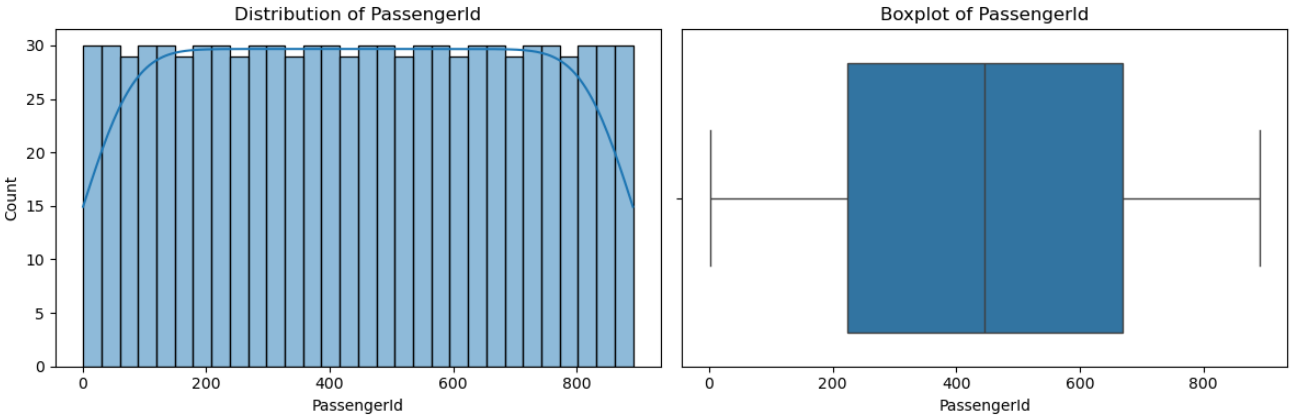
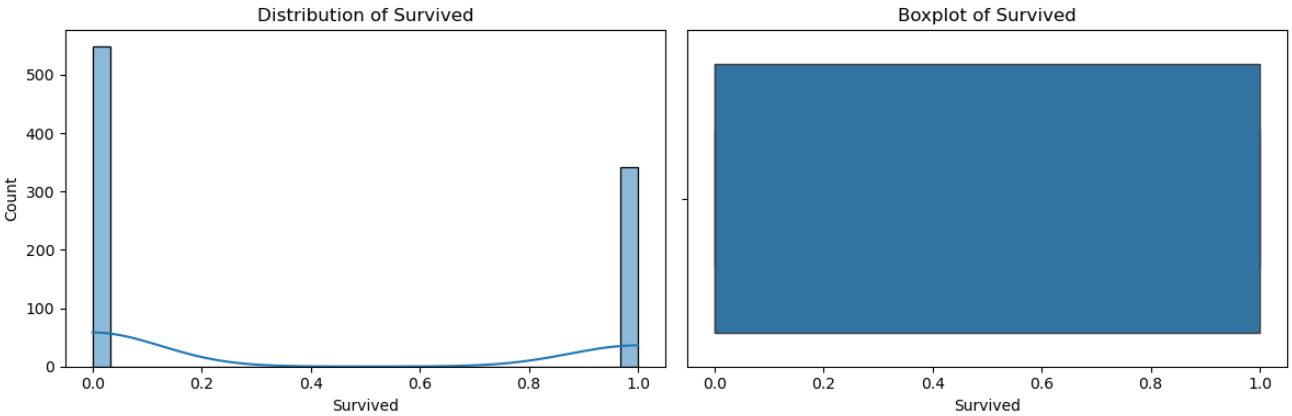
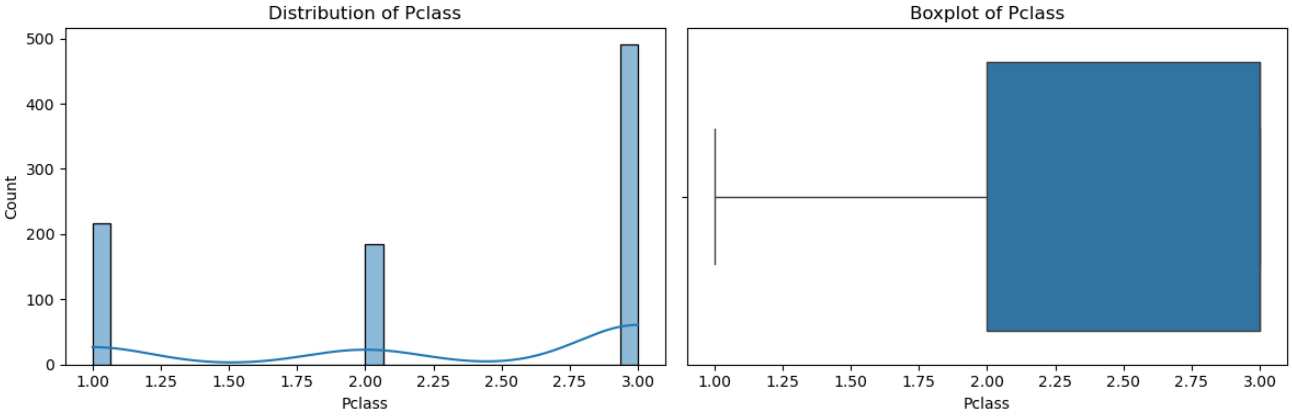
```python
# Importing Libraries
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

#     Load the Dataset
df = pd.read_csv(r"C:\Users\Rohit\Documents\Rohit\Internship\Elevate Labs\Task 5\tr

# BASIC OVERVIEW

print("Shape:", df.shape)
print("\nColumn Types:\n", df.dtypes)
print("\nMissing Values:\n", df.isnull().sum())
print("\nUnique Values:\n", df.nunique())
print("\nDescriptive Stats:\n", df.describe(include='all'))
```

```
Shape: (891, 12)

Column Types:
 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

Missing Values:
 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

Unique Values:
 PassengerId    891
Survived         2
Pclass           3
Name           891
Sex              2
Age             88
SibSp            7
Parch            7
Ticket         681
Fare           248
Cabin          147
Embarked         3
dtype: int64

Descriptive Stats:
         PassengerId    Survived      Pclass                     Name   Sex  \
count    891.000000  891.000000  891.000000                      891   891
unique          NaN         NaN         NaN                      891     2
top             NaN         NaN         NaN  Braund, Mr. Owen Harris  male
freq            NaN         NaN         NaN                        1   577
mean     446.000000    0.383838    2.308642                      NaN   NaN
std      257.353842    0.486592    0.836071                      NaN   NaN
min        1.000000    0.000000    1.000000                      NaN   NaN
25%      223.500000    0.000000    2.000000                      NaN   NaN
50%      446.000000    0.000000    3.000000                      NaN   NaN
75%      668.500000    1.000000    3.000000                      NaN   NaN
max      891.000000    1.000000    3.000000                      NaN   NaN
```

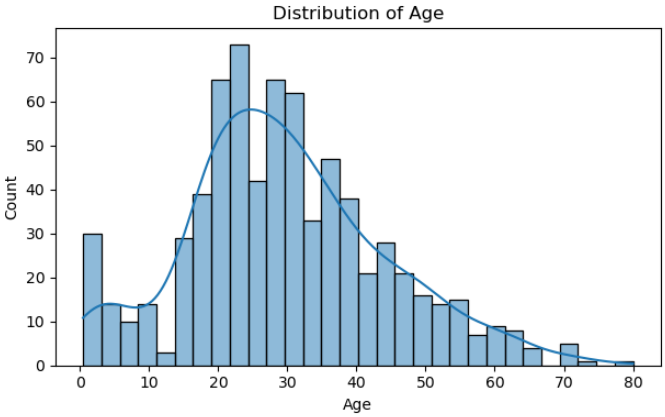
```python
# UNIVARIATE ANALYSIS

numeric_cols = df.select_dtypes(include=['int64', 'float64']).columns
categorical_cols = df.select_dtypes(include='object').columns

# Plot numeric columns
for col in numeric_cols:
    plt.figure(figsize=(12, 4))
    plt.subplot(1, 2, 1)
    sns.histplot(df[col].dropna(), kde=True, bins=30)
    plt.title(f"Distribution of {col}")

    plt.subplot(1, 2, 2)
    sns.boxplot(x=df[col])
    plt.title(f"Boxplot of {col}")
    plt.tight_layout()
    plt.show()

# Plot categorical columns
for col in categorical_cols:
    plt.figure(figsize=(8, 4))
    df[col].value_counts().plot(kind='bar')
    plt.title(f"Bar Plot of {col}")
    plt.xticks(rotation=45)
    plt.tight_layout()
    plt.show()
```

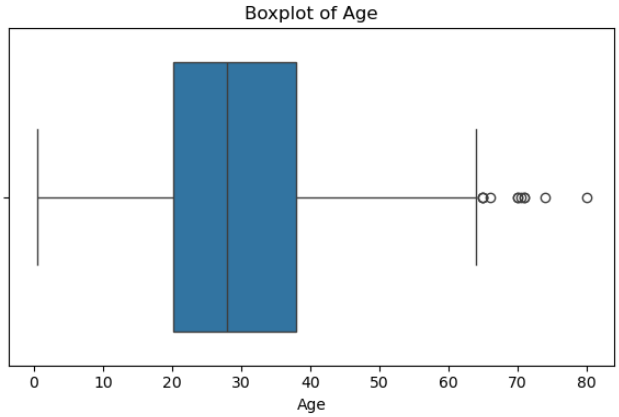


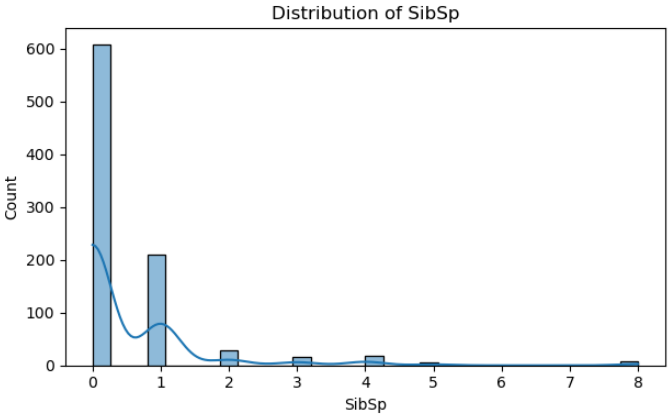


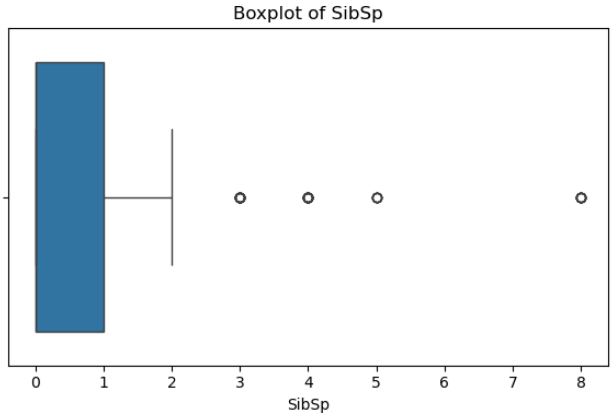

Distribution of Pclass
Count
Pclass

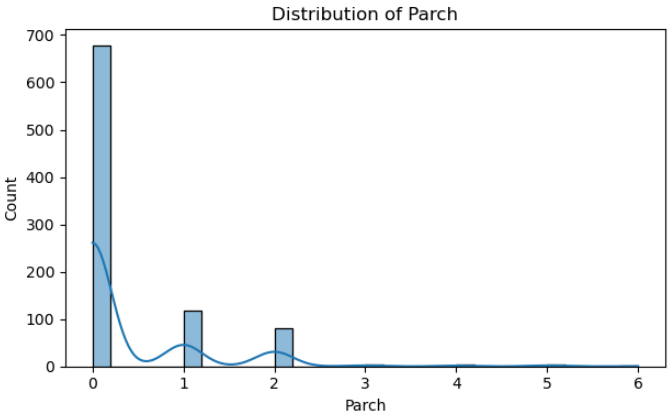
Boxplot of Pclass
Pclass

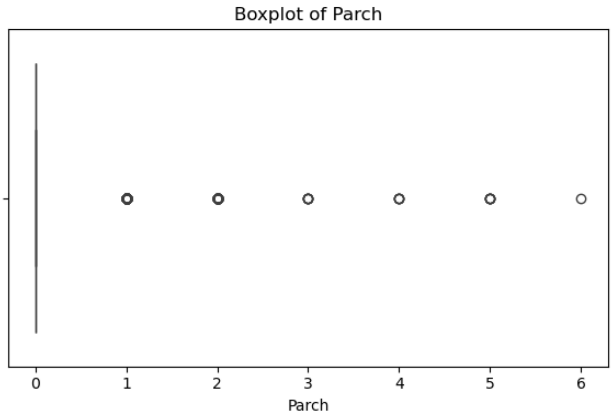

Distribution of Age
Count
Age

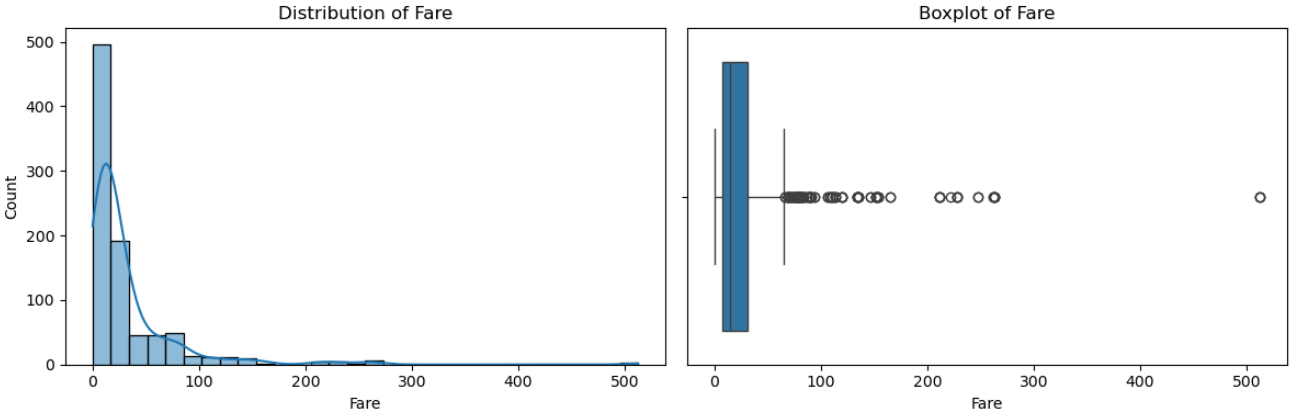

Boxplot of Age
Age


Distribution of SibSp
Count
SibSp

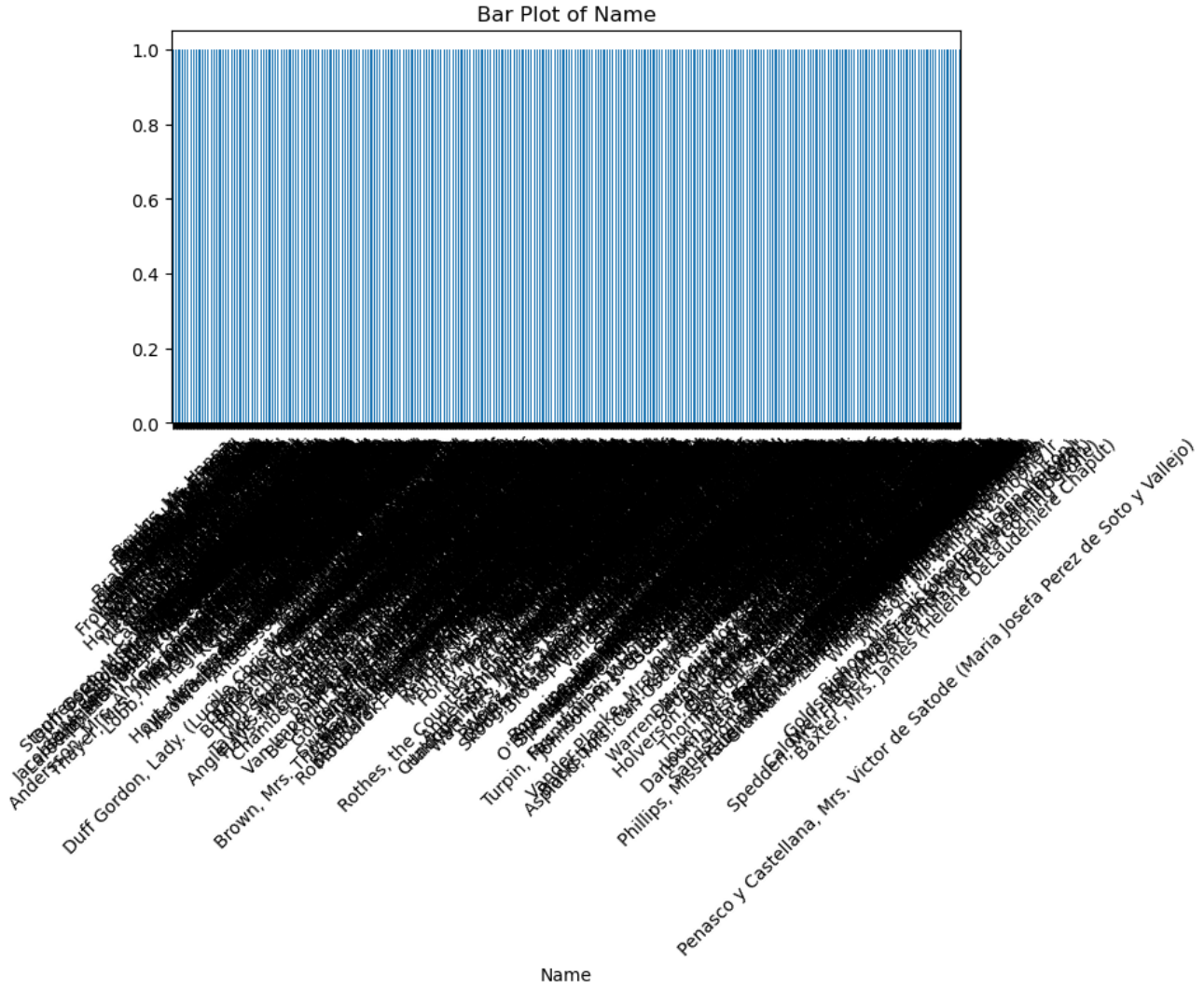

Boxplot of SibSp
SibSp

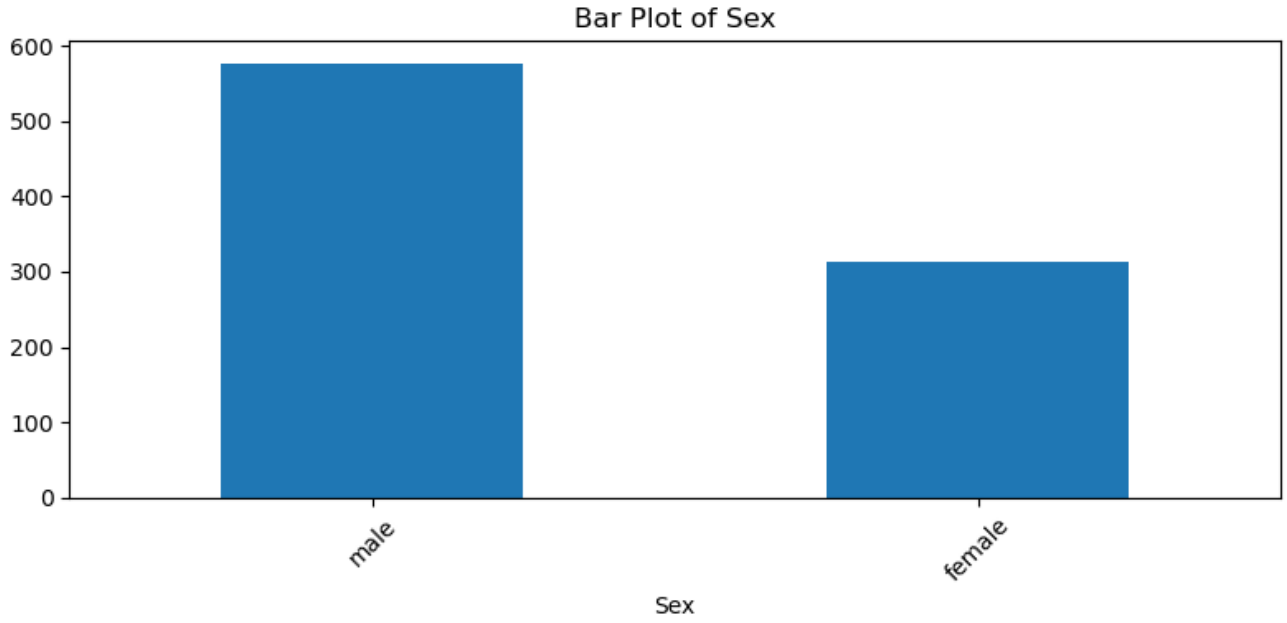

Distribution of Parch
Count
Parch

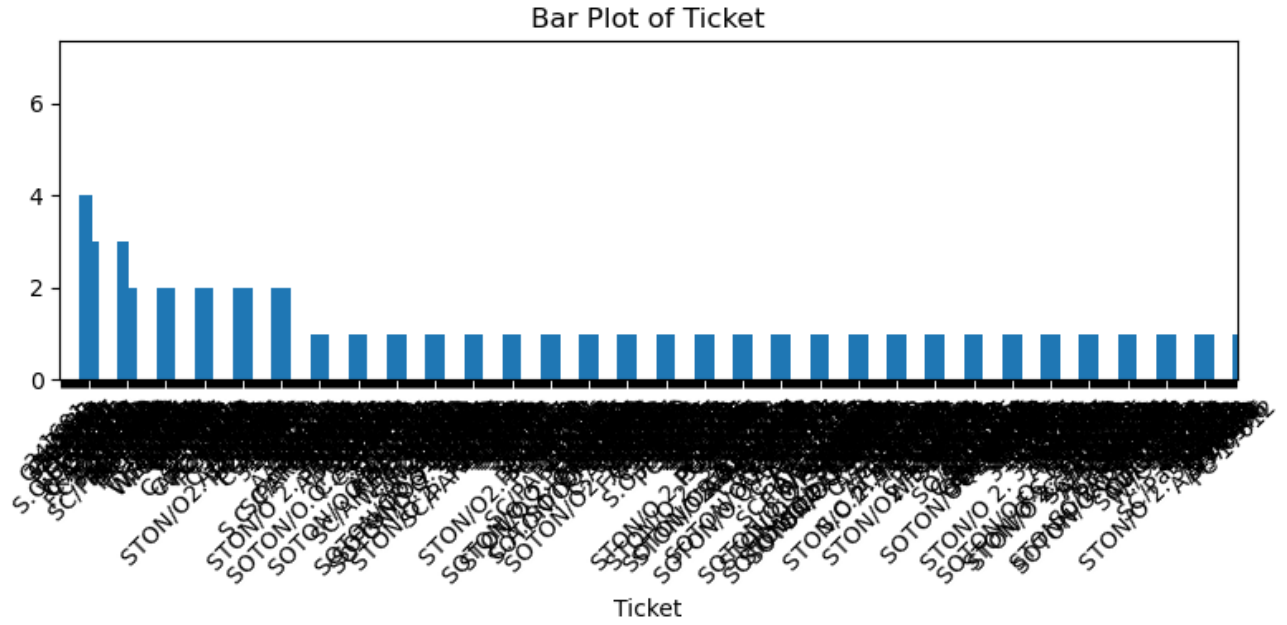

Boxplot of Parch
Parch

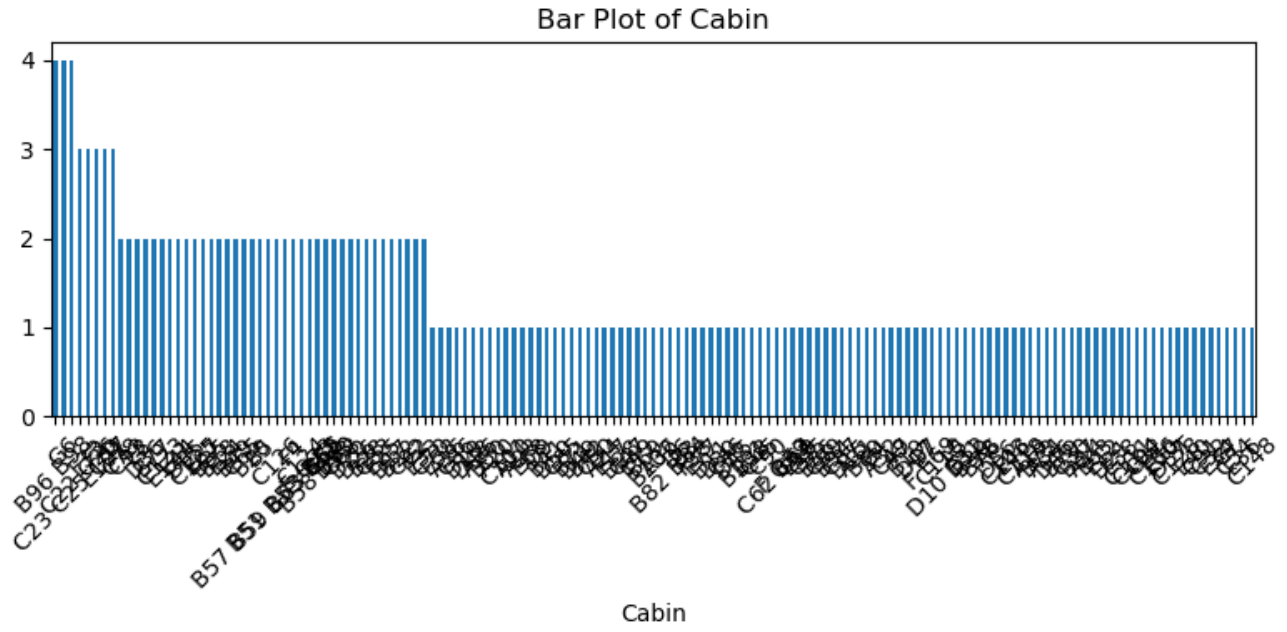


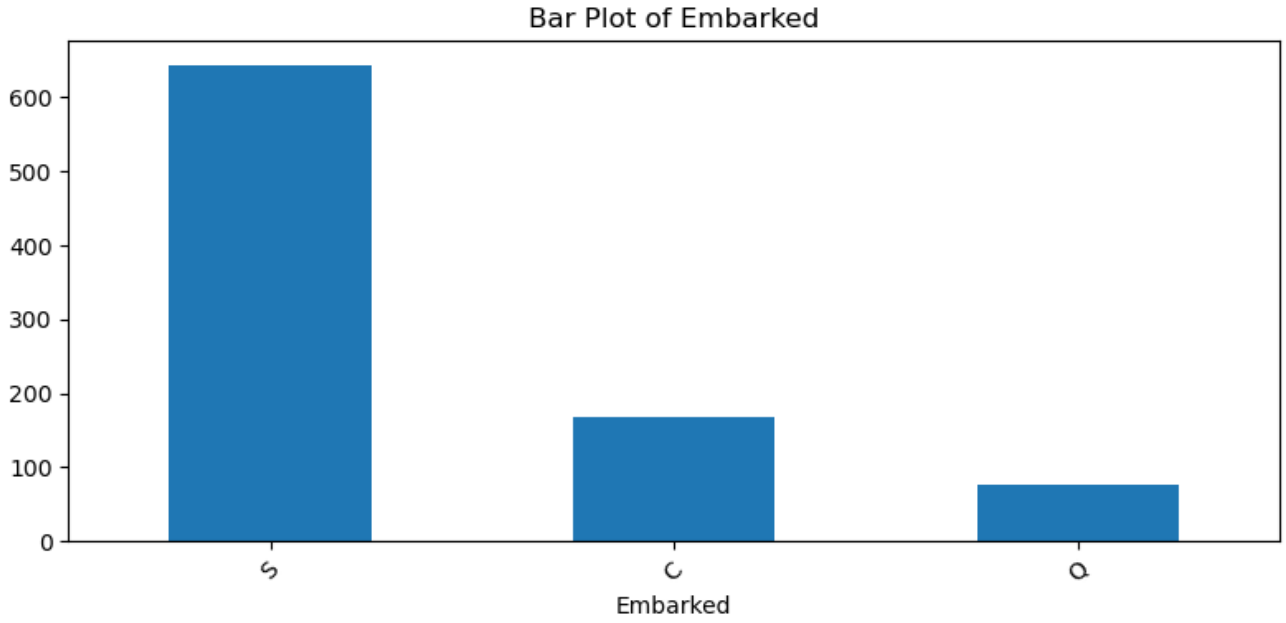

```
C:\Users\Rohit\AppData\Local\Temp\ipykernel_6244\2807690441.py:25: UserWarning:
Tight layout not applied. The bottom and top margins cannot be made large enough to
accommodate all Axes decorations.
  plt.tight_layout()
```



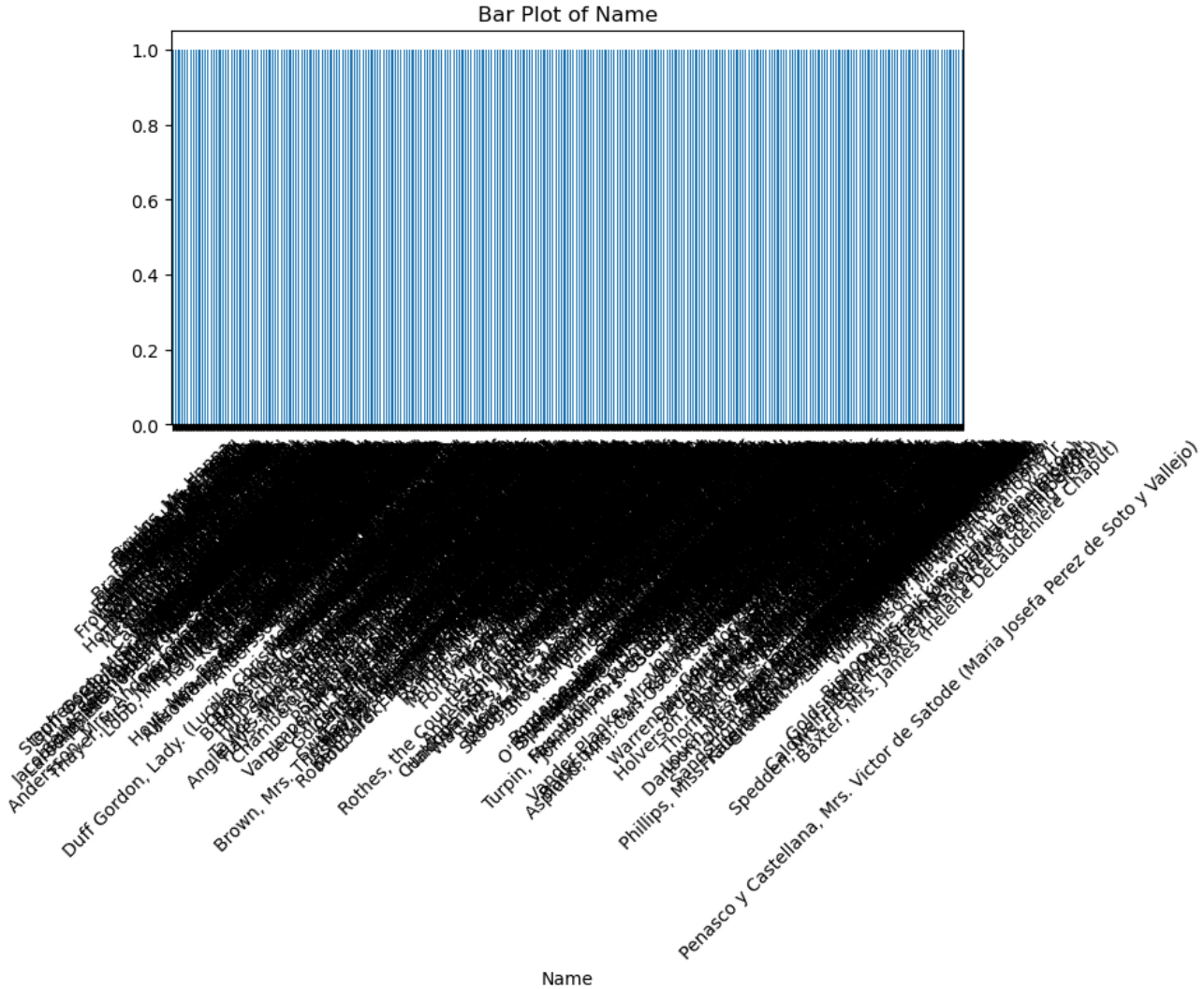

Bar Plot of Sex
600
500
400
300
200
100
0
male
female
Sex

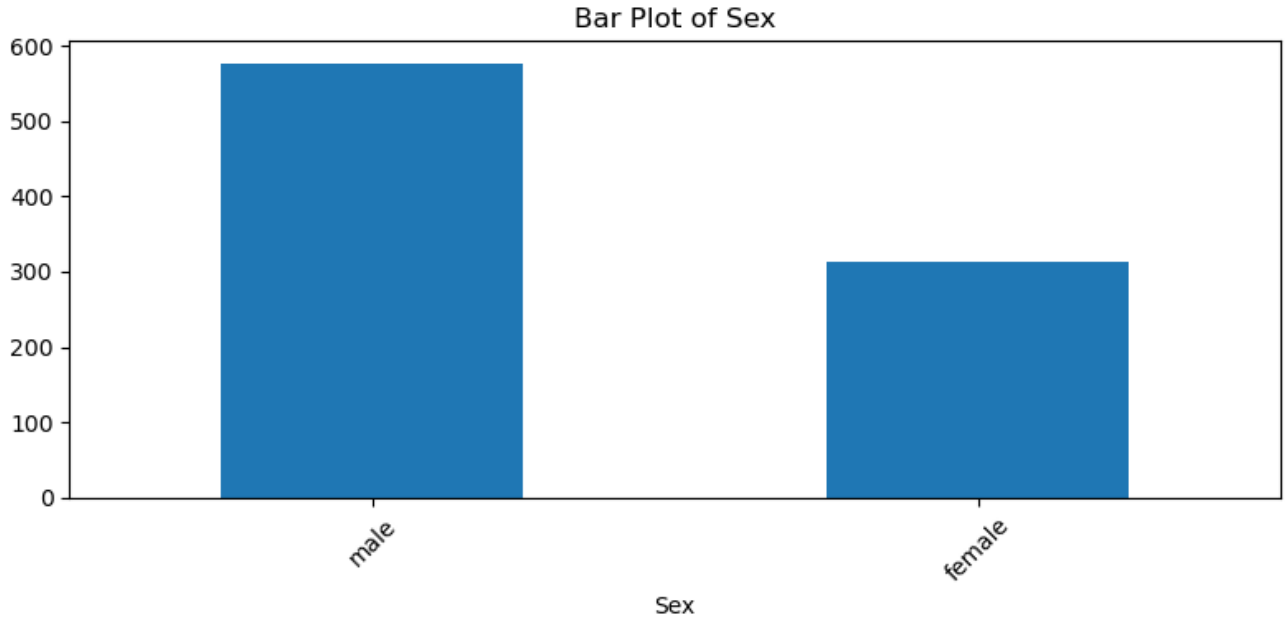

Bar Plot of Ticket
6
4
2
0
Ticket

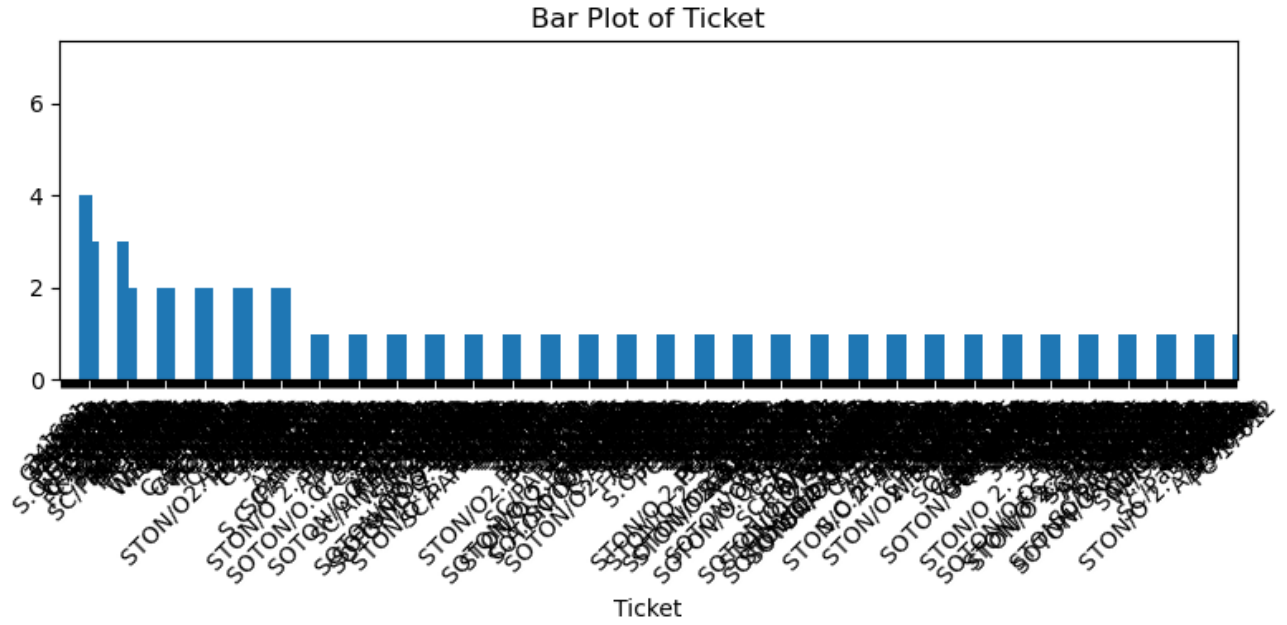

Bar Plot of Cabin
4
3
2
1
0
Cabin

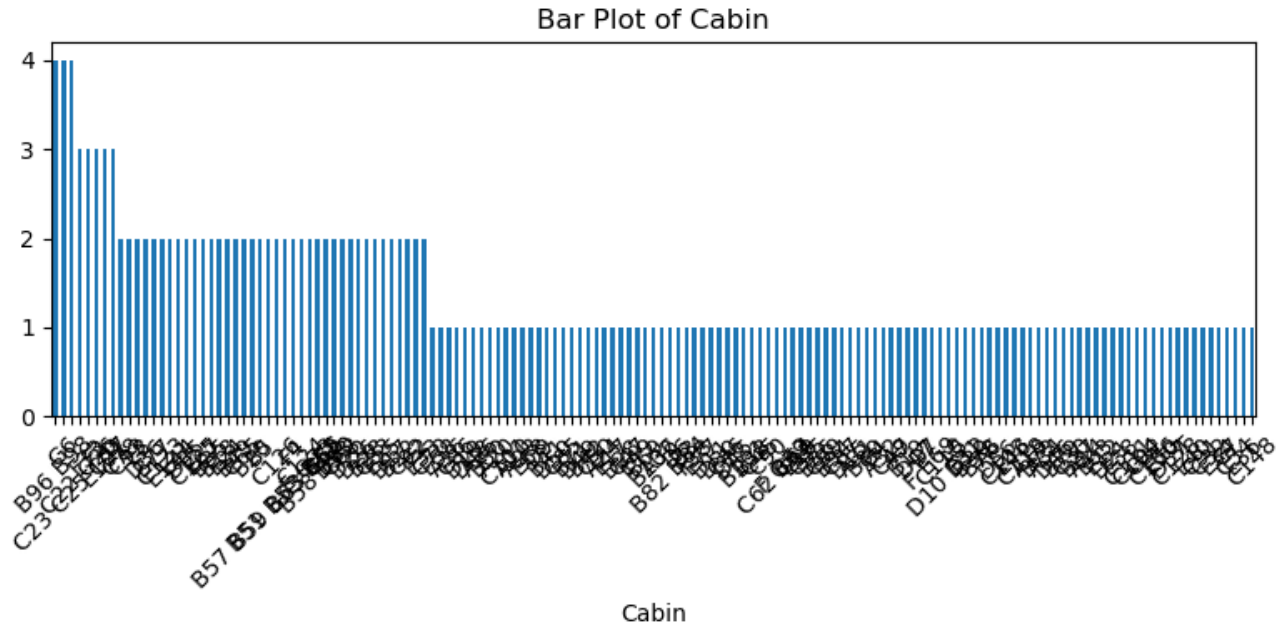


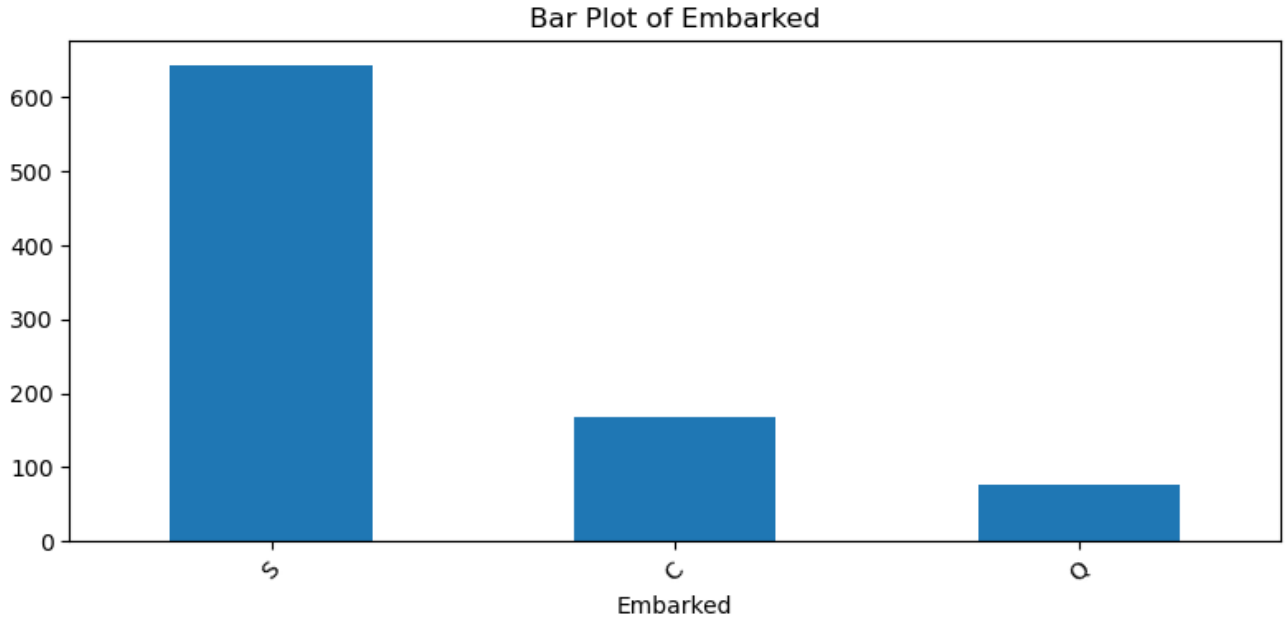

```
C:\Users\Rohit\AppData\Local\Temp\ipykernel_6244\1676552089.py:7: UserWarning:
Tight layout not applied. The bottom and top margins cannot be made large enough to
accommodate all Axes decorations.
  plt.tight_layout()
```



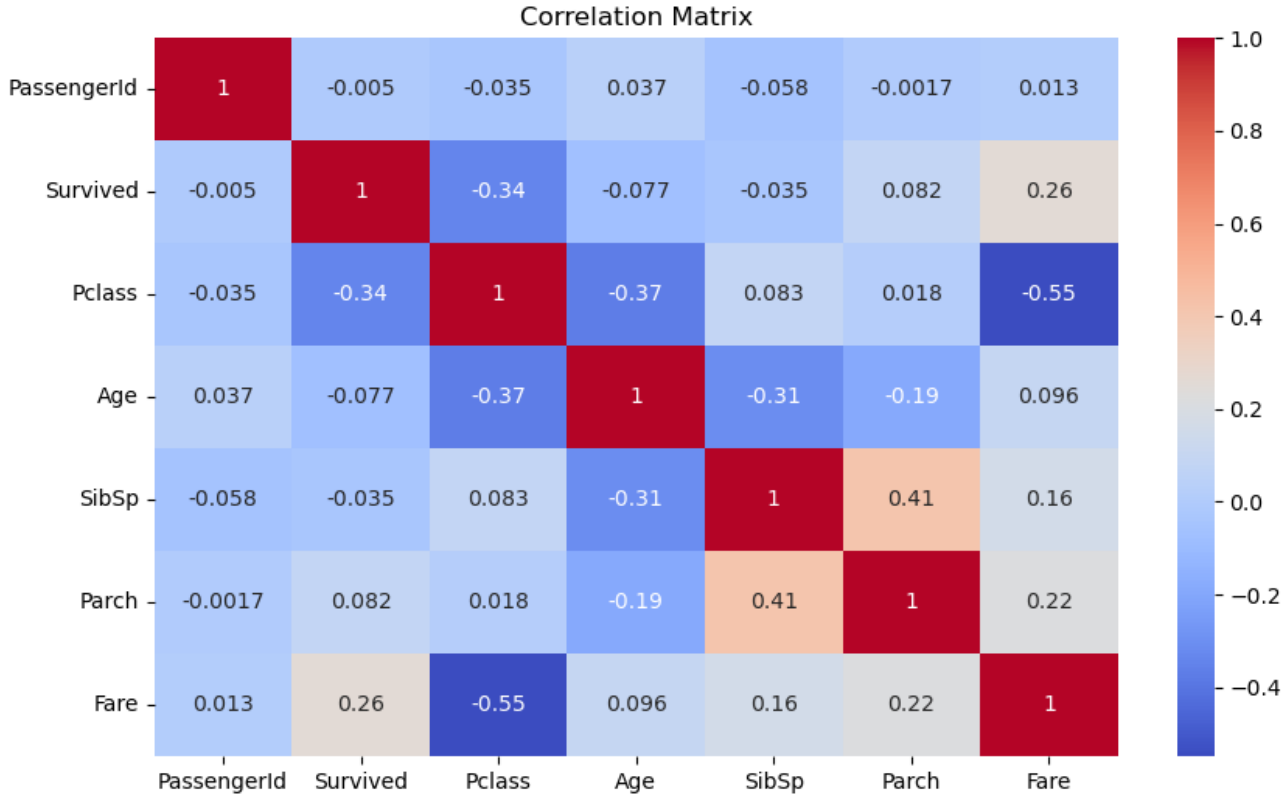

Bar Plot of Sex
600
500
400
300
200
100
0
male
female
Sex

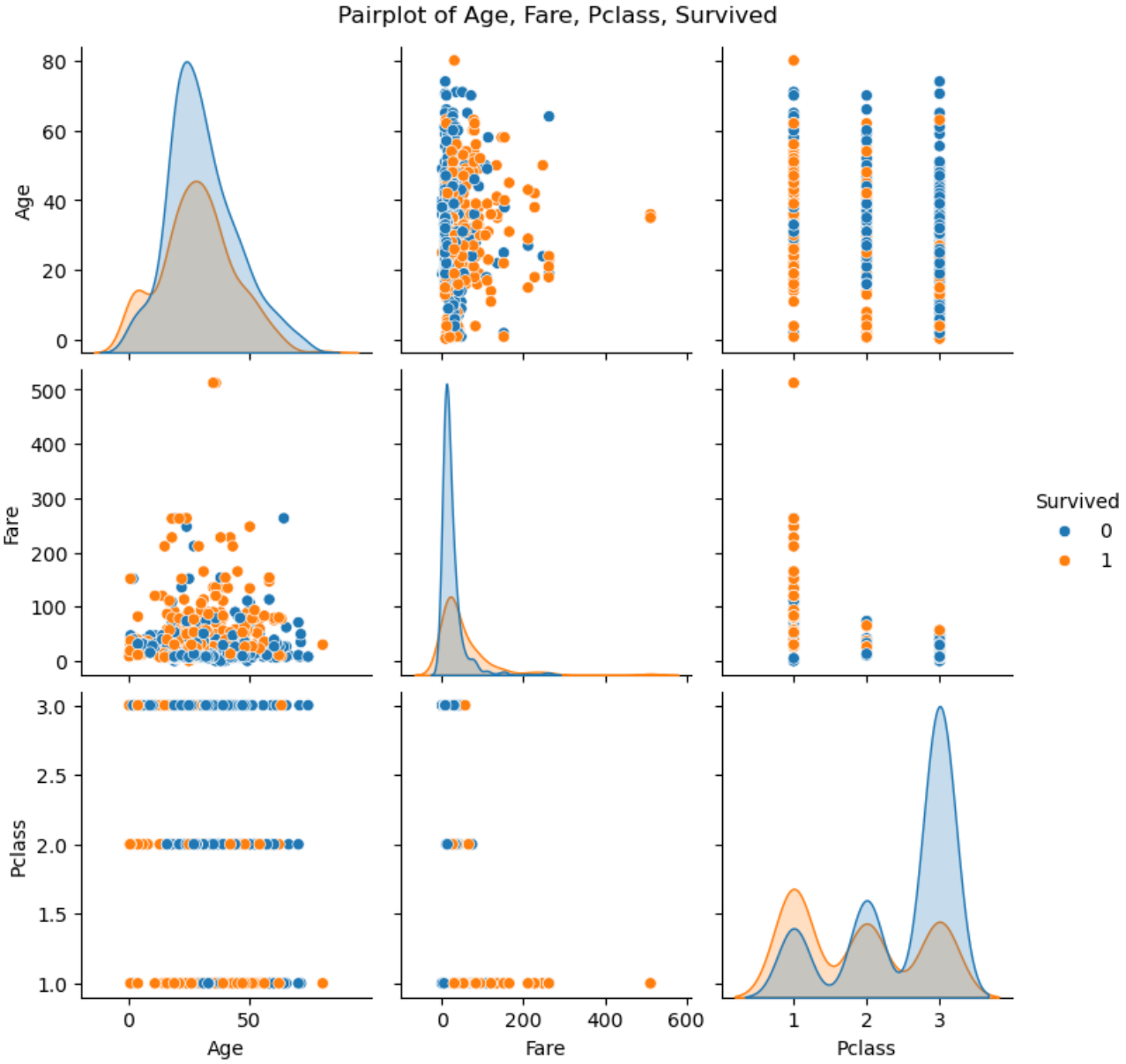

Bar Plot of Ticket
6
4
2
0
Ticket

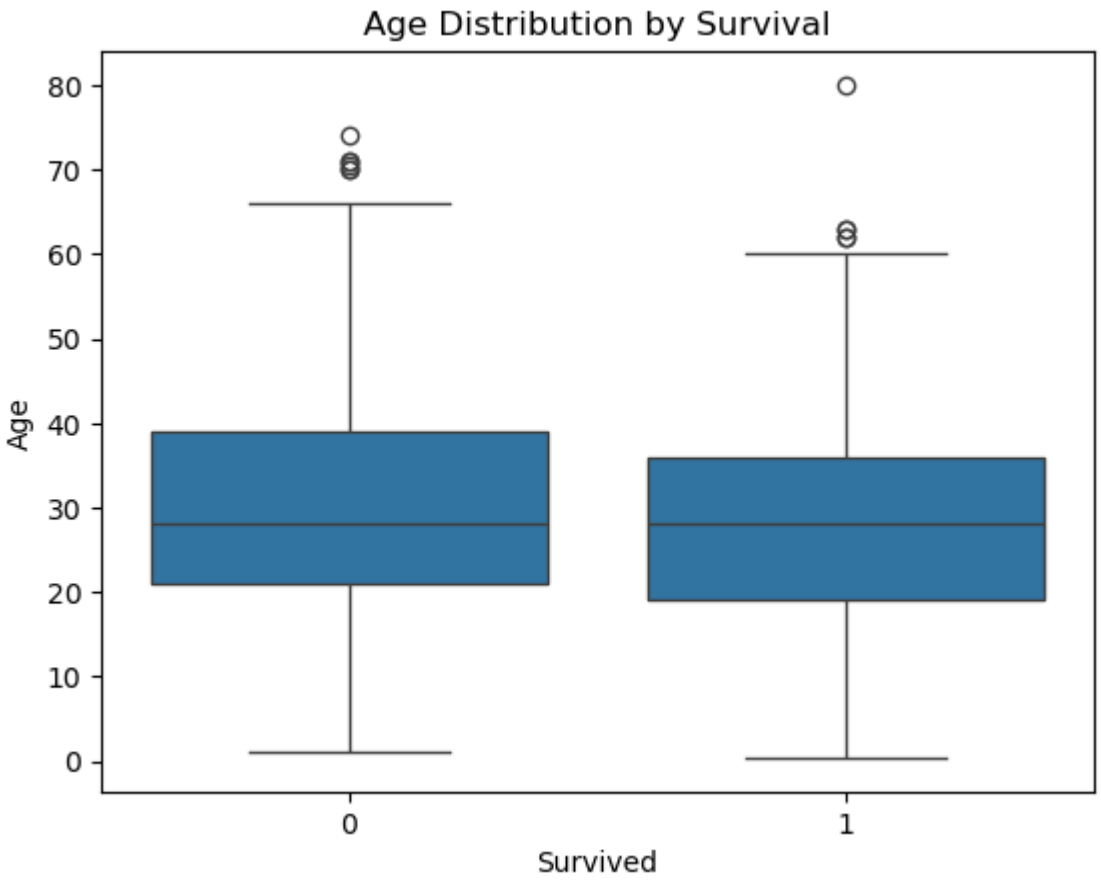

Bar Plot of Cabin
4
3
2
1
0
Cabin

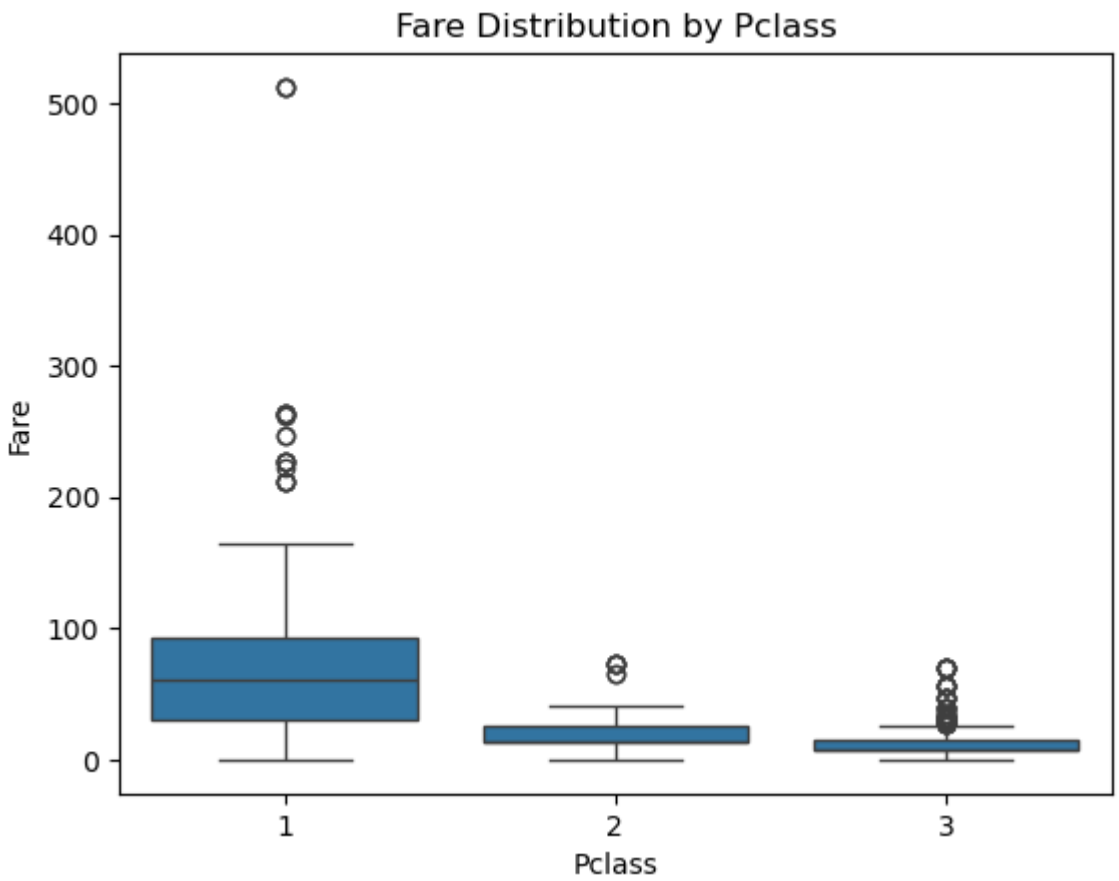


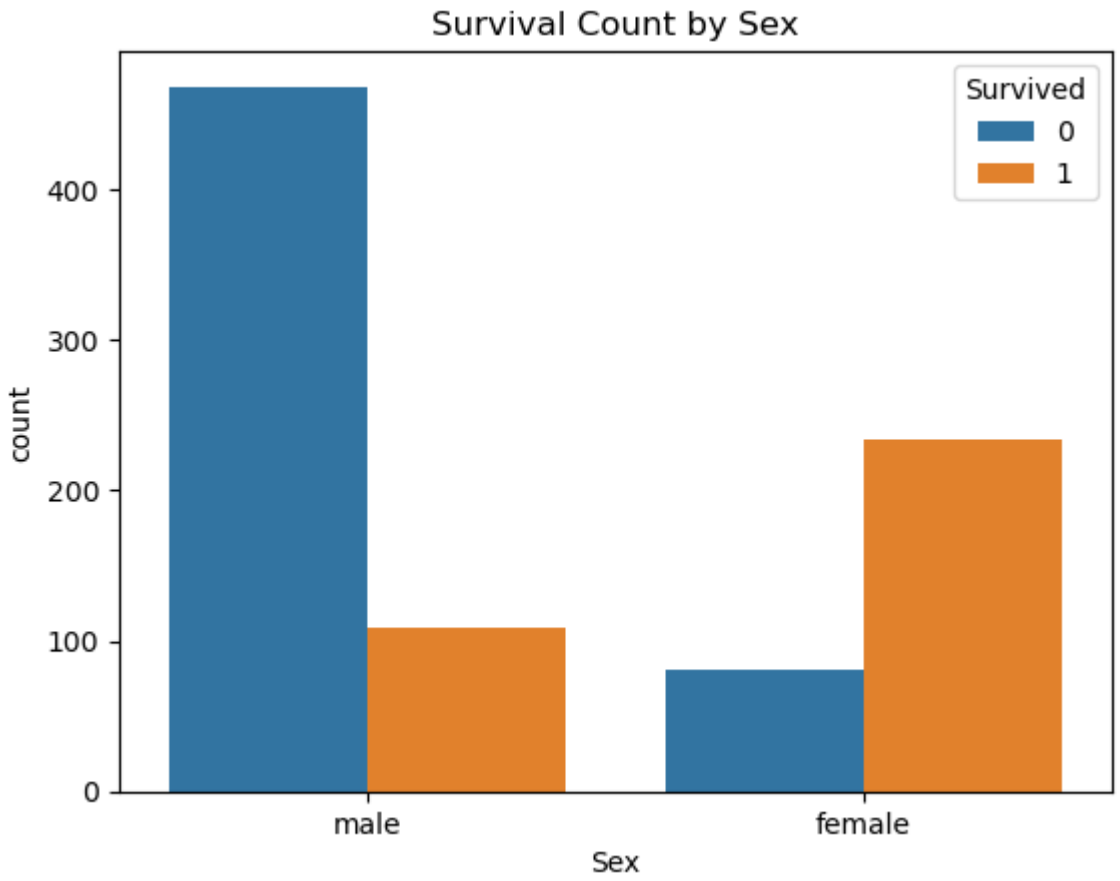

```python
# BIVARIATE / MULTIVARIATE ANALYSIS
# Correlation heatmap
plt.figure(figsize=(10, 6))
sns.heatmap(df[numeric_cols].corr(), annot=True, cmap='coolwarm')
plt.title("Correlation Matrix")
plt.show()

# Clean and prepare pairplot data
pairplot_data = df[['Age', 'Fare', 'Pclass', 'Survived']].copy()
for col in pairplot_data.columns:
    pairplot_data[col] = pd.to_numeric(pairplot_data[col], errors='coerce')
pairplot_data.dropna(inplace=True)

# Pairplot
sns.pairplot(pairplot_data, hue='Survived')
plt.suptitle("Pairplot of Age, Fare, Pclass, Survived", y=1.02)
plt.show()

# Boxplot: Age by Survival
sns.boxplot(x='Survived', y='Age', data=df)
plt.title("Age Distribution by Survival")
plt.show()

# Boxplot: Fare by Pclass
sns.boxplot(x='Pclass', y='Fare', data=df)
plt.title("Fare Distribution by Pclass")
plt.show()

# Countplot: Survival by Sex
sns.countplot(x='Sex', hue='Survived', data=df)
plt.title("Survival Count by Sex")
plt.show()
```


Correlation Matrix
PassengerId
Survived
Pclass
Age
SibSp
Parch
Fare
1 -0.005 -0.035 0.037 -0.058 -0.0017 0.013
-0.005 1 -0.34 -0.077 -0.035 0.082 0.26
-0.035 -0.34 1 -0.37 0.083 0.018 -0.55
0.037 -0.077 -0.37 1 -0.31 -0.19 0.096
-0.058 -0.035 0.083 -0.31 1 0.41 0.16
-0.0017 0.082 0.018 -0.19 0.41 1 0.22
0.013 0.26 -0.55 0.096 0.16 0.22 1
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4


Pairplot of Age, Fare, Pclass, Survived
Age
Fare
Pclass
Survived
0
1


Age Distribution by Survival
Age
Survived
0
10
20
30
40
50
60
70
80
0
1


Fare Distribution by Pclass
Fare
Pclass
0
100
200
300
400
500
1
2
3




```
# MISSING VALUES VISUALIZATION

plt.figure(figsize=(10, 5))
sns.heatmap(df.isnull(), cbar=False, cmap='viridis')
plt.title("Missing Values Heatmap")
plt.show()
```