TASK - 5 (Exploratory Data Analysis (EDA))

In [1]:

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

df = pd.read_csv("C:/Users/vikra/OneDrive/Desktop/DA Python projects/train.csv")
df.head()
```

Out[1]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0

Basic Exploration

Dataset Information

In [2]:

```
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
```

Statistical Summary

In [3]:

```
df.describe()
```

Out[3]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	
count	891.000000	891.000000	891.000000	714.000000	891.000000	891.000000	891.000
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.204
std	257.353842	0.486592	0.836071	14.526497	1.102743	0.806057	49.693
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.000000	0.000
25%	223.500000	0.000000	2.000000	20.125000	0.000000	0.000000	7.910
50%	446.000000	0.000000	3.000000	28.000000	0.000000	0.000000	14.454
75%	668.500000	1.000000	3.000000	38.000000	1.000000	0.000000	31.000
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329

Check Missing Values

In [4]:

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

Out[4]:

```
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
```

Observation: Titanic dataset usually has missing values in Age, Cabin, Embarked.

Handle Missing Values

In [9]:

```
df["Age"] = df["Age"].fillna(df["Age"].median())
df["Embarked"] = df["Embarked"].fillna(df["Embarked"].mode()[0])
df.isnull().sum()
```

Out[9]:

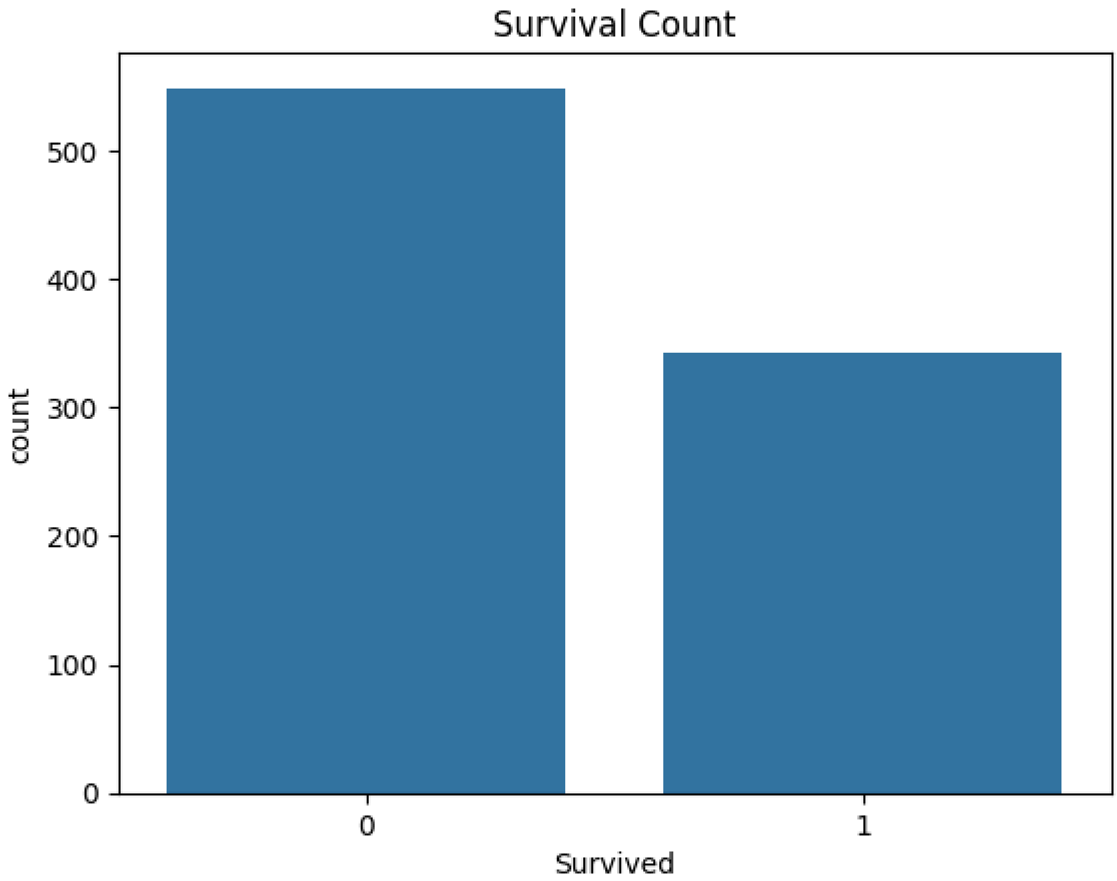
```
PassengerId    0
Survived       0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Embarked       0
dtype: int64
```

Univariate Analysis

Survival Distribution

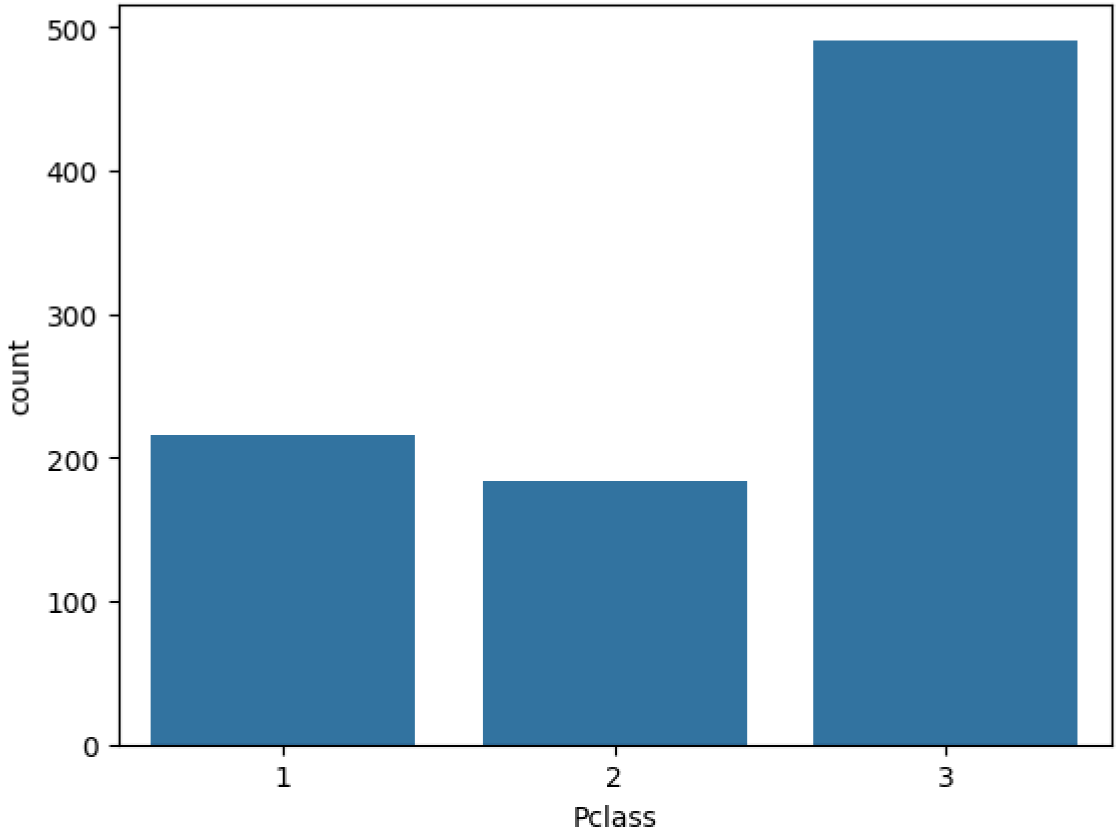
In [10]:

```
sns.countplot(x="Survived", data=df)
plt.title("Survival Count")
plt.show()
```



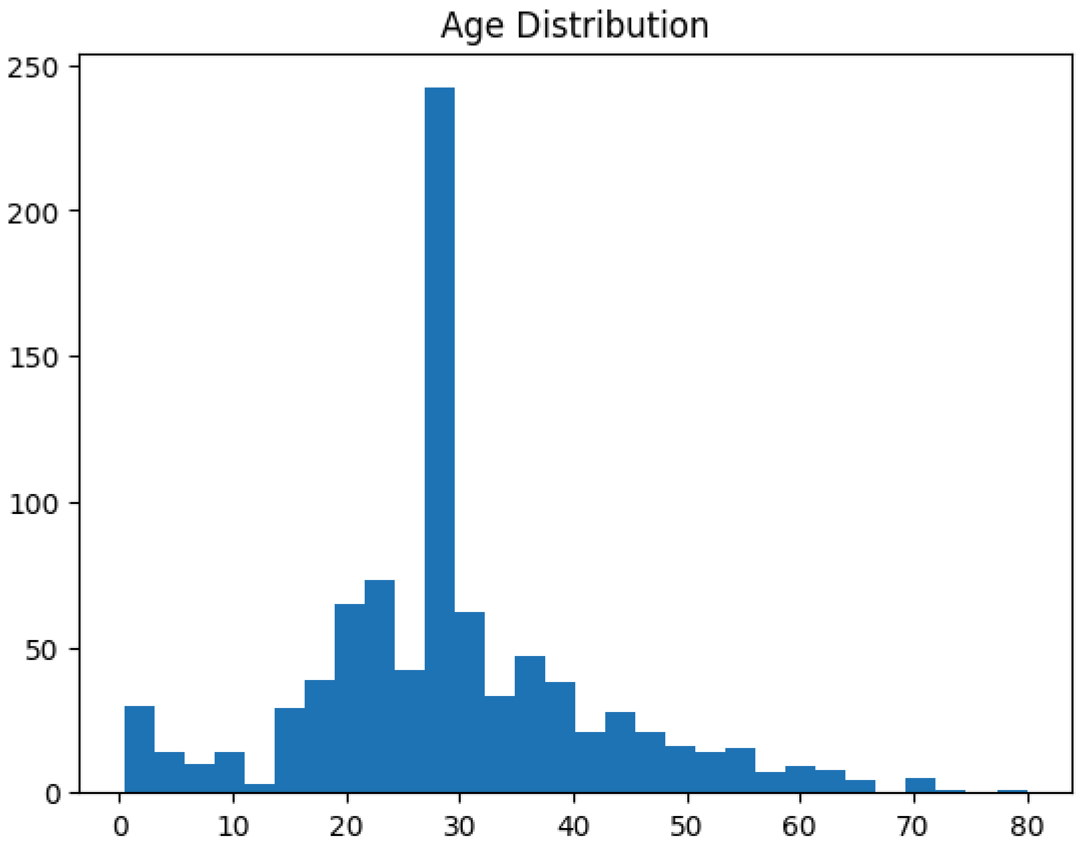
Passenger Class Distribution

In [11]:
```
sns.countplot(x="Pclass", data=df)
plt.show()
```



Age Distribution

```
In [12]: plt.hist(df["Age"], bins=30)
         plt.title("Age Distribution")
         plt.show()
```

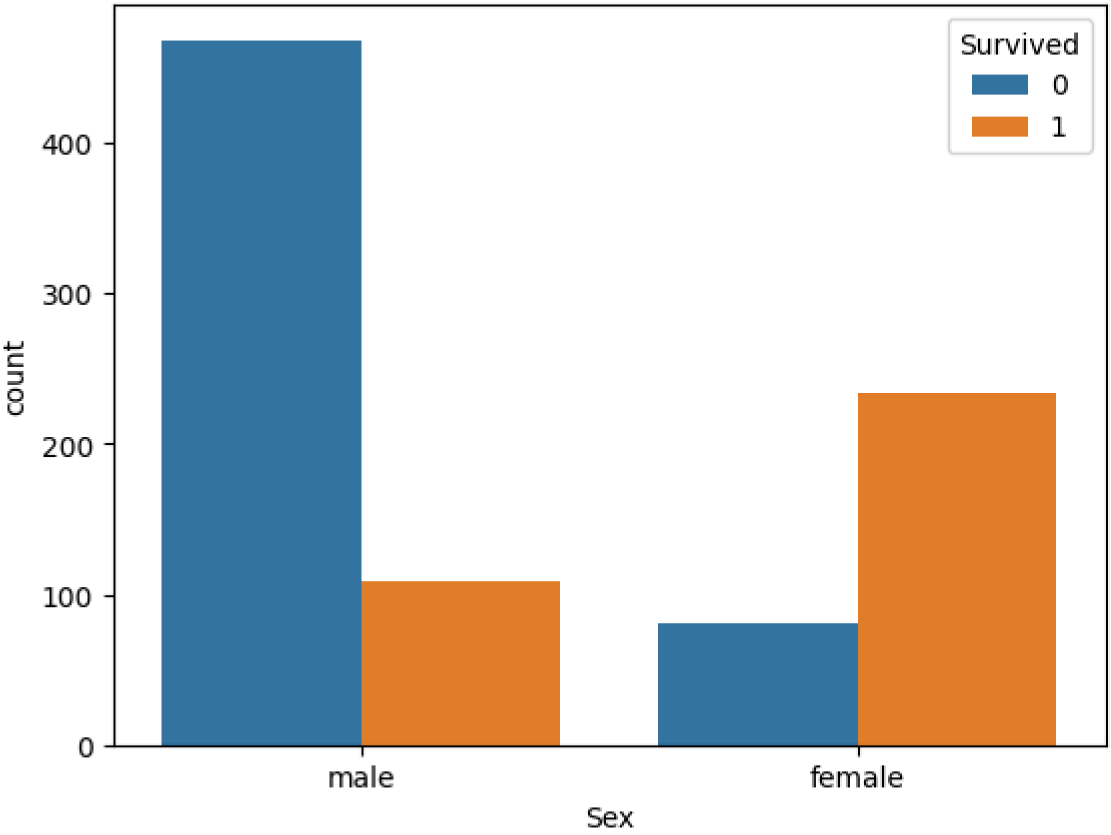


Observation : Most passengers were young adults between 20–40.

Bivariate Analysis

Survival vs Sex

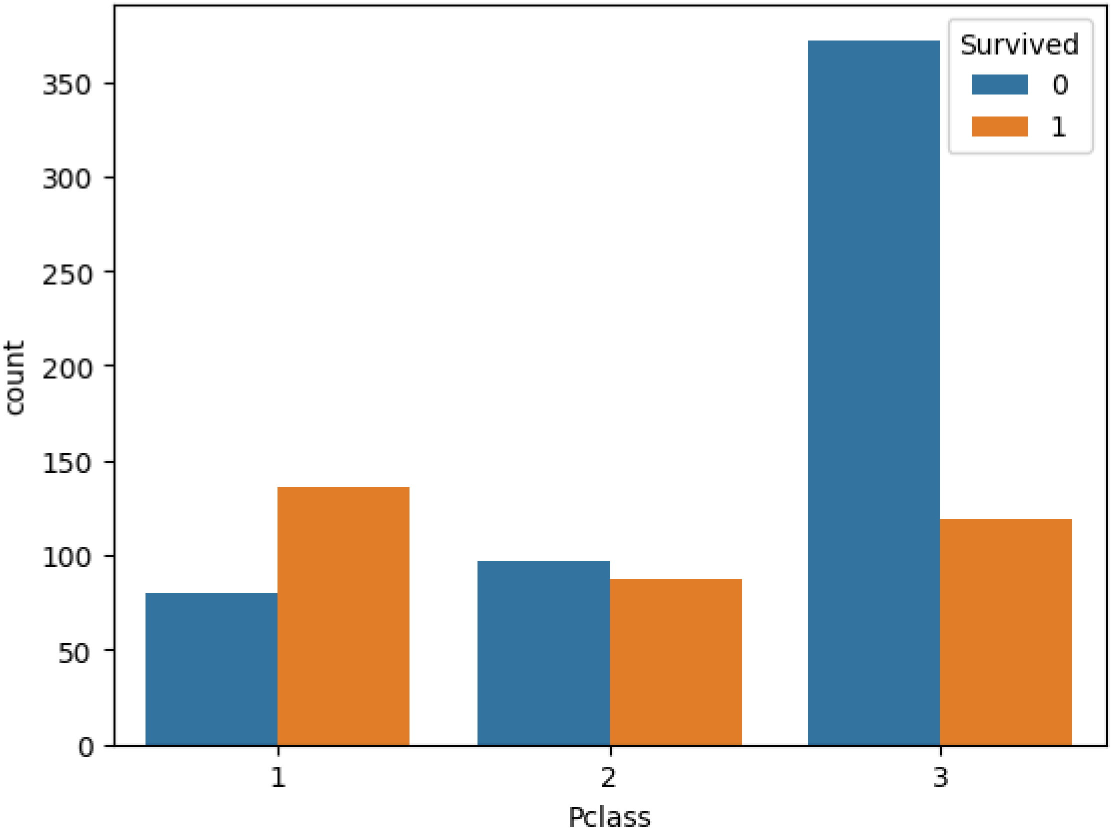
```
In [13]: sns.countplot(x="Sex", hue="Survived", data=df)
         plt.show()
```



Survival vs Pclass

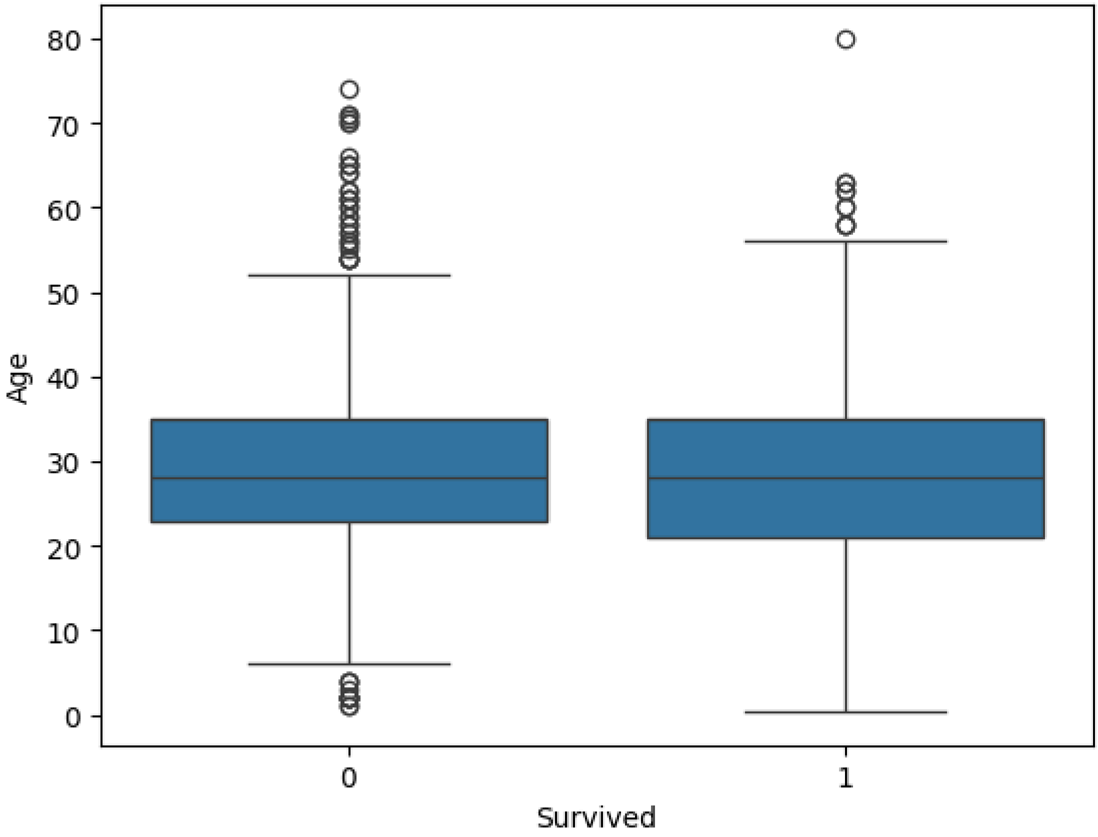
In [14]:

```python
sns.countplot(x="Pclass", hue="Survived", data=df)
plt.show()
```



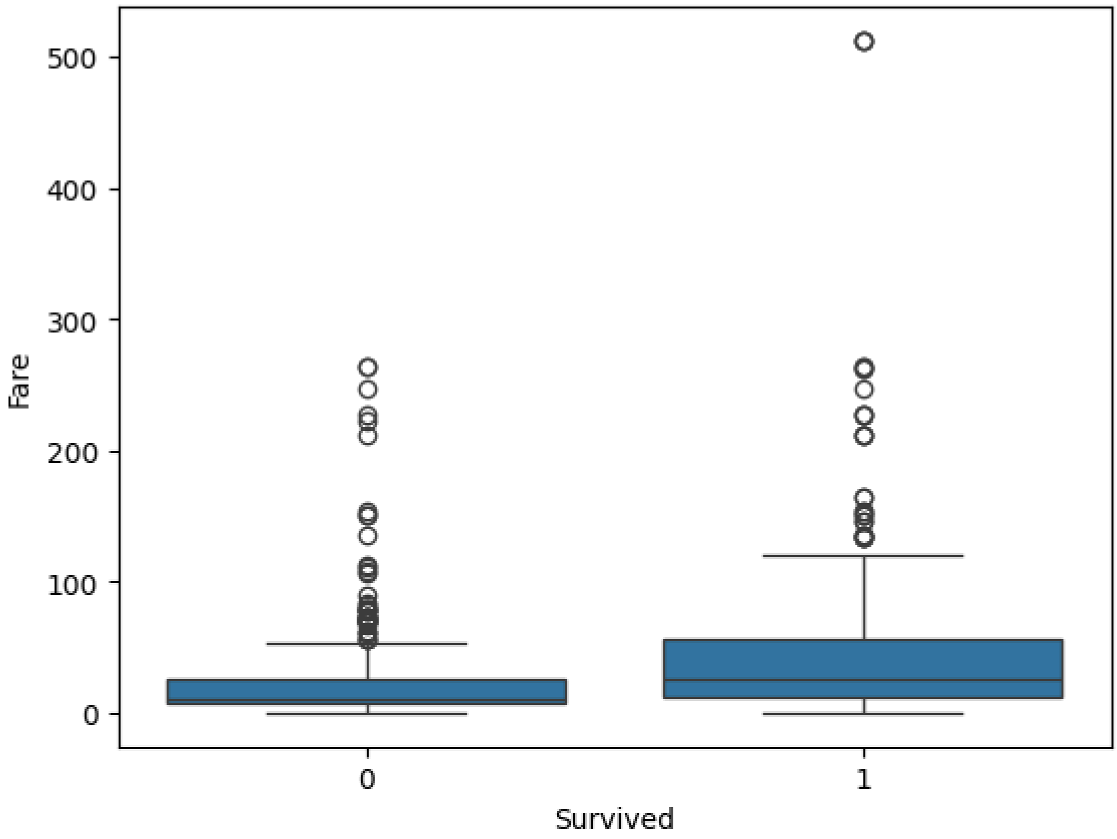
Age vs Survival

In [15]:
```
sns.boxplot(x="Survived", y="Age", data=df)
plt.show()
```



Fare vs Survival

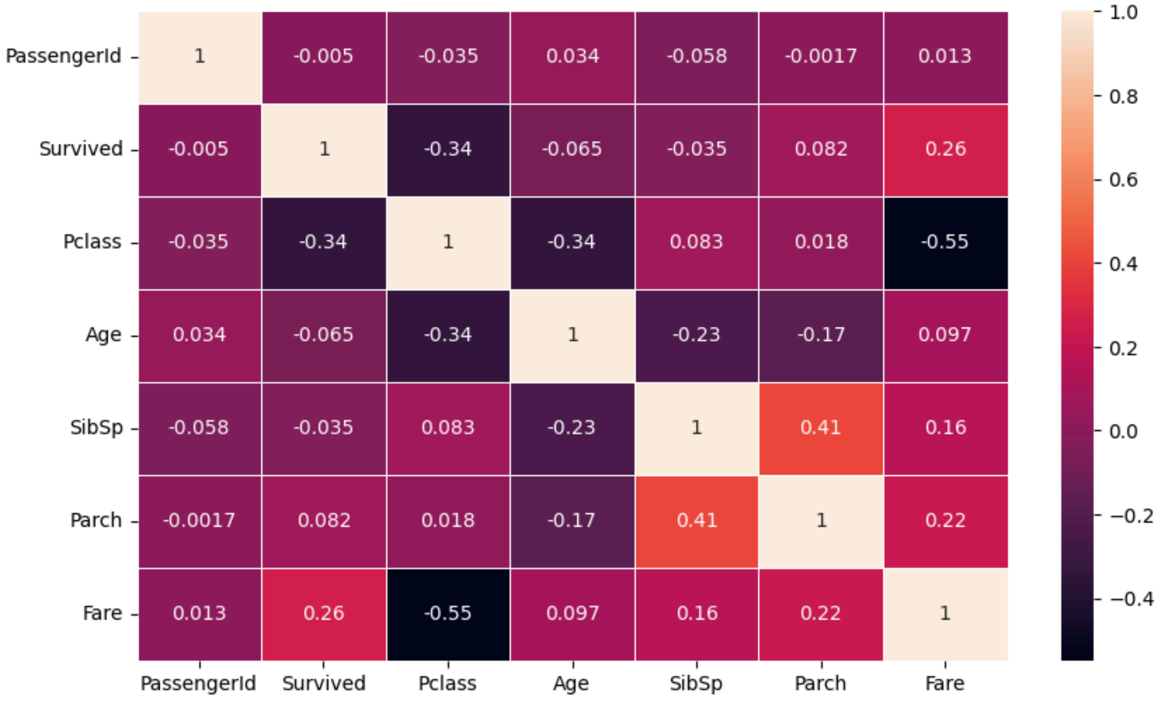
In [16]:
```
sns.boxplot(x="Survived", y="Fare", data=df)
plt.show()
```



Correlation Heatmap

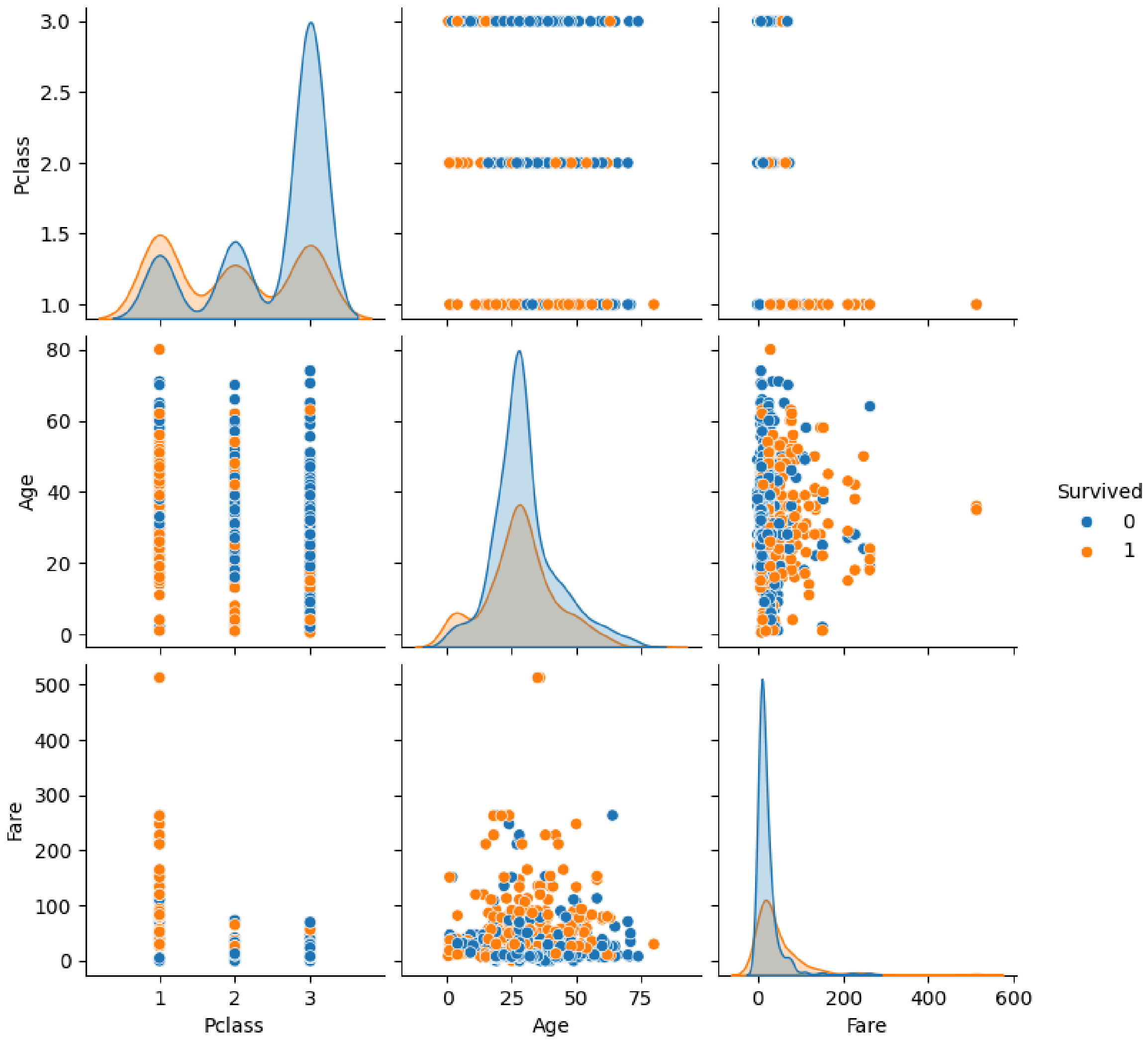
In [18]:

```
plt.figure(figsize=(10,6))
sns.heatmap(df.select_dtypes(include='number').corr(), annot=True, linewidths=0.
plt.show()
```



Pairplot (Multivariate Analysis)

```
In [19]: sns.pairplot(df[["Survived", "Pclass", "Age", "Fare"]], hue="Survived")
plt.show()
```



Key Insights

✓ Females survived more than males

✓ Passengers in 1st class had higher survival rates

✓ Younger passengers had slightly better survival odds

✓ High-fare passengers were more likely to survive

✓ Missed cabins cause incomplete analysis

In [ ]:

```
```