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

dt = sns.load_dataset("titanic")

dt.head()
```

```
   survived  pclass     sex   age  sibsp  parch     fare embarked
class  \
0         0       3    male  22.0      1      0   7.2500        S
Third
1         1       1  female  38.0      1      0  71.2833        C
First
2         1       3  female  26.0      0      0   7.9250        S
Third
3         1       1  female  35.0      1      0  53.1000        S
First
4         0       3    male  35.0      0      0   8.0500        S
Third

     who  adult_male deck  embark_town alive  alone
0    man        True  NaN  Southampton    no  False
1  woman       False    C    Cherbourg   yes  False
2  woman       False  NaN  Southampton   yes   True
3  woman       False    C  Southampton   yes  False
4    man        True  NaN  Southampton    no   True
```

```
dt.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 15 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   survived     891 non-null    int64
 1   pclass       891 non-null    int64
 2   sex          891 non-null    object
 3   age          714 non-null    float64
 4   sibsp        891 non-null    int64
 5   parch        891 non-null    int64
 6   fare         891 non-null    float64
 7   embarked     889 non-null    object
 8   class        891 non-null    category
 9   who          891 non-null    object
 10  adult_male   891 non-null    bool
 11  deck         203 non-null    category
 12  embark_town  889 non-null    object
 13  alive        891 non-null    object
```

```
 14  alone        891 non-null    bool
dtypes: bool(2), category(2), float64(2), int64(4), object(5)
memory usage: 80.7+ KB
```

```
dt.describe()
```

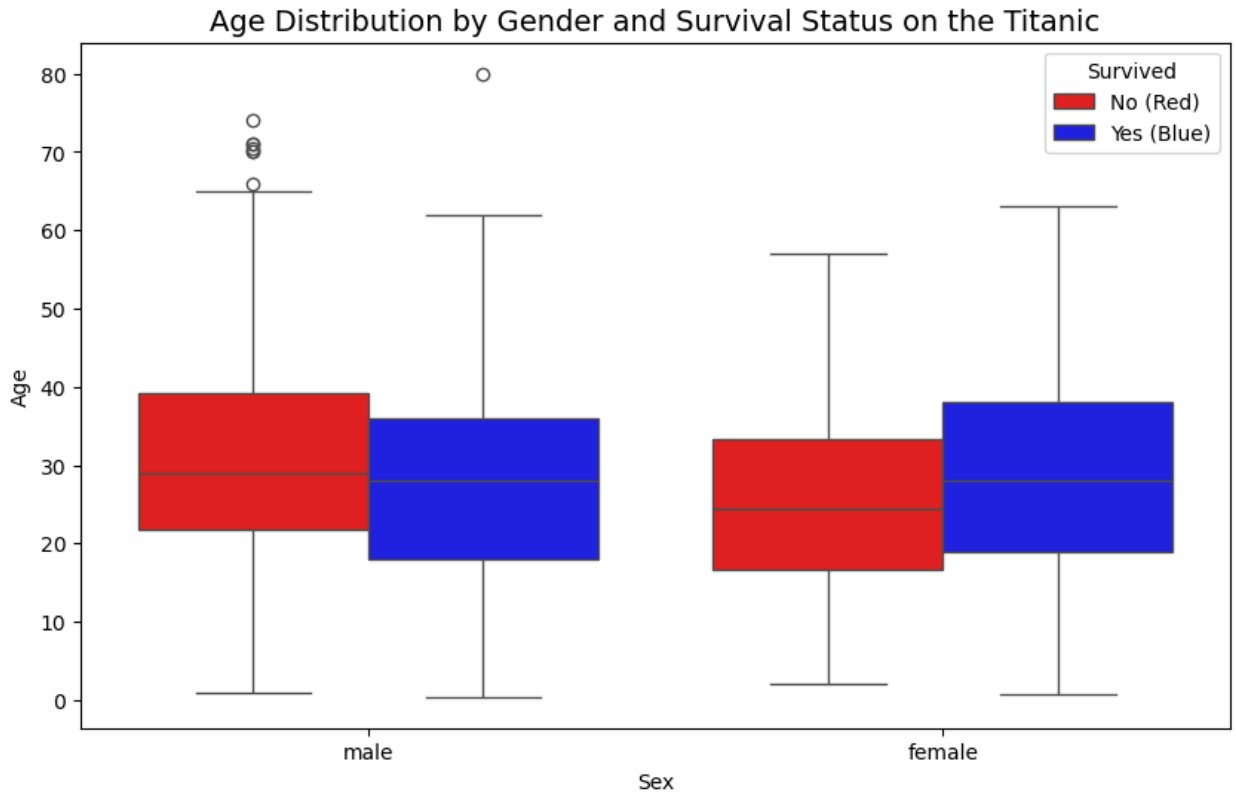
```
         survived      pclass         age       sibsp       parch
fare
count  891.000000  891.000000  714.000000  891.000000  891.000000
891.000000
mean     0.383838    2.308642   29.699118    0.523008    0.381594
32.204208
std      0.486592    0.836071   14.526497    1.102743    0.806057
49.693429
min      0.000000    1.000000    0.420000    0.000000    0.000000
0.000000
25%      0.000000    2.000000   20.125000    0.000000    0.000000
7.910400
50%      0.000000    3.000000   28.000000    0.000000    0.000000
14.454200
75%      1.000000    3.000000   38.000000    1.000000    0.000000
31.000000
max      1.000000    3.000000   80.000000    8.000000    6.000000
512.329200
```

```
dt.isnull().sum()
```

```
survived         0
pclass           0
sex              0
age            177
sibsp            0
parch            0
fare             0
embarked         2
class            0
who              0
adult_male       0
deck           688
embark_town      2
alive            0
alone            0
dtype: int64
```

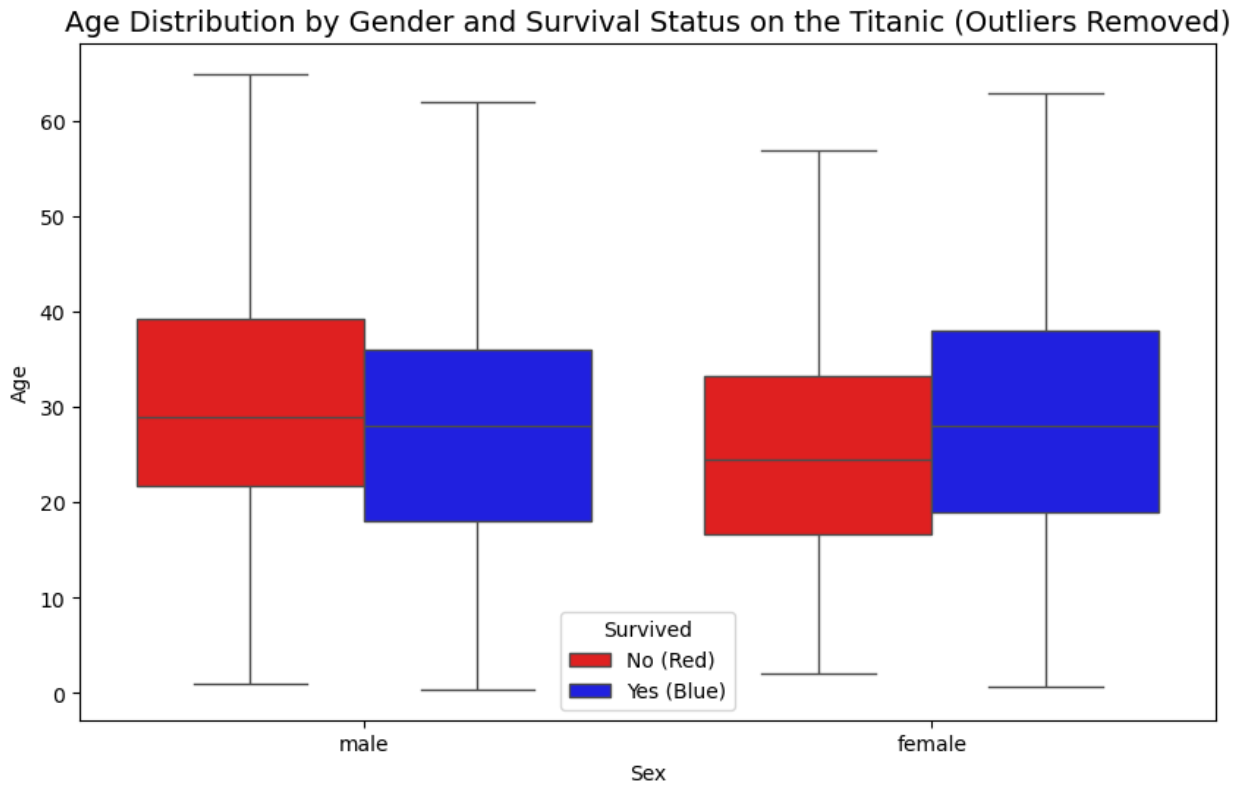
```
# Define highly contrasting colors
custom_palette = {0: 'red', 1: 'blue'}  # 0: Not Survived (Red), 1:
Survived (Blue)

# Create the box plot
plt.figure(figsize=(10, 6))
```

```
sns.boxplot(x='sex', y='age', hue='survived', data=dt,
palette=custom_palette)

# Fix legend labels properly
legend_labels = ['No (Red)', 'Yes (Blue)']
handles, labels = plt.gca().get_legend_handles_labels()
plt.legend(handles, legend_labels, title='Survived')

# Add title and labels
plt.title('Age Distribution by Gender and Survival Status on the
Titanic', fontsize=14)
plt.xlabel('Sex')
plt.ylabel('Age')

# Show plot
plt.show()
```



OBSERVATION:- The boxplot reveals that survival on the Titanic was influenced by both gender and age. Female passengers had a higher survival rate compared to males, as indicated by the larger presence of the blue (survived) boxes among females. In both genders, survivors tended to be younger, with the median age of survivors slightly lower than that of non-survivors. Notably, many children, especially young girls, survived, supporting the “women and children first” policy. In contrast, a significant number of males did not survive, particularly adults. The presence of outliers also shows that a few elderly individuals were among both the survivors and non-survivors.

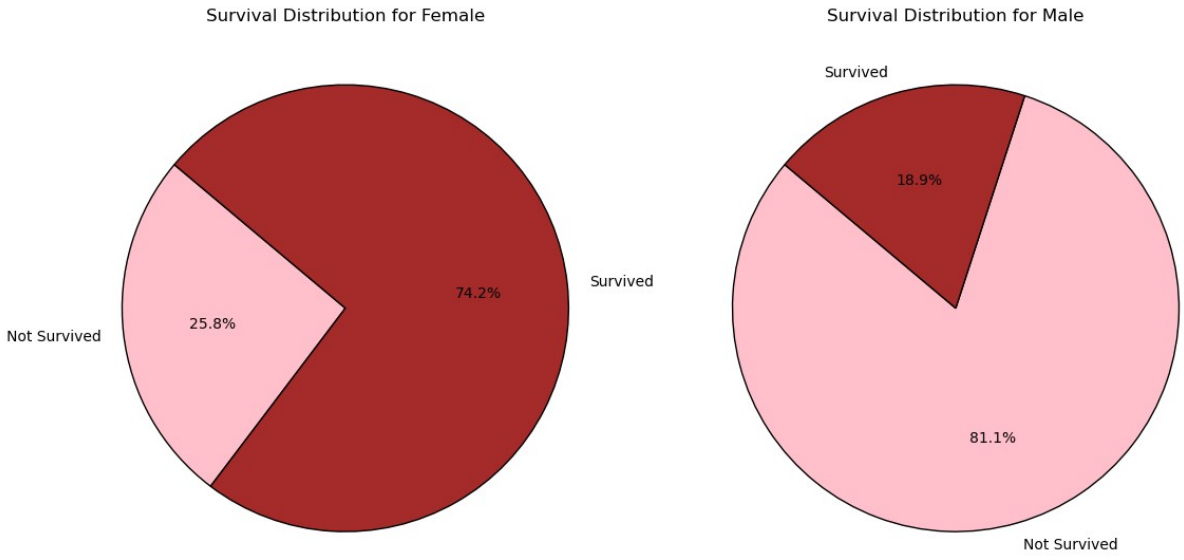
```
# Define distinct colors for survival status
custom_palette = {0: 'red', 1: 'blue'}  # 0: Did not survive, 1: Survived

# Create the box plot without outliers
plt.figure(figsize=(10, 6))
sns.boxplot(x='sex', y='age', hue='survived', data=dt,
            palette=custom_palette, showfliers=False)

# Fix legend labels properly
legend_labels = ['No (Red)', 'Yes (Blue)']
handles, labels = plt.gca().get_legend_handles_labels()
plt.legend(handles, legend_labels, title='Survived')

# Add title and labels
plt.title('Age Distribution by Gender and Survival Status on the Titanic (Outliers Removed)', fontsize=14)
plt.xlabel('Sex')
plt.ylabel('Age')

# Show plot
plt.show()
```



OBSERVATION:- This boxplot shows the age of men and women on the Titanic and whether they survived, but without showing the extreme age values (outliers). From the graph, we can see that more women survived than men. Also, people who survived were usually younger than

those who didn't. Removing the outliers makes it easier to see the main age group for each category and better understand the pattern of survival.

```
# Count of survival status grouped by gender
survival_counts = dt.groupby(['sex', 'survived']).size().unstack()

# Define colors for better visualization
colors = ['pink', 'brown']  # pink: Not survived, brown: Survived

# Create the pie charts
fig, axes = plt.subplots(1, 2, figsize=(12, 6))

# Plot each pie chart by gender
for i, gender in enumerate(survival_counts.index):
    axes[i].pie(survival_counts.loc[gender],
                labels=['Not Survived', 'Survived'],
                autopct='%1.1f%%',
                colors=colors,
                startangle=140,
                wedgeprops={'edgecolor': 'black'})

    axes[i].set_title(f'Survival Distribution for
{gender.capitalize()}')

plt.tight_layout()
plt.show()
```



OBSERVATION:- The pie charts show that more women survived the Titanic than men. In the chart for women, the bigger part is for "Survived," while in the men's chart, the bigger part is for "Not Survived." This means women had a better chance of survival. It clearly shows that during the rescue, women were given more priority than men, which follows the rule of "women and children first."