**1. Age Distribution**

* The majority of passengers were between **20 and 40 years old**.
* Few passengers were children or elderly.
* Some missing values in the Age column are visible as gaps in the histogram.

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

* Survivors tended to be **slightly younger** than non-survivors.
* A **wider range of ages** is seen among survivors.
* **Children (low-age outliers)** are more common among survivors, reflecting the “women and children first” evacuation rule.

**3. Fare vs Passenger Class (Boxplot)**

* **First-class passengers** paid the **highest fares**, with a broad range and many outliers.
* Fares clearly **decrease across classes** from 1 to 3.
* Suggests strong economic class differences on board.

**4. Fare vs Age (Scatterplot) Colored by Survival**

* **Survivors cluster around higher fares and younger ages**.
* Most **low-fare passengers did not survive**.
* Indicates that **wealthier and younger passengers** had a survival advantage.

**5. Pairplot of Key Features (Survived, Pclass, Age, Fare, SibSp, Parch)**

* Survivors are more frequent in **1st class** and among passengers who paid **higher fares**.
* Some separation is visible between survivors and non-survivors across multiple features.
* Highlights potential multivariate relationships influencing survival.

**6. Correlation Heatmap**

* **Fare and Pclass** are moderately **negatively correlated** (higher fare → lower Pclass).
* **SibSp and Parch** are **positively correlated**, suggesting larger family groups often traveled together.
* Weak but **positive correlation between Fare and Survival**, supporting earlier visual findings.

**Overall Insights:**

* **Passenger Class, Fare, Age, and Sex** all had strong relationships with **Survival**.
* **Younger and wealthier passengers** had **higher survival rates**.
* **First-class passengers** were far more likely to survive than those in second or third class.
* The dataset reflects **social and economic inequalities** in survival outcomes.

**Observation for each visulas:**

The age distribution is right-skewed, with most passengers falling between 20 and 40 years old. Very few children (under 10) and elderly passengers (above 60) were on board. Some gaps in the histogram suggest missing age values in the dataset

Survivors (Survived = 1) had a slightly lower median age than non-survivors. This indicates that younger passengers, possibly children, had better survival chances. The age spread among survivors is broader, showing greater diversity in survivor ages.

First-class passengers (Pclass = 1) paid significantly higher fares compared to second and third class. The 1st class fare distribution also had more variation and extreme outliers. This suggests a wide range of wealth among first-class passengers.

Survivors tend to cluster around higher fares and younger ages. Many passengers who paid low fares did not survive. This implies a relationship between wealth (higher fare) and survival, as well as the prioritization of younger individuals during evacuation.

The pairplot reveals several trends. Survivors are more common in lower Pclass values (i.e., 1st class). A positive trend between Fare and Survived is noticeable. Some scatter combinations (e.g., Age vs Fare) show clearer survival clusters. Survivors and non-survivors tend to form distinct groups across these features.

## **Identify relationships and trends**

From the analysis, we observe strong relationships between **Passenger Class**, **Fare**, **Sex**, and **Survival**. First-class passengers and those who paid higher fares had higher survival rates. Females had much better survival chances than males. There is a mild positive trend indicating that younger passengers, especially children, were more likely to survive. Lastly, those with small families (1–3 members) had a slightly higher chance of survival compared to those traveling alone or in very large groups.