In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

sns.set(style="whitegrid")
```

In [2]:
```
df = pd.read_csv("train.csv")
```

In [3]:
```
df.head()
df.tail()
df.shape
df.info()
df.describe(include="all")
df.isnull().sum()
```

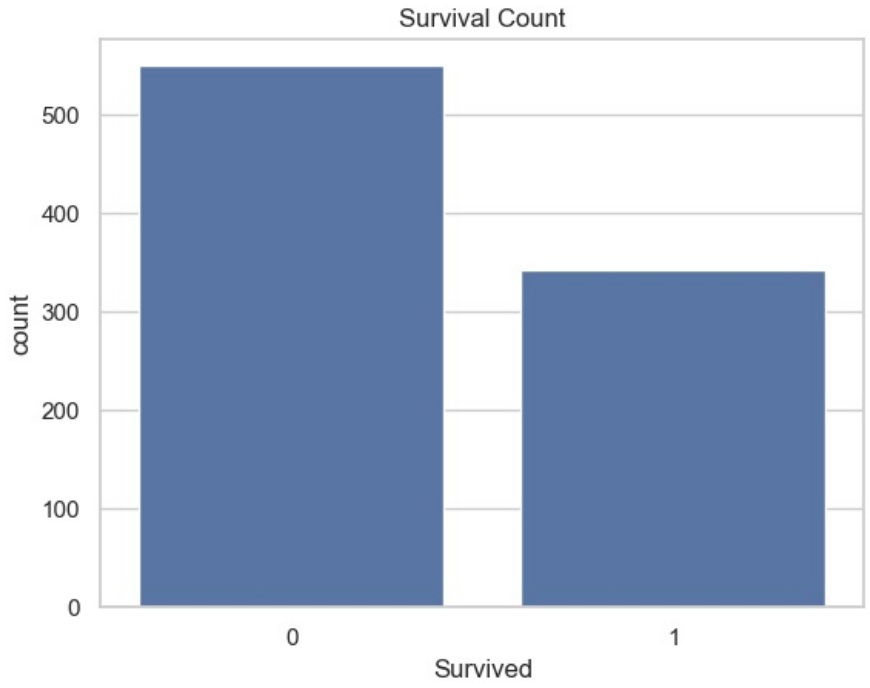
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  891 non-null    int64  
 1   Survived     891 non-null    int64  
 2   Pclass       891 non-null    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
```

Out[3]:
```
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
```

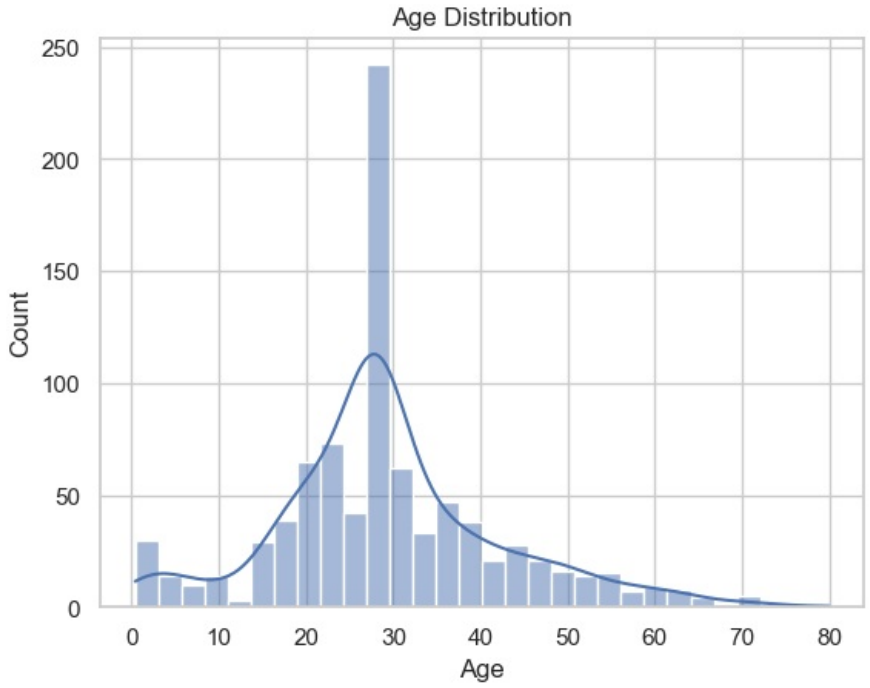
In [4]:
```
df['Age'] = df['Age'].fillna(df['Age'].median())
df['Embarked'] = df['Embarked'].fillna(df['Embarked'].mode()[0])
df.drop(columns=['Cabin'], inplace=True)
df.isnull().sum()
```

Out[4]:
```
PassengerId    0
Survived       0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Embarked       0
dtype: int64
```

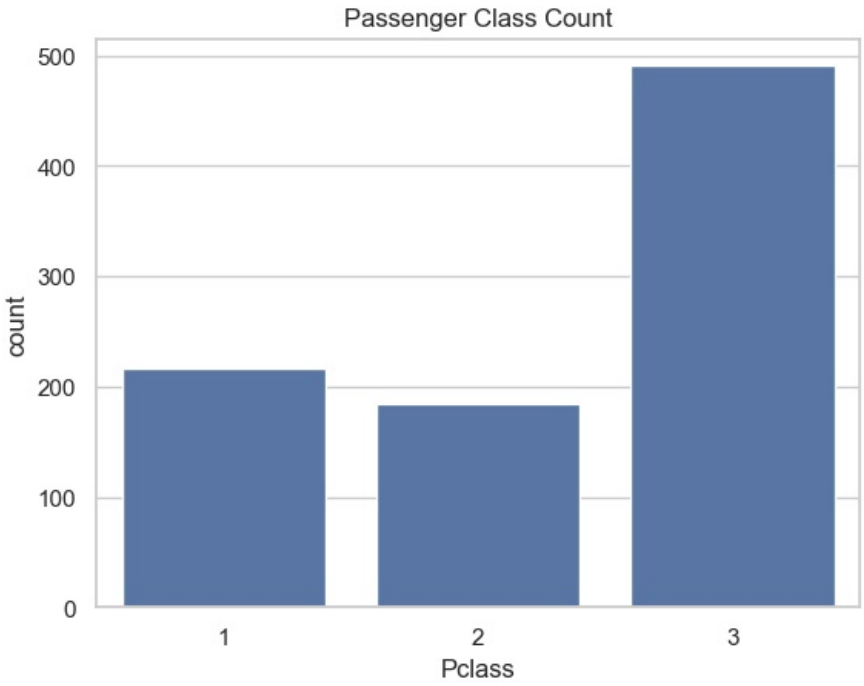
In [5]:
```
sns.countplot(x='Survived', data=df)
plt.title("Survival Count")
plt.show()
```



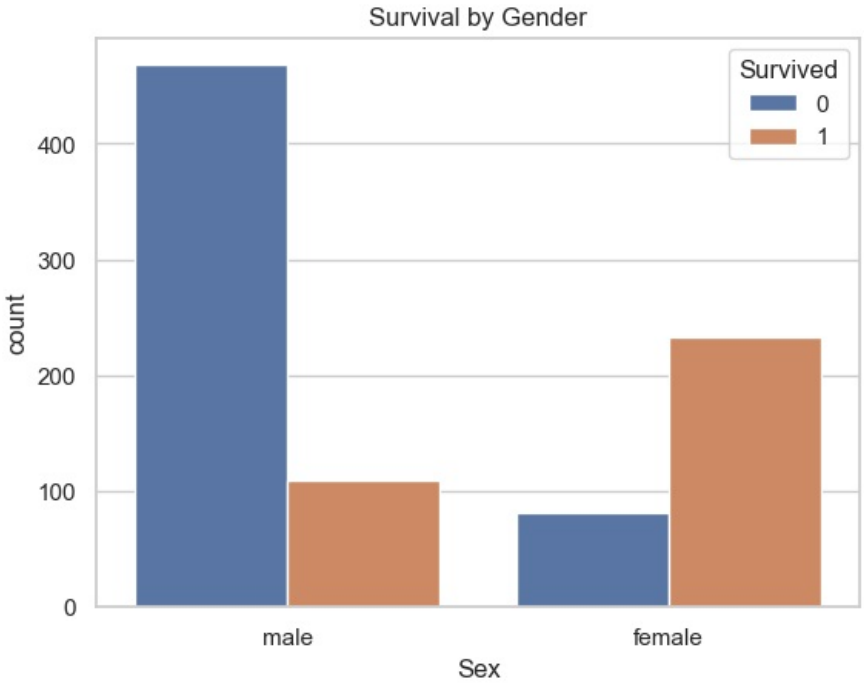
In [6]:
```
sns.histplot(df['Age'], kde=True)
plt.title("Age Distribution")
plt.show()
```



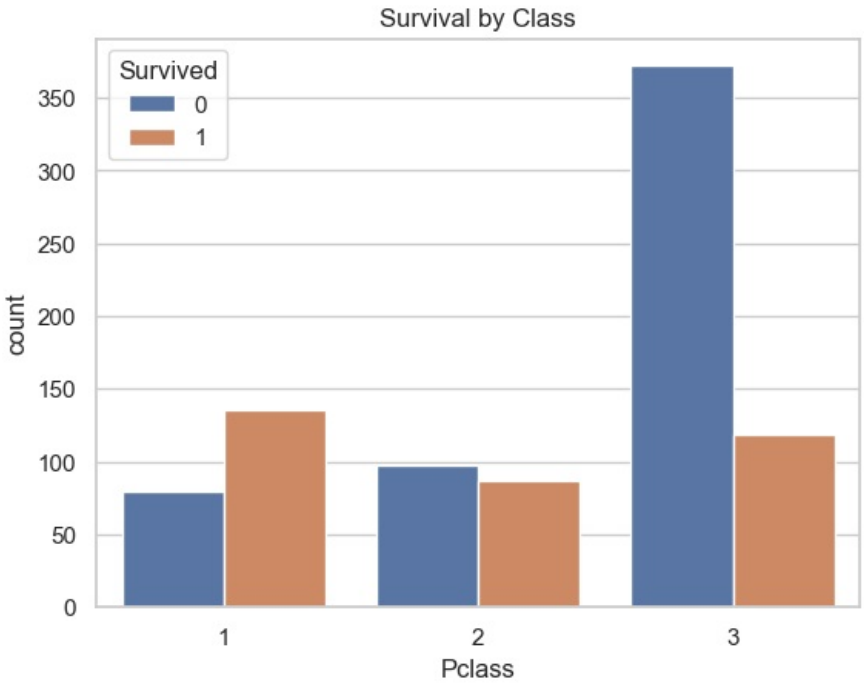
In [7]:
```
sns.countplot(x='Pclass', data=df)
plt.title("Passenger Class Count")
plt.show()
```



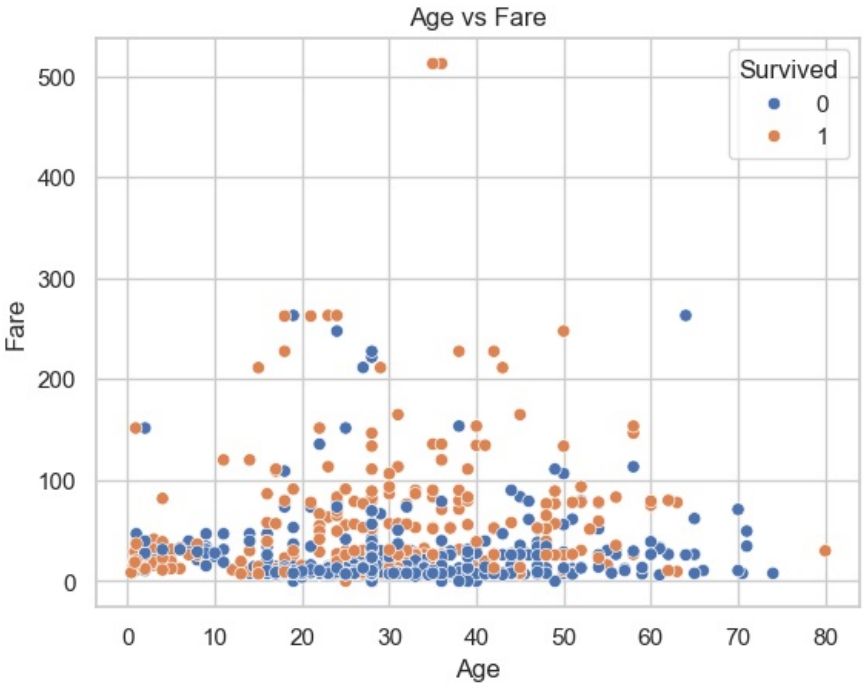
In [8]:
```
sns.countplot(x='Sex', hue='Survived', data=df)
plt.title("Survival by Gender")
plt.show()
```



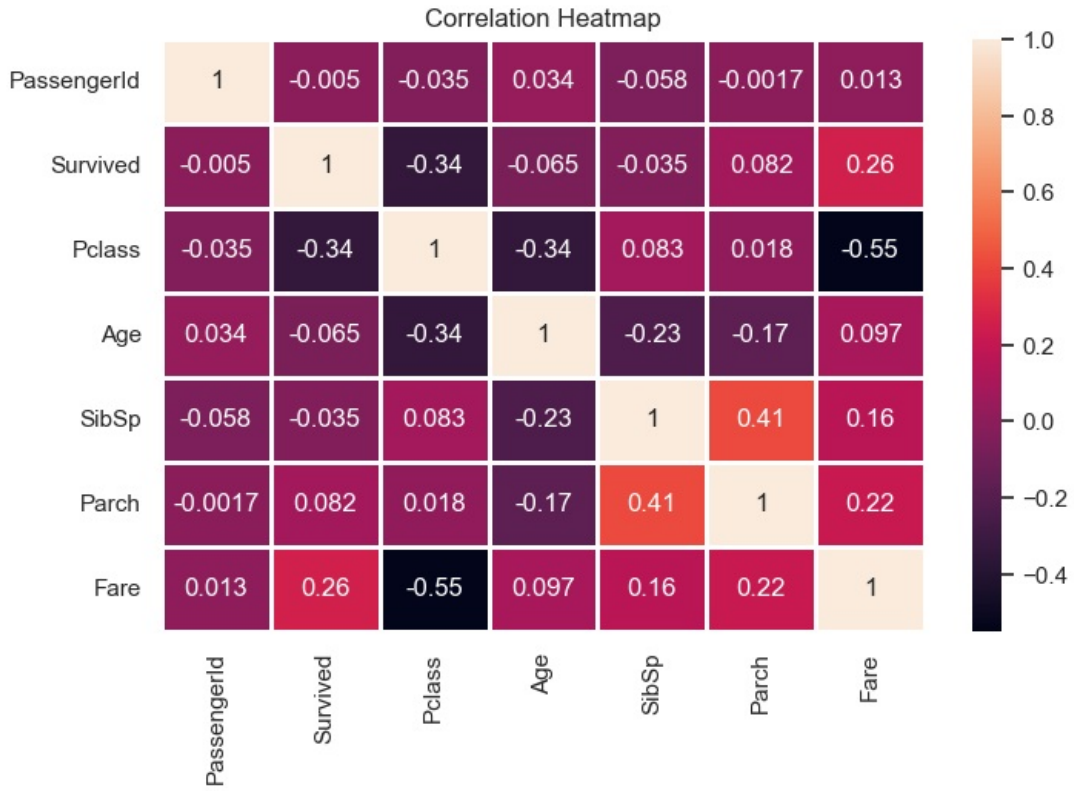
In [9]:
```
sns.countplot(x='Pclass', hue='Survived', data=df)
plt.title("Survival by Class")
plt.show()
```



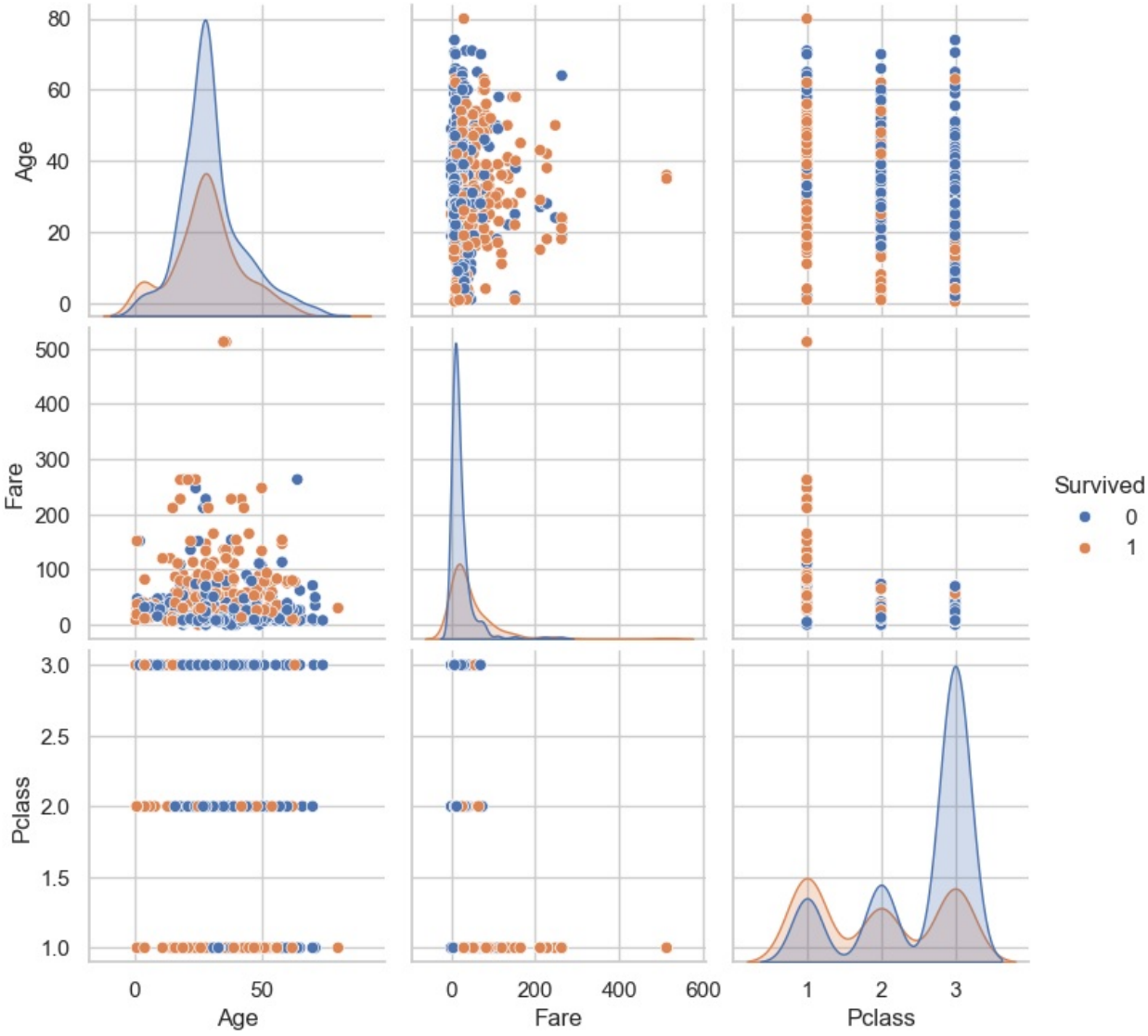
In [10]:
```
sns.scatterplot(x='Age', y='Fare', hue='Survived', data=df)
plt.title("Age vs Fare")
plt.show()
```



In [11]:
```
plt.figure(figsize=(8,5))
sns.heatmap(df.corr(numeric_only=True), annot=True, linewidths=1)
plt.title("Correlation Heatmap")
plt.show()
```



In [12]:
```
sns.pairplot(df[['Survived','Age','Fare','Pclass']], hue='Survived')
plt.show()
```



In [13]:
```
df.to_csv('train_analysis.csv',index=False)
```

In [ ]:
```
##Final Summary of EDA
```

```
### 1.Missing values Fixed
Missing Age filled using Median.
Missing Embarked filled using Mode.


### 2.Age Distribution
Most passengers belonged to the 3rd class. Age is mostly between 20-40.

### 3.Gender Distribution
There are more male passengers than female.

### 4. Survival Based on Gender
Women and first-class passengers had higher survival rates.

### 5. Survival Based on Class
1st Class has the Highest Survival rate.
3rd Class has the Lowest Survival rate.

### 6. Correlation Insights
Fare and Pclass negatively correlat
Fare has a positive Correlation with survival.
Pclass has a negative correlation with survival.

### Overall Conclusion
Survival is strongly influenced by demographic and socio-economic factors.
Women, children, and wealthier passengers had significantly higher survival chances.
Therefore, the key determinants of survival were Gender, Passenger Class, and Fare.
```