RWorksheet_lauron#4c.Rmd.

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```
#(1.)

#a import a csv file

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
```

```
library(ggplot2)
data(mpg)

write.csv(mpg, "mpg.csv", row.names = FALSE)

mpgdata <- read.csv("mpg.csv", header = TRUE, stringsAsFactors = FALSE)
str(mpgdata)
```

```
## 'data.frame':    234 obs. of  11 variables:
##  $ manufacturer: chr  "audi" "audi" "audi" "audi" ...
##  $ model       : chr  "a4" "a4" "a4" "a4" ...
##  $ displ       : num  1.8 1.8 2 2 2.8 2.8 3.1 1.8 1.8 2 ...
##  $ year        : int  1999 1999 2008 2008 1999 1999 2008 1999 1999 2008 ...
##  $ cyl         : int  4 4 4 4 6 6 6 4 4 4 ...
##  $ trans       : chr  "auto(l5)" "manual(m5)" "manual(m6)" "auto(av)" ...
##  $ drv         : chr  "f" "f" "f" "f" ...
##  $ cty         : int  18 21 20 21 16 18 18 18 16 20 ...
##  $ hwy         : int  29 29 31 30 26 26 27 26 25 28 ...
##  $ fl          : chr  "p" "p" "p" "p" ...
##  $ class       : chr  "compact" "compact" "compact" "compact" ...
```

```
#b. variables from mpg dataset are categorical
#The variables from mpg dataset that are categorical manufacturer, model, trans, #drv, fl, class.

#c. continuous variables
#These are the continuous variables are year,displ, cty, hwy, cyl.
```

```r
#(2.)  manufacturer that has the most models.Model that has the most variations.

manu_models_vars <- mpgdata %>%
  group_by(model) %>%
  summarise(total_manumovars = n()) %>%
  arrange(desc(total_manumovars))

manu_models_vars
```

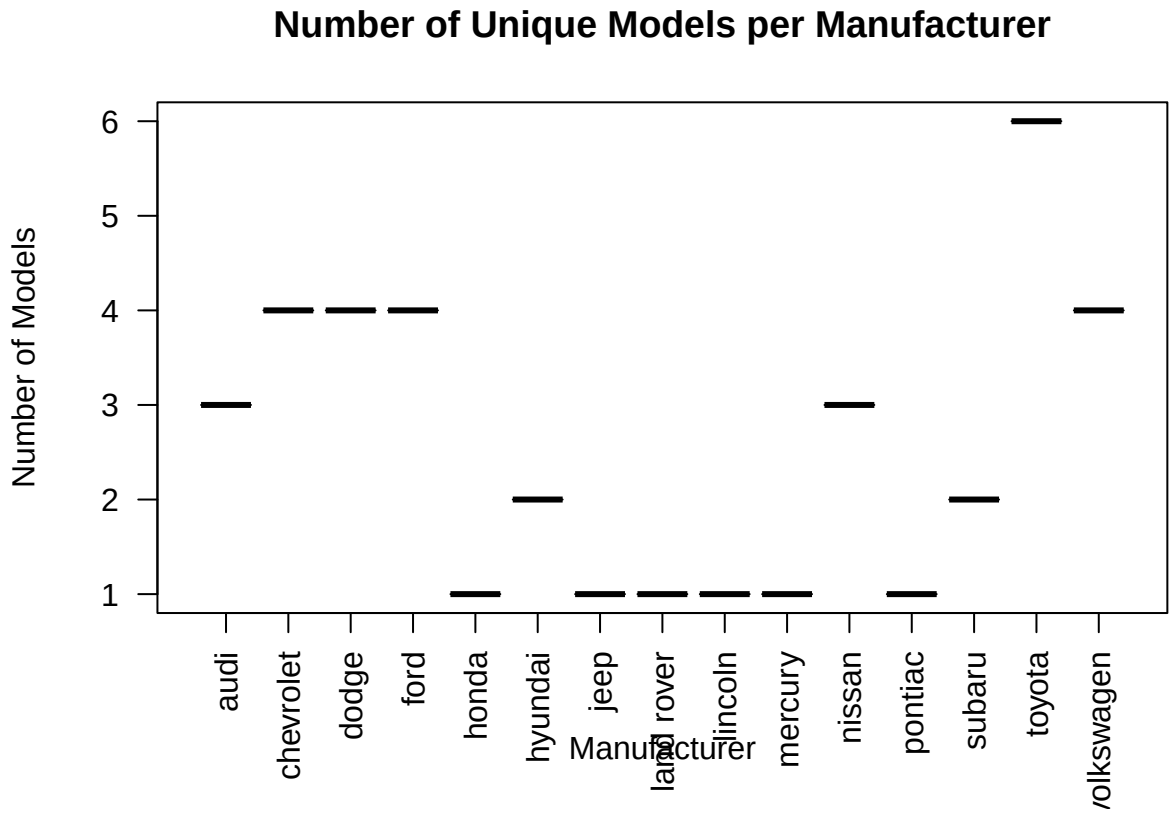
```
## # A tibble: 38 x 2
##    model                total_manumovars
##    <chr>                           <int>
##  1 caravan 2wd                        11
##  2 ram 1500 pickup 4wd                10
##  3 civic                               9
##  4 dakota pickup 4wd                   9
##  5 jetta                               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
#a. Group the manufacturers and find the unique models.

manu_model <- mpgdata %>%
  group_by(manufacturer) %>%
  summarise(uniquemodels = n_distinct(model)) %>%
  arrange(desc(uniquemodels))
manu_model
```

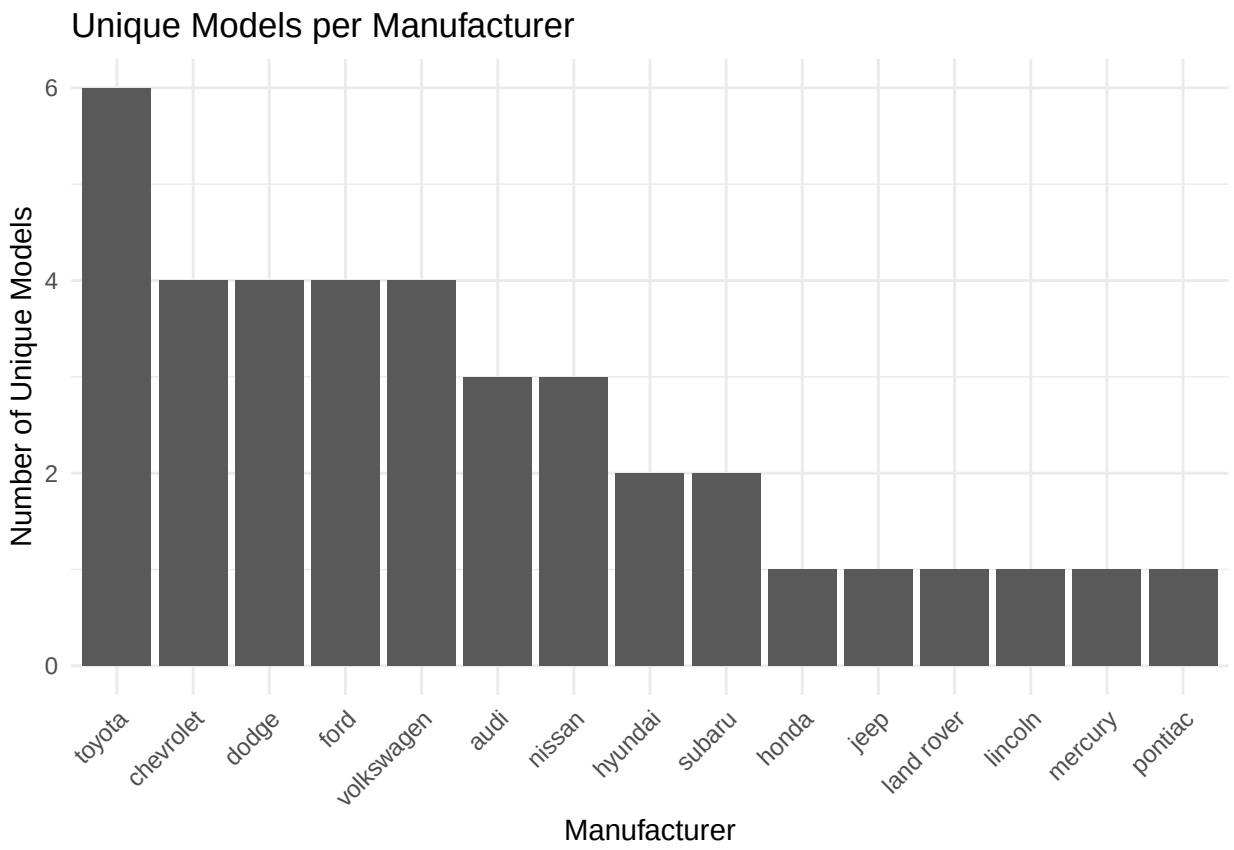
```
## # A tibble: 15 x 2
##    manufacturer uniquemodels
##    <chr>               <int>
##  1 toyota                  6
##  2 chevrolet               4
##  3 dodge                   4
##  4 ford                    4
##  5 volkswagen              4
##  6 audi                    3
##  7 nissan      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

```r
#OUTPUT:
# A tibble: 15 × 2
#manufacturer total_models
#<chr>               <int>
```

```
#  1 toyota                  6
#2 chevrolet                4
#3 dodge                    4
#4 ford                     4
#5 volkswagen               4
#6 audi                     3
#7 nissan                   3
#8 hyundai                  2
#9 subaru                   2
#10 honda                   1
#11 jeep                    1
#12 land rover              1
#13 lincoln                 1
#14 mercury                 1
#15 pontiac                 1


#b.  plot() and ggplot().

#b1. plot()

plot(as.factor(manu_model$manufacturer),
     manu_model$uniquemodels,
     las = 2,
     main = "Number of Unique Models per Manufacturer",
     xlab = "Manufacturer",
     ylab = "Number of Models")
```

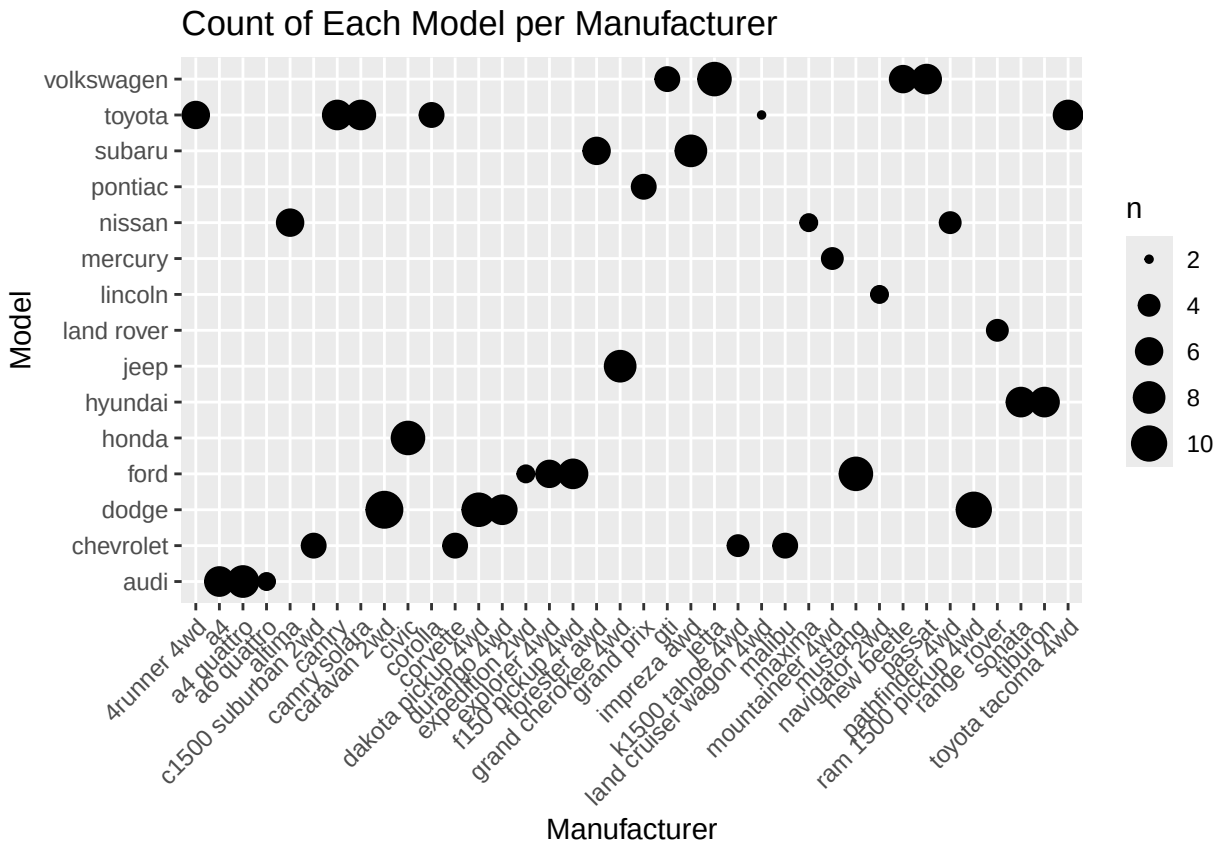


```r
#b2. ggplot()

ggplot(manu_model, aes(x = reorder(manufacturer, -uniquemodels), y = uniquemodels)) +
  geom_bar(stat = "identity") +
  theme_minimal() +
  labs(title = "Unique Models per Manufacturer",
       x = "Manufacturer",
       y = "Number of Unique Models") +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```

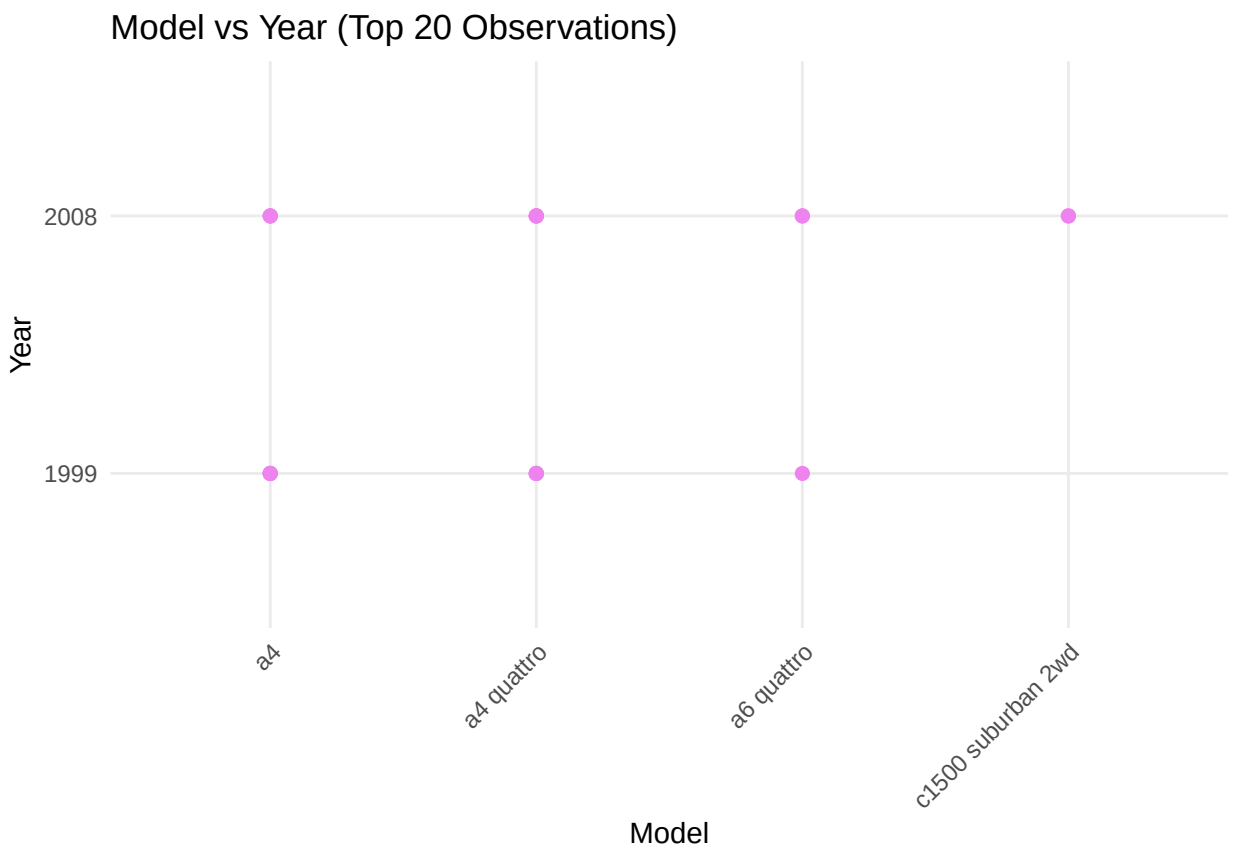



```r
#(2.) Relationship of the modeland the manufacturer.

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

#The ggplot shows the number of models per manufacturer: on the y axis it shows
#that number of models and on the x axix it showss the manufacturer listing a
#models in vertical way. The whole graph shows the relationship of models to
#manufacturer.

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

#It is already useful but not really an informative as it lacks some key points.


#alternatives:
ggplot(mpgdata, aes(model, manufacturer)) +
  geom_count() +
```

```
  theme(axis.text.x = element_text(angle = 45, hjust = 1)) +
  labs(title = "Count of Each Model per Manufacturer",
       x = "Manufacturer",
       y = "Model")
```




```
#(3.) Plot the model and the year using ggplot() (top 20 observations).
twenny_obser <- mpgdata[1:20, ]

ggplot(twenny_obser, aes(x = model, y = factor(year))) +
  geom_point(color = "violet", size = 2) +
  labs(title = "Model vs Year (Top 20 Observations)",
       x = "Model",
       y = "Year") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```



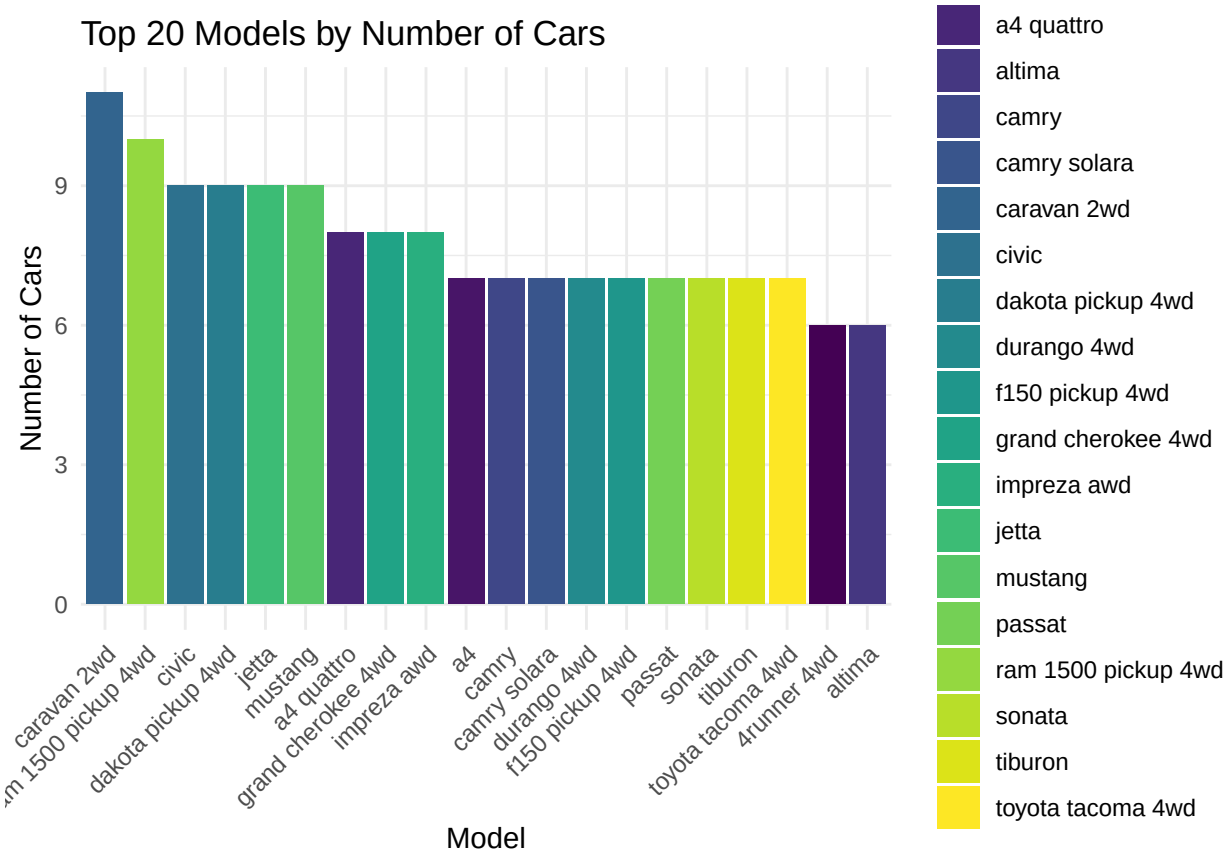

```
#(4.) Using the pipe (%>%), group the model and get the number of cars per model.

model_g <- mpgdata %>%
  group_by(model) %>%
  summarise(carnum = n()) %>%
  arrange(desc(carnum))

model_g
```

```
## # A tibble: 38 x 2
##    model               carnum
##    <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
```

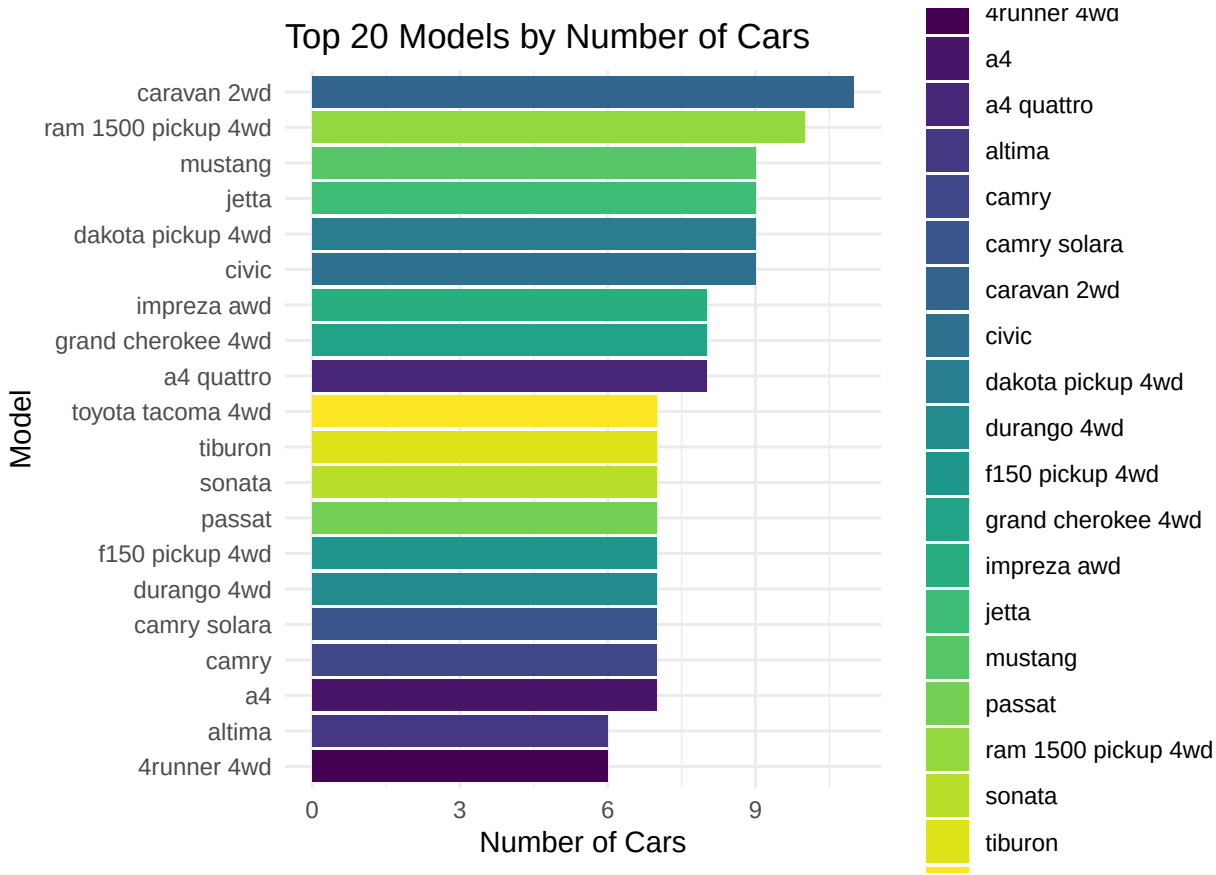
```
#OUTPUT:
# A tibble: 38 × 2
#model               number_of_cars
#<chr>                        <int>
```

```
#  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
```

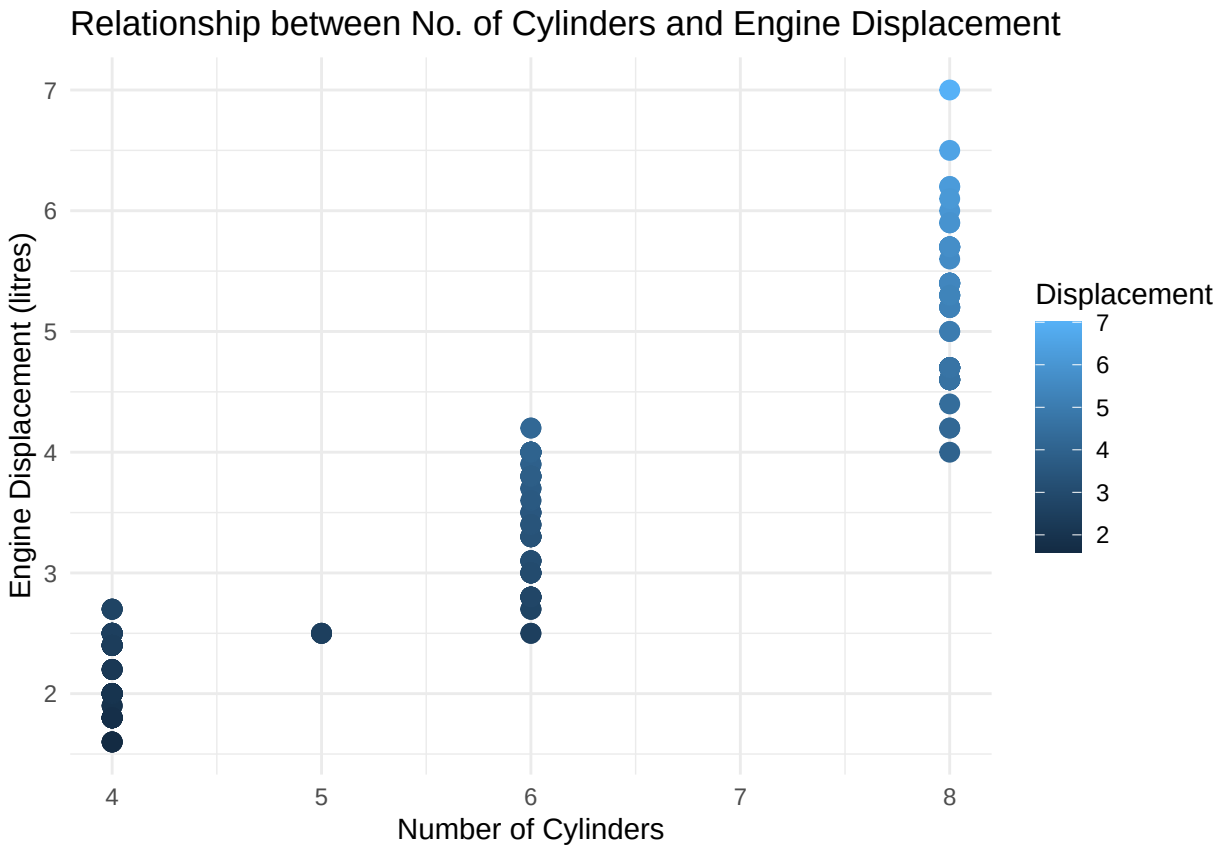
```
#a. Plot using geom_bar() using the top 20 observations only.

twenny_obser <- model_g[1:20, ]

ggplot(twenny_obser, aes(x = reorder(model, -carnum), y = carnum, fill = model)) +
  geom_bar(stat = "identity") +
  labs(title = "Top 20 Models by Number of Cars",
       x = "Model",
       y = "Number of Cars") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1)) +
  scale_fill_viridis_d()
```



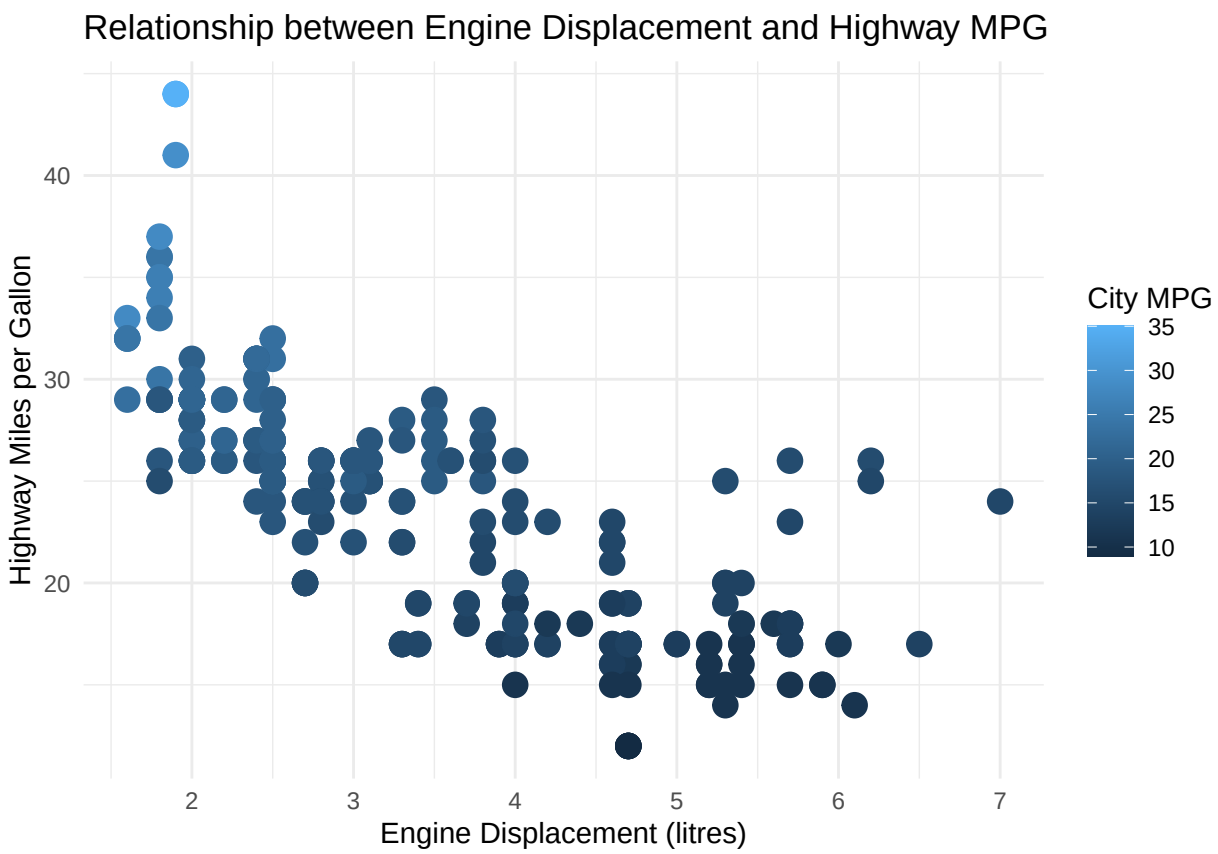
```r
#b. Plot using the geom_bar() + coord_flip()
ggplot(twenny_obser, aes(x = reorder(model, carnum), y = carnum, fill = model)) +
  geom_bar(stat = "identity") +
  coord_flip() +
  labs(title = "Top 20 Models by Number of Cars",
       x = "Model",
       y = "Number of Cars") +
  theme_minimal() +
   scale_fill_viridis_d()
```




```r
#(5.) Plot the relationship between cyl - number of cylinders and displ - engine displacement using geo

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




```
#a. How would you describe its relationship?

# I would describe its relationship a clear positive relationship between the
#number of cylinders and engine displacement. Vehicles with fewer cylinders, such
#as 4-cylinder engines, have smaller displacements, typically ranging from about
#1 to 3 liters. As the number of cylinders increases to six, engine
#displacement also increases, falling around 2.5 to 4 liters. Cars with eight
#cylinders have the higher displacements, reaching between 4 to 7 liters.



#6. Plot the relationship between displ (engine displacement) and hwy(highway miles per gallon).

ggplot(mpgdata, aes(x = displ, y = hwy, color = cty)) +
  geom_point(size = 4) +
  labs(title = "Relationship between Engine Displacement and Highway MPG",
       x = "Engine Displacement (litres)",
       y = "Highway Miles per Gallon",
       color = "City MPG") +
  theme_minimal()
```




```
#Result and why produced such output.


# It produced such output beacuse it shows the relationship of  hwy and displ in
#numeric value because both are continous. The engine displacement has a higher
#hwy in the first dislp and gradually lower.

#6. Import the traffic.csv onto your R environment.
library(readr)
traffic <- read_csv("/cloud/project/traffic.csv")
```

```
## Rows: 9 Columns: 4
```

```
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (1): Date
## dbl  (2): Junction, Vehicles
## time (1): Time
##
## 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.
```

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

nrow(traffic)
```

```
## [1] 9
```

```r
names(traffic)
```

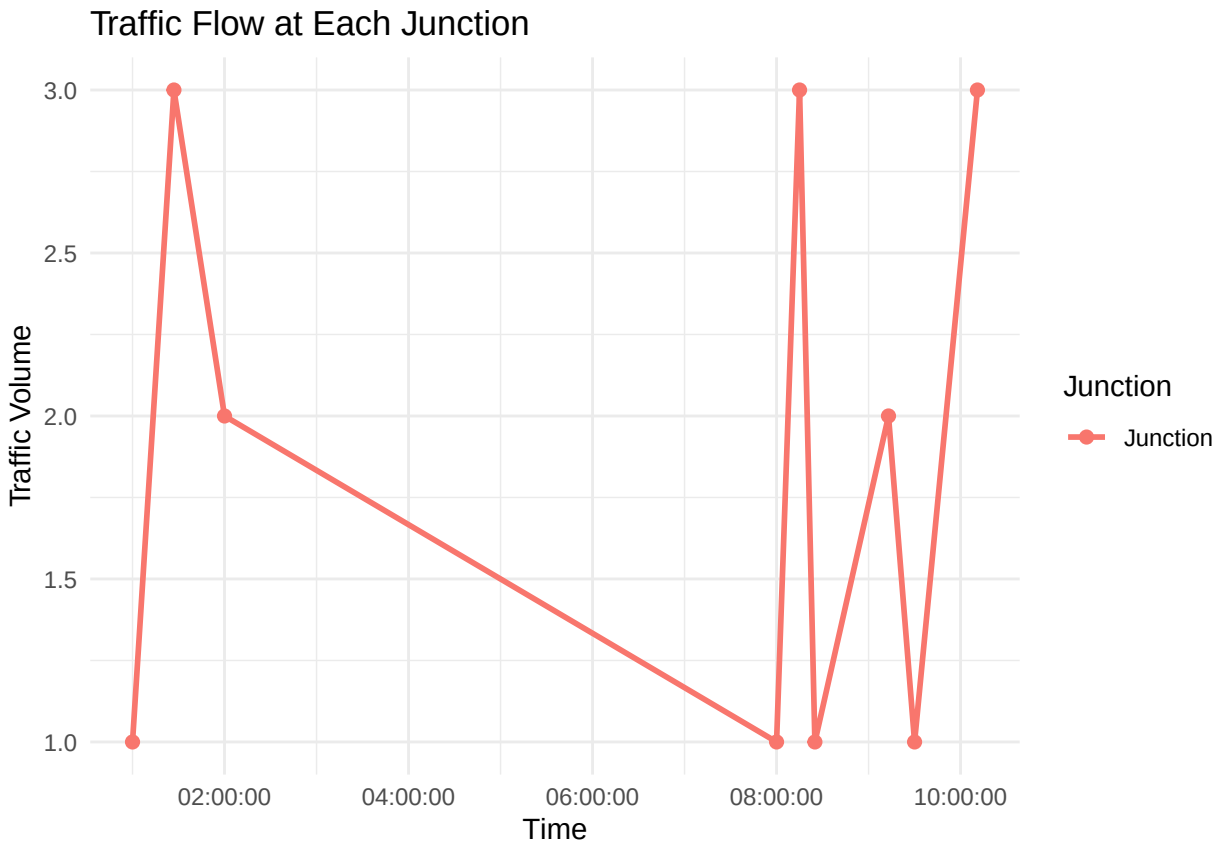
```
## [1] "Date"     "Time"     "Junction" "Vehicles"
```

```r
#b. subset the traffic dataset into junctions.

traffic_2junc <- traffic[, c("Junction")]

traffic_2junc
```

```
## # A tibble: 9 x 1
##   Junction
##      <dbl>
## 1        1
## 2        3
## 3        1
## 4        2
## 5        1
## 6        3
## 7        1
## 8        3
## 9        2
```

```r
#c. Plot each junction in a using geom_line().
library(tidyr)

traffic_junc <- traffic %>%
  pivot_longer(cols = starts_with("Junction"),
               names_to = "Junction",
               values_to = "TrafficFlow")

ggplot(traffic_junc, aes(x = Time, y = TrafficFlow, color = Junction)) +
  geom_line(size = 1) +
  geom_point(size = 2) +
  labs(title = "Traffic Flow at Each Junction",
       x = "Time",
       y = "Traffic Volume") +
  theme_minimal()
```

```
## 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.
```




```
#7. From alexa_file.xlsx, import it to your environment
library(readxl)

alexa_file <- read_excel("/cloud/project/alexa_file.xlsx")


#a. alexa_file observation  and  number of columns.

alexa_obs <- nrow(alexa_file)

alexa_col <- ncol(alexa_file)

alexa_obs
```

```
## [1] 3150
```

```
alexa_col
```

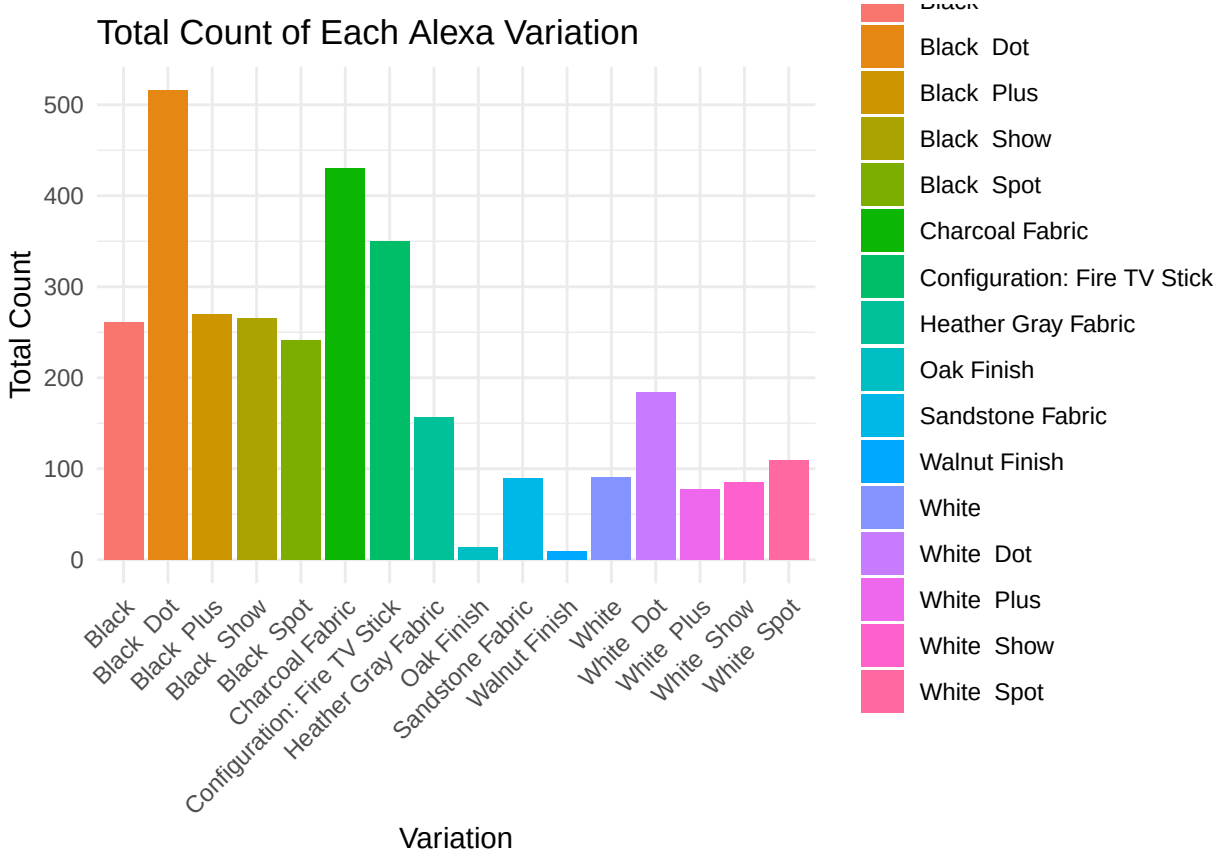
```
## [1] 5
```

```
#b. group the variations and get the total of each variations.

varg_each <- alexa_file %>%
  group_by(variation) %>%
  summarise(total = n())

varg_each
```

```
## # A tibble: 16 x 2
```

```
##    variation                    total
##    <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
```

```
#OUTPUT:
## A tibble: 16 × 2
#variation                    total
#<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.

ggplot(varg_each, aes(x = variation, y = total, fill = variation)) +
  geom_bar(stat = "identity") +
  labs(
    title = "Total Count of Each Alexa Variation",
    x = "Variation",
    y = "Total Count"
  ) +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```



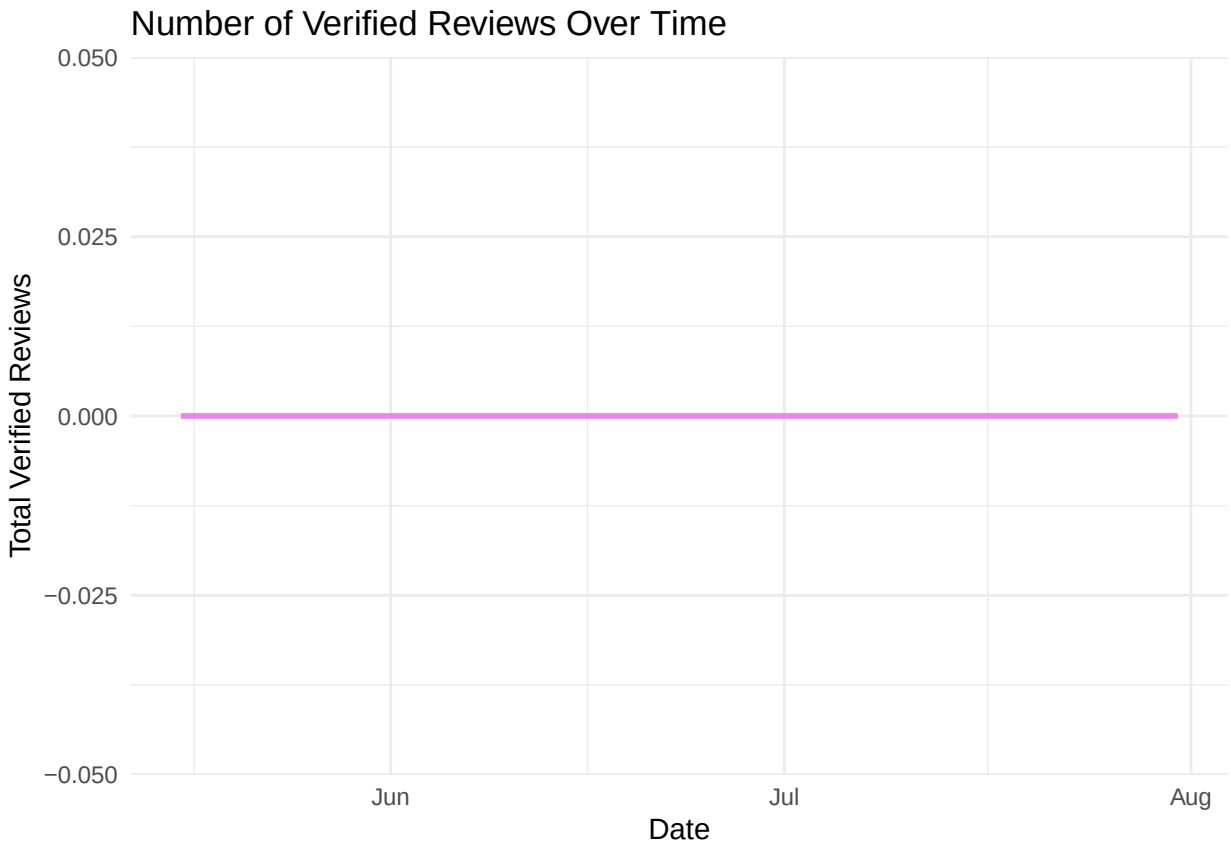

```
#d. Plot a geom_line() with the date and the number of verified reviews.

alexa_file$date <- as.Date(alexa_file$date, format="%Y-%m-%d")

alexa_file$verifiedreviews <- as.numeric(gsub(",", "", alexa_file$verified_reviews))
```

```
## Warning: NAs introduced by coercion
```

```
sum(is.na(alexa_file$verifiedreviews))
```

```
## [1] 3150
```

```
veri_reviews <- alexa_file %>%
  group_by(date) %>%
  summarise(totalverified = sum(verifiedreviews, na.rm = TRUE))

ggplot(veri_reviews, aes(x = date, y = totalverified)) +
  geom_line(color = "violet", linewidth = 1) +
  labs(
    title = "Number of Verified Reviews Over Time",
    x = "Date",
    y = "Total Verified Reviews"
  ) +
  theme_minimal()
```

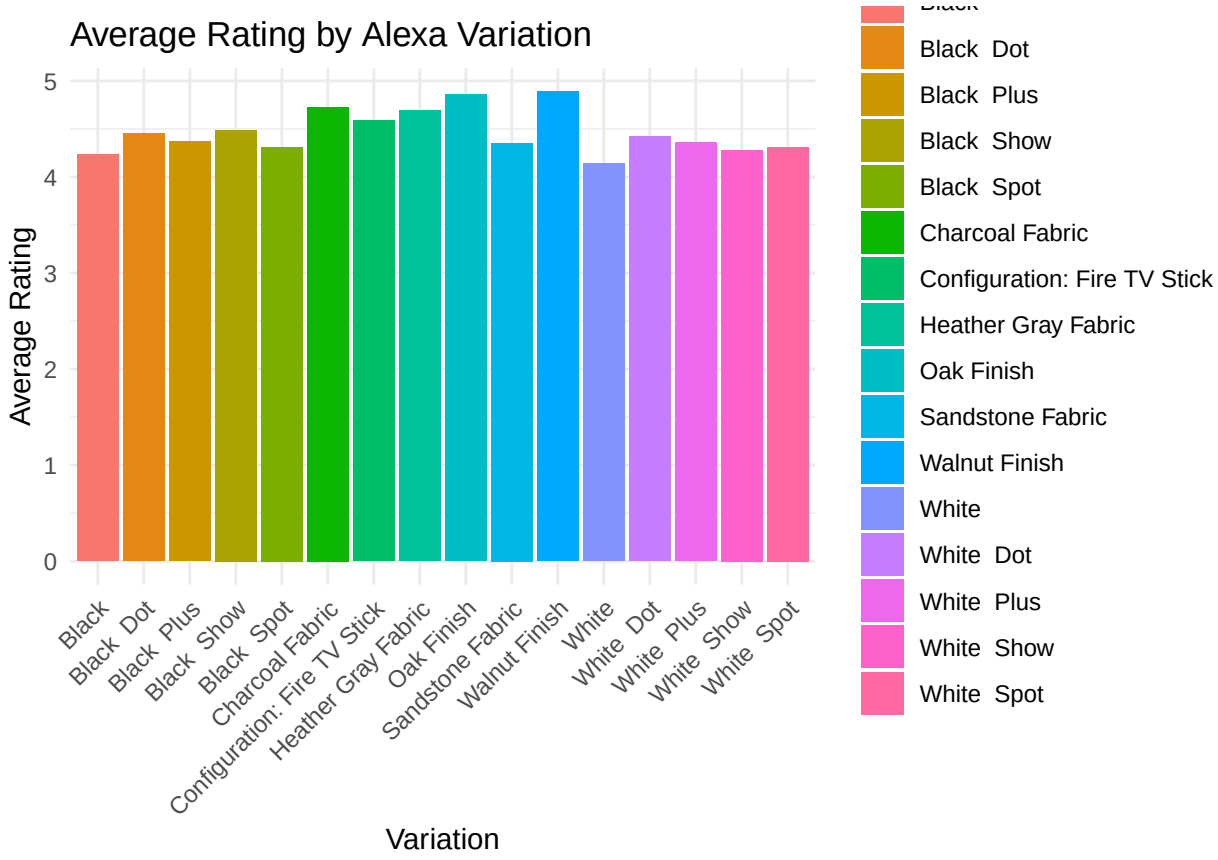



```
#e.relationship of variations and ratings and who got the most highest in rating.

high_rating <- alexa_file %>%
  group_by(variation) %>%
  summarise(avg_rating = mean(rating, na.rm = TRUE)) %>%
  arrange(desc(avg_rating))

high_rating
```

```
## # A tibble: 16 x 2
##    variation                    avg_rating
##    <chr>                             <dbl>
##  1 Walnut Finish                      4.89
##  2 Oak Finish                         4.86
##  3 Charcoal Fabric                    4.73
##  4 Heather Gray Fabric                4.69
##  5 Configuration: Fire TV Stick       4.59
##  6 Black  Show                        4.49
##  7 Black  Dot                         4.45
##  8 White  Dot                         4.42
##  9 Black  Plus                        4.37
## 10 White  Plus                        4.36
## 11 Sandstone Fabric                   4.36
## 12 White  Spot                        4.31
## 13 Black  Spot                        4.31
## 14 White  Show                        4.28
## 15 Black                              4.23
```

```
## 16 White                              4.14
```

```r
ggplot(high_rating, aes(x = variation, y = avg_rating, fill = variation)) +
  geom_bar(stat = "identity") +
  labs(
    title = "Average Rating by Alexa Variation",
    x = "Variation",
    y = "Average Rating"
  ) +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```




```r
#The variation that got the most highest in rating is the  Walnut Finish as it has the highest bar on t
```