Cars_homeworkassignment

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```
# Load the required libraries
library(ggplot2)
library(dplyr)
```

```
Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

    filter, lag

The following objects are masked from 'package:base':

    intersect, setdiff, setequal, union
```

```
# Load the mtcars dataset
data("mtcars")

# Display the initial few rows of the dataset
head(mtcars)
```

```
                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

```r
# Calculate and display summary statistics for weight and miles per gallon
summary_stats <- mtcars %>%
  summarize(
    min_wt = min(wt),
    max_wt = max(wt),
    mean_wt = mean(wt),
    median_wt = median(wt),
    first_quartile_wt = quantile(wt, 0.25),
    third_quartile_wt = quantile(wt, 0.75),
    min_mpg = min(mpg),
    max_mpg = max(mpg),
    mean_mpg = mean(mpg),
    median_mpg = median(mpg),
    first_quartile_mpg = quantile(mpg, 0.25),
    third_quartile_mpg = quantile(mpg, 0.75)
  )

print("Summary Statistics:")
```

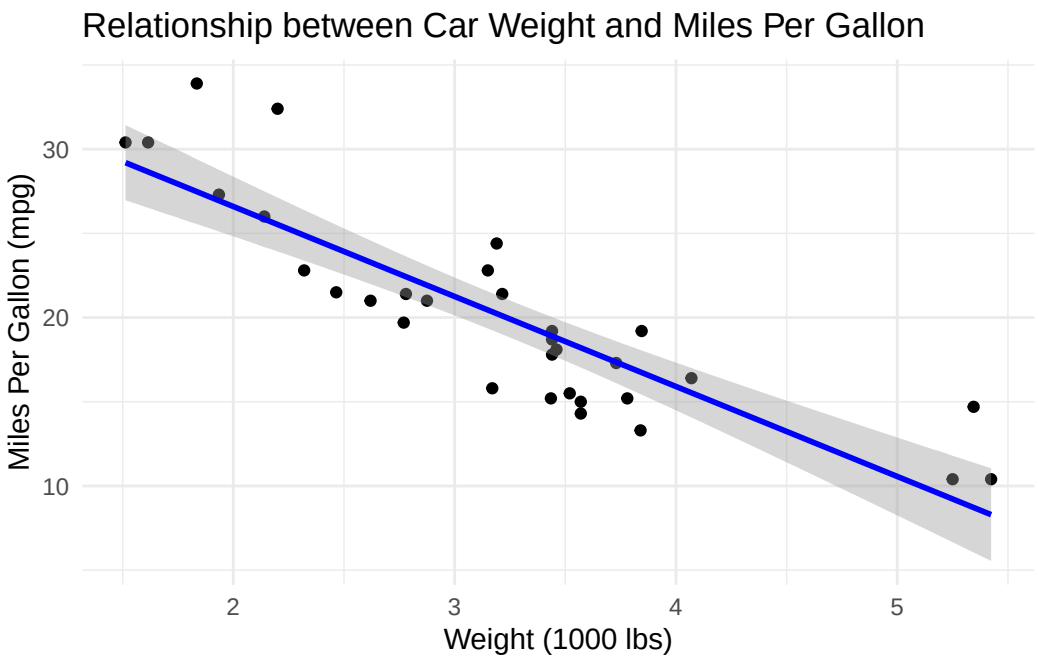
```
[1] "Summary Statistics:"
```

```r
print(summary_stats)
```

```
  min_wt max_wt mean_wt median_wt first_quartile_wt third_quartile_wt min_mpg
1  1.513  5.424 3.21725     3.325           2.58125              3.61    10.4
  max_mpg mean_mpg median_mpg first_quartile_mpg third_quartile_mpg
1    33.9 20.09062       19.2             15.425               22.8
```

```r
# Create a scatter plot of weight vs miles per gallon, including a regression line
ggplot(mtcars, aes(x = wt, y = mpg)) +
  geom_point() +
  geom_smooth(method = "lm", col = "blue") +
  labs(
    title = "Relationship between Car Weight and Miles Per Gallon",
    x = "Weight (1000 lbs)",
    y = "Miles Per Gallon (mpg)"
  ) +
  theme_minimal()
```

```
`geom_smooth()` using formula = 'y ~ x'
```




```r
# Calculate and display the correlation between weight and miles per gallon
correlation <- cor(mtcars$wt, mtcars$mpg)
print(paste("Correlation between weight and miles per gallon:", correlation))
```

```
[1] "Correlation between weight and miles per gallon: -0.867659376517228"
```

```r
# Provide an interpretation of the results
cat("Interpretation:\n")
```

```
Interpretation:
```

```r
cat("The summary statistics show that the car weights range from", summary_stats$min_wt, "
    "with an average of", round(summary_stats$mean_wt, 2), "thousand pounds. The miles per
    summary_stats$min_mpg, "to", summary_stats$max_mpg, "with an average of", round(summar
```

```
The summary statistics show that the car weights range from 1.513 to 5.424 with an average o
```

```r
cat("The scatter plot with a regression line suggests that there is a negative correlation
    "indicating that heavier cars tend to have lower fuel efficiency.\n")
```

```
The scatter plot with a regression line suggests that there is a negative correlation betwee
```

```r
cat("This is confirmed by the correlation coefficient of", round(correlation, 2), "which s
```

```
This is confirmed by the correlation coefficient of -0.87 which shows a strong negative corr
```