purushotham21bce5289-assignment-3

September 20, 2023

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

```
[318]: df=pd.read_csv('Titanic-dfset.csv')
       df.head()
```

```
[318]:    PassengerId  Survived  Pclass  \
       0            1         0       3
       1            2         1       1
       2            3         1       3
       3            4         1       1
       4            5         0       3

                                                       Name     Sex   Age  SibSp  \
       0                            Braund, Mr. Owen Harris    male  22.0      1
       1  Cumings, Mrs. John Bradley (Florence Briggs Th…  female  38.0      1
       2                             Heikkinen, Miss. Laina  female  26.0      0
       3       Futrelle, Mrs. Jacques Heath (Lily May Peel)  female  35.0      1
       4                           Allen, Mr. William Henry    male  35.0      0

          Parch            Ticket     Fare Cabin Embarked
       0      0         A/5 21171   7.2500   NaN        S
       1      0          PC 17599  71.2833   C85        C
       2      0  STON/O2. 3101282   7.9250   NaN        S
       3      0            113803  53.1000  C123        S
       4      0            373450   8.0500   NaN        S
```

```
[319]: 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
```

[320]:

```
df.describe()
```

[320]:

```
       PassengerId    Survived      Pclass         Age       SibSp  \
count   891.000000  891.000000  891.000000  714.000000  891.000000
mean    446.000000    0.383838    2.308642   29.699118    0.523008
std     257.353842    0.486592    0.836071   14.526497    1.102743
min       1.000000    0.000000    1.000000    0.420000    0.000000
25%     223.500000    0.000000    2.000000   20.125000    0.000000
50%     446.000000    0.000000    3.000000   28.000000    0.000000
75%     668.500000    1.000000    3.000000   38.000000    1.000000
max     891.000000    1.000000    3.000000   80.000000    8.000000

            Parch        Fare
count  891.000000  891.000000
mean     0.381594   32.204208
std      0.806057   49.693429
min      0.000000    0.000000
25%      0.000000    7.910400
50%      0.000000   14.454200
75%      0.000000   31.000000
max      6.000000  512.329200
```

[321]:

```
corr=df.corr()
corr
```

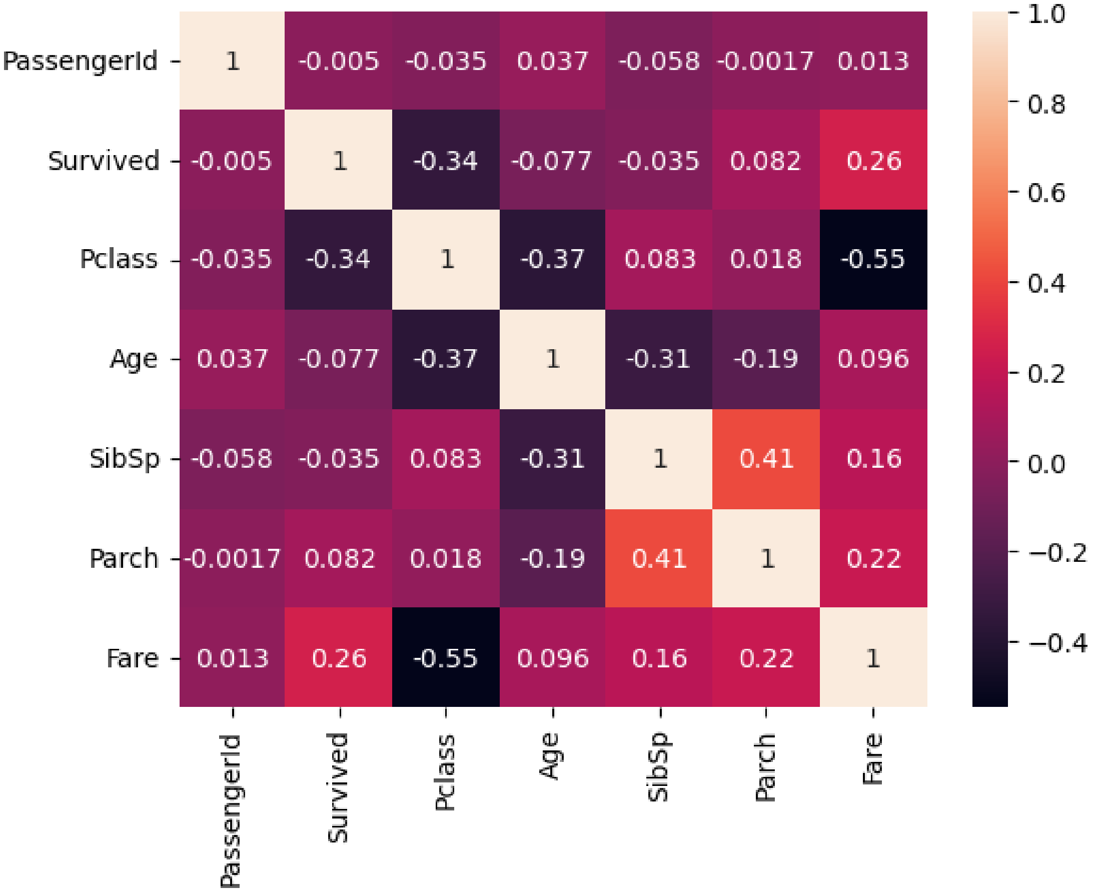
[321]:

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

```
                  Fare
PassengerId   0.012658
Survived      0.257307
Pclass       -0.549500
Age           0.096067
SibSp         0.159651
Parch         0.216225
Fare          1.000000
```

[322]:
```
sns.heatmap(corr,annot=True)
```

[322]:
```
<AxesSubplot:>
```



[323]:
```
df.Cabin.value_counts()
```

[323]:
```
B96 B98        4
G6             4
C23 C25 C27    4
```

```
C22 C26        3
F33            3
              ..
E34            1
C7             1
C54            1
E36            1
C148           1
Name: Cabin, Length: 147, dtype: int64
```

[324]:
```
df.Embarked.value_counts()
```

[324]:
```
S    644
C    168
Q     77
Name: Embarked, dtype: int64
```

[325]:
```
df.Parch.value_counts()
```

[325]:
```
0    678
1    118
2     80
5      5
3      5
4      4
6      1
Name: Parch, dtype: int64
```

[326]:
```
df.isnull().any()
```

[326]:
```
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
```

[327]:
```
df.isnull().sum()
```

```
[327]: 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
```

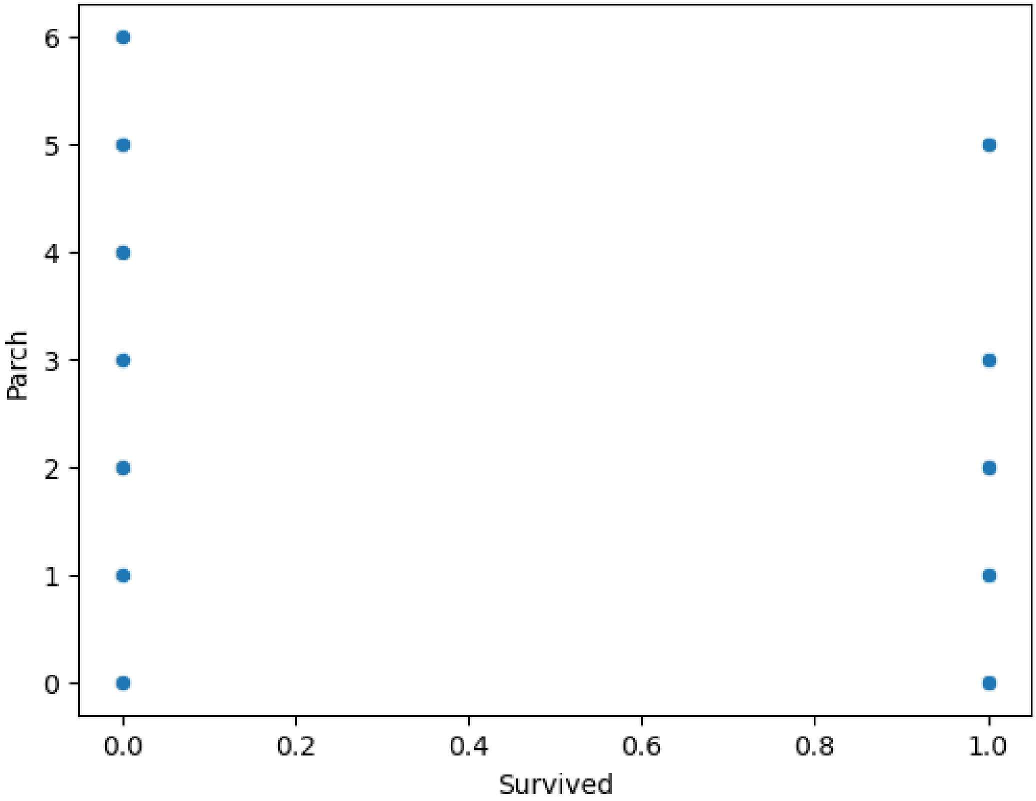
```
[328]: df["Age"].fillna(df["Age"].mean(),inplace=True)
       df["Cabin"].fillna(df["Cabin"].mode()[0],inplace=True)
       df["Embarked"].fillna(df["Embarked"].mode()[0],inplace=True)
```

```
[329]: df.isnull().sum()#I removed all null values
```

```
[329]: 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
```

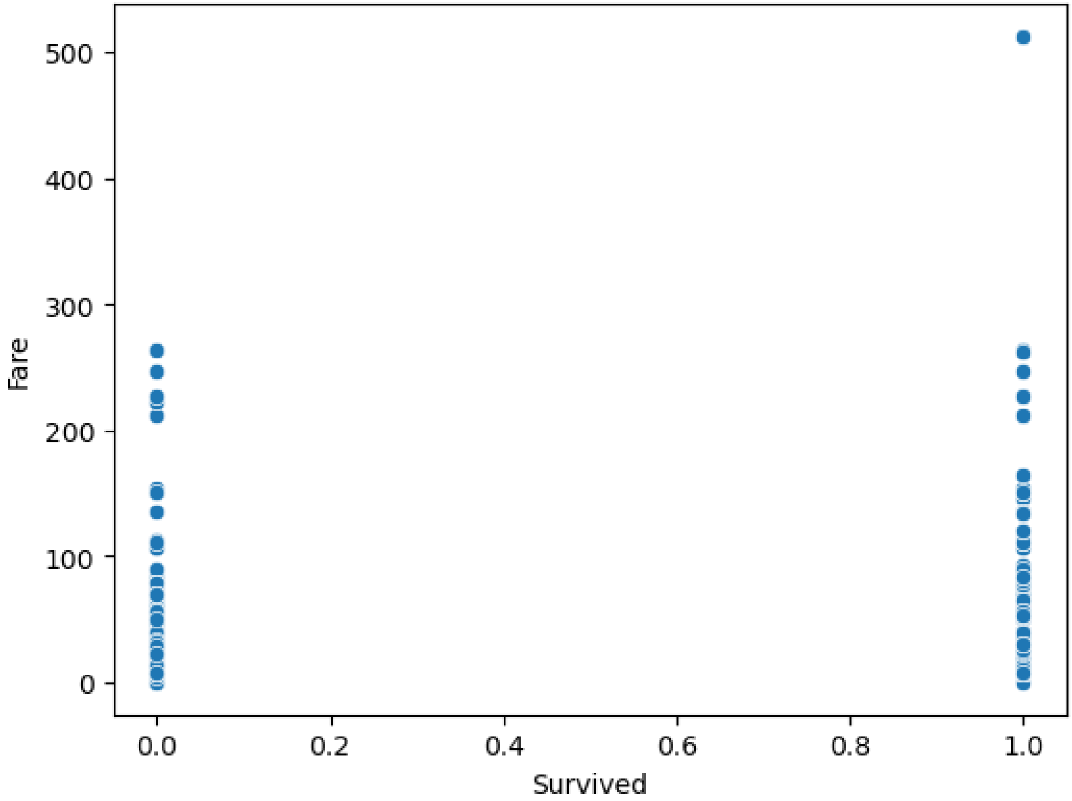
```
[330]: sns.scatterplot(x=df["Survived"],y=df["Parch"])
```

```
[330]: <AxesSubplot:xlabel='Survived', ylabel='Parch'>
```



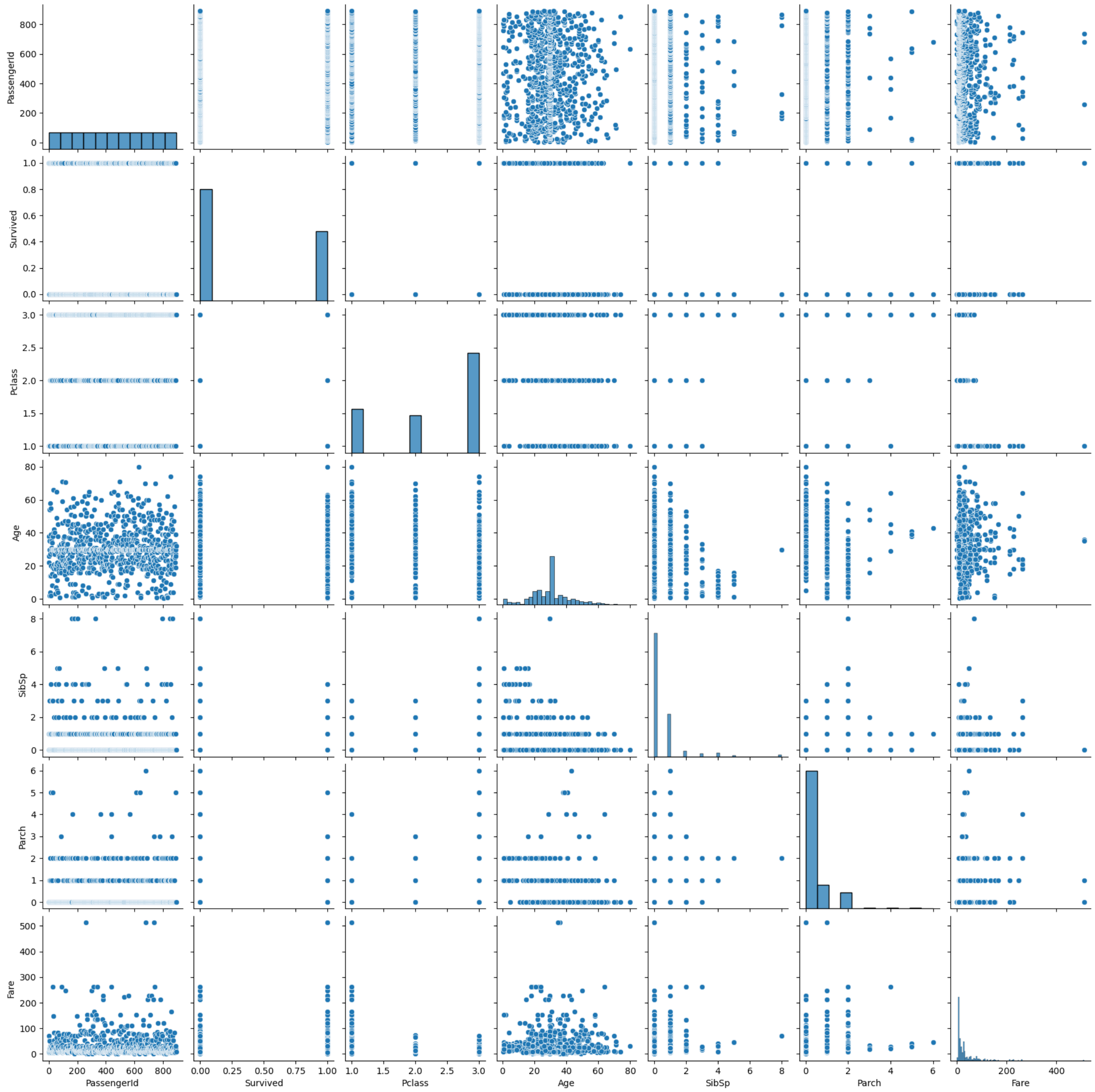
```
[331]: sns.scatterplot(x=df["Survived"],y=df["Fare"])
```

```
[331]: <AxesSubplot:xlabel='Survived', ylabel='Fare'>
```



[332]:
```
sns.pairplot(df)
```

[332]:
```
<seaborn.axisgrid.PairGrid at 0x2064cd352e0>
```



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

```
[334]: df["Sex"]=le.fit_transform(df["Sex"])
```

```
[335]: df["Embarked"]=le.fit_transform(df["Embarked"])
```

```
[336]: df.head()
```

```
[336]:    PassengerId  Survived  Pclass  \
       0            1         0       3
       1            2         1       1
       2            3         1       3
```

```
3            4         1       1
4            5         0       3

                                                Name  Sex   Age  SibSp  Parch  \
0                            Braund, Mr. Owen Harris    1  22.0      1      0
1  Cumings, Mrs. John Bradley (Florence Briggs Th…    0  38.0      1      0
2                             Heikkinen, Miss. Laina    0  26.0      0      0
3       Futrelle, Mrs. Jacques Heath (Lily May Peel)    0  35.0      1      0
4                           Allen, Mr. William Henry    1  35.0      0      0

             Ticket     Fare    Cabin  Embarked
0         A/5 21171   7.2500  B96 B98         2
1          PC 17599  71.2833      C85         0
2  STON/O2. 3101282   7.9250  B96 B98         2
3            113803  53.1000     C123         2
4            373450   8.0500  B96 B98         2
```

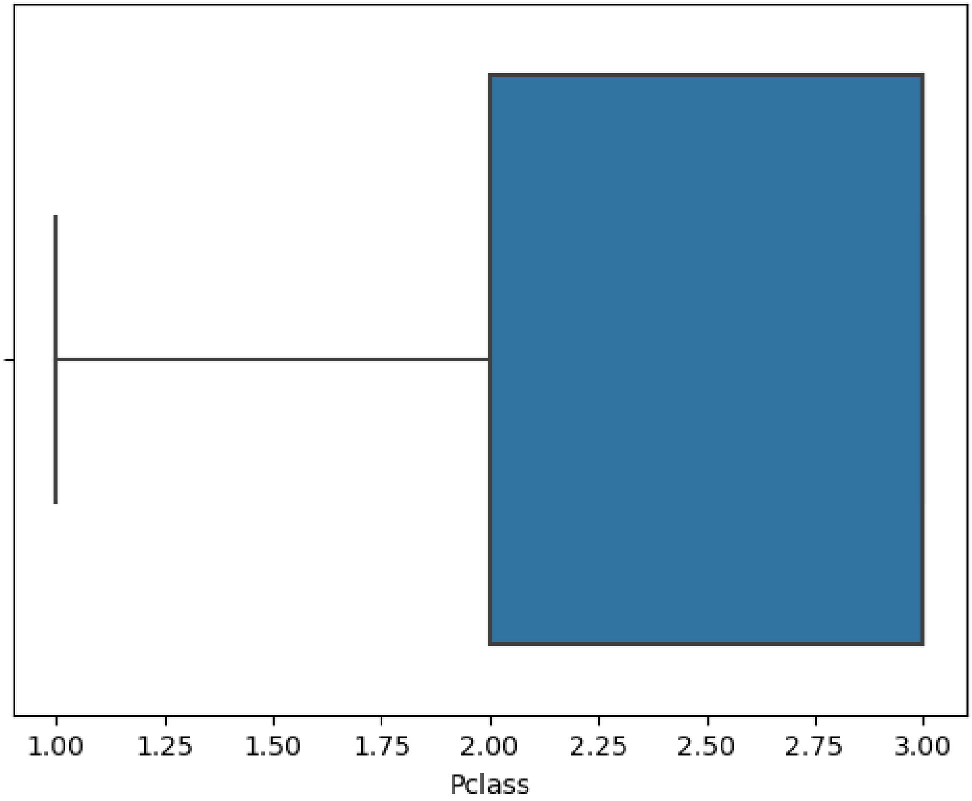
[337]:

```
sns.boxplot(df['Pclass'])
```

```
C:\Users\harsh\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(
```

[337]:

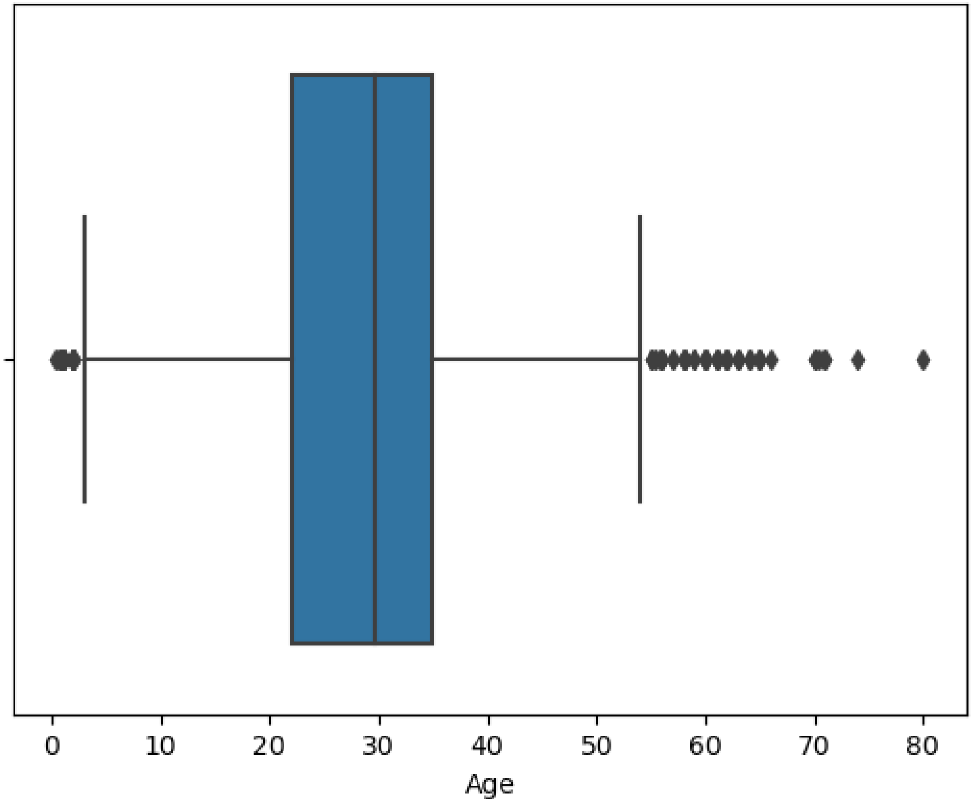
```
<AxesSubplot:xlabel='Pclass'>
```



[338]:
```
sns.boxplot(df['Age'])
```

```
C:\Users\harsh\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(
```

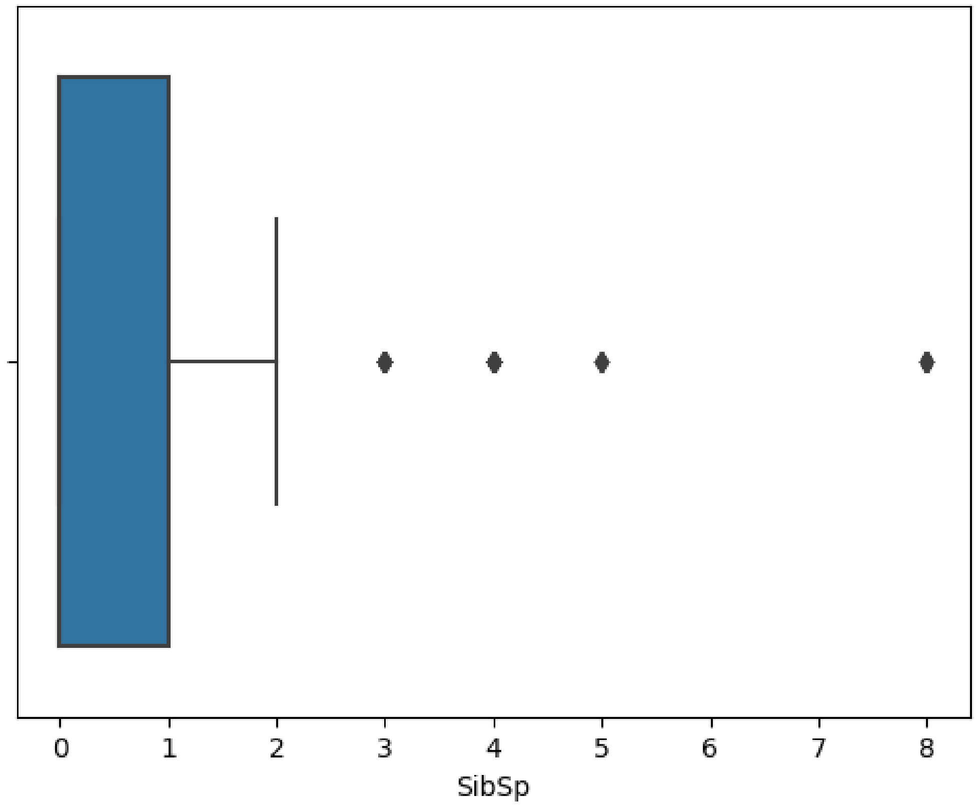
[338]:
```
<AxesSubplot:xlabel='Age'>
```



[339]:
```
sns.boxplot(df['SibSp'])
```

```
C:\Users\harsh\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(
```

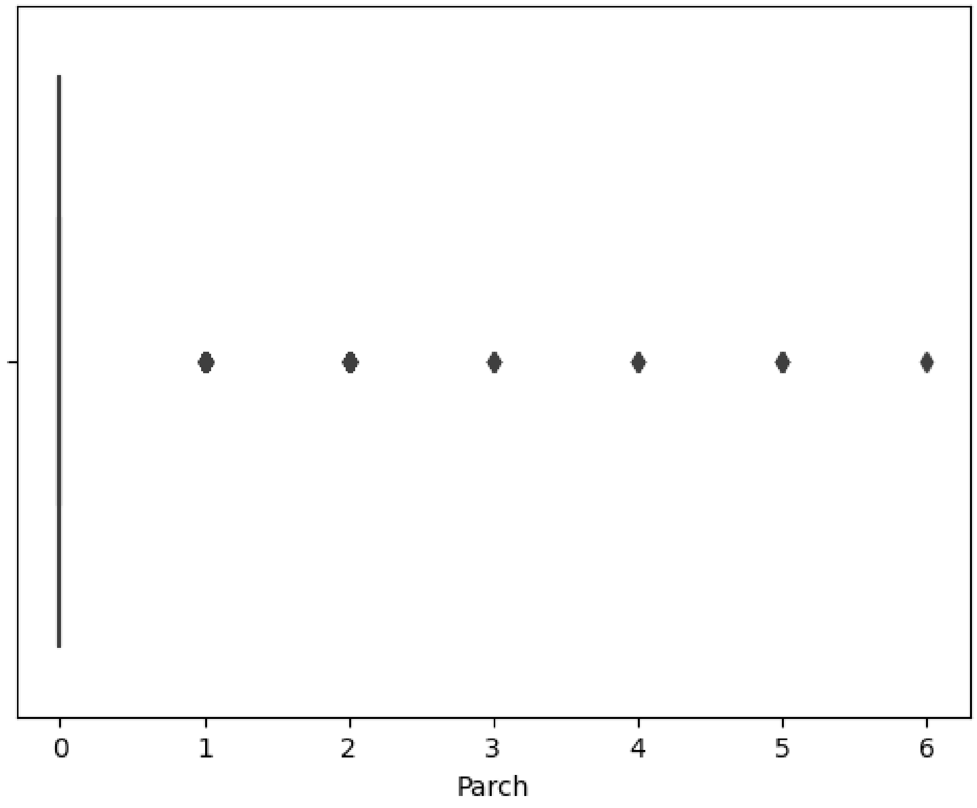
[339]:
```
<AxesSubplot:xlabel='SibSp'>
```



```
[340]: sns.boxplot(df['Parch'])
```

```
C:\Users\harsh\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(
```

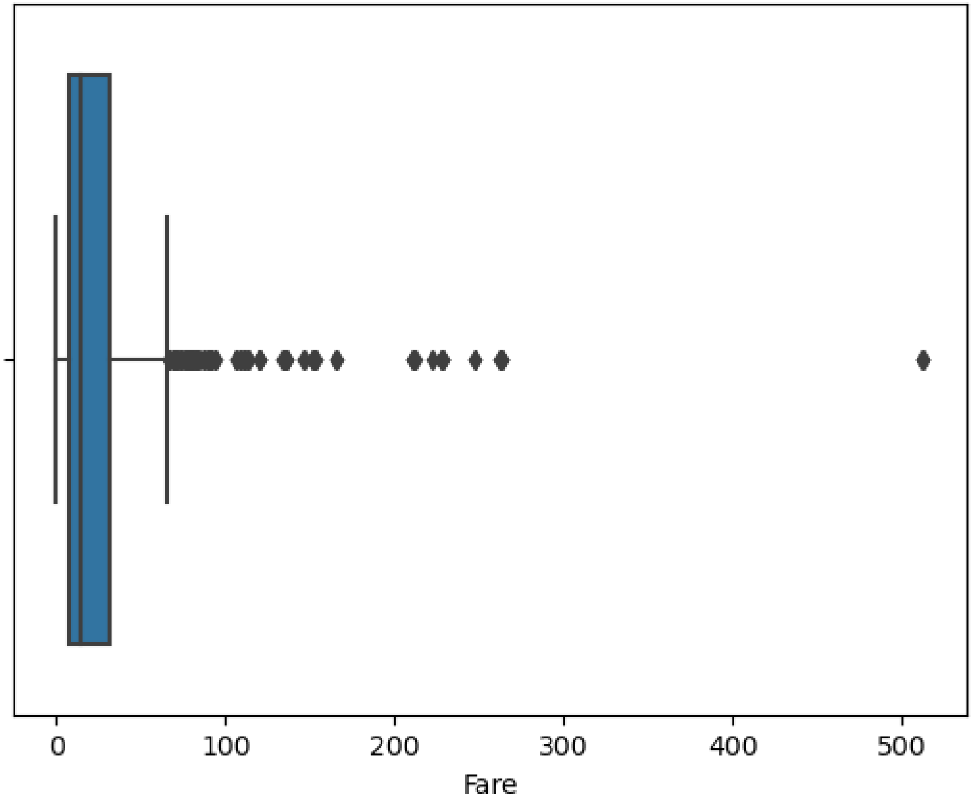
```
[340]: <AxesSubplot:xlabel='Parch'>
```



[341]:
```
sns.boxplot(df['Fare'])
```

```
C:\Users\harsh\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(
```

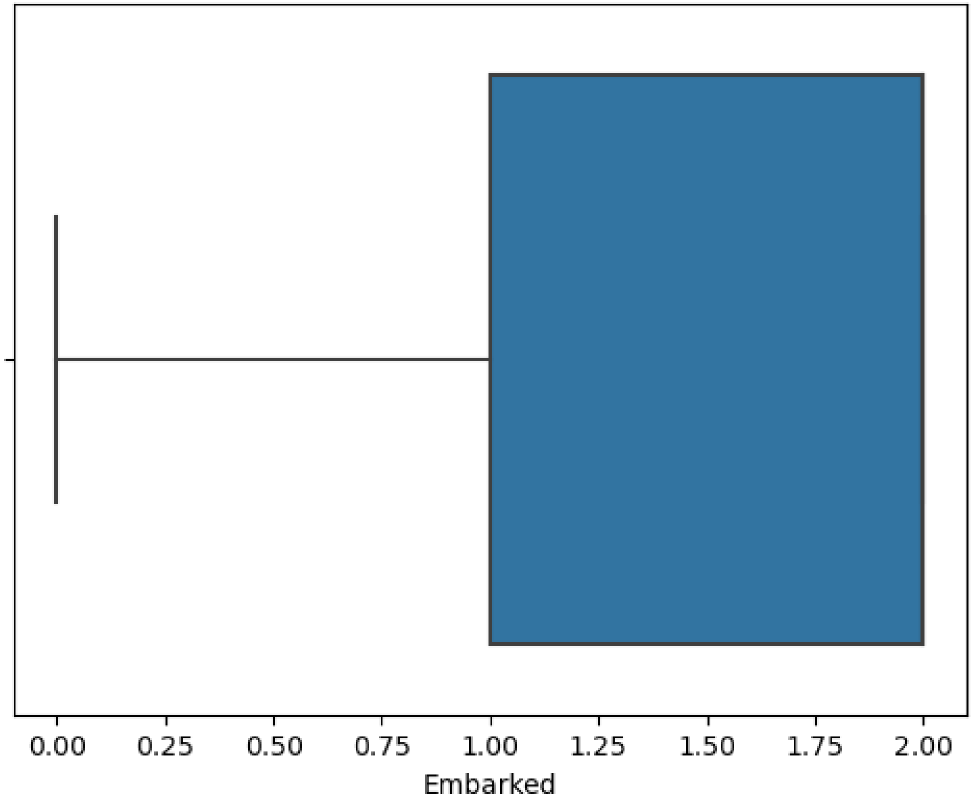
[341]:
```
<AxesSubplot:xlabel='Fare'>
```



[342]:
```
sns.boxplot(df['Embarked'])
```

```
C:\Users\harsh\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(
```

[342]:
```
<AxesSubplot:xlabel='Embarked'>
```



[343]:

```
q1=df.Age.quantile(0.25)
q3=df.Age.quantile(0.75)
print(q1)
print(q3)
```

```
22.0
35.0
```

[344]:

```
iqr=q3-q1
iqr
```

[344]:

```
13.0
```

[345]:

```
upperlimit = q3+1.5*iqr
upperlimit
```

[345]:

```
54.5
```

[346]:

```
lowerlimit=q1-1.5*iqr
lowerlimit
```

```
[346]: 2.5
```

```
[347]: df.median()
```

```
C:\Users\harsh\AppData\Local\Temp\ipykernel_11488\4184645713.py:1:
FutureWarning: Dropping of nuisance columns in DataFrame reductions (with
'numeric_only=None') is deprecated; in a future version this will raise
TypeError.  Select only valid columns before calling the reduction.
  data.median()
```

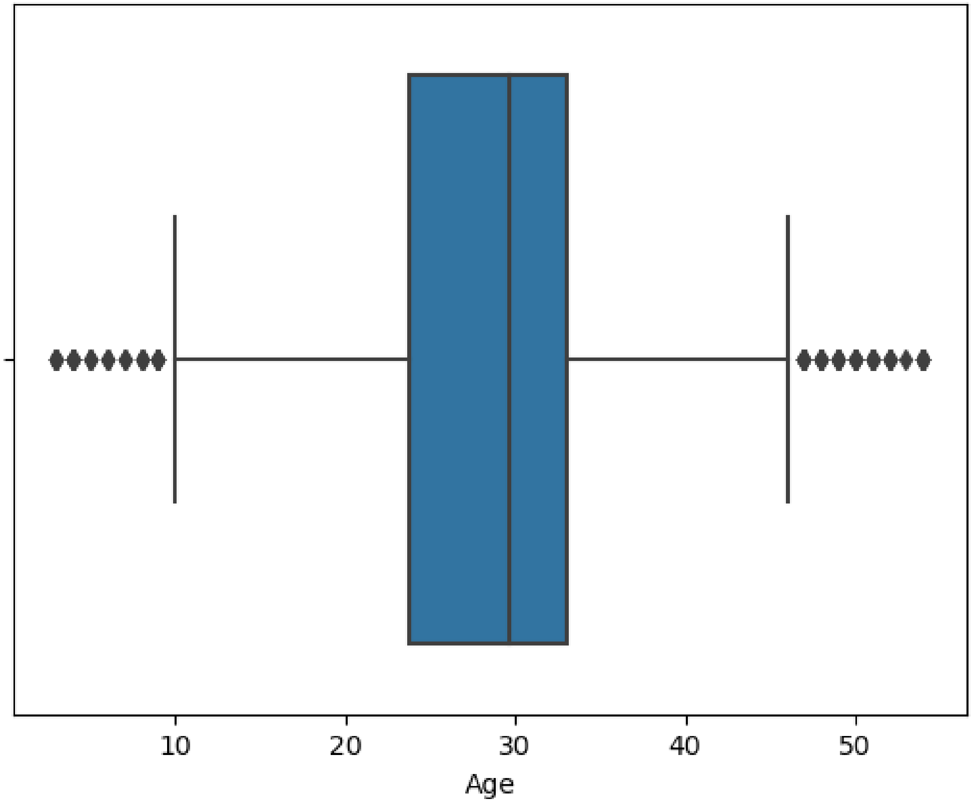
```
[347]: PassengerId    446.000000
       Survived         0.000000
       Pclass           3.000000
       Sex              1.000000
       Age             29.699118
       SibSp            0.000000
       Parch            0.000000
       Fare            14.454200
       Embarked         2.000000
       dtype: float64
```

```
[348]: df['Age']=np.where(df['Age']>upperlimit,29.699118,df['Age'])
       df['Age'] = np.where(df['Age'] < lowerlimit,29.699118, df['Age'])
```

```
[349]: sns.boxplot(df['Age'])
```

```
C:\Users\harsh\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(
```

```
[349]: <AxesSubplot:xlabel='Age'>
```



```
[350]: q1=df.SibSp.quantile(0.25)
       q3=df.SibSp.quantile(0.75)
       print(q1)
       print(q3)
```

```
0.0
1.0
```

```
[351]: iqr=q3-q1
       iqr
```

```
[351]: 1.0
```

```
[352]: upperlimit = q3+1.5*iqr
       upperlimit
```

```
[352]: 2.5
```

```
[353]: lowerlimit=q1-1.5*iqr
       lowerlimit
```

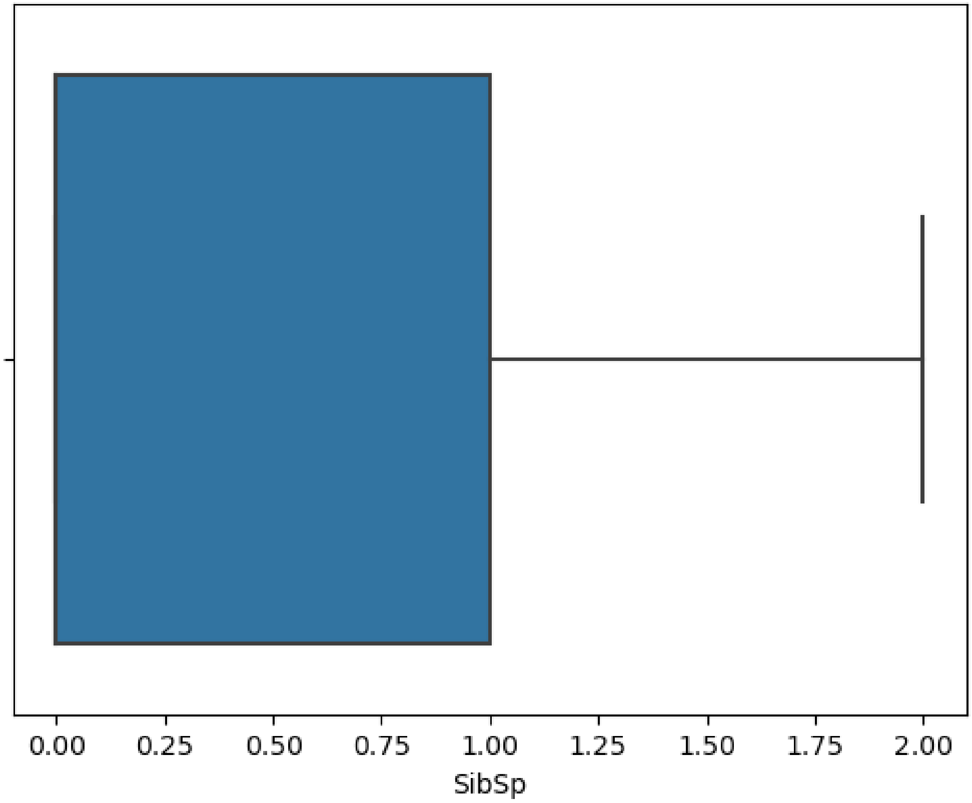
```
[353]: -1.5
```

```
[354]: df['SibSp']=np.where(df['SibSp']>upperlimit,0.000000,df['SibSp'])
```

```
[355]: sns.boxplot(df['SibSp'])
```

```
C:\Users\harsh\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(
```

```
[355]: <AxesSubplot:xlabel='SibSp'>
```



```
[356]: q1=df.Parch.quantile(0.25)
       q3=df.Parch.quantile(0.75)
       print(q1)
       print(q3)
```

```
0.0
0.0
```

```
[357]: iqr=q3-q1
       iqr
```

```
[357]: 0.0
```

```
[358]: upperlimit = q3+1.5*iqr
       upperlimit
```

```
[358]: 0.0
```

```
[359]: lowerlimit=q1-1.5*iqr
       lowerlimit
```

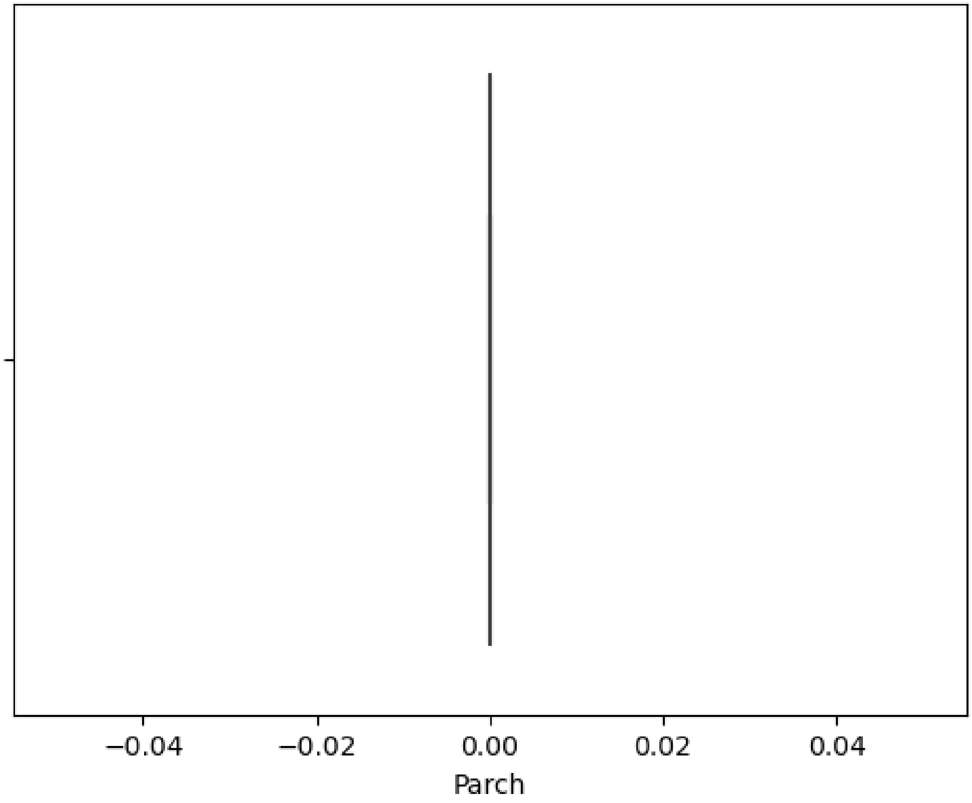
```
[359]: 0.0
```

```
[360]: df['Parch']=np.where(df['Parch']>upperlimit,0.000000,df['Parch'])
```

```
[361]: sns.boxplot(df['Parch'])
```

```
C:\Users\harsh\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(
```

```
[361]: <AxesSubplot:xlabel='Parch'>
```



[385]:
```
q1=df.Fare.quantile(0.25)
q3=df.Fare.quantile(0.75)
print(q1)
print(q3)
```

```
7.8958
30.0
```

[386]:
```
iqr=q3-q1
iqr
```

[386]:
```
22.1042
```

[387]:
```
upperlimit = q3+1.5*iqr
upperlimit
```

[387]:
```
63.1563
```

[388]:
```
lowerlimit=q1-1.5*iqr
lowerlimit
```

```
[388]: -25.2605
```

```
[389]: df.median()
```

```
C:\Users\harsh\AppData\Local\Temp\ipykernel_11488\4184645713.py:1:
FutureWarning: Dropping of nuisance columns in DataFrame reductions (with
'numeric_only=None') is deprecated; in a future version this will raise
TypeError.  Select only valid columns before calling the reduction.
  data.median()
```

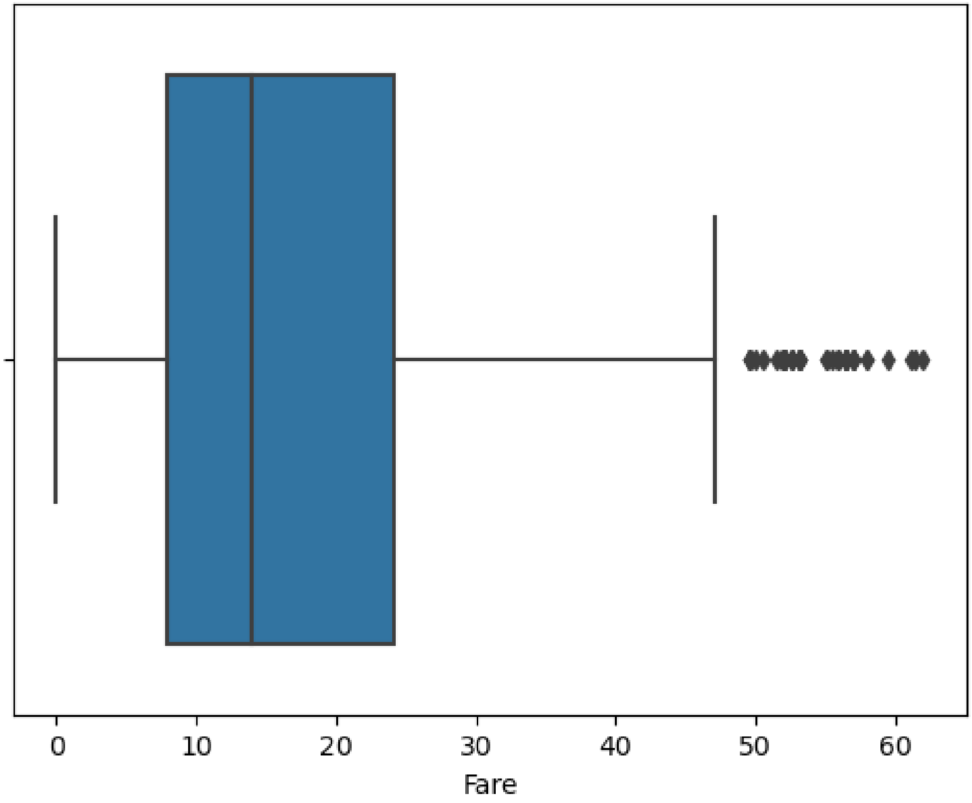
```
[389]: PassengerId    447.500000
       Survived         0.000000
       Pclass           3.000000
       Sex              1.000000
       Age             29.699118
       SibSp            0.000000
       Parch            0.000000
       Fare            14.054150
       Embarked         2.000000
       dtype: float64
```

```
[390]: df['Fare']=np.where(df['Fare']>upperlimit,14.054150,df['Fare'])
```

```
[391]: sns.boxplot(df.Fare)
```

```
C:\Users\harsh\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(
```

```
[391]: <AxesSubplot:xlabel='Fare'>
```



[392]:

```
y=df["Survived"]
```

[393]:

```
X=df.drop(columns=["Name","PassengerId","Survived","Ticket","Cabin"],axis=1)
```

[394]:

```
y.head()
```

[394]:

```
0    0
1    1
2    1
3    1
4    0
Name: Survived, dtype: int64
```

[395]:

```
from sklearn.preprocessing import MinMaxScaler
ms=MinMaxScaler()
```

[396]:

```
X_Scaled=ms.fit_transform(X)
```

[397]:

```
X_Scaled=pd.Dataframe(ms.fit_transform(X),columns=X.columns)
```

[398]:

```
X_Scaled.head()
```

[398]:

```
   Pclass  Sex       Age  SibSp  Parch      Fare  Embarked
0     1.0  1.0  0.372549    0.5    0.0  0.116975       1.0
1     0.0  0.0  0.686275    0.5    0.0  0.226756       0.0
2     1.0  0.0  0.450980    0.0    0.0  0.127865       1.0
3     0.0  0.0  0.627451    0.5    0.0  0.856739       1.0
4     1.0  1.0  0.627451    0.0    0.0  0.129882       1.0
```

[399]:

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test = train_test_split(X_Scaled,y,test_size =0.
 ↪2,random_state =0)
```

[400]:

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

```
(699, 7) (175, 7) (699,) (175,)
```