MEDIKONDA PREMCHAND

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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.preprocessing import StandardScaler
from sklearn import preprocessing
```

Importing Dataset

```
df = pd.read_csv('Titanic_Dataset.csv')
```

```
print(df.shape)
```

```
(891, 12)
```

```
print(df.dtypes)
```

```
PassengerId      int64
Survived         int64
Pclass           int64
Name            object
Sex             object
Age            float64
SibSp            int64
Parch            int64
Ticket          object
Fare           float64
Cabin           object
Embarked        object
dtype: object
```

Checking for null values

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

```
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
```

```
df.head()
```

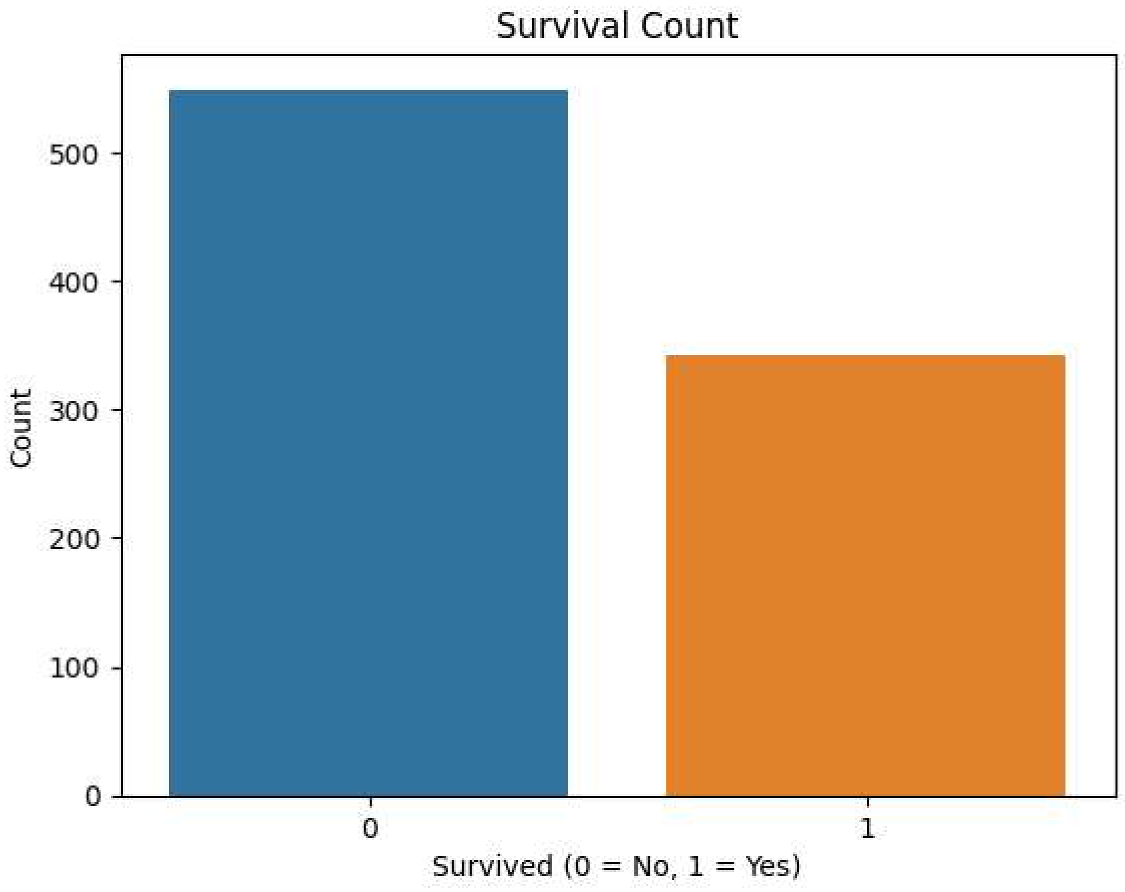
	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0.0	A/5 21171	7.2500
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0.0	PC 17599	14.4542
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0.0	STON/O2. 3101282	7.9250
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0.0	113803	14.4542
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0.0	373450	8.0500

```
df.describe()
```

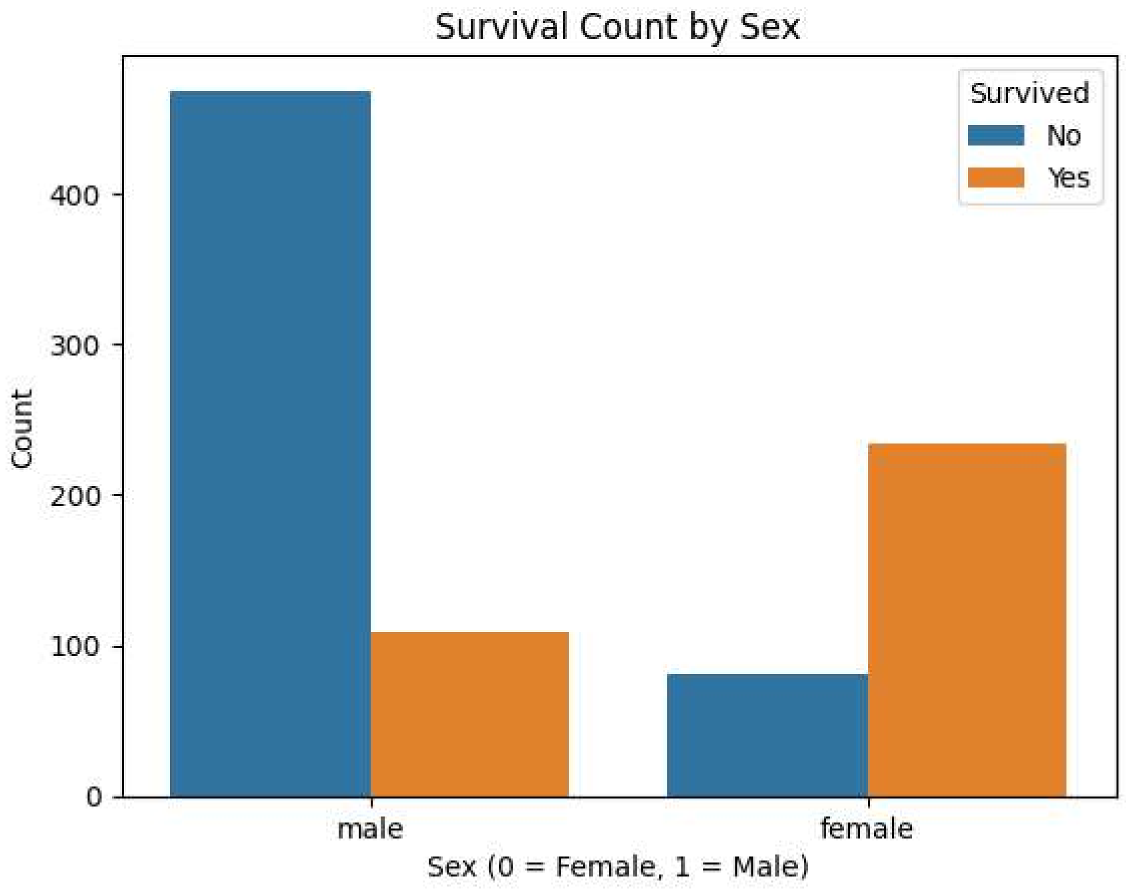
	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	891.000000	891.000000	891.0	891.000000
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.0	14.200184
std	257.353842	0.486592	0.836071	13.002015	1.102743	0.0	7.332994
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.0	0.000000
25%	223.500000	0.000000	2.000000	22.000000	0.000000	0.0	7.910400
50%	446.000000	0.000000	3.000000	29.699118	0.000000	0.0	14.454200
75%	668.500000	1.000000	3.000000	35.000000	1.000000	0.0	15.500000

Data Visualization

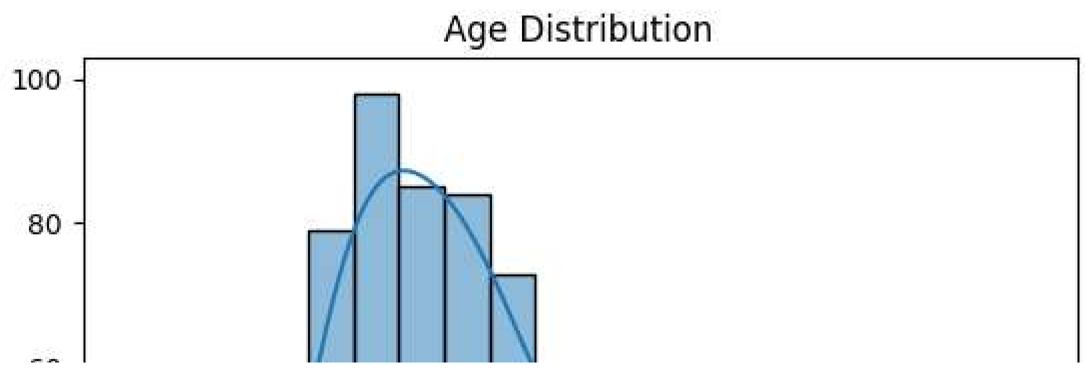
```
sns.countplot(x='Survived', data=df)
plt.title('Survival Count')
plt.xlabel('Survived (0 = No, 1 = Yes)')
plt.ylabel('Count')
plt.show()
```



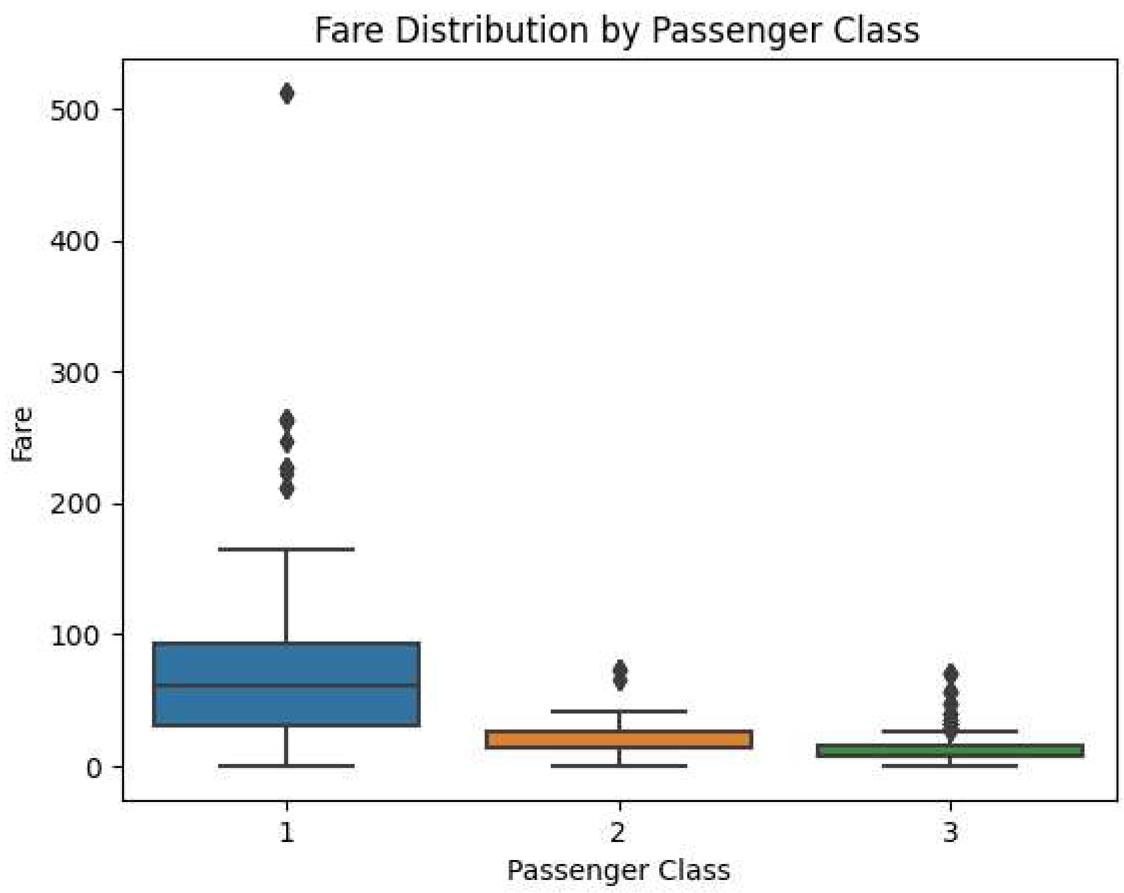
```
sns.countplot(x='Sex', hue='Survived', data=df)
plt.title('Survival Count by Sex')
plt.xlabel('Sex (0 = Female, 1 = Male)')
plt.ylabel('Count')
plt.legend(title='Survived', labels=['No', 'Yes'])
plt.show()
```



```
sns.histplot(df['Age'], bins=20, kde=True)
plt.title('Age Distribution')
plt.xlabel('Age')
plt.ylabel('Frequency')
plt.show()
```

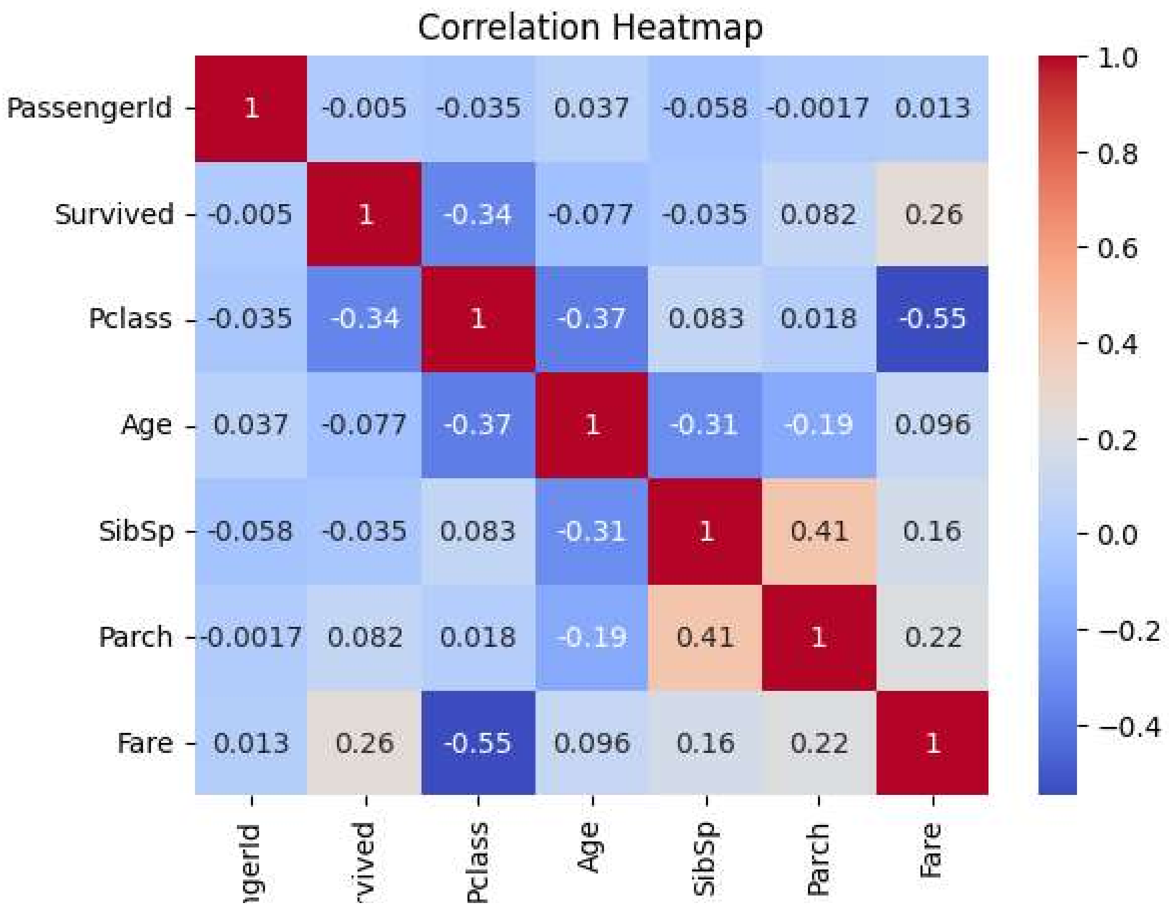


```
sns.boxplot(x='Pclass', y='Fare', data=df)
plt.title('Fare Distribution by Passenger Class')
plt.xlabel('Passenger Class')
plt.ylabel('Fare')
plt.show()
```



```
correlation_matrix = df.corr()
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm')
plt.title('Correlation Heatmap')
plt.show()
```

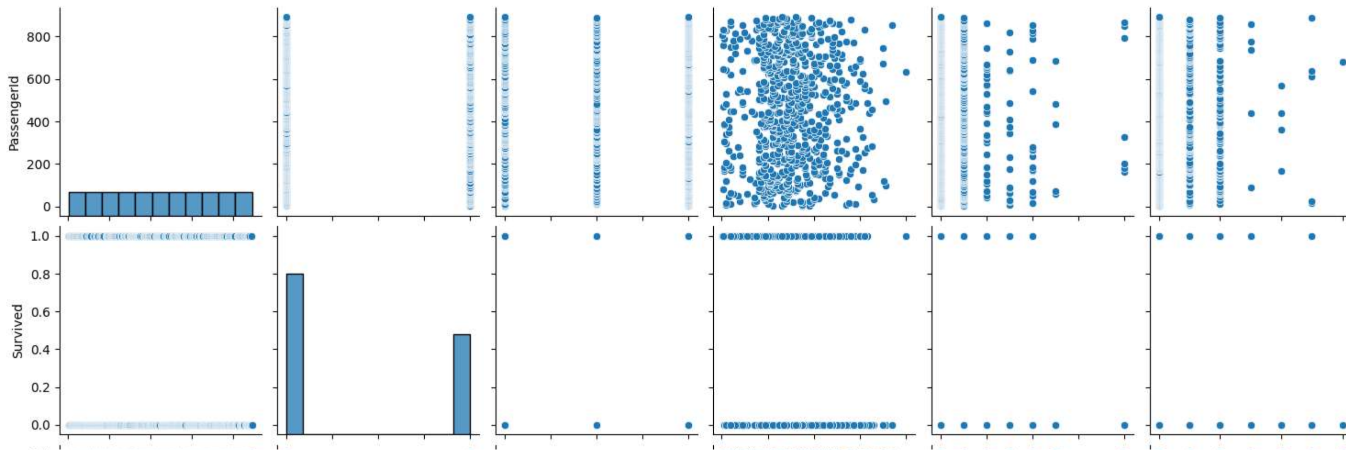
```
<ipython-input-68-182fd031f822>:1: FutureWarning: The default value of numeric_only in [
  correlation_matrix = df.corr()
```



	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
PassengerId	1	-0.005	-0.035	0.037	-0.058	-0.0017	0.013
Survived	-0.005	1	-0.34	-0.077	-0.035	0.082	0.26
Pclass	-0.035	-0.34	1	-0.37	0.083	0.018	-0.55
Age	0.037	-0.077	-0.37	1	-0.31	-0.19	0.096
SibSp	-0.058	-0.035	0.083	-0.31	1	0.41	0.16
Parch	-0.0017	0.082	0.018	-0.19	0.41	1	0.22
Fare	0.013	0.26	-0.55	0.096	0.16	0.22	1

```
sns.pairplot(df)
```

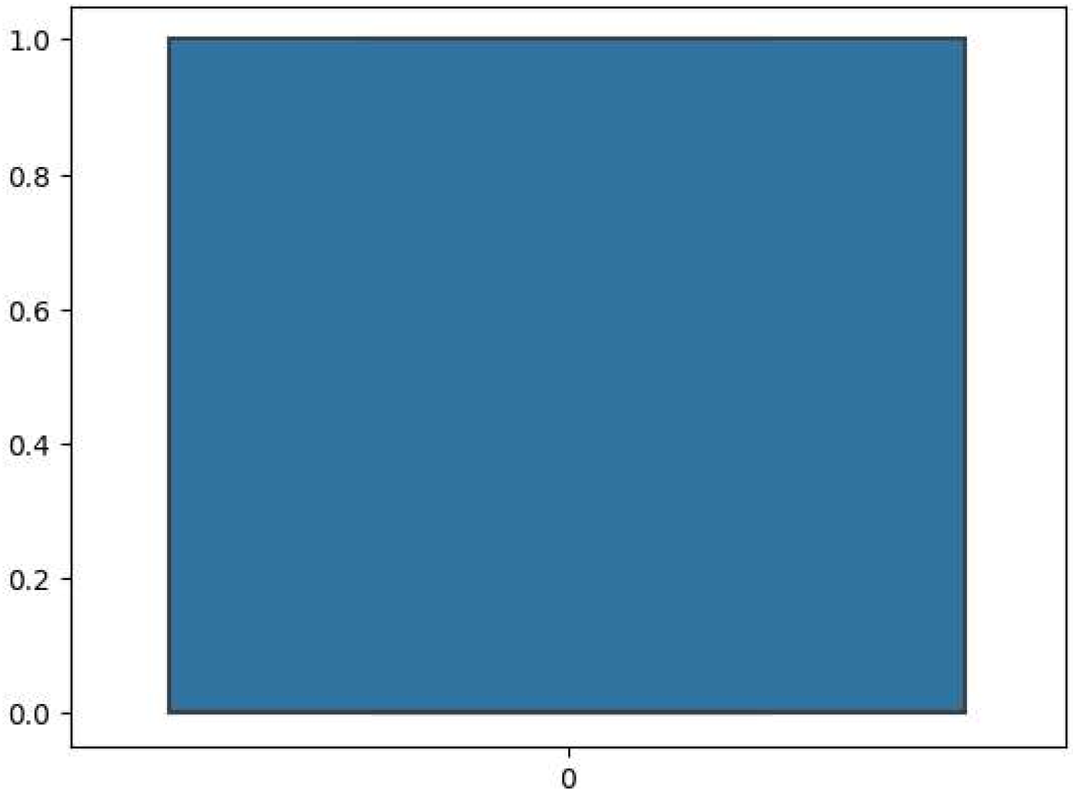
```
<seaborn.axisgrid.PairGrid at 0x7be07f7cf430>
```



Outlier Detection

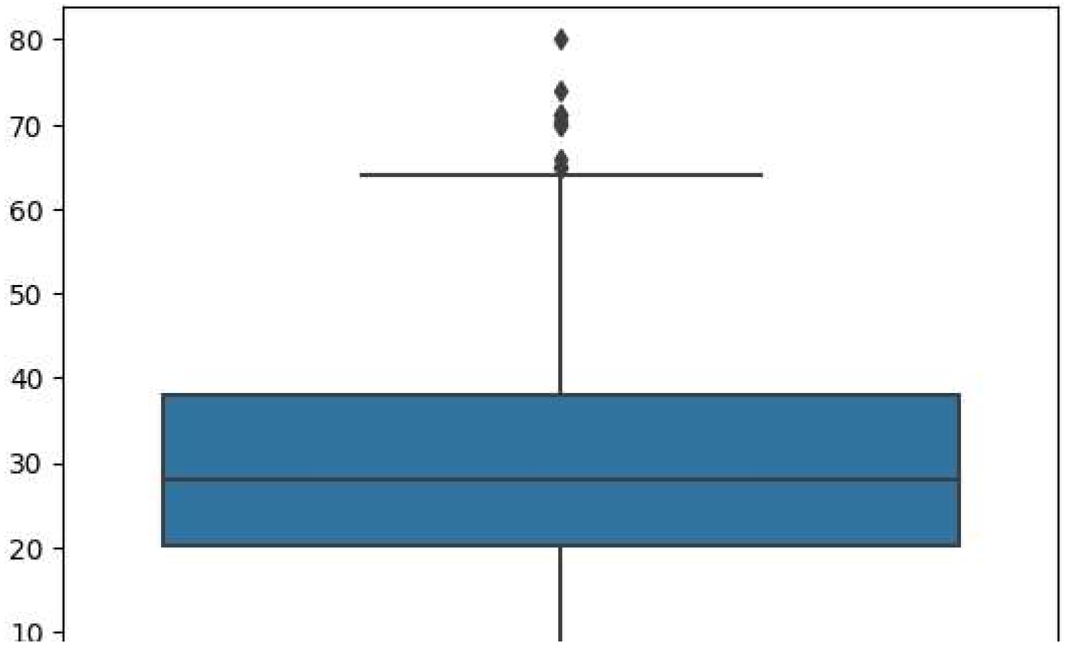
```
sns.boxplot(df.Survived)
```

```
<Axes: >
```



```
sns.boxplot(df.Age)
```

```
<Axes: >
```



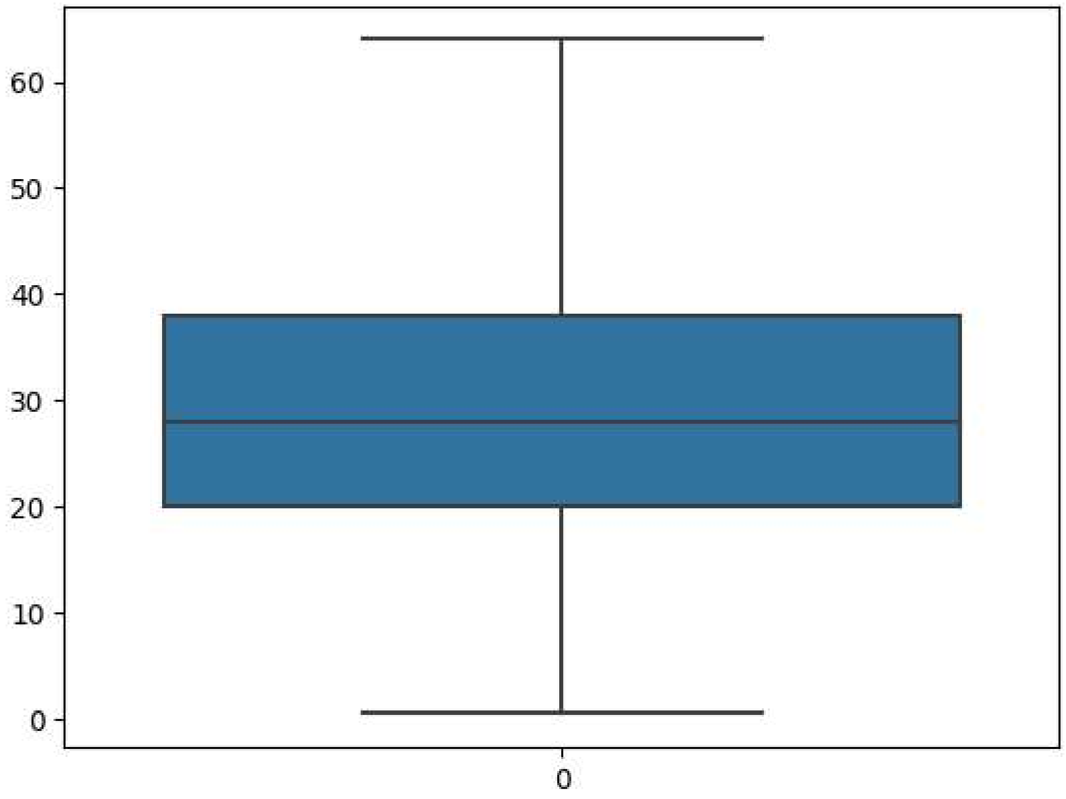
```
q1 = df.Age.quantile(0.25)
q3 = df.Age.quantile(0.75)
print(q1)
print(q3)

     20.125
     38.0


IQR = q3-q1
print(IQR)

     17.875


ul = q3+1.5*IQR
print(ul)

     64.8125


ll = q1-1.5*IQR
print(ll)

     -6.6875


df.median()

     <ipython-input-77-6d467abf240d>:1: FutureWarning: The default value of numeric_only in I
       df.median()
     PassengerId    446.0000
     Survived         0.0000
     Pclass           3.0000
     Age             28.0000
```

```
SibSp            0.0000
Parch            0.0000
Fare            14.4542
dtype: float64
```

```
df = df[df.Age<ul]
```

```
sns.boxplot(df.Age)
```

```
<Axes: >
```

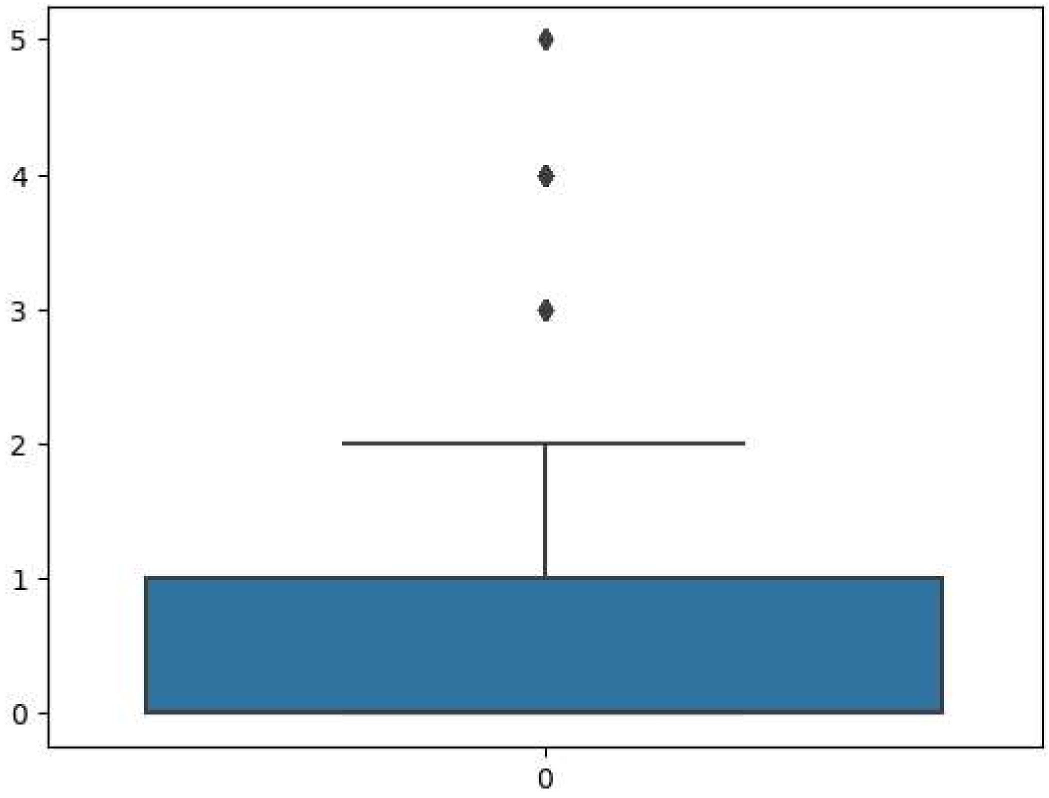


```
sns.boxplot(df.Pclass)
```

```
<Axes: >
```

```
sns.boxplot(df.SibSp)
```

```
<Axes: >
```



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

```
IQR = q3-q1
print(IQR)
```

```
ul = q3+1.5*IQR
print(ul)
```

```
ll = q1-1.5*IQR
print(ll)
```

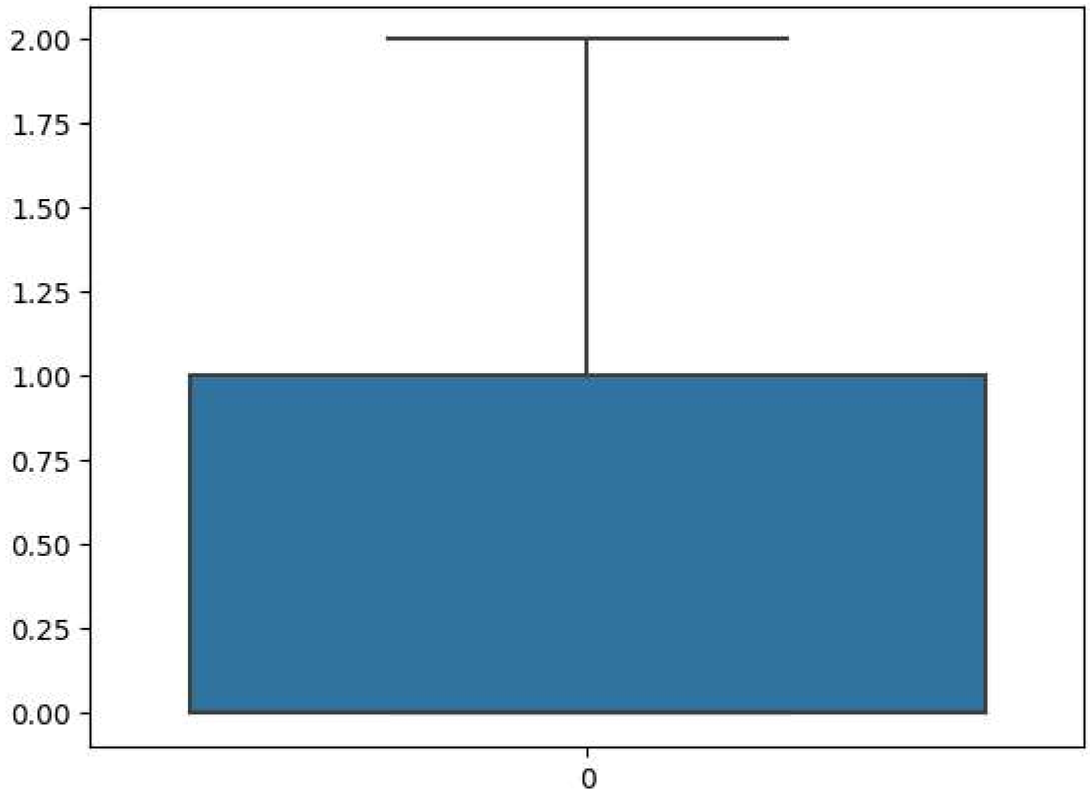
```
df.median()
```

```
<ipython-input-4-6d467abf240d>:1: FutureWarning: The default value of numeric_only in Da
  df.median()
PassengerId    446.0000
Survived         0.0000
Pclass           3.0000
Age             28.0000
SibSp            0.0000
Parch            0.0000
Fare            14.4542
dtype: float64
```

```
df = df[df.SibSp<ul]
```

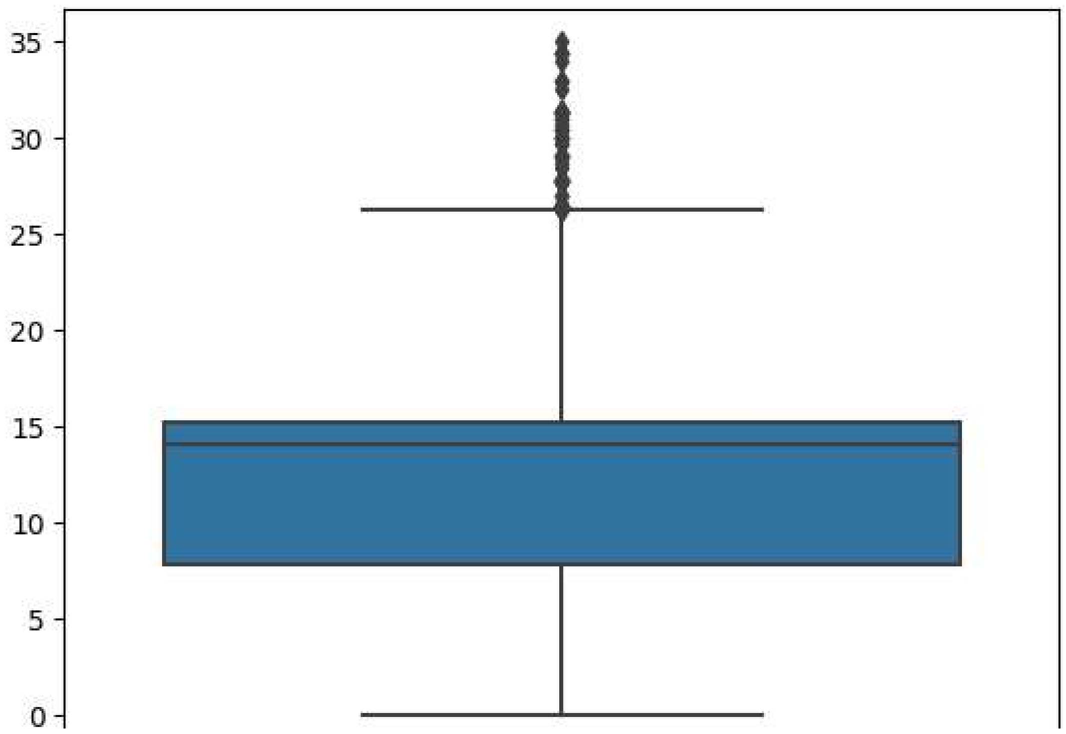
```
sns.boxplot(df.SibSp)
```

```
<Axes: >
```



```
sns.boxplot(df.Fare)
```

```
<Axes: >
```



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

```
7.9104
18.75
```

```
IQR = q3-q1
print(IQR)
ul = q3+1.5*IQR
print(ul)
ll = q1-1.5*IQR
print(ll)
```

```
10.8396
35.0094
-8.349
```

```
df.median()
```

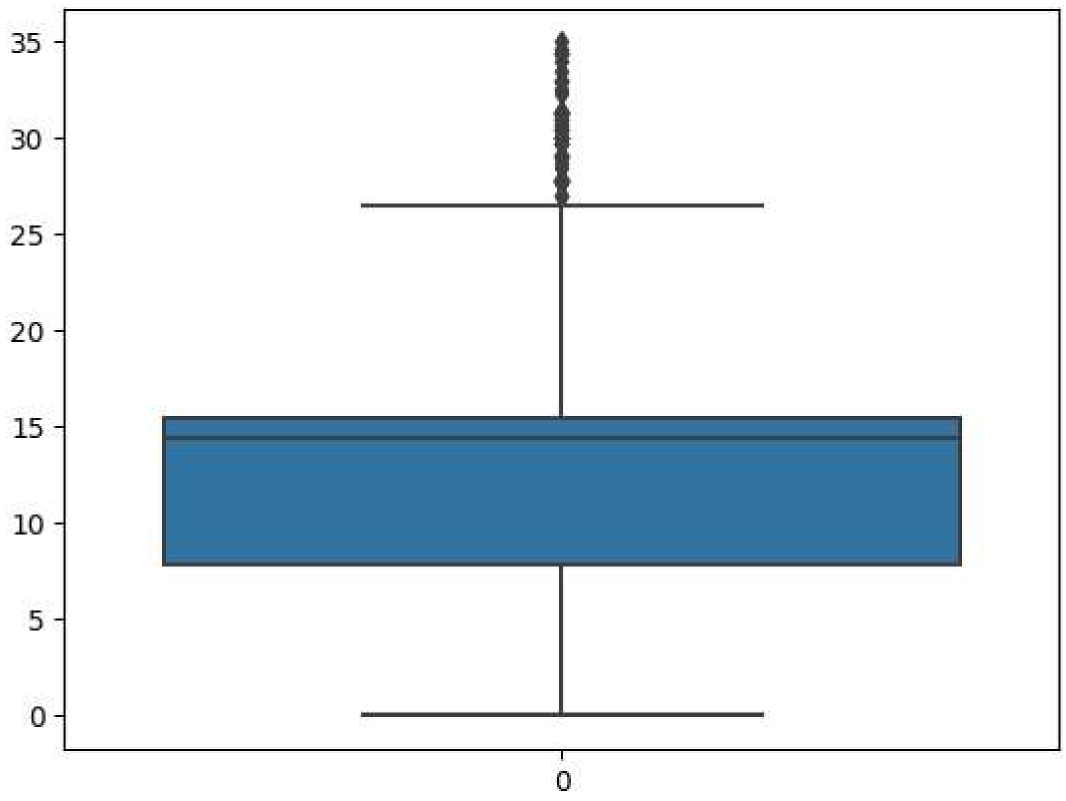
```
<ipython-input-29-6d467abf240d>:1: FutureWarning: The default value of numeric_only in I
  df.median()
PassengerId    446.0000
Survived         0.0000
Pclass           3.0000
Age             28.0000
SibSp            0.0000
Parch            0.0000
```

```
Fare            14.4542
dtype: float64
```

```
df['Fare'] = np.where(df['Fare']>ul,14.4542,df['Fare'])
```

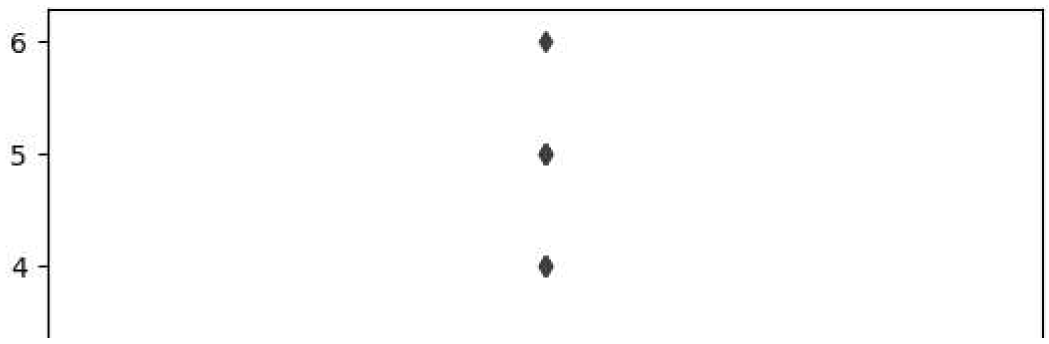
```
sns.boxplot(df.Fare)
```

```
<Axes: >
```



```
sns.boxplot(df.Parch)
```

```
<Axes: >
```



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

```
0.0
0.0
```

```
IQR = q3-q1
print(IQR)
ul = q3 + 1.5*IQR
print(ul)
ll = q1-1.5*IQR
print(ll)
```

```
0.0
0.0
0.0
```

```
df.median()
```

```
<ipython-input-17-6d467abf240d>:1: FutureWarning: The default value of numeric_only in [
  df.median()
PassengerId    446.0000
Survived         0.0000
Pclass           3.0000
Age             28.0000
SibSp            0.0000
Parch            0.0000
Fare            14.4542
dtype: float64
```

```
df['Parch'] = np.where(df['Parch']>ul,0.0,df['Parch'])
```

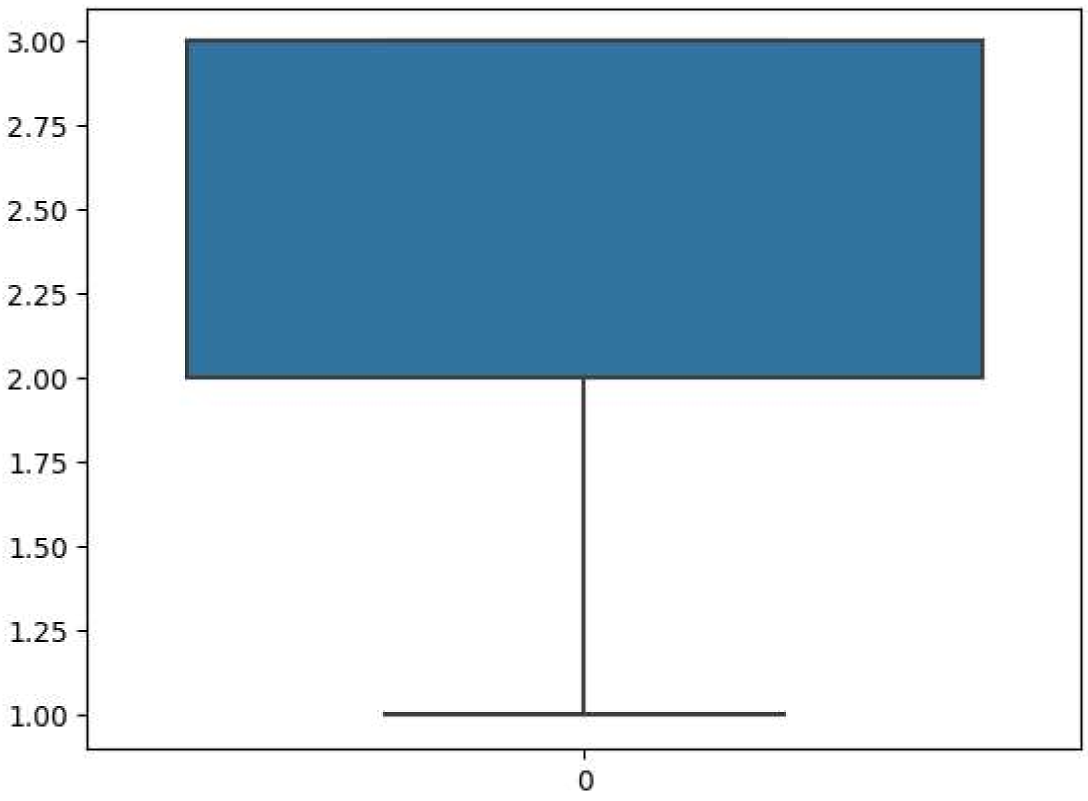
```
sns.boxplot(df.Parch)
```

```
<Axes: >
```

0.04
0.02
0.00
−0.02
−0.04

```
sns.boxplot(df.Pclass)
```

```
<Axes: >
```



Splitting into Independent and Dependent Variables

Independent Variables

```
X = df.drop('Survived', axis=1)
print(X)
```

```
     PassengerId  Pclass                                               Name  \
0              1       3                            Braund, Mr. Owen Harris
1              2       1  Cumings, Mrs. John Bradley (Florence Briggs Th...
2              3       3                             Heikkinen, Miss. Laina
3              4       1       Futrelle, Mrs. Jacques Heath (Lily May Peel)
4              5       3                           Allen, Mr. William Henry
..           ...     ...                                                ...
886          887       2                              Montvila, Rev. Juozas
887          888       1                       Graham, Miss. Margaret Edith
888          889       3           Johnston, Miss. Catherine Helen "Carrie"
889          890       1                              Behr, Mr. Karl Howell
890          891       3                                Dooley, Mr. Patrick

        Sex   Age  SibSp  Parch            Ticket     Fare Cabin Embarked
0      male  22.0      1    0.0         A/5 21171   7.2500   NaN        S
1    female  38.0      1    0.0          PC 17599  14.4542   C85        C
2    female  26.0      0    0.0  STON/O2. 3101282   7.9250   NaN        S
3    female  35.0      1    0.0            113803  14.4542  C123        S
4      male  35.0      0    0.0            373450   8.0500   NaN        S
..      ...   ...    ...    ...               ...      ...   ...      ...
886    male  27.0      0    0.0            211536  13.0000   NaN        S
887  female  19.0      0    0.0            112053  30.0000   B42        S
888  female   NaN      1    0.0        W./C. 6607  23.4500   NaN        S
889    male  26.0      0    0.0            111369  30.0000  C148        C
890    male  32.0      0    0.0            370376   7.7500   NaN        Q

[891 rows x 11 columns]
```

Dependent Variables

```
y = df['Survived']
print(Y)
```

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

Encoding

```
label_encoder = preprocessing.LabelEncoder()
df['Embarked']= label_encoder.fit_transform(df['Embarked'])
df['Embarked'].unique()
label_encoder2 = preprocessing.LabelEncoder()
df['PassengerId']= label_encoder2.fit_transform(df['PassengerId'])
df['PassengerId'].unique()
label_encoder3 = preprocessing.LabelEncoder()
df['Survived']= label_encoder3.fit_transform(df['Survived'])
df['Survived'].unique()
label_encoder4 = preprocessing.LabelEncoder()
df['Pclass']= label_encoder4.fit_transform(df['Pclass'])
```

```
df['Pclass'].unique()
label_encoder5 = preprocessing.LabelEncoder()
df['Name']= label_encoder5.fit_transform(df['Name'])
df['Name'].unique()
label_encoder6 = preprocessing.LabelEncoder()
df['Sex']= label_encoder6.fit_transform(df['Sex'])
df['Sex'].unique()
label_encoder7 = preprocessing.LabelEncoder()
df['Age']= label_encoder7.fit_transform(df['Age'])
df['Age'].unique()
label_encoder8 = preprocessing.LabelEncoder()
df['SibSp']= label_encoder8.fit_transform(df['SibSp'])
df['SibSp'].unique()
label_encoder9 = preprocessing.LabelEncoder()
df['Parch']= label_encoder9.fit_transform(df['Parch'])
df['Parch'].unique()
label_encoder10 = preprocessing.LabelEncoder()
df['Ticket']= label_encoder10.fit_transform(df['Ticket'])
df['Ticket'].unique()
label_encoder11 = preprocessing.LabelEncoder()
df['Fare']= label_encoder11.fit_transform(df['Fare'])
df['Fare'].unique()
label_encoder12 = preprocessing.LabelEncoder()
df['Cabin']= label_encoder12.fit_transform(df['Cabin'])
df['Cabin'].unique()
```

```
array([147,  81,  55, 129, 145,  49, 111,  13,  63,  41, 101,  23,  71,
        21,  80, 142, 140, 122,  12,  91,  98,  52,  36, 116, 138, 107,
        45, 141,  61, 123,  18,  14,  69, 144,   9,  28,  43,   8, 103,
        93,  87,  78, 102,  83,  40, 134,  46,  57,  89,  54, 113,   3,
        31,  90,  62,  51,  74, 125,  72,  35,  76, 124,  65,  17,  56,
        85, 127, 146,  59, 104,  24, 131,  79,  47, 115, 128,  10,  50,
        53,  86, 126,  97, 117, 133,   1,  25,  64,  96,  42, 121, 106,
        39,  88,  26,  27,  20,  82,  77,   2,  48,  75,   0, 135,  29,
         4,  95, 110, 114,   5,  33,   7, 108, 132,  58,  38,  34, 109,
        32,  19, 139,  73, 120,  84,  66, 137,  15, 105,  67, 100, 118,
        92, 136, 143,  22, 112,  44,  94,  11,  16,  37, 130,  68,  99,
       119,   6,  70,  30,  60])
```

Feature Scaling

```
numerical_columns = df.select_dtypes(include=['int64', 'float64']).columns
scaler = StandardScaler()
df[numerical_columns] = scaler.fit_transform(df[numerical_columns])
print(df.head())
```

```
   Survived    Pclass                                               Name  \
0 -0.789272  0.827377                            Braund, Mr. Owen Harris
1  1.266990 -1.566107  Cumings, Mrs. John Bradley (Florence Briggs Th...
2  1.266990  0.827377                           Heikkinen, Miss. Laina
3  1.266990 -1.566107       Futrelle, Mrs. Jacques Heath (Lily May Peel)
4 -0.789272  0.827377                          Allen, Mr. William Henry

      Sex       Age     SibSp     Parch            Ticket      Fare Cabin  \
0    male -0.530377  0.432793 -0.473674         A/5 21171 -0.502445   NaN
1  female  0.571831  0.432793 -0.473674          PC 17599  0.786845   C85
2  female -0.254825 -0.474545 -0.473674  STON/O2. 3101282 -0.488854   NaN
3  female  0.365167  0.432793 -0.473674            113803  0.420730  C123
4    male  0.365167 -0.474545 -0.473674            373450 -0.486337   NaN

   ... PassengerId_882  PassengerId_883  PassengerId_884  PassengerId_885  \
0  ...               0                0                0                0
1  ...               0                0                0                0
2  ...               0                0                0                0
3  ...               0                0                0                0
4  ...               0                0                0                0

   PassengerId_886  PassengerId_887  PassengerId_888  PassengerId_889  \
0                0                0                0                0
1                0                0                0                0
2                0                0                0                0
3                0                0                0                0
4                0                0                0                0

   PassengerId_890  PassengerId_891
0                0                0
1                0                0
2                0                0
3                0                0
4                0                0

[5 rows x 901 columns]
```

Splitting into Train and Test

```
X = df.drop('Survived', axis=1)
y = df['Survived']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_sta
print("X_train shape:", X_train.shape)
print("X_test shape:", X_test.shape)
print("y_train shape:", y_train.shape)
print("y_test shape:", y_test.shape)
```

```
X_train shape: (623, 11)
X_test shape: (268, 11)
y_train shape: (623,)
y_test shape: (268,)
```

✓ 0s completed at 12:05 PM