Worksheet#6

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#worksheet6 #1)

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.2.2
```

```
data(mpg)
nrow(mpg)
```

```
## [1] 234
```

```
ncol(mpg)
```

```
## [1] 11
```

```
#Answer: The number of columns in a mpg dataset is 11 while the number of rows is 234.
```

#2)

#Answer:

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 4.2.2
```

```
##
## 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
mpg
```

```
## # A tibble: 234 x 11
##    manufacturer model      displ  year   cyl trans drv     cty   hwy fl    class
##    <chr>        <chr>      <dbl> <int> <int> <chr> <chr> <int> <int> <chr> <chr>
##  1 audi         a4           1.8  1999     4 auto~ f        18    29 p     comp~
##  2 audi         a4           1.8  1999     4 manu~ f        21    29 p     comp~
##  3 audi         a4           2    2008     4 manu~ f        20    31 p     comp~
##  4 audi         a4           2    2008     4 auto~ f        21    30 p     comp~
##  5 audi         a4           2.8  1999     6 auto~ f        16    26 p     comp~
##  6 audi         a4           2.8  1999     6 manu~ f        18    26 p     comp~
##  7 audi         a4           3.1  2008     6 auto~ f        18    27 p     comp~
##  8 audi         a4 quattro   1.8  1999     4 manu~ 4        18    26 p     comp~
##  9 audi         a4 quattro   1.8  1999     4 auto~ 4        16    25 p     comp~
## 10 audi         a4 quattro   2    2008     4 manu~ 4        20    28 p     comp~
## # ... with 224 more rows
```

```r
print(mpg)
```

```
## # A tibble: 234 x 11
##    manufacturer model      displ  year   cyl trans drv     cty   hwy fl    class
##    <chr>        <chr>      <dbl> <int> <int> <chr> <chr> <int> <int> <chr> <chr>
##  1 audi         a4           1.8  1999     4 auto~ f        18    29 p     comp~
##  2 audi         a4           1.8  1999     4 manu~ f        21    29 p     comp~
##  3 audi         a4           2    2008     4 manu~ f        20    31 p     comp~
##  4 audi         a4           2    2008     4 auto~ f        21    30 p     comp~
##  5 audi         a4           2.8  1999     6 auto~ f        16    26 p     comp~
##  6 audi         a4           2.8  1999     6 manu~ f        18    26 p     comp~
##  7 audi         a4           3.1  2008     6 auto~ f        18    27 p     comp~
##  8 audi         a4 quattro   1.8  1999     4 manu~ 4        18    26 p     comp~
##  9 audi         a4 quattro   1.8  1999     4 auto~ 4        16    25 p     comp~
## 10 audi         a4 quattro   2    2008     4 manu~ 4        20    28 p     comp~
## # ... with 224 more rows
```

```r
View(mpg)

most_model <- mpg %>%
  group_by(manufacturer) %>%
  tally(sort = TRUE)
most_model
```

```
## # A tibble: 15 x 2
##    manufacturer     n
##    <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
```

```
most_variations <- mpg %>%
  group_by(model) %>%
  tally(sort = TRUE)
most_variations
```

```
## # A tibble: 38 x 2
##    model                   n
##    <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
## # ... with 28 more rows
```

#Dodge has the most models in this data set and the model that has the most variations is caravan 2wd.

#a.

```
data1 <- mpg
u_models <- data1 %>% group_by(manufacturer, model) %>%
  distinct() %>% count()
u_models
```

```
## # A tibble: 38 x 3
## # Groups:   manufacturer, model [38]
##    manufacturer model                  n
##    <chr>        <chr>              <int>
##  1 audi         a4                     7
##  2 audi         a4 quattro             8
##  3 audi         a6 quattro             3
##  4 chevrolet    c1500 suburban 2wd     4
##  5 chevrolet    corvette               5
##  6 chevrolet    k1500 tahoe 4wd        4
##  7 chevrolet    malibu                 5
##  8 dodge        caravan 2wd            9
##  9 dodge        dakota pickup 4wd      8
## 10 dodge        durango 4wd            6
## # ... with 28 more rows
```

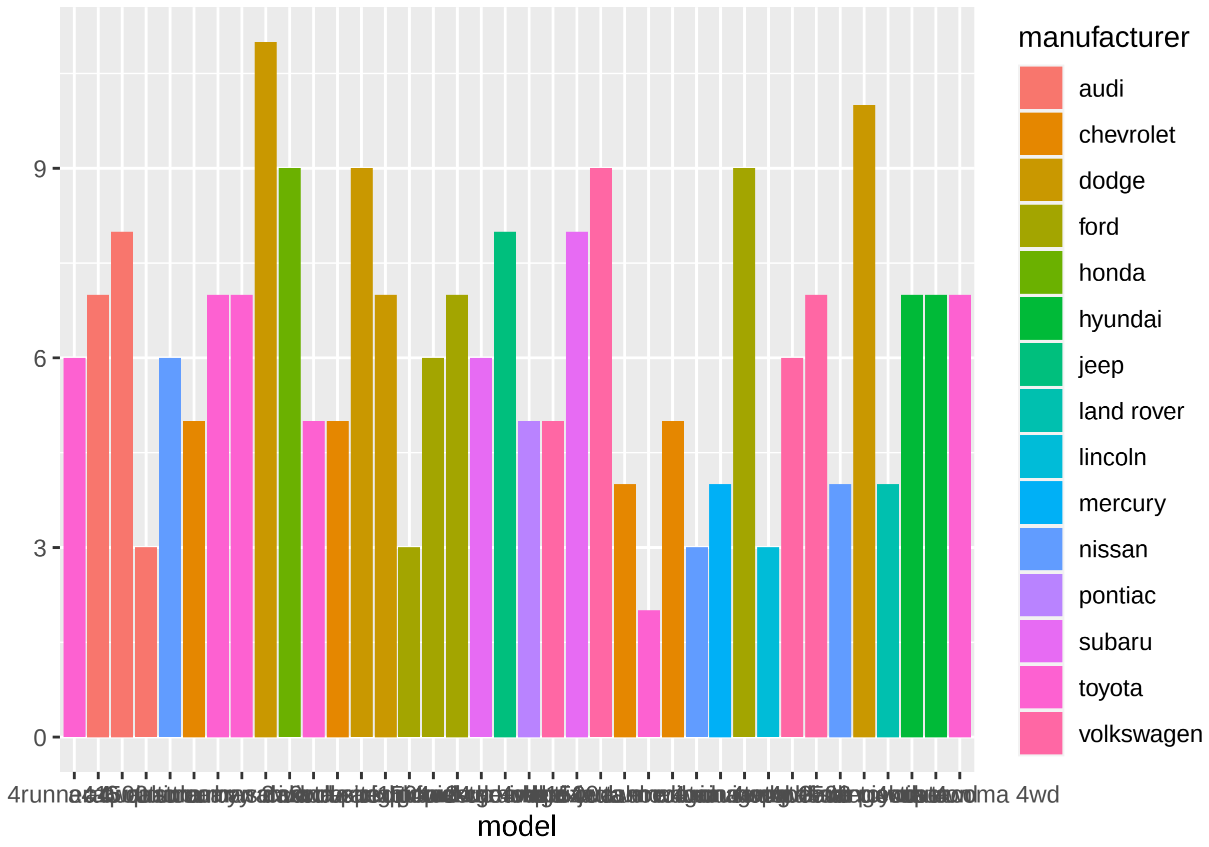
```
colnames(u_models) <- c("Manufacturer", "Model", "Counts")
u_models
```

```
## # A tibble: 38 x 3
## # Groups:   Manufacturer, Model [38]
##    Manufacturer Model              Counts
##    <chr>        <chr>               <int>
##  1 audi         a4                      7
##  2 audi         a4 quattro              8
##  3 audi         a6 quattro              3
##  4 chevrolet    c1500 suburban 2wd      4
##  5 chevrolet    corvette                5
##  6 chevrolet    k1500 tahoe 4wd         4
##  7 chevrolet    malibu                  5
##  8 dodge        caravan 2wd             9
##  9 dodge        dakota pickup 4wd       8
## 10 dodge        durango 4wd             6
## # ... with 28 more rows
```

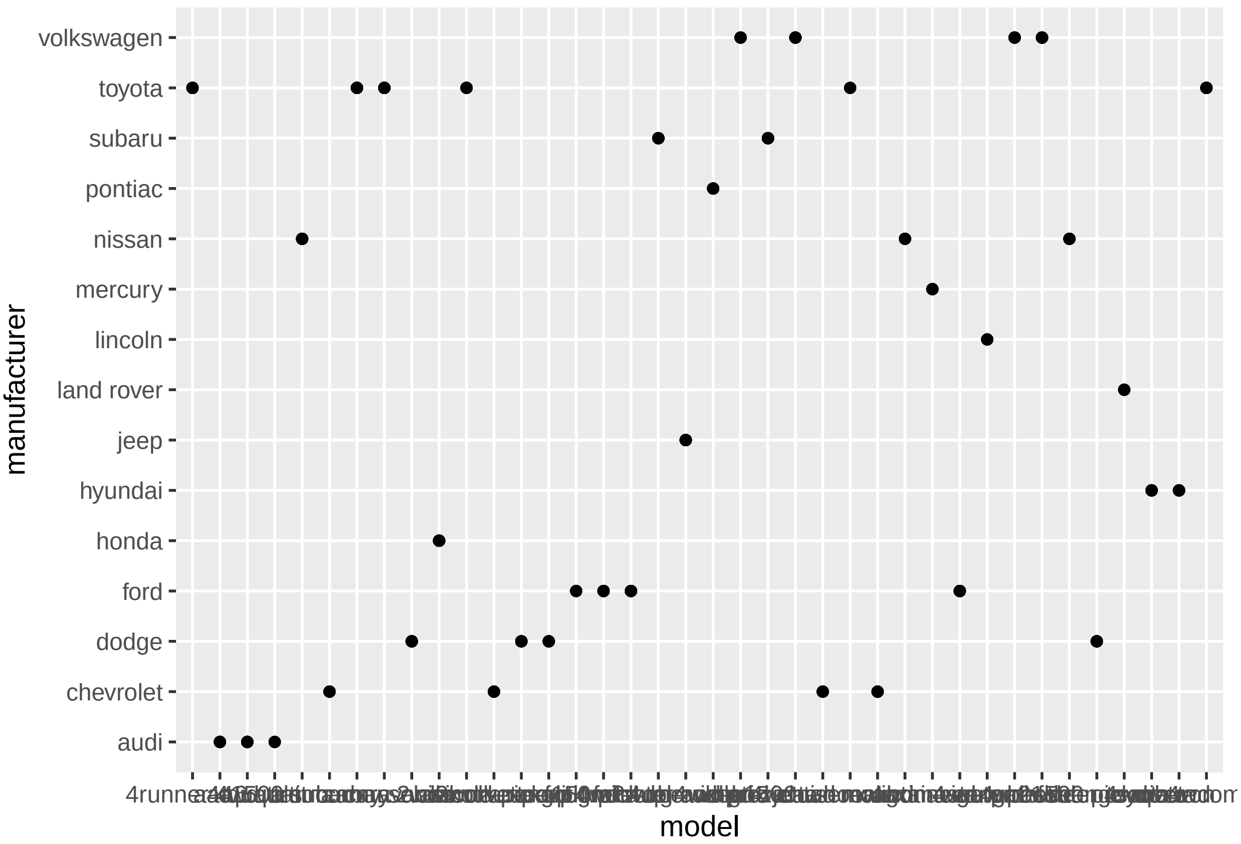
#b.

```
qplot(model, data = mpg,geom = "bar", fill=manufacturer)
```

```
## Warning: ‘qplot()‘ was deprecated in ggplot2 3.4.0.
```



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



#3)

```
data1 <- mpg
u_models <- data1 %>% group_by(manufacturer, model) %>%
  distinct() %>% count()
u_models
```

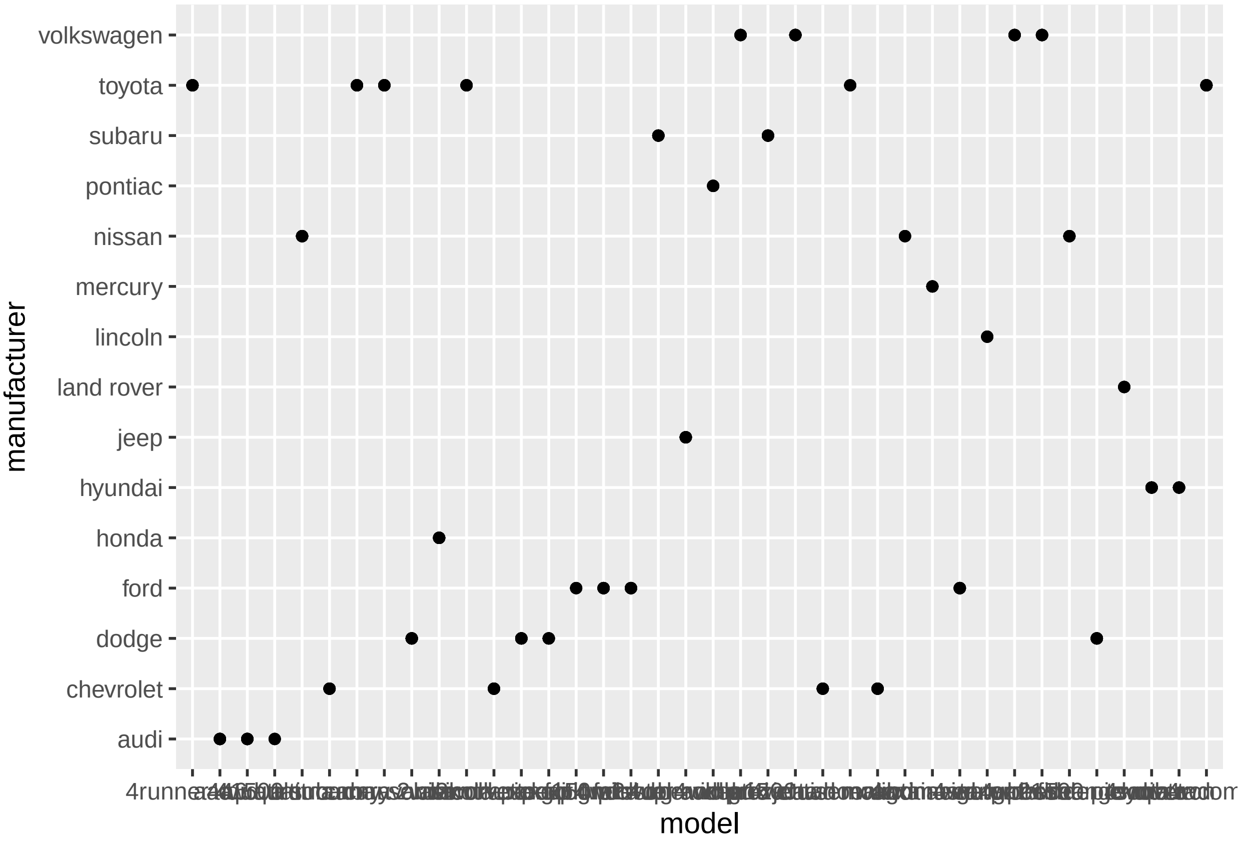
```
## # A tibble: 38 x 3
## # Groups:   manufacturer, model [38]
##    manufacturer model                  n
##    <chr>        <chr>              <int>
##  1 audi         a4                     7
##  2 audi         a4 quattro             8
##  3 audi         a6 quattro             3
##  4 chevrolet    c1500 suburban 2wd     4
##  5 chevrolet    corvette               5
##  6 chevrolet    k1500 tahoe 4wd        4
##  7 chevrolet    malibu                 5
##  8 dodge        caravan 2wd            9
##  9 dodge        dakota pickup 4wd      8
## 10 dodge        durango 4wd            6
## # ... with 28 more rows
```

```
colnames(u_models) <- c("Manufacturer", "Model", "Counts")
u_models
```

```
## # A tibble: 38 x 3
## # Groups:   Manufacturer, Model [38]
##    Manufacturer Model              Counts
##    <chr>        <chr>               <int>
##  1 audi         a4                      7
##  2 audi         a4 quattro              8
##  3 audi         a6 quattro              3
##  4 chevrolet    c1500 suburban 2wd      4
##  5 chevrolet    corvette                5
##  6 chevrolet    k1500 tahoe 4wd         4
##  7 chevrolet    malibu                  5
##  8 dodge        caravan 2wd             9
##  9 dodge        dakota pickup 4wd       8
## 10 dodge        durango 4wd             6
## # ... with 28 more rows
```

#a.

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



#Answer: This code shows a geometric point graph of model and manufacturer of the mpg data set.

#b.

#Answer: For me, the plot is already useful if you want to find a specific model and what #manufacturer made it, then this plot can really help you find the information that you need.

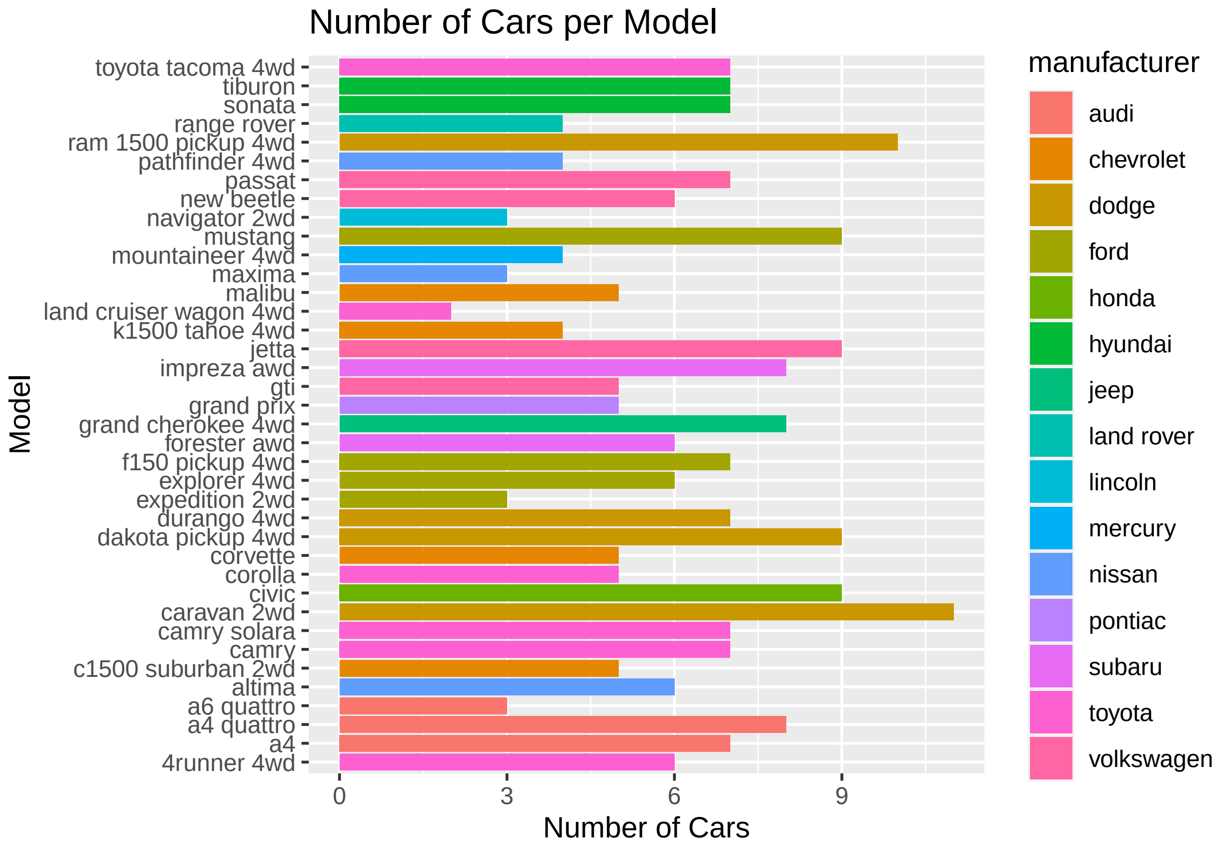
#4)

```
data2 <- u_models %>% group_by(Model) %>% count()
colnames(data2) <- c("Model","Counts")
data2
```

```
## # A tibble: 38 x 2
## # Groups:   Model [38]
##    Model              Counts
##    <chr>               <int>
##  1 4runner 4wd             1
##  2 a4                      1
##  3 a4 quattro              1
##  4 a6 quattro              1
##  5 altima                  1
##  6 c1500 suburban 2wd      1
##  7 camry                   1
##  8 camry solara            1
##  9 caravan 2wd             1
## 10 civic                   1
## # ... with 28 more rows
```

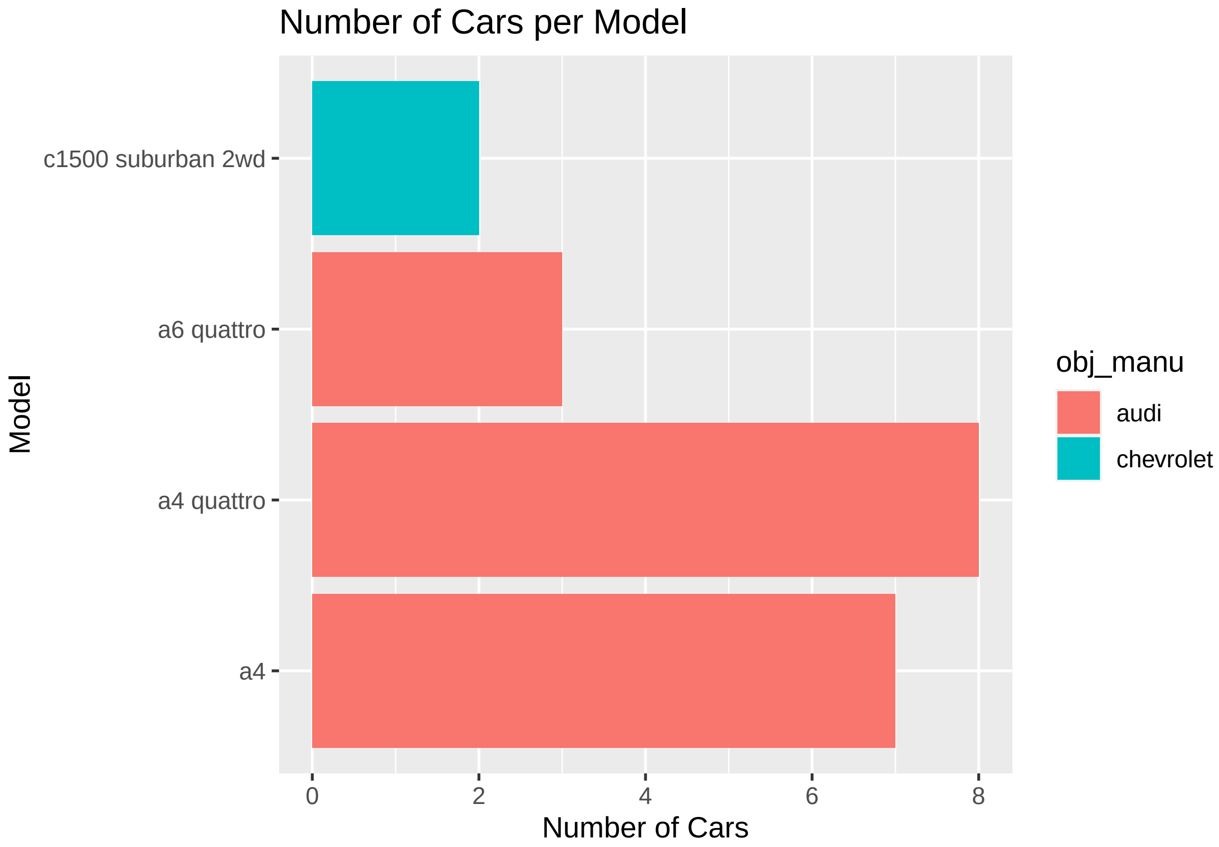
#a.

```
qplot(model, data= mpg, main= "Number of Cars per Model",
      xlab= "Model", ylab= "Number of Cars", geom= "bar", fill= manufacturer) + coord_flip()
```



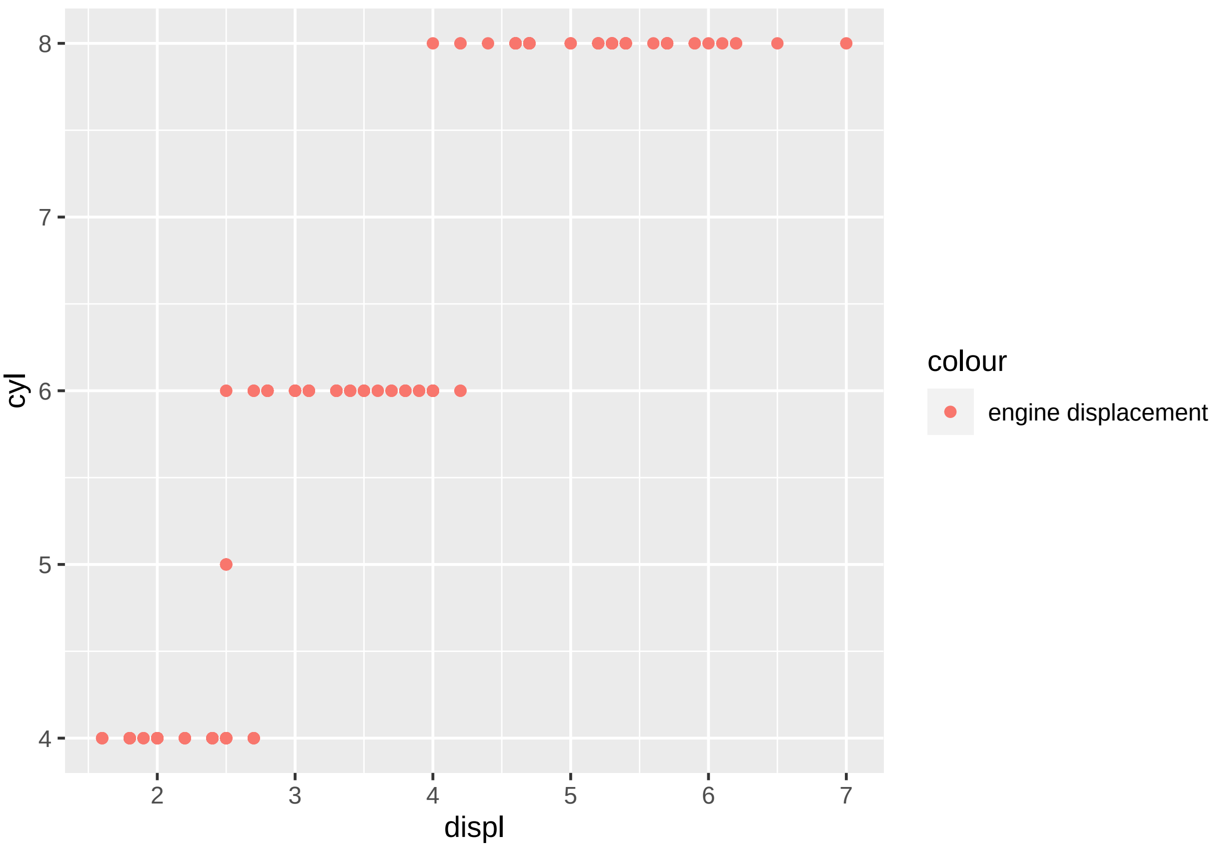
#b.

```
data1 <- subset(mpg[c(1:20),c(1:11)])
obj_manu <- mpg$manufacturer[1:20]
obj_mode <- mpg$model[1:20]

qplot(obj_mode, data = data1, main = "Number of Cars per Model",
      xlab = "Model",ylab = "Number of Cars", geom = "bar", fill = obj_manu) + coord_flip()
```



#5) #a.

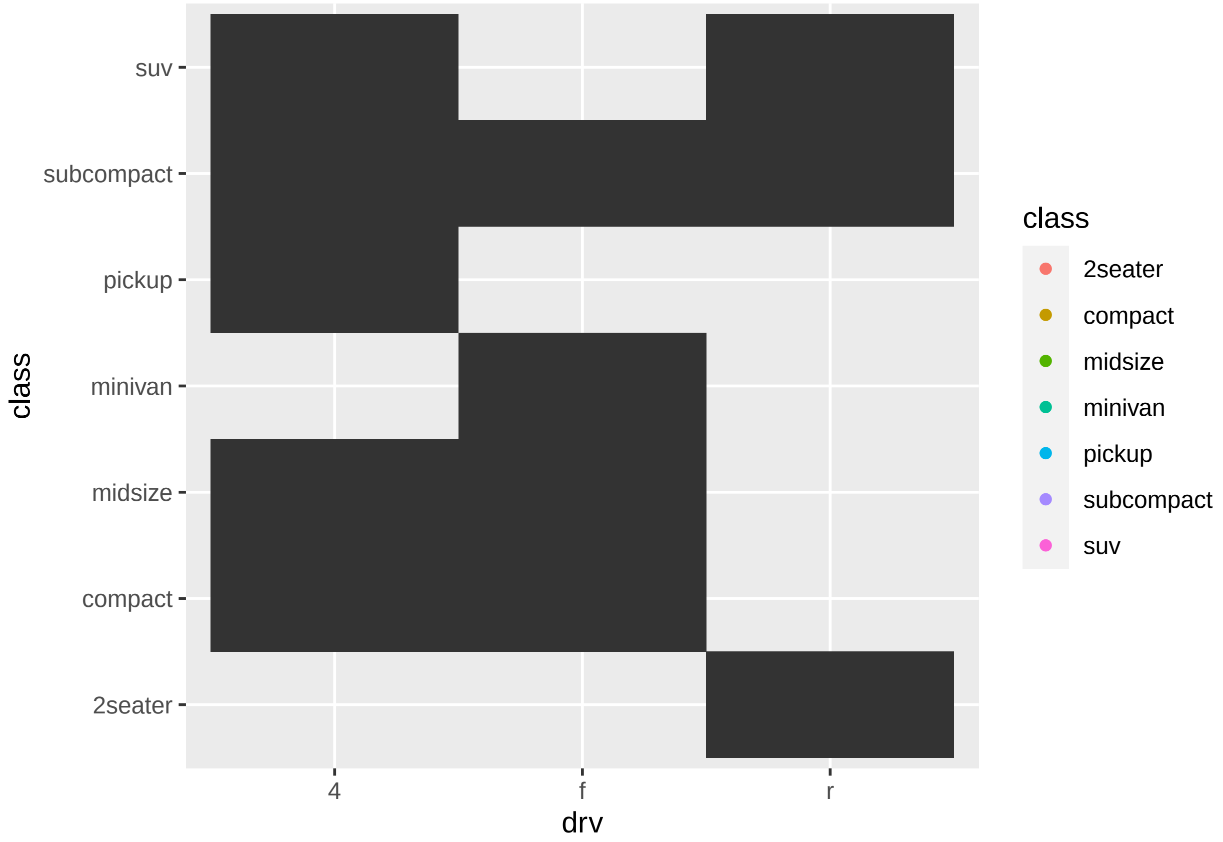
```
ggplot(data = mpg , mapping = aes(x = displ,
                                   y = cyl, main = "Relationship between No. of Cylinders and Engine Disp
  geom_point(mapping=aes(colour = "engine displacement"))
```



#b. #Answer: In the y axis we have the number of cylinders and in the x axis we have the displacement, #the red dots represents the engine displacement. The plot is about the ctlinders by displacement.

#6) #a.

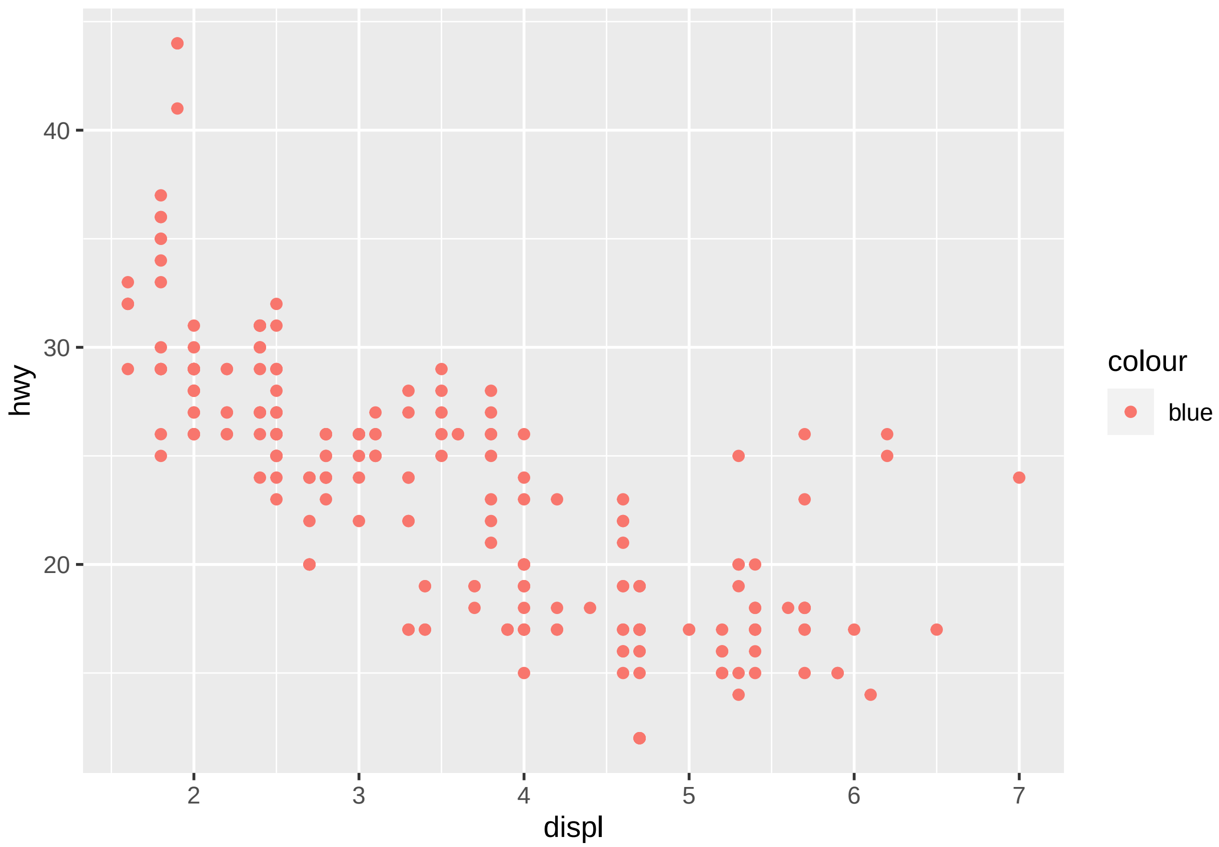
```
ggplot(data= mpg, mapping= aes(x= drv, y= class)) +
  geom_point(mapping= aes(color= class)) + geom_tile()
```



#b. #Answer: It is class by the type of drive train, where f = front-wheel drive, #r = rear wheel drive, 4 = 4wd. The plot looks like a heatmap but the color is black. #The class or the legend has color representations but the plot doesn't have any color.

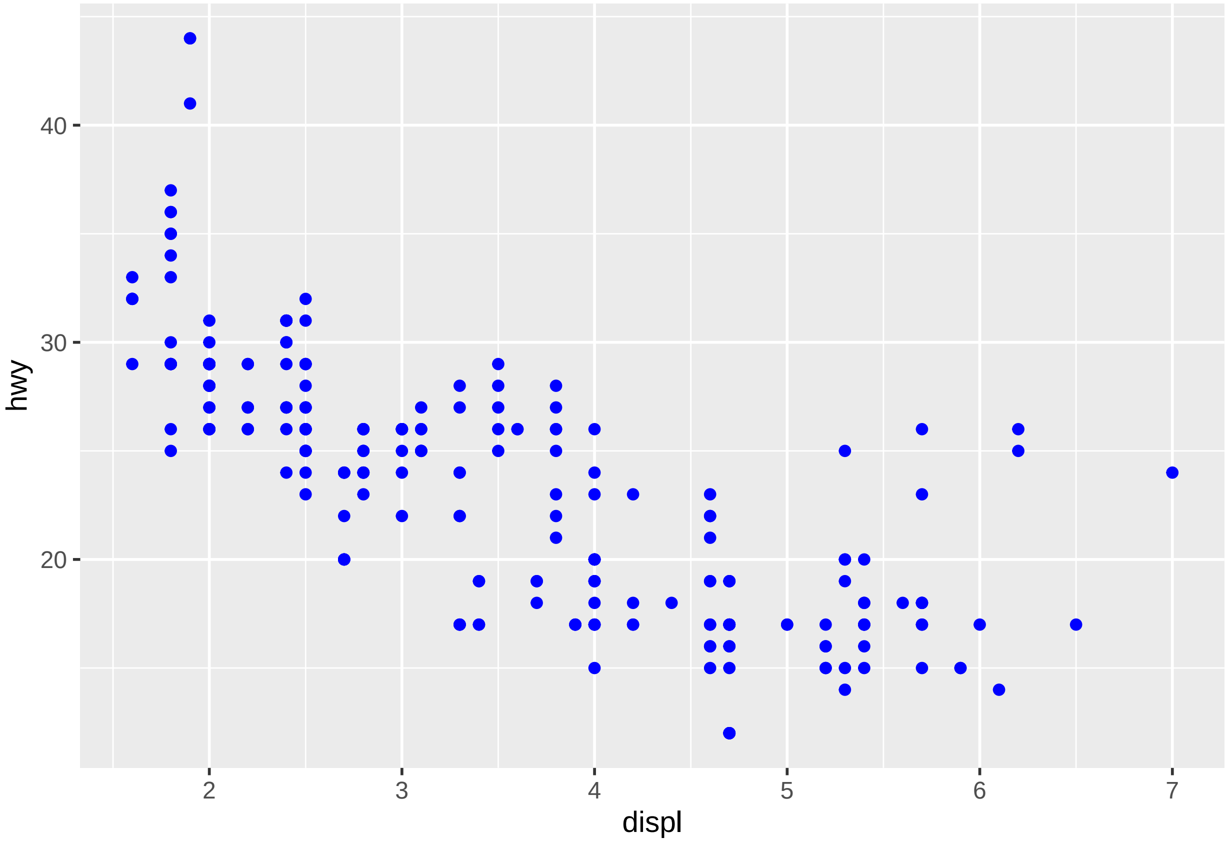
#7) #Code 1.

```
ggplot(data = mpg) + geom_point(mapping = aes(x = displ, y = hwy, colour = "blue"))
```



#Code 2.

```
ggplot(data = mpg) + geom_point(mapping = aes(x = displ, y = hwy), colour = "blue")
```



#Answer: The difference between code 1 and code 2 is that in code 1 colour is for #representing what the dot is. It is basically a legend, while in code 2 it is #for changing the color of the dots.

#8) ?mpg #Answer: The result of the command is that it opened up the help tab. It gave the title #Fuel economy data from 1999 to 2008 for 38 popular models of cars, it gave a short description, #usage, and format.

#a. #Answer: The variables that are categorical in the mpg data set are #manufacturer, model, trans, drv, fl, and class.

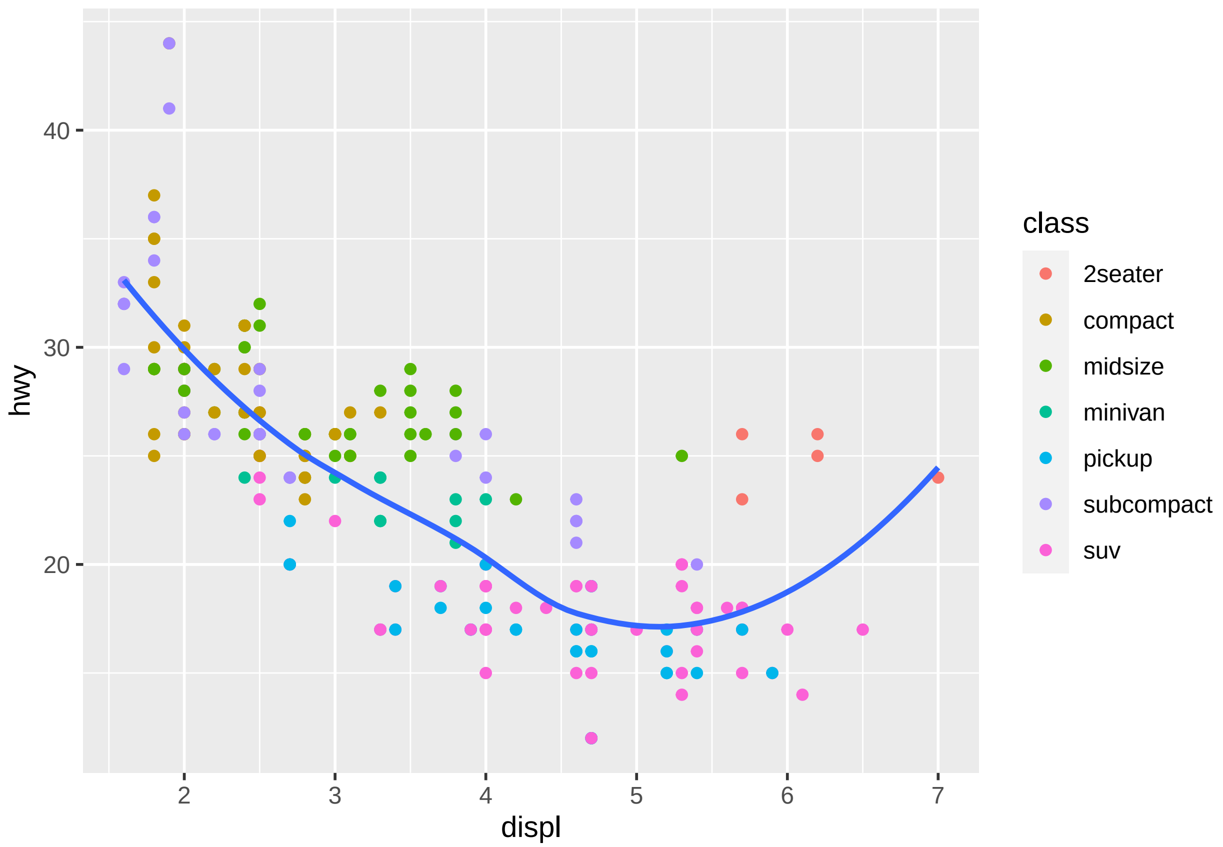
#b. #Answer: The continuous variables in the mpg data set are displ, year, cyl.

#c. ggplot(mpg, aes(x = displ, y = hwy, colour = cty)) + geom_point() #Answer: The plot is keeping track of the cty by having different hues of color blue. #It produced this output because of the ggplot code.

#9)

```
ggplot(data= mpg, mapping = aes(x= displ, y= hwy)) + geom_point(mapping= aes(color= class)) +
  geom_smooth(se= FALSE)
```

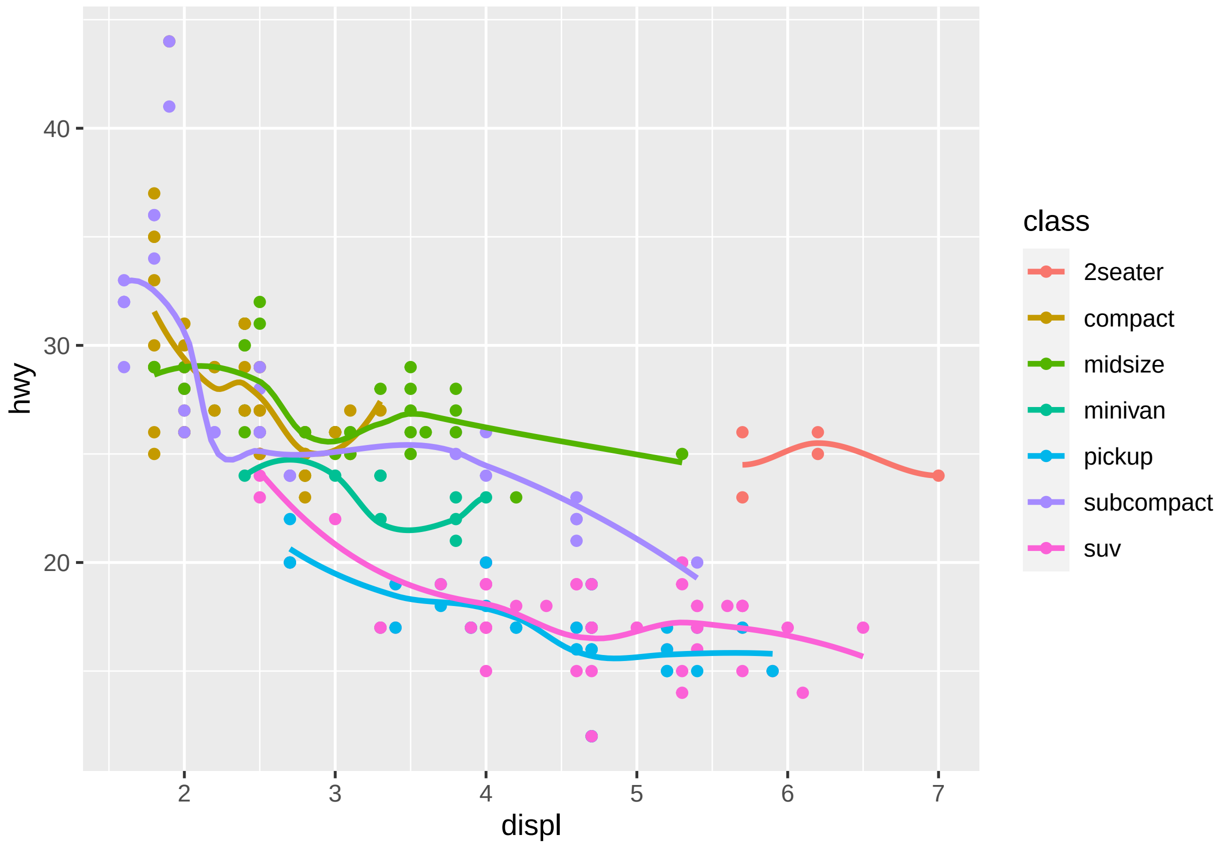
```
## ‘geom_smooth()‘ using method = ’loess’ and formula = ’y ~ x’
```



#10)

```
ggplot(data= mpg, mapping= aes(x= displ, y= hwy, color= class)) + geom_point() +
  geom_smooth(se= FALSE)
```

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

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : span too small. fewer data values than degrees of freedom.

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : pseudoinverse used at 5.6935

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : neighborhood radius 0.5065

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : reciprocal condition number 0

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : There are other near singularities as well. 0.65044

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : pseudoinverse used at 4.008
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : neighborhood radius 0.708

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : reciprocal condition number 0

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : There are other near singularities as well. 0.25
```


hwy
displ
class
2seater
compact
midsize
minivan
pickup
subcompact
suv