RWorksheet_Castigador#4C

2023-11-22

#1a

```
  library(readr)
  empg <- 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`
```

```
  empg
```

```
## # A tibble: 234 x 12
##     ...1 manufacturer model      displ  year   cyl trans drv     cty   hwy fl
##    <dbl> <chr>        <chr>      <dbl> <dbl> <dbl> <chr> <chr> <dbl> <dbl> <chr>
##  1     1 audi         a4           1.8  1999     4 auto~ f        18    29 p
##  2     2 audi         a4           1.8  1999     4 manu~ f        21    29 p
##  3     3 audi         a4           2    2008     4 manu~ f        20    31 p
##  4     4 audi         a4           2    2008     4 auto~ f        21    30 p
##  5     5 audi         a4           2.8  1999     6 auto~ f        16    26 p
##  6     6 audi         a4           2.8  1999     6 manu~ f        18    26 p
##  7     7 audi         a4           3.1  2008     6 auto~ f        18    27 p
##  8     8 audi         a4 quattro   1.8  1999     4 manu~ 4        18    26 p
##  9     9 audi         a4 quattro   1.8  1999     4 auto~ 4        16    25 p
## 10    10 audi         a4 quattro   2    2008     4 manu~ 4        20    28 p
## # i 224 more rows
## # i 1 more variable: class <chr>
```

#1b

```
 str(empg)
```

```
## 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>
```

#1c

```
summary(empg)
```

```
##       ...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
```

#2 Which manufacturer has the most models in this data set? Which model has the most variations?

```
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
```

```
 models <- empg %>%
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
```

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

count <- empg %>%
group_by(model) %>%
summarise(variation = n()) %>%
arrange(desc(variation))

print(count)
```

```
## # 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
```

```
#The models with most variation is caravan 2wd
```

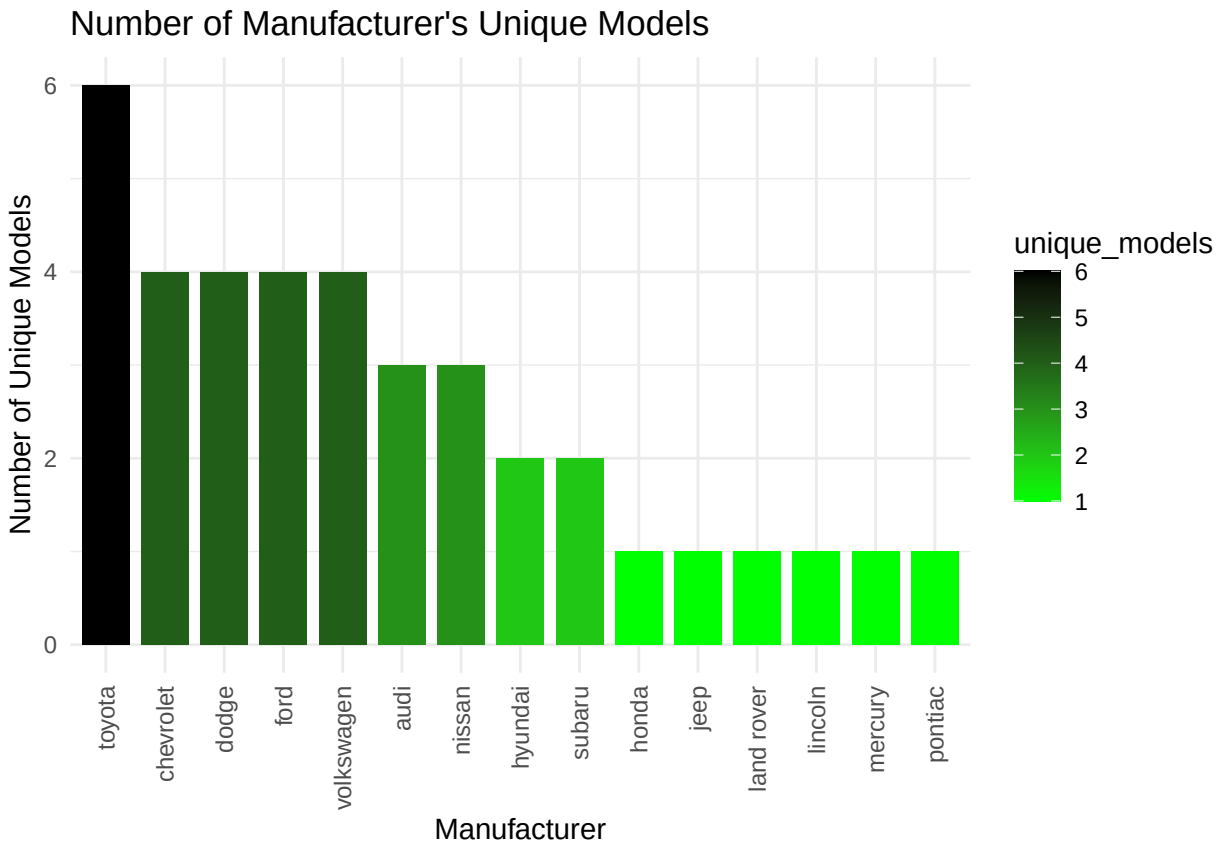
#2a A Group the manufacturers and find the unique models.

```
library(dplyr)

manu_model <- empg %>%
 group_by(manufacturer) %>%
 summarise(unique_models = n_distinct(model))

print(manu_model)
```

```
## # 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 Graph the result by using plot() and ggplot().

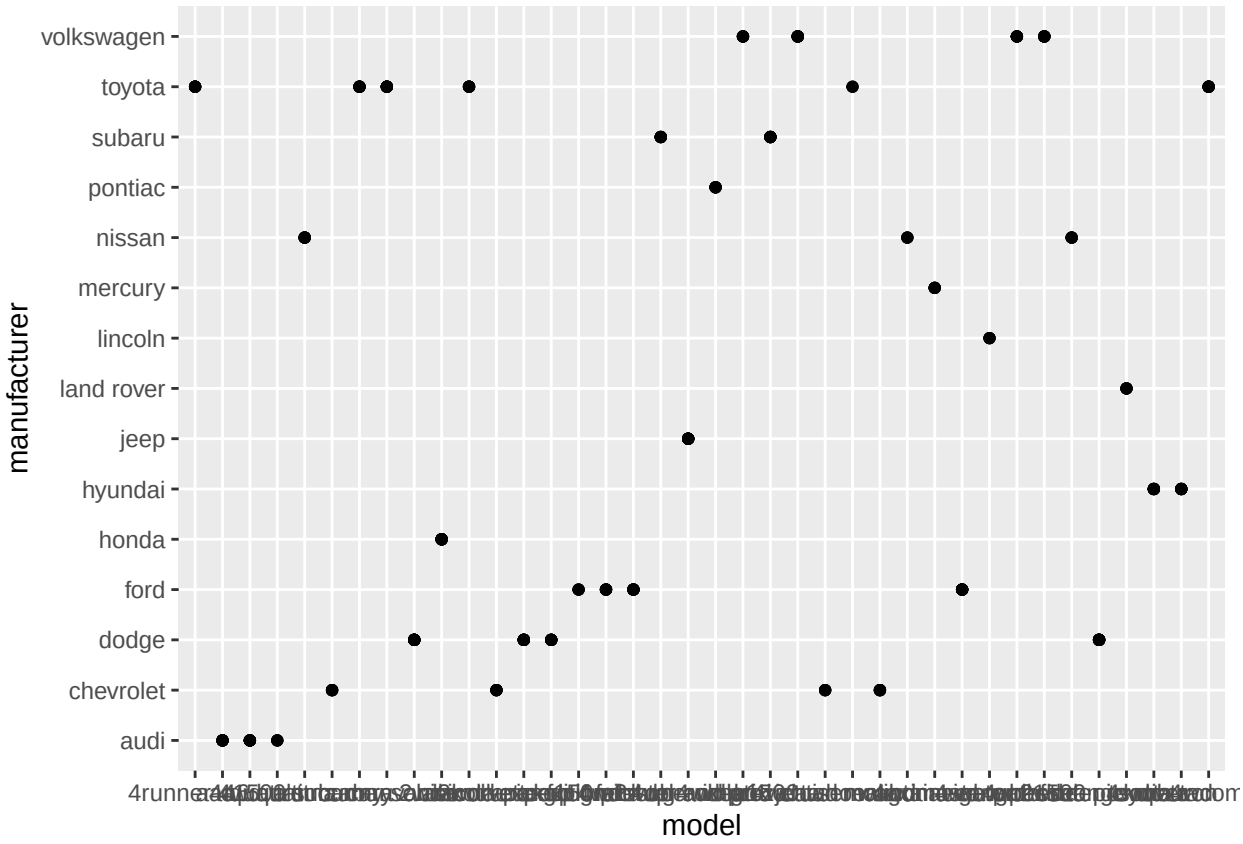
```
library(ggplot2)

plot(ggplot(manu_model, aes(x = reorder(manufacturer, -unique_models), y = unique_models, fill = unique_
 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 = "green", high = "black") +
 theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)))
```



#2 Same dataset will be used. You are going to show the relationship of the model and the manufacturer #A. What does ggplot(mpg, aes(model, manufacturer)) + geom_point() show?

#Interpret: This generate 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.

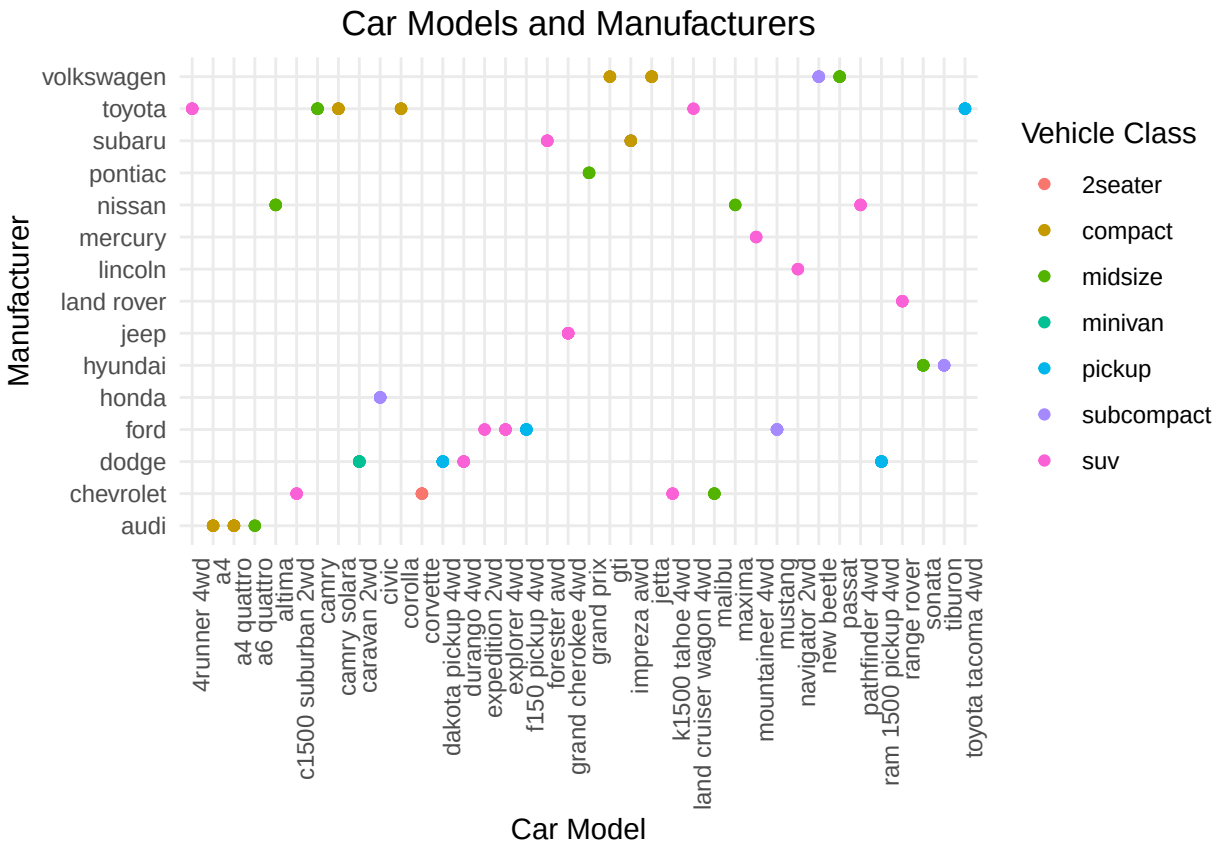
```
ggplot(empg, aes(model, manufacturer)) + geom_point()
```



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

#Answer: No, the provided code is merely a basic framework. 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.

```
# code
ggplot(empg, 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 Plot the model and the year using ggplot(). Use only the top 20 observations.

```
library(ggplot2)
library(dplyr)

data(empg)
```

```
## Warning in data(empg): data set 'empg' not found
```

```
mean_displ_df <- empg %>%
 group_by(year, model) %>%
 summarise(mean_displ = mean(displ)) %>%
 arrange(desc(mean_displ)) %>%
 filter(row_number() < 20)
```

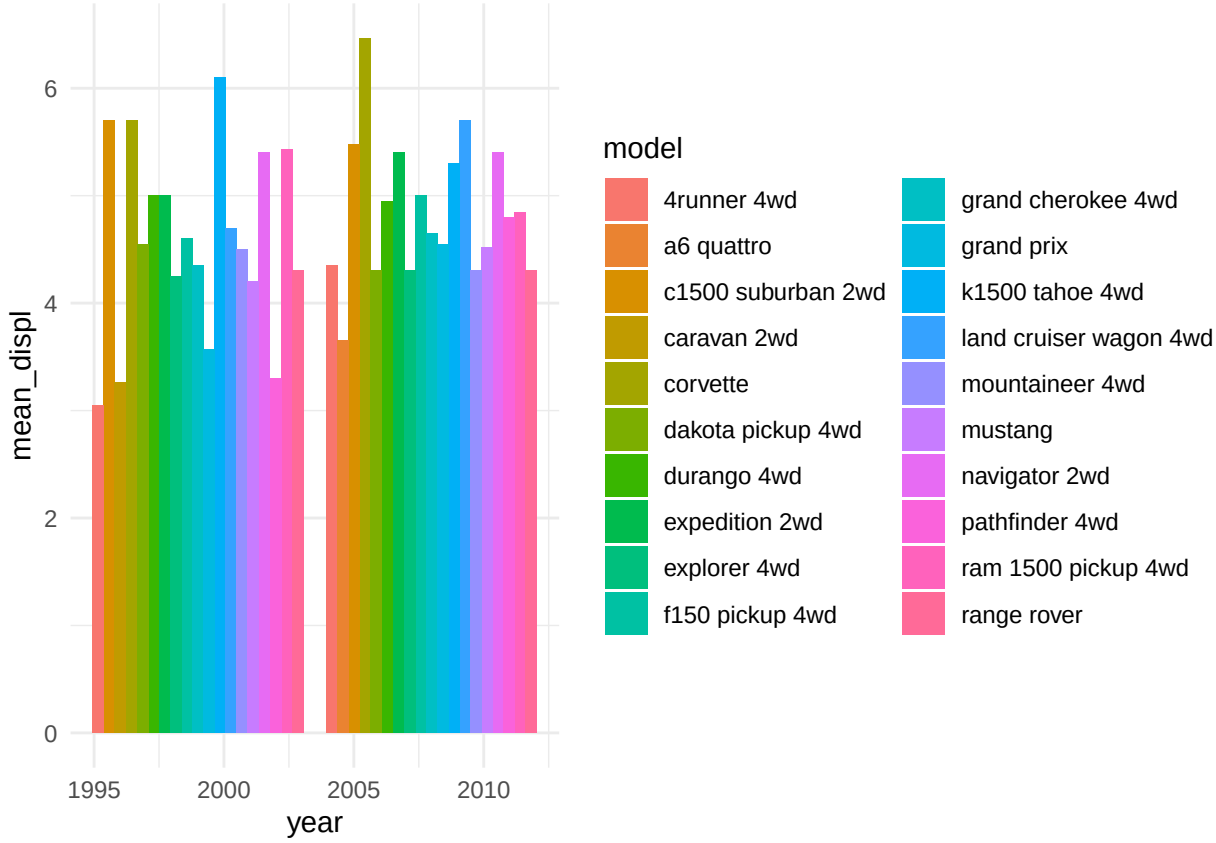
```
## `summarise()` has grouped output by 'year'. You can override using the
## `.groups` argument.
```

```
plot <- ggplot(mean_displ_df, aes(x = year, y = mean_displ, 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(empg)
```

```
## Warning in data(empg): data set 'empg' not found
```

```
carcount_permodel <- empg %>%
  group_by(model) %>%
  summarise(num_cars = n())


print(carcount_permodel)
```

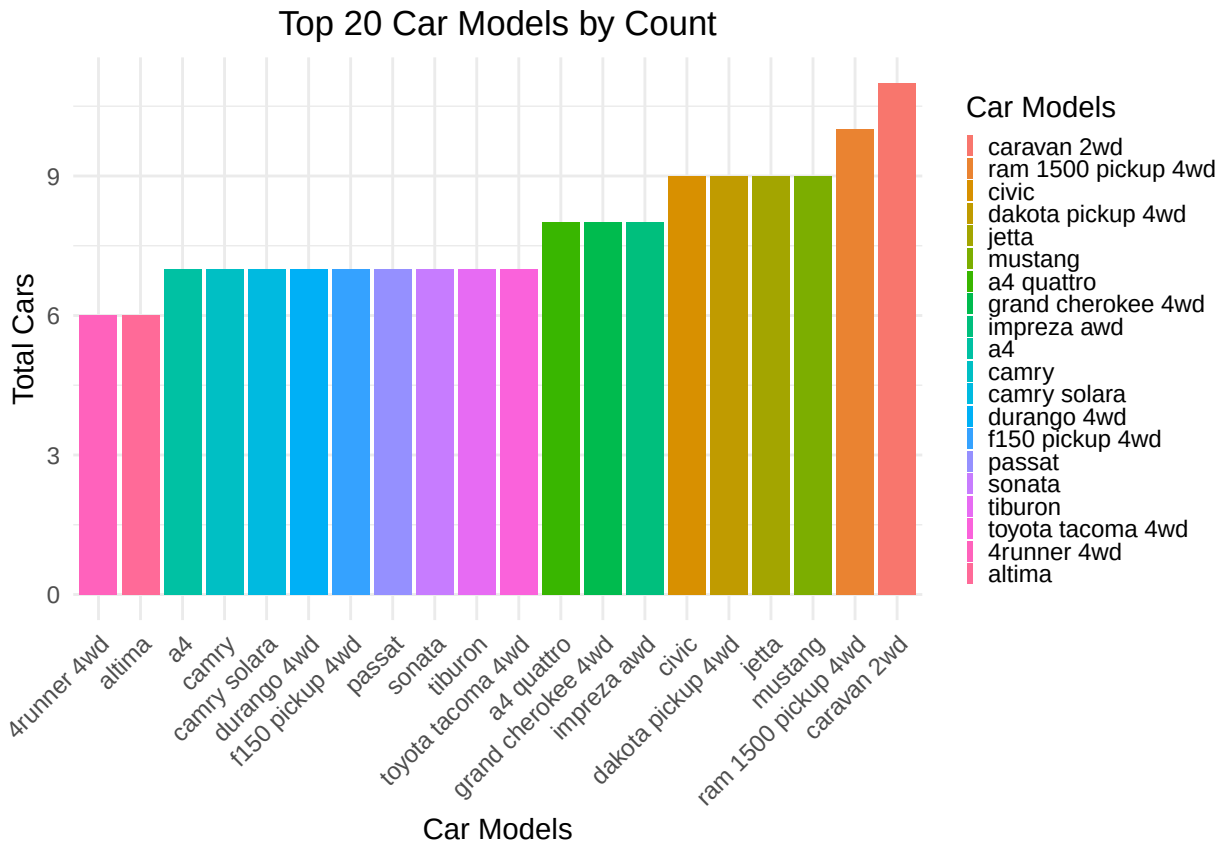
```
## # A tibble: 38 x 2
##    model              num_cars
##    <chr>                 <int>
##  1 4runner 4wd               6
##  2 a4                        7
##  3 a4 quattro                8
##  4 a6 quattro                3
##  5 altima                    6
##  6 c1500 suburban 2wd        5
##  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.

```
library(ggplot2)
library(dplyr)

data(empg)
```

```
## Warning in data(empg): data set 'empg' not found
```

```
summary_data <- empg %>%
  count(model) %>%
  arrange(desc(n)) %>%
  slice(1:20)

top_models <- summary_data$model
palette <- scales::hue_pal()(length(top_models))

summary_data <- summary_data %>%
  mutate(color = palette[match(model, top_models)])

ggplot(summary_data, 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 = summary_data$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)
  )
```



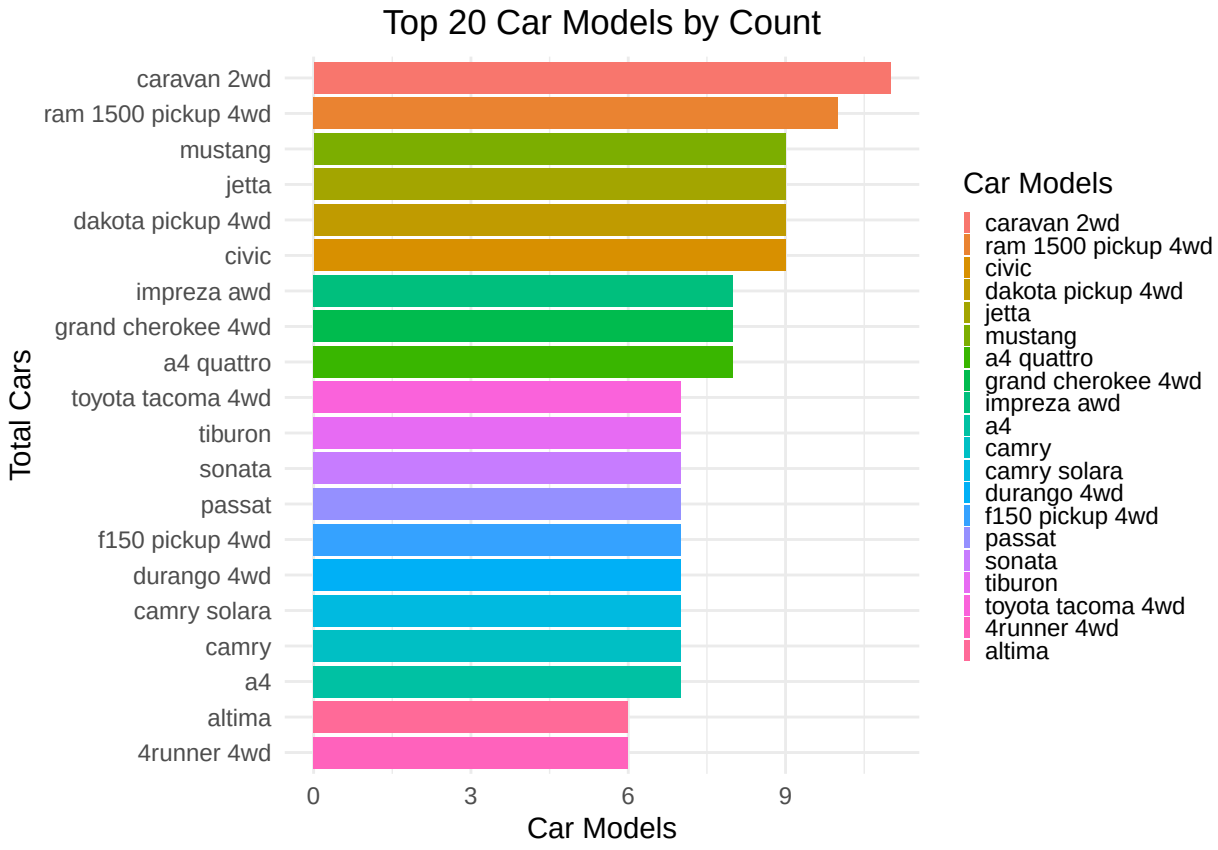
#b Plot using the geom_bar() + coord_flip() just like what is shown below.

```
library(ggplot2)
library(dplyr)

data(empg)
```

```
## Warning in data(empg): data set 'empg' not found
```

```
summary_data <- empg %>%
  count(model) %>%
  arrange(desc(n)) %>%
  slice(1:20)


top_models <- summary_data$model
palette <- scales::hue_pal()(length(top_models))

summary_data <- summary_data %>%
  mutate(color = palette[match(model, top_models)])

ggplot(summary_data, 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 = summary_data$model) +
```

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

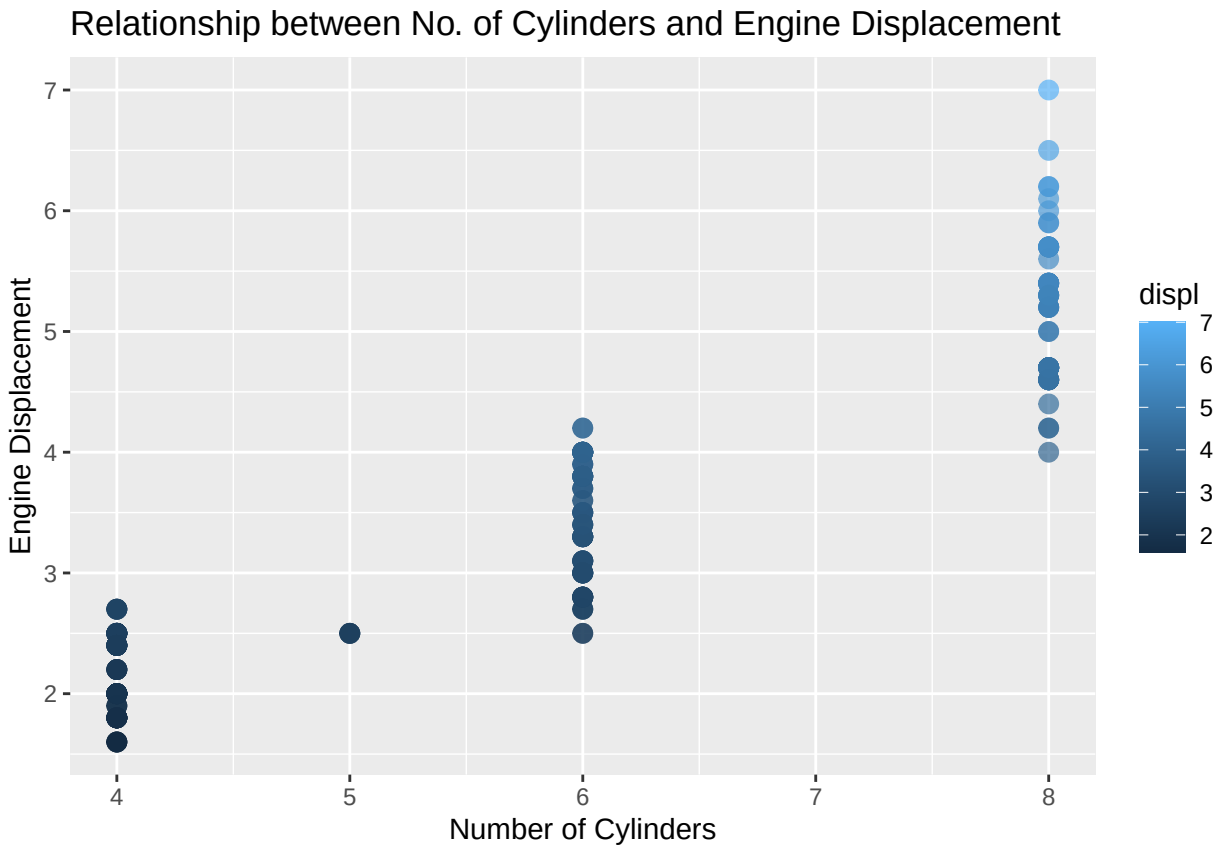


#5 Plot the relationship between cyl - number of cylinders and displ - engine displacement using geom_point with aesthetic color = engine displacement. Title should be "Relationship between No. of Cylinders and Engine Displacement".

```
library(ggplot2)
library(dplyr)

data(empg)
```

```
## Warning in data(empg): data set 'empg' not found
```

```
ggplot(empg, 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.

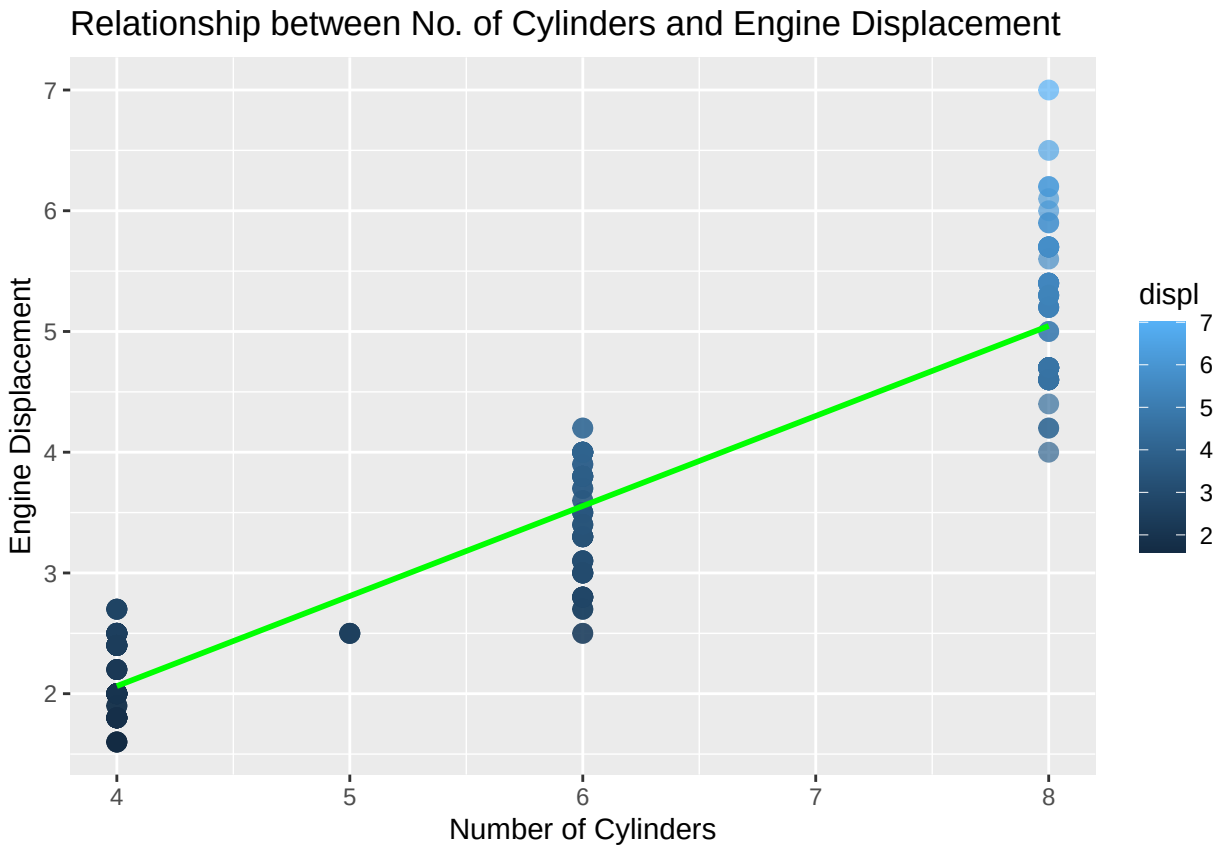
Describe: Using the line regression to visualize the relationship of the No. of cyl and displ so as the number of cylinders goes up, the engine size tends to increase too.

```
library(ggplot2)
library(dplyr)

data(empg)
```

```
## Warning in data(empg): data set 'empg' not found
```

```
ggplot(empg, aes(x = cyl, y = displ, color = displ)) +
  geom_point(size = 3, alpha = 0.7) +
  geom_smooth(method = "lm", se = FALSE, color = "green") +
  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?

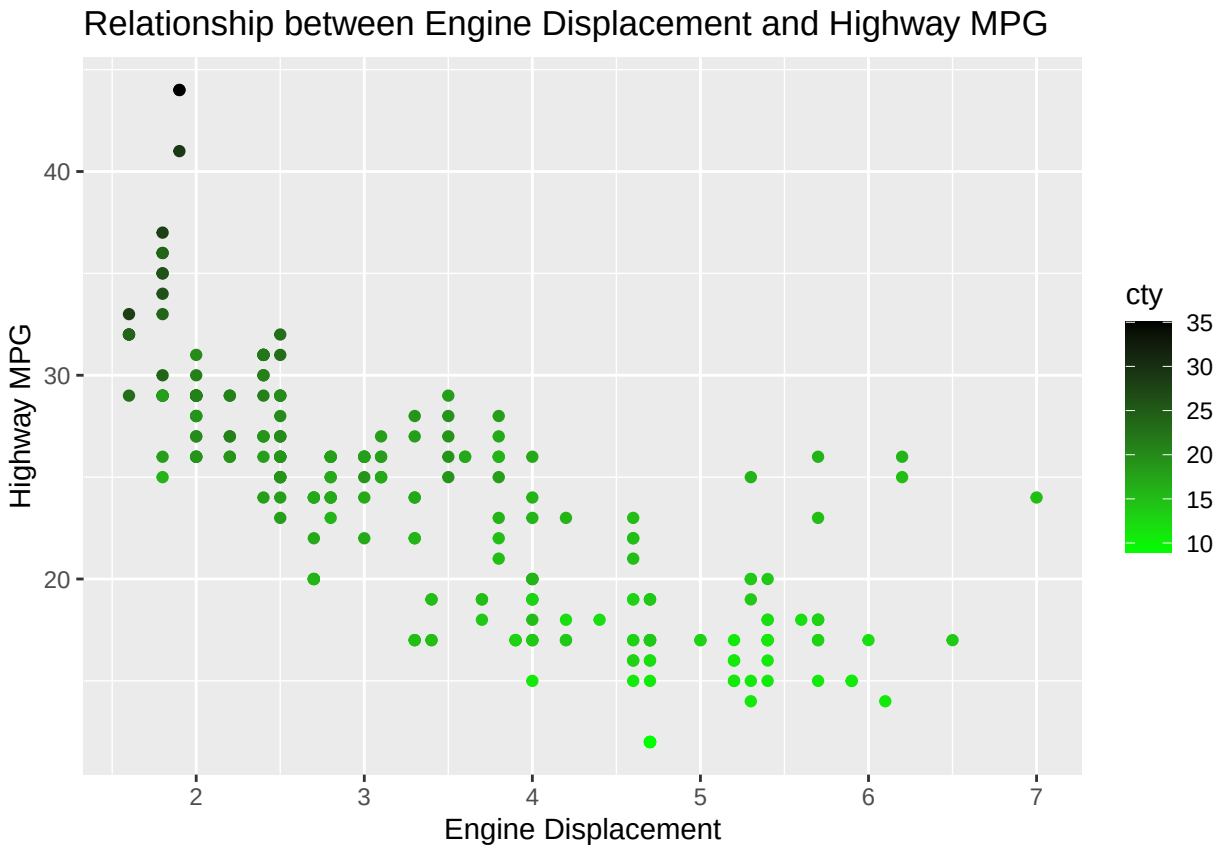
Answer: The scatter plot displays engine displacement (displ) against highway miles per gallon (hwy), while using the color gradient of city miles per gallon (cty) to represent a continuous variable across the points.

Answer: The color gradient based on city miles per gallon (cty) doesn't indicate a direct relationship with engine displacement and highway miles per gallon (displ and hwy), serving instead to visualize the variation in city MPG across the scatter plot.

```
library(ggplot2)
library(dplyr)

data(empg)
```

```
## Warning in data(empg): data set 'empg' not found
```

```
ggplot(empg, 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 = "green", high = "black")
```



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
observations <- nrow(traffic)
variables <- names(traffic)

cat("Number of observations:", observations, "\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
```

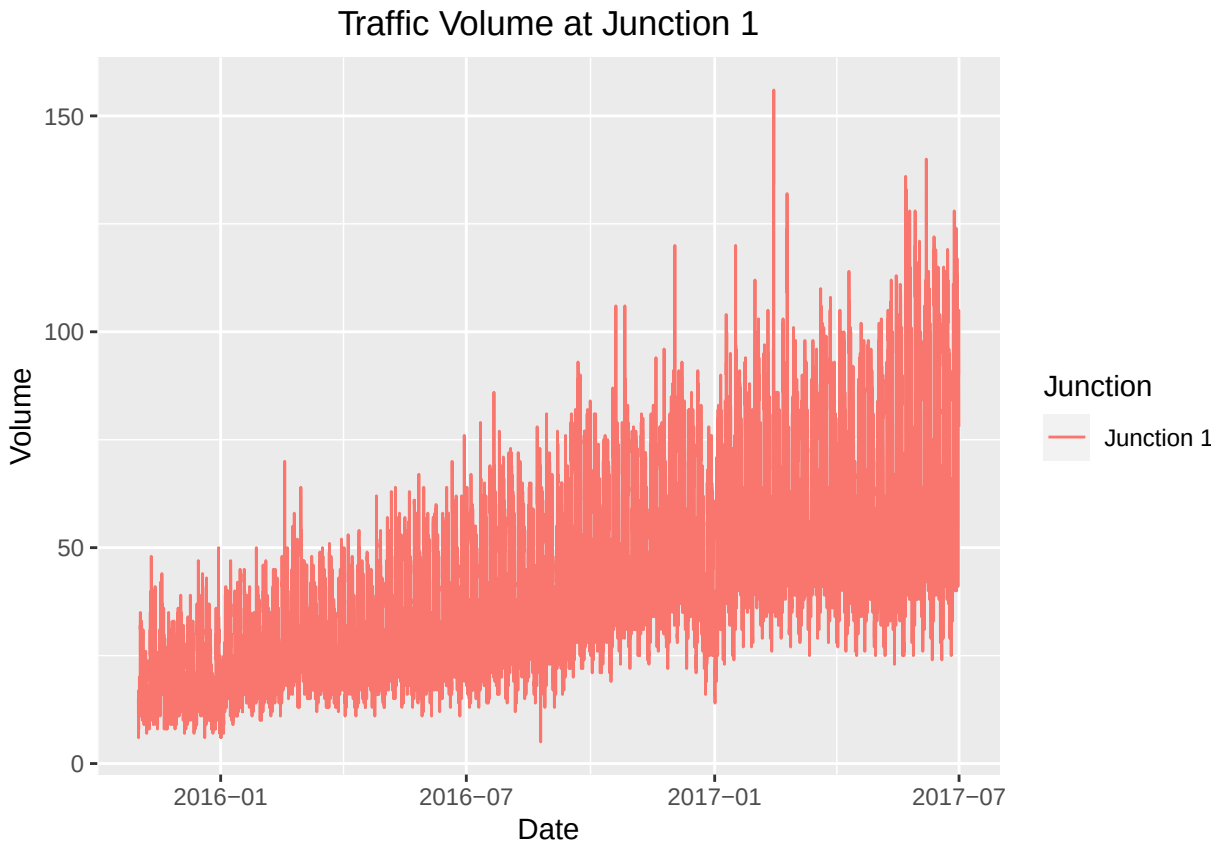
```
##    <dttm>                <dbl>    <dbl>       <dbl>
##  1 2015-11-01 00:00:00       3        9 20151101003
##  2 2015-11-01 01:00:00       3        7 20151101013
##  3 2015-11-01 02:00:00       3        5 20151101023
##  4 2015-11-01 03:00:00       3        1 20151101033
##  5 2015-11-01 04:00:00       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
```

```
junctions4
```

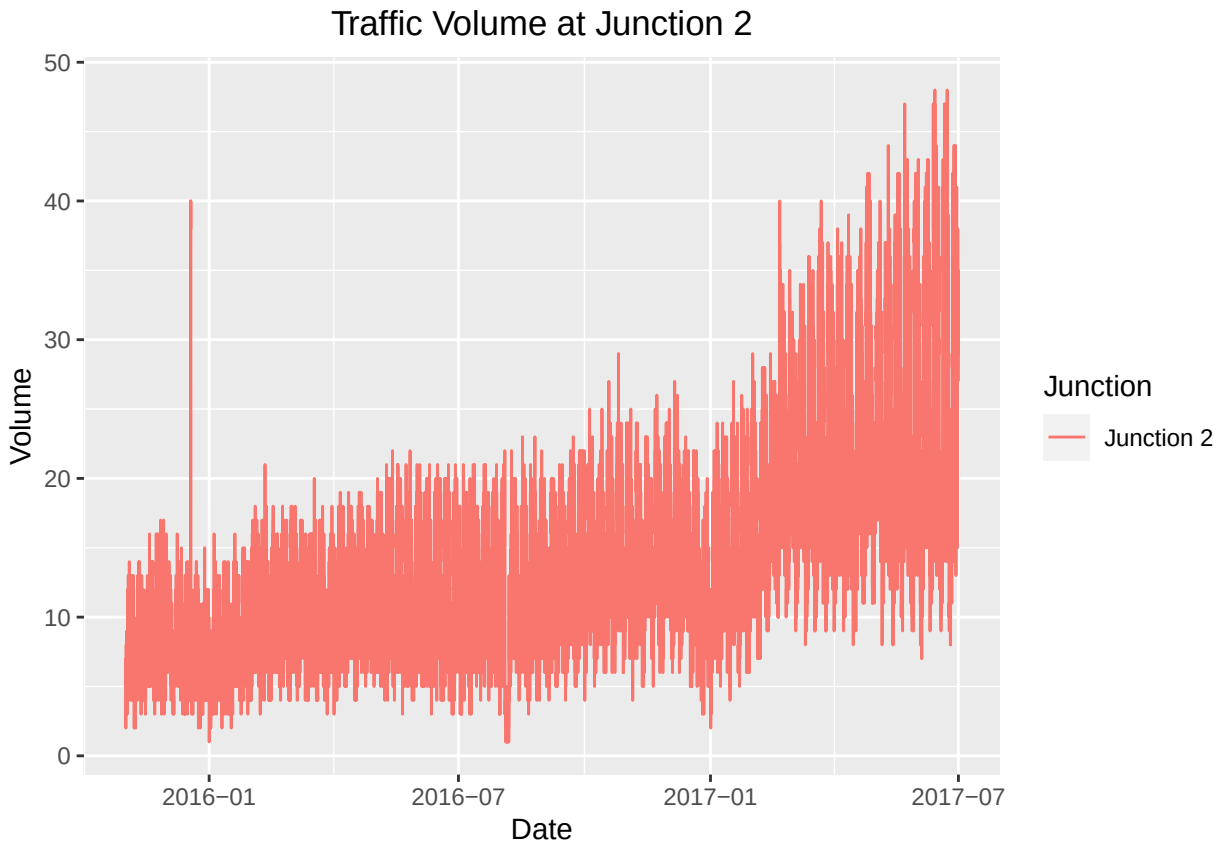
```
## # A tibble: 4,344 x 4
##    DateTime            Junction Vehicles          ID
##    <dttm>                 <dbl>    <dbl>       <dbl>
##  1 2017-01-01 00:00:00        4        3 20170101004
##  2 2017-01-01 01:00:00        4        1 20170101014
##  3 2017-01-01 02:00:00        4        4 20170101024
##  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.

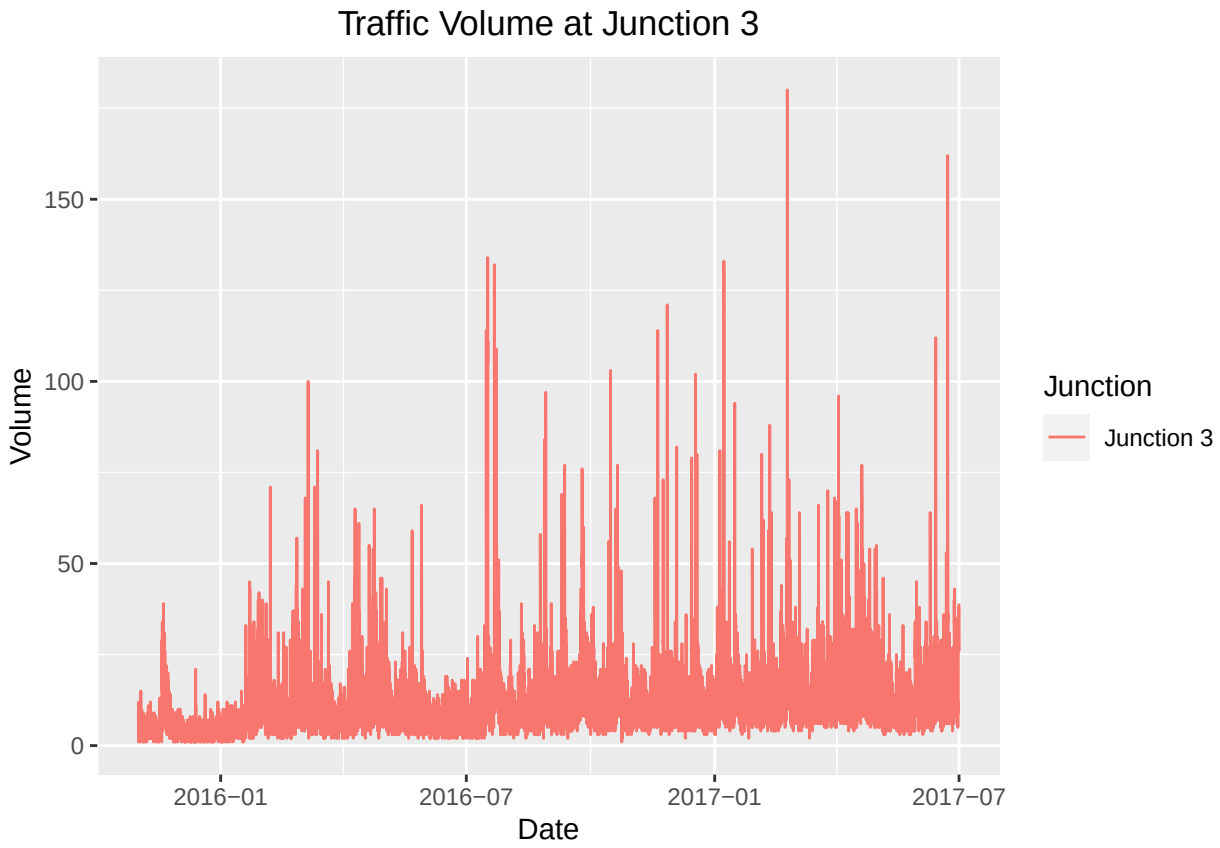
```
# Junction 1
ggplot(junctions1, aes(x = DateTime, y = Vehicles, color = "Junction 1")) +
  geom_line() +
  labs(
    title = "Traffic Volume at Junction 1",
    x = "Date",
    y = "Volume"
  ) +
  scale_color_discrete(name = "Junction") +
 theme(plot.title = element_text(hjust = 0.5))
```



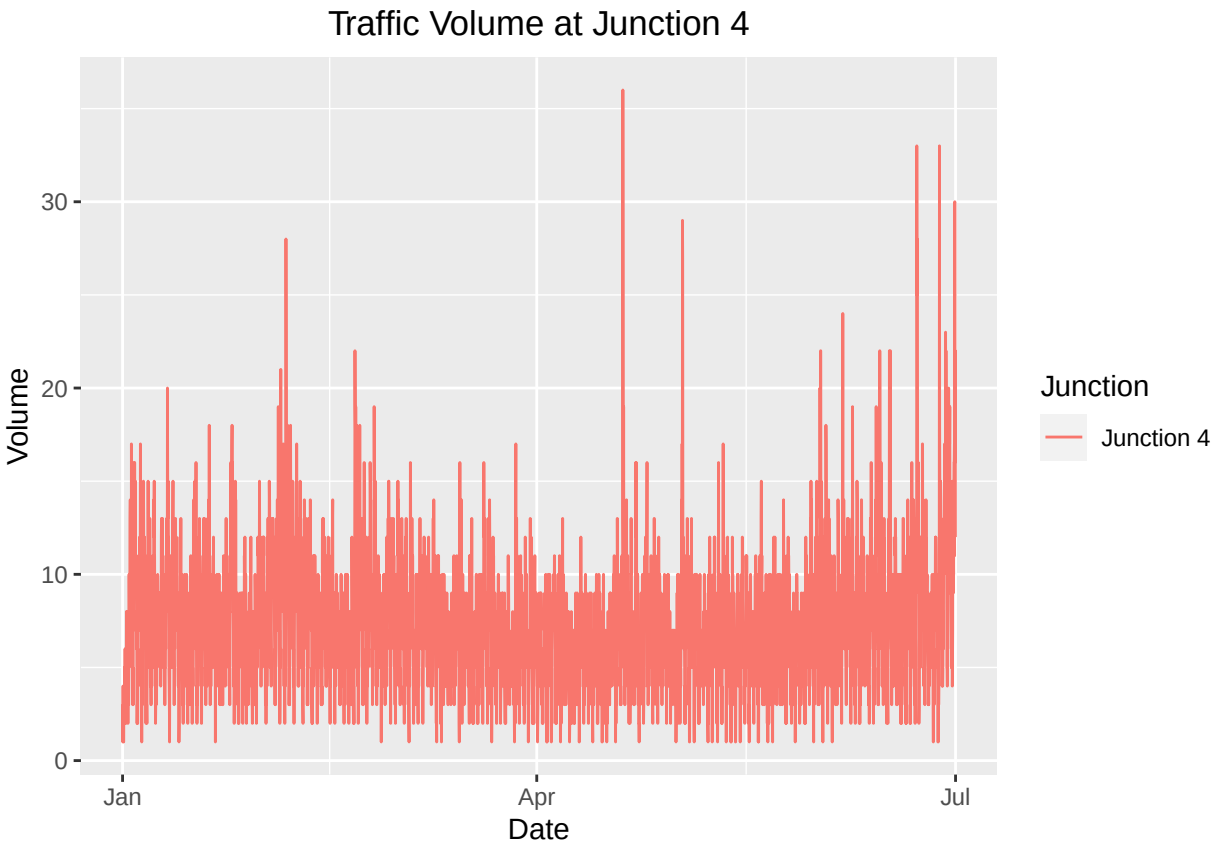

```r
#Junction 2
ggplot(junctions2, aes(x = DateTime, y = Vehicles, color = "Junction 2")) +
  geom_line() +
  labs(
    title = "Traffic Volume at Junction 2",
    x = "Date",
    y = "Volume"
  ) +
  scale_color_discrete(name = "Junction") +
  theme(plot.title = element_text(hjust = 0.5))
```




```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. From alexa_file.xlsx, import it to your environment

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

```
## # 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. How many observations does alexa_file has? What about the number of columns? Show your solution and answer.

```
observations <- nrow(alexa_file)
columns <- ncol(alexa_file)

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

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

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

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

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

b. group the variations and get the total of each variations. Use dplyr package. Show solution and answer.

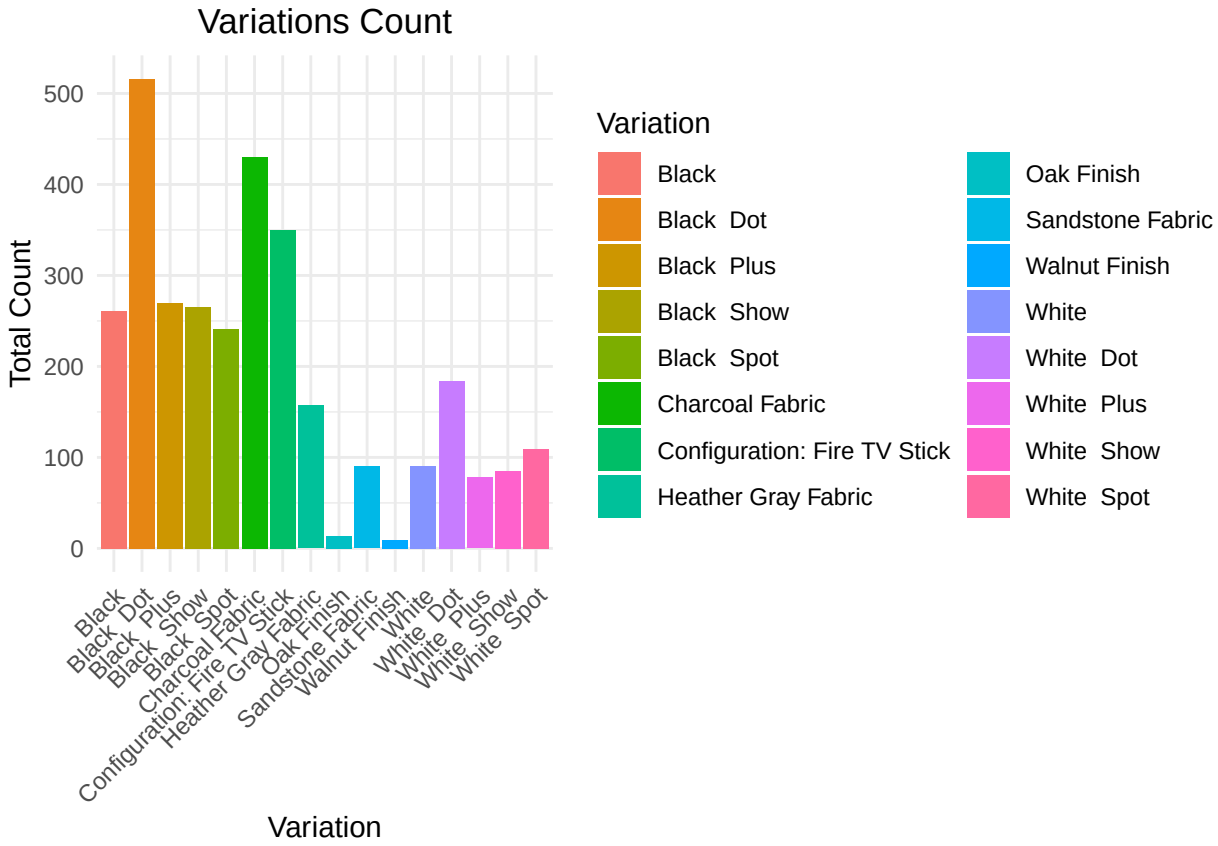
```
library(dplyr)

result <- alexa_file %>%
  group_by(variation) %>%
  summarise(total_variations = n())

print(result)
```

```
## # 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.

Answer: This plot is the variations of the Alexa File showing each variation name with color to guide for the viewer to analyze this plot also this include the total of each variation. The variation called Black Dot is more known or shows up a lot more often than the others. The legend,this split into two columns, helps easily see which color represents each type of variation.

```
library(ggplot2)

var <- ggplot(result, 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(var)
```



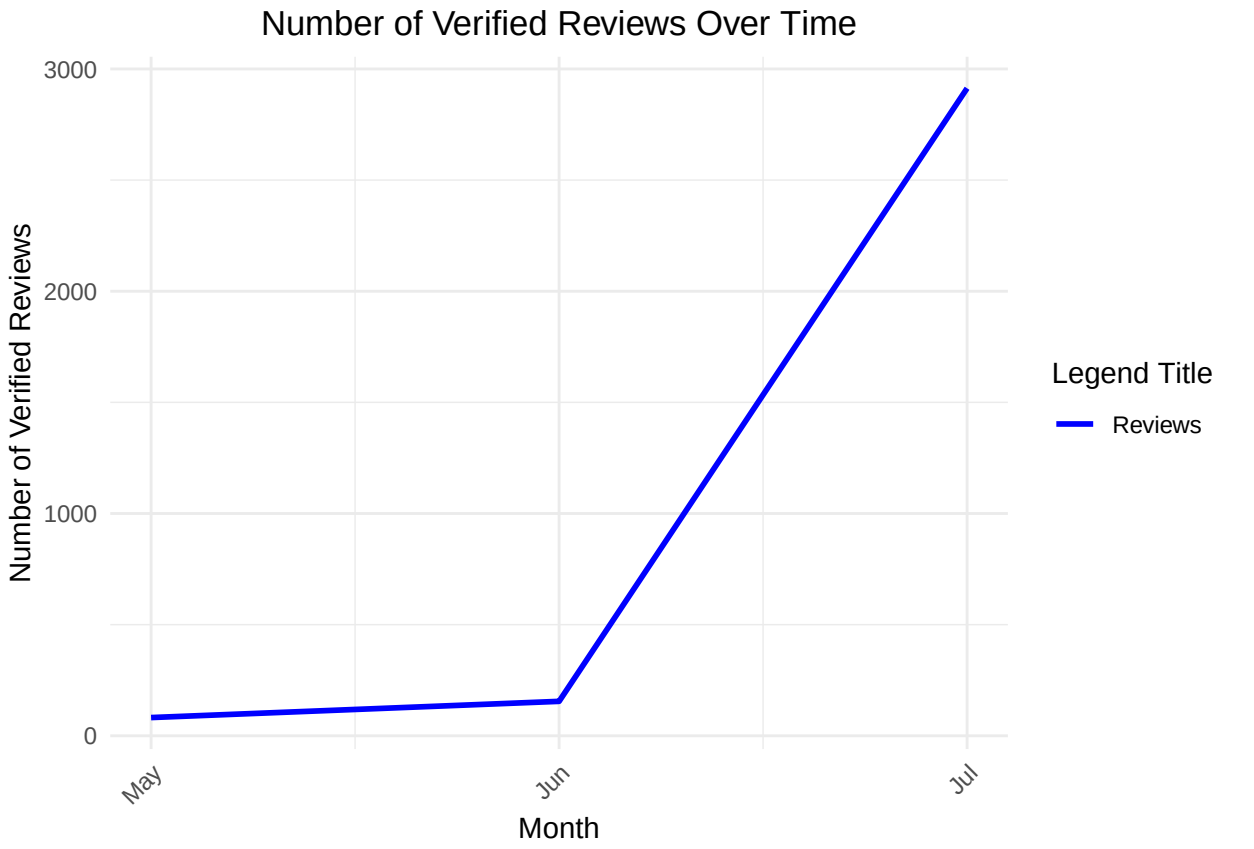
d. Plot a geom_line() with the date and the number of verified reviews. Complete the details of the graphs. Show your answer and solution.

```
library(dplyr)
library(ggplot2)

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

monthcount <- alexa_file %>%
   count(month)

 p <- ggplot(monthcount, 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("blue"), 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.
```

```
print(p)
```



e. Get the relationship of variations and ratings. Which variations got the most highest in rating? Plot a graph to show its relationship. Show your solution and answer.

```
library(dplyr)
library(ggplot2)

variation_ratings <- alexa_file %>%
  group_by(variation) %>%
  summarize(avg_rating = mean(rating))
print(variation_ratings)
```

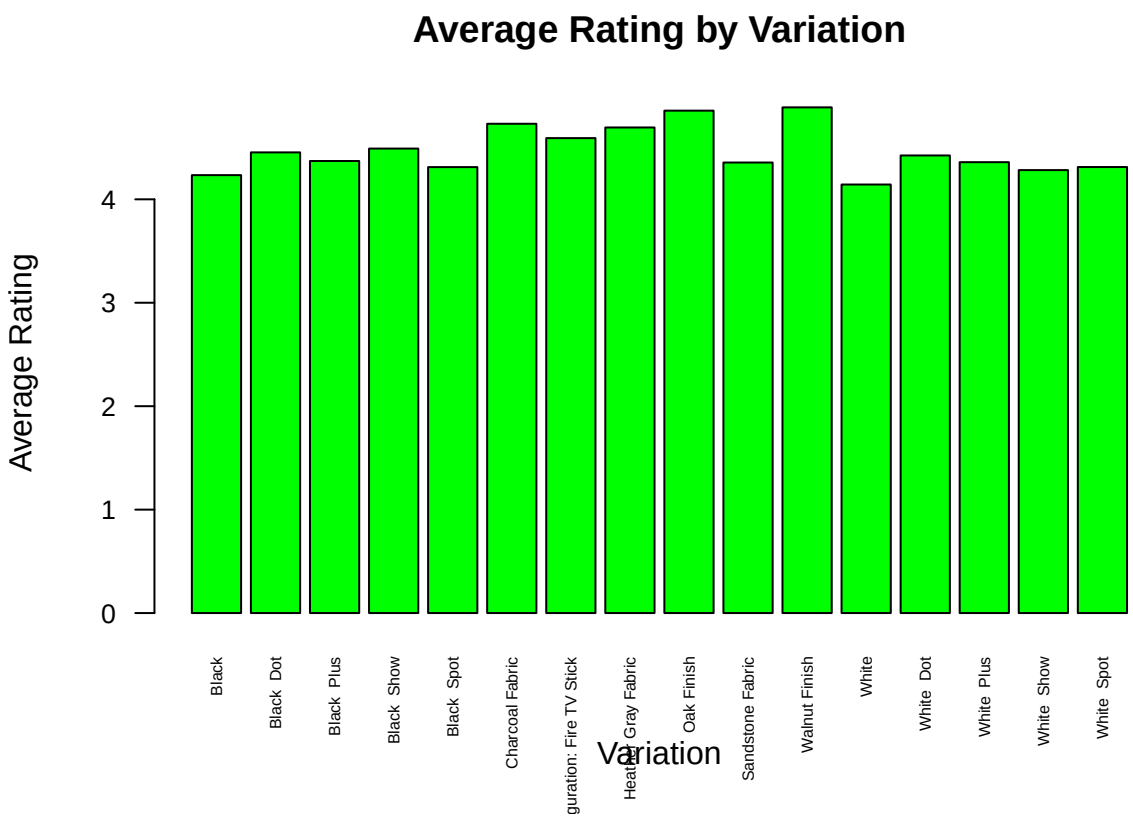
```
## # A tibble: 16 x 2
##    variation                    avg_rating
##    <chr>                             <dbl>
##  1 Black                              4.23
##  2 Black  Dot                         4.45
##  3 Black  Plus                        4.37
##  4 Black  Show                        4.49
##  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
```

```
highest <- variation_ratings %>%
  filter(avg_rating == max(avg_rating))
print(highest)
```

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

```
variation_names <- variation_ratings$variation
average_ratings <- variation_ratings$avg_rating

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




```
top_variation <- variation_names[which.max(average_ratings)]
top_rating <- max(average_ratings)

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

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