Homework

Meee Chaiman

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Homework

1. Create Rmarkdown
2. Create 5 charts

Use data = mpg

Explore data

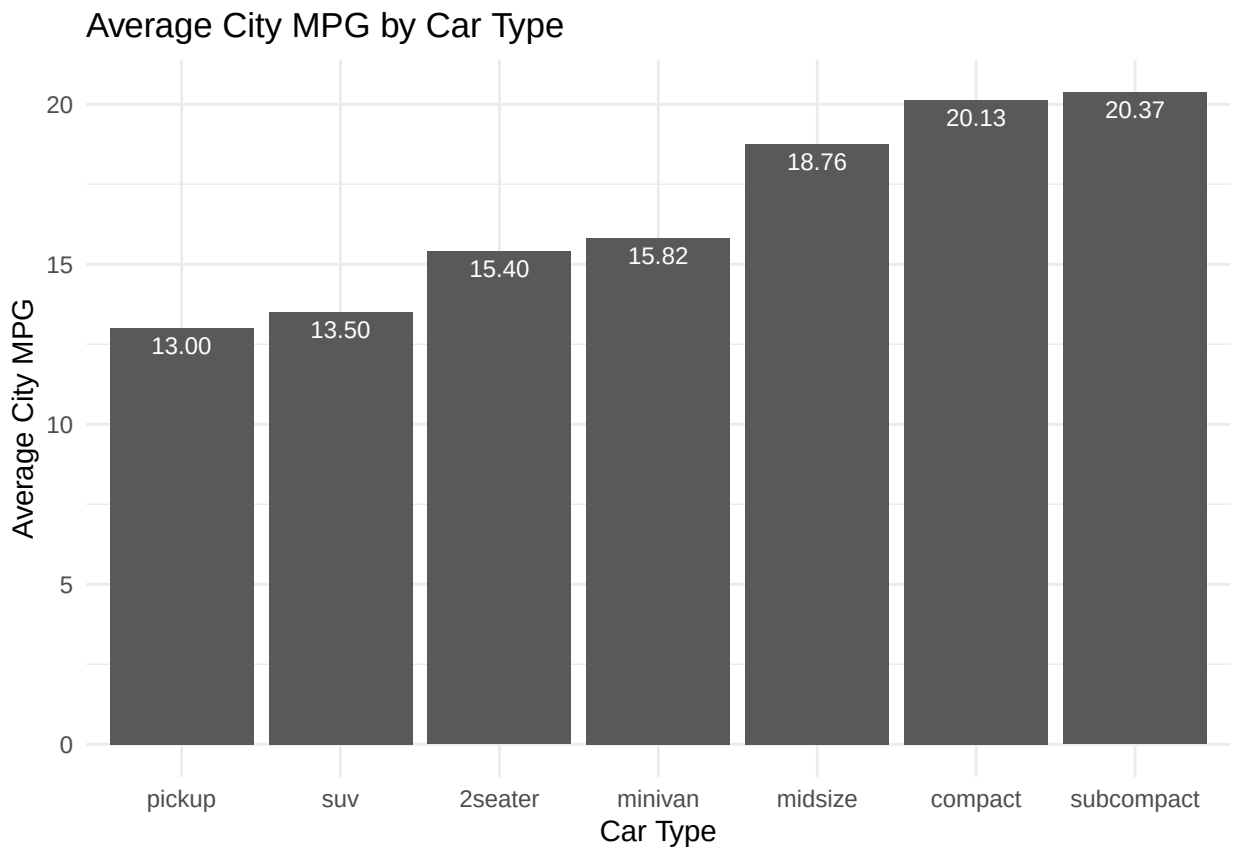
```
library(tidyverse)
library(patchwork)

head(mpg)
```

```
## # A tibble: 6 x 11
##   manufacturer model displ  year   cyl trans      drv     cty   hwy fl    class
##   <chr>        <chr> <dbl> <int> <int> <chr>      <chr> <int> <int> <chr> <chr>
## 1 audi         a4      1.8  1999     4 auto(l5)   f        18    29 p     compa~
## 2 audi         a4      1.8  1999     4 manual(m5) f        21    29 p     compa~
## 3 audi         a4      2    2008     4 manual(m6) f        20    31 p     compa~
## 4 audi         a4      2    2008     4 auto(av)   f        21    30 p     compa~
## 5 audi         a4      2.8  1999     6 auto(l5)   f        16    26 p     compa~
## 6 audi         a4      2.8  1999     6 manual(m5) f        18    26 p     compa~
```

1. What is the most city fuel-efficient "type" of car?

According to the bar plot, among the different types of cars, `Pickup` emerges as the most city fuel-efficient, with remarkably low fuel consumption.

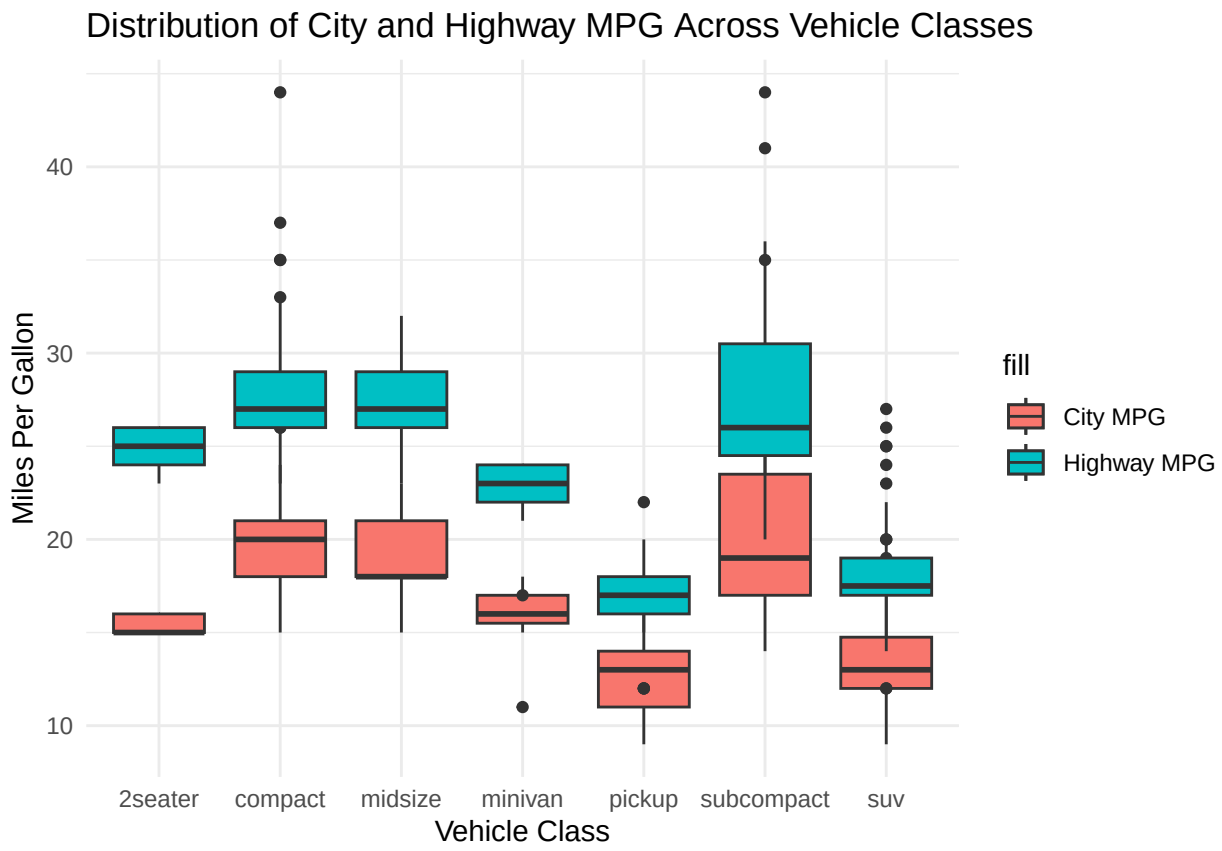
```
mpg %>%
  group_by(class) %>%
  summarise(avg_cty = mean(cty)) %>%
  ggplot(aes(x=reorder(class, avg_cty), y=avg_cty, label=sprintf("%0.2f", round(avg_cty, digits = 2)))) +
  geom_col() +
  labs(title = "Average City MPG by Car Type",
       y = "Average City MPG",
       x = "Car Type") +
  geom_text(size = 3, vjust = 1.5, colour = "white") +
  theme_minimal()
```



2. How does the distribution of city and highway miles per gallon vary across different vehicle classes?

All vesicle classes consume less fuel in City compared to Highway and pickup is lowest fuel consumption.

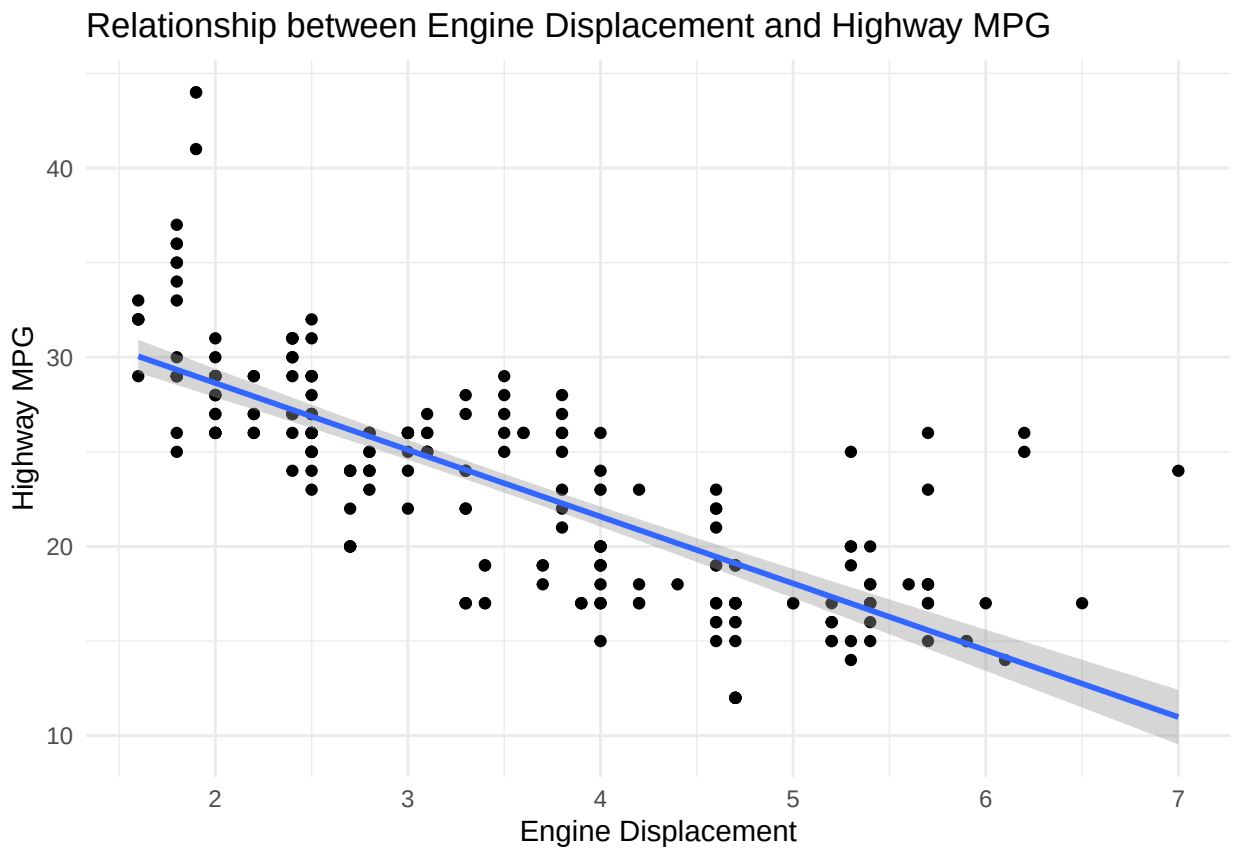
```
mpg %>%
  ggplot(aes(x = class, y = cty)) +
  geom_boxplot(aes(fill = "City MPG")) +
  geom_boxplot(aes(x = class, y = hwy, fill = "Highway MPG")) +
  labs(title = "Distribution of City and Highway MPG Across Vehicle Classes",
       x = "Vehicle Class",
       y = "Miles Per Gallon") +
  theme_minimal()
```



3. Is there a correlation between engine displacement and highway miles per gallon?

Indeed, there appears to be a negative correlation between engine displacement and highway miles per gallon. As the engine displacement increases, the fuel consumption tends to decrease.

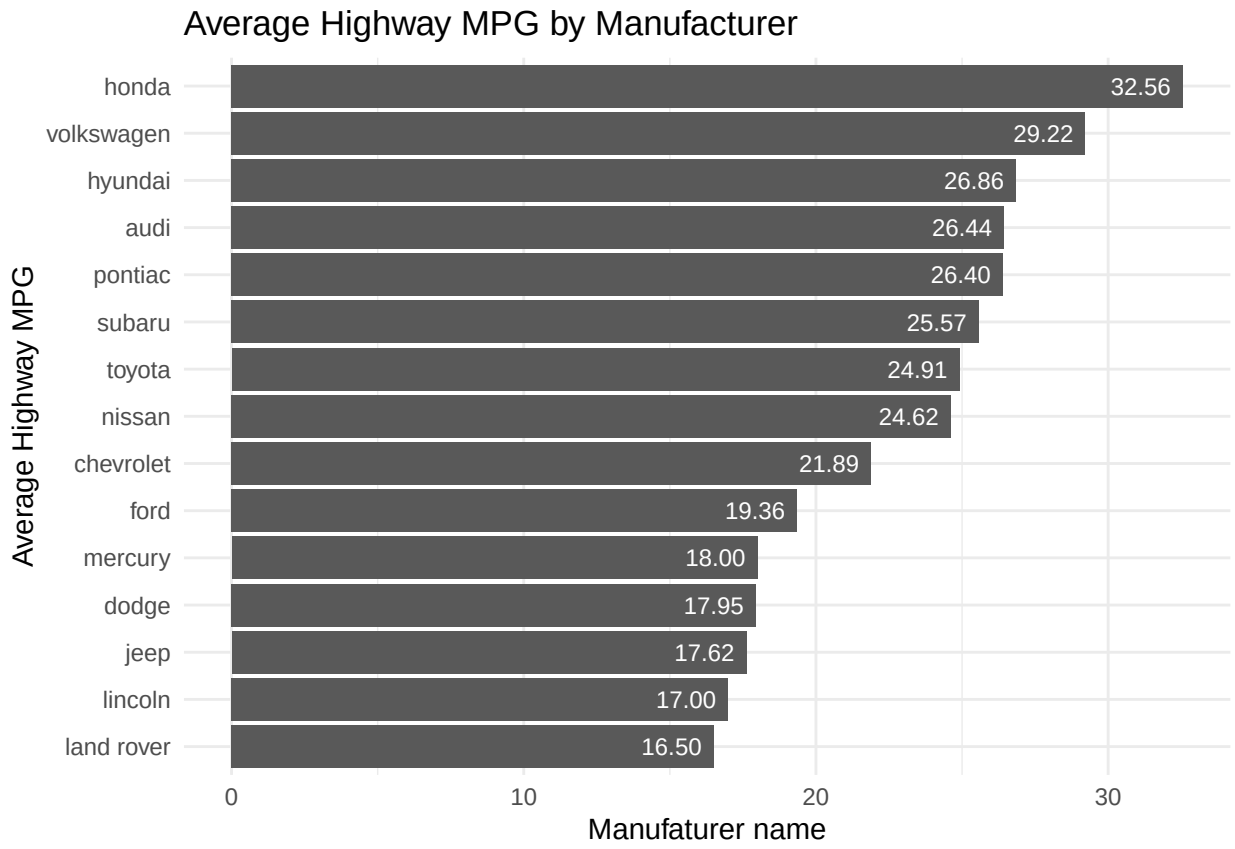
```
ggplot(mpg, aes(displ, hwy)) +
  geom_point() +
  geom_smooth(formula = y ~ x, method = "lm") +
  labs(
    title = "Relationship between Engine Displacement and Highway MPG",
    x = "Engine Displacement",
    y = "Highway MPG"
  ) +
  theme_minimal()
```



4. What is the average fuel efficiency for each manufacturer?

According to the bar plot, among the manufacturers, `Land Rover` stands out as having the highest highway fuel efficiency, with notably lower fuel consumption.

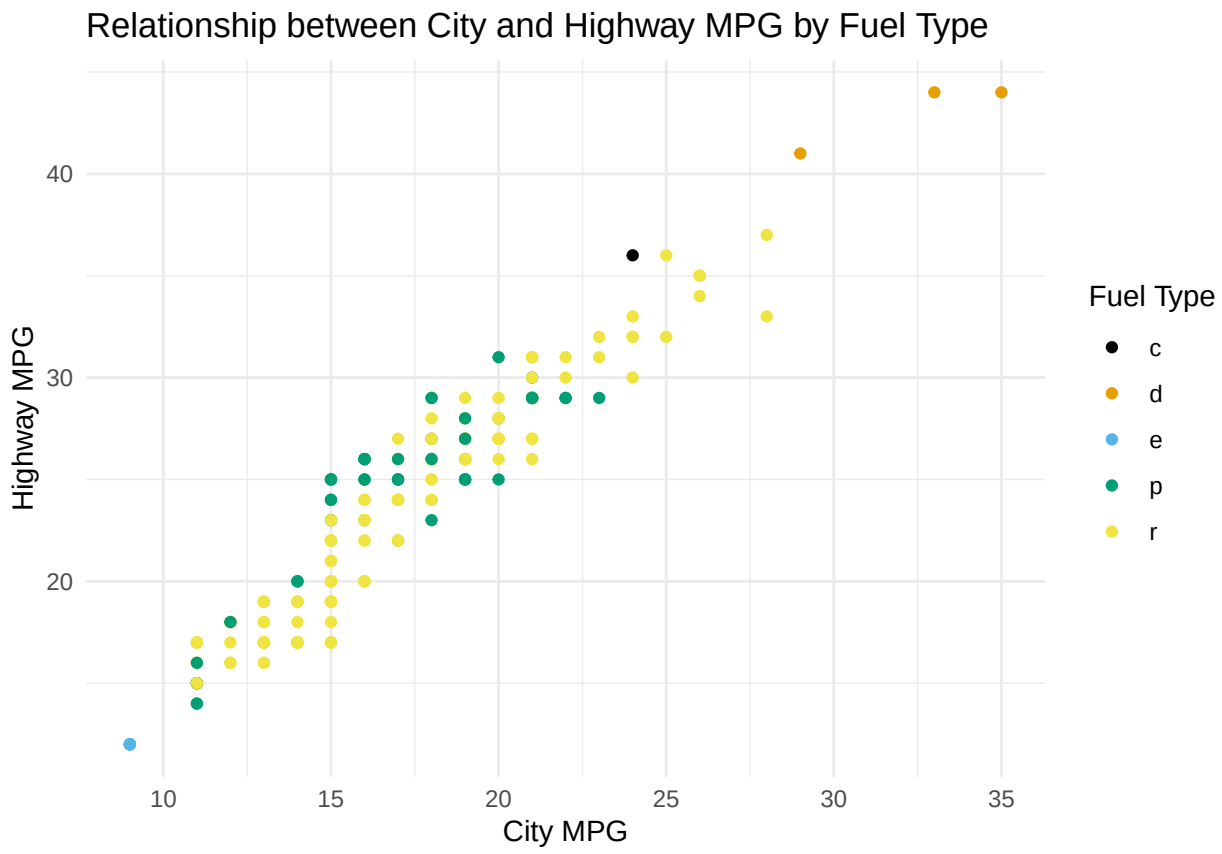
```
mpg %>%
  group_by(manufacturer) %>%
  summarise(avg_hwy = mean(hwy)) %>%
  ggplot(aes(x=avg_hwy, y=reorder(manufacturer, avg_hwy), label=sprintf("%0.2f", round(avg_hwy, digits =
  geom_col() +
  labs(title = "Average Highway MPG by Manufacturer",
       y = "Manufacturer",
       x = "Average Highway MPG") +
  labs(y = "Average Highway MPG", x = "Manufaturer name") +
  geom_text(size = 3, hjust = 1.2, vjust = 0.5, colour = "white") +
  theme_minimal()
```



5. How does the relationship between city and highway MPG vary for different types of fuel?

There is a positive correlation between city and highway MPG. Notably, the fuel type 'electric (e)' exhibits the lowest consumption, while 'diesel (d)' has the highest fuel consumption in this relationship.

```
ggplot(mpg, aes(cty, hwy, color = fl)) +
  geom_point() +
  labs(title = "Relationship between City and Highway MPG by Fuel Type",
       x = "City MPG",
       y = "Highway MPG",
       color = "Fuel Type") +
  scale_color_manual(values = c(
    "#000000", "#E69F00", "#56B4E9", "#009E73", "#F0E442" # Color Bline
  )) +
  theme_minimal()
```


Relationship between City and Highway MPG by Fuel Type
Highway MPG
City MPG
40
30
20
10
15
20
25
30
35
Fuel Type
c
d
e
p
r