Homework

Titanic Dataset Summary

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目錄

Load Data

```r
library(tidyverse)

# Load Titanic dataset
titanic <- read.csv("titanic.csv")


# Summary statistics
summary(titanic)
```

```
  PassengerId       Survived          Pclass          Name
 Min.   :  1.0   Min.   :0.0000   Min.   :1.000   Length:891
 1st Qu.:223.5   1st Qu.:0.0000   1st Qu.:2.000   Class :character
 Median :446.0   Median :0.0000   Median :3.000   Mode  :character
 Mean   :446.0   Mean   :0.3838   Mean   :2.309
 3rd Qu.:668.5   3rd Qu.:1.0000   3rd Qu.:3.000
 Max.   :891.0   Max.   :1.0000   Max.   :3.000

     Sex                 Age            SibSp           Parch
 Length:891         Min.   : 0.42   Min.   :0.000   Min.   :0.0000
 Class :character   1st Qu.:20.12   1st Qu.:0.000   1st Qu.:0.0000
 Mode  :character   Median :28.00   Median :0.000   Median :0.0000
                    Mean   :29.70   Mean   :0.523   Mean   :0.3816
                    3rd Qu.:38.00   3rd Qu.:1.000   3rd Qu.:0.0000
                    Max.   :80.00   Max.   :8.000   Max.   :6.0000
                    NA's   :177
    Ticket               Fare           Cabin             Embarked
 Length:891         Min.   :  0.00   Length:891         Length:891
 Class :character   1st Qu.:  7.91   Class :character   Class :character
 Mode  :character   Median : 14.45   Mode  :character   Mode  :character
                    Mean   : 32.20
```

```
                  3rd Qu.: 31.00
                  Max.   :512.33
```

Dataset Description

The Titanic dataset contains information on 891, consists of 12 columns (variables) and 891 rows (observations).

There are variables in the dataset:

1. PassengerId: Unique identifier for each passenger (Nominal variable)
2. Survived: Survival status (Binary: 0 = Did not survive, 1 = Survived)
3. Pclass: Passenger class (Categorical variable: 1 = First, 2 = Second, 3 = Third)
4. Name: Passenger name (Nominal variable)
5. Sex: Gender of the passenger (Categorical variable: male, female)
6. Age: Age of the passenger (Numeric)
7. SibSp: Number of siblings/spouses aboard (Integer)
8. Parch: Number of parents/children aboard (Integer)
9. Ticket: Ticket number (Nominal variable)
10. Fare: Fare paid for the ticket (Numeric)
11. Cabin: Cabin number (Nominal variable)
12. Embarked: embarked (Categorical variable: C, Q, S)

Missing Values

```
# Check for missing values
sapply(titanic, function(x) sum(is.na(x)|(x=="")))
```

```
PassengerId    Survived      Pclass        Name         Sex         Age 
          0           0           0           0           0         177 
      SibSp       Parch      Ticket        Fare       Cabin    Embarked 
          0           0           0           0         687           2 
```

Age: 177 entries are missing.

Cabin: 687 entries are missing, indicating many passengers did not have assigned cabins.

Embarked: 2 entries are missing.

Survival Rate

```
# Survival rate by gender and class
titanic %>%
  group_by(Sex, Pclass) %>%
  summarise(Survival_Rate = mean(Survived))
```

```
# A tibble: 6 x 3
# Groups:   Sex [2]
  Sex    Pclass Survival_Rate
  <chr>   <int>         <dbl>
1 female      1         0.968
2 female      2         0.921
3 female      3         0.5  
4 male        1         0.369
```

```
5 male        2         0.157
6 male        3         0.135
```

```
# Survival rate by gender
titanic %>%
  group_by(Sex) %>%
  summarise(Survival_Rate = mean(Survived))
```

```
# A tibble: 2 x 2
  Sex    Survival_Rate
  <chr>          <dbl>
1 female         0.742
2 male           0.189
```

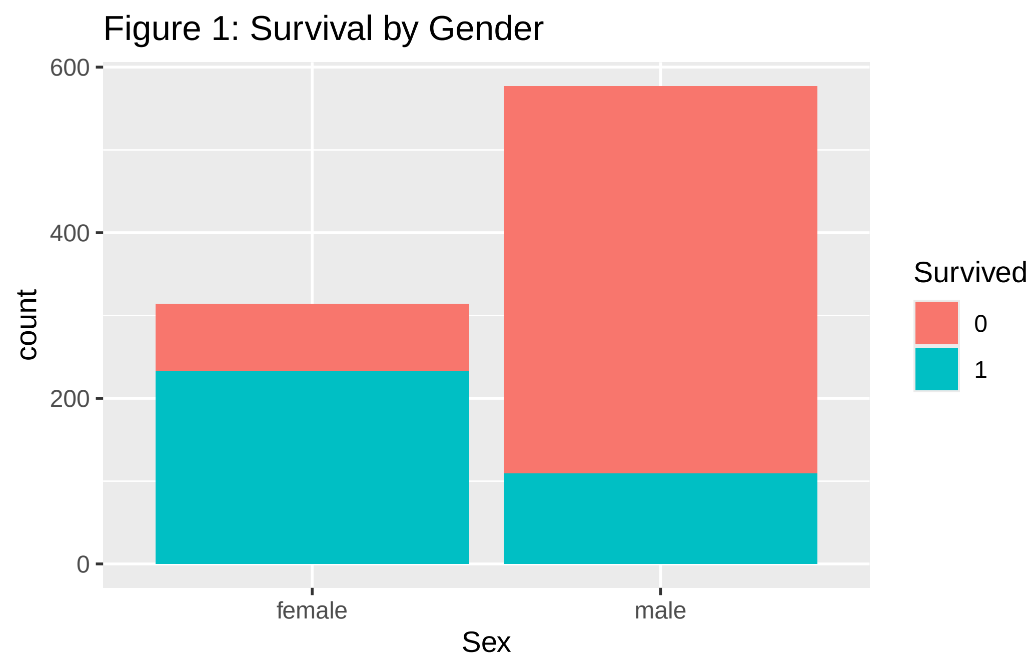
```
# Survival rate by class
titanic %>%
  group_by(Pclass) %>%
  summarise(Survival_Rate = mean(Survived))
```

```
# A tibble: 3 x 2
  Pclass Survival_Rate
   <int>         <dbl>
1      1         0.630
2      2         0.473
3      3         0.242
```

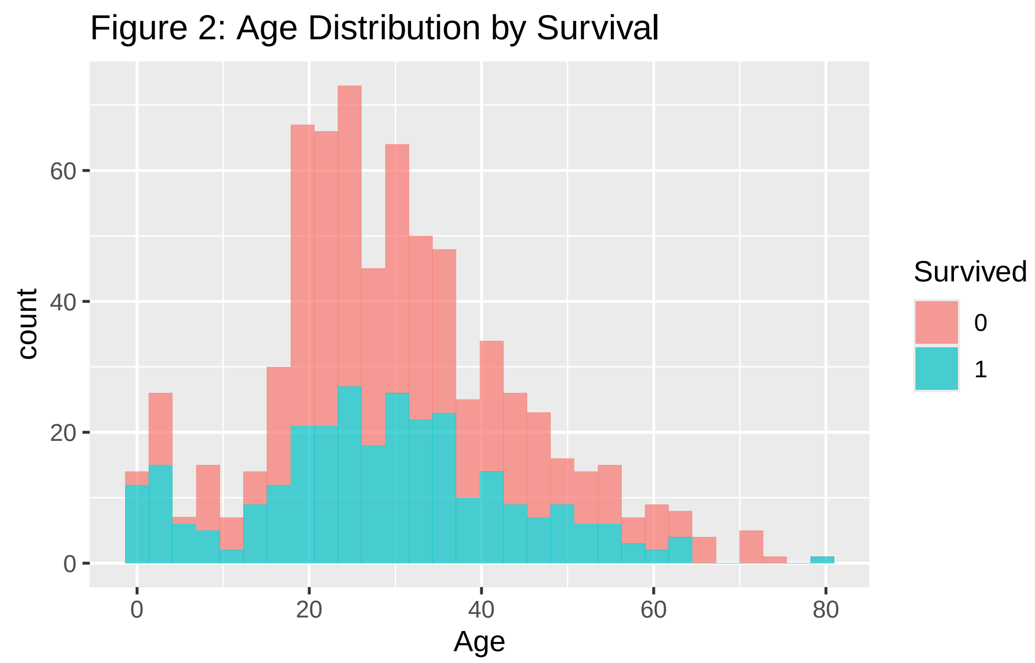
Visualizations

```
library(ggplot2)

# Survival by gender
ggplot(titanic, aes(x = Sex, fill = factor(Survived))) +
  geom_bar() +
  labs(title = "Figure 1: Survival by Gender", fill = "Survived")
```

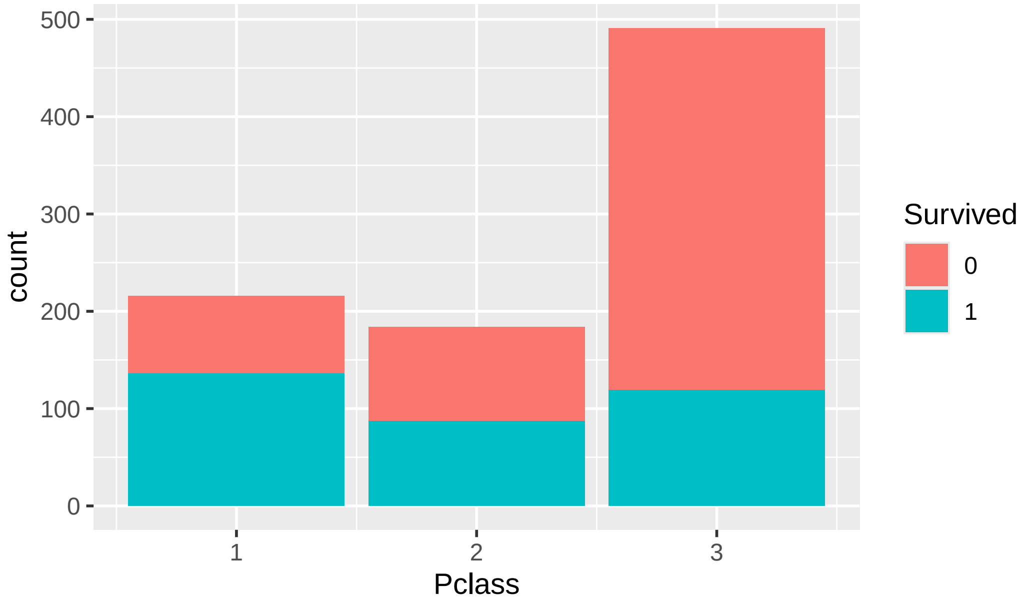


```r
# Age distribution by survival
ggplot(titanic, aes(x = Age, fill = factor(Survived))) +
  geom_histogram(bins = 30, alpha = 0.7) +
  labs(title = "Figure 2: Age Distribution by Survival", fill = "Survived")
```



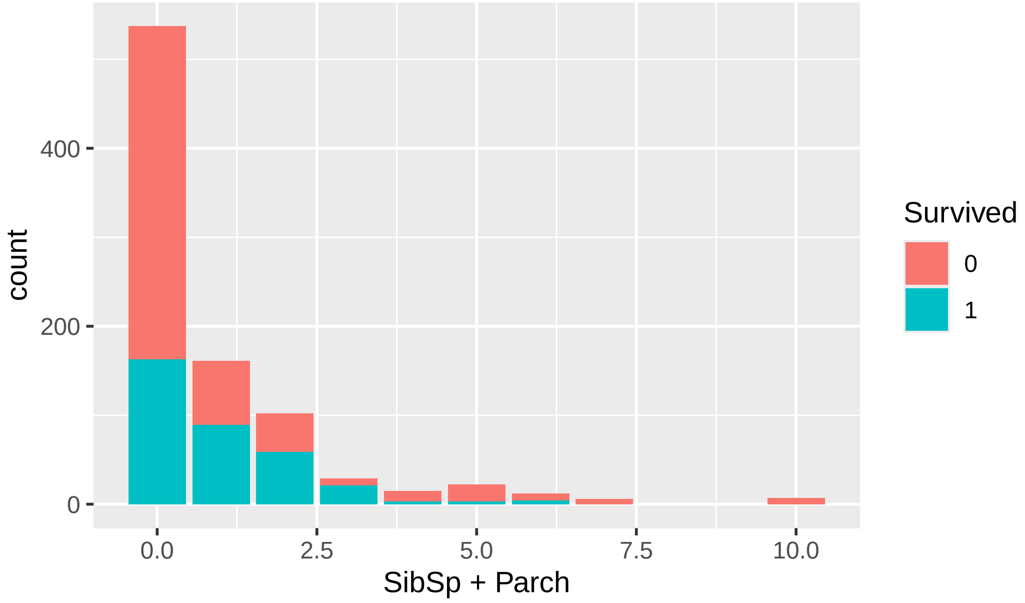
```r
# Survival by class
ggplot(titanic, aes(x = Pclass, fill = factor(Survived))) +
  geom_bar() +
  labs(title = "Figure 3: Survival by Passenger Class", fill = "Survived")
```

Figure 3: Survival by Passenger Class



```r
ggplot(titanic, aes(x = SibSp+Parch, fill = factor(Survived))) +
  geom_bar() +
  labs(title = "Figure 4: Survival by the number of family members aboard", fill = "Survived")
```

Figure 4: Survival by the number of family members aboard



Around 38% of passengers survived, while 62% did not survive.

From Figure 1, females had a higher survival rate compared to males. And from Figure 2, the average passenger age was approximately 29 years, with younger passengers having a better chance of survival. From Figure 3, first-class passengers had the highest survival rate, while third-class passengers had the lowest.From Figure 4, passengers traveling alone had a lower survival rate compared to those with family members aboard.