RWorksheet_Deluna#4c

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```
#1. Use the dataset mpg
#a. Show your solutions on how to import a csv file into the environment.

  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`
```

```
  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~
```

```
#b. Which variables from mpg dataset are categorical?

  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>
```

```
#Manufacturer, model, year, cyl, trans, drv, and class are the categorical variables.
```

```
#c. Which are continuous variables?

  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
```

```
#Manufacturer, model, display, year, cyl, cty, hy, fl, trans, drv, and class are the continuous variabl
```

```
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
```

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

  model <- mpg %>%
  group_by(manufacturer) %>%
  summarise(count = n()) %>%
  arrange(desc(count))

print(model)
```

```
## # 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
```

```
#Dodge is the manufacturer with the most models.

count <- mpg %>%
  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
```

```
#Caravan 2wd is the model with the most variation.
```

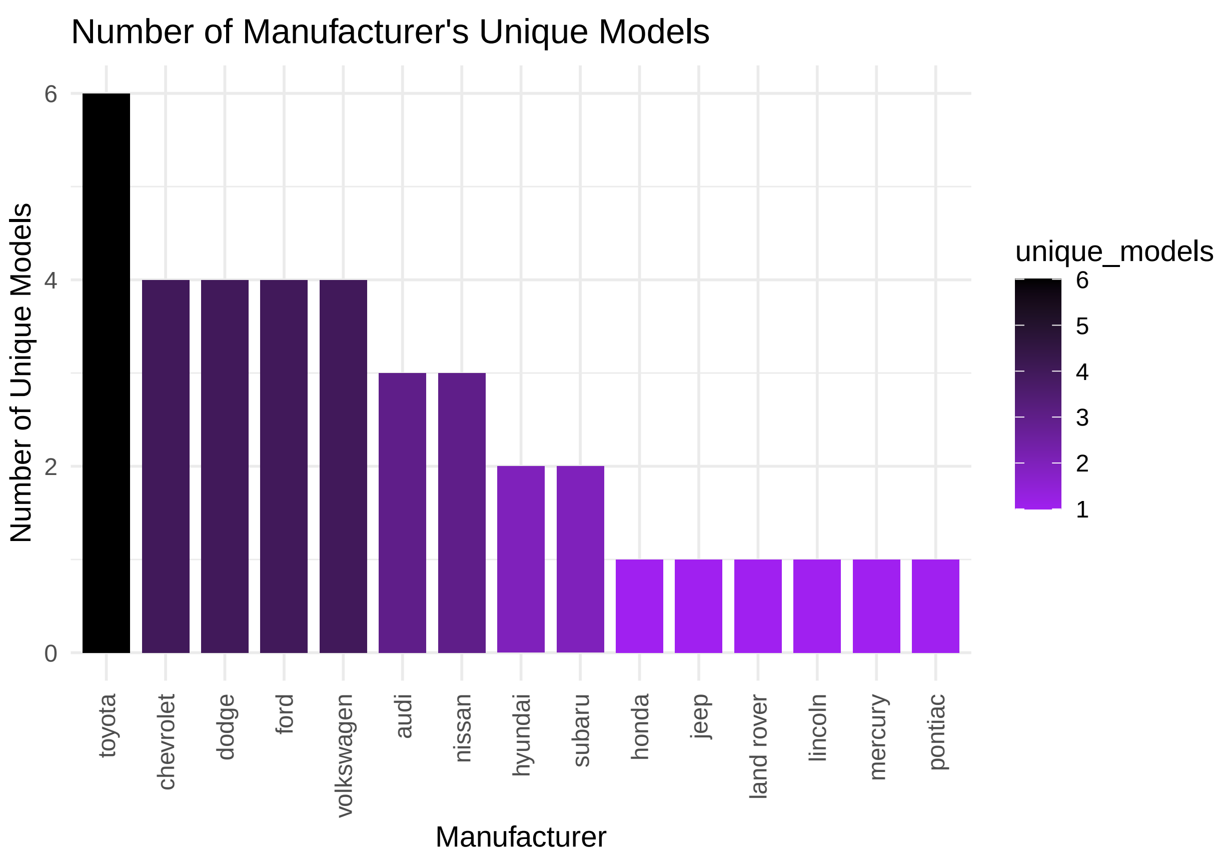
```
#a. Group the manufacturers and find the unique models. Show your codes and result.

  library(dplyr)

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
```

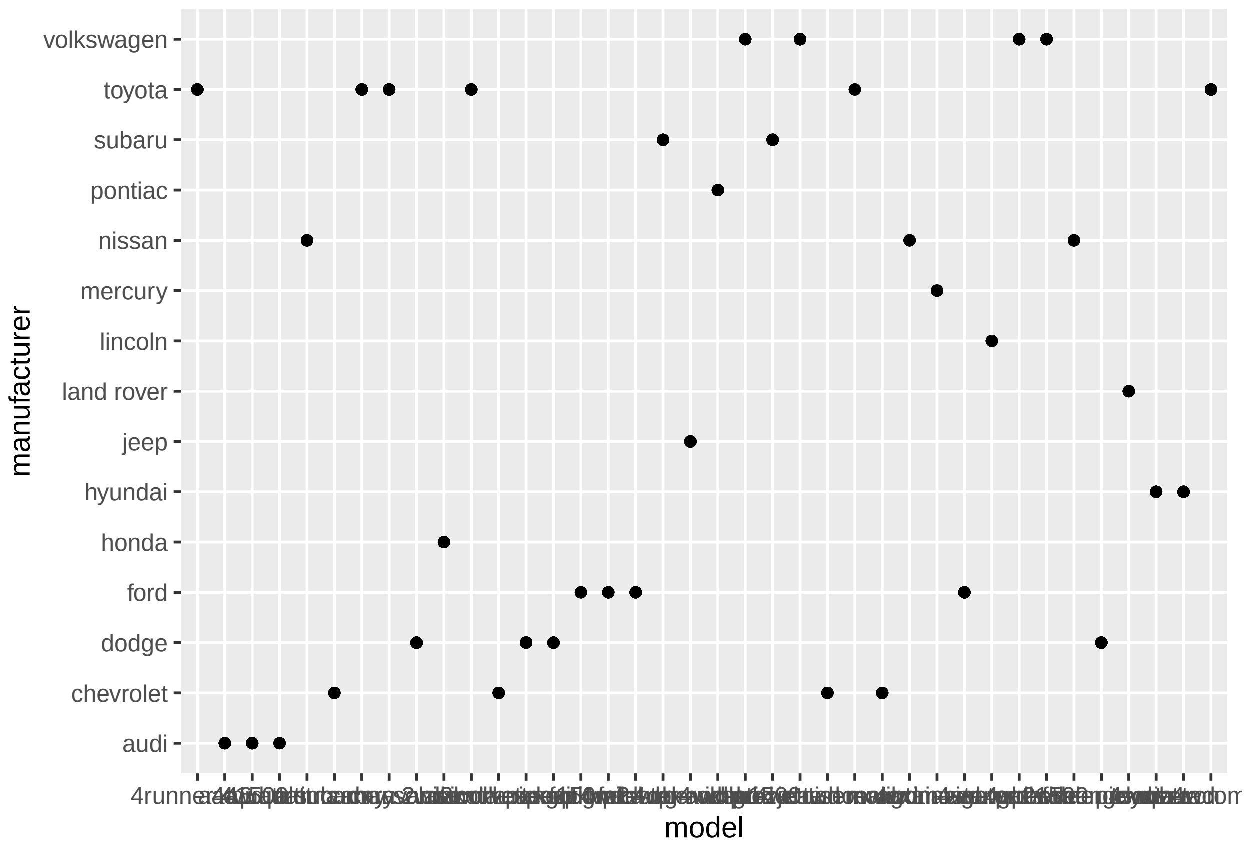
```
#b. Graph the result by using plot() and ggplot(). Write the codes and its result.
library(ggplot2)
```

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

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

```
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 = "purple", high = "black") +
 theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)))
```

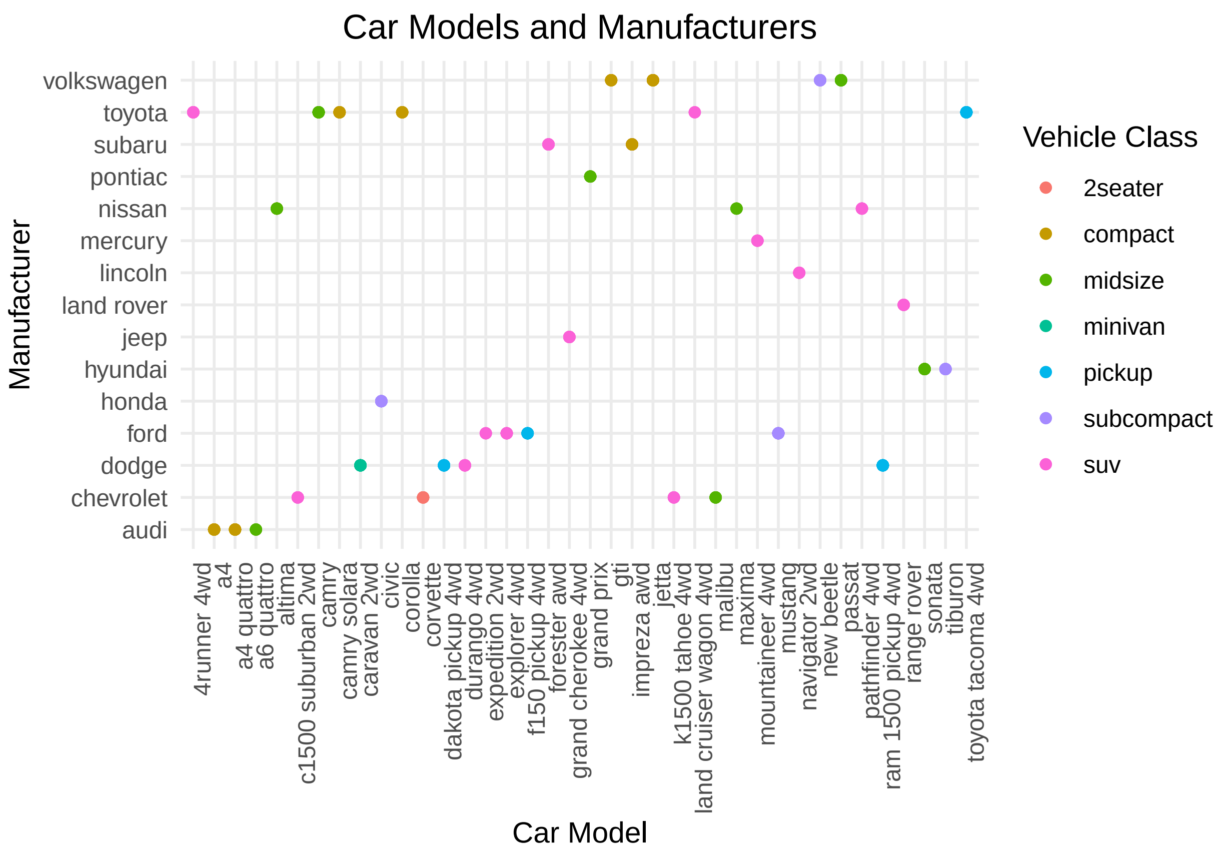


```
#2. Same dataset will be used. You are going to show the relationship of the model and the manufacturer
#a. What does ggplot(mpg, aes(model, manufacturer)) + geom_point() show?

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

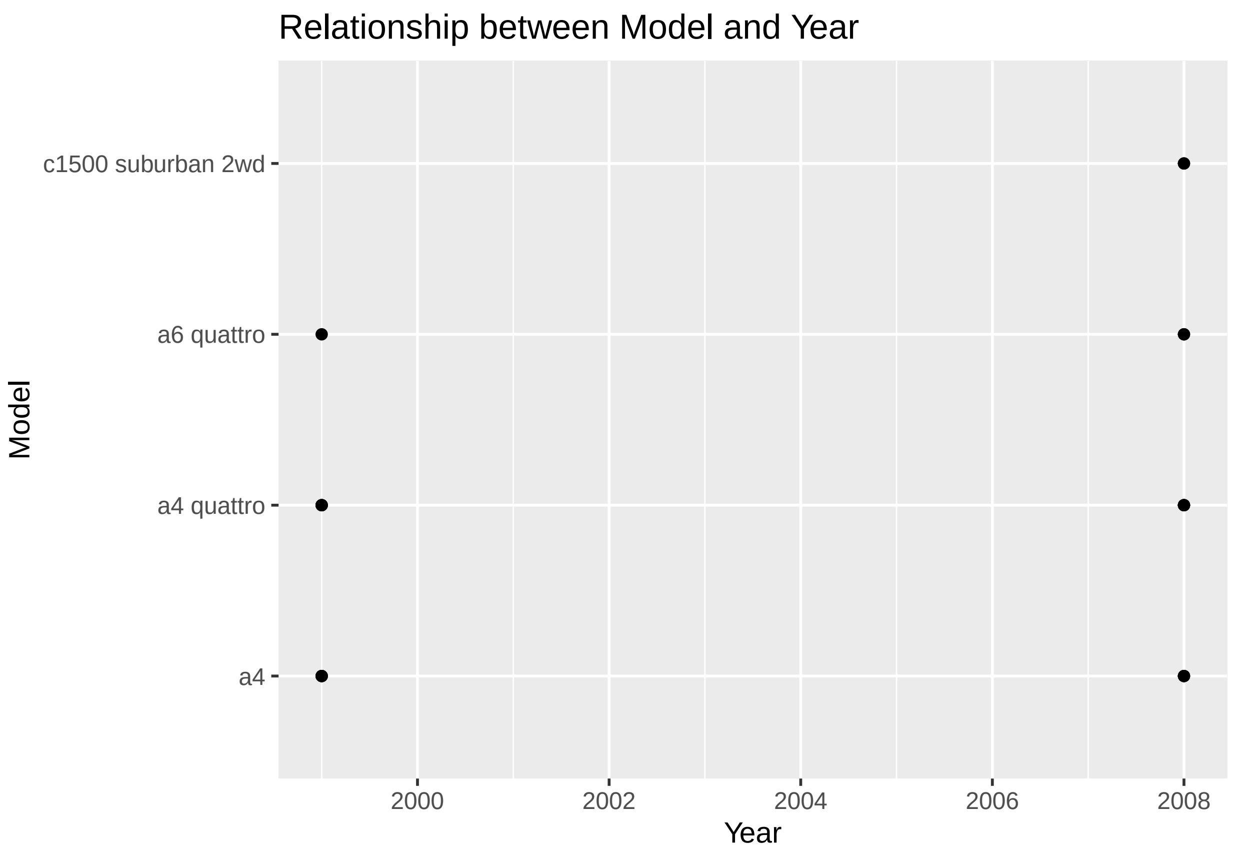


```
#This produces an uninformative scatter plot with points representing the association between car model
```

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

#No, the provided code is merely a basic framework. In order to make this more helpful, I'll change the

#Modify it like this:

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))
```



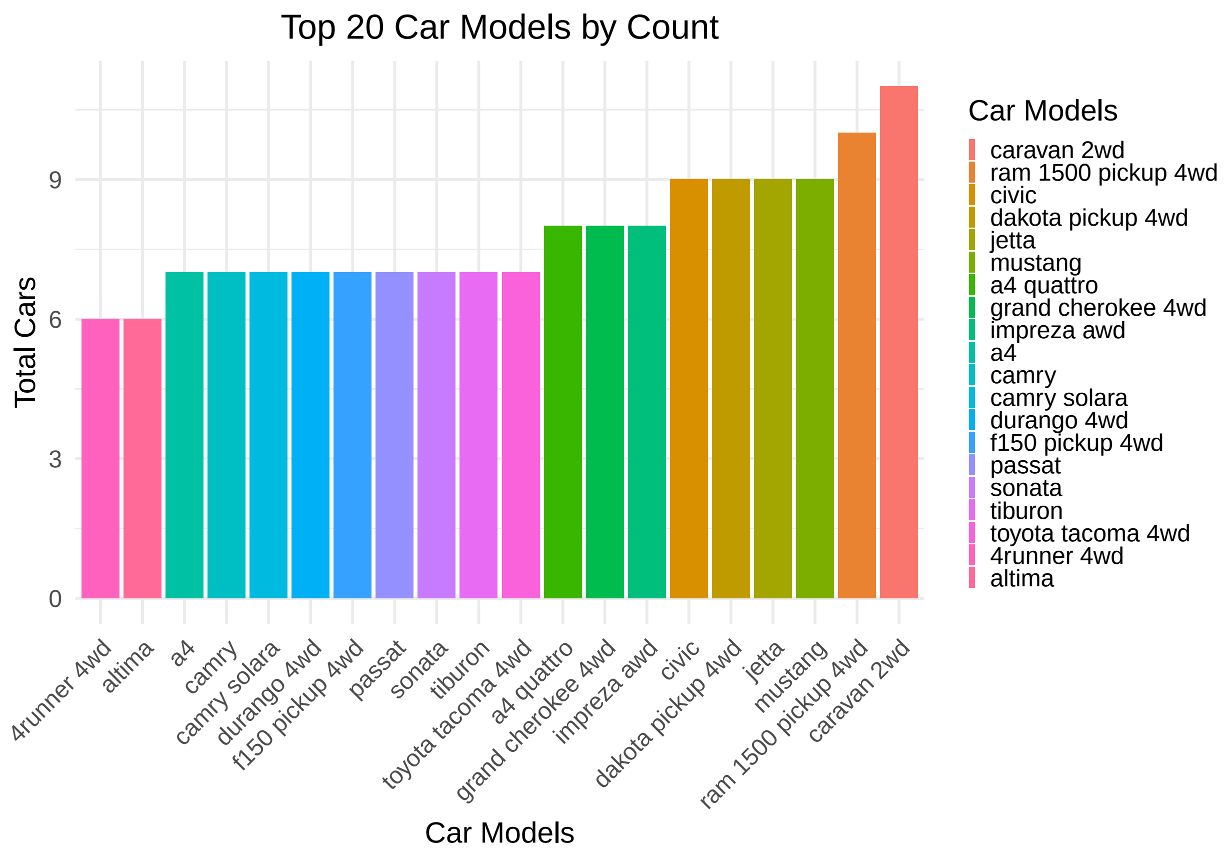
```
#3. Plot the model and the year using ggplot(). Use only the top 20 observations. Write the codes and i

  library(ggplot2)
  library(dplyr)

  data(mpg)
  top_20 <- mpg %>% slice_head(n = 20)

ggplot(top_20, aes(x = year, y = model)) +
  geom_point()  +
  labs(title = "Relationship between Model and Year",
       x = "Year",
       y = "Model")
```



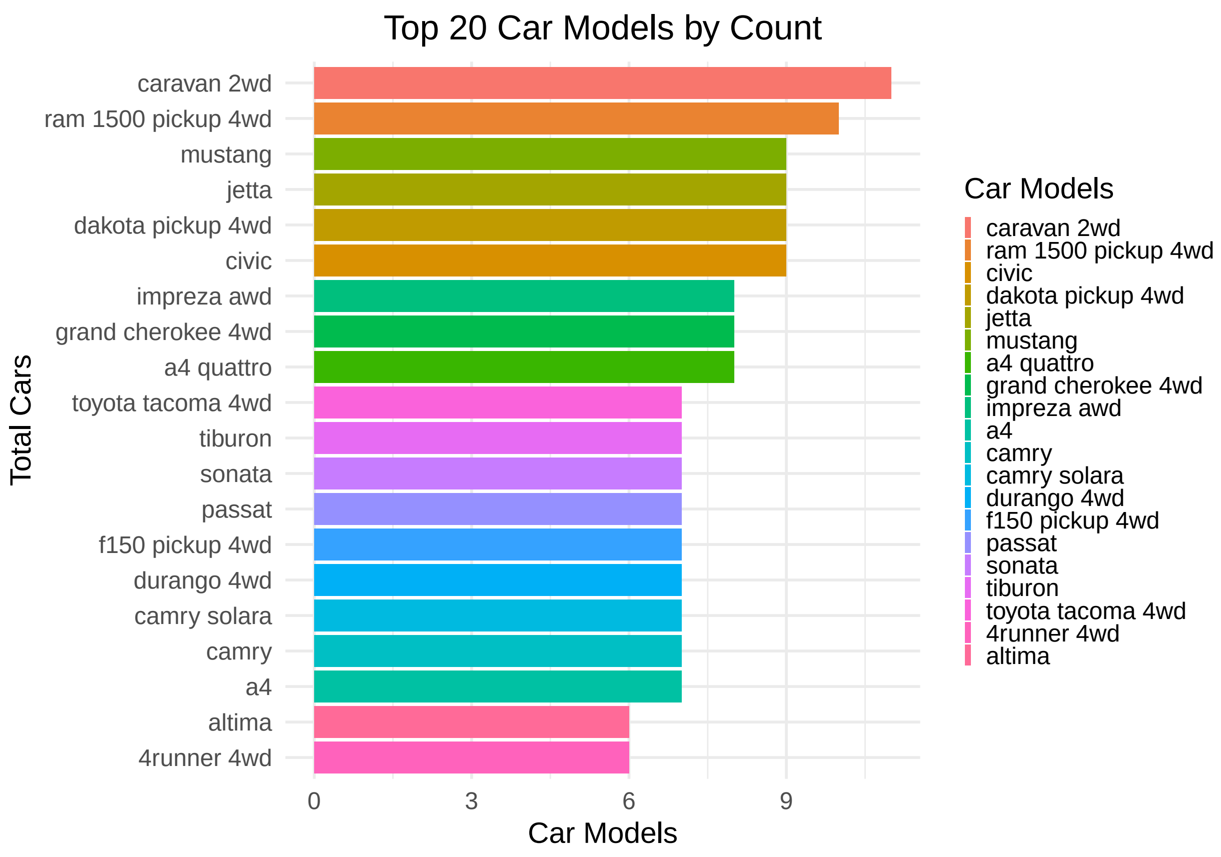
```
#4. Using the pipe (%>%), group the model and get the number of cars per model. Show codes and its resu

  library(dplyr)
  data(mpg)


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


print(Carcountpermodel)
```

```
## # 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
```

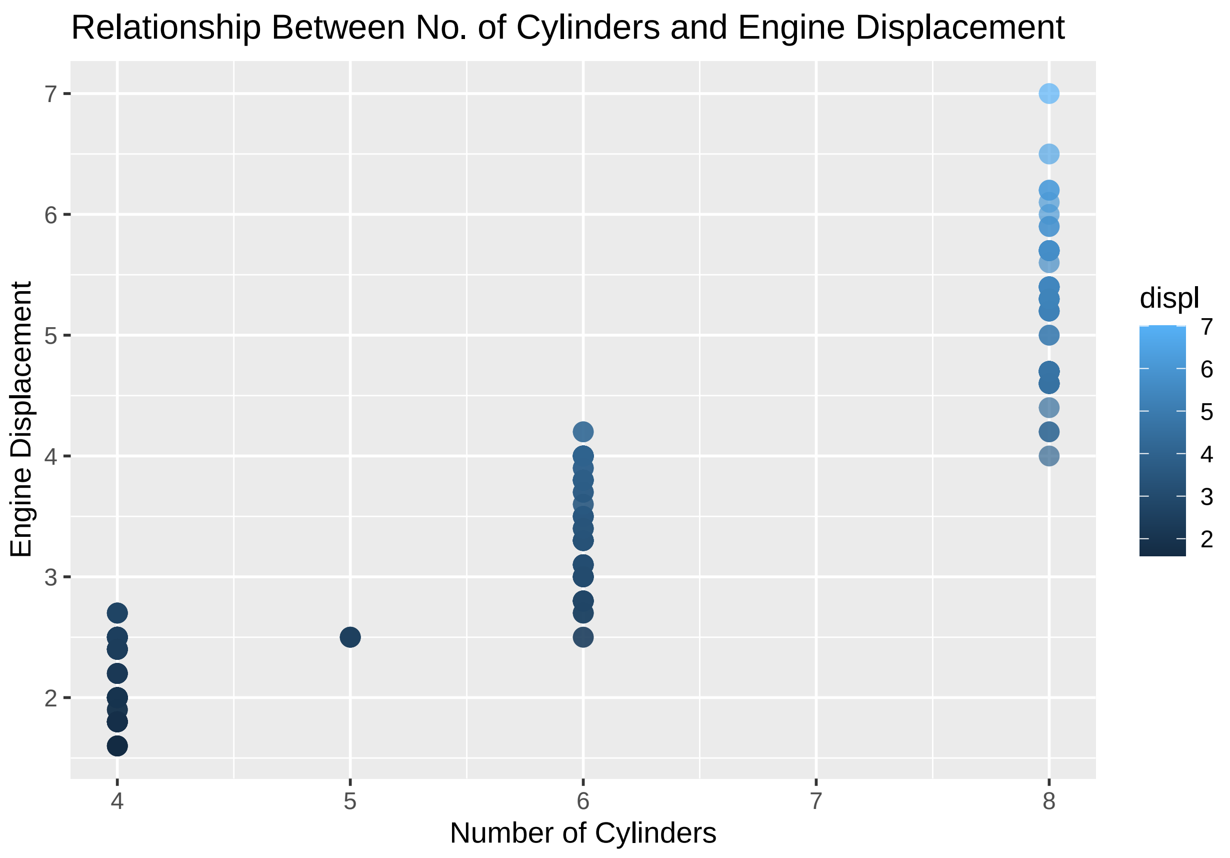
```
#a. Plot using geom_bar() using the top 20 observations only. The graphs shoudl have a title, labels an

  library(ggplot2)
  library(dplyr)

  data(mpg)

Summary_data <- mpg %>%
  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)
  )
```



```r
#b. Plot using the geom_bar() + coord_flip() just like what is shown below. Show codes and its result.

  library(ggplot2)
  library(dplyr)

  data(mpg)

Summary_data <- mpg %>%
  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)
  )
```

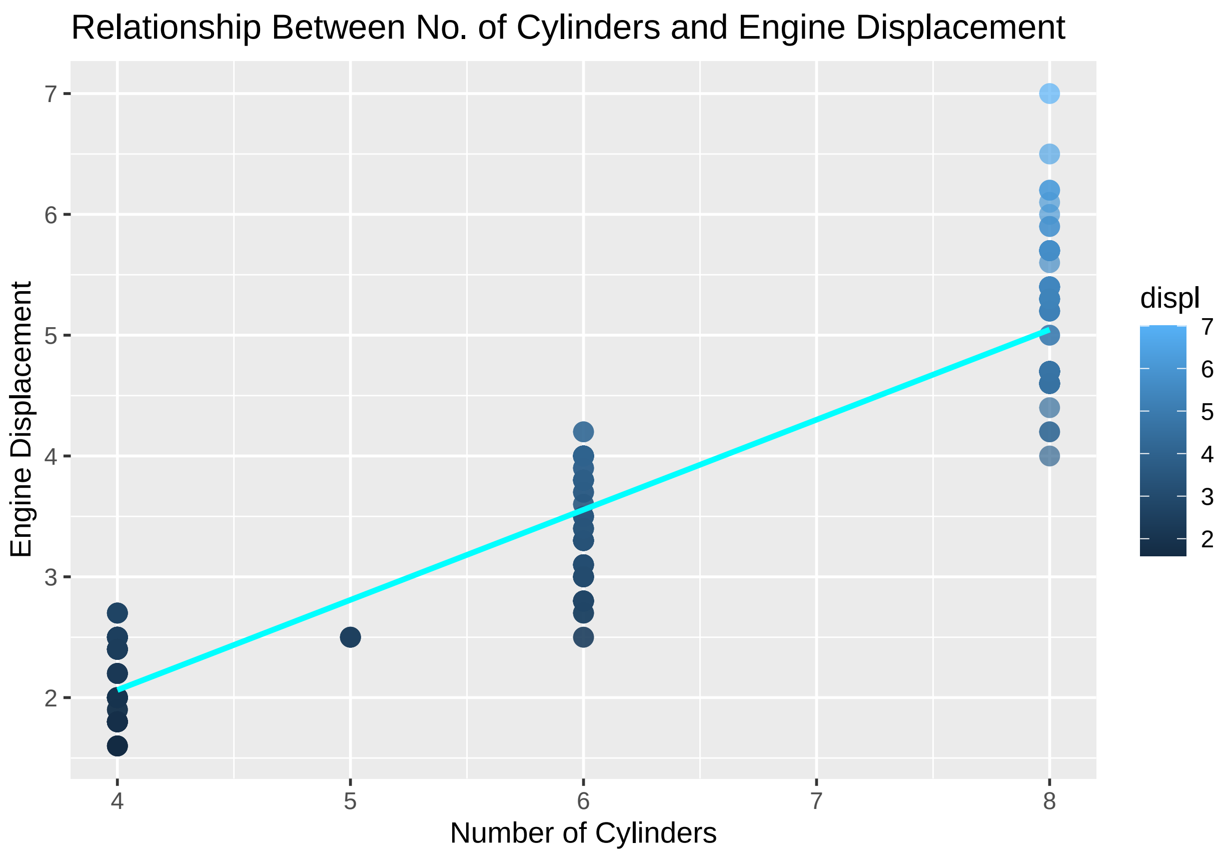


```
#5. Plot the relationship between cyl - number of cylinders and displ - engine displacement using geom_

  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"
  )
```

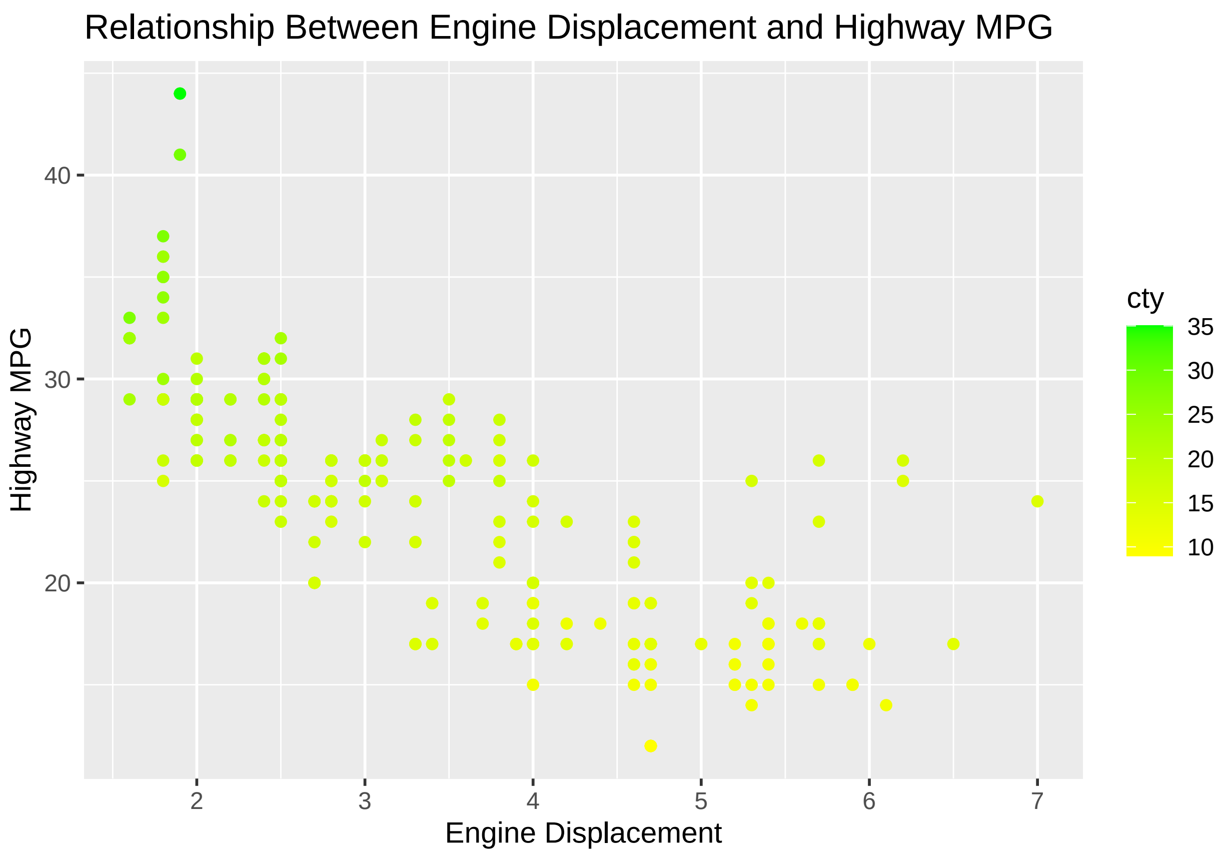


```
#a. How would you describe its relationship? Show the codes and its result.

  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 = "cyan") +
  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

#Engine displacement (displ) is plotted against highway miles per gallon (hwy) in a scatter plot, with

#Answer: The color gradient based on city miles per gallon (cty) is used to display the variation in ci

  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 = "yellow", high = "green")
```



```r
#6. Import the traffic.csv onto your R environment.

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

```
## Rows: 48120 Columns: 4
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (1): DateTime
## dbl (3): Junction, Vehicles, ID
##
## 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.
```

```r
  head(traffic)
```

```
## # A tibble: 6 x 4
##   DateTime       Junction Vehicles          ID
##   <chr>             <dbl>    <dbl>       <dbl>
## 1 11/1/2015 0:00        1       15 20151101001
## 2 11/1/2015 1:00        1       13 20151101011
## 3 11/1/2015 2:00        1       10 20151101021
## 4 11/1/2015 3:00        1        7 20151101031
## 5 11/1/2015 4:00        1        9 20151101041
## 6 11/1/2015 5:00        1        6 20151101051
```

```r
#a. How many numbers of observation does it have? What are the variables of the traffic dataset the Sho

  Observations <- nrow(traffic)
  Variables <- names(traffic)
```

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

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

```
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?

  Junctions1 <- subset(traffic, Junction == 1)
  Junctions2 <- subset(traffic, Junction == 2)
  Junctions3 <- subset(traffic, Junction == 3)
  Junctions4 <- subset(traffic, Junction == 4)

#These are the output:
  Junctions1
```

```
## # A tibble: 14,592 x 4
##    DateTime       Junction Vehicles          ID
##    <chr>             <dbl>    <dbl>       <dbl>
##  1 11/1/2015 0:00        1       15 20151101001
##  2 11/1/2015 1:00        1       13 20151101011
##  3 11/1/2015 2:00        1       10 20151101021
##  4 11/1/2015 3:00        1        7 20151101031
##  5 11/1/2015 4:00        1        9 20151101041
##  6 11/1/2015 5:00        1        6 20151101051
##  7 11/1/2015 6:00        1        9 20151101061
##  8 11/1/2015 7:00        1        8 20151101071
##  9 11/1/2015 8:00        1       11 20151101081
## 10 11/1/2015 9:00        1       12 20151101091
## # i 14,582 more rows
```

```
  Junctions2
```

```
## # A tibble: 14,592 x 4
##    DateTime       Junction Vehicles          ID
##    <chr>             <dbl>    <dbl>       <dbl>
##  1 11/1/2015 0:00        2        6 20151101002
##  2 11/1/2015 1:00        2        6 20151101012
##  3 11/1/2015 2:00        2        5 20151101022
##  4 11/1/2015 3:00        2        6 20151101032
##  5 11/1/2015 4:00        2        7 20151101042
##  6 11/1/2015 5:00        2        2 20151101052
##  7 11/1/2015 6:00        2        4 20151101062
##  8 11/1/2015 7:00        2        4 20151101072
##  9 11/1/2015 8:00        2        3 20151101082
## 10 11/1/2015 9:00        2        3 20151101092
## # i 14,582 more rows
```

```
  Junctions3
```

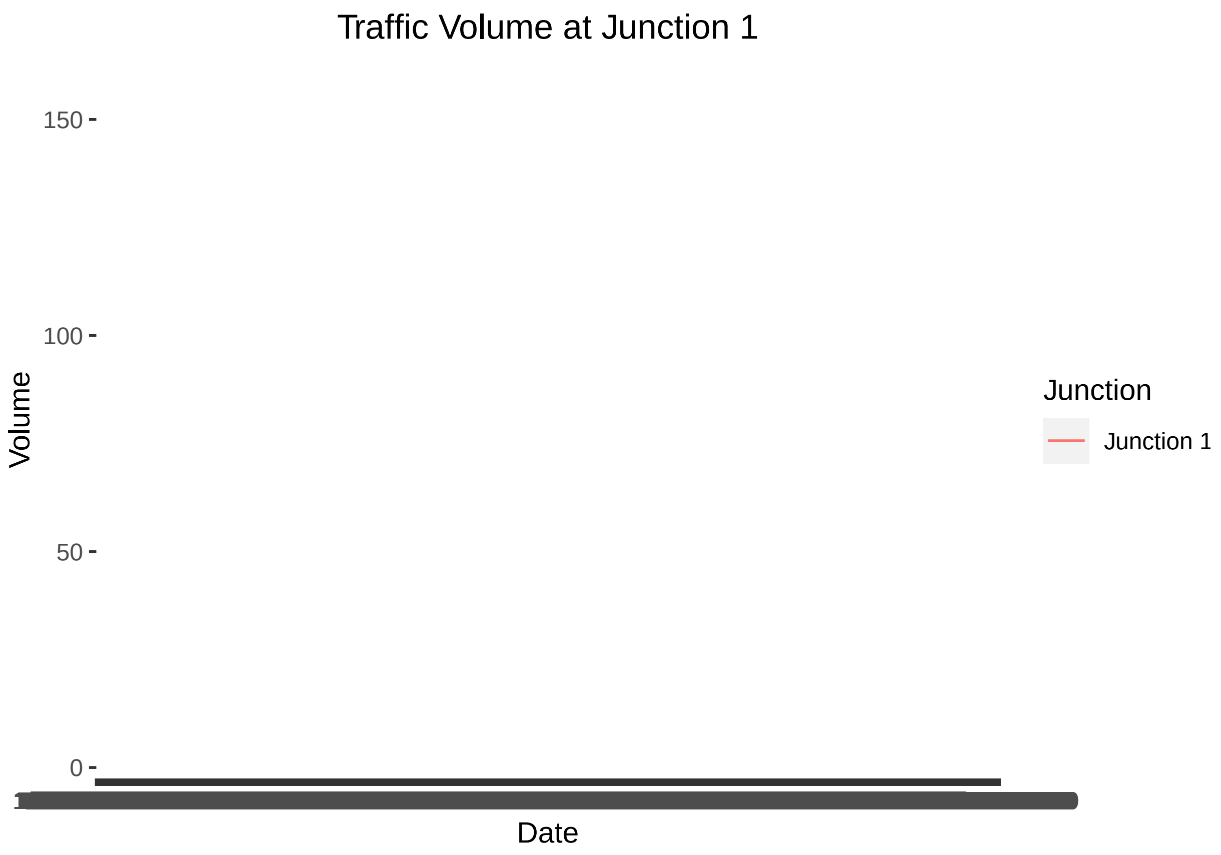
```
## # A tibble: 14,592 x 4
##    DateTime       Junction Vehicles          ID
##    <chr>             <dbl>    <dbl>       <dbl>
##  1 11/1/2015 0:00        3        9 20151101003
##  2 11/1/2015 1:00        3        7 20151101013
##  3 11/1/2015 2:00        3        5 20151101023
##  4 11/1/2015 3:00        3        1 20151101033
##  5 11/1/2015 4:00        3        2 20151101043
##  6 11/1/2015 5:00        3        2 20151101053
##  7 11/1/2015 6:00        3        3 20151101063
##  8 11/1/2015 7:00        3        4 20151101073
##  9 11/1/2015 8:00        3        3 20151101083
## 10 11/1/2015 9:00        3        6 20151101093
## # i 14,582 more rows
```

```
  Junctions4
```

```
## # A tibble: 4,344 x 4
##    DateTime      Junction Vehicles          ID
##    <chr>            <dbl>    <dbl>       <dbl>
##  1 1/1/2017 0:00        4        3 20170101004
##  2 1/1/2017 1:00        4        1 20170101014
##  3 1/1/2017 2:00        4        4 20170101024
##  4 1/1/2017 3:00        4        4 20170101034
##  5 1/1/2017 4:00        4        2 20170101044
##  6 1/1/2017 5:00        4        1 20170101054
##  7 1/1/2017 6:00        4        1 20170101064
##  8 1/1/2017 7:00        4        4 20170101074
##  9 1/1/2017 8:00        4        4 20170101084
## 10 1/1/2017 9:00        4        2 20170101094
## # i 4,334 more rows
```

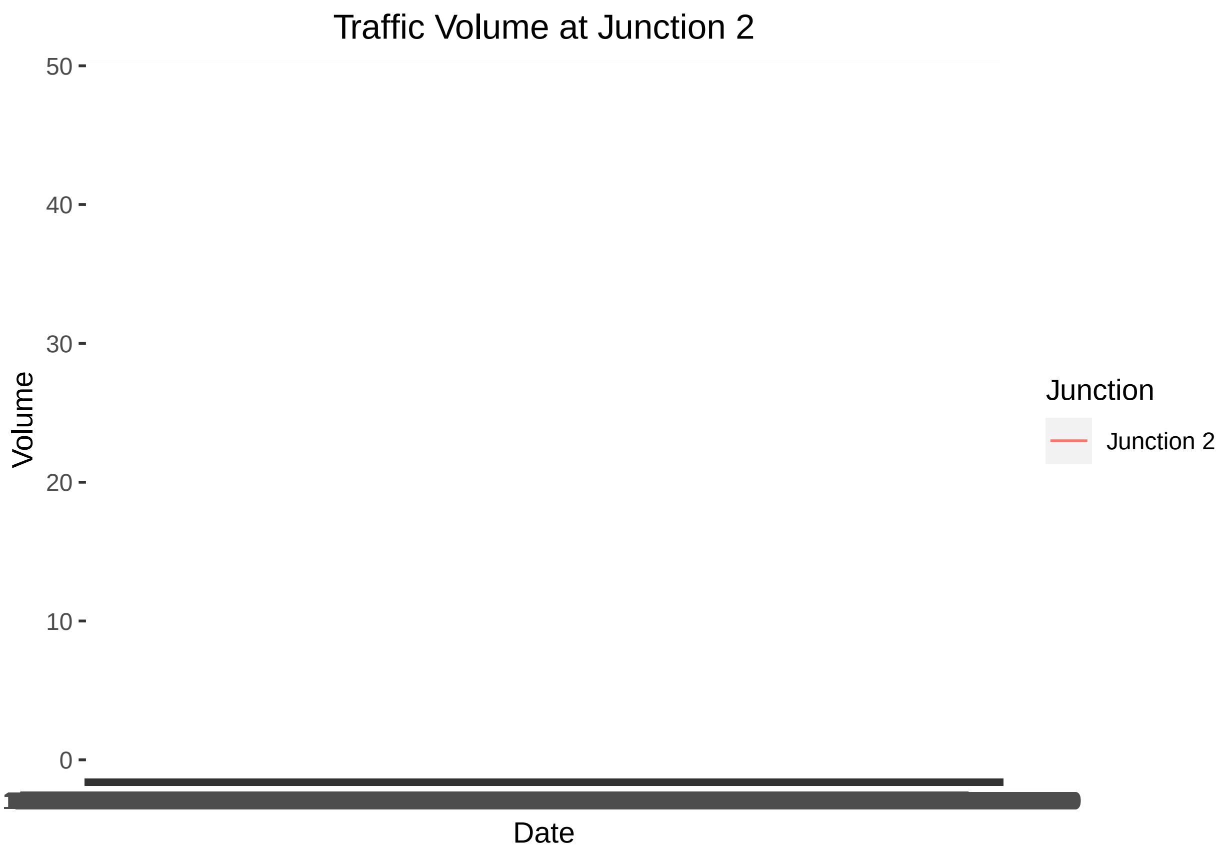
```
#c. Plot each junction in a using geom_line(). Show your solution and output.

#Junction1
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))
```

```
## `geom_line()`: Each group consists of only one observation.
## i Do you need to adjust the group aesthetic?
```



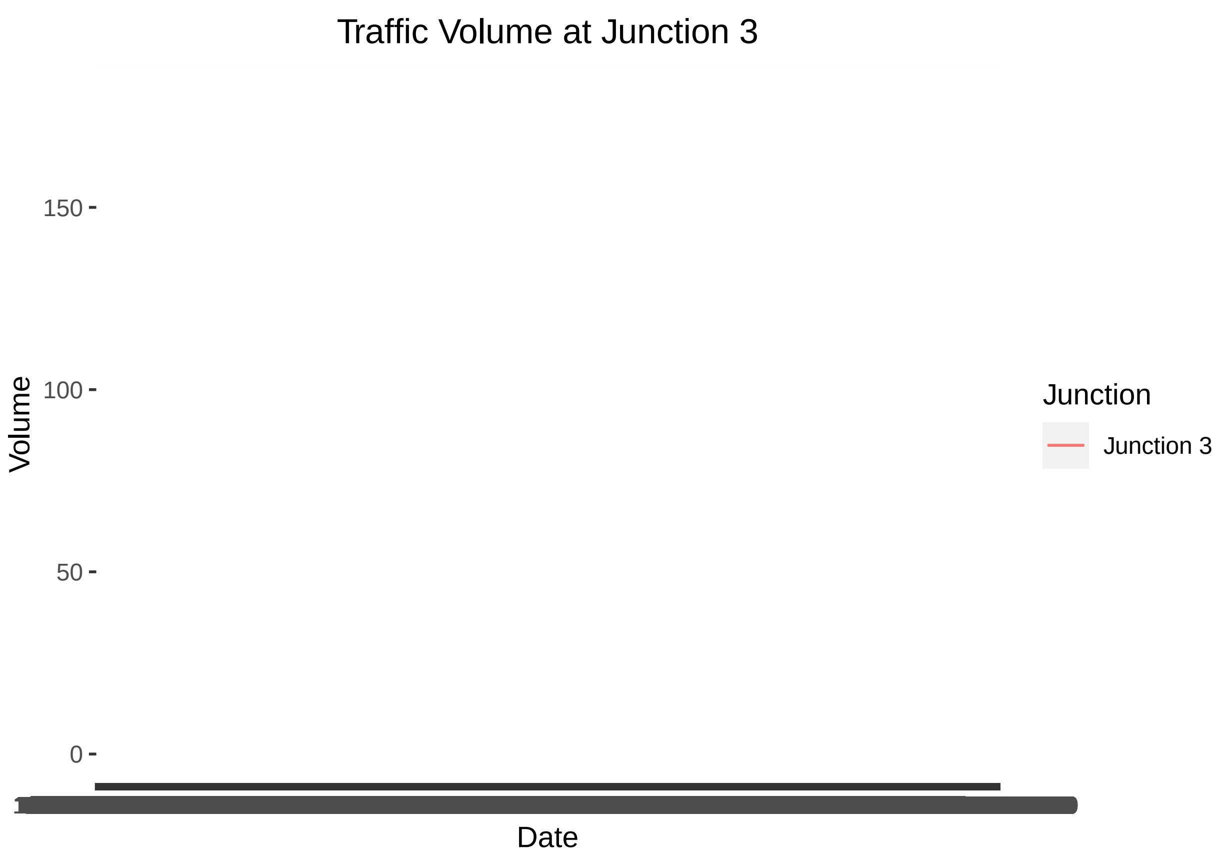
```r
#Junction2
ggplot(Junctions2, aes(x = DateTime, y = Vehicles, color = "Junction 2")) +
  geom_line() +
  labs(
    title = "Traffic Volume at Junction 2",
    x = "Date",
    y = "Volume"
  ) +
  scale_color_discrete(name = "Junction") +
  theme(plot.title = element_text(hjust = 0.5))
```

```
## `geom_line()`: Each group consists of only one observation.
## i Do you need to adjust the group aesthetic?
```



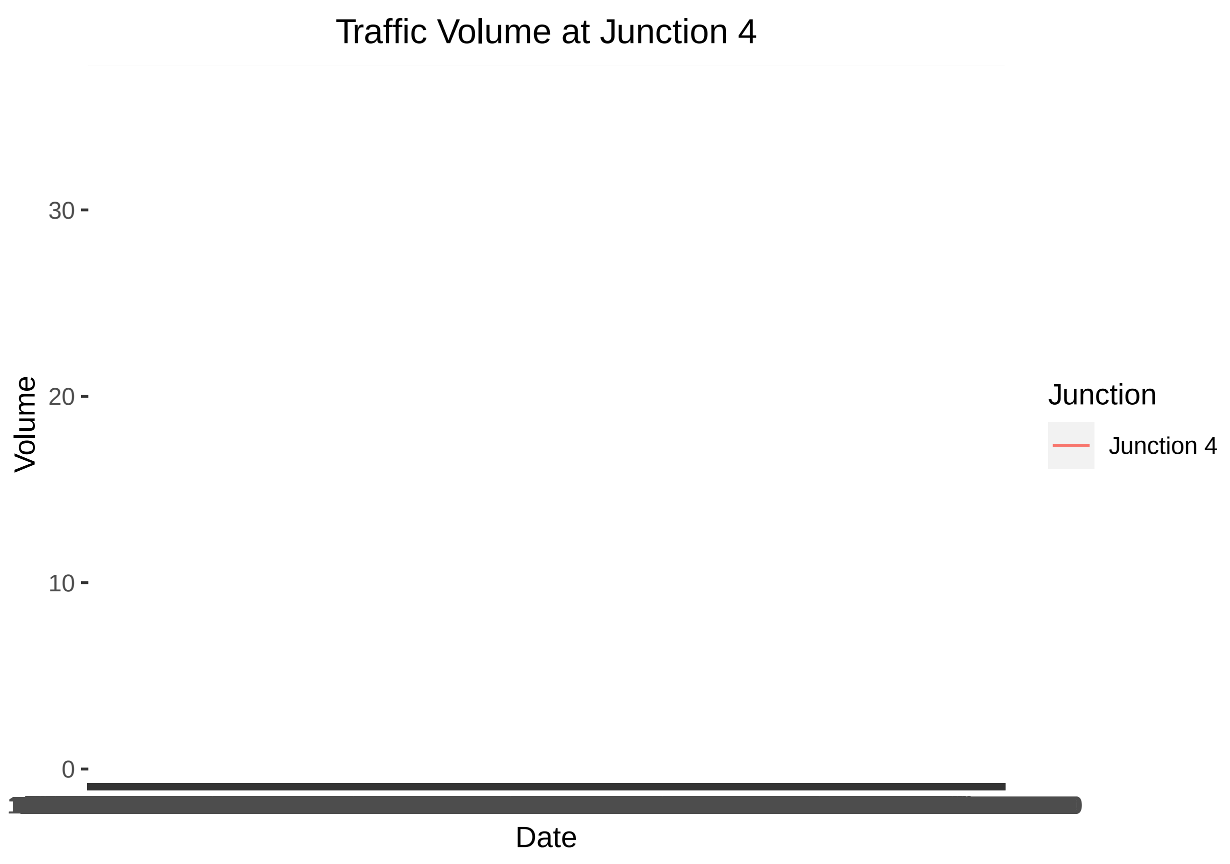
```
#Junction3
ggplot(Junctions3, aes(x = DateTime, y = Vehicles, color = "Junction 3")) +
  geom_line() +
  labs(
    title = "Traffic Volume at Junction 3",
    x = "Date",
    y = "Volume"
  ) +
  scale_color_discrete(name = "Junction") +
 theme(plot.title = element_text(hjust = 0.5))
```

```
## `geom_line()`: Each group consists of only one observation.
## i Do you need to adjust the group aesthetic?
```



```r
#Junction4
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))
```

```
## `geom_line()`: Each group consists of only one observation.
## i Do you need to adjust the group aesthetic?
```



```r
#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
```

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

  Observations <- nrow(alexa_file)
  columns <- ncol(alexa_file)

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

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

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

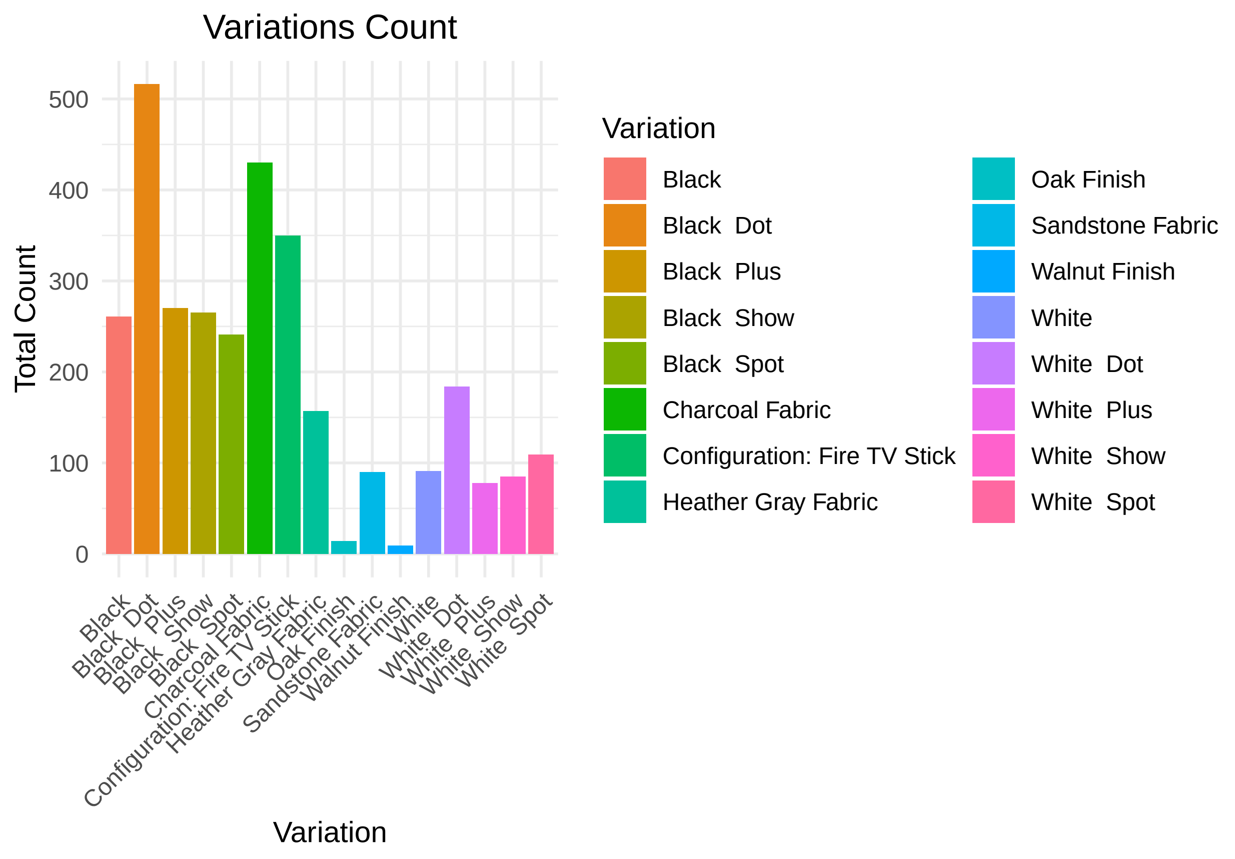
```
## Number of columns: 5
```

```
#The number of observations does alexa_file has 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 ans

  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
```

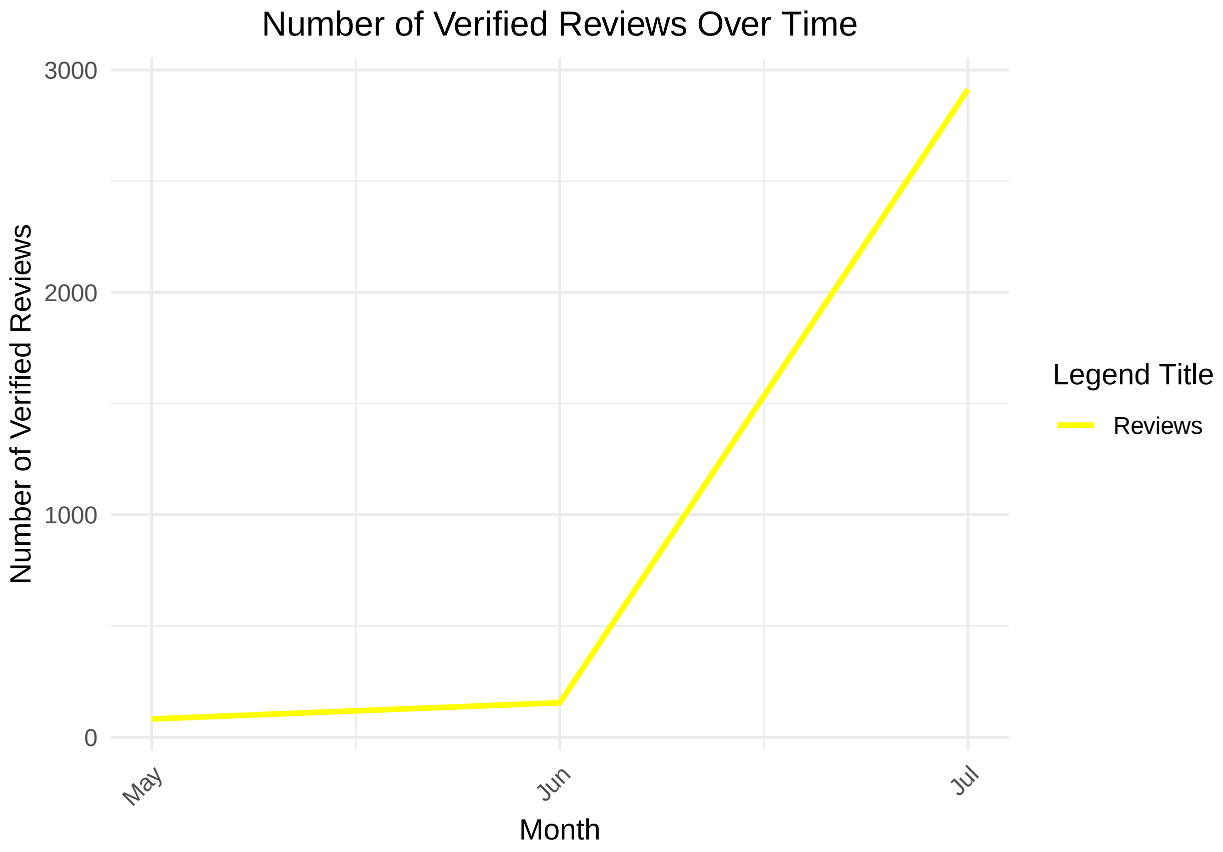
```
#c. Plot the variations using the ggplot() function. What did you observe? Complete the details of the 

#Answer:The variations of the Alexa file are shown below, with the sum of each variation as well as eac

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)
```



```r
#d. Plot a geom_line() with the date and the number of verified reviews. Complete the details of the gr

  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("yellow"), 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)
```



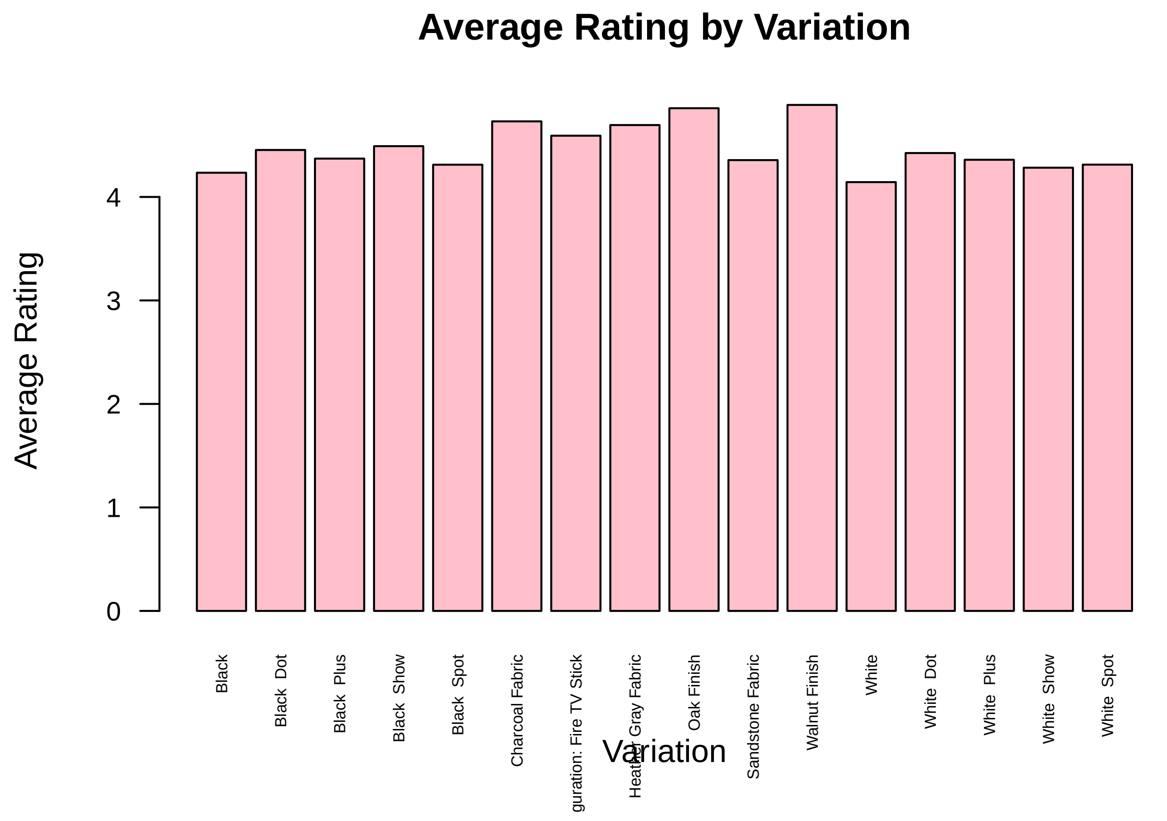
```
#e. Get the relationship of variations and ratings. Which variations got the most highest in rating? Pl

  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 = "pink",
        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
```