In [1]:

```
# Part 1 - Import Libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

# Set seaborn style for better visuals
sns.set(style="whitegrid")
```

In [2]:

```
# Part 2 - Load Titanic datasets
train_df = pd.read_csv(r"D:\Elevate Labs\titanic\train.csv")
test_df = pd.read_csv(r"D:\Elevate Labs\titanic\test.csv")
gender_submission_df = pd.read_csv(r"D:\Elevate Labs\titanic\gender_submission.c

# Make a working copy from train data
df = train_df.copy()
```

In [3]:

```
# Part 3 - View first rows
df.head()
```

Out[3]:

	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

In [4]:

```
# Dataset Info
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
```

In [5]:
```
# Dataset Description
df.describe(include="all")
```

Out[5]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	
count	891.000000	891.000000	891.000000	891	891	714.000000	891.000000	89
unique	NaN	NaN	NaN	891	2	NaN	NaN	
top	NaN	NaN	NaN	Braund, Mr. Owen Harris	male	NaN	NaN	
freq	NaN	NaN	NaN	1	577	NaN	NaN	
mean	446.000000	0.383838	2.308642	NaN	NaN	29.699118	0.523008	
std	257.353842	0.486592	0.836071	NaN	NaN	14.526497	1.102743	
min	1.000000	0.000000	1.000000	NaN	NaN	0.420000	0.000000	
25%	223.500000	0.000000	2.000000	NaN	NaN	20.125000	0.000000	
50%	446.000000	0.000000	3.000000	NaN	NaN	28.000000	0.000000	
75%	668.500000	1.000000	3.000000	NaN	NaN	38.000000	1.000000	
max	891.000000	1.000000	3.000000	NaN	NaN	80.000000	8.000000	

In [6]:
```
# Value counts for categorical columns
print("Sex counts:\n", df['Sex'].value_counts())
print("\nEmbarked counts:\n", df['Embarked'].value_counts())
```

```
Sex counts:
 Sex
male      577
female    314
Name: count, dtype: int64

Embarked counts:
 Embarked
S    644
C    168
Q     77
Name: count, dtype: int64
```

In [7]:

```
# Check missing values
df.isnull().sum()
```

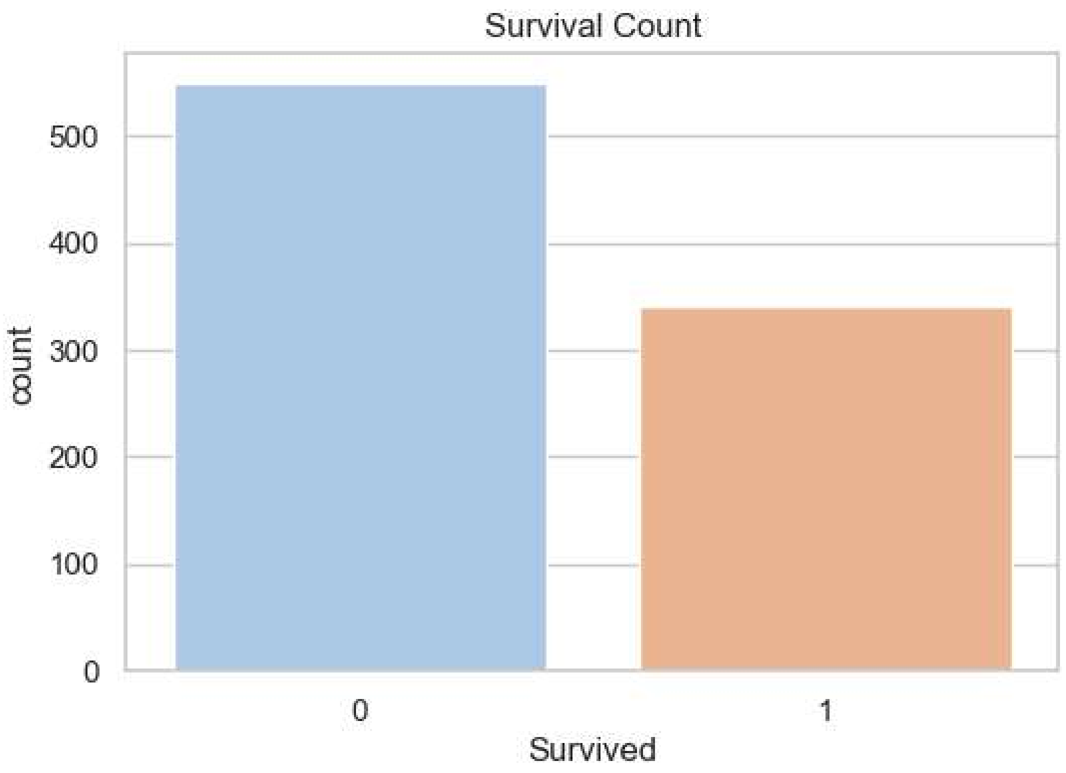
Out[7]:

```
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
```

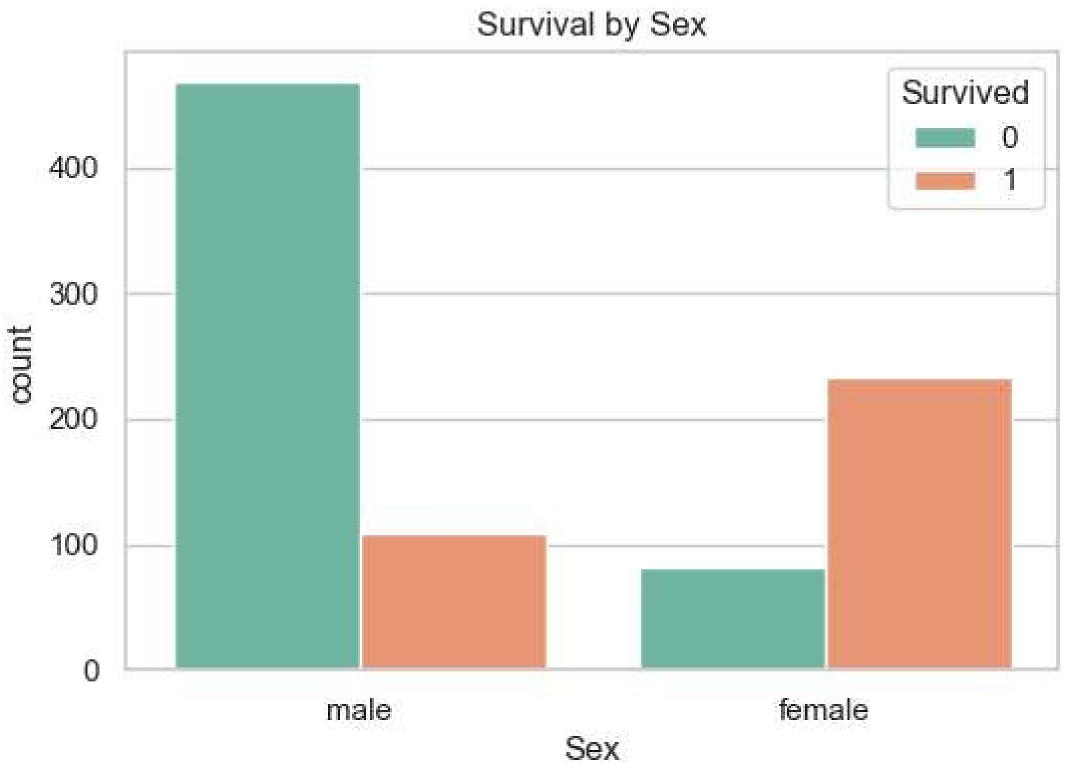
In [8]:

```
# Survival Count Plot
plt.figure(figsize=(6,4))
sns.countplot(data=df, x='Survived', palette='pastel')
plt.title('Survival Count')
plt.show()
```

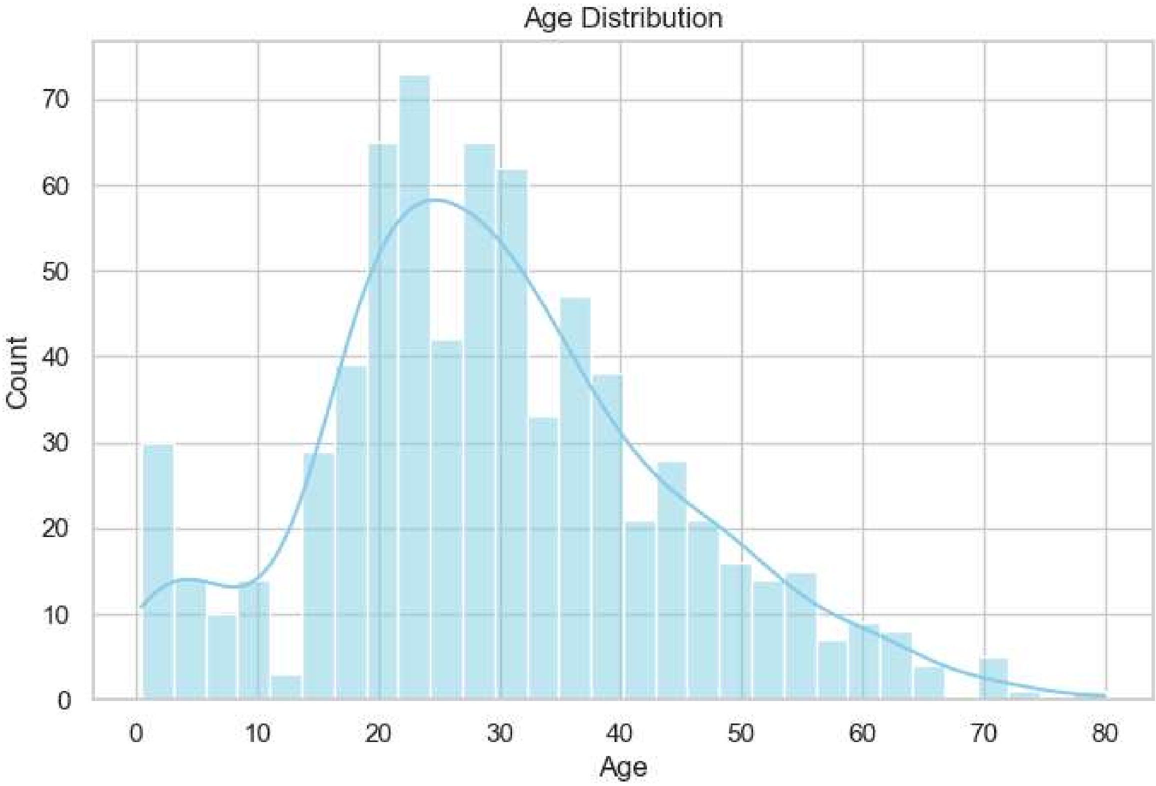
```
C:\Users\Administrator\AppData\Local\Temp\ipykernel_18532\331093014.py:3: FutureW
arning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v
0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same effe
ct.

  sns.countplot(data=df, x='Survived', palette='pastel')
```



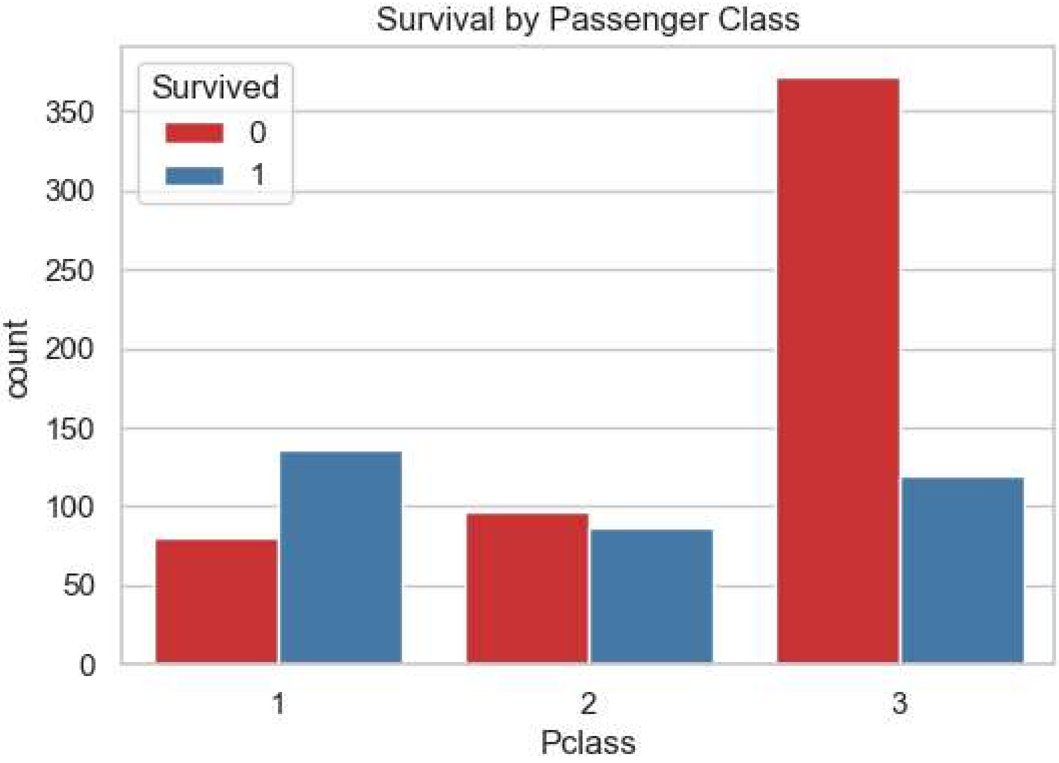
In [9]:
```
# Survival by Sex
plt.figure(figsize=(6,4))
sns.countplot(data=df, x='Sex', hue='Survived', palette='Set2')
plt.title('Survival by Sex')
plt.show()
```



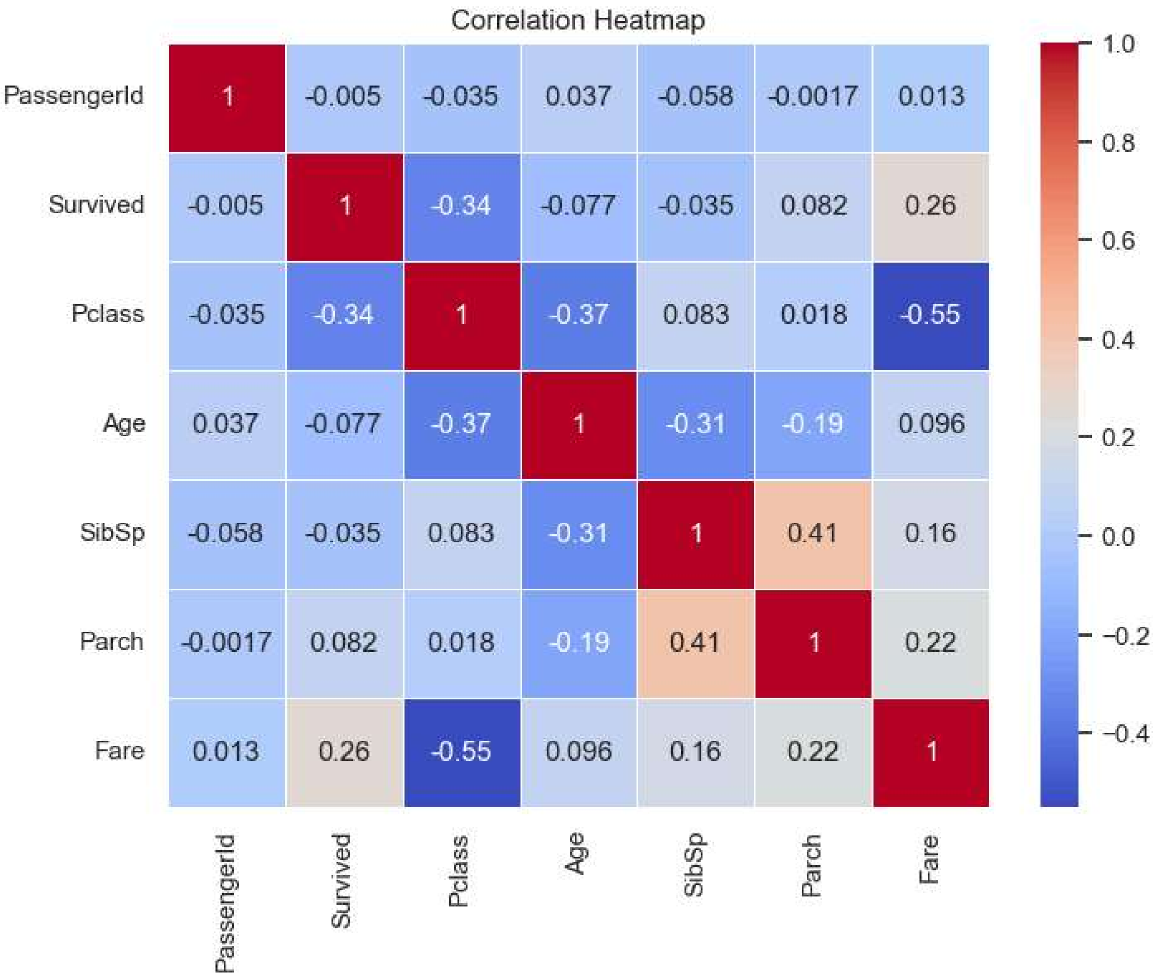
In [10]:
```
# Age Distribution
plt.figure(figsize=(8,5))
sns.histplot(df['Age'].dropna(), bins=30, kde=True, color='skyblue')
plt.title('Age Distribution')
plt.show()
```



In [11]:
```
# Survival by Passenger Class
plt.figure(figsize=(6,4))
sns.countplot(data=df, x='Pclass', hue='Survived', palette='Set1')
plt.title('Survival by Passenger Class')
plt.show()
```

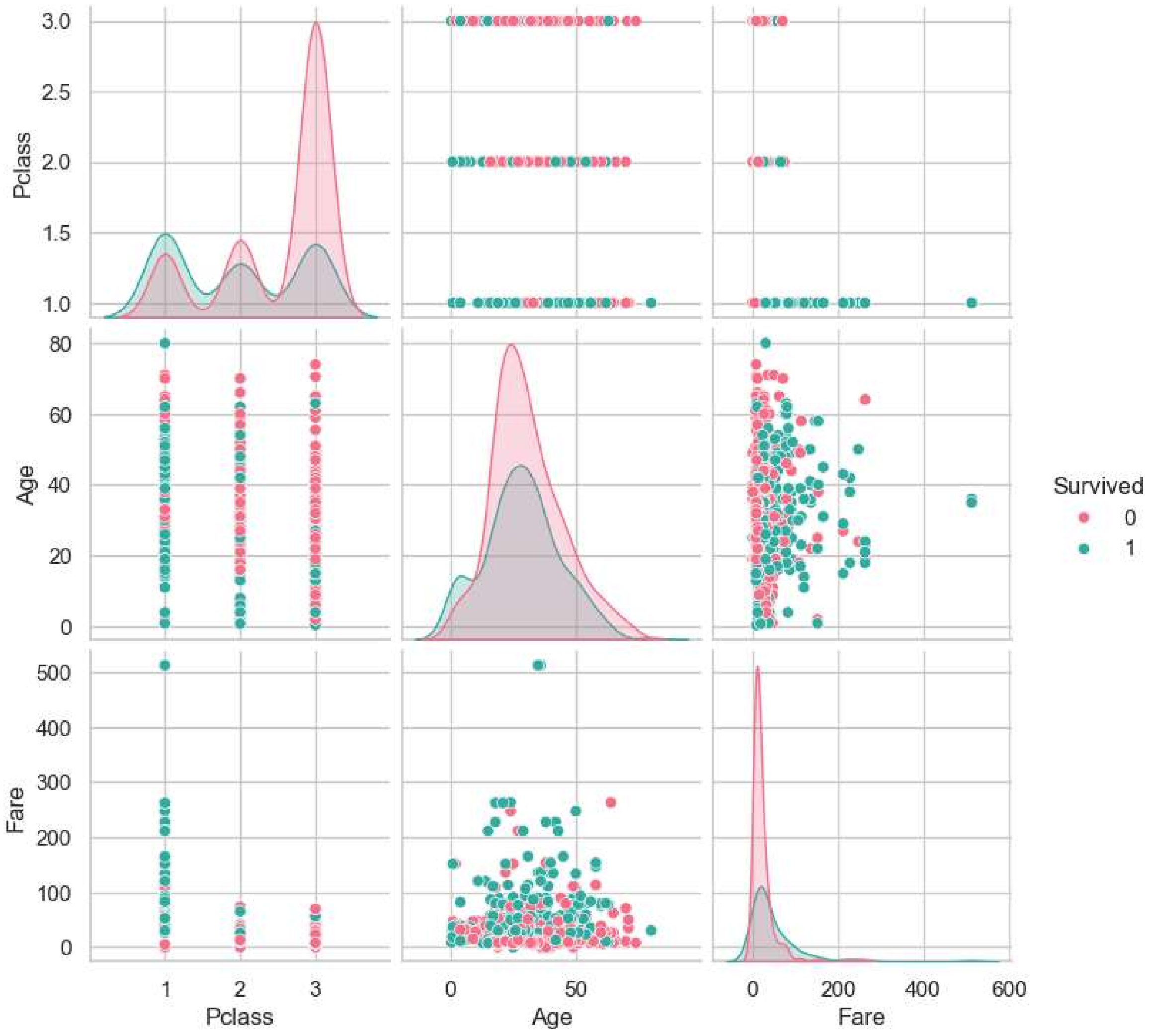


In [12]:
```
# Correlation Heatmap
plt.figure(figsize=(8,6))
sns.heatmap(df.corr(numeric_only=True), annot=True, cmap='coolwarm', linewidths=
plt.title('Correlation Heatmap')
plt.show()
```



	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

In [13]:
```
# Pairplot for some features
sns.pairplot(df[['Survived','Pclass','Age','Fare']], hue='Survived', palette='hu
plt.show()
```



```
In [14]: # Age vs Pclass
         plt.figure(figsize=(8,5))
         sns.boxplot(data=df, x='Pclass', y='Age', palette='pastel')
         plt.title('Age Distribution by Pclass')
         plt.show()
```

```
C:\Users\Administrator\AppData\Local\Temp\ipykernel_18532\189395899.py:3: FutureW
arning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v
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ct.

  sns.boxplot(data=df, x='Pclass', y='Age', palette='pastel')
```

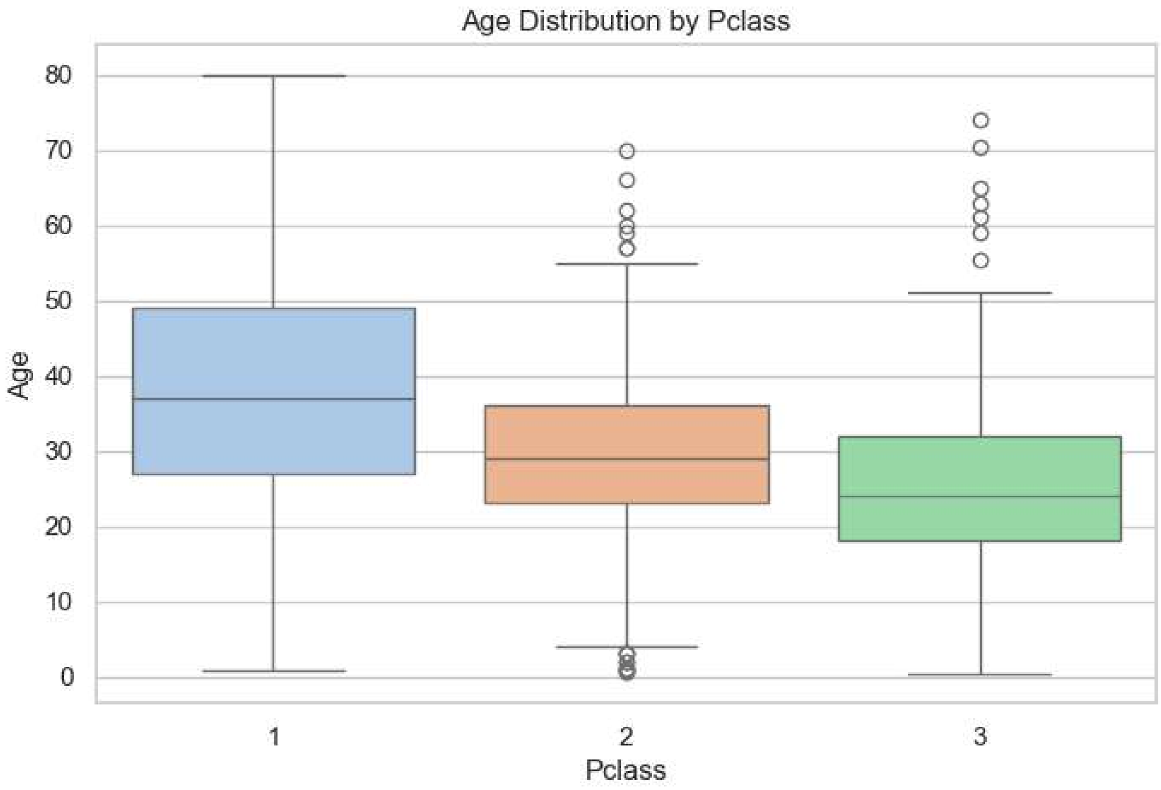

In [15]:
```
# Key Observations
observations = """
1. Females had a higher survival rate compared to males.
2. Passengers in 1st class were more likely to survive than those in 3rd class.
3. Younger passengers tended to survive more, but there were exceptions.
4. Fare is negatively correlated with Pclass.
5. Missing values mainly in Age, Cabin, and Embarked.
"""
print(observations)
```

```
1. Females had a higher survival rate compared to males.
2. Passengers in 1st class were more likely to survive than those in 3rd class.
3. Younger passengers tended to survive more, but there were exceptions.
4. Fare is negatively correlated with Pclass.
5. Missing values mainly in Age, Cabin, and Embarked.
```

In [ ]: