Exercise Report

EXERCISE 1

```r
# Load the dataset
titanic <- read.csv("./datasets/titanic.csv", header=TRUE, sep=',')
```

```r
# Remove the row index column
titanic <- subset(titanic, select=-X)
```

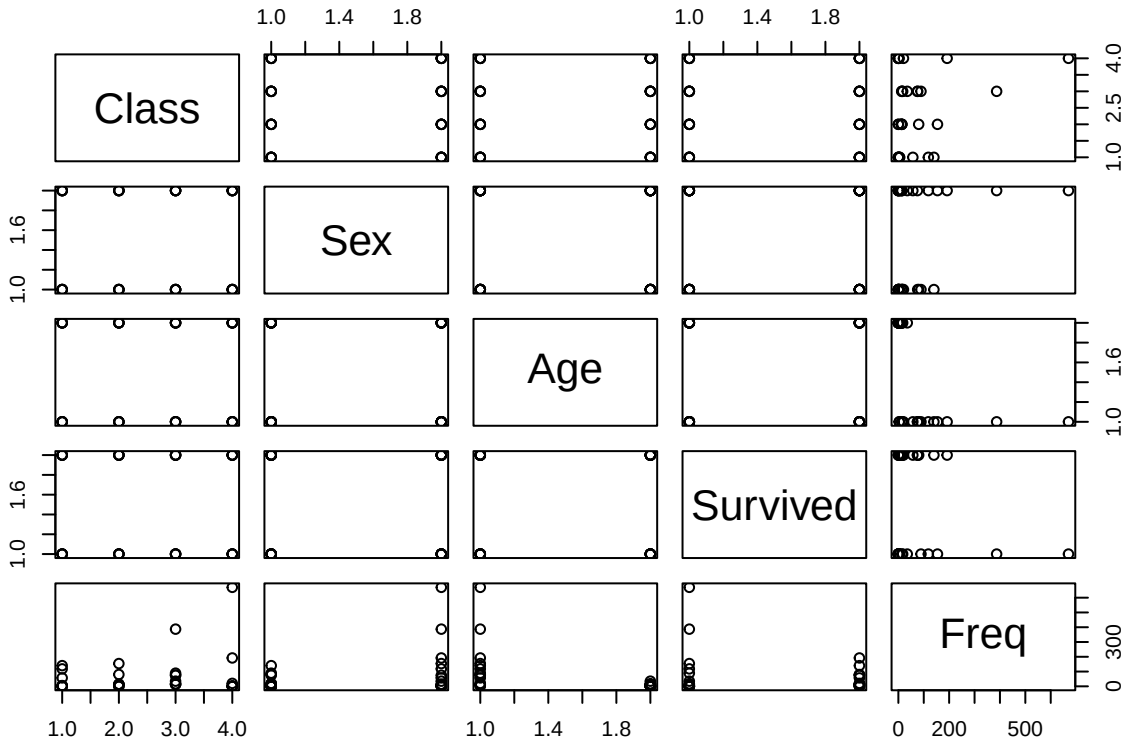
```r
# Display the first few rows of the dataset
head(titanic)
```

```
##   Class    Sex   Age Survived Freq
## 1   1st   Male Child       No    0
## 2   2nd   Male Child       No    0
## 3   3rd   Male Child       No   35
## 4  Crew   Male Child       No    0
## 5   1st Female Child       No    0
## 6   2nd Female Child       No    0
```

```r
# Display the summary statistics of the dataset
summary(titanic)
```

```
##     Class              Sex                 Age              Survived
##  Length:32          Length:32          Length:32          Length:32
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##       Freq
##  Min.   :  0.00
##  1st Qu.:  0.75
##  Median : 13.50
##  Mean   : 68.78
##  3rd Qu.: 77.00
##  Max.   :670.00
```

```r
# Create a scatterplot matrix of the dataset
plot(titanic)
```




```
dev.off()
```

```
## pdf
##   3
```

```
# Using str() function we can see the structure of the dataset
str(titanic)
```

```
## 'data.frame':    32 obs. of  5 variables:
##  $ Class   : chr  "1st" "2nd" "3rd" "Crew" ...
##  $ Sex     : chr  "Male" "Male" "Male" "Male" ...
##  $ Age     : chr  "Child" "Child" "Child" "Child" ...
##  $ Survived: chr  "No" "No" "No" "No" ...
##  $ Freq    : int  0 0 35 0 0 0 17 0 118 154 ...
```

Quantitative (Numerical) Variables:

- Freq: Represents the frequency (number of people)

Categorical Variables:

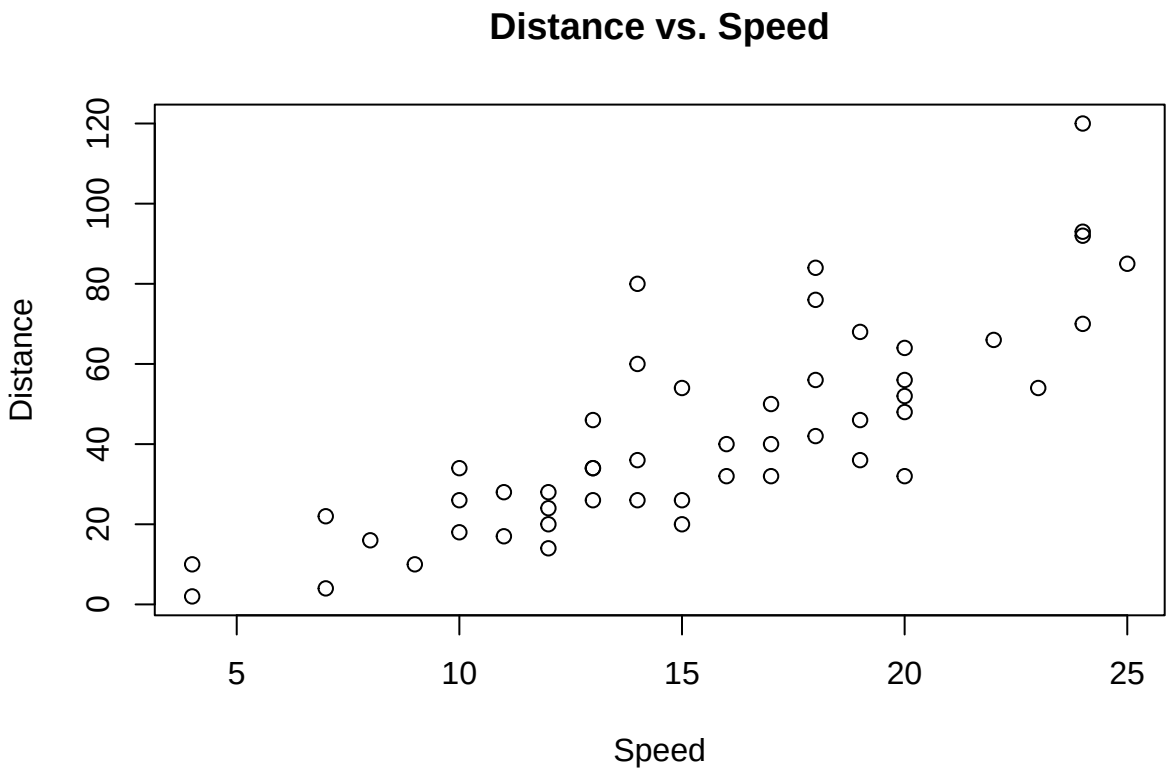
- X: Row index (treated as categorical, despite being an integer)
- Class: Passenger class (e.g., "1st", "2nd", "3rd", "Crew")
- Sex: Gender (e.g., "Male", "Female")
- Age: Age group (e.g., "Child", "Adult")
- Survived: Survival status (e.g., "Yes", "No")

EXERCISE 2

```
# Load the dataset
cars <- read.csv("./datasets/cars.csv", header=TRUE, sep=',')
dev.off()
```

```
## pdf
##   3
```

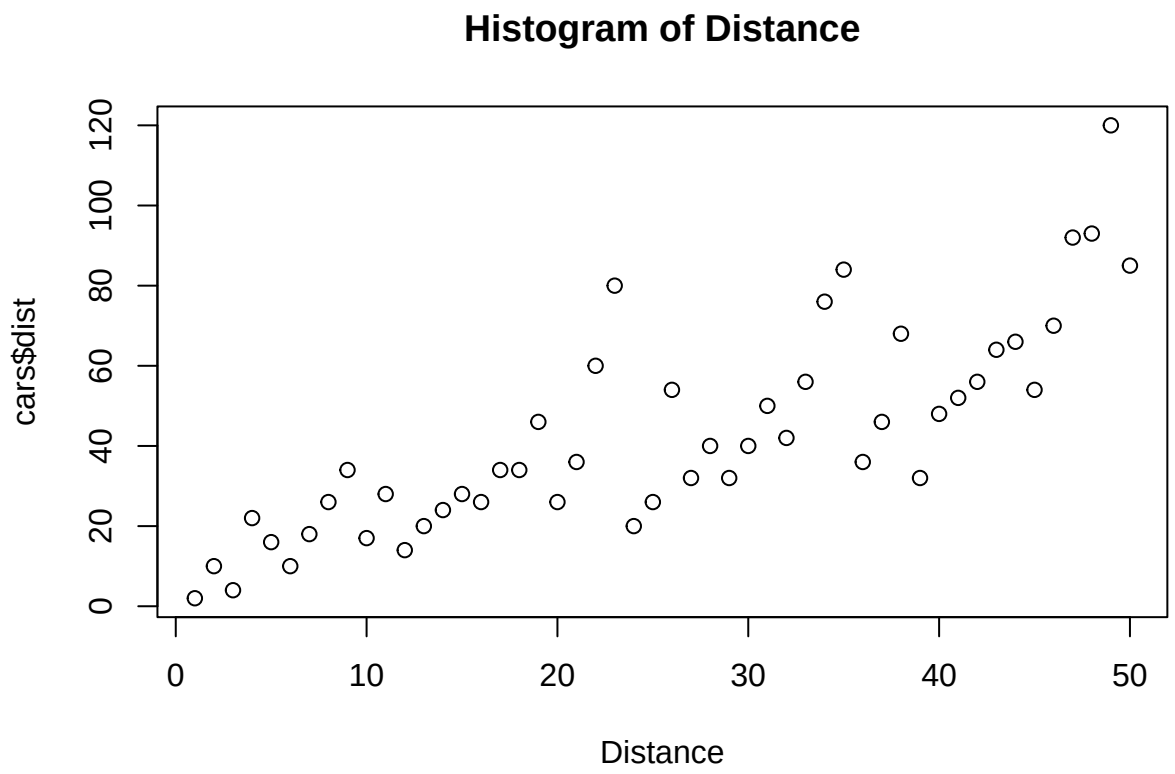
```
# Make a plot of the distance field in terms of the speed field (use the $ syntax)
plot(cars$speed, cars$dist, xlab="Speed", ylab="Distance", main="Distance vs. Speed")
```




```
dev.off()
```

```
## pdf
##   3
```

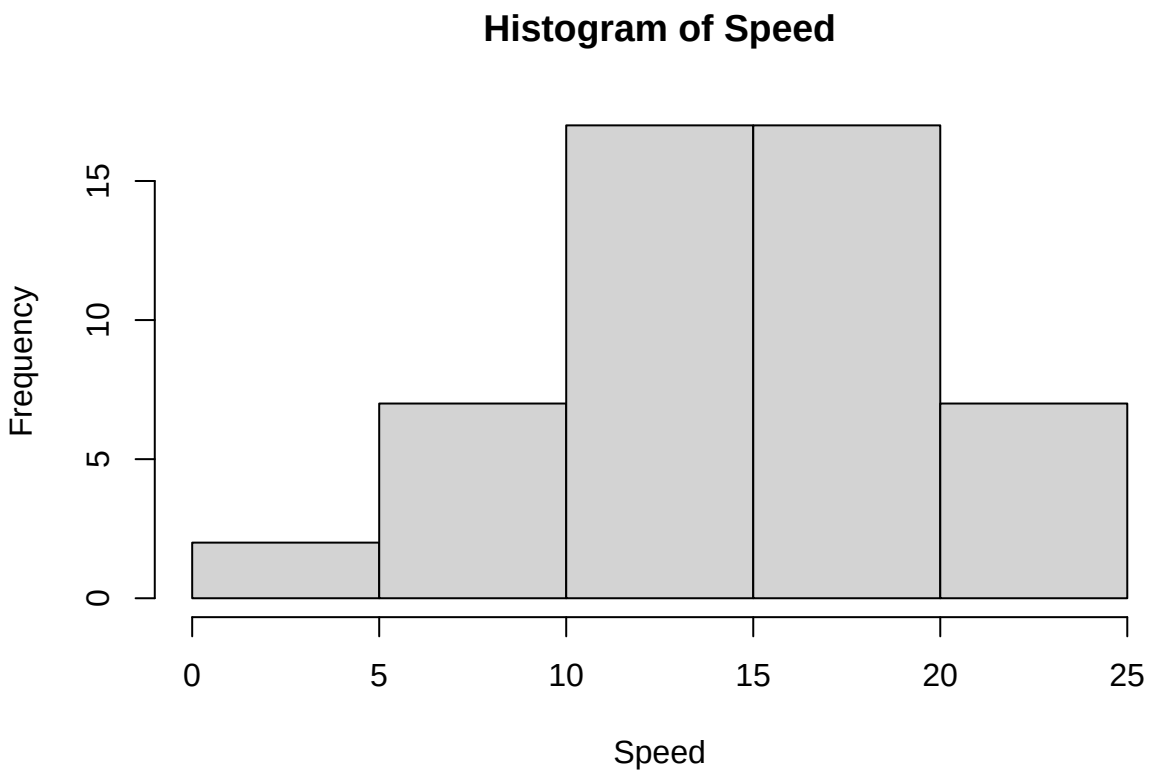
```
# Create a histogram of the distance field
plot(cars$dist, xlab="Distance", main="Histogram of Distance")
```




```
dev.off()
```

```
## pdf
##   3
```

```
# Create a histogram of the speed field
hist(cars$speed, xlab="Speed", main="Histogram of Speed")
```

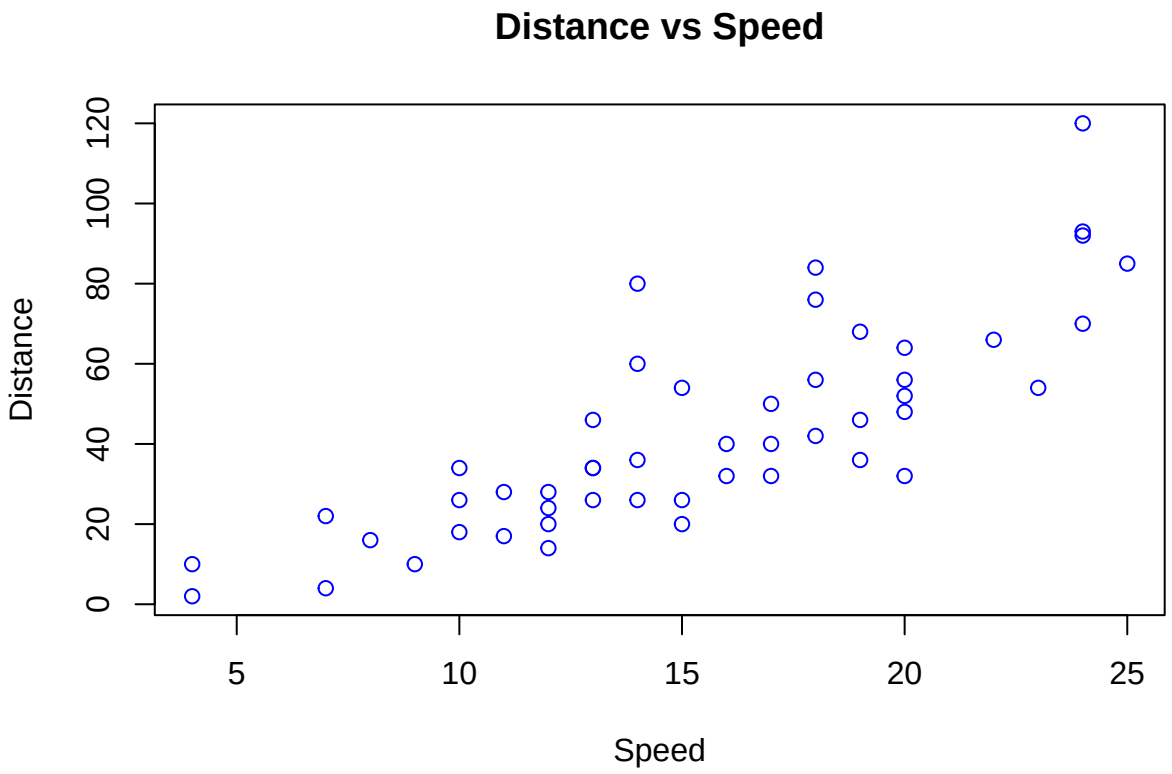



```
dev.off()
```

```
## pdf
##   3
```

```
# Save the scatterplot of the distance field in terms of the speed field to a PDF file
pdf("./documents/exercice2/ex2_distance_vs_speed_plot.pdf")
```

```
# Scatterplot of Distance vs Speed with modified title, axis labels, and color
plot(cars$speed, cars$dist,
     xlab="Speed",
     ylab="Distance",
     main="Distance vs Speed",
     col="blue")
```

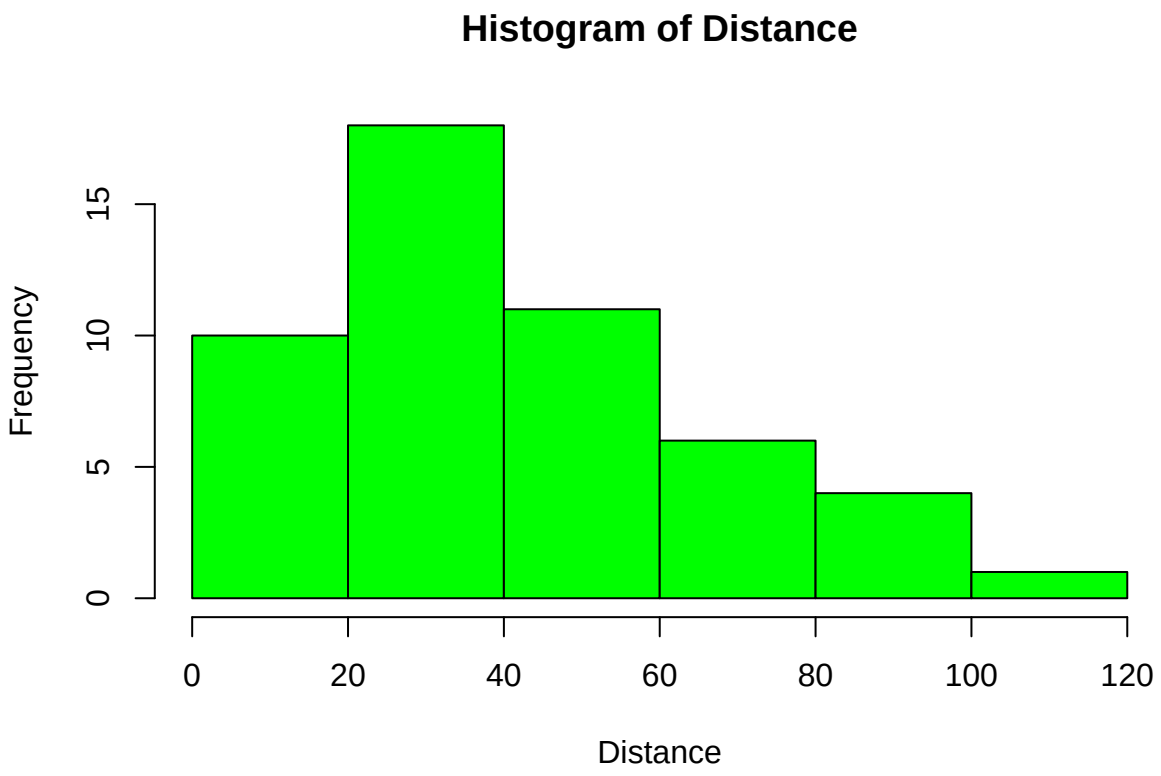



```
dev.off()
```

```
## pdf
##   3
```

```
# Save the histogram of the distance field to a PDF file
pdf("./documents/exercice2/ex2_histogram_distance.pdf")
```

```
# Histogram of Distance with modified title, axis labels, and color
hist(cars$dist,
     xlab="Distance",
     main="Histogram of Distance",
     col="green")
```

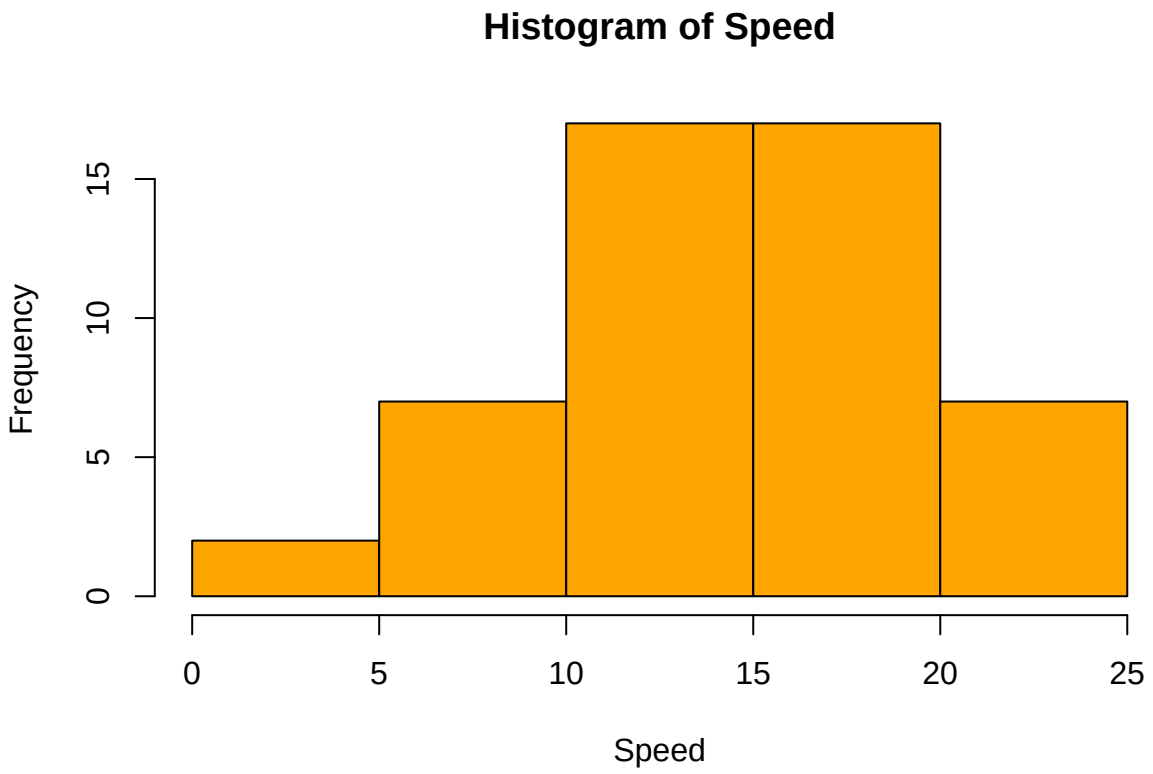



```
dev.off()
```

```
## pdf
##   3
```

```
# Save the histogram of the speed field to a PDF file
pdf("./documents/exercice2/ex2_histogram_speed.pdf")
```

```
# Histogram of Speed with modified title, axis labels, and color
hist(cars$speed,
     xlab="Speed",
     main="Histogram of Speed",
     col="orange")
```




```
dev.off()
```

```
## pdf
##   3
```

EXERCISE 3

```
# Load the dataset
cars <- read.csv("./datasets/cars.csv", header=TRUE, sep=',')
```

```
# Remove the first column of the cars data frame
cars <- cars[, -1]
```

```
# Construct a new data frame
new_cars <- data.frame(speed = c(21, 34), dist = c(47, 87))
```

```
# Add the constructed data frame to the cars data frame
cars <- rbind(cars, new_cars)
```

```
# Sort the data in the resulting dataset by column speed (ascending)
cars <- cars[order(cars$speed), ]
```

```
# Write the resulting dataset to a CSV file
write.csv(cars, file = "./datasets/cars_sorted.csv", row.names = FALSE)
```

EXERCISE 4

```
# Load the dataset
airquality <- read.csv("./datasets/airquality.csv", header=TRUE, sep=',')
```

```r
# Display the first two rows of the dataset
print(airquality[1:2, ])
```

```
##   Ozone Solar.R Wind Temp Month Day
## 1    41     190  7.4   67     5   1
## 2    36     118  8.0   72     5   2
```

```r
# How many rows are in the dataset?
nrow(airquality)
```

```
## [1] 153
```

```r
# What is the value of Ozone in the 40th row?
airquality[40, "Ozone"]
```

```
## [1] 71
```

```r
# How many missing values are there in the Ozone column?
sum(is.na(airquality$Ozone))
```

```
## [1] 37
```

```r
# What is the mean of the Ozone column in this dataset? Exclude NA values
airquality <- read.csv("./datasets/airquality.csv", header=TRUE, sep=',')
ozone_clean <- na.omit(airquality$Ozone)
print(mean(ozone_clean))
```

```
## [1] 42.12931
```

```r
# Extract the rows where the Ozone value is greater than 31 and Temp value is greater than 90
airquality <- read.csv("./datasets/airquality.csv", header=TRUE, sep=',')
airquality <- na.omit(airquality)
airquality_subset <- airquality[airquality$Ozone > 31 & airquality$Temp > 90,]

# What is the mean of Solar.R in this subset?
print(mean(airquality_subset$Solar.R))
```

```
## [1] 212.8
```