

Pre_test_Team_GA

2022-10-06

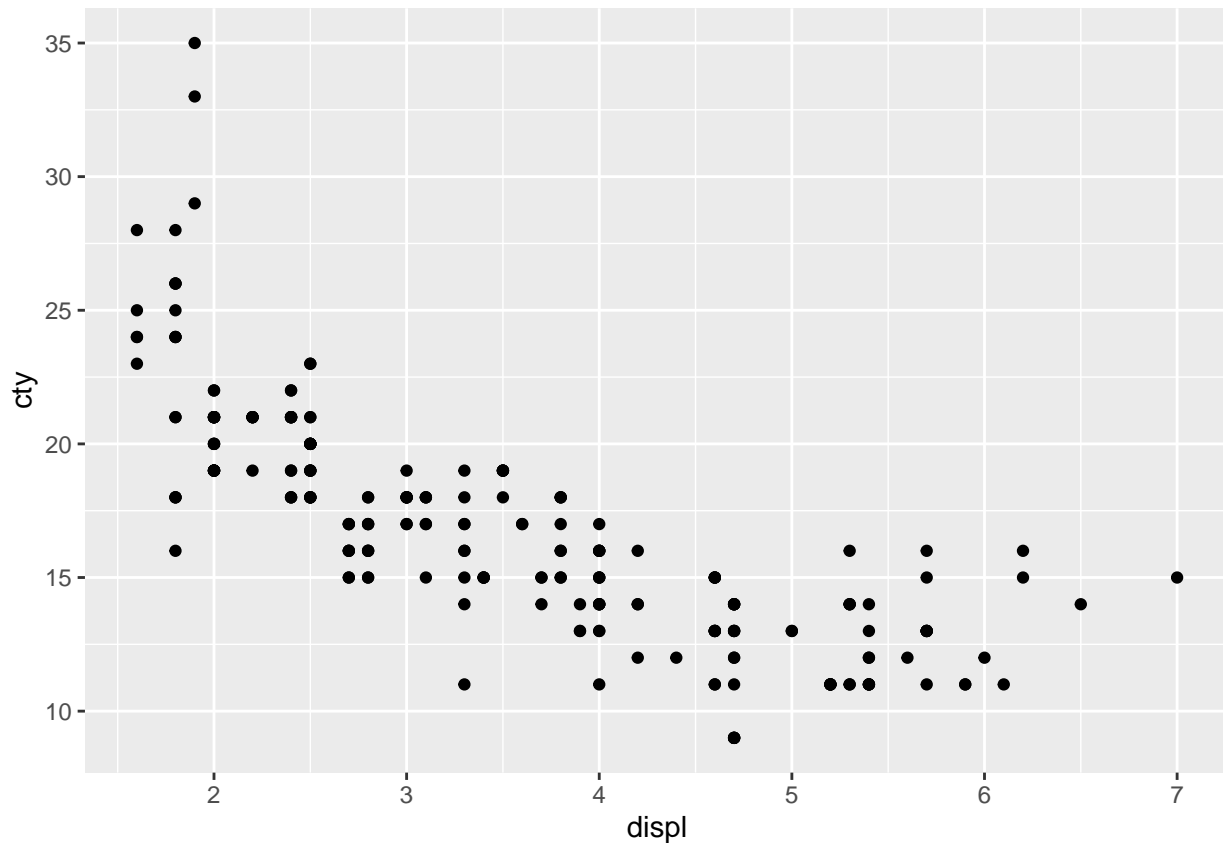
412/612 PRACTICE TEST
PART 1 GGLOT PRACTICE (Use tidyverse coding for all problems)

```
library(tidyverse)
```

```
## -- Attaching packages ----- tidyverse 1.3.2 --  
## v ggplot2 3.3.6      v purrr  0.3.4  
## v tibble  3.1.8      v dplyr  1.0.10  
## v tidyr   1.2.1      v stringr 1.4.1  
## v readr   2.1.2      v forcats 0.5.2  
## -- Conflicts ----- tidyverse_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag()    masks stats::lag()
```

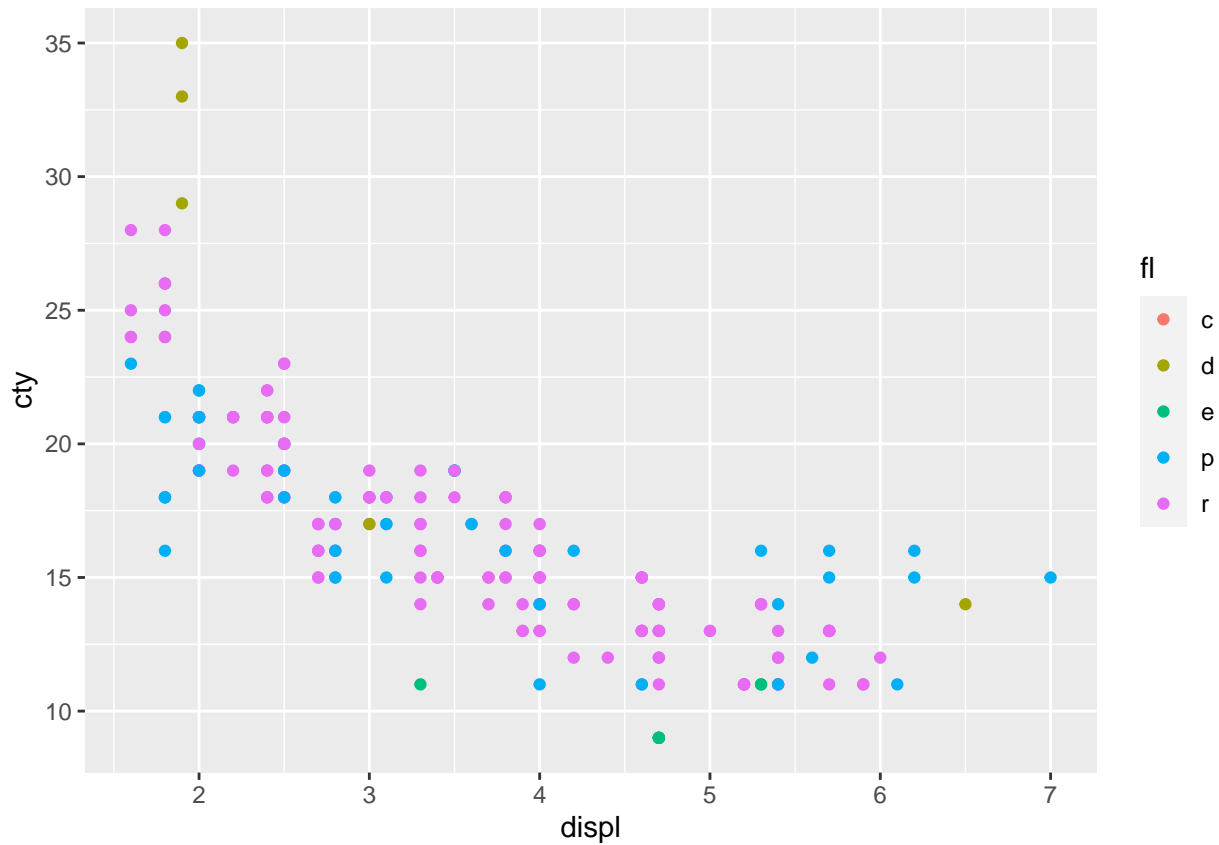
1) Using the mpg data frame, create a scatter plot that shows a relationship between the variables displ and cty. (displ =x and cty=y)

```
#data(mpg)  
ggplot(data=mpg, aes(x=displ, y=cty))+  
geom_point()
```



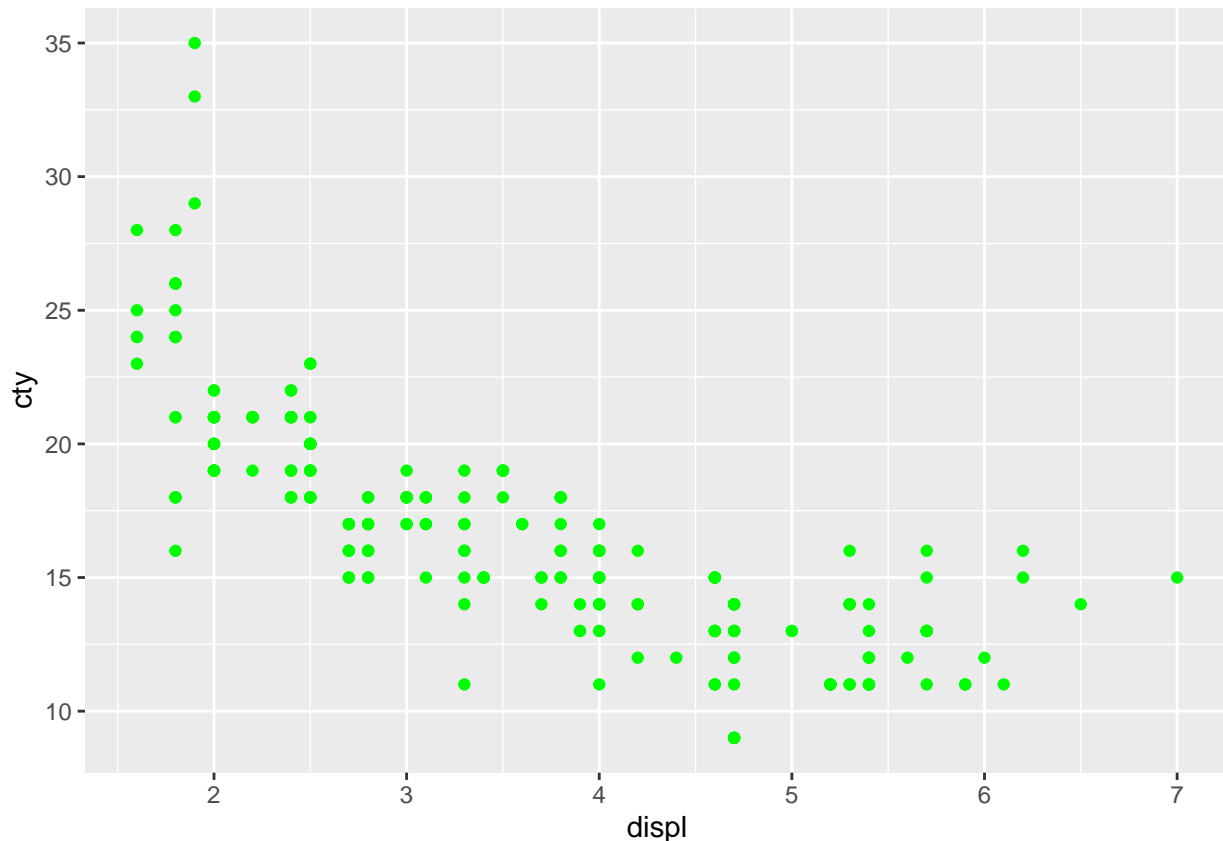
2 Using the mpg data frame, create a scatter plot that shows a relationship between the variables displ and cty. (displ =x and cty=y),and also map colors of your scatter plot to the variable fl.

```
ggplot(data=mpg, aes(x=displ, y=cty, color =fl))+  
geom_point()
```



3. Using the mpg data frame, create a scatter plot that shows a relationship between the variables displ and cty. (displ =x and cty=y), and also include code so that all of your scatter plot points are green.

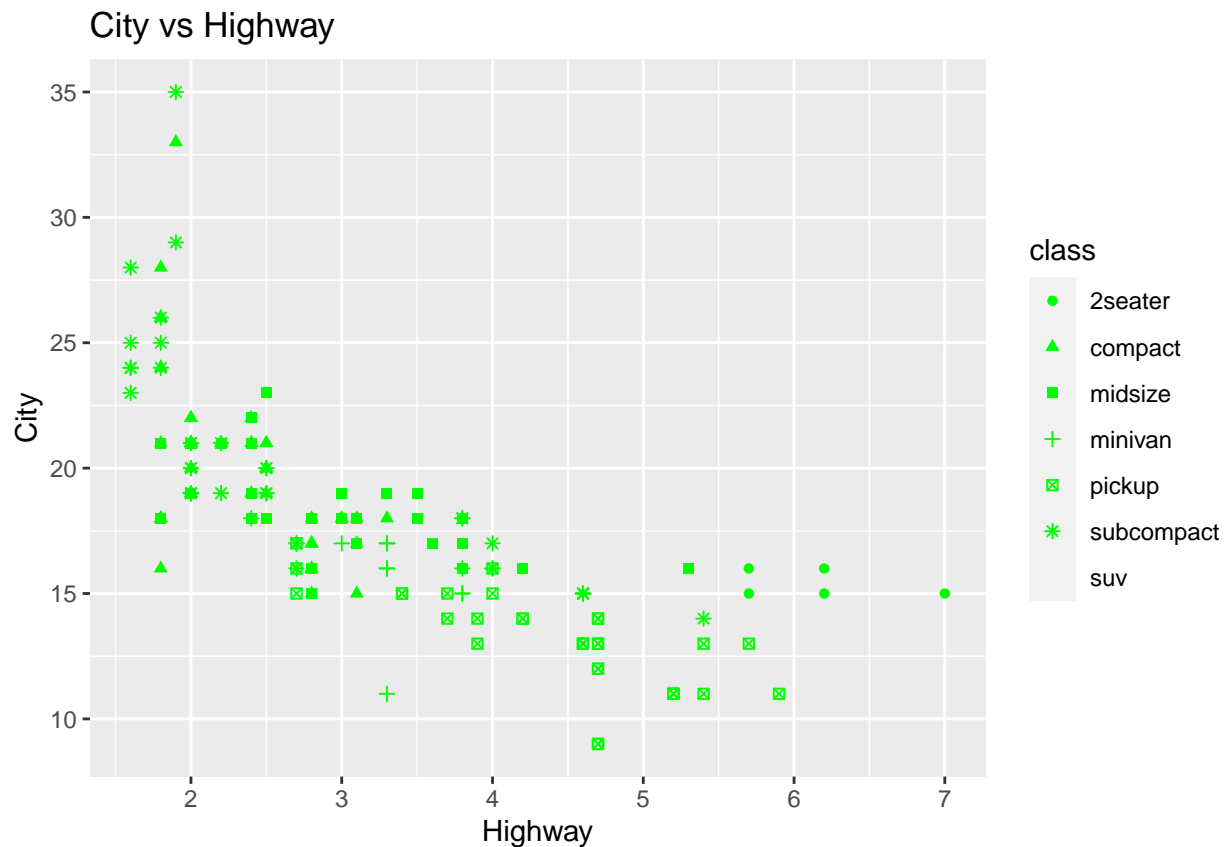
```
ggplot(data=mpg, aes(x=displ, y=cty))+
  geom_point(color= 'green')
```



4. Using the mpg data frame, create a scatter plot that shows a relationship between the variables displ and cty. (displ =x and cty=y), and also include code so that the scatter plot has different shapes or characters according to class. Code so that your scatter plot has the title City vs Highway , the y axis is labeled City and the x axis is labeled Highway. (Check out the ggplot graphing example towards the end of chapter one in your book to get data points with different shapes)

```
ggplot(data=mpg, aes(x=displ, y=cty, shape= class))+
  xlab("Highway") +
  ylab("City") +
  ggtitle("City vs Highway")+
  geom_point(color='green')
```

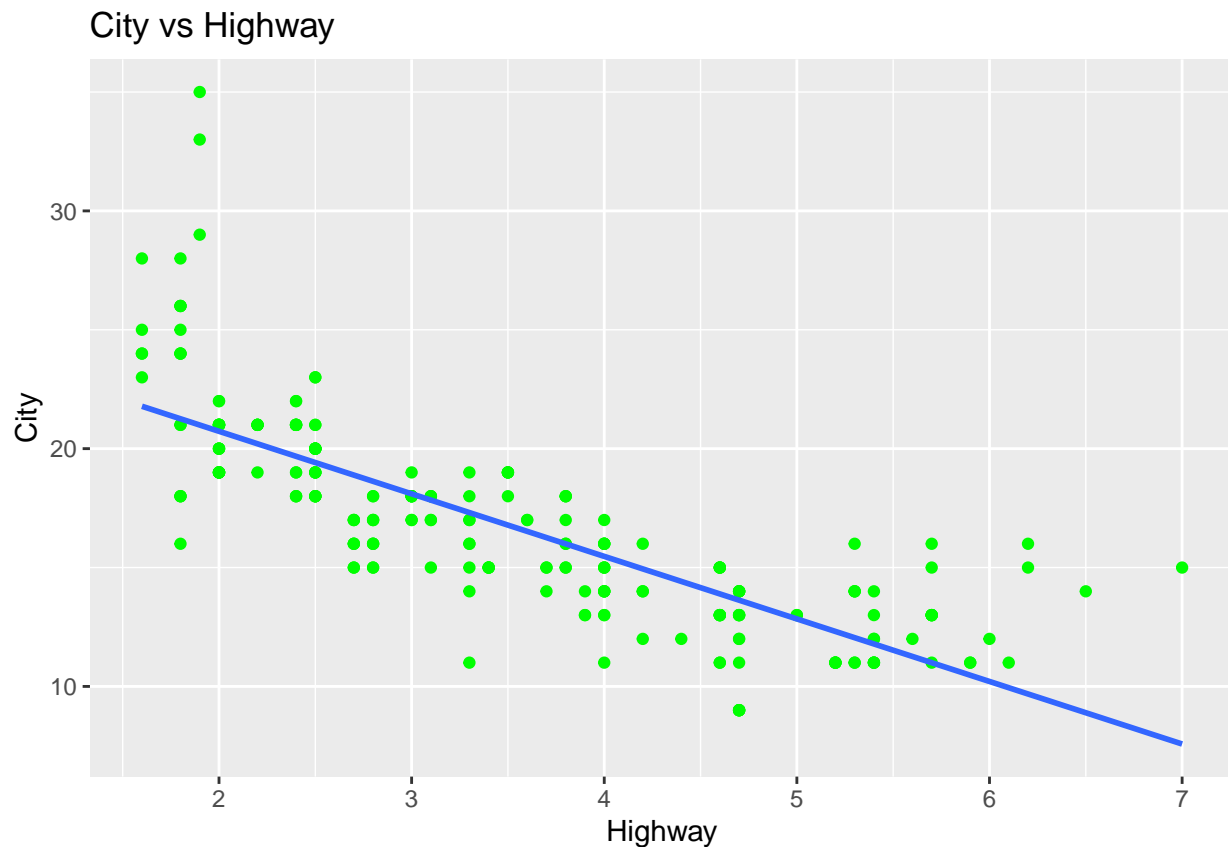
```
## Warning: The shape palette can deal with a maximum of 6 discrete values because
## more than 6 becomes difficult to discriminate; you have 7. Consider
## specifying shapes manually if you must have them.
## Warning: Removed 62 rows containing missing values (geom_point).
```



5. Using the mpg data frame, create a smooth line fitted to the data displ and cty. (displ =x and cty=y).

```
ggplot(data=mpg, aes(x=displ, y=cty))+
  xlab("Highway") +
  ylab("City") +
  ggtitle("City vs Highway")+
  geom_point(color='green') +
  geom_smooth(se = FALSE, method = lm)
```

```
## `geom_smooth()` using formula 'y ~ x'
```



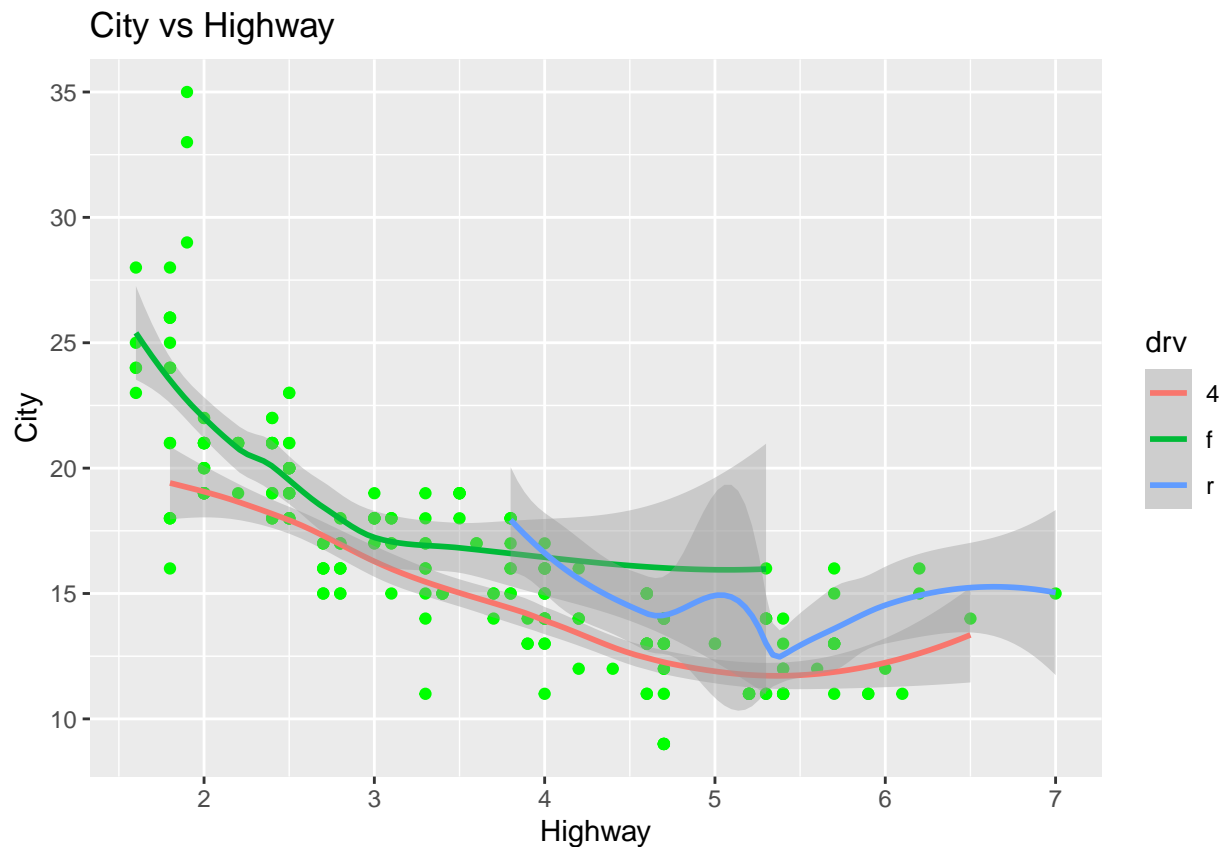
```
geom_smooth()
```

```
## geom_smooth: na.rm = FALSE, orientation = NA, se = TRUE
## stat_smooth: na.rm = FALSE, orientation = NA, se = TRUE
## position_identity
```

6. Using the mpg data frame, create smooth lines over the scatter plot for the data displ and cty. (displ =x and cty=y) based on drv levels.

```
ggplot(data=mpg, aes(x=displ, y=cty, color=drv))+
  xlab("Highway") +
  ylab("City") +
  ggtitle("City vs Highway")+
  geom_point(color= "green") +
  #geom_smooth(se = FALSE, method = lm)
  geom_smooth()
```

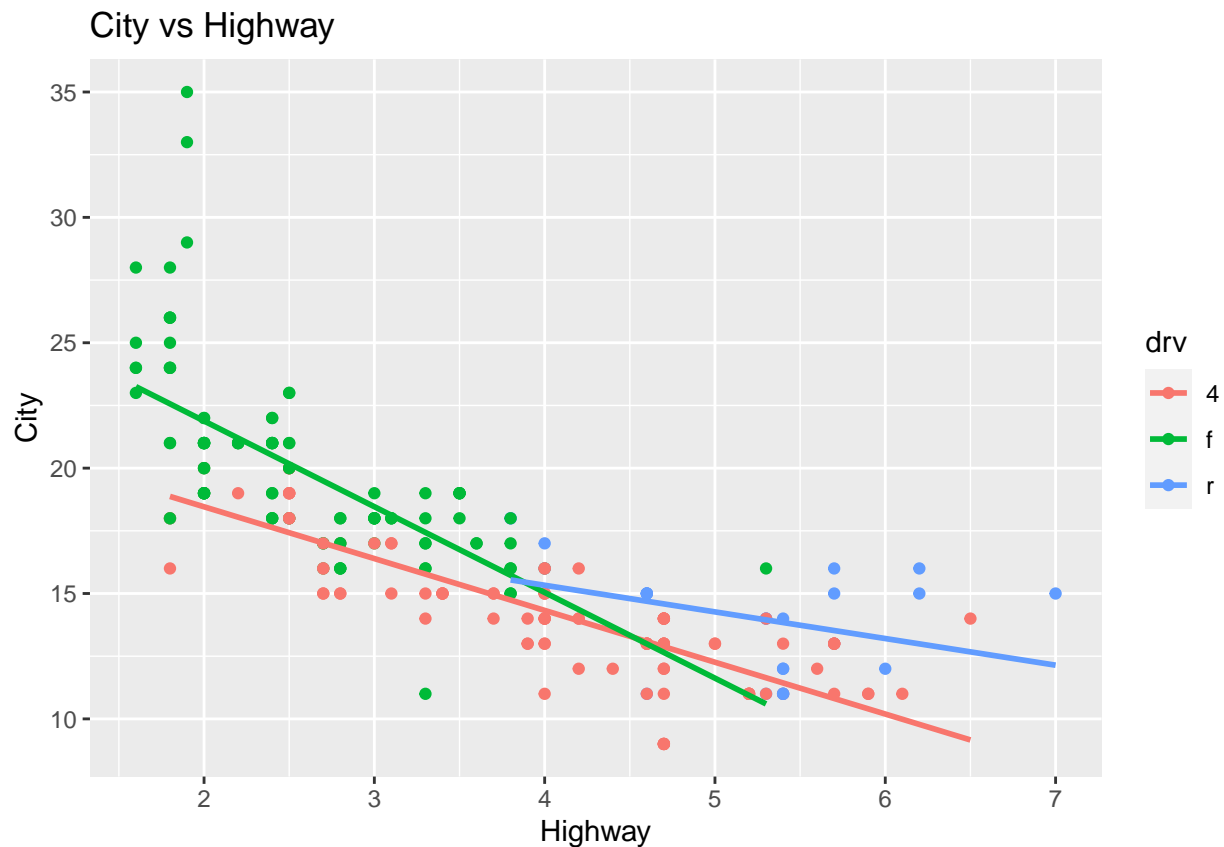
```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```



7. Using the mpg data frame, create a scatter plot that shows a relationship between the variables displ and cty. (displ =x and cty=y), and also include code that produces overlayed regression lines based on drv levels. The data points should also be color coded according to levels of drv.

```
ggplot(data=mpg, aes(x=displ, y=cty, color=drv))+
  xlab("Highway") +
  ylab("City") +
  ggtitle("City vs Highway")+
  geom_point() +
  geom_smooth(se = FALSE, method = lm)
```

```
## `geom_smooth()` using formula 'y ~ x'
```

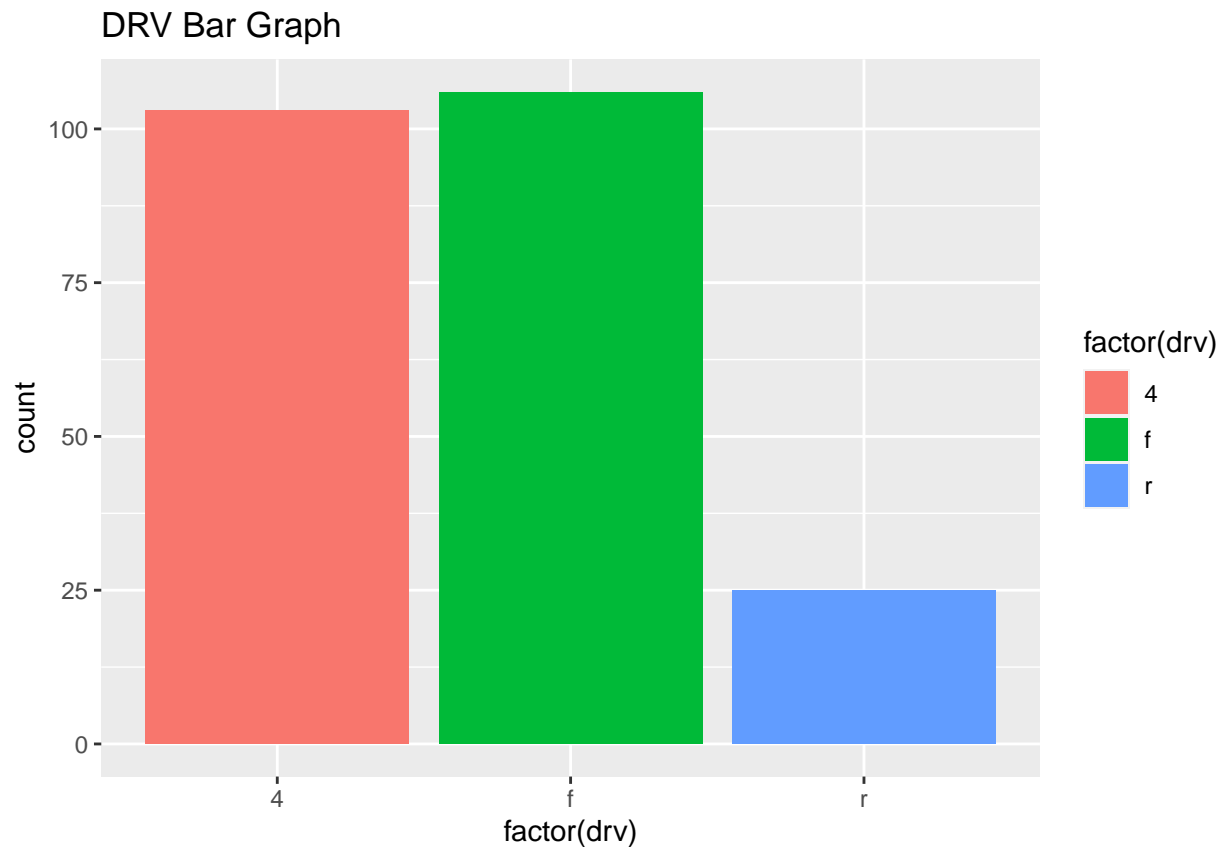


```
geom_smooth()
```

```
## geom_smooth: na.rm = FALSE, orientation = NA, se = TRUE
## stat_smooth: na.rm = FALSE, orientation = NA, se = TRUE
## position_identity
```

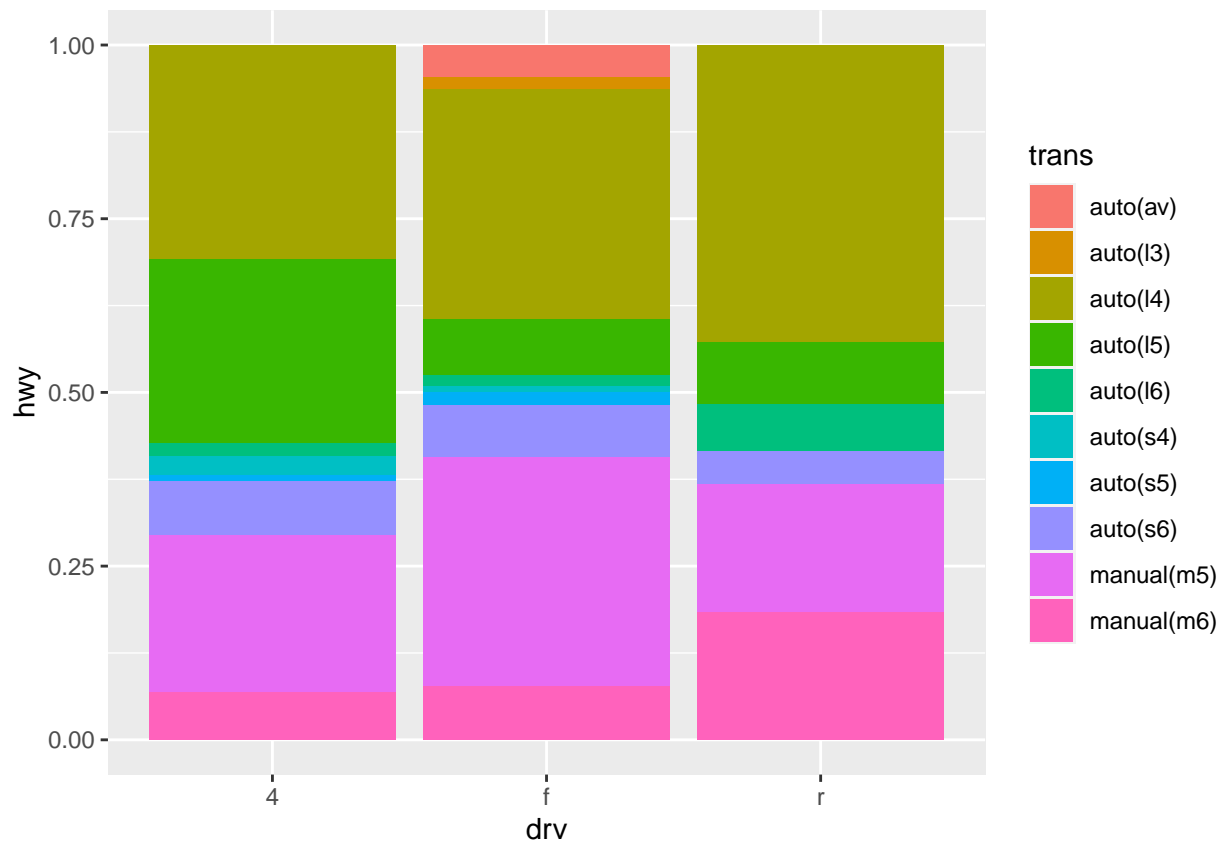
8. Using the mpg data frame, create a bar graph for the variable drv. include code so that each bar has a different color. Title your bar graph DRV Bar Graph

```
ggplot(data=mpg, aes(factor(drv), fill = factor(drv))) +
  ggtitle("DRV Bar Graph")+
  geom_bar()
```

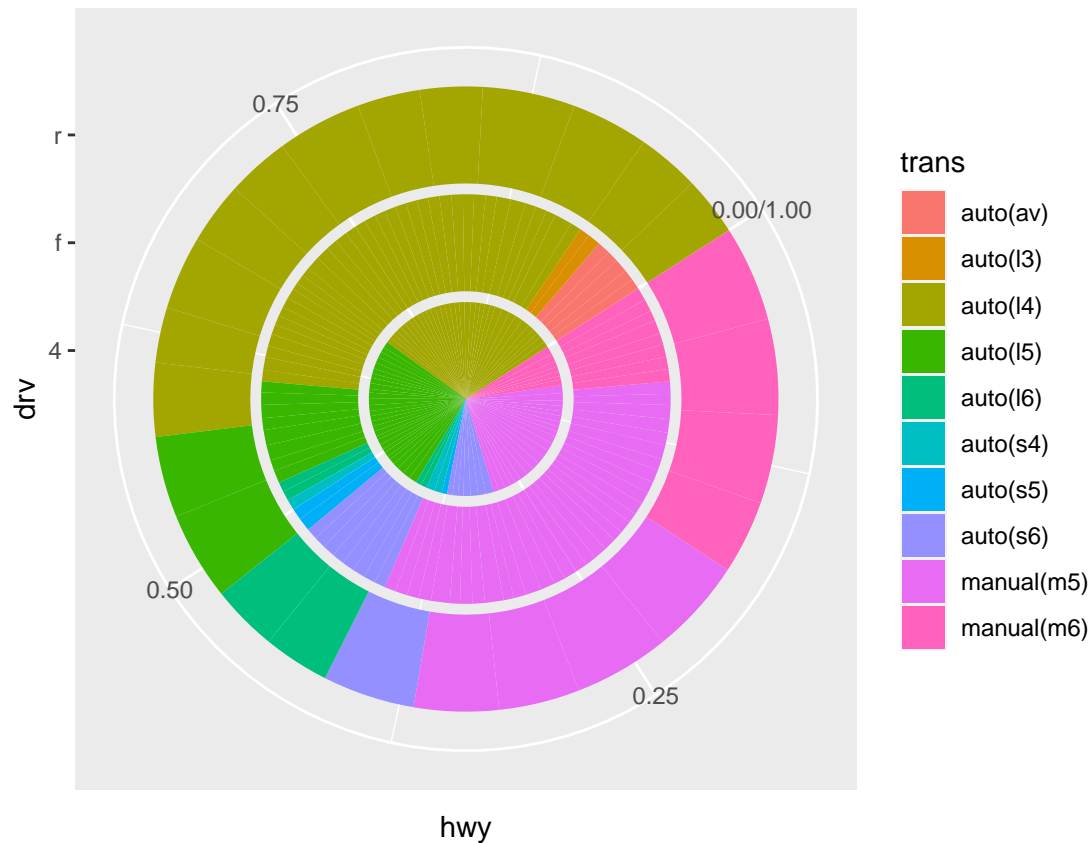
9. Using the mpg data frame, for the variable drv, create a bar graph that shows color stacked bars over the variable trans for the variable hwy

```
ggplot(mpg, aes(x = drv, y = hwy, fill = trans)) + # Create stacked bar chart
  geom_bar(stat = "identity", position = 'fill')
```



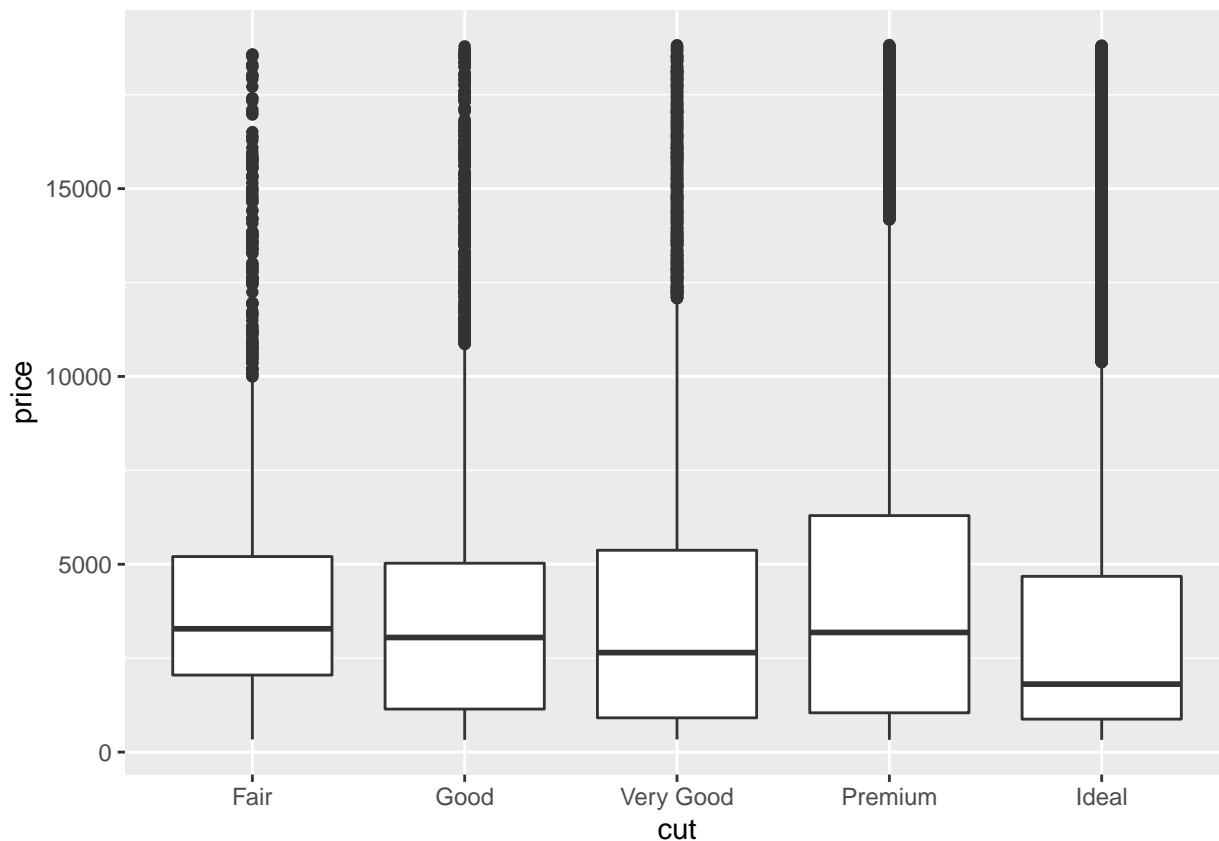
10. Using the stacked bar graph from number 10, create a pie chart.

```
ggplot(mpg, aes(x = drv, y = hwy, fill = trans)) + # Create stacked bar chart
geom_bar(stat = "identity", position = "fill") +
coord_polar("y", start=1)
```



11. Use and show R code that will produce the following side by side box plots from the diamonds data frame.

```
data("diamonds")
ggplot(diamonds, aes(y= price, x= cut))+
  geom_boxplot()
```



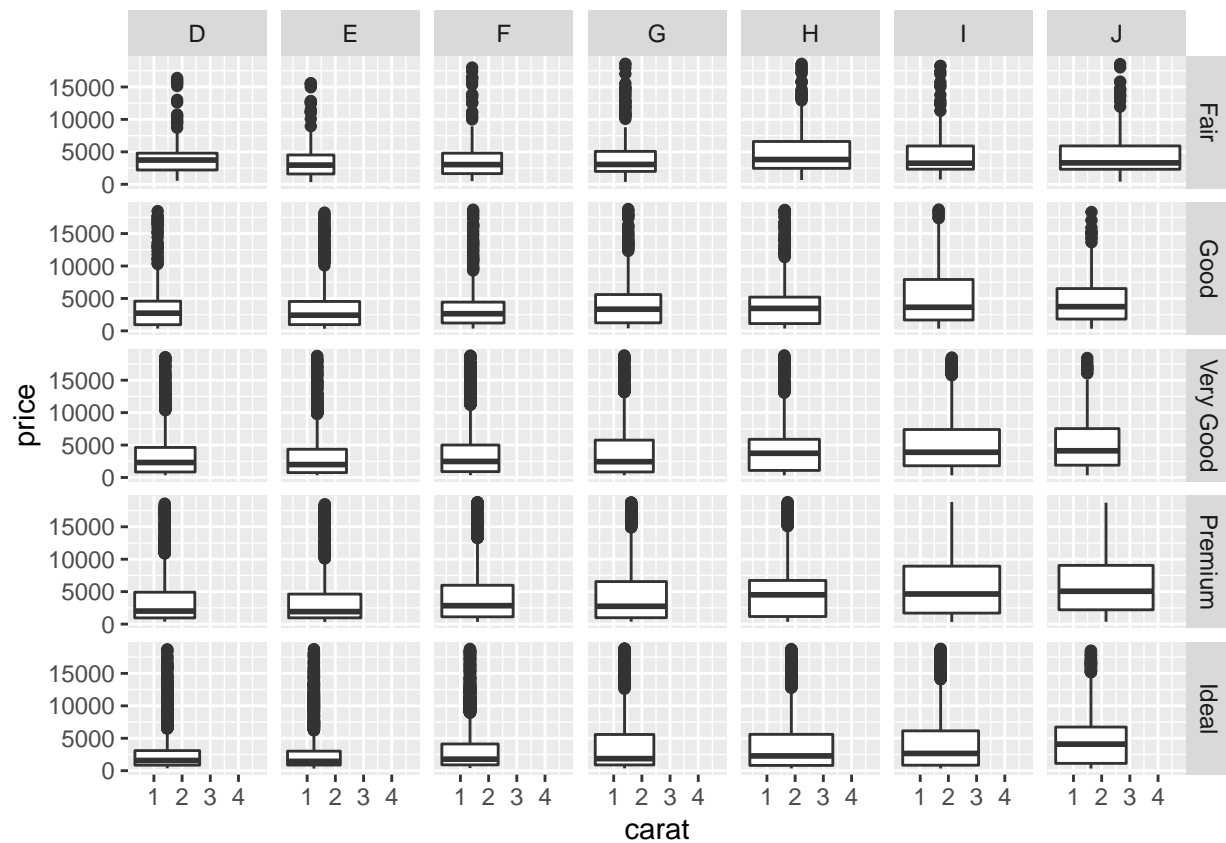
```
diamonds
```

```
## # A tibble: 53,940 x 10
##   carat cut      color clarity depth table price     x     y     z
##   <dbl> <ord>    <ord> <ord>  <dbl> <dbl> <int> <dbl> <dbl> <dbl>
## 1 0.23 Ideal     E    SI2    61.5   55   326  3.95  3.98  2.43
## 2 0.21 Premium  E    SI1    59.8   61   326  3.89  3.84  2.31
## 3 0.23 Good     E    VS1    56.9   65   327  4.05  4.07  2.31
## 4 0.29 Premium  I    VS2    62.4   58   334  4.2   4.23  2.63
## 5 0.31 Good     J    SI2    63.3   58   335  4.34  4.35  2.75
## 6 0.24 Very Good J    VVS2    62.8   57   336  3.94  3.96  2.48
## 7 0.24 Very Good I    VVS1    62.3   57   336  3.95  3.98  2.47
## 8 0.26 Very Good H    SI1    61.9   55   337  4.07  4.11  2.53
## 9 0.22 Fair     E    VS2    65.1   61   337  3.87  3.78  2.49
## 10 0.23 Very Good H    VS1    59.4   61   338  4     4.05  2.39
## # ... with 53,930 more rows
```

12. Use and show R code that will produce the following faceted display of boxplots from the diamonds data frame.

```
ggplot(data = diamonds, aes(x=carat, y= price)) +
  geom_boxplot() +
  facet_grid(cut~color)
```

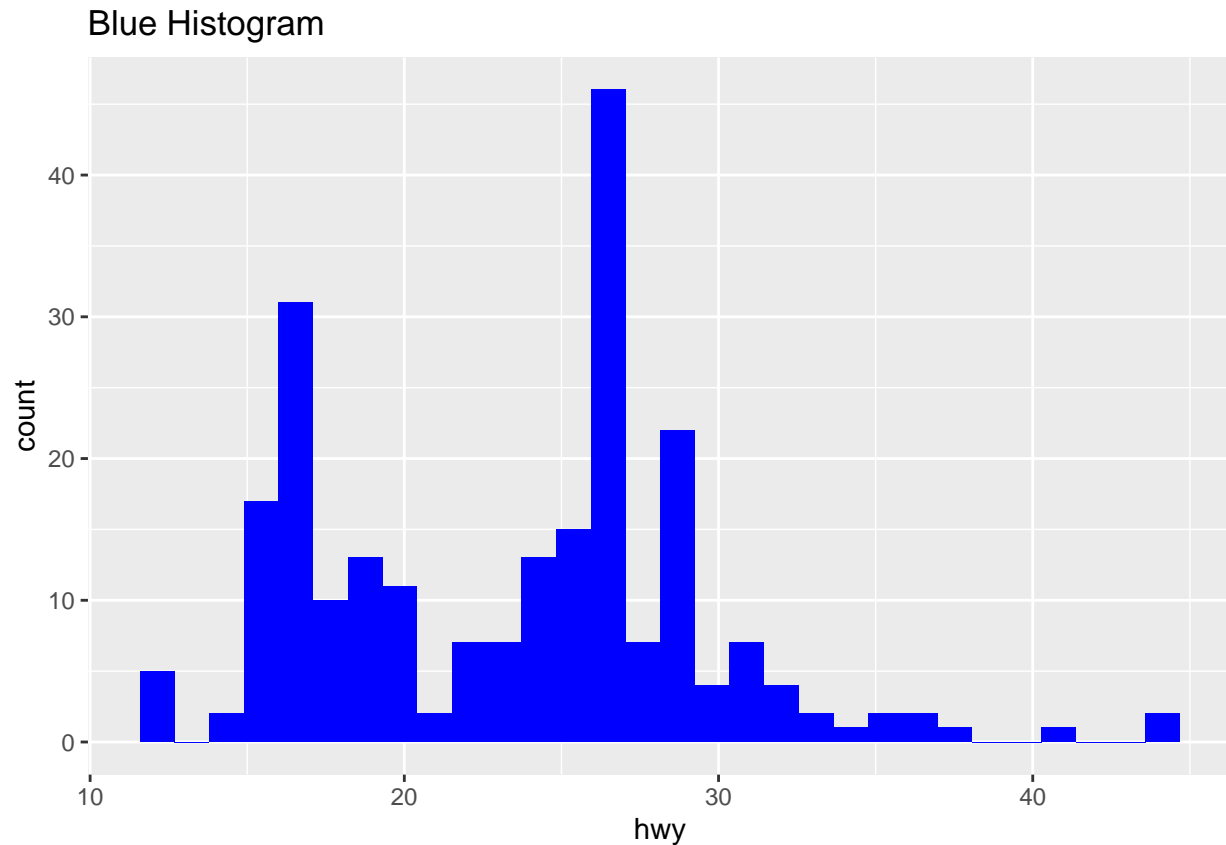
```
## Warning: Continuous x aesthetic -- did you forget aes(group=...)?
```



13. Use and show R code that will produce a histogram that is colored blue for the hwy variable from the mpg data frame. Give the histogram the title Blue Histogram.

```
ggplot(mpg, aes(x=hwy))+
  geom_histogram(fill = "blue")+
  ggtitle("Blue Histogram")
```

`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.



PART II DPLYR PRACTICE (You may use the piping method or the assignment method)

1. Using the DPLYR filter function and the mpg data frame, produce a data frame that only has output for a Dodge Durango 4wd.

```
library(dplyr)

Dodge_durango_4wd <- mpg %>% filter(manufacturer == "dodge" & model == "durango 4wd")

Dodge_durango_4wd
```

```
## # A tibble: 7 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 dodge        durango 4wd    3.9  1999     6 auto~ 4      13   17 r     suv
## 2 dodge        durango 4wd    4.7  2008     8 auto~ 4      13   17 r     suv
## 3 dodge        durango 4wd    4.7  2008     8 auto~ 4       9   12 e     suv
## 4 dodge        durango 4wd    4.7  2008     8 auto~ 4      13   17 r     suv
## 5 dodge        durango 4wd    5.2  1999     8 auto~ 4      11   16 r     suv
## 6 dodge        durango 4wd    5.7  2008     8 auto~ 4      13   18 r     suv
## 7 dodge        durango 4wd    5.9  1999     8 auto~ 4      11   15 r     suv
```

2. Using the DPLYR filter function and the mpg data frame, produce a data frame that only has output for vehicles whose city mileage is less than 10 miles per gallon and whose highway mileage is less than 16 miles per gallon.

```
vehicle_milage_cityunder10_highwayunder16<- mpg %>% filter(cty < 10 & hwy<16)
vehicle_milage_cityunder10_highwayunder16
```

```
## # A tibble: 5 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 dodge         dakota pic~   4.7  2008     8 auto~ 4       9   12 e  pick~
## 2 dodge         durango 4wd   4.7  2008     8 auto~ 4       9   12 e  suv
## 3 dodge         ram 1500 p~   4.7  2008     8 auto~ 4       9   12 e  pick~
## 4 dodge         ram 1500 p~   4.7  2008     8 manu~ 4       9   12 e  pick~
## 5 jeep          grand cher~  4.7  2008     8 auto~ 4       9   12 e  suv
```

3. Using the DPLYR arrange function and the mpg data frame, produce a data frame that displays displ in descending order

```
displ_desc<-mpg %>% arrange(displ)
head(data.frame(displ_desc$displ))
```

```
##   displ_desc.displ
## 1                1.6
## 2                1.6
## 3                1.6
## 4                1.6
## 5                1.6
## 6                1.8
```

4. Using the DPLYR arrange function and the mpg data frame, produce a data frame of 30 observations that display city miles per gallon in ascending order. Which vehicle has the lowest city miles per gallon ?

```
p<-mpg %>% select(model, cty)%>%
  arrange(cty, desc= FALSE) # arrange city miles per gallon in ascending order
head(p,30) # shows the first 30 rows
```

```
## # A tibble: 30 x 2
##   model      cty
##   <chr>    <int>
## 1 dakota pickup 4wd      9
## 2 durango 4wd          9
## 3 ram 1500 pickup 4wd     9
## 4 ram 1500 pickup 4wd     9
```

```
## 5 grand cherokee 4wd      9
## 6 c1500 suburban 2wd     11
## 7 k1500 tahoe 4wd        11
## 8 k1500 tahoe 4wd        11
## 9 caravan 2wd           11
## 10 dakota pickup 4wd     11
## # ... with 20 more rows

head(p,1) #dodge with model dakota pickup 4wd vehicle has the lowest city miles per gallon

## # A tibble: 1 x 2
##   model      cty
##   <chr>    <int>
## 1 dakota pickup 4wd      9
```

#5. Using the DPLYR filter and select functions and the mpg data frame, produce a data frame that displays all ford vehicles for 1999 whose city miles per gallon is less than 16 and whose highway miles per gallon is also less than 16.

```
p_ford1999<-mpg %>% filter(year==1999 & manufacturer== "ford" & cty < 16 & hwy <16 )
p_ford1999 #only one vehicles found
```

```
## # A tibble: 1 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 ford          f150 picku~    5.4  1999     8 auto~ 4      11   15 r    pick~
```

#6. Using the DPLYR filter, select and mutate functions and the mpg data frame, produce a data frame that displays the difference between highway mileage and city mileage for the ford mustang. A partial data frame is given below; manufacturer model cty hwy difference 1 ford mustang 18 26 8 2 ford mustang 18 25 7 3 ford mustang 17 26 9

```
p_ford_mustang<- mutate(mpg, difference= hwy-cty) %>%
  filter(manufacturer=="ford" & model== "mustang") %>%
  select(manufacturer, model, cty, hwy, difference)
```

```
p_ford_mustang
```

```
## # A tibble: 9 x 5
##   manufacturer model      cty  hwy difference
##   <chr>          <chr>  <int> <int>      <int>
## 1 ford          mustang   18   26         8
## 2 ford          mustang   18   25         7
## 3 ford          mustang   17   26         9
## 4 ford          mustang   16   24         8
## 5 ford          mustang   15   21         6
## 6 ford          mustang   15   22         7
## 7 ford          mustang   15   23         8
## 8 ford          mustang   15   22         7
## 9 ford          mustang   14   20         6
```

#7. Install the New York City flights data package;install.packages("nycflights13") Now code and execute the following library library(nycflights.13) And then code and call the following data frame flights

```
library(nycflights13)
flights
```

```
## # A tibble: 336,776 x 19
```



```
##      year month   day dep_time sched_de-1 dep_d-2 arr_t-3 sched-4 arr_d-5 carrier
##      <int> <int> <int>   <int>      <int>   <dbl>   <int>   <int>   <dbl> <chr>
##  1  2013     1     1     517        515     2     830     819     11 UA
##  2  2013     1     1     533        529     4     850     830     20 UA
##  3  2013     1     1     542        540     2     923     850     33 AA
##  4  2013     1     1     544        545    -1    1004    1022    -18 B6
##  5  2013     1     1     554        600    -6     812     837    -25 DL
##  6  2013     1     1     554        558    -4     740     728     12 UA
##  7  2013     1     1     555        600    -5     913     854     19 B6
##  8  2013     1     1     557        600    -3     709     723    -14 EV
##  9  2013     1     1     557        600    -3     838     846     -8 B6
## 10  2013     1     1     558        600    -2     753     745      8 AA
## # ... with 336,766 more rows, 9 more variables: flight <int>, tailnum <chr>,
## #   origin <chr>, dest <chr>, air_time <dbl>, distance <dbl>, hour <dbl>,
## #   minute <dbl>, time_hour <dtm>, and abbreviated variable names
## #   1: sched_dep_time, 2: dep_delay, 3: arr_time, 4: sched_arr_time,
## #   5: arr_delay
?flights
```

Use the following commands to further explore the data frame `flights`

```
names(flights)

## [1] "year"      "month"     "day"       "dep_time"
## [5] "sched_dep_time" "dep_delay" "arr_time"  "sched_arr_time"
## [9] "arr_delay"  "carrier"   "flight"    "tailnum"
## [13] "origin"     "dest"      "air_time"  "distance"
## [17] "hour"       "minute"    "time_hour"
```

Use `DPLYR` functions and the piping operator to produce a data frame that shows arrival delay times in descending order for American Airlines on March 17, 2013. A partial table is given below.

```
Americanairlines_172013_delay<-flights%>%
  filter(carrier == "AA" & month == 3 & day == 17 & year == 2013) %>%
  select(carrier, year, month, day, arr_delay)

arrange(Americanairlines_172013_delay, desc(arr_delay))

## # A tibble: 88 x 5
##   carrier year month   day arr_delay
##   <chr>   <int> <int> <int>   <dbl>
## 1 AA      2013     3    17      67
## 2 AA      2013     3    17      39
## 3 AA      2013     3    17      39
## 4 AA      2013     3    17      36
## 5 AA      2013     3    17      33
## 6 AA      2013     3    17      22
## 7 AA      2013     3    17      22
```

```
## 8 AA      2013      3    17      21
## 9 AA      2013      3    17      19
## 10 AA     2013      3    17      19
## # ... with 78 more rows
```

#8. Using the mpg data frame, dplyr functions and the pipe operator, produce a data frame that displays the mean mpg for city driving for manufacturers in the year 1999 only in descending order. Which manufacturer got the best average gas mileage in 1999?

```
p<-mpg %>%
  filter(year==1999) %>%
  select(manufacturer, year, cty)%>%
  group_by(manufacturer) %>%
  summarize(avg=mean(cty))%>%
  arrange(desc(avg))
p # Jeep got low average gas mile.
```

```
## # A tibble: 15 x 2
##   manufacturer  avg
##   <chr>        <dbl>
## 1 honda        24.8
## 2 volkswagen   21.2
## 3 subaru       19
## 4 hyundai      18.3
## 5 toyota       18.2
## 6 nissan        17.7
## 7 audi         17.1
## 8 pontiac      17
## 9 chevrolet    15.1
## 10 jeep         14.5
## 11 ford         13.9
## 12 mercury     13.5
## 13 dodge       13.4
## 14 land rover  11
## 15 lincoln     11
```