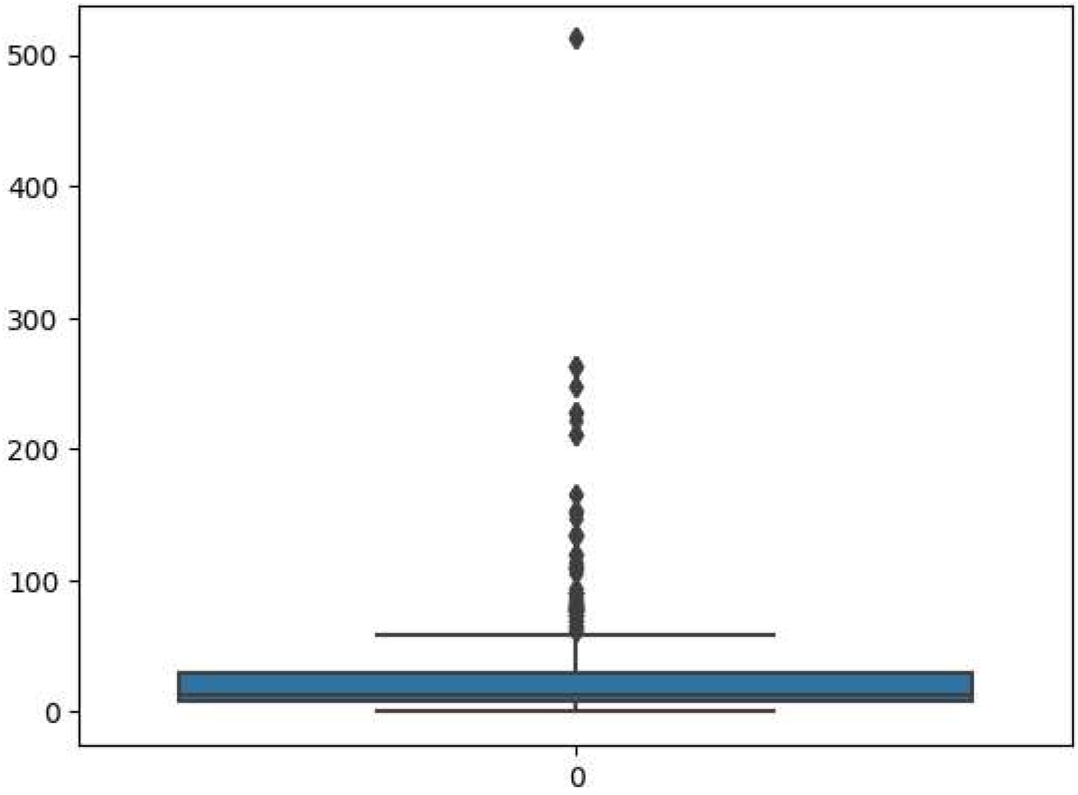


In [37]:

```
sns.boxplot(df["Fare"])
```

Out[37]:

```
<Axes: >
```

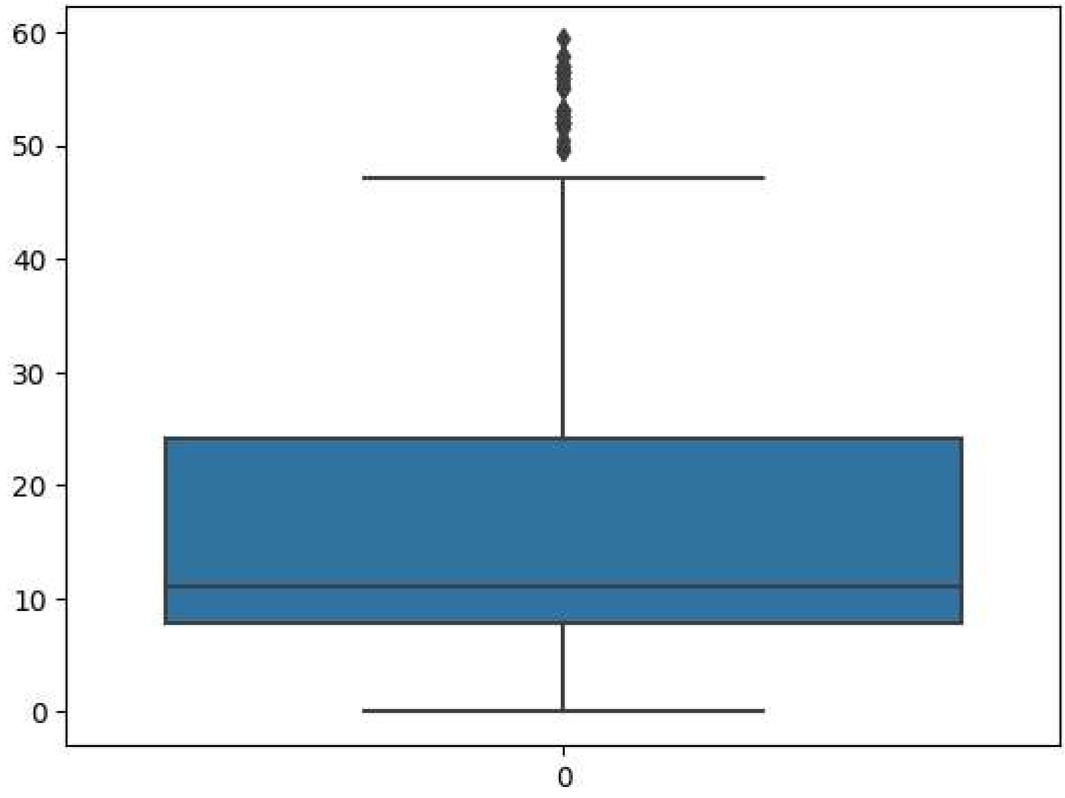


In [38]:

```
Q1 = df['Fare'].quantile(0.25)
Q3 = df['Fare'].quantile(0.75)

IQR = Q3 - Q1

threshold = 1.5 * IQR

df = df[(df['Fare'] >= Q1 - threshold) & (df['Fare'] <= Q3 + threshold)]
```

```
In [39]: sns.boxplot(df.Fare)
```

```
Out[39]: <Axes: >
```



Splitting Dependent and Independent Variables

```
In [40]: x = df.drop(columns=["Survived","PassengerId","Name","Ticket","Cabin"],axis=1) #
```

```
In [41]: x.head()
```

Out[41]:

	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked
0	3	male	22.000000	1	0	7.2500	S
2	3	female	26.000000	0	0	7.9250	S
3	1	female	35.000000	1	0	53.1000	S
4	3	male	35.000000	0	0	8.0500	S
5	3	male	29.699118	0	0	8.4583	Q

```
In [42]: y = pd.Series(df["Survived"])
```

In [43]:
```
y.head()
```

Out[43]:
```
0    0
2    1
3    1
4    0
5    0
Name: Survived, dtype: int64
```

Encoding

In [44]:
```
from sklearn.preprocessing import LabelEncoder
```

In [45]:
```
le = LabelEncoder()
```

In [46]:
```
x["Sex"] = le.fit_transform(x["Sex"])
```

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

Out[47]:

	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked
0	3	1	22.000000	1	0	7.2500	S
2	3	0	26.000000	0	0	7.9250	S
3	1	0	35.000000	1	0	53.1000	S
4	3	1	35.000000	0	0	8.0500	S
5	3	1	29.699118	0	0	8.4583	Q

In [48]:
```
print(le.classes_)
```

```
['female' 'male']
```

In [50]:
```
mapping=dict(zip(le.classes_,range(len(le.classes_))))
mapping
```

Out[50]:
```
{'female': 0, 'male': 1}
```

In [51]:
```
le1 = LabelEncoder()
```

In [52]:
```
x["Embarked"] = le1.fit_transform(x["Embarked"])
```

In [53]:
```
x.head()
```

Out[53]:

	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked
0	3	1	22.000000	1	0	7.2500	2
2	3	0	26.000000	0	0	7.9250	2
3	1	0	35.000000	1	0	53.1000	2
4	3	1	35.000000	0	0	8.0500	2
5	3	1	29.699118	0	0	8.4583	1

In [54]:
```
print(le1.classes_)
```

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

In [55]:
```
mapping1=dict(zip(le1.classes_,range(len(le1.classes_))))
mapping1
```

Out[55]:
```
{'C': 0, 'Q': 1, 'S': 2}
```

Feature Scaling

In [56]:
```
from sklearn.preprocessing import MinMaxScaler
ms = MinMaxScaler()
```

In [57]:
```
x_Scaled = pd.DataFrame(ms.fit_transform(x),columns = x.columns)
```

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

Out[58]:

	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked
0	1.0	1.0	0.372549	0.25	0.0	0.122054	1.0
1	1.0	0.0	0.450980	0.00	0.0	0.133418	1.0
2	0.0	0.0	0.627451	0.25	0.0	0.893939	1.0
3	1.0	1.0	0.627451	0.00	0.0	0.135522	1.0
4	1.0	1.0	0.523512	0.00	0.0	0.142396	0.5

Splitting Training and Testing Data

In [59]:
```
from sklearn.model_selection import train_test_split
```

In [60]:
```
x_train,x_test,y_train,y_test = train_test_split(x_Scaled,y,test_size = 0.2,rando
```

In [61]:

```
print(x_train.shape,x_test.shape,y_train.shape,y_test.shape)
```

```
(562, 7) (141, 7) (562,) (141,)
```