Rworksheet#4c

2023-11-22

1a.

```r
library(readr)
mpg <- read_csv("mpg.csv")
```

```
## New names:
## Rows: 234 Columns: 12
## -- Column specification
## -------------------------------------------------------- Delimiter: "," chr
## (6): manufacturer, model, trans, drv, fl, class dbl (6): ...1, displ, year,
## cyl, cty, hwy
## i Use `spec()` to retrieve the full column specification for this data. i
## Specify the column types or set `show_col_types = FALSE` to quiet this message.
## * `` -> `...1`
```

```r
head(mpg)
```

```
## # A tibble: 6 x 12
##    ...1 manufacturer model displ  year   cyl trans drv     cty   hwy fl    class
##   <dbl> <chr>        <chr> <dbl> <dbl> <dbl> <chr> <chr> <dbl> <dbl> <chr> <chr>
## 1     1 audi         a4      1.8  1999     4 auto~ f        18    29 p     comp~
## 2     2 audi         a4      1.8  1999     4 manu~ f        21    29 p     comp~
## 3     3 audi         a4      2    2008     4 manu~ f        20    31 p     comp~
## 4     4 audi         a4      2    2008     4 auto~ f        21    30 p     comp~
## 5     5 audi         a4      2.8  1999     6 auto~ f        16    26 p     comp~
## 6     6 audi         a4      2.8  1999     6 manu~ f        18    26 p     comp~
```

1b.

```r
str(mpg)
```

```
## spc_tbl_ [234 x 12] (S3: spec_tbl_df/tbl_df/tbl/data.frame)
##  $ ...1        : num [1:234] 1 2 3 4 5 6 7 8 9 10 ...
##  $ manufacturer: chr [1:234] "audi" "audi" "audi" "audi" ...
##  $ model       : chr [1:234] "a4" "a4" "a4" "a4" ...
##  $ displ       : num [1:234] 1.8 1.8 2 2 2.8 2.8 3.1 1.8 1.8 2 ...
##  $ year        : num [1:234] 1999 1999 2008 2008 1999 ...
##  $ cyl         : num [1:234] 4 4 4 4 6 6 6 4 4 4 ...
##  $ trans       : chr [1:234] "auto(l5)" "manual(m5)" "manual(m6)" "auto(av)" ...
##  $ drv         : chr [1:234] "f" "f" "f" "f" ...
##  $ cty         : num [1:234] 18 21 20 21 16 18 18 18 16 20 ...
##  $ hwy         : num [1:234] 29 29 31 30 26 26 27 26 25 28 ...
##  $ fl          : chr [1:234] "p" "p" "p" "p" ...
##  $ class       : chr [1:234] "compact" "compact" "compact" "compact" ...
##  - attr(*, "spec")=
##   .. cols(
##   ..   ...1 = col_double(),
##   ..   manufacturer = col_character(),
```

```
##   ..   model = col_character(),
##   ..   displ = col_double(),
##   ..   year = col_double(),
##   ..   cyl = col_double(),
##   ..   trans = col_character(),
##   ..   drv = col_character(),
##   ..   cty = col_double(),
##   ..   hwy = col_double(),
##   ..   fl = col_character(),
##   ..   class = col_character()
##   .. )
##  - attr(*, "problems")=<externalptr>
```

```
#The categorical variables are the manufacturer,model, year,cyl,trans,drv,fl and class
```

1c.

```
summary(mpg)
```

```
##       ...1        manufacturer          model               displ
##  Min.   :  1.00   Length:234         Length:234         Min.   :1.600
##  1st Qu.: 59.25   Class :character   Class :character   1st Qu.:2.400
##  Median :117.50   Mode  :character   Mode  :character   Median :3.300
##  Mean   :117.50                                         Mean   :3.472
##  3rd Qu.:175.75                                         3rd Qu.:4.600
##  Max.   :234.00                                         Max.   :7.000
##       year           cyl           trans               drv
##  Min.   :1999   Min.   :4.000   Length:234         Length:234
##  1st Qu.:1999   1st Qu.:4.000   Class :character   Class :character
##  Median :2004   Median :6.000   Mode  :character   Mode  :character
##  Mean   :2004   Mean   :5.889
##  3rd Qu.:2008   3rd Qu.:8.000
##  Max.   :2008   Max.   :8.000
##       cty             hwy             fl                 class
##  Min.   : 9.00   Min.   :12.00   Length:234         Length:234
##  1st Qu.:14.00   1st Qu.:18.00   Class :character   Class :character
##  Median :17.00   Median :24.00   Mode  :character   Mode  :character
##  Mean   :16.86   Mean   :23.44
##  3rd Qu.:19.00   3rd Qu.:27.00
##  Max.   :35.00   Max.   :44.00
```

```
#The continous variables are the; manufacturer, model, disply, year , cyl, cty ,hwy, fl, trans, drv and
```

2.

```
library(magrittr)
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
```

```r
models <- mpg %>%
 group_by(manufacturer) %>%
 summarise(count = n()) %>%
 arrange(desc(count))

print(models)
```

```
## # A tibble: 15 x 2
##    manufacturer count
##    <chr>        <int>
##  1 dodge           37
##  2 toyota          34
##  3 volkswagen      27
##  4 ford            25
##  5 chevrolet       19
##  6 audi            18
##  7 hyundai         14
##  8 subaru          14
##  9 nissan          13
## 10 honda            9
## 11 jeep             8
## 12 pontiac          5
## 13 land rover       4
## 14 mercury          4
## 15 lincoln          3
```

```r
#The manufacturer with the most models is dodge.

counts <- mpg %>%
 group_by(model) %>%
 summarise(variation = n()) %>%
 arrange(desc(variation))

print(counts)
```

```
## # A tibble: 38 x 2
##    model              variation
##    <chr>                  <int>
##  1 caravan 2wd               11
##  2 ram 1500 pickup 4wd       10
##  3 civic                      9
##  4 dakota pickup 4wd          9
##  5 jetta                      9
##  6 mustang                    9
##  7 a4 quattro                 8
##  8 grand cherokee 4wd         8
##  9 impreza awd                8
## 10 a4                         7
## # i 28 more rows
```

```r
#The model with most variation is caravan 2wd.
```

2a.

```r
library(dplyr)
```

```r
manufacmodel <- mpg %>%
 group_by(manufacturer) %>%
 summarise(unique_models = n_distinct(model))

print(manufacmodel)
```

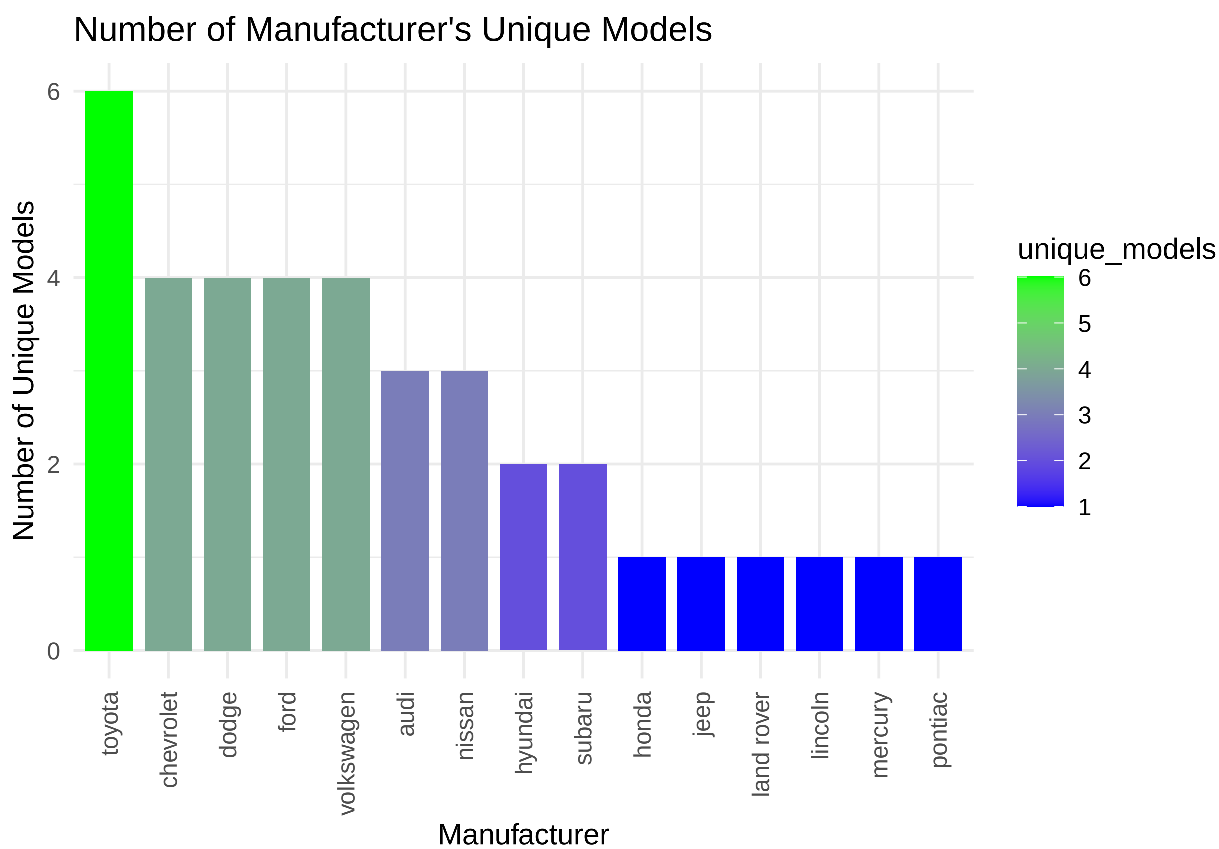
```
## # A tibble: 15 x 2
##    manufacturer unique_models
##    <chr>                <int>
##  1 audi                     3
##  2 chevrolet                4
##  3 dodge                    4
##  4 ford                     4
##  5 honda                    1
##  6 hyundai                  2
##  7 jeep                     1
##  8 land rover               1
##  9 lincoln                  1
## 10 mercury                  1
## 11 nissan                   3
## 12 pontiac                  1
## 13 subaru                   2
## 14 toyota                   6
## 15 volkswagen               4
```

2b.

```r
library(ggplot2)
```

```
##
## Attaching package: 'ggplot2'

## The following object is masked _by_ '.GlobalEnv':
##
##     mpg
```

```r
plot(ggplot(manufacmodel, aes(x = reorder(manufacturer, -unique_models), y = unique_models, fill = uniq
 geom_bar(stat = "identity", width = 0.8) +
 labs(title = "Number of Manufacturer's Unique Models",
      x = "Manufacturer",
      y = "Number of Unique Models") +

 theme_minimal() +
 scale_fill_gradient(low = "blue", high = "green") +
 theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)))
```

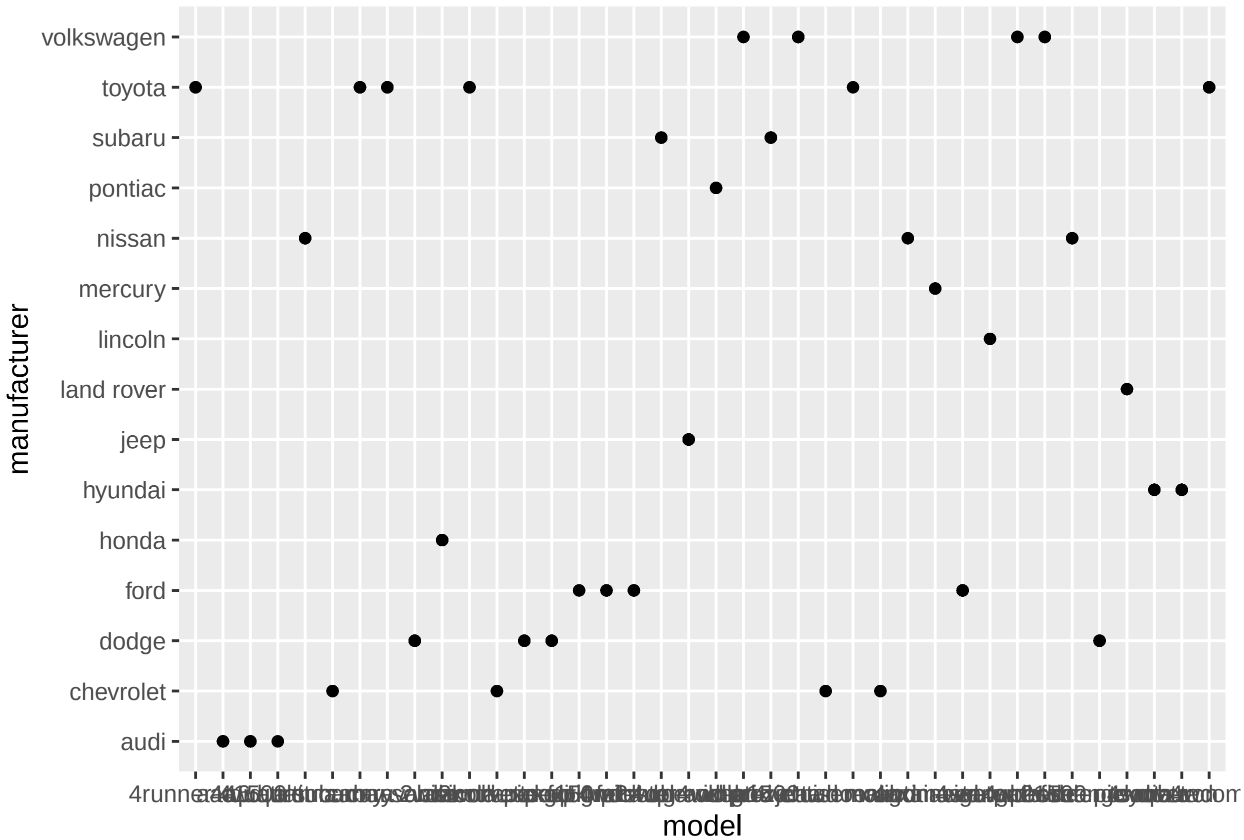


2.

a. What does ggplot(mpg, aes(model, manufacturer)) + geom_point() show?

It generates a scatter plot showing the relationship between car models and their respective manufacturers using points but the car models are not readable, leads to uninformative data.

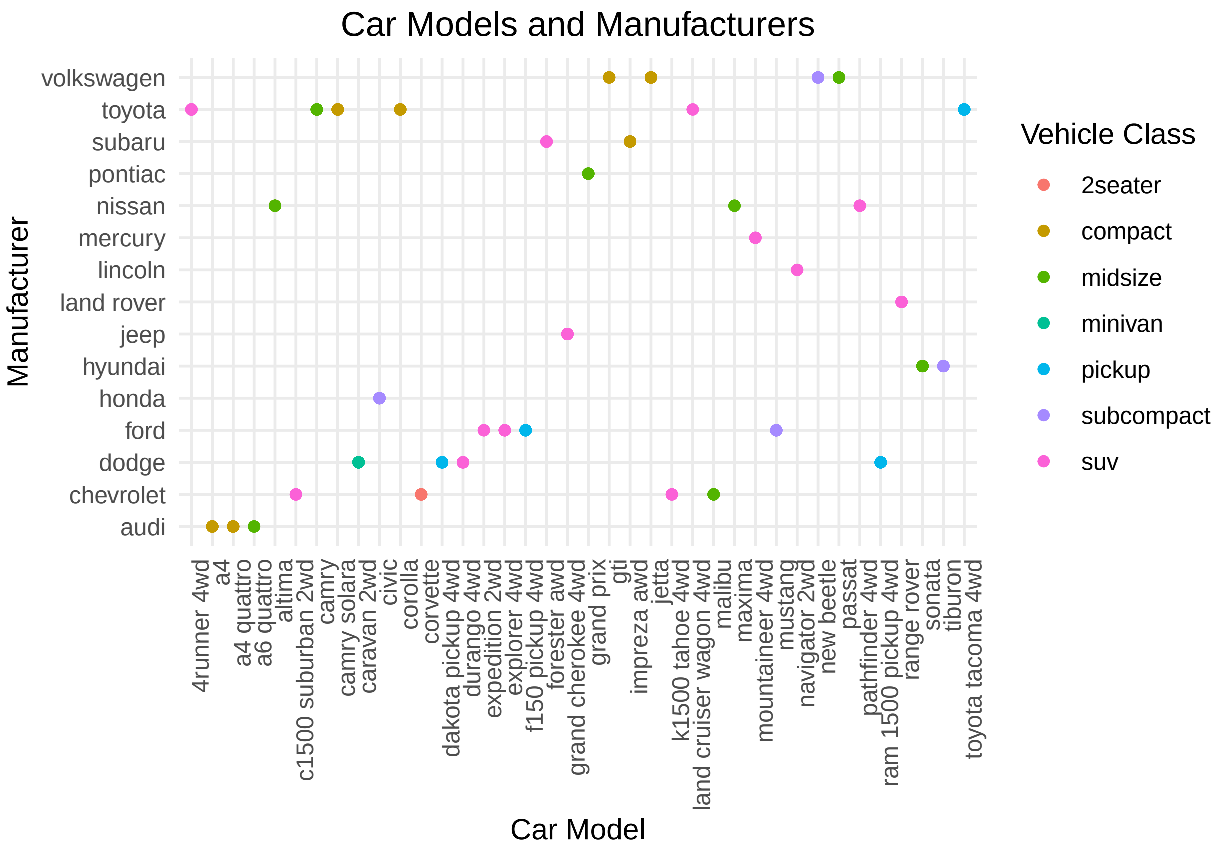
```r
ggplot(mpg, aes(model, manufacturer)) + geom_point()
```



b. For you, is it useful? If not, how could you modify the data to make it more informative?

No, The code given is just a basic structure. In order to make this more helpful, I'll change the size of the variable names according to their angle to make it easier to read, add color to distinguish the points based on various factors, and include a legend to help the viewer and prevent confusion.

```
#like this code
ggplot(mpg, aes(x = model, y = manufacturer, color = class)) +
  geom_point() +
  labs(title = "Car Models and Manufacturers",
       cex = 3,
       x = "Car Model",
       y = "Manufacturer",
       color = "Vehicle Class") +
  theme_minimal() +
  theme(legend.position = "right", axis.text.x = element_text(angle = 90, hjust = 1),
  plot.title = element_text(hjust  = 0.5))
```



3.

```
library(ggplot2)
library(dplyr)

data(mpg)


displaymean <- mpg %>%
 group_by(year, model) %>%
 summarise(mean_display = mean(displ)) %>%
 arrange(desc(mean_display)) %>%
 filter(row_number() < 20)
```

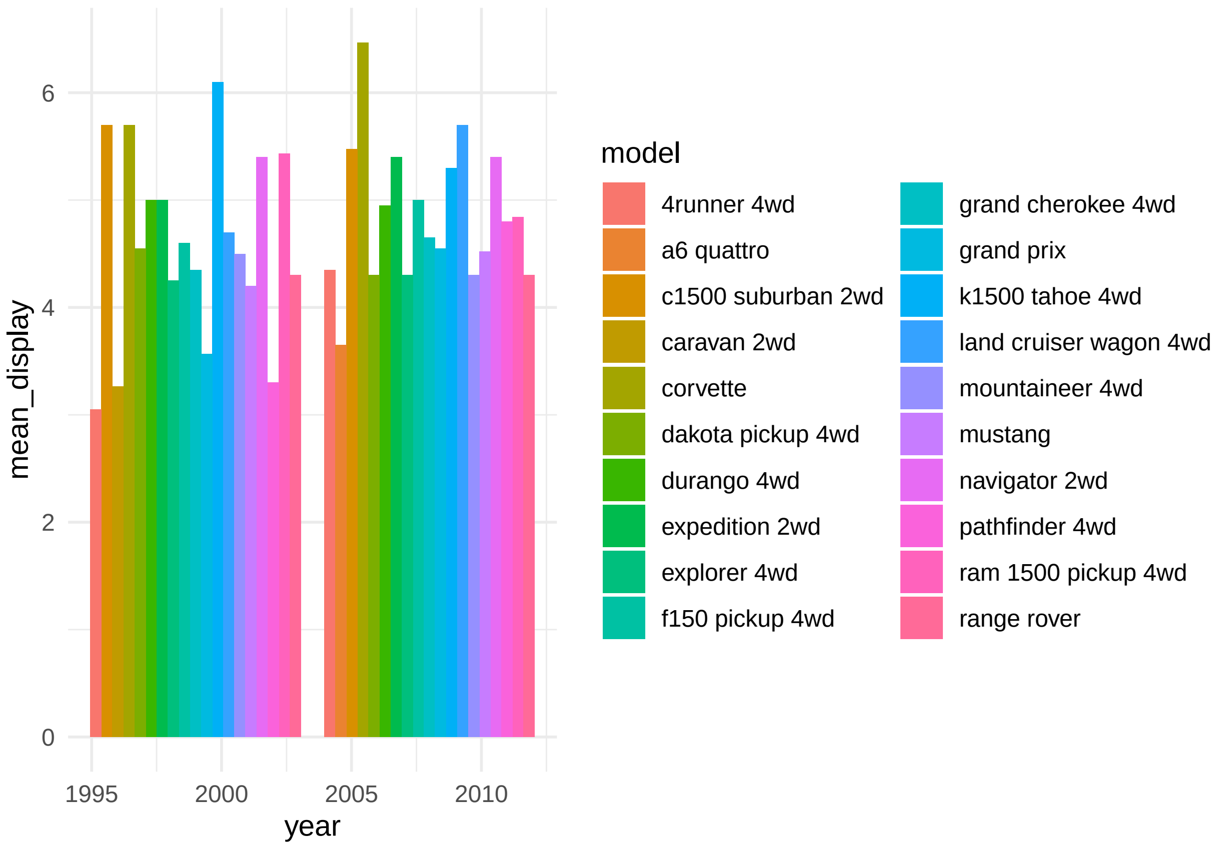
```
## `summarise()` has grouped output by 'year'. You can override using the
## `.groups` argument.
```

```
plot <- ggplot(displaymean, aes(x = year, y = mean_display, fill = model)) +
 geom_bar(stat = "identity", position = "dodge") +
 theme_minimal() +
 guides(fill = guide_legend(ncol = 2))
 labs(title = "Average Engine Displacement over the years for the top 20 models",
       x = "Year",
       y = "Engine Displacement",
       fill = "Model")
```

```
## $x
## [1] "Year"
```

```
##
## $y
## [1] "Engine Displacement"
##
## $fill
## [1] "Model"
##
## $title
## [1] "Average Engine Displacement over the years for the top 20 models"
##
## attr(,"class")
## [1] "labels"
```

```
print(plot)
```



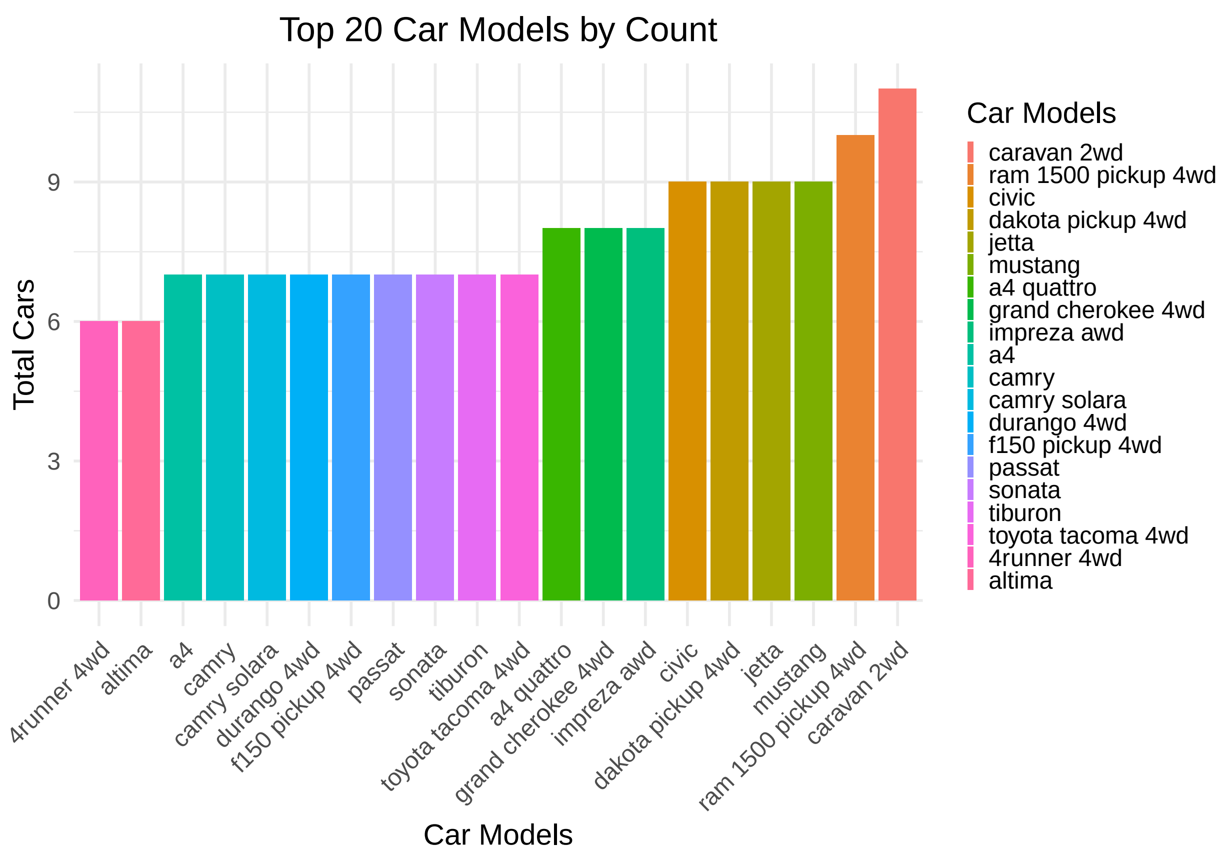
4. Using the pipe (%>%), group the model and get the number of cars per model. Show codes and its result

```
library(dplyr)
data(mpg)


carcount<- mpg %>%
  group_by(model) %>%
  summarise(num_cars = n())


print(carcount)
```

```
## # A tibble: 38 x 2
##    model              num_cars
##    <chr>                 <int>
##  1 4runner 4wd               6
##  2 a4                        7
##  3 a4 quattro                8
##  4 a6 quattro                3
##  5 altima                    6
##  6 c1500 suburban 2wd        5
##  7 camry                     7
##  8 camry solara              7
##  9 caravan 2wd              11
## 10 civic                     9
## # i 28 more rows
```

a. Plot using geom_bar() using the top 20 observations only. The graphs should have a title, labels and colors. Show code and results.

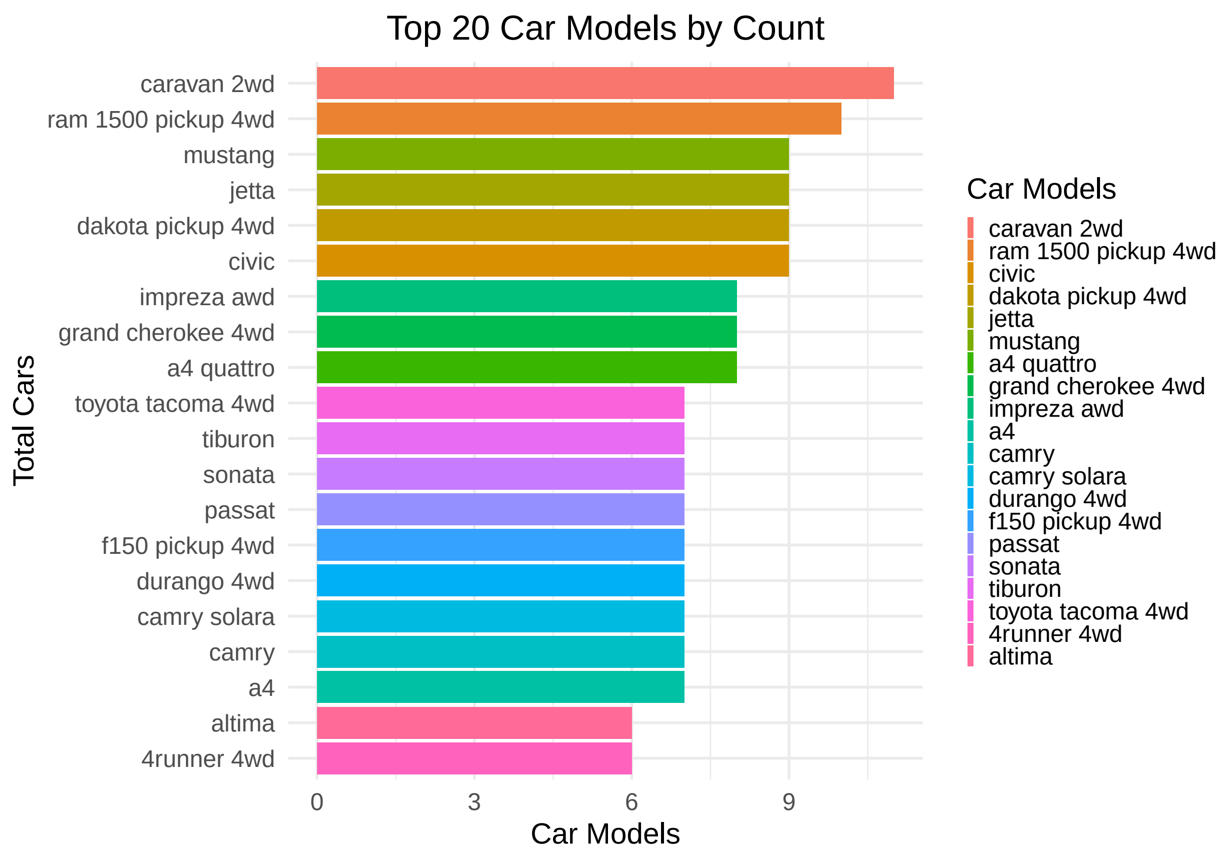
```r
library(ggplot2)
library(dplyr)

data(mpg)

summdata <- mpg %>%
  count(model) %>%
  arrange(desc(n)) %>%
  slice(1:20)

topModel <- summdata$model
palette <- scales::hue_pal()(length(topModel))

summdata <- summdata %>%
  mutate(color = palette[match(model, topModel)])

ggplot(summdata, aes(x = reorder(model, n), y = n, fill = model)) +
  geom_bar(stat = "identity") +
  labs(
    title = "Top 20 Car Models by Count",
    x = "Car Models",
    y = "Total Cars"
  ) +
  scale_fill_manual(values = palette, name = "Car Models", breaks = summdata$model) +
  theme_minimal() +
  theme(
    axis.text.x = element_text(angle = 45, hjust = 1),
    legend.key.size = unit(0.1, "cm"),
    plot.title = element_text(hjust = 0.5)
  )
```



b.

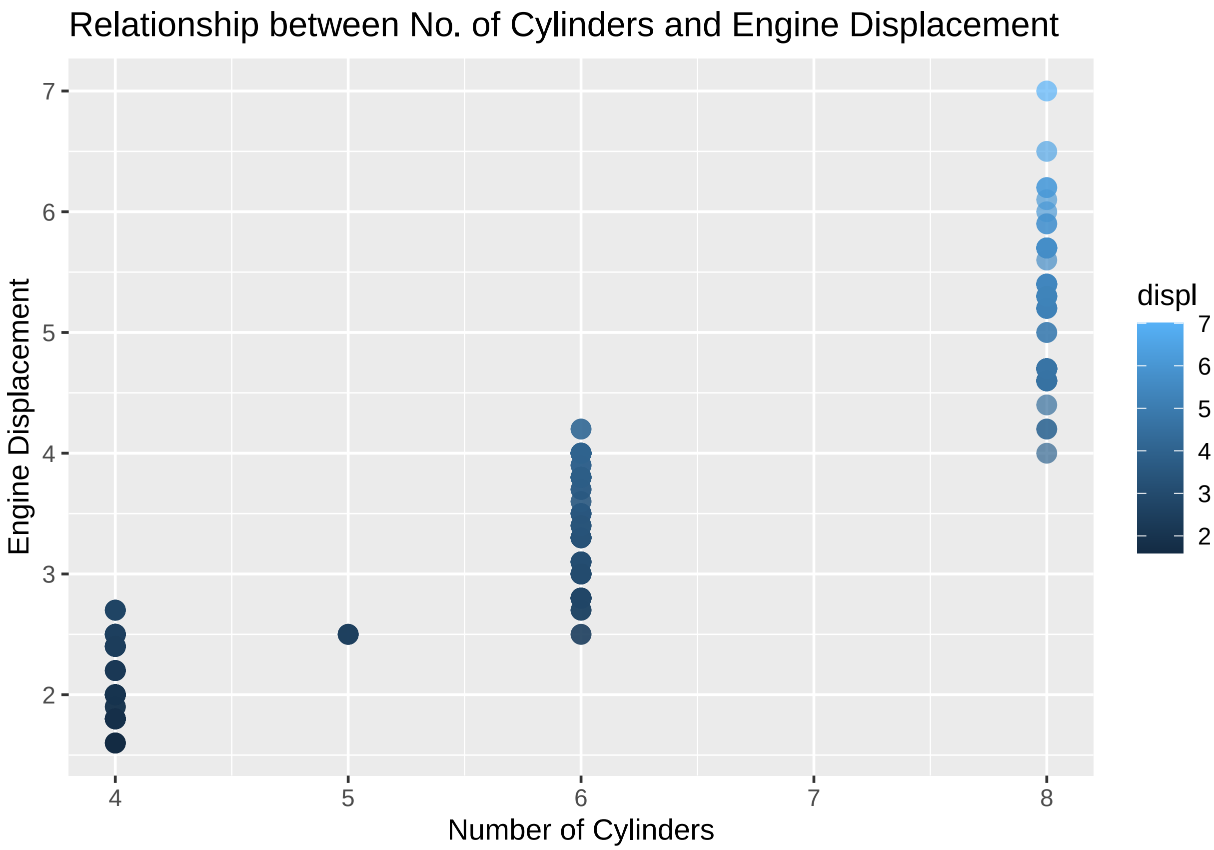
```
library(ggplot2)
library(dplyr)

data(mpg)

summdata <- mpg %>%
  count(model) %>%
  arrange(desc(n)) %>%
  slice(1:20)


topModel <- summdata$model
palette <- scales::hue_pal()(length(topModel))

summdata <- summdata %>%
  mutate(color = palette[match(model, topModel)])

ggplot(summdata, aes(x = reorder(model, n), y = n, fill = model)) +
  geom_bar(stat = "identity") +
  labs(
    title = "Top 20 Car Models by Count",
    y = "Car Models",
    x = "Total Cars"
  ) +
  scale_fill_manual(values = palette, name = "Car Models", breaks = summdata$model) +
  coord_flip() +
  theme_minimal() +
```

```r
  theme(
    legend.key.size = unit(0.1, "cm"),
    plot.title = element_text(hjust = 0.5)
  )
```



5.

```r
library(ggplot2)
library(dplyr)

data(mpg)

ggplot(mpg, aes(x = cyl, y = displ, color = displ)) +
  geom_point(size = 3, alpha = 0.7) +
  labs(
    title = "Relationship between No. of Cylinders and Engine Displacement",
    x = "Number of Cylinders",
    y = "Engine Displacement"
  )
```



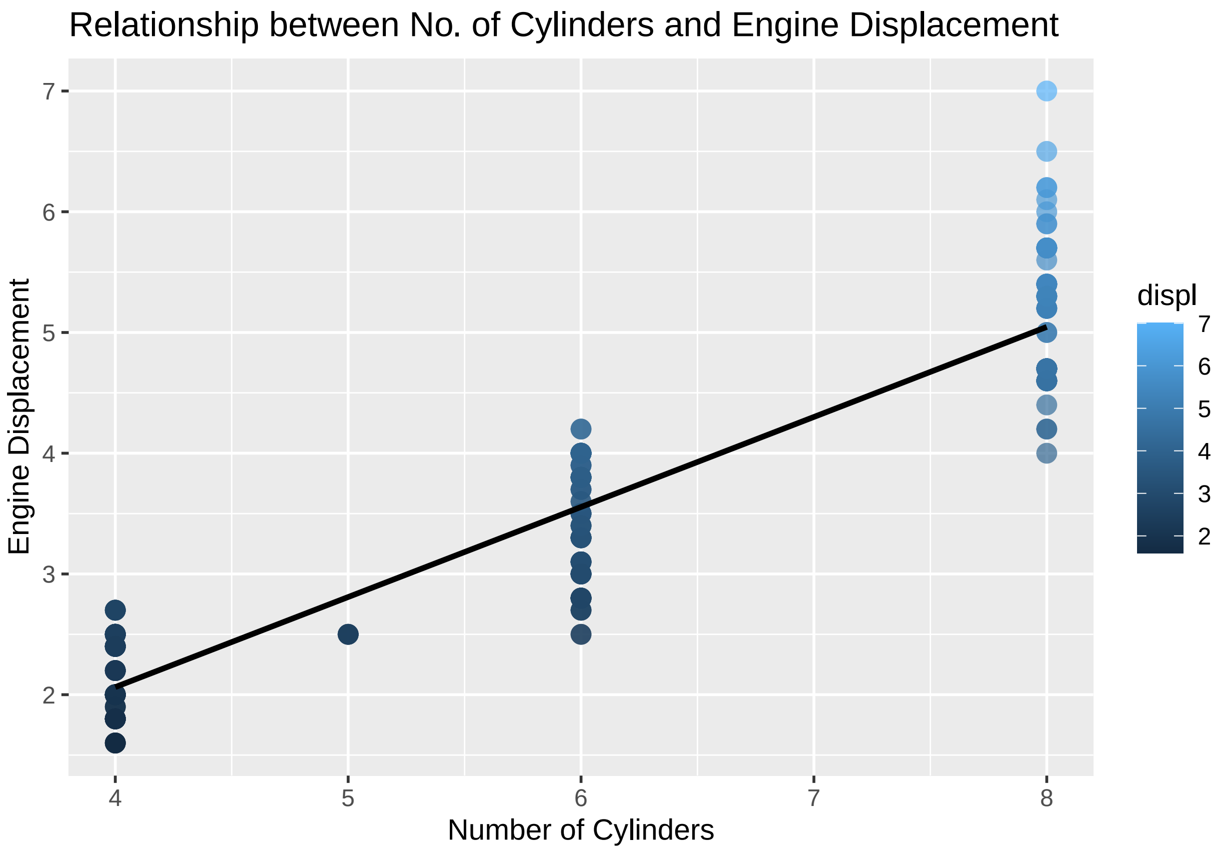
a.

How would you describe its relationship? Show the codes and its result.

Using the line regression to visualize the relationship of the No. of cyl and displ so as the number of cylinders goes up, the engine size tends to increase too.

```
library(ggplot2)
library(dplyr)

data(mpg)

ggplot(mpg, aes(x = cyl, y = displ, color = displ)) +
  geom_point(size = 3, alpha = 0.7) +
  geom_smooth(method = "lm", se = FALSE, color = "black") +
  labs(
    title = "Relationship between No. of Cylinders and Engine Displacement",
    x = "Number of Cylinders",
    y = "Engine Displacement"
  )
```

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

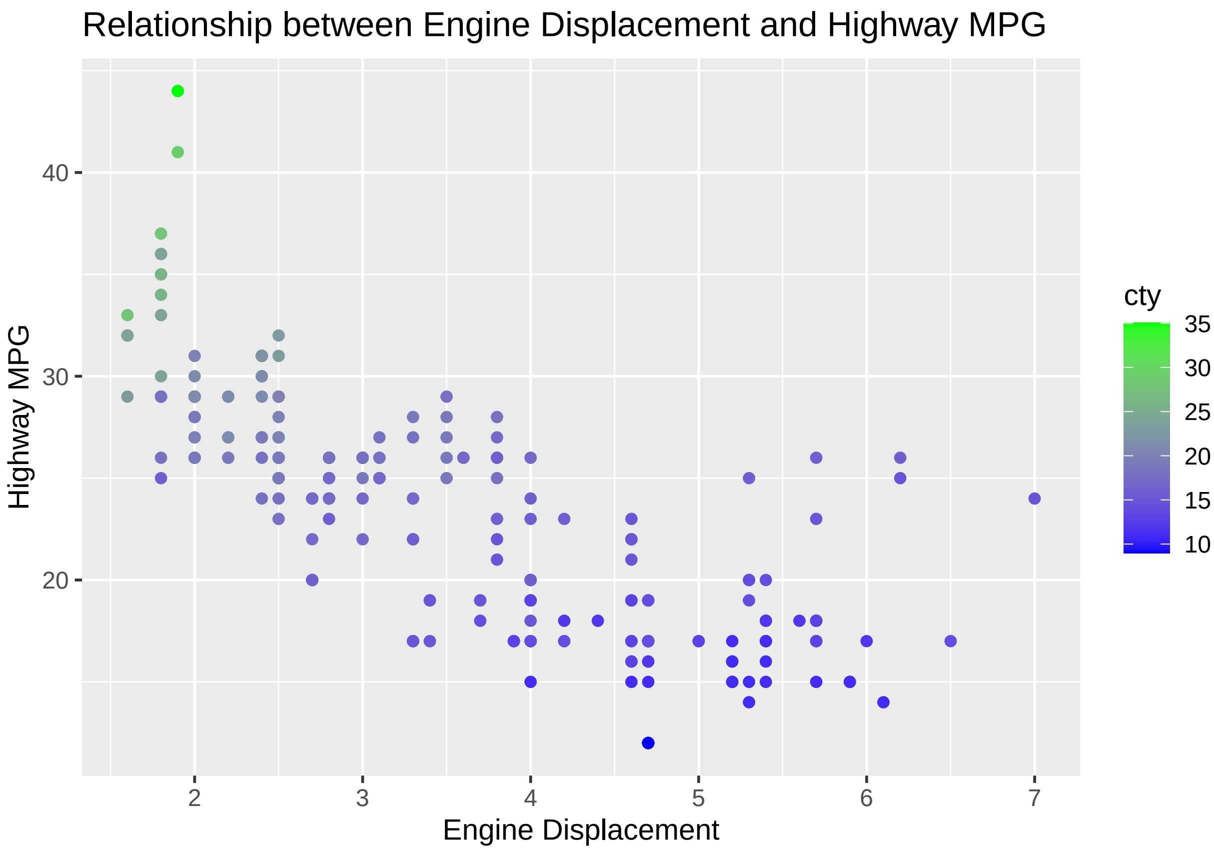


6. Plot the relationship between displ (engine displacement) and hwy(highway miles per gallon). Mapped it with a continuous variable you have identified in #1-c. What is its result? Why it produced such output?

-Engine displacement (displ) is plotted against highway miles per gallon (hwy) in a scatter plot, with a continuous variable represented across the points by the color gradient of city miles per gallon (cty).

-To visualize the difference in city MPG across the scatter plot, the color gradient based on city miles per gallon (cty) does not show a straight relationship with engine displacement and highway miles per gallon (displ and hwy).

```
library(ggplot2)
library(dplyr)

data(mpg)

ggplot(mpg, aes(x = displ, y = hwy, color = cty)) +
  geom_point() +
  labs(
    title = "Relationship between Engine Displacement and Highway MPG",
    x = "Engine Displacement",
    y = "Highway MPG"
  ) +
  scale_color_gradient(low = "blue", high = "green")
```



6. Import the traffic.csv onto your R environment.

```
traffic <- read_csv("traffic.csv")
```

```
## Rows: 48120 Columns: 4
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## dbl  (3): Junction, Vehicles, ID
## dttm (1): DateTime
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
head(traffic)
```

```
## # A tibble: 6 x 4
##   DateTime            Junction Vehicles          ID
##   <dttm>                 <dbl>    <dbl>       <dbl>
## 1 2015-11-01 00:00:00        1       15 20151101001
## 2 2015-11-01 01:00:00        1       13 20151101011
## 3 2015-11-01 02:00:00        1       10 20151101021
## 4 2015-11-01 03:00:00        1        7 20151101031
## 5 2015-11-01 04:00:00        1        9 20151101041
## 6 2015-11-01 05:00:00        1        6 20151101051
```

a. How many numbers of observation does it have? What are the variables of the traffic dataset the Show your answer.

```r
observation <- nrow(traffic)
variables <- names(traffic)

cat("Number of observations:", observation, "\n")
```

```
## Number of observations: 48120
```

```r
cat("The variables are:", variables, "\n")
```

```
## The variables are: DateTime Junction Vehicles ID
```

b. subset the traffic dataset into junctions. What is the R codes and its output?

```r
junctions1 <- subset(traffic, Junction == 1)
junctions2 <- subset(traffic, Junction == 2)
junctions3 <- subset(traffic, Junction == 3)
junctions4 <- subset(traffic, Junction == 4)

#The output are:
junctions1
```

```
## # A tibble: 14,592 x 4
##    DateTime            Junction Vehicles          ID
##    <dttm>                 <dbl>    <dbl>       <dbl>
##  1 2015-11-01 00:00:00        1       15 20151101001
##  2 2015-11-01 01:00:00        1       13 20151101011
##  3 2015-11-01 02:00:00        1       10 20151101021
##  4 2015-11-01 03:00:00        1        7 20151101031
##  5 2015-11-01 04:00:00        1        9 20151101041
##  6 2015-11-01 05:00:00        1        6 20151101051
##  7 2015-11-01 06:00:00        1        9 20151101061
##  8 2015-11-01 07:00:00        1        8 20151101071
##  9 2015-11-01 08:00:00        1       11 20151101081
## 10 2015-11-01 09:00:00        1       12 20151101091
## # i 14,582 more rows
```

```r
junctions2
```

```
## # A tibble: 14,592 x 4
##    DateTime            Junction Vehicles          ID
##    <dttm>                 <dbl>    <dbl>       <dbl>
##  1 2015-11-01 00:00:00        2        6 20151101002
##  2 2015-11-01 01:00:00        2        6 20151101012
##  3 2015-11-01 02:00:00        2        5 20151101022
##  4 2015-11-01 03:00:00        2        6 20151101032
##  5 2015-11-01 04:00:00        2        7 20151101042
##  6 2015-11-01 05:00:00        2        2 20151101052
##  7 2015-11-01 06:00:00        2        4 20151101062
##  8 2015-11-01 07:00:00        2        4 20151101072
##  9 2015-11-01 08:00:00        2        3 20151101082
## 10 2015-11-01 09:00:00        2        3 20151101092
## # i 14,582 more rows
```

```r
junctions3
```

```
## # A tibble: 14,592 x 4
##    DateTime            Junction Vehicles          ID
```

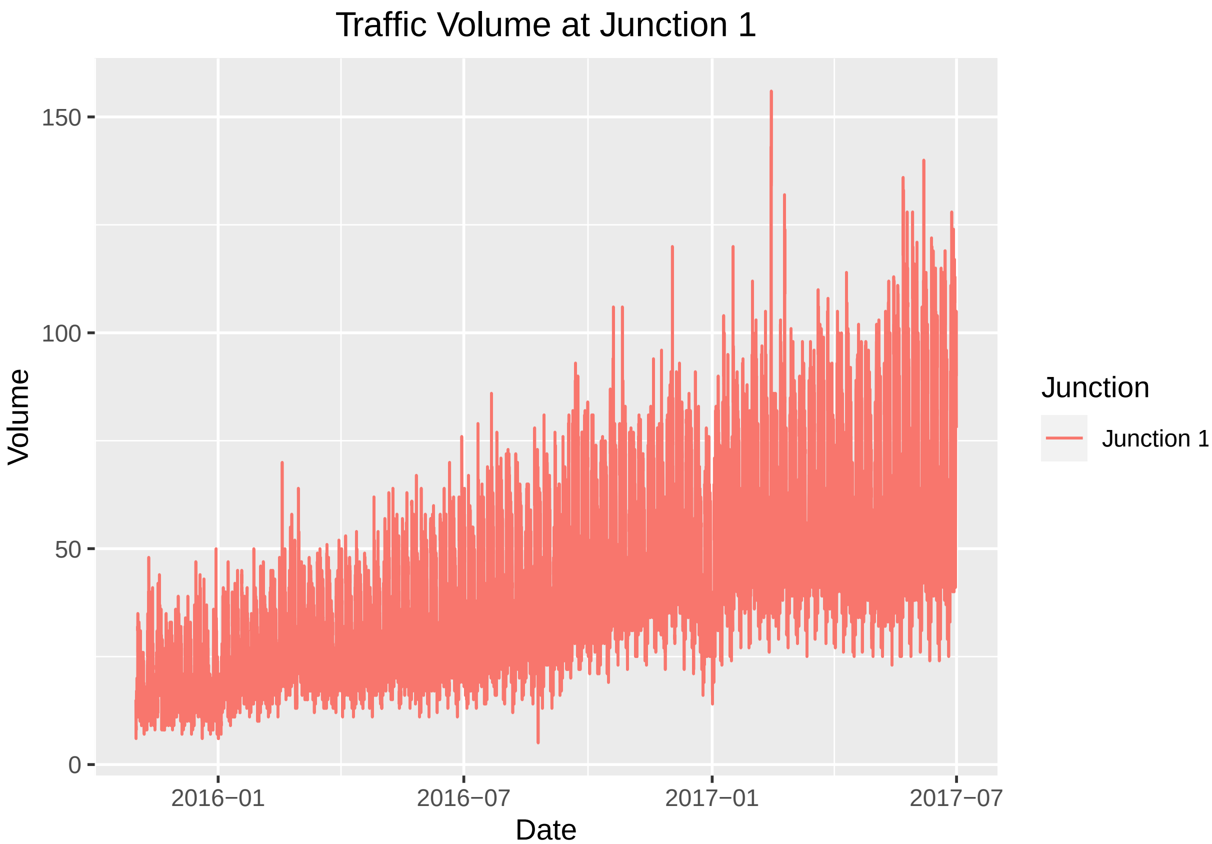
```
##    <dttm>                    <dbl>    <dbl>       <dbl>
##  1 2015-11-01 00:00:00        3        9 20151101003
##  2 2015-11-01 01:00:00        3        7 20151101013
##  3 2015-11-01 02:00:00        3        5 20151101023
##  4 2015-11-01 03:00:00        3        1 20151101033
##  5 2015-11-01 04:00:00        3        2 20151101043
##  6 2015-11-01 05:00:00        3        2 20151101053
##  7 2015-11-01 06:00:00        3        3 20151101063
##  8 2015-11-01 07:00:00        3        4 20151101073
##  9 2015-11-01 08:00:00        3        3 20151101083
## 10 2015-11-01 09:00:00        3        6 20151101093
## # i 14,582 more rows
```

```r
junctions4
```

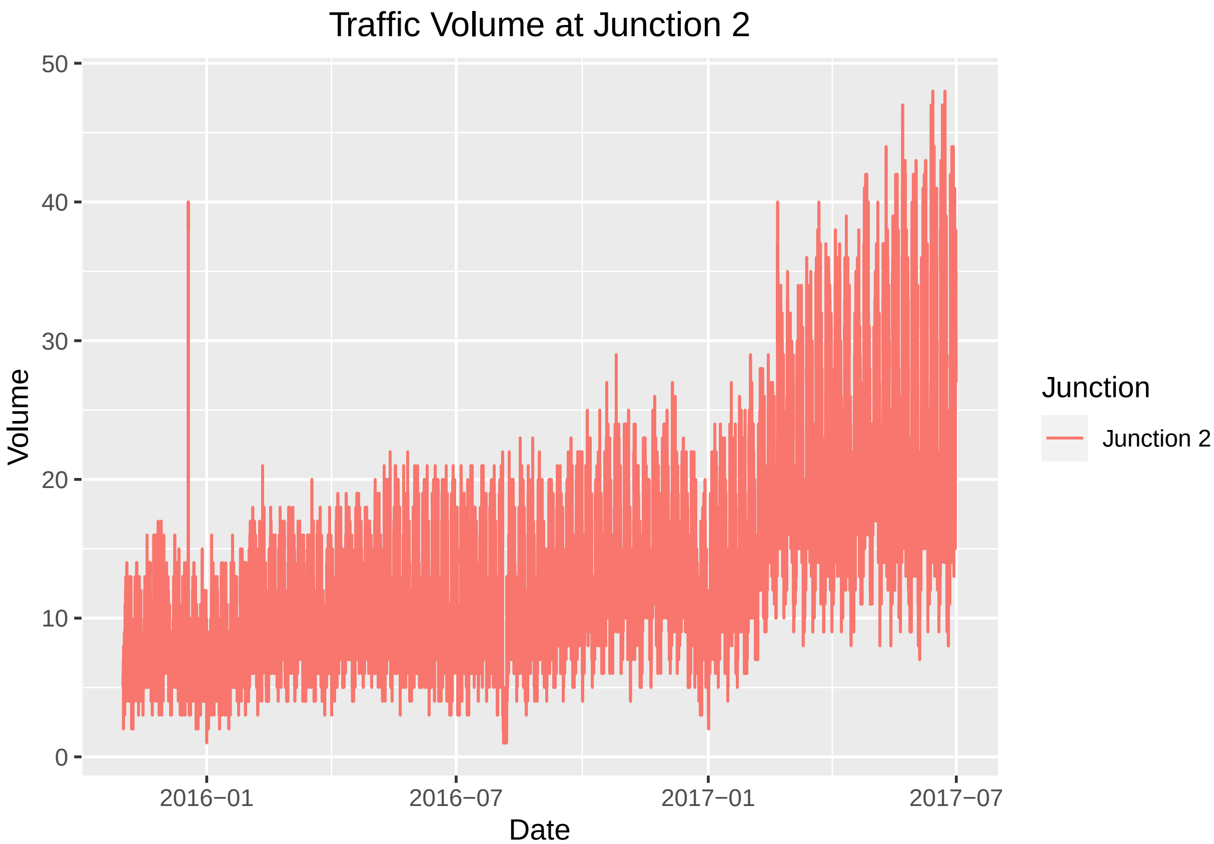
```
## # A tibble: 4,344 x 4
##    DateTime            Junction Vehicles          ID
##    <dttm>                 <dbl>    <dbl>       <dbl>
##  1 2017-01-01 00:00:00        4        3 20170101004
##  2 2017-01-01 01:00:00        4        1 20170101014
##  3 2017-01-01 02:00:00        4        4 20170101024
##  4 2017-01-01 03:00:00        4        4 20170101034
##  5 2017-01-01 04:00:00        4        2 20170101044
##  6 2017-01-01 05:00:00        4        1 20170101054
##  7 2017-01-01 06:00:00        4        1 20170101064
##  8 2017-01-01 07:00:00        4        4 20170101074
##  9 2017-01-01 08:00:00        4        4 20170101084
## 10 2017-01-01 09:00:00        4        2 20170101094
## # i 4,334 more rows
```

c. Plot each junction in a using geom_line(). Show your solution and output.

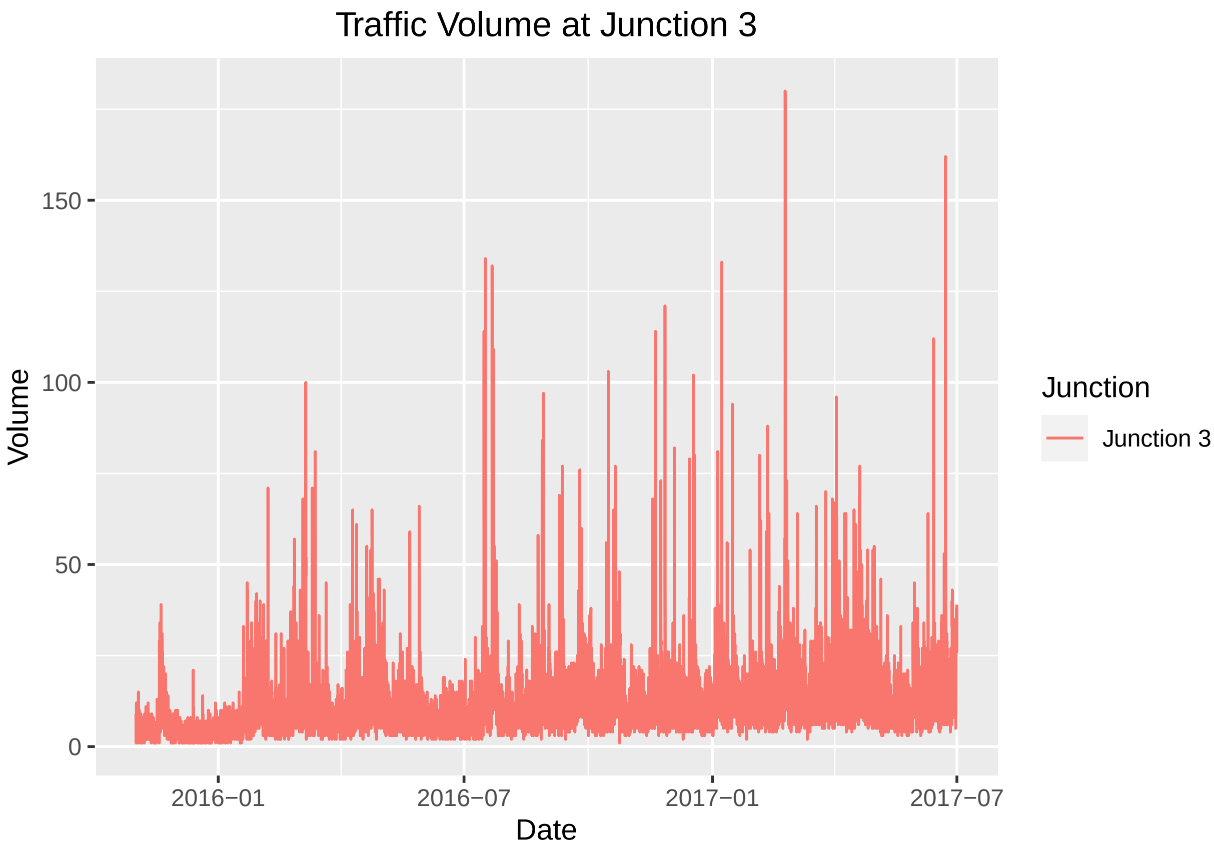
```r
# Junction 1
ggplot(junctions1, aes(x = DateTime, y = Vehicles, color = "Junction 1")) +
  geom_line() +
  labs(
    title = "Traffic Volume at Junction 1",
    x = "Date",
    y = "Volume"
  ) +
  scale_color_discrete(name = "Junction") +
 theme(plot.title = element_text(hjust = 0.5))
```



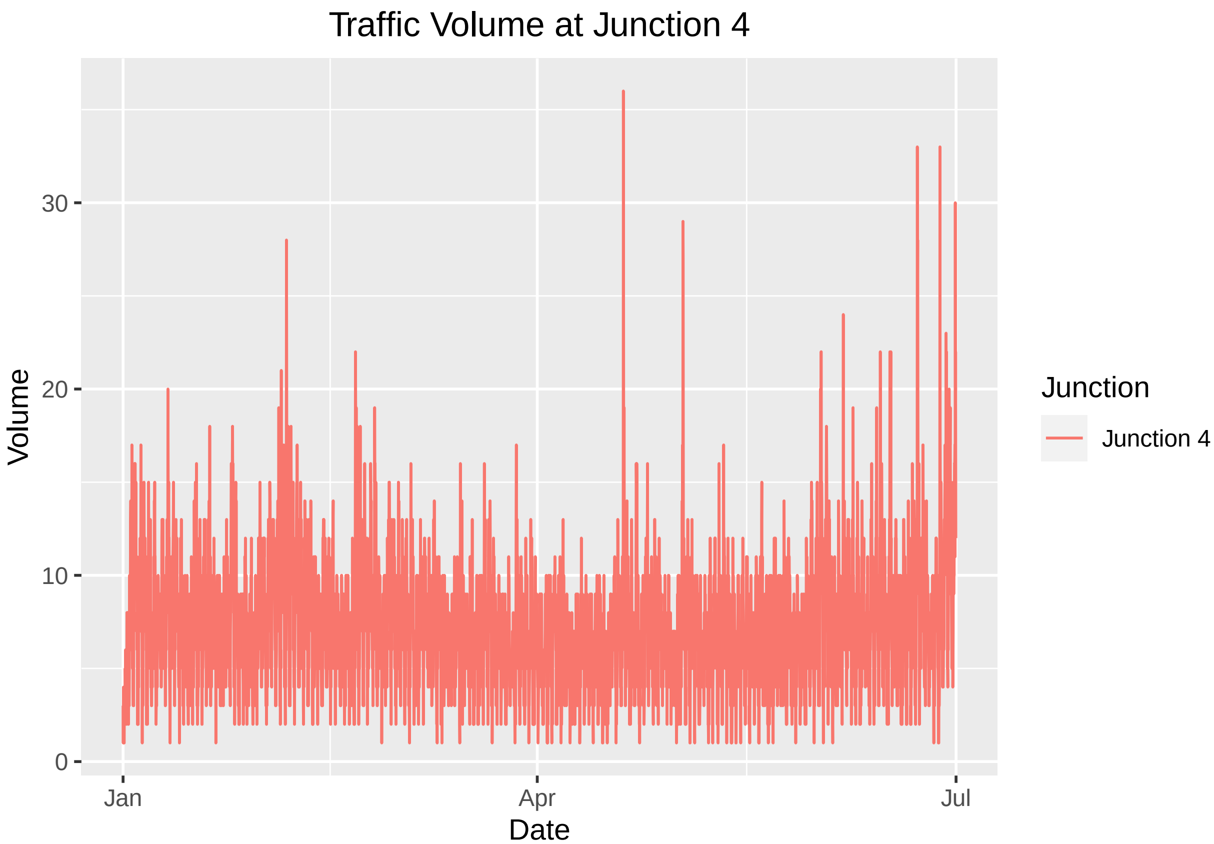

```r
#Junction 2
ggplot(junctions2, aes(x = DateTime, y = Vehicles, color = "Junction 2")) +
  geom_line() +
  labs(
    title = "Traffic Volume at Junction 2",
    x = "Date",
    y = "Volume"
  ) +
  scale_color_discrete(name = "Junction") +
  theme(plot.title = element_text(hjust = 0.5))
```




```r
#Junction 3
ggplot(junctions3, aes(x = DateTime, y = Vehicles, color = "Junction 3")) +
  geom_line() +
  labs(
    title = "Traffic Volume at Junction 3",
    x = "Date",
    y = "Volume"
  ) +
  scale_color_discrete(name = "Junction") +
 theme(plot.title = element_text(hjust = 0.5))
```




```r
#Junction 4
ggplot(junctions4, aes(x = DateTime, y = Vehicles, color = "Junction 4")) +
  geom_line() +
  labs(
    title = "Traffic Volume at Junction 4",
    x = "Date",
    y = "Volume"
  ) +
  scale_color_discrete(name = "Junction") +
  theme(plot.title = element_text(hjust = 0.5))
```



7.

```r
library(readxl)
alexa <- read_excel("alexa_file.xlsx")
head(alexa)
```

```
## # A tibble: 6 x 5
##   rating date                variation         verified_reviews      feedback
##    <dbl> <dttm>              <chr>             <chr>                    <dbl>
## 1      5 2018-07-31 00:00:00 Charcoal Fabric   Love my Echo!                1
## 2      5 2018-07-31 00:00:00 Charcoal Fabric   Loved it!                    1
## 3      4 2018-07-31 00:00:00 Walnut Finish     Sometimes while playi~       1
## 4      5 2018-07-31 00:00:00 Charcoal Fabric   I have had a lot of f~       1
## 5      5 2018-07-31 00:00:00 Charcoal Fabric   Music                        1
## 6      5 2018-07-31 00:00:00 Heather Gray Fabric I received the echo a~     1
```

a.

```r
observation <- nrow(alexa)
column <- ncol(alexa)

cat("Number of observations:", observation, "\n")
```

```
## Number of observations: 3150
```

```r
cat("Number of columns:", column, "\n")
```

```
## Number of columns: 5
```

```r
#The number of observations is 3,150 and The number of columns is 5.
```

b.

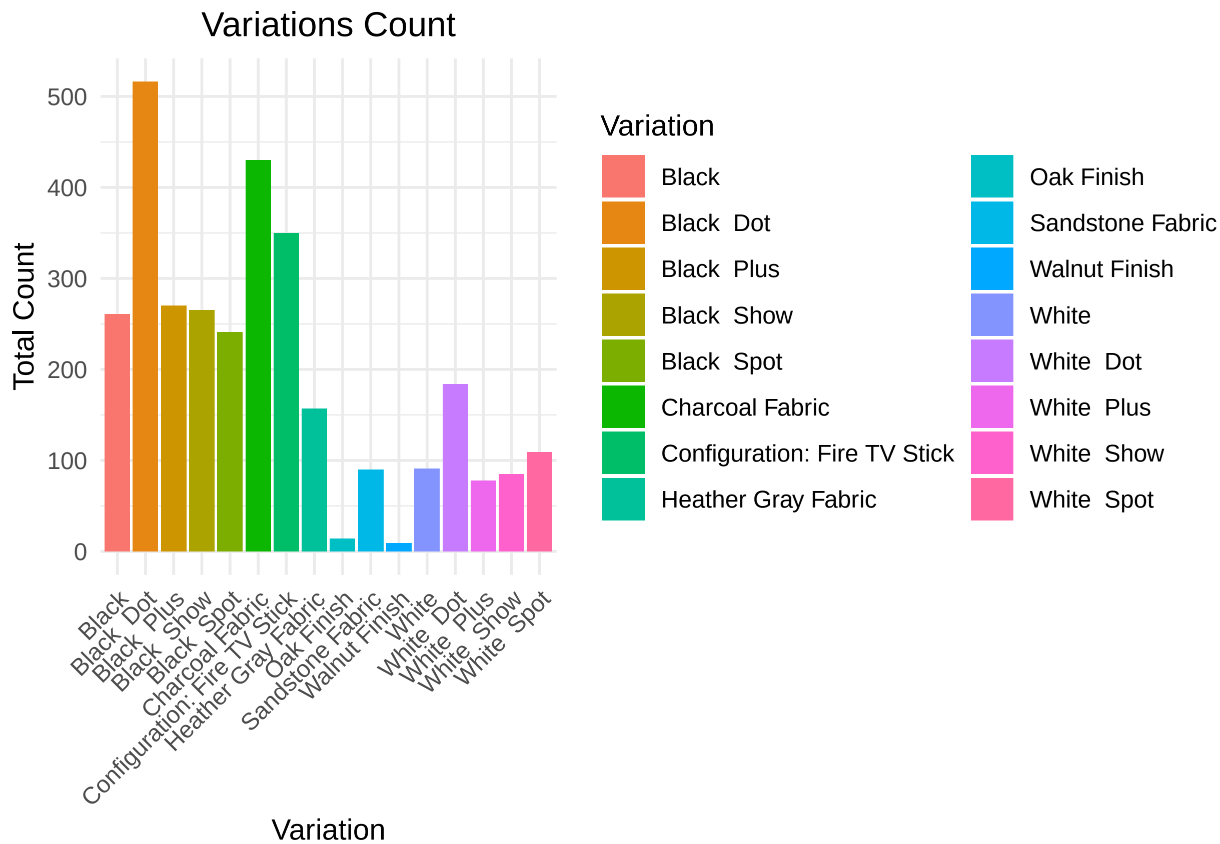
```r
library(dplyr)

vartot <- alexa %>%
  group_by(variation) %>%
  summarise(total_variations = n())

print(vartot)
```

```
## # A tibble: 16 x 2
##    variation                    total_variations
##    <chr>                                   <int>
##  1 Black                                     261
##  2 Black  Dot                                516
##  3 Black  Plus                               270
##  4 Black  Show                               265
##  5 Black  Spot                               241
##  6 Charcoal Fabric                           430
##  7 Configuration: Fire TV Stick              350
##  8 Heather Gray Fabric                       157
##  9 Oak Finish                                 14
## 10 Sandstone Fabric                           90
## 11 Walnut Finish                               9
## 12 White                                      91
## 13 White  Dot                                184
## 14 White  Plus                                78
## 15 White  Show                                85
## 16 White  Spot                               109
```

c. Plot the variations using the ggplot() function. What did you observe? Complete the details of the graph. Show solution and answer.

In order to help the user examine the plot, each variation's name and color are displayed, along with the total number of variations in this plot of the Alexa file. Compared to the others, the Black Dot variety is either more well-known or appears much more frequently. The legend, which is divided into two columns, makes it simple to understand which hue corresponds to each kind of variation.

```r
library(ggplot2)

varitot <- ggplot(vartot, aes(x = variation, y = total_variations, fill = variation)) +
  geom_bar(stat = "identity") +
  labs(title = "Variations Count",
       x = "Variation",
       y = "Total Count") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1)) +
  scale_fill_discrete(name = "Variation") +
  guides(fill = guide_legend(ncol = 2)) +
  theme(plot.title = element_text(hjust = 0.5))

print(varitot)
```

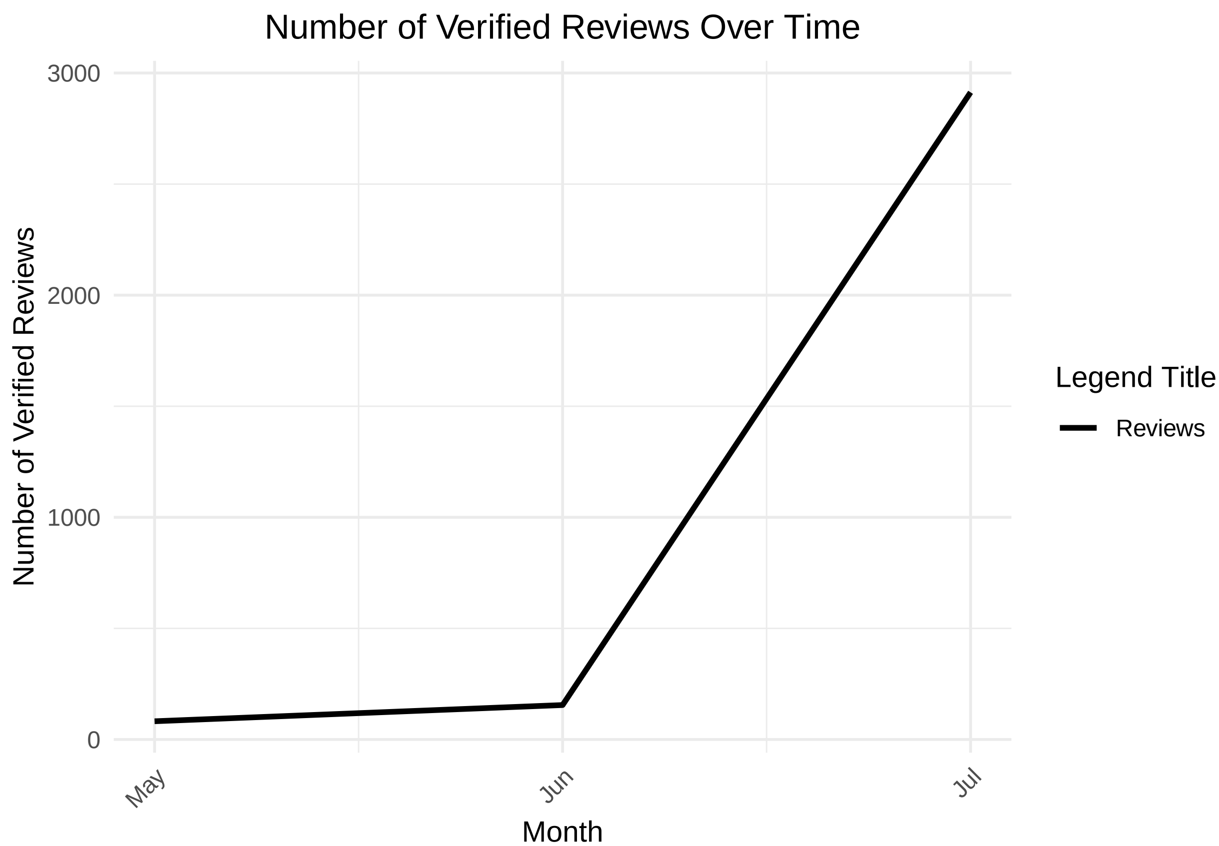


d.

```r
library(dplyr)
library(ggplot2)

alexa$date <- as.Date(alexa$date)
alexa$month <- format(alexa$date, "%m")

moCount <- alexa %>%
   count(month)

 kj <- ggplot(moCount, aes(x = as.integer(month), y = n, color = "Reviews")) +
  geom_line(size = 1) +
  labs(title = "Number of Verified Reviews Over Time",
       x = "Month",
       y = "Number of Verified Reviews",
       color = "Legend Title") +  # Change legend title
  scale_x_continuous(breaks = 1:12, labels = month.abb) +
  scale_color_manual(values = c("black"), labels = c("Reviews")) +
  theme_minimal() +
  theme(plot.title = element_text(hjust = 0.5),
        axis.text.x = element_text(angle = 45, hjust = 1))
```

```
## Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use `linewidth` instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```r
print(kj)
```



e.

```r
library(dplyr)
library(ggplot2)

varate <- alexa %>%
  group_by(variation) %>%
  summarize(avag_rating = mean(rating))
print(varate)
```

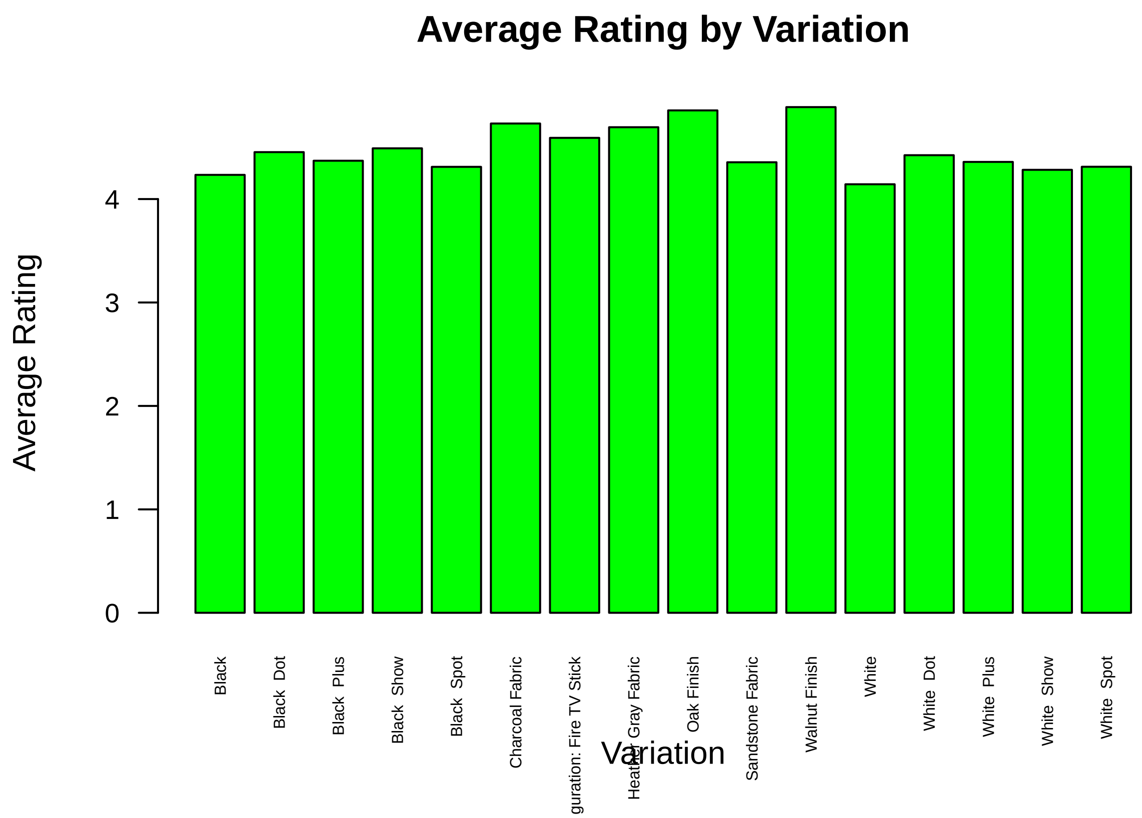
```
## # A tibble: 16 x 2
##    variation                    avag_rating
##    <chr>                              <dbl>
##  1 Black                               4.23
##  2 Black  Dot                          4.45
##  3 Black  Plus                         4.37
##  4 Black  Show                         4.49
##  5 Black  Spot                         4.31
##  6 Charcoal Fabric                     4.73
##  7 Configuration: Fire TV Stick        4.59
##  8 Heather Gray Fabric                 4.69
##  9 Oak Finish                          4.86
## 10 Sandstone Fabric                    4.36
## 11 Walnut Finish                       4.89
## 12 White                               4.14
## 13 White  Dot                          4.42
```

```
## 14 White  Plus                          4.36
## 15 White  Show                          4.28
## 16 White  Spot                          4.31
```

```r
high <- varate%>%
  filter(avag_rating == max(avag_rating))
print(high)
```

```
## # A tibble: 1 x 2
##   variation     avag_rating
##   <chr>               <dbl>
## 1 Walnut Finish        4.89
```

```r
varnim <- varate$variation
averate <- varate$avag_rating

barplot(averate, names.arg = varnim, col = "green",
        main = "Average Rating by Variation",
        xlab = "Variation", ylab = "Average Rating",
        cex.axis = 0.8, cex.names = 0.5, las = 2)
```




```r
top_variation <- varnim[which.max(averate)]
top_rating <- max(averate)

cat("The variation with the highest average rating is:", top_variation, "with an average rating of", top
```

```
## The variation with the highest average rating is: Walnut Finish with an average rating of 4.888889
```