In [12]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

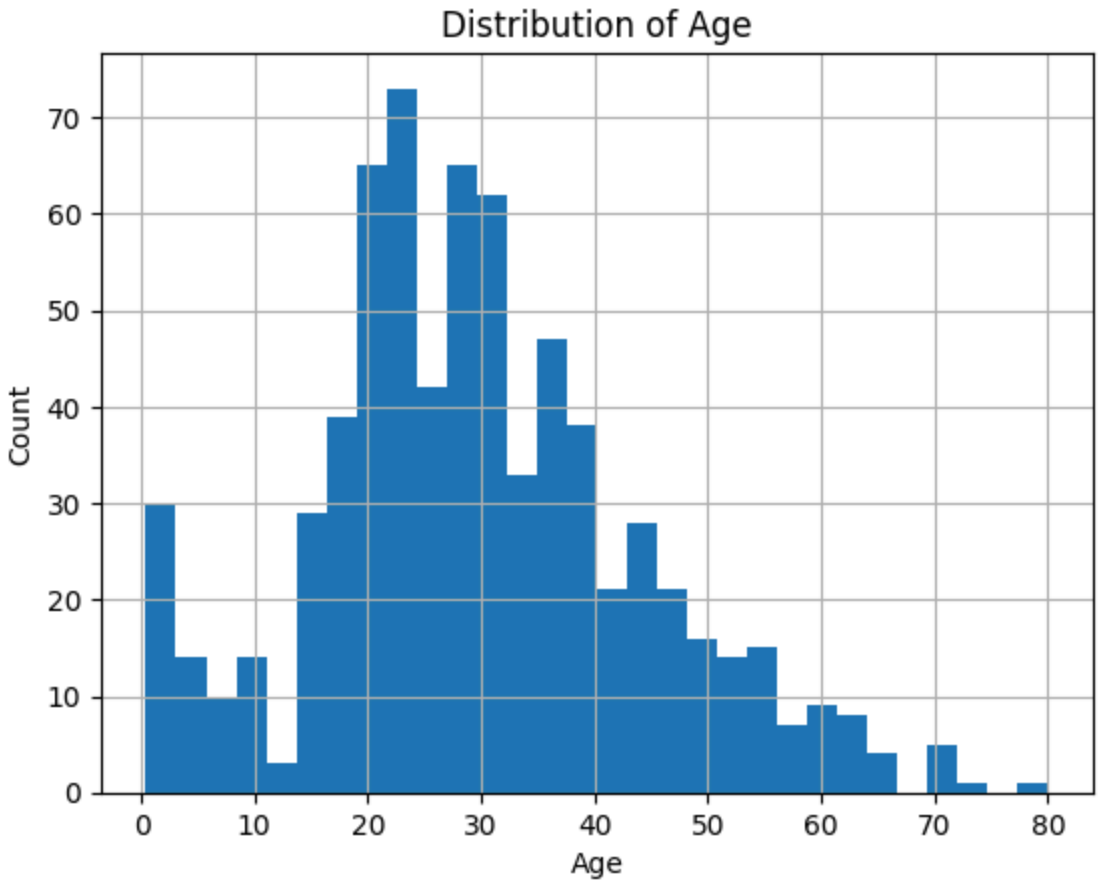
In [3]:
```
data = pd.read_csv("C:\\Users\\amank\\OneDrive\\Desktop\\elevate labs intern\\task 5\\train.csv")
```

In [4]:
```
# Basic information
print(data.info())

# Statistical summary
print(data.describe())

# View first few rows
print(data.head())
```

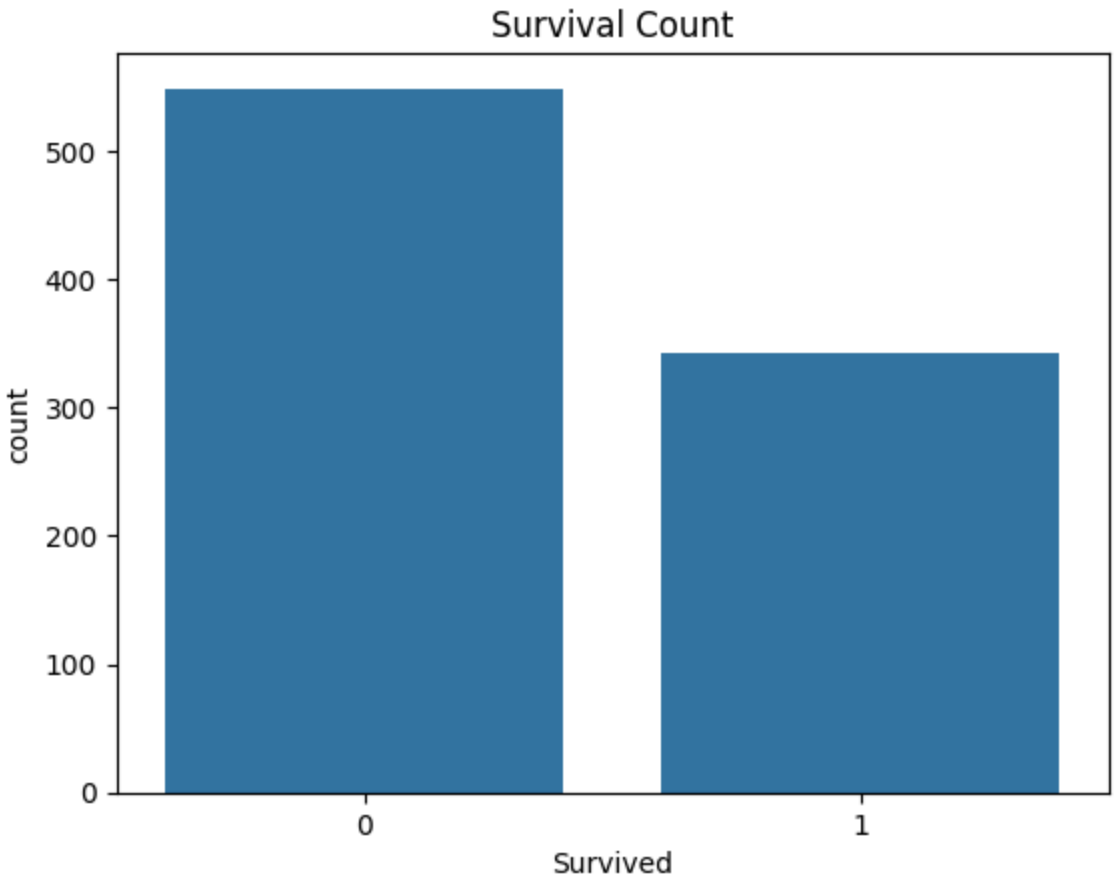
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  891 non-null    int64  
 1   Survived     891 non-null    int64  
 2   Pclass       891 non-null    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
None
       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  
   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
```

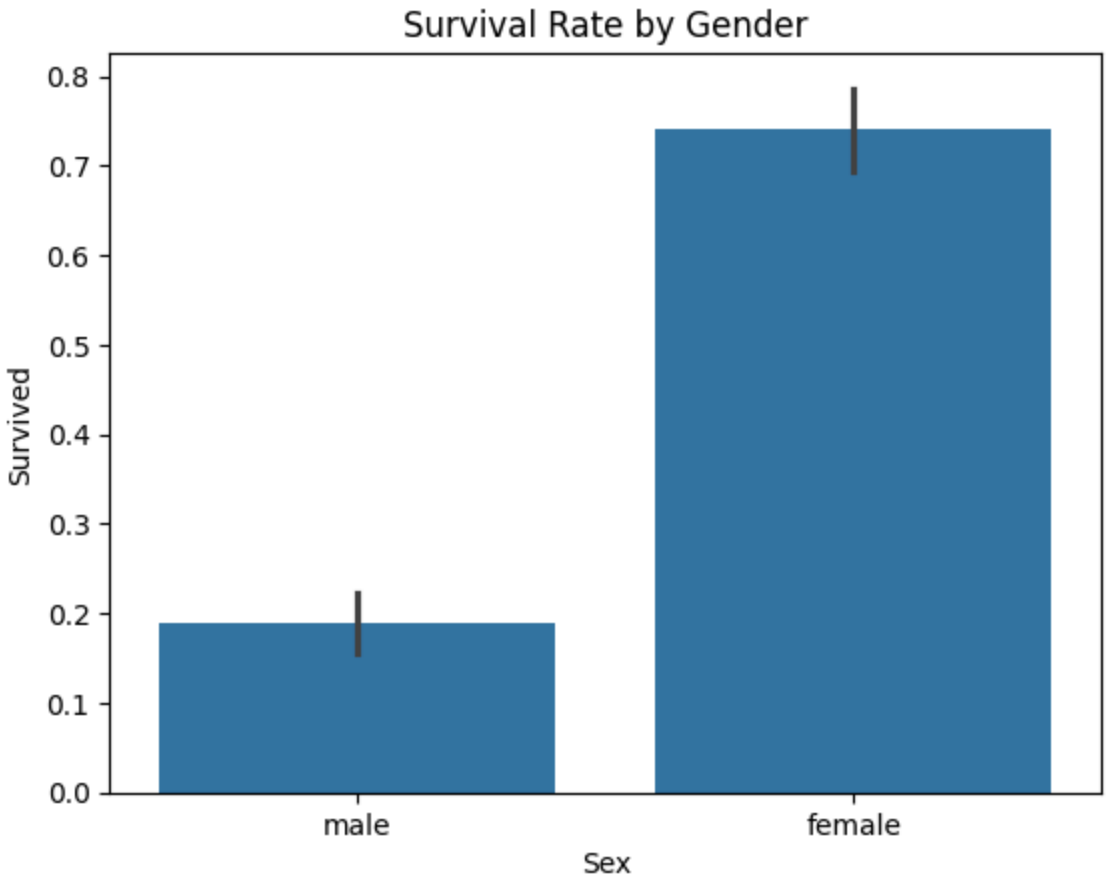
In [5]:
```
data['Age'].hist(bins=30)
plt.title('Distribution of Age')
plt.xlabel('Age')
plt.ylabel('Count')
plt.show()
```

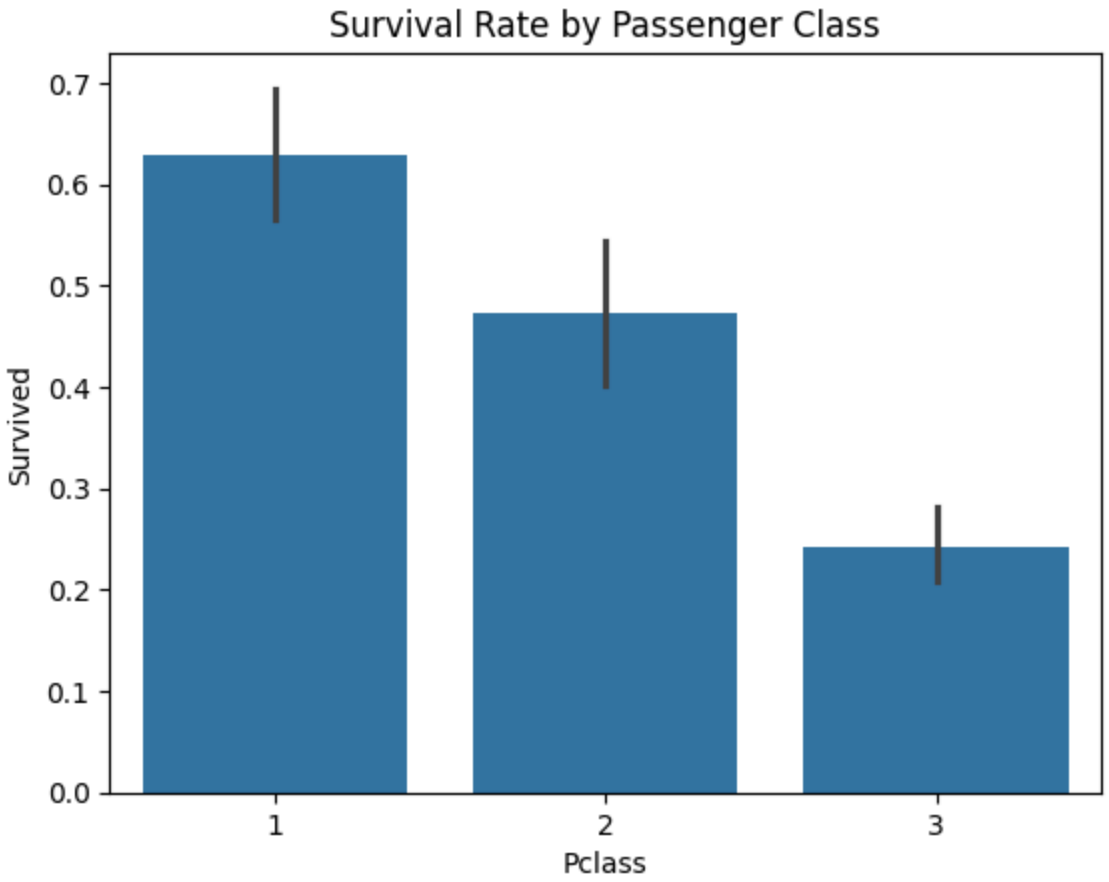


In [6]:
```
sns.countplot(x='Survived', data=data)
plt.title('Survival Count')
plt.show()
```

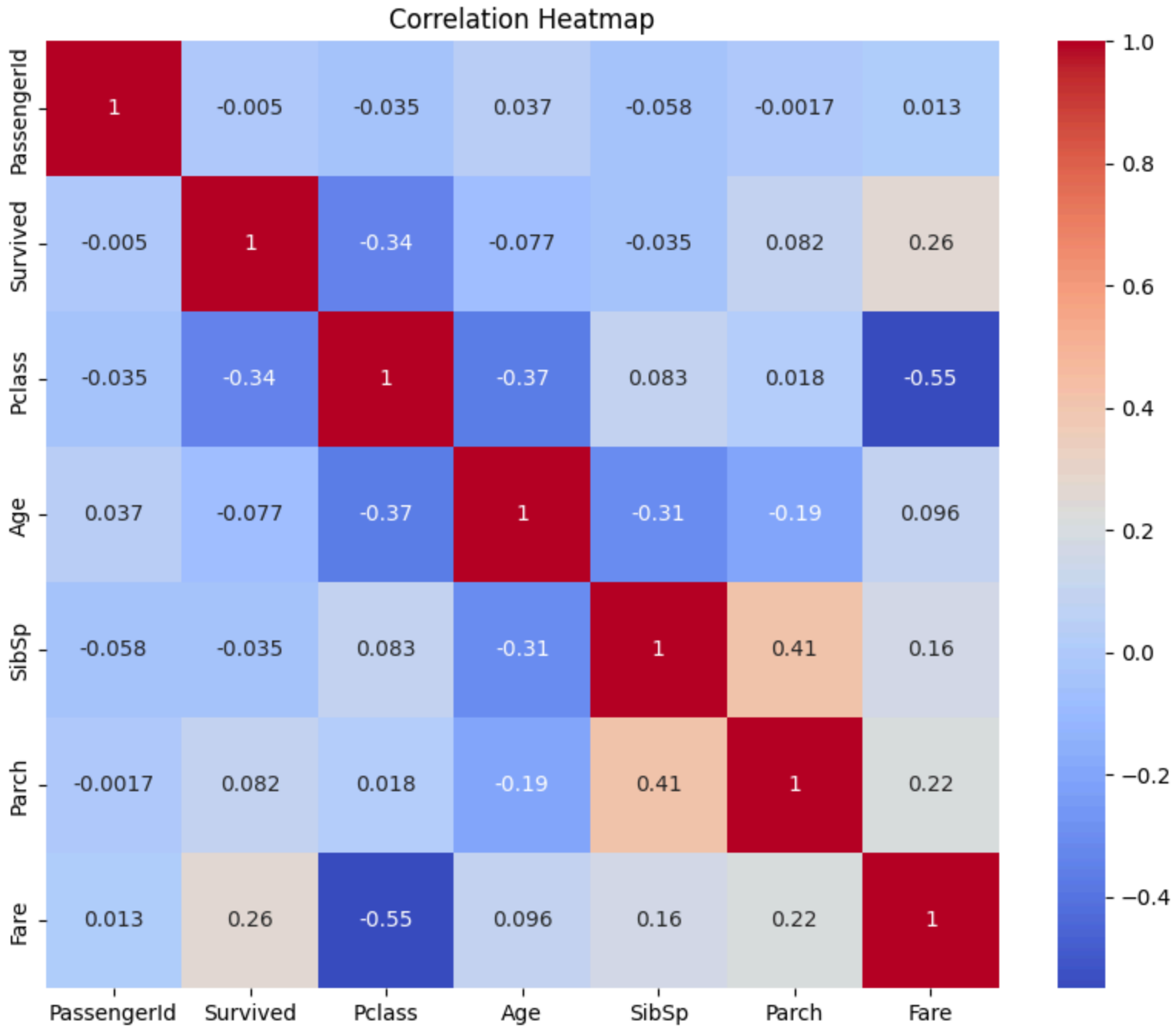


In [7]:
```
sns.barplot(x='Sex', y='Survived', data=data)
plt.title('Survival Rate by Gender')
plt.show()

sns.barplot(x='Pclass', y='Survived', data=data)
plt.title('Survival Rate by Passenger Class')
plt.show()
```

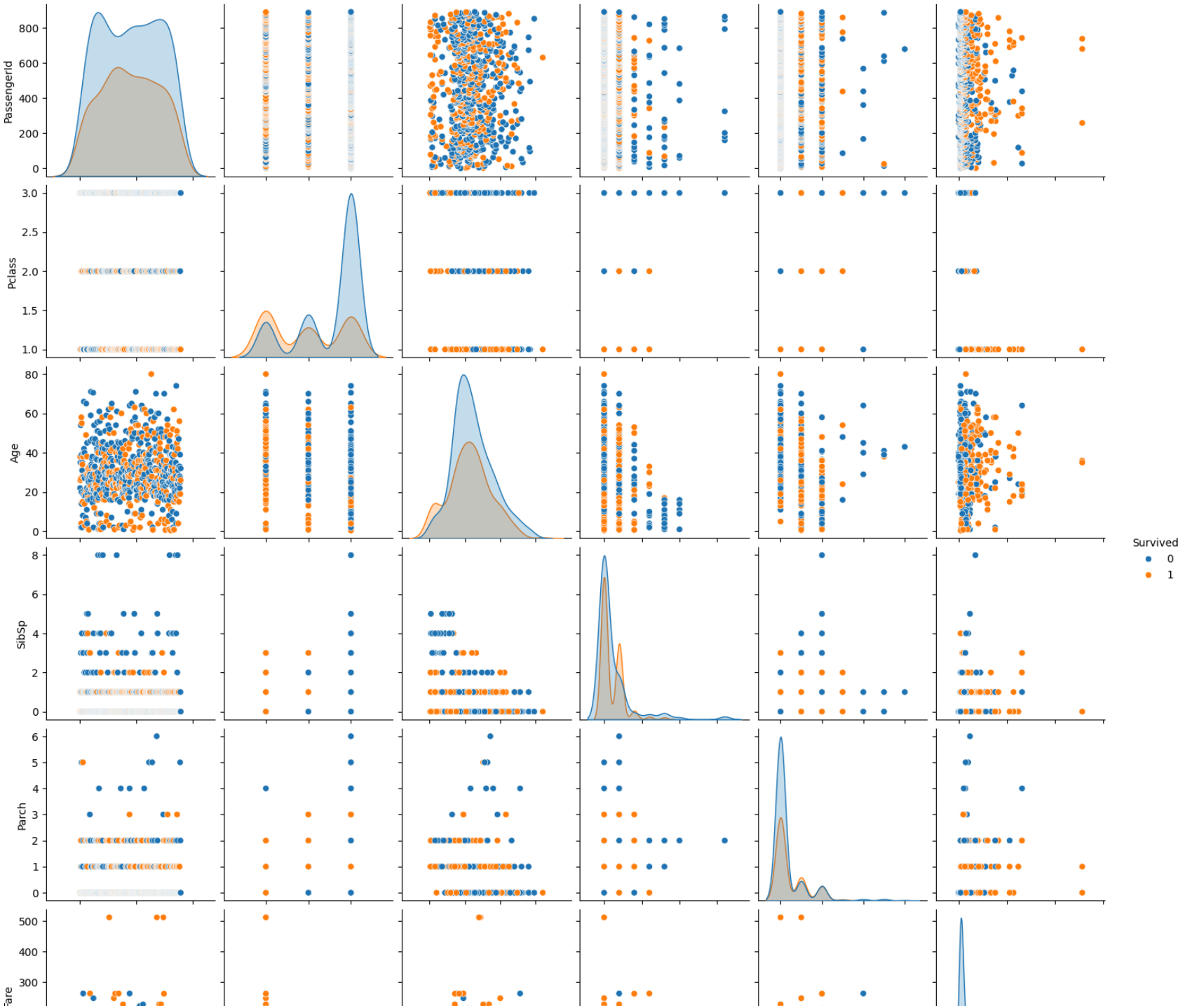

Survival Rate by Gender
Survived
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
male
female
Sex

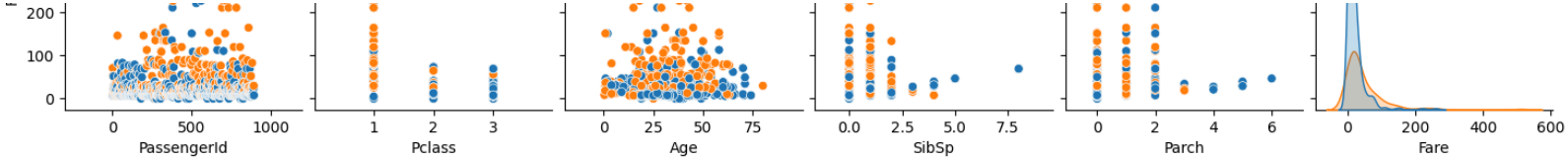


In [13]:
```
# Select only numeric columns
numeric_data = data.select_dtypes(include=[np.number])

# Now plot the heatmap
plt.figure(figsize=(10,8))
sns.heatmap(numeric_data.corr(), annot=True, cmap='coolwarm')
plt.title('Correlation Heatmap')
plt.show()
```


Correlation Heatmap
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

In [15]:
```
sns.pairplot(data, hue='Survived')
plt.show()
```


PassengerId
Pclass
Age
SibSp
Parch
Fare
Survived
0
1

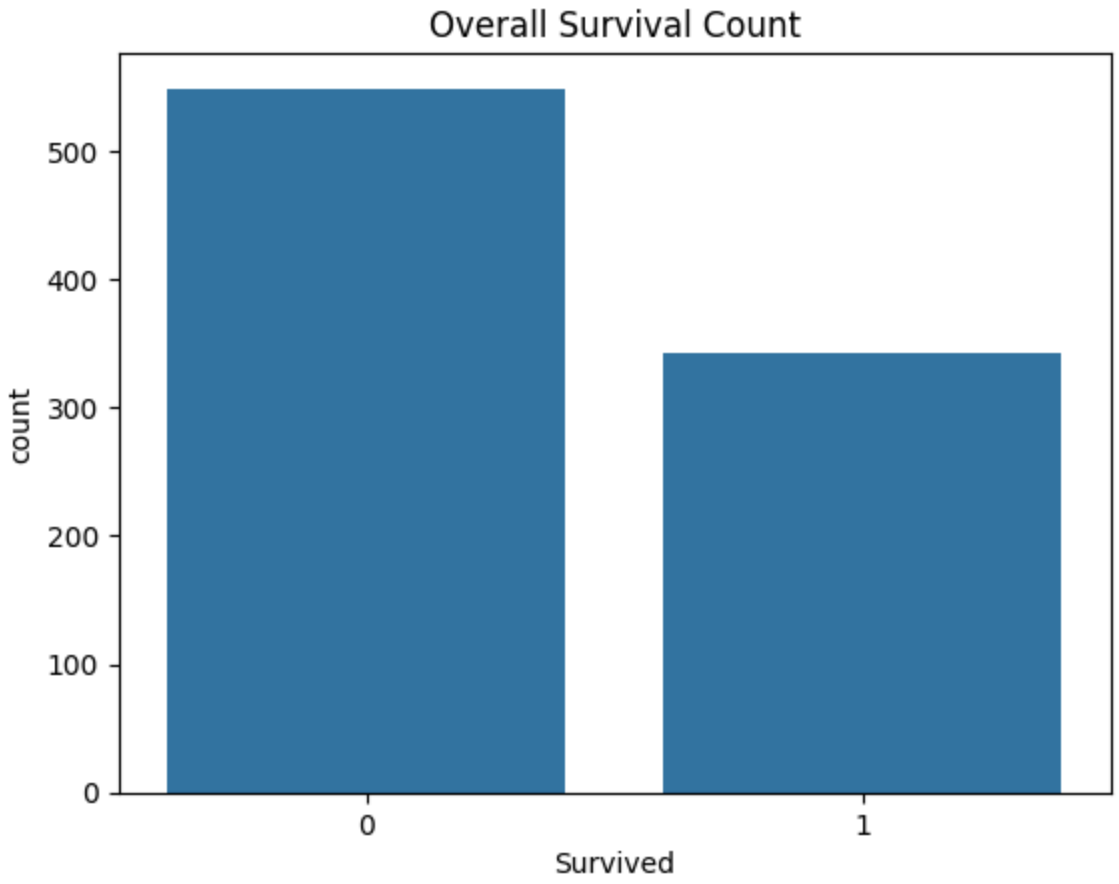


In [16]:
```
data.isnull().sum()
```

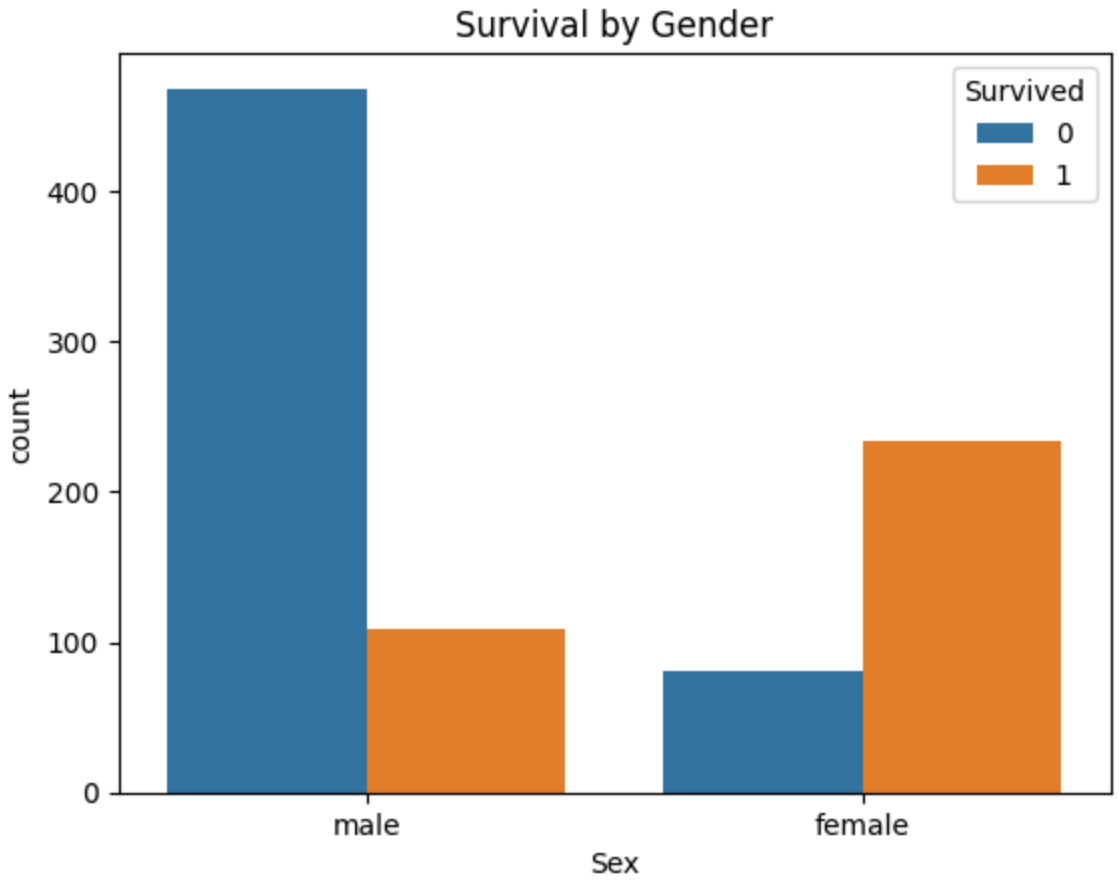
Out[16]:
```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
```

In [18]:
```
data['Age'] = data['Age'].fillna(data['Age'].median())
```

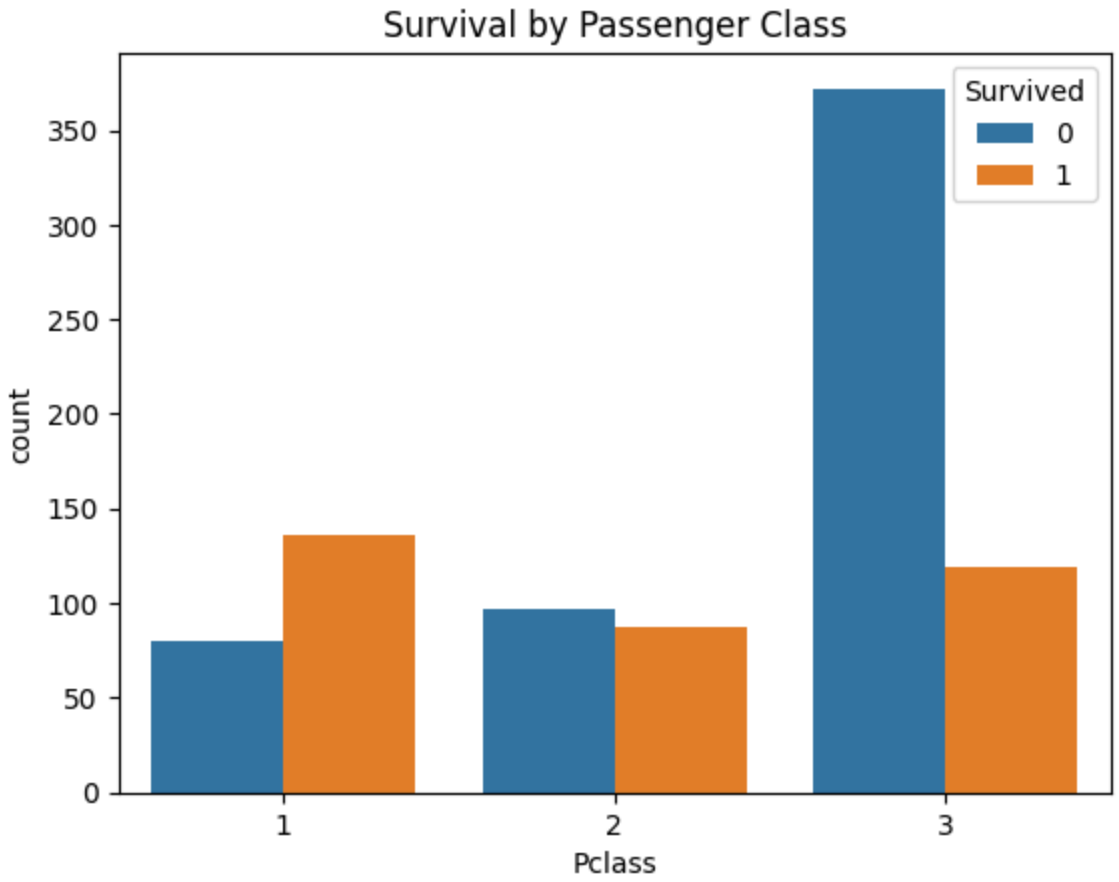
In [19]:
```
sns.countplot(x='Survived', data=data)
plt.title('Overall Survival Count')
plt.show()
```



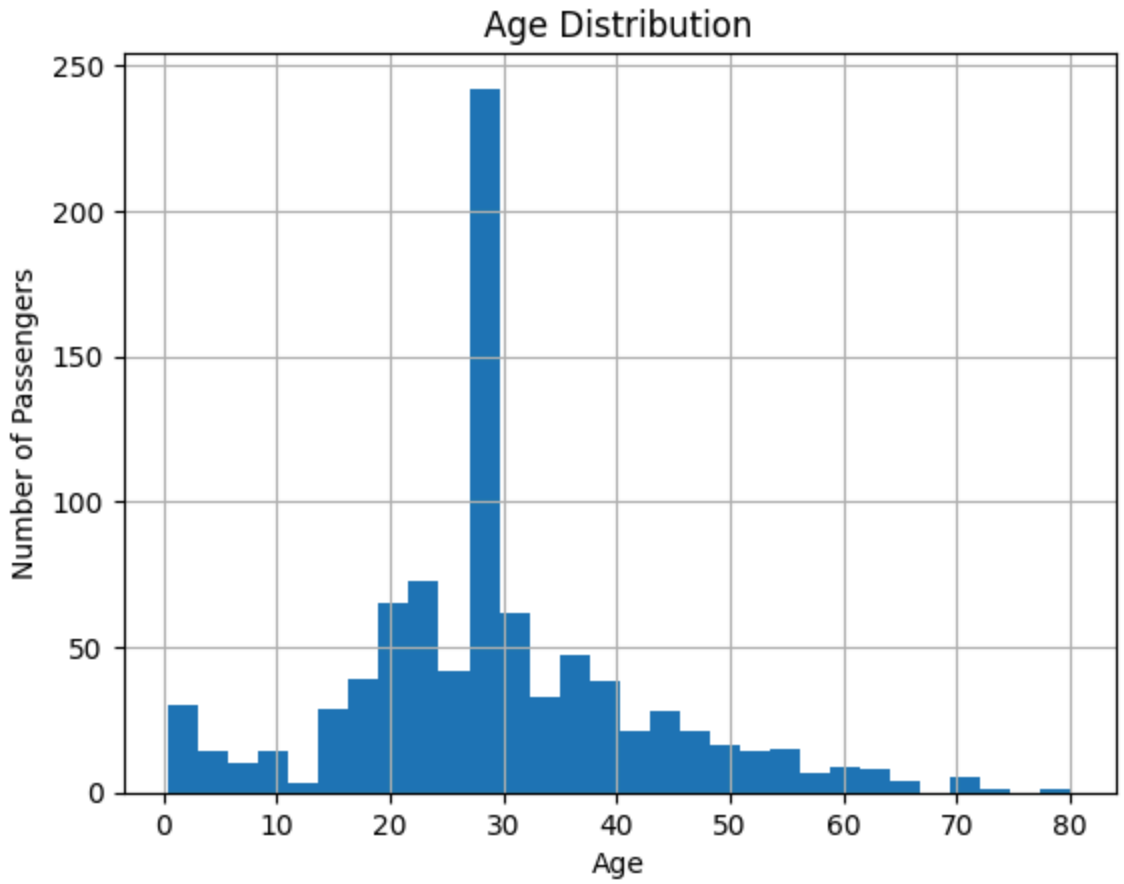
In [20]:
```
sns.countplot(x='Sex', hue='Survived', data=data)
plt.title('Survival by Gender')
plt.show()
```



In [21]:
```
sns.countplot(x='Pclass', hue='Survived', data=data)
plt.title('Survival by Passenger Class')
plt.show()
```

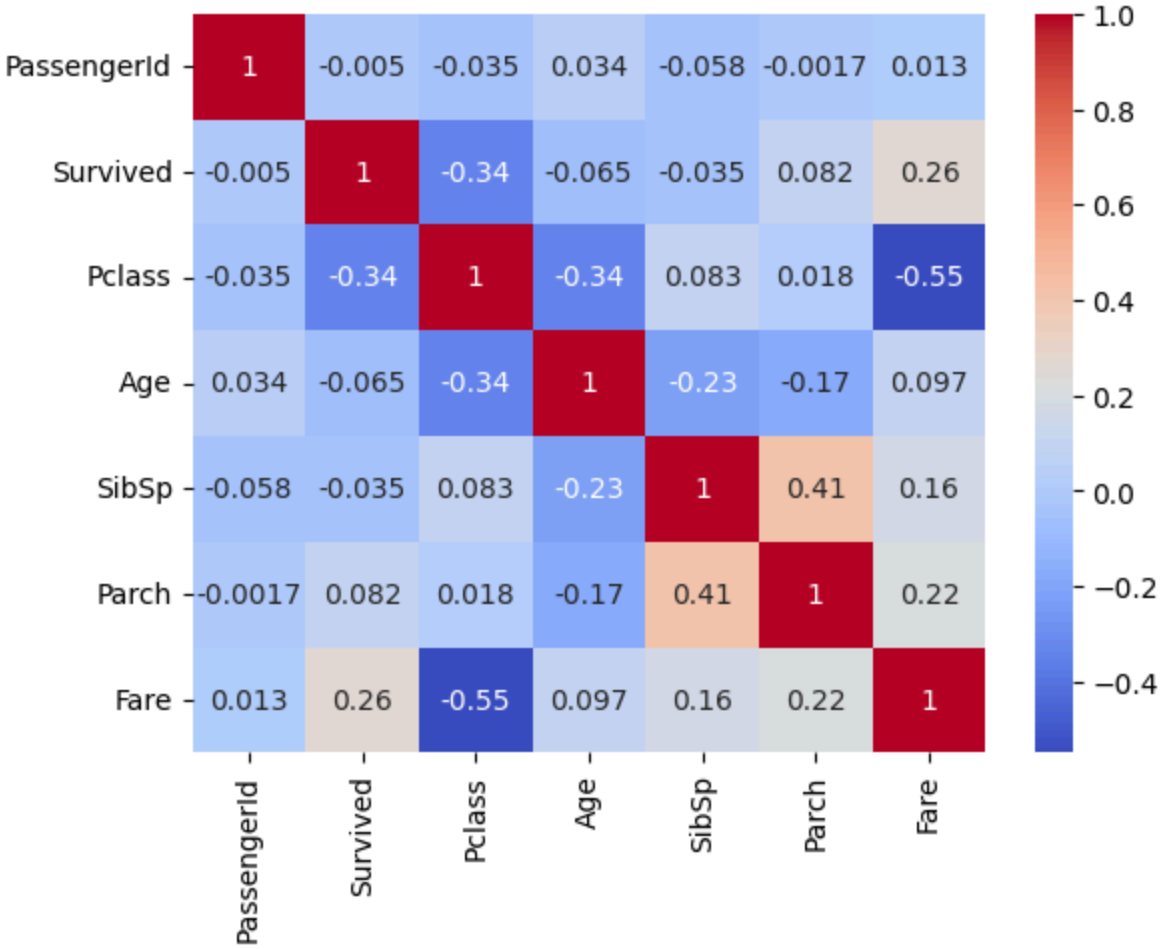


In [22]:
```
data['Age'].hist(bins=30)
plt.title('Age Distribution')
plt.xlabel('Age')
plt.ylabel('Number of Passengers')
plt.show()
```



In [24]:
```
sns.heatmap(data.select_dtypes(include=[np.number]).corr(), annot=True, cmap='coolwarm')
```

Out[24]: <Axes: >



In [ ]:
```
# Summary of Findings

Around 62% of passengers did not survive, while only about 38% survived.

Females had a much higher survival rate compared to males.

Passengers traveling in 1st class had a higher chance of survival than those in 2nd and 3rd class.

3rd class passengers had the highest mortality rate.

The majority of the passengers were aged between 20 to 40 years.
```

```
Children (age below 10 years) had slightly better survival chances compared to adults.

Passengers who paid higher fares had better survival chances, indicating fare was related to social status and survi

Embarked port 'C' (Cherbourg) had the highest survival rates among the three embarkation points.

Cabin information had too many missing values and was dropped from the analysis.

Age and Fare showed a weak positive correlation with survival, while Pclass had a negative correlation with survival

# Final Conclusion

"Passenger gender, travel class, and ticket fare were the most significant factors affecting survival on the Titanic.
```