RWorksheet_parita#4c

Daven Parita

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1.

```
library(ggplot2)
write.csv(mpg, "mpg.csv", row.names = FALSE)
mpg_data <- read.csv("mpg.csv", header = TRUE)
str(mpg_data)
```

```
## '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" ...
```

```
categorical_vars <- names(mpg_data)[sapply(mpg_data, function(x) is.character(x) | is.factor(x))]
categorical_vars
```

```
## [1] "manufacturer" "model"        "trans"        "drv"          "fl"
## [6] "class"
```

```
continuous_vars <- names(mpg_data)[sapply(mpg_data, is.numeric)]
continuous_vars
```

```
## [1] "displ" "year"  "cyl"   "cty"   "hwy"
```

2.

a.

```r
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
data(mpg)

manufacturer_counts <- mpg %>%
  group_by(manufacturer) %>%
  summarise(unique_models = n_distinct(model)) %>%
  arrange(desc(unique_models))

print("Unique models per manufacturer:")
```

```
## [1] "Unique models per manufacturer:"
```

```r
print(manufacturer_counts)
```

```
## # A tibble: 15 x 2
##    manufacturer unique_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
```

```r
top_manufacturer <- manufacturer_counts$manufacturer[1]
print(paste("Manufacturer with the most models:", top_manufacturer))
```

```
## [1] "Manufacturer with the most models: toyota"
```

```r
model_counts <- mpg %>%
  group_by(model) %>%
  summarise(variations = n()) %>%
  arrange(desc(variations))

print("Model variations:")
```

```
## [1] "Model variations:"
```

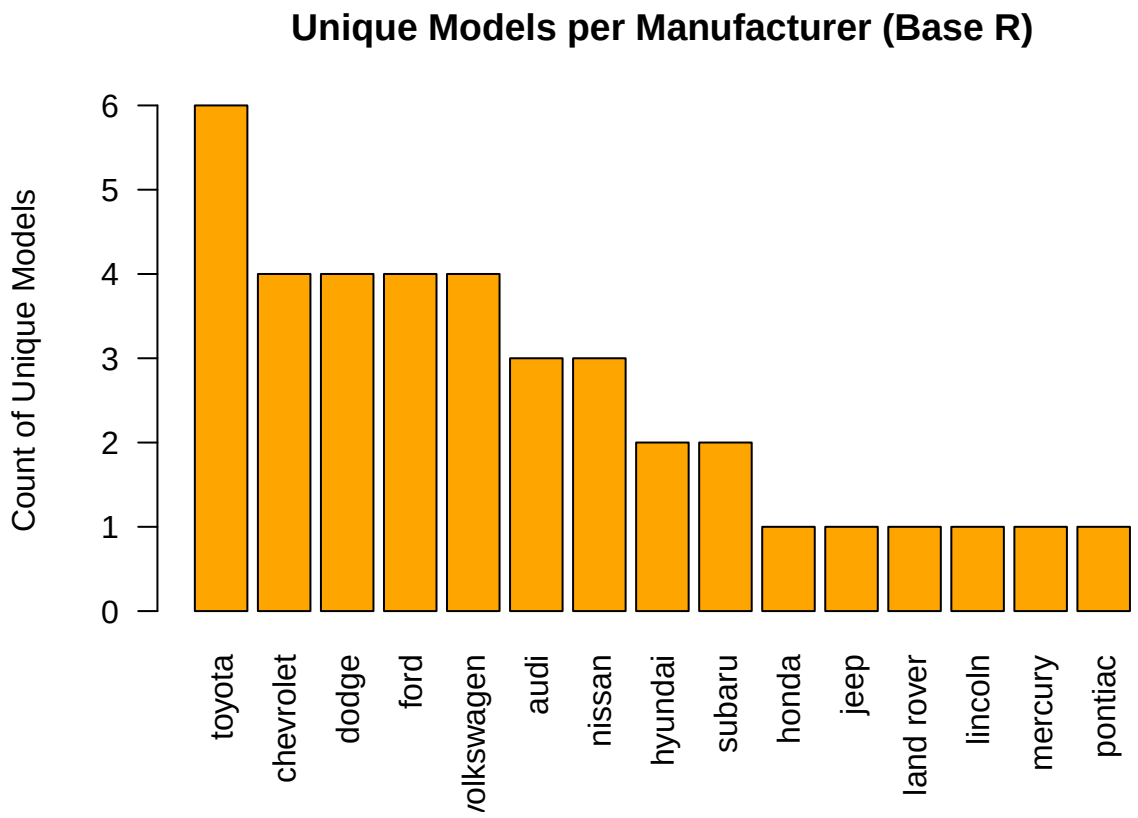
```r
print(model_counts)
```

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

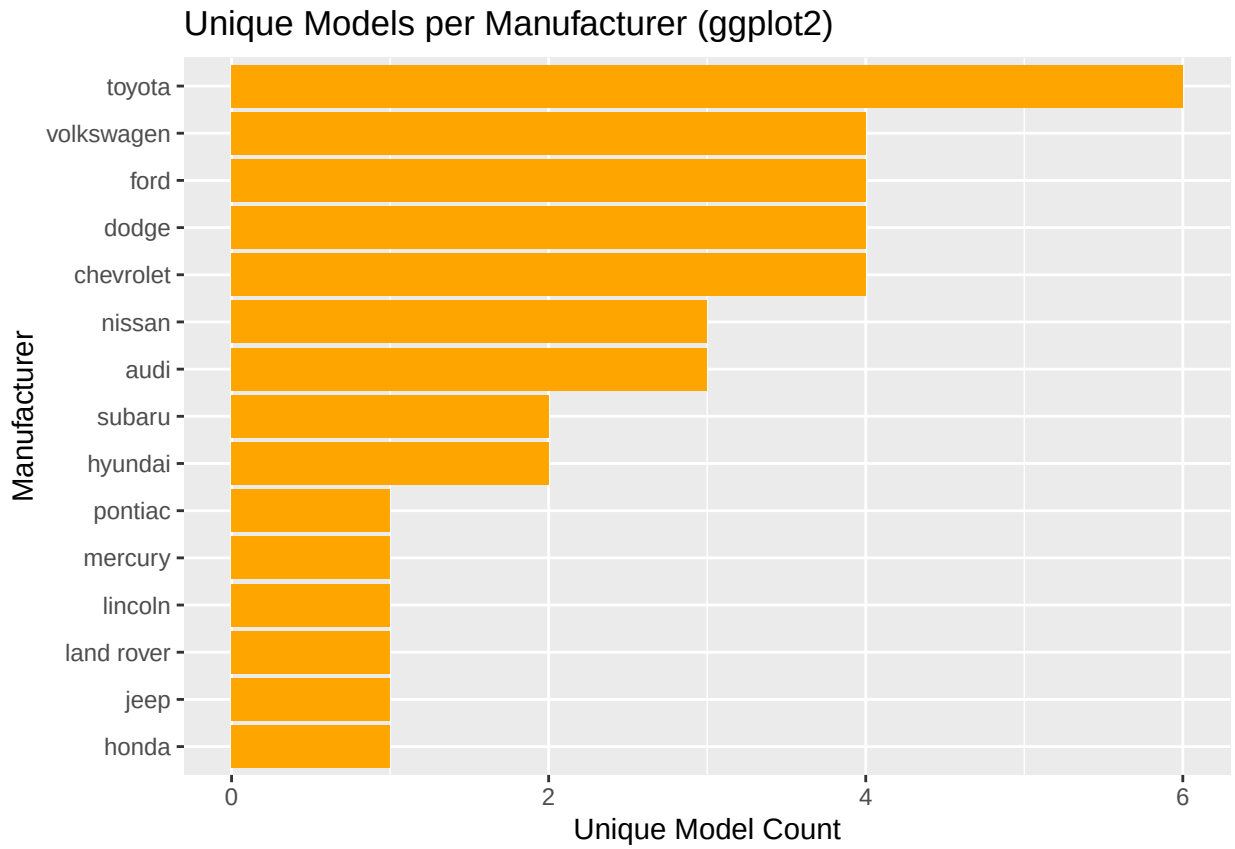
```r
top_model <- model_counts$model[1]
print(paste("Model with the most variations:", top_model))
```

```
## [1] "Model with the most variations: caravan 2wd"
```

```r
barplot(height = manufacturer_counts$unique_models,
        names.arg = manufacturer_counts$manufacturer,
        col = "orange",
        las = 2,
        main = "Unique Models per Manufacturer (Base R)",
        ylab = "Count of Unique Models")
```

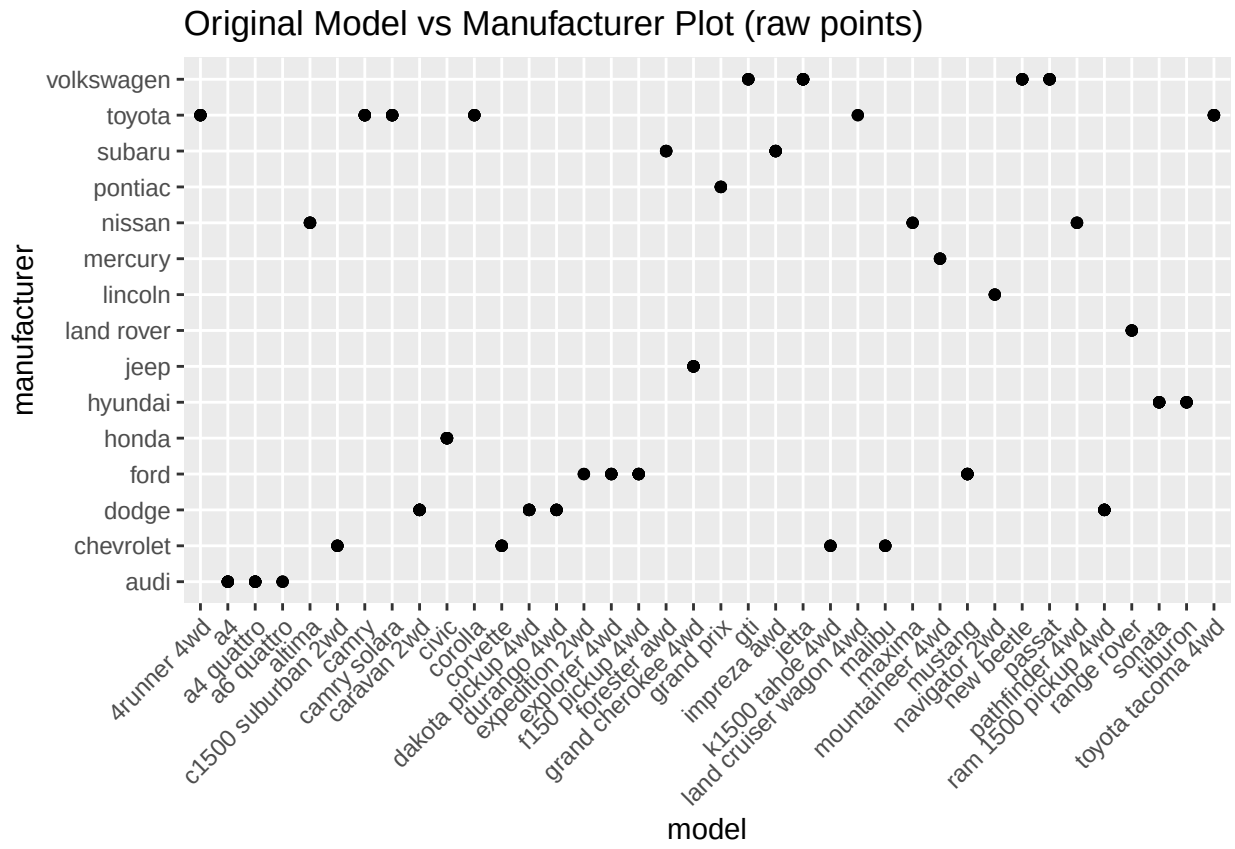



```r
ggplot(manufacturer_counts, aes(x = reorder(manufacturer, unique_models),
                                y = unique_models)) +
  geom_col(fill = "orange") +
  coord_flip() +
  labs(title = "Unique Models per Manufacturer (ggplot2)",
       x = "Manufacturer",
       y = "Unique Model Count")
```



b.

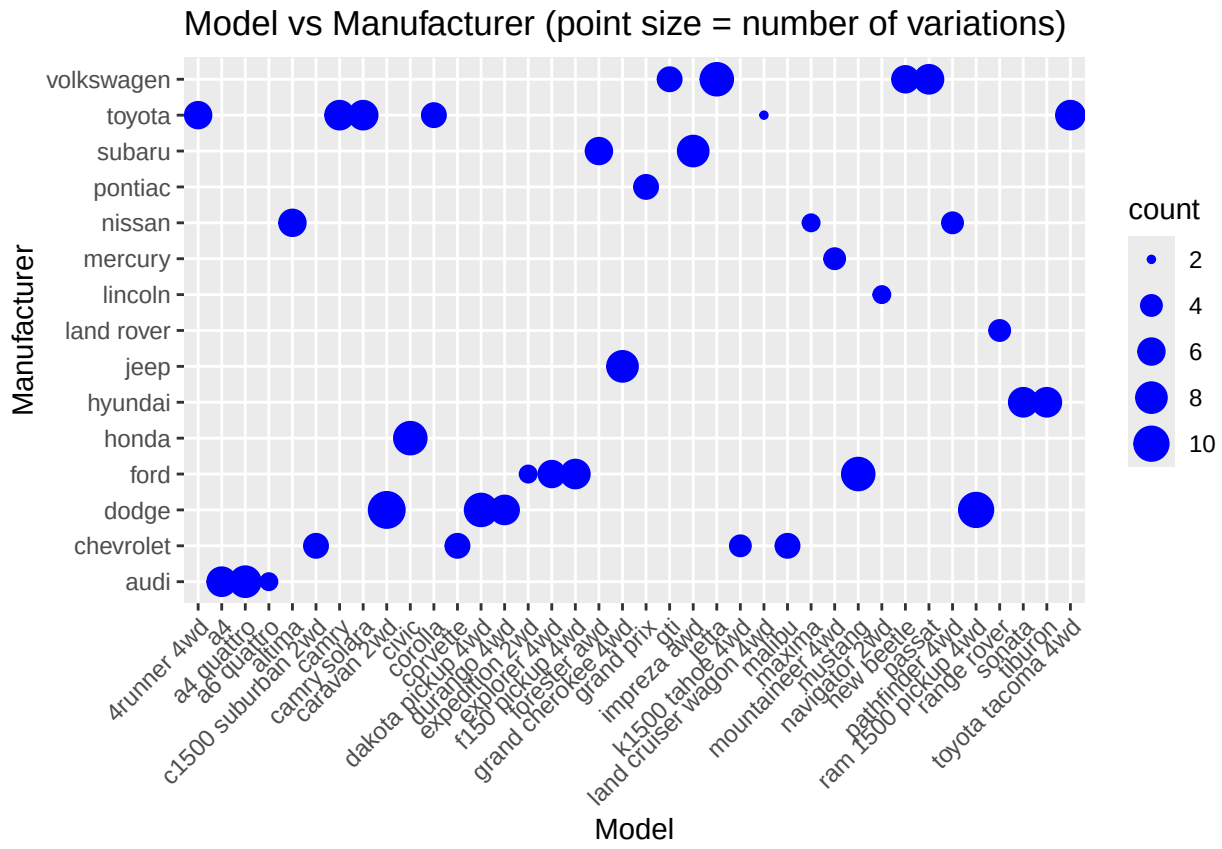
```
data(mpg)

ggplot(mpg, aes(model, manufacturer)) +
  geom_point() +
  labs(title = "Original Model vs Manufacturer Plot (raw points)") +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```




```
model_summary <- mpg %>%
  group_by(manufacturer, model) %>%
  summarise(count = n()) %>%
  ungroup()
```

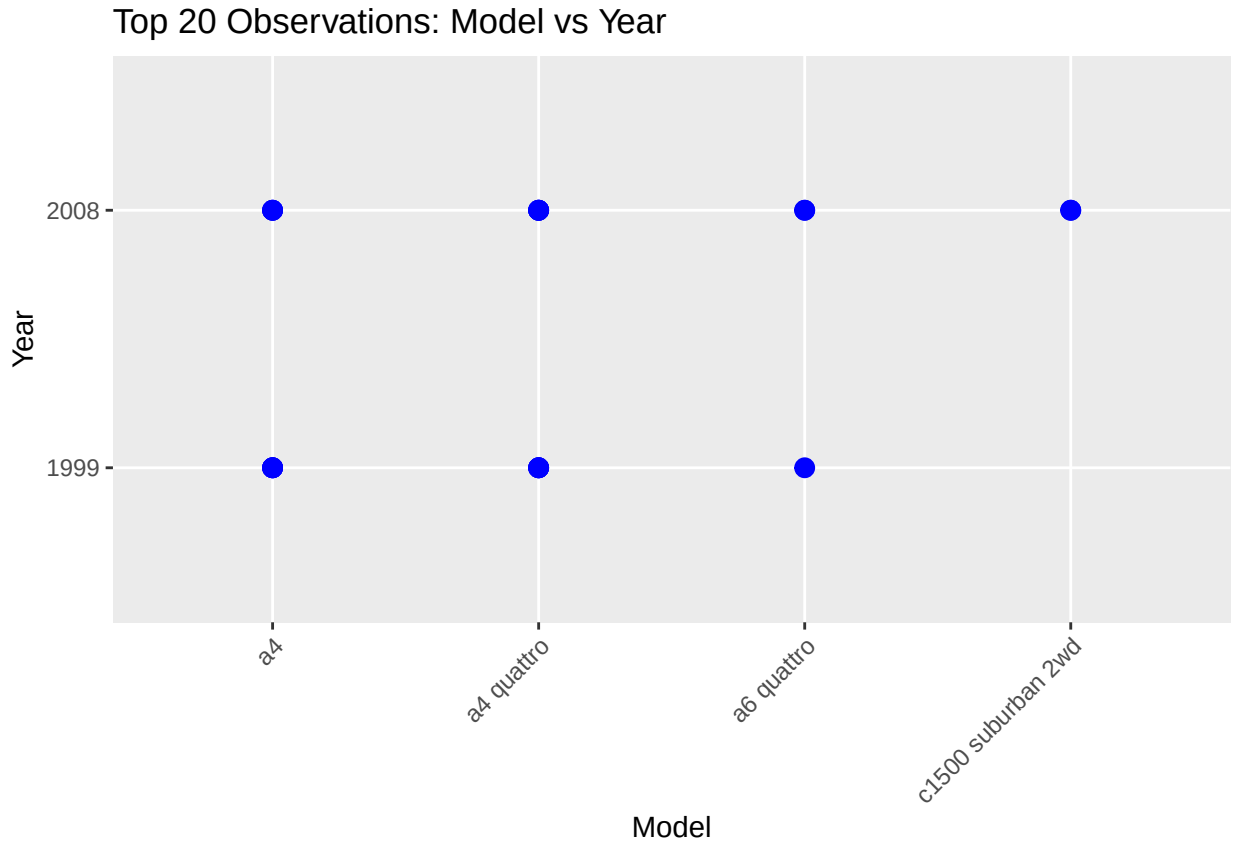
```
## `summarise()` has grouped output by 'manufacturer'. You can override using the
## `.groups` argument.
```

```
ggplot(model_summary, aes(x = model, y = manufacturer, size = count)) +
  geom_point(color = "blue") +
  theme(axis.text.x = element_text(angle = 45, hjust = 1)) +
  labs(title = "Model vs Manufacturer (point size = number of variations)",
       x = "Model",
       y = "Manufacturer")
```



3.

```
data(mpg)

top20 <- mpg %>% slice(1:20)

ggplot(top20, aes(x = model, y = factor(year))) +
  geom_point(color = "blue", size = 3) +
  theme(axis.text.x = element_text(angle = 45, hjust = 1)) +
  labs(title = "Top 20 Observations: Model vs Year",
       x = "Model",
       y = "Year")
```



4.

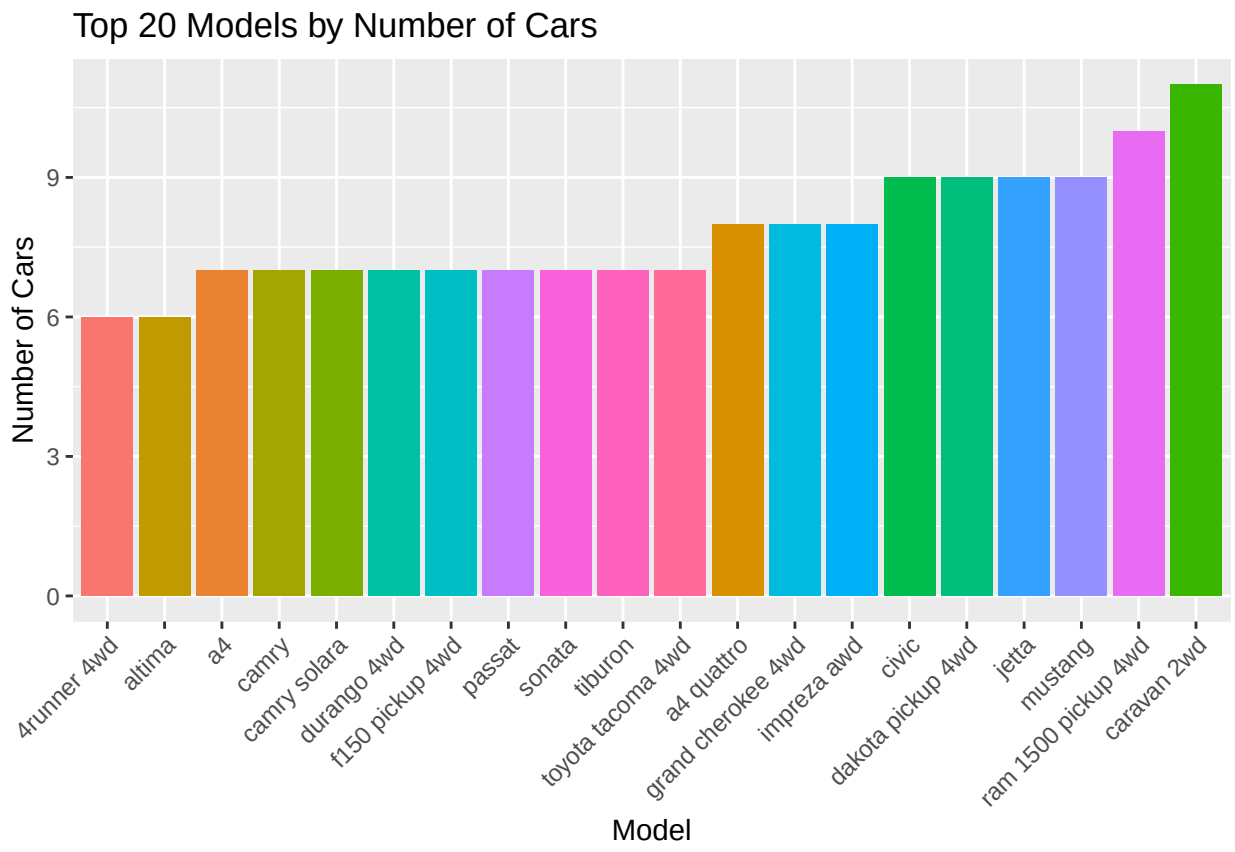
```
data(mpg)

model_count <- mpg %>%
  group_by(model) %>%
  summarise(num_cars = n()) %>%
  arrange(desc(num_cars))

print(model_count)
```

```
## # A tibble: 38 x 2
##    model               num_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
## # i 28 more rows
```

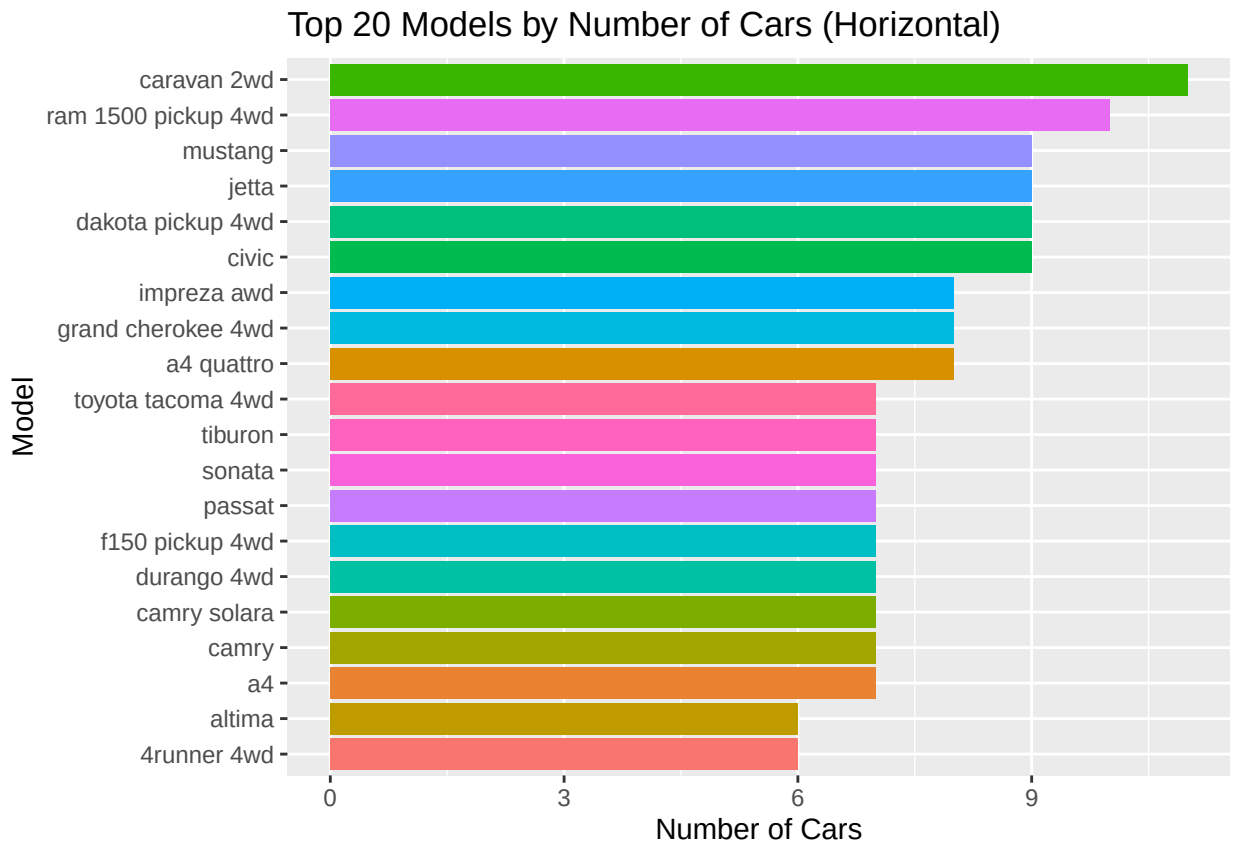
```
top20_models <- model_count %>% slice(1:20)

ggplot(top20_models, aes(x = reorder(model, num_cars), y = num_cars, fill = model)) +
  geom_bar(stat = "identity") +
  theme(axis.text.x = element_text(angle = 45, hjust = 1)) +
  labs(title = "Top 20 Models by Number of Cars",
       x = "Model",
       y = "Number of Cars") +
  guides(fill = FALSE)
```

```
## Warning: The '<scale>' argument of 'guides()' cannot be 'FALSE'. Use "none" instead as
## of ggplot2 3.3.4.
## This warning is displayed once every 8 hours.
## Call 'lifecycle::last_lifecycle_warnings()' to see where this warning was
## generated.
```



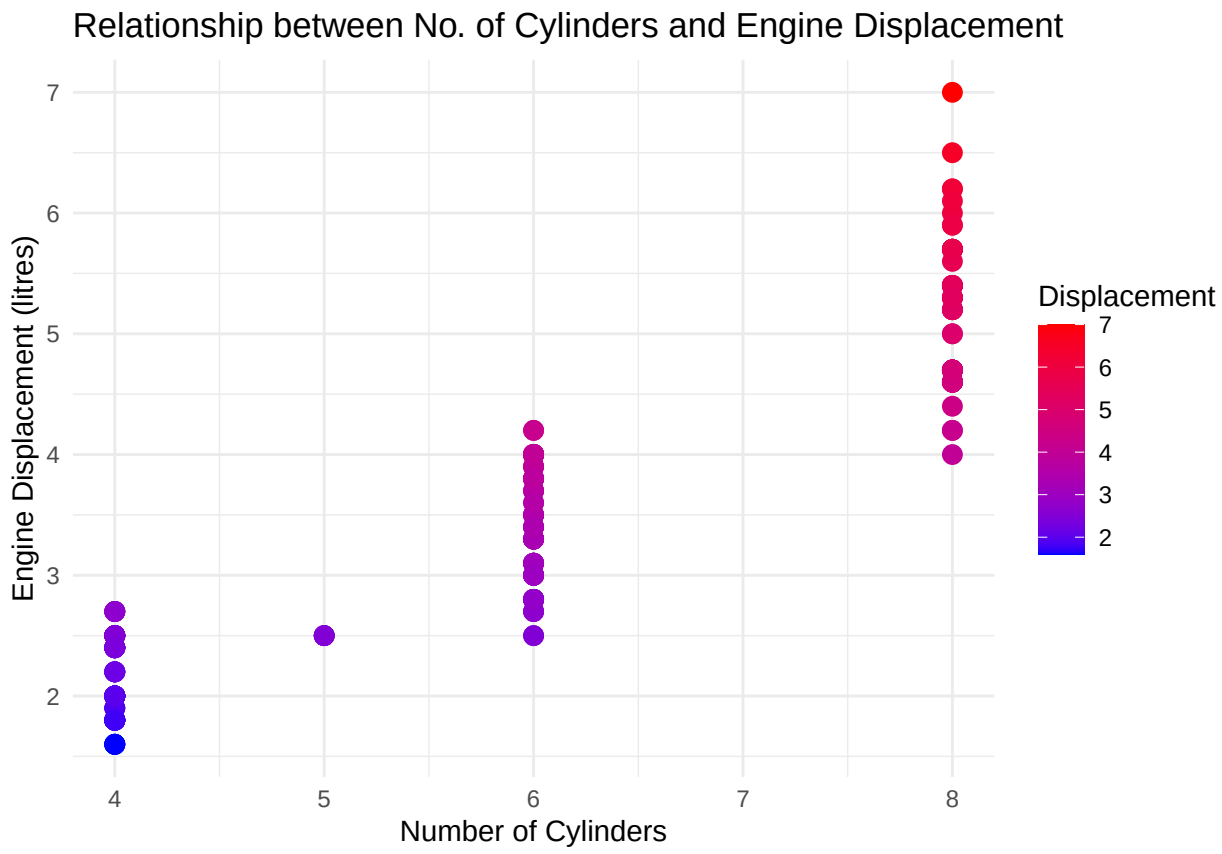

```
ggplot(top20_models, aes(x = reorder(model, num_cars), y = num_cars, fill = model)) +
  geom_bar(stat = "identity") +
  coord_flip() +
  labs(title = "Top 20 Models by Number of Cars (Horizontal)",
       x = "Model",
```

```
      y = "Number of Cars") +
  guides(fill = FALSE)
```



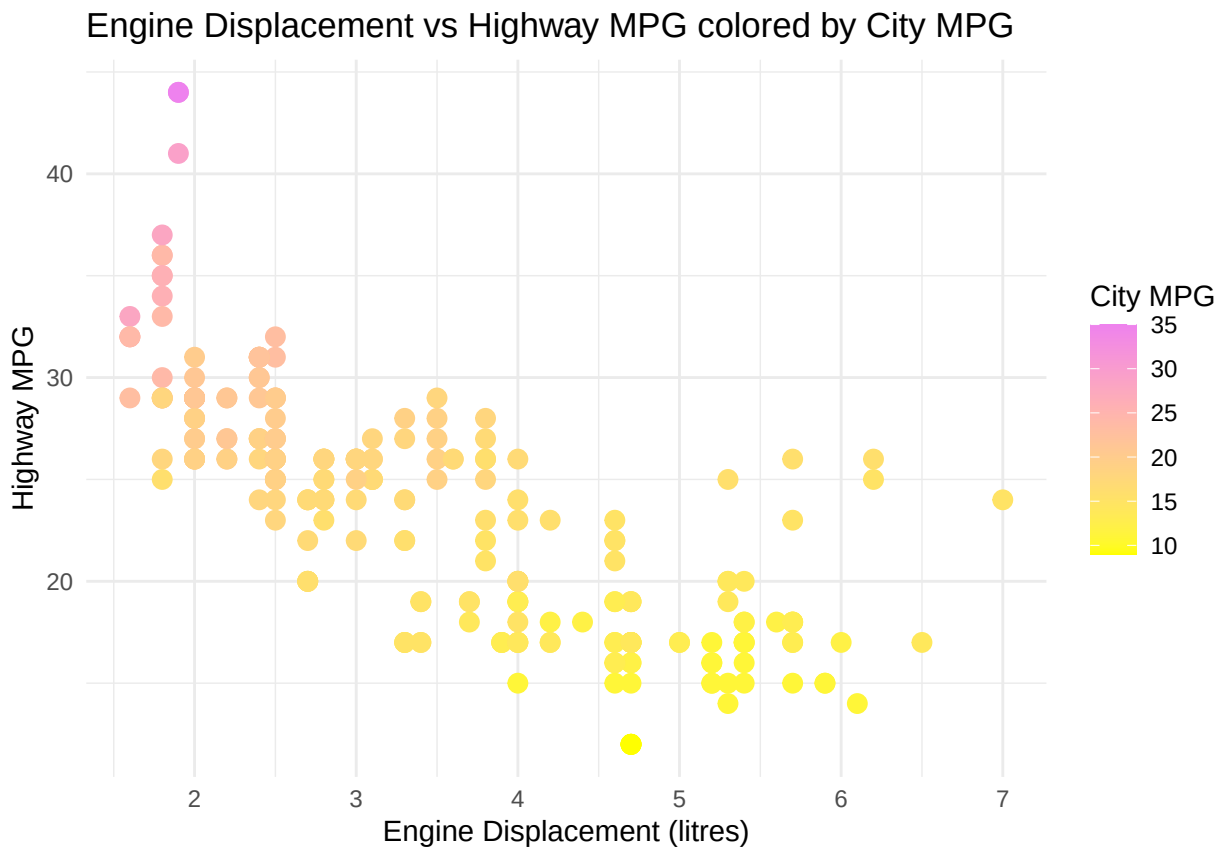
5.

```
data(mpg)

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



6.

```
data(mpg)

ggplot(mpg, aes(x = displ, y = hwy, color = cty)) +
  geom_point(size = 3) +
  scale_color_gradient(low = "yellow", high = "violet") +
  labs(title = "Engine Displacement vs Highway MPG colored by City MPG",
       x = "Engine Displacement (litres)",
       y = "Highway MPG",
       color = "City MPG") +
  theme_minimal()
```




```
traffic <- data.frame(
  Date = as.Date('2025-11-01') + 0:9,
  Location = rep(c("Intersection A", "Intersection B"), each = 5),
  Vehicles = c(120, 150, 130, 160, 140, 200, 210, 190, 205, 220),
  Average_Speed = c(35.5, 34.2, 36.0, 33.8, 34.5, 32.0, 31.5, 33.0, 30.8, 29.5)
)

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

traffic_data <- read.csv("traffic.csv", stringsAsFactors = FALSE)

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

```
## Number of observations: 10
```

```
cat("Variables in the traffic dataset:\n")
```

```
## Variables in the traffic dataset:
```

```
print(names(traffic_data))
```

```
## [1] "Date"          "Location"      "Vehicles"      "Average_Speed"
```

```r
junction_A <- traffic_data %>% filter(Location == "Intersection A")
junction_B <- traffic_data %>% filter(Location == "Intersection B")

print("Junction A data:")
```

```
## [1] "Junction A data:"
```

```r
print(junction_A)
```

```
##         Date       Location Vehicles Average_Speed
## 1 2025-11-01 Intersection A      120          35.5
## 2 2025-11-02 Intersection A      150          34.2
## 3 2025-11-03 Intersection A      130          36.0
## 4 2025-11-04 Intersection A      160          33.8
## 5 2025-11-05 Intersection A      140          34.5
```

```r
print("Junction B data:")
```

```
## [1] "Junction B data:"
```

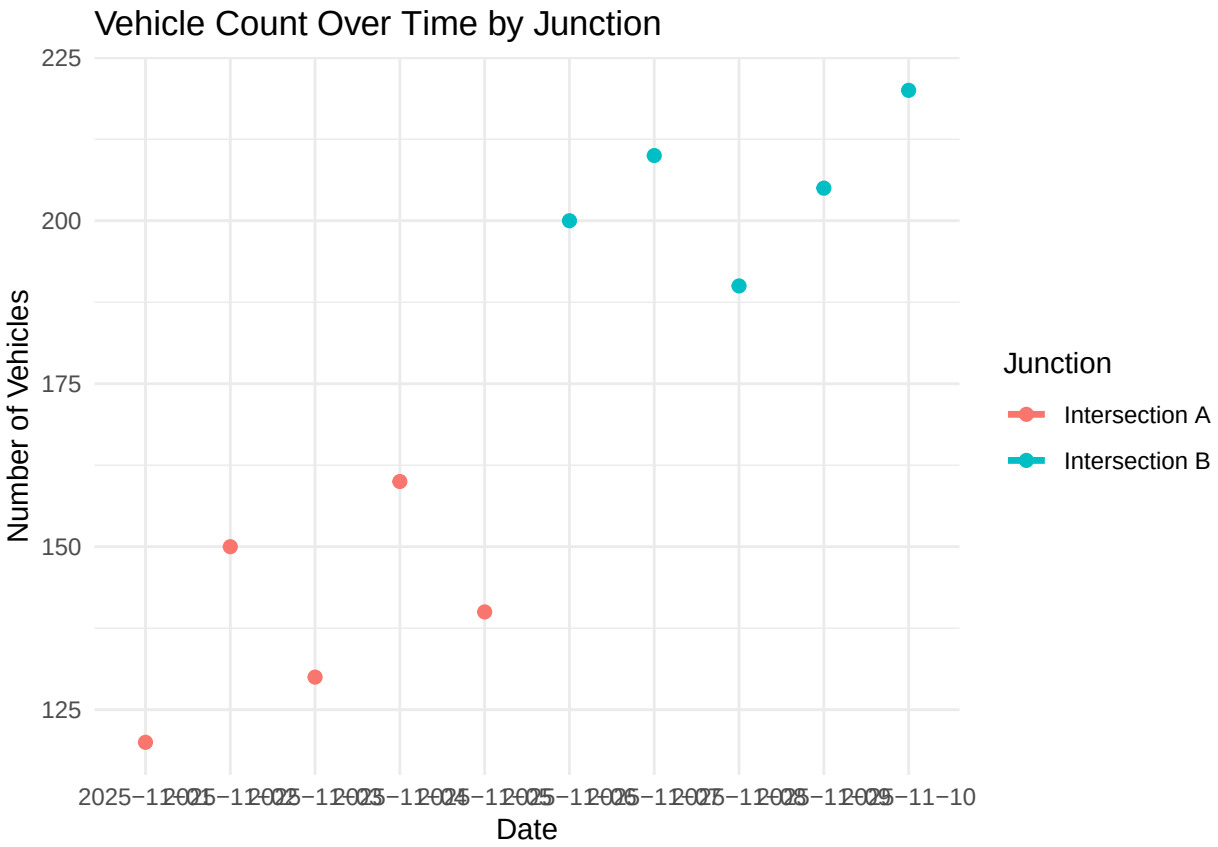
```r
print(junction_B)
```

```
##         Date       Location Vehicles Average_Speed
## 1 2025-11-06 Intersection B      200          32.0
## 2 2025-11-07 Intersection B      210          31.5
## 3 2025-11-08 Intersection B      190          33.0
## 4 2025-11-09 Intersection B      205          30.8
## 5 2025-11-10 Intersection B      220          29.5
```

```r
ggplot(traffic_data, aes(x = Date, y = Vehicles, color = Location)) +
  geom_line(size = 1.2) +
  geom_point(size = 2) +
  labs(title = "Vehicle Count Over Time by Junction",
       x = "Date",
       y = "Number of Vehicles",
       color = "Junction") +
  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.
```

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



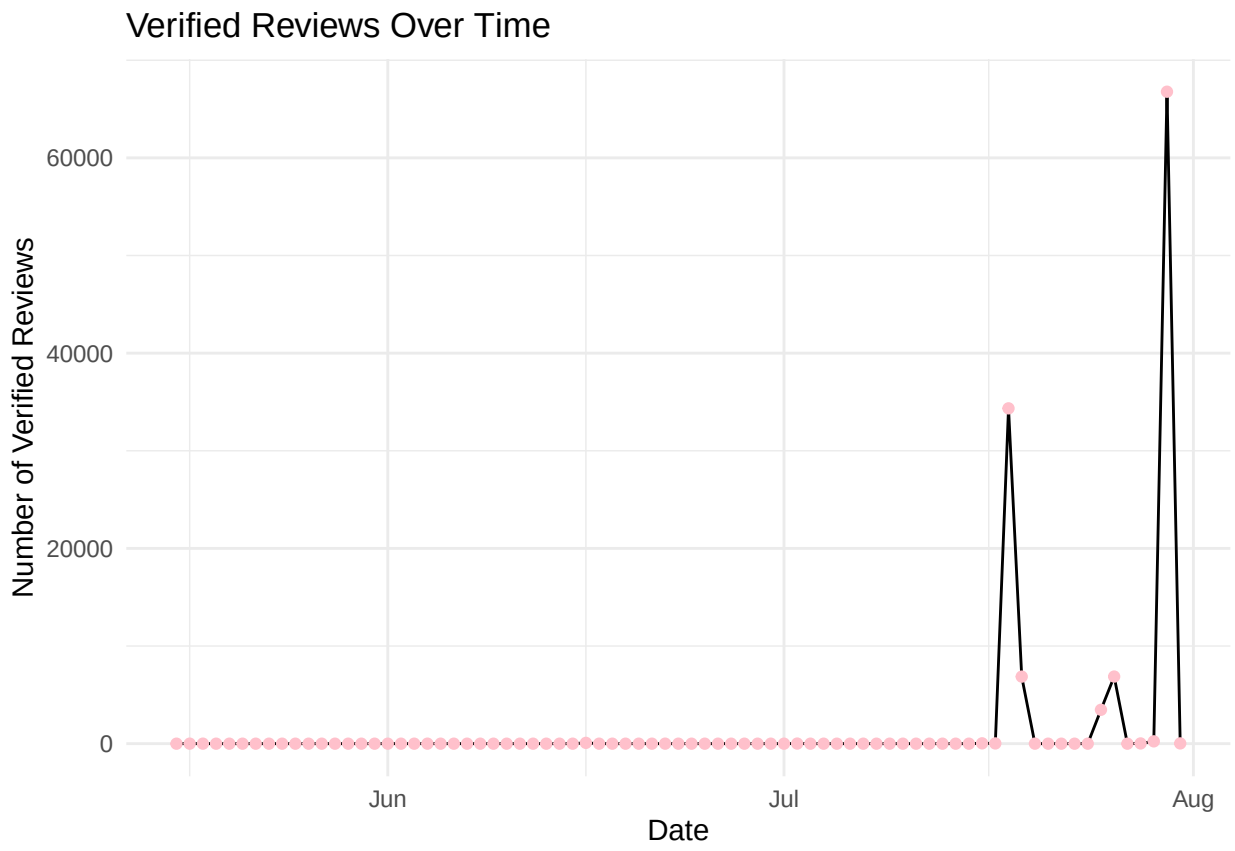
7.

```
library(readxl)

alexa <- read_excel("alexa_file.xlsx")

alexa <- alexa %>%
  mutate(
    verified_reviews = as.numeric(gsub("[^0-9.]", "", verified_reviews)),
    rating = as.numeric(gsub("[^0-9.]", "", rating)),
    date = as.Date(date)
  )
```

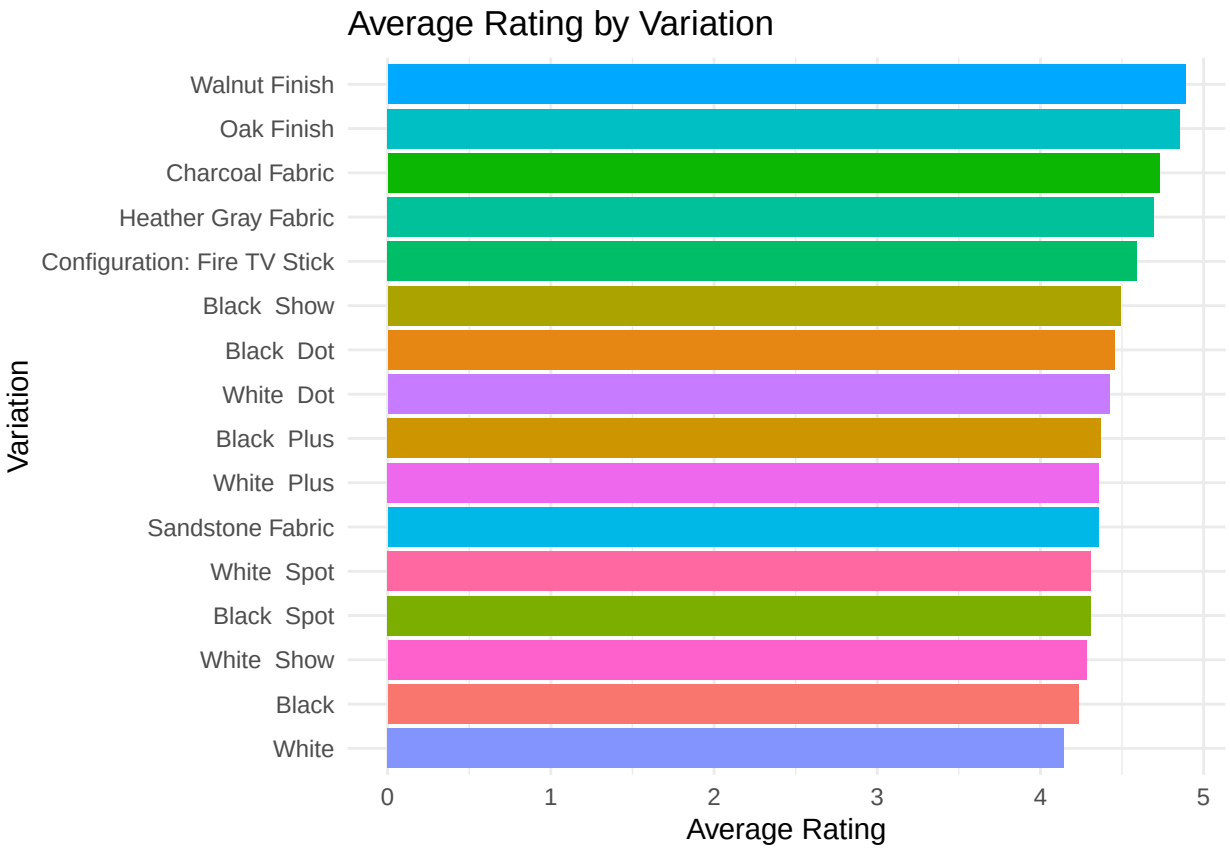
```
## Warning: There was 1 warning in `mutate()`.
## i In argument: `verified_reviews = as.numeric(gsub("[^0-9.]", "",
##   verified_reviews))`.
## Caused by warning:
## ! NAs introduced by coercion
```

```
reviews_over_time <- alexa %>%
  group_by(date) %>%
  summarise(total_reviews = sum(verified_reviews, na.rm = TRUE))
```

```
ggplot(reviews_over_time, aes(x = date, y = total_reviews)) +
  geom_line(color = "black") +
  geom_point(color = "pink") +
  labs(title = "Verified Reviews Over Time",
       x = "Date",
       y = "Number of Verified Reviews") +
  theme_minimal()
```




```
variation_rating <- alexa %>%
  group_by(variation) %>%
  summarise(avg_rating = mean(rating, na.rm = TRUE),
            count = n()) %>%
  arrange(desc(avg_rating))

ggplot(variation_rating, aes(x = reorder(variation, avg_rating), y = avg_rating, fill = variation)) +
  geom_col() +
  coord_flip() +
  labs(title = "Average Rating by Variation",
       x = "Variation",
       y = "Average Rating") +
  theme_minimal() +
  guides(fill = FALSE)
```


Average Rating by Variation
Walnut Finish
Oak Finish
Charcoal Fabric
Heather Gray Fabric
Configuration: Fire TV Stick
Black Show
Black Dot
White Dot
Black Plus
White Plus
Sandstone Fabric
White Spot
Black Spot
White Show
Black
White
Variation
0
1
2
3
4
5
Average Rating