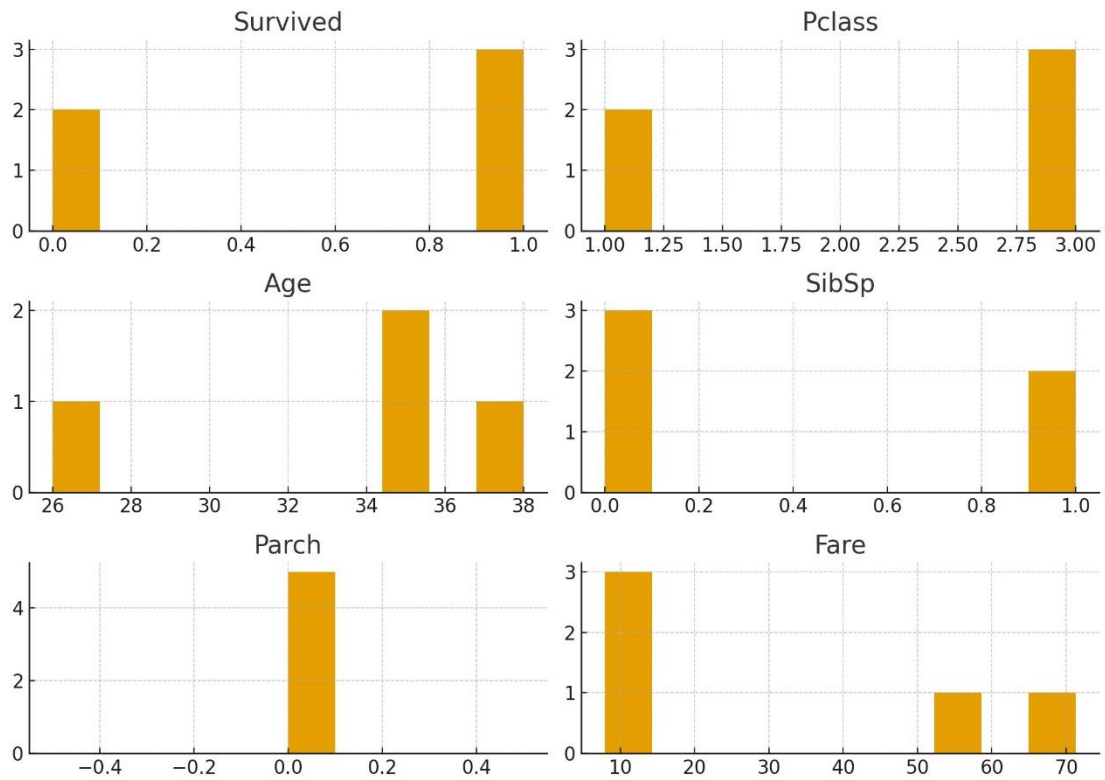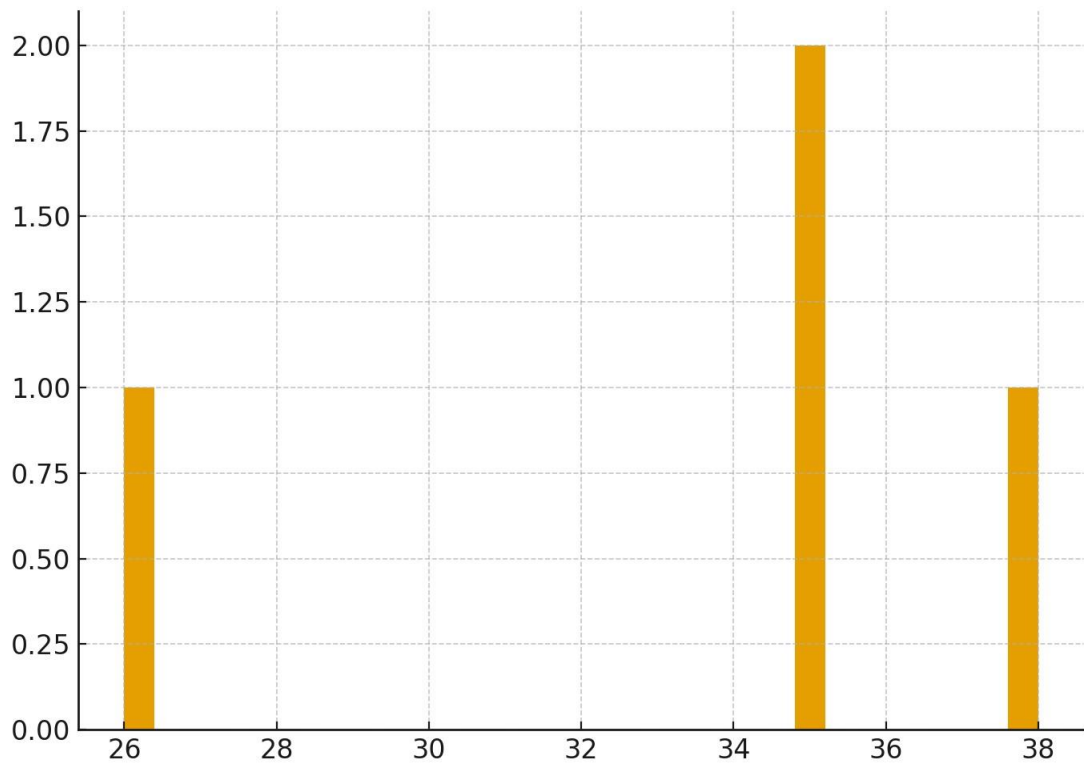# Titanic Dataset – Exploratory Data Analysis Report

This report provides a detailed and structured Exploratory Data Analysis (EDA) of the Titanic dataset, following the exact workflow defined in the accompanying Python script. It begins with an initial inspection of the dataset, including its structure, dimensions, data types, summary statistics, and missing values. Building on this foundation, the report explores the data through multiple layers of visual analysis.

The univariate analysis examines the distribution of key numerical and categorical variables such as Age, Fare, Sex, Survival status, and Passenger Class. This is followed by bivariate visualizations that uncover relationships between survival and factors like gender, class, age, and fare. Further, multivariate analysis techniques such as pairplots, KDE distributions, joint plots, and facet grids help reveal deeper interactions among variables, highlighting meaningful patterns in passenger demographics and survival outcomes.
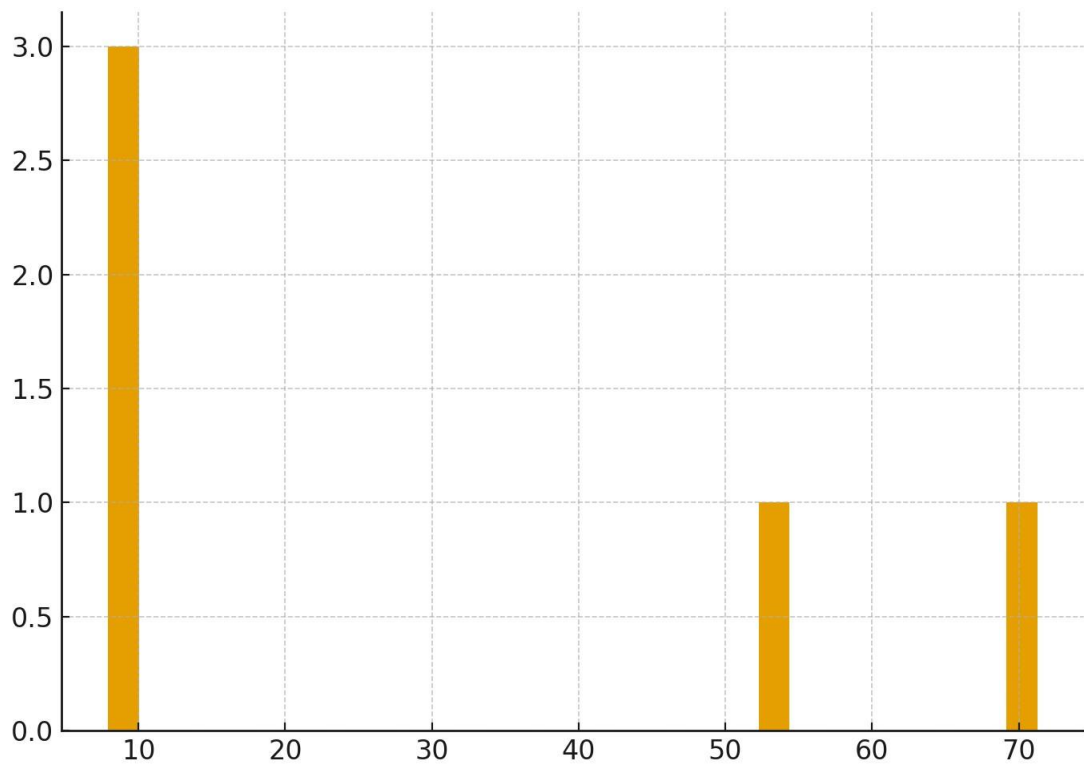
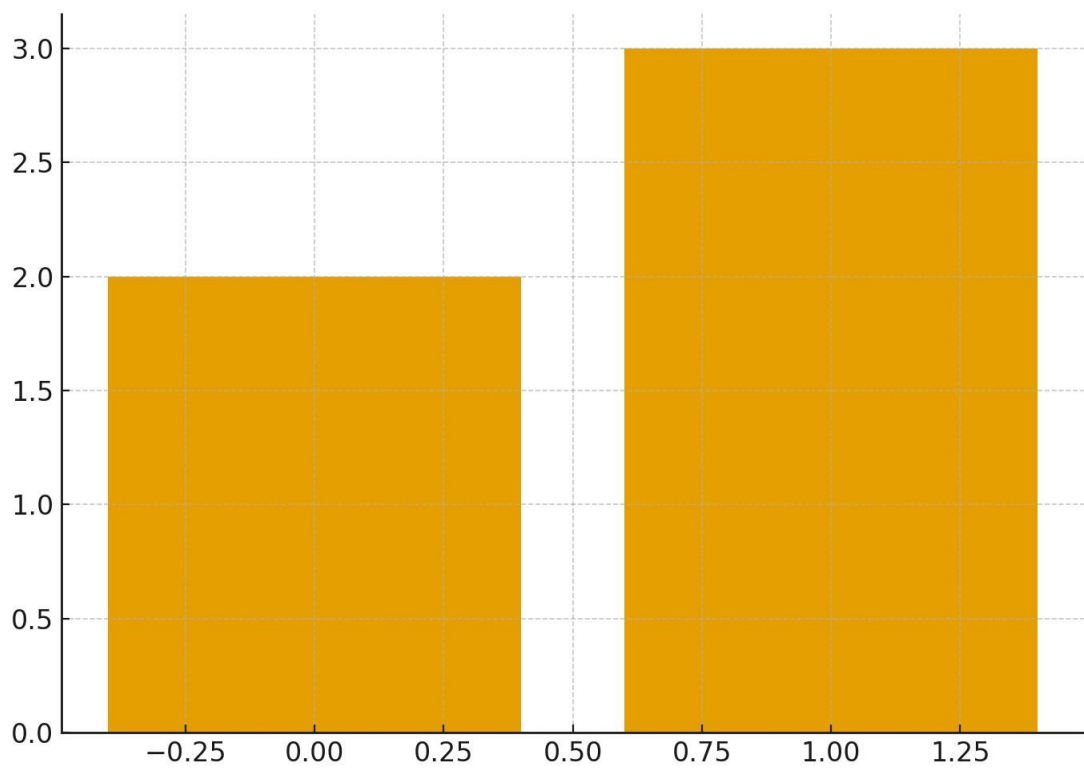***Histograms of all numerical columns: Shows distribution patterns for Age, Fare, etc.***

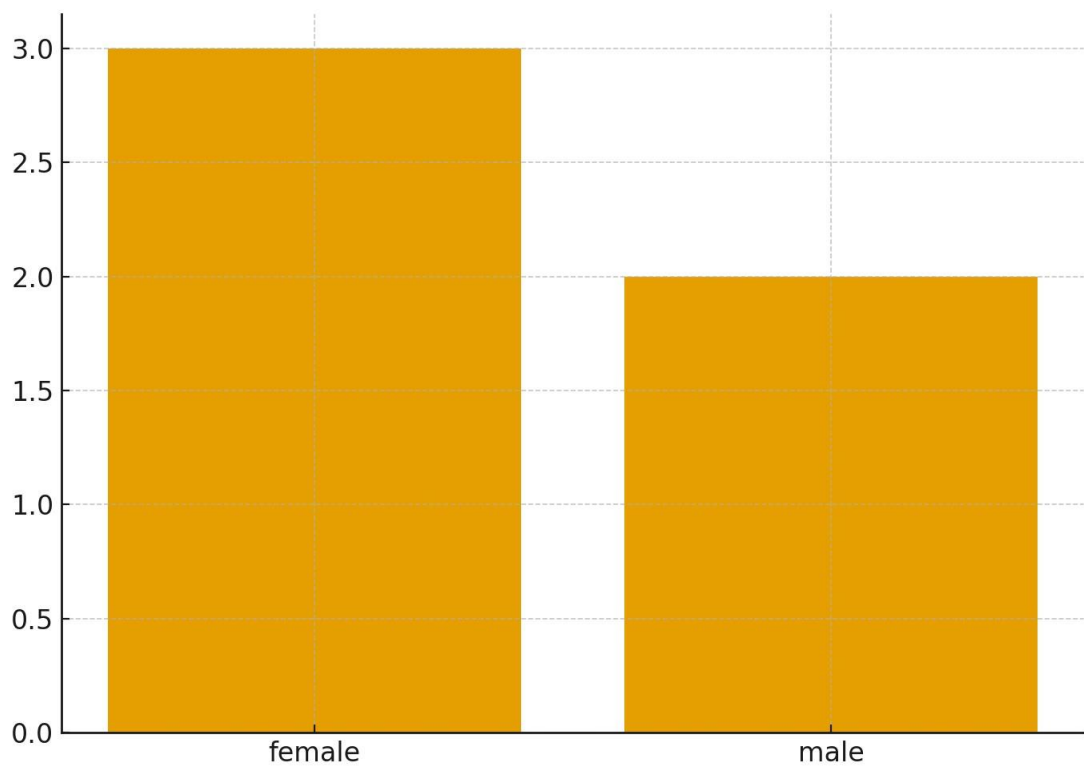**Age Distribution: Visualizes how passenger ages are spread.**

Fare Distribution: Highlights variation and extreme values in passenger fares.
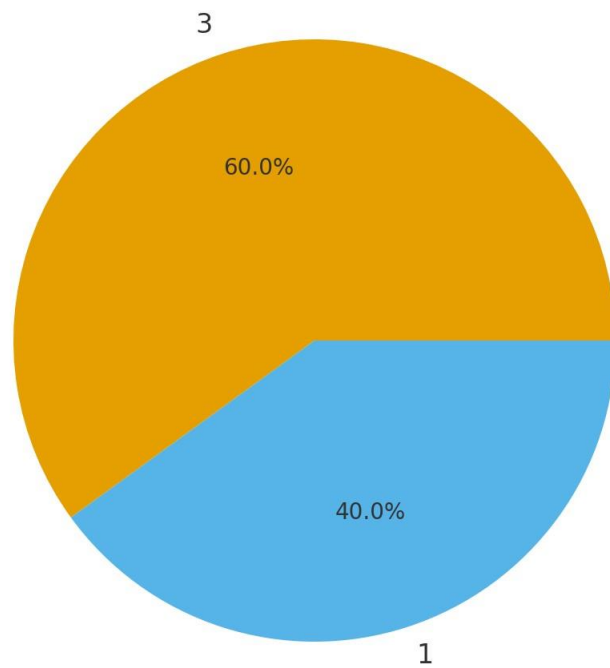
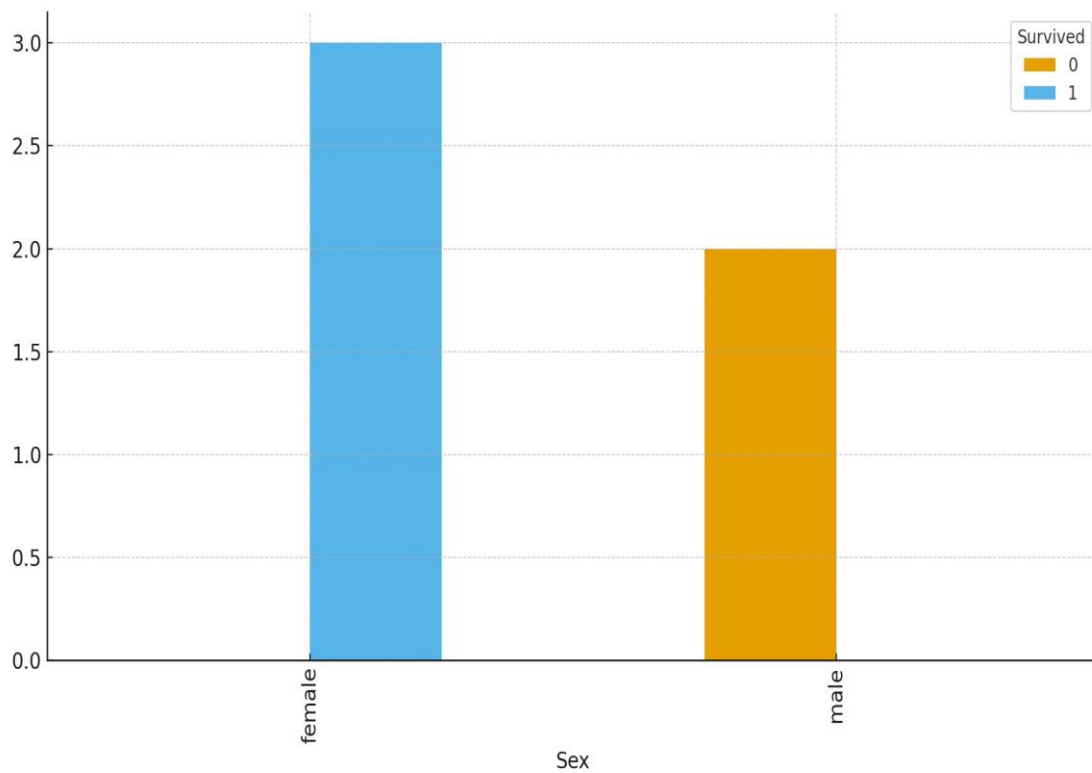## Survival Count: Number of passengers who survived vs did not survive.

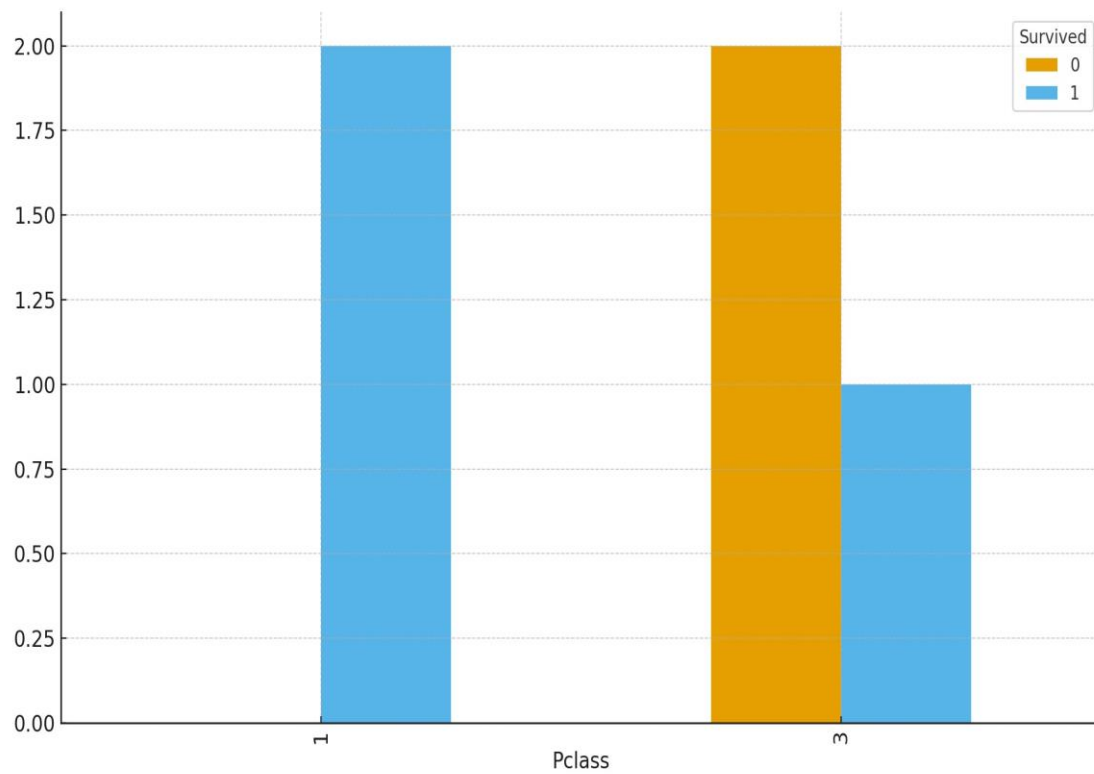## Gender Count: Shows male vs female distribution.

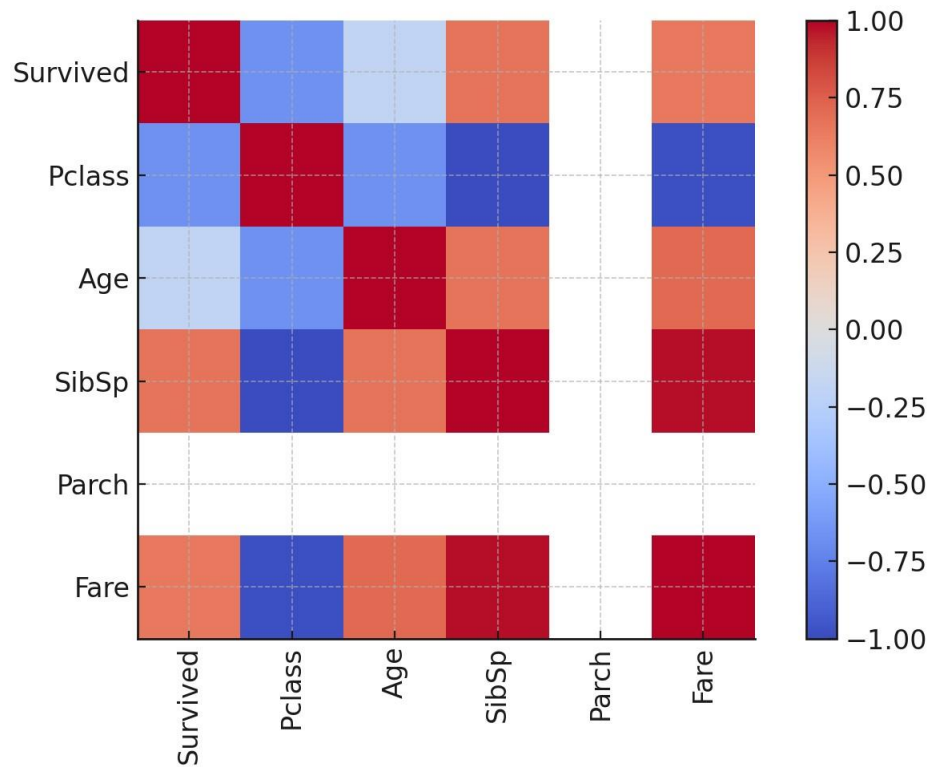**Passenger Class Distribution: Proportion of 1st, 2nd, and 3rd class passengers.**

Survival by Gender: Females had significantly higher survival rates.

Survival by Class: Higher-class passengers survived more.

Correlation Heatmap: Displays relationships among key numerical features.

Key Findings:

1.Most passengers were male and aged between 20–40.
2.Females had much higher survival rates than males.
3.1st class passengers showed the highest survival probability.
4.Higher fares correlated positively with survival chances.
5.Age, Fare, and Passenger Class show meaningful patterns tied to survival.
6.Significant missing values appear in Age, Cabin, and Embarked.
7.Fare varies substantially across classes and survival groups.
8.Younger passengers showed lower survival, especially males.