**Titanic EDA Observations**

**1.Survival Count**

The bar for Survived = 0 is taller than Survived = 1, meaning more people did not survive. The survival rate is roughly 36%, so the dataset is imbalanced toward non-survivors.

**2.Age Distribution**

Most passengers are between 20–40 years old. There is a smaller peak for children below ~10 years, and the distribution is slightly right-skewed with fewer elderly passengers.

**3.Passenger Class Distribution**

The largest number of passengers traveled in 3rd class, followed by 1st and 2nd class. This indicates more low-income travelers in the dataset.

**4.Embarkation Port Distribution**

The majority boarded at port 'S', with fewer from 'C' and 'Q'. This suggests that Southampton was the main departure point.

**5.Survival by Gender**

Females have a significantly higher survival rate than males. Most females survived, while most males did not.

**6.Survival by Passenger Class**

Passengers in 1st class had a much higher survival rate than those in 2nd and especially 3rd class, where survival was lowest.

**7.Age vs Survival (Boxplot)**

Survivors tend to be slightly younger than non-survivors. The interquartile range for survivors is shifted lower compared to non-survivors.

**8.Age Distribution by Survival and Gender (Violin Plot)**

Female survivors span all ages but cluster around young and middle-aged adults. Male survivors are fewer and mostly younger, suggesting women and children were prioritized.

**9.Correlation Heatmap**

Survival has a positive correlation with Fare and HasCabin, and a negative correlation with Pclass. SibSp and Parch have low correlation with survival individually.

**10.Pairplot**

There is visible separation in Fare vs Pclass by survival — survivors tend to have higher fares and lower Pclass numbers (1st class).

**11.Passenger Count by Class and Gender (Heatmap)**

Most male passengers were in 3rd class, while female passengers are more evenly distributed across classes.

**12.Survival by Number of Siblings/Spouses (SibSp)**

Survival rates are higher for passengers with 1–2 siblings/spouses aboard, but very low for those with many (≥3).

**13.Survival by Number of Parents/Children (Parch)**

Having 1–3 parents/children on board appears to slightly improve survival chances, but large numbers (>3) reduce survival.

**Conclusion**

1. Survival rate is lower than non-survival

2. Females survived at a much higher rate than males.

3. Higher-class passengers had higher survival chances.

4. Higher fares are strongly linked to survival.

5. Younger passengers survived more frequently.

6. Having a cabin increased the probability of survival.

7. Large families onboard had lower survival rates.