Basic data manipulation and visualization

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Let us write a function to subset a given dataset

```
library(ggplot2)
sub <- function(data, ...){
  arg <- list(...)
  a = data[0]

  for(i in arg){

    a <- cbind(a, data[i])
    }

return(a)
}
```

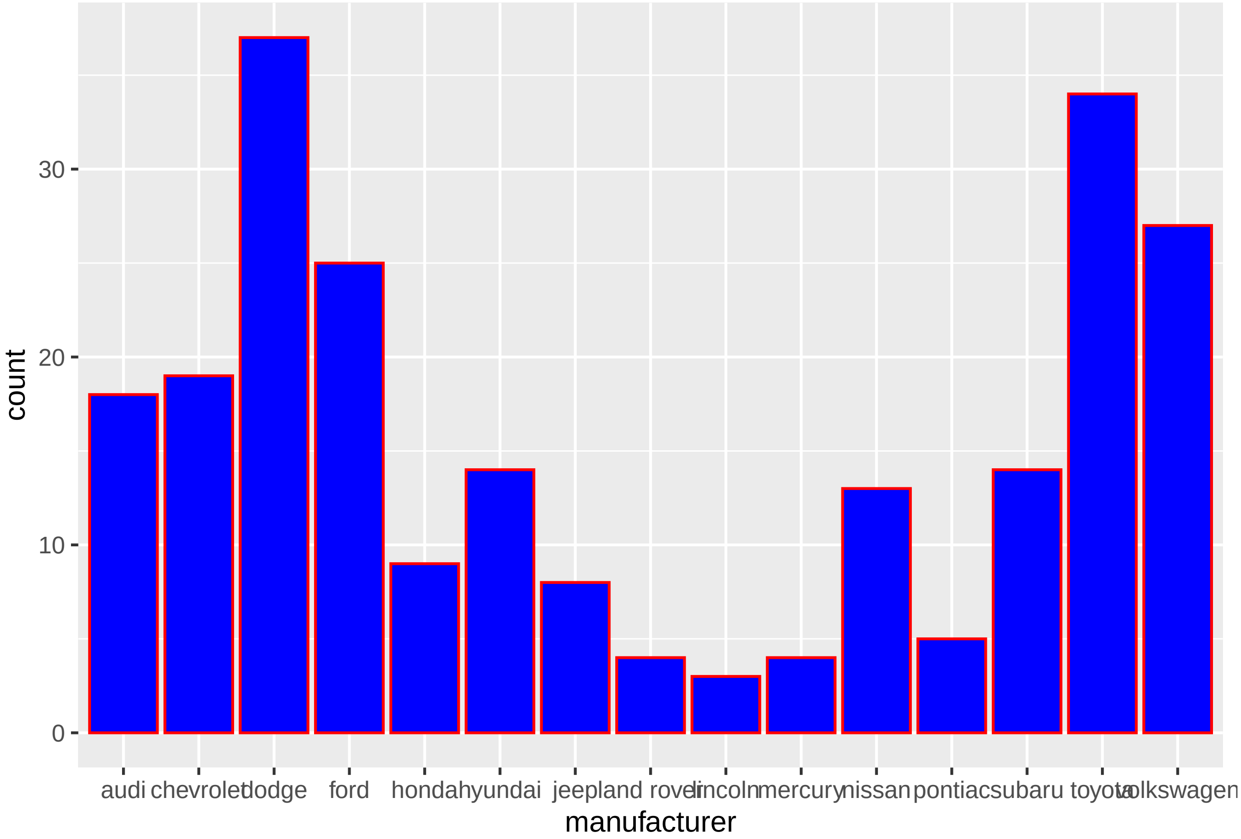
Testing it on mpg dataset

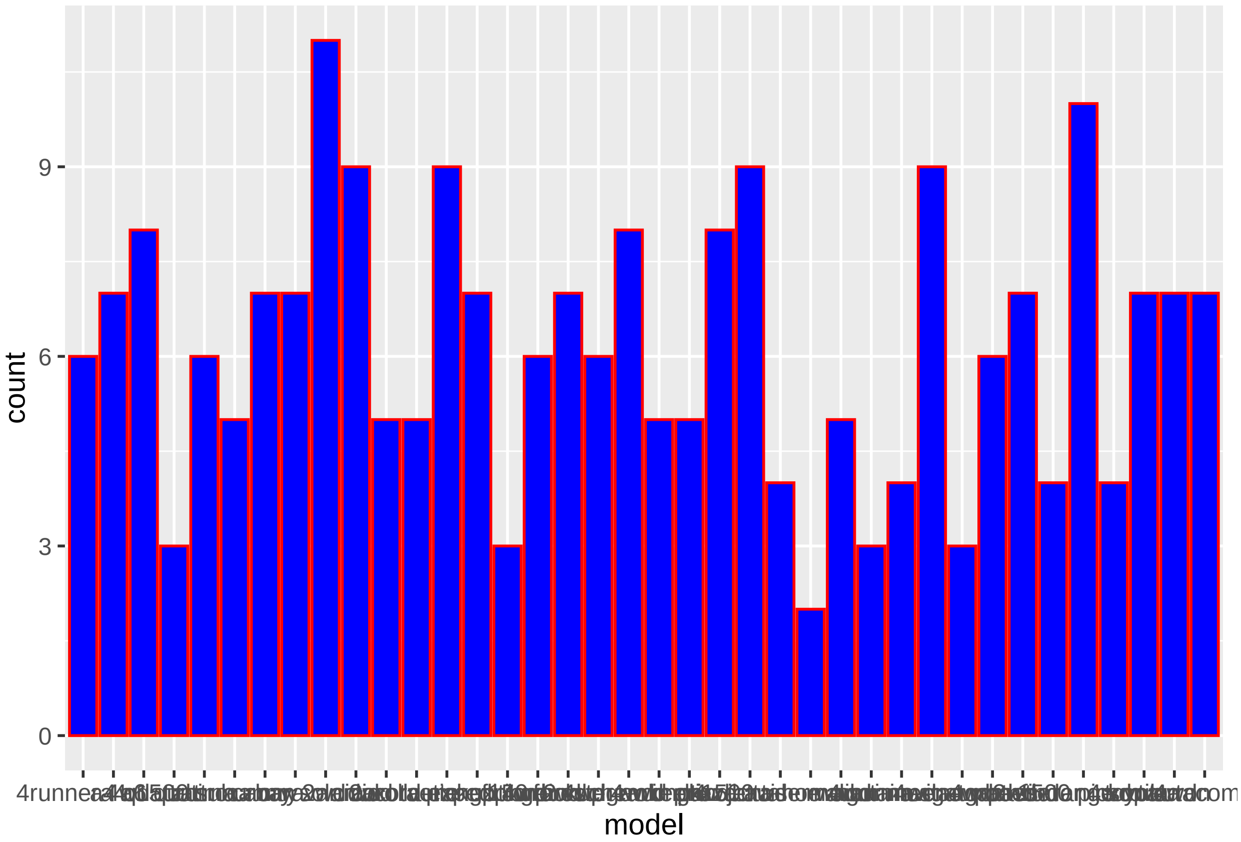
```
sub(mpg, "drv" ,3, "cyl", 1, 4)
```

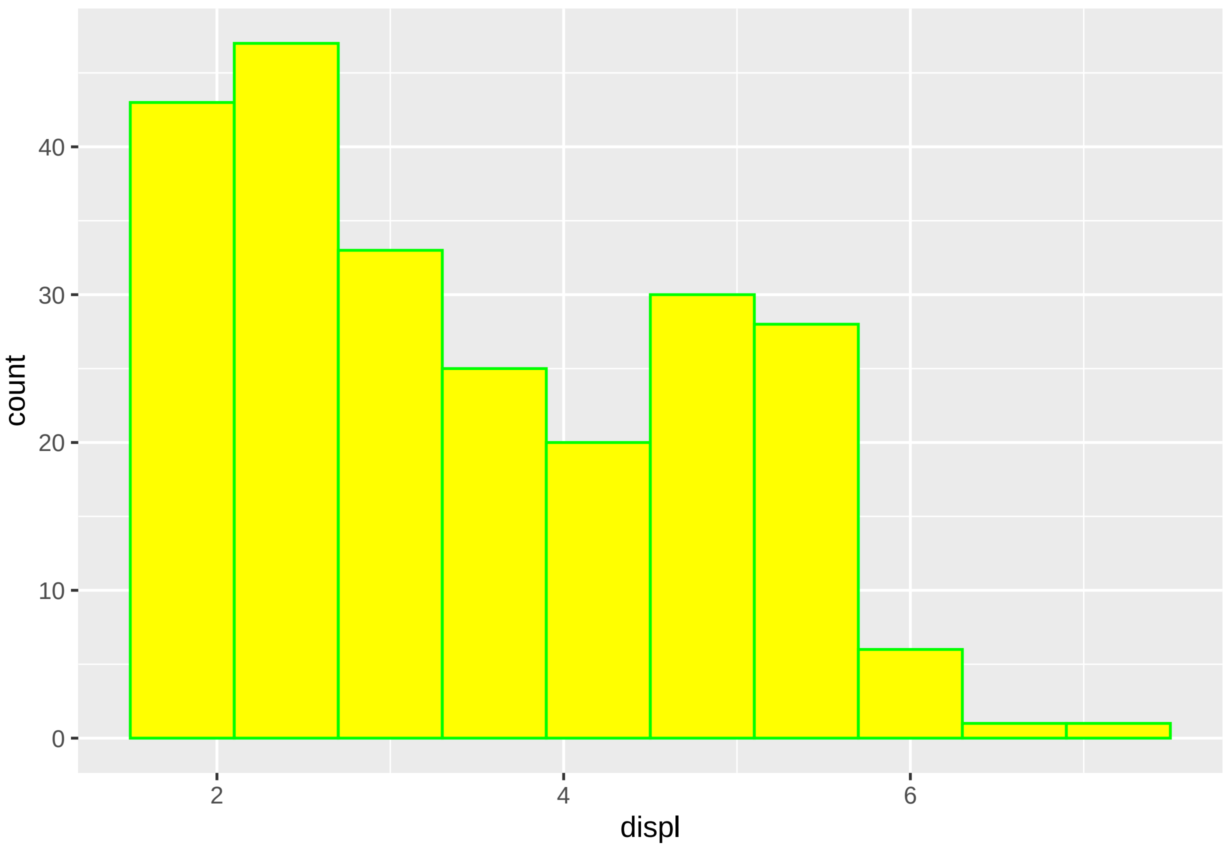
```
##     drv displ cyl manufacturer year
## 1     f   1.8   4         audi 1999
## 2     f   1.8   4         audi 1999
## 3     f   2.0   4         audi 2008
## 4     f   2.0   4         audi 2008
## 5     f   2.8   6         audi 1999
## 6     f   2.8   6         audi 1999
## 7     f   3.1   6         audi 2008
## 8     4   1.8   4         audi 1999
## 9     4   1.8   4         audi 1999
## 10    4   2.0   4         audi 2008
## 11    4   2.0   4         audi 2008
## 12    4   2.8   6         audi 1999
## 13    4   2.8   6         audi 1999
## 14    4   3.1   6         audi 2008
## 15    4   3.1   6         audi 2008
## 16    4   2.8   6         audi 1999
## 17    4   3.1   6         audi 2008
## 18    4   4.2   8         audi 2008
## 19    r   5.3   8    chevrolet 2008
## 20    r   5.3   8    chevrolet 2008
## 21    r   5.3   8    chevrolet 2008
## 22    r   5.7   8    chevrolet 1999
## 23    r   6.0   8    chevrolet 2008
## 24    r   5.7   8    chevrolet 1999
## 25    r   5.7   8    chevrolet 1999
## 26    r   6.2   8    chevrolet 2008
## 27    r   6.2   8    chevrolet 2008
## 28    r   7.0   8    chevrolet 2008
## 29    4   5.3   8    chevrolet 2008
## 30    4   5.3   8    chevrolet 2008
## 31    4   5.7   8    chevrolet 1999
## 32    4   6.5   8    chevrolet 1999
## 33    f   2.4   4    chevrolet 1999
## 34    f   2.4   4    chevrolet 2008
## 35    f   3.1   6    chevrolet 1999
## 36    f   3.5   6    chevrolet 2008
## 37    f   3.6   6    chevrolet 2008
## 38    f   2.4   4        dodge 1999
## 39    f   3.0   6        dodge 1999
## 40    f   3.3   6        dodge 1999
## 41    f   3.3   6        dodge 1999
## 42    f   3.3   6        dodge 2008
## 43    f   3.3   6        dodge 2008
## 44    f   3.3   6        dodge 2008
## 45    f   3.8   6        dodge 1999
## 46    f   3.8   6        dodge 1999
## 47    f   3.8   6        dodge 2008
## 48    f   4.0   6        dodge 2008
## 49    4   3.7   6        dodge 2008
## 50    4   3.7   6        dodge 2008
## 51    4   3.9   6        dodge 1999
## 52    4   3.9   6        dodge 1999
## 53    4   4.7   8        dodge 2008
## 54    4   4.7   8        dodge 2008
## 55    4   4.7   8        dodge 2008
## 56    4   5.2   8        dodge 1999
## 57    4   5.2   8        dodge 1999
## 58    4   3.9   6        dodge 1999
## 59    4   4.7   8        dodge 2008
## 60    4   4.7   8        dodge 2008
## 61    4   4.7   8        dodge 2008
## 62    4   5.2   8        dodge 1999
## 63    4   5.7   8        dodge 2008
## 64    4   5.9   8        dodge 1999
## 65    4   4.7   8        dodge 2008
## 66    4   4.7   8        dodge 2008
## 67    4   4.7   8        dodge 2008
## 68    4   4.7   8        dodge 2008
## 69    4   4.7   8        dodge 2008
## 70    4   4.7   8        dodge 2008
## 71    4   5.2   8        dodge 1999
## 72    4   5.2   8        dodge 1999
## 73    4   5.7   8        dodge 2008
## 74    4   5.9   8        dodge 1999
## 75    r   4.6   8         ford 1999
## 76    r   5.4   8         ford 1999
## 77    r   5.4   8         ford 2008
## 78    4   4.0   6         ford 1999
## 79    4   4.0   6         ford 1999
## 80    4   4.0   6         ford 1999
## 81    4   4.0   6         ford 2008
## 82    4   4.6   8         ford 2008
## 83    4   5.0   8         ford 1999
## 84    4   4.2   6         ford 1999
## 85    4   4.2   6         ford 1999
## 86    4   4.6   8         ford 1999
## 87    4   4.6   8         ford 1999
## 88    4   4.6   8         ford 2008
## 89    4   5.4   8         ford 1999
## 90    4   5.4   8         ford 2008
## 91    r   3.8   6         ford 1999
## 92    r   3.8   6         ford 1999
## 93    r   4.0   6         ford 2008
## 94    r   4.0   6         ford 2008
## 95    r   4.6   8         ford 1999
## 96    r   4.6   8         ford 1999
## 97    r   4.6   8         ford 2008
## 98    r   4.6   8         ford 2008
## 99    r   5.4   8         ford 2008
## 100   f   1.6   4        honda 1999
## 101   f   1.6   4        honda 1999
## 102   f   1.6   4        honda 1999
## 103   f   1.6   4        honda 1999
## 104   f   1.6   4        honda 1999
## 105   f   1.8   4        honda 2008
## 106   f   1.8   4        honda 2008
## 107   f   1.8   4        honda 2008
## 108   f   2.0   4        honda 2008
## 109   f   2.4   4      hyundai 1999
## 110   f   2.4   4      hyundai 1999
## 111   f   2.4   4      hyundai 2008
## 112   f   2.4   4      hyundai 2008
## 113   f   2.5   6      hyundai 1999
## 114   f   2.5   6      hyundai 1999
## 115   f   3.3   6      hyundai 2008
## 116   f   2.0   4      hyundai 1999
## 117   f   2.0   4      hyundai 1999
## 118   f   2.0   4      hyundai 2008
## 119   f   2.0   4      hyundai 2008
## 120   f   2.7   6      hyundai 2008
## 121   f   2.7   6      hyundai 2008
## 122   f   2.7   6      hyundai 2008
## 123   4   3.0   6         jeep 2008
## 124   4   3.7   6         jeep 2008
## 125   4   4.0   6         jeep 1999
## 126   4   4.7   8         jeep 1999
## 127   4   4.7   8         jeep 2008
## 128   4   4.7   8         jeep 2008
## 129   4   5.7   8         jeep 2008
## 130   4   6.1   8         jeep 2008
## 131   4   4.0   8   land rover 1999
## 132   4   4.2   8   land rover 2008
## 133   4   4.4   8   land rover 2008
## 134   4   4.6   8   land rover 1999
## 135   r   5.4   8      lincoln 1999
## 136   r   5.4   8      lincoln 1999
## 137   r   5.4   8      lincoln 2008
## 138   4   4.0   6      mercury 1999
## 139   4   4.0   6      mercury 2008
## 140   4   4.6   8      mercury 2008
## 141   4   5.0   8      mercury 1999
## 142   f   2.4   4       nissan 1999
## 143   f   2.4   4       nissan 1999
## 144   f   2.5   4       nissan 2008
## 145   f   2.5   4       nissan 2008
## 146   f   3.5   6       nissan 2008
## 147   f   3.5   6       nissan 2008
## 148   f   3.0   6       nissan 1999
## 149   f   3.0   6       nissan 1999
## 150   f   3.5   6       nissan 2008
## 151   4   3.3   6       nissan 1999
## 152   4   3.3   6       nissan 1999
## 153   4   4.0   6       nissan 2008
## 154   4   5.6   8       nissan 2008
## 155   f   3.1   6      pontiac 1999
## 156   f   3.8   6      pontiac 1999
## 157   f   3.8   6      pontiac 1999
## 158   f   3.8   6      pontiac 2008
## 159   f   5.3   8      pontiac 2008
## 160   4   2.5   4       subaru 1999
## 161   4   2.5   4       subaru 1999
## 162   4   2.5   4       subaru 2008
## 163   4   2.5   4       subaru 2008
## 164   4   2.5   4       subaru 2008
## 165   4   2.5   4       subaru 2008
## 166   4   2.2   4       subaru 1999
## 167   4   2.2   4       subaru 1999
## 168   4   2.5   4       subaru 1999
## 169   4   2.5   4       subaru 1999
## 170   4   2.5   4       subaru 2008
## 171   4   2.5   4       subaru 2008
## 172   4   2.5   4       subaru 2008
## 173   4   2.5   4       subaru 2008
## 174   4   2.7   4       toyota 1999
## 175   4   2.7   4       toyota 1999
## 176   4   3.4   6       toyota 1999
## 177   4   3.4   6       toyota 1999
## 178   4   4.0   6       toyota 2008
## 179   4   4.7   8       toyota 2008
## 180   f   2.2   4       toyota 1999
## 181   f   2.2   4       toyota 1999
## 182   f   2.4   4       toyota 2008
## 183   f   2.4   4       toyota 2008
## 184   f   3.0   6       toyota 1999
## 185   f   3.0   6       toyota 1999
## 186   f   3.5   6       toyota 2008
## 187   f   2.2   4       toyota 1999
## 188   f   2.2   4       toyota 1999
## 189   f   2.4   4       toyota 2008
## 190   f   2.4   4       toyota 2008
## 191   f   3.0   6       toyota 1999
## 192   f   3.0   6       toyota 1999
## 193   f   3.3   6       toyota 2008
## 194   f   1.8   4       toyota 1999
## 195   f   1.8   4       toyota 1999
## 196   f   1.8   4       toyota 1999
## 197   f   1.8   4       toyota 2008
## 198   f   1.8   4       toyota 2008
## 199   4   4.7   8       toyota 1999
## 200   4   5.7   8       toyota 2008
## 201   4   2.7   4       toyota 1999
## 202   4   2.7   4       toyota 1999
## 203   4   2.7   4       toyota 2008
## 204   4   3.4   6       toyota 1999
## 205   4   3.4   6       toyota 1999
## 206   4   4.0   6       toyota 2008
## 207   4   4.0   6       toyota 2008
## 208   f   2.0   4   volkswagen 1999
## 209   f   2.0   4   volkswagen 1999
## 210   f   2.0   4   volkswagen 2008
## 211   f   2.0   4   volkswagen 2008
## 212   f   2.8   6   volkswagen 1999
## 213   f   1.9   4   volkswagen 1999
## 214   f   2.0   4   volkswagen 1999
## 215   f   2.0   4   volkswagen 1999
## 216   f   2.0   4   volkswagen 2008
## 217   f   2.0   4   volkswagen 2008
## 218   f   2.5   5   volkswagen 2008
## 219   f   2.5   5   volkswagen 2008
## 220   f   2.8   6   volkswagen 1999
## 221   f   2.8   6   volkswagen 1999
## 222   f   1.9   4   volkswagen 1999
## 223   f   1.9   4   volkswagen 1999
## 224   f   2.0   4   volkswagen 1999
## 225   f   2.0   4   volkswagen 1999
## 226   f   2.5   5   volkswagen 2008
## 227   f   2.5   5   volkswagen 2008
## 228   f   1.8   4   volkswagen 1999
## 229   f   1.8   4   volkswagen 1999
## 230   f   2.0   4   volkswagen 2008
## 231   f   2.0   4   volkswagen 2008
## 232   f   2.8   6   volkswagen 1999
## 233   f   2.8   6   volkswagen 1999
## 234   f   3.6   6   volkswagen 2008
```

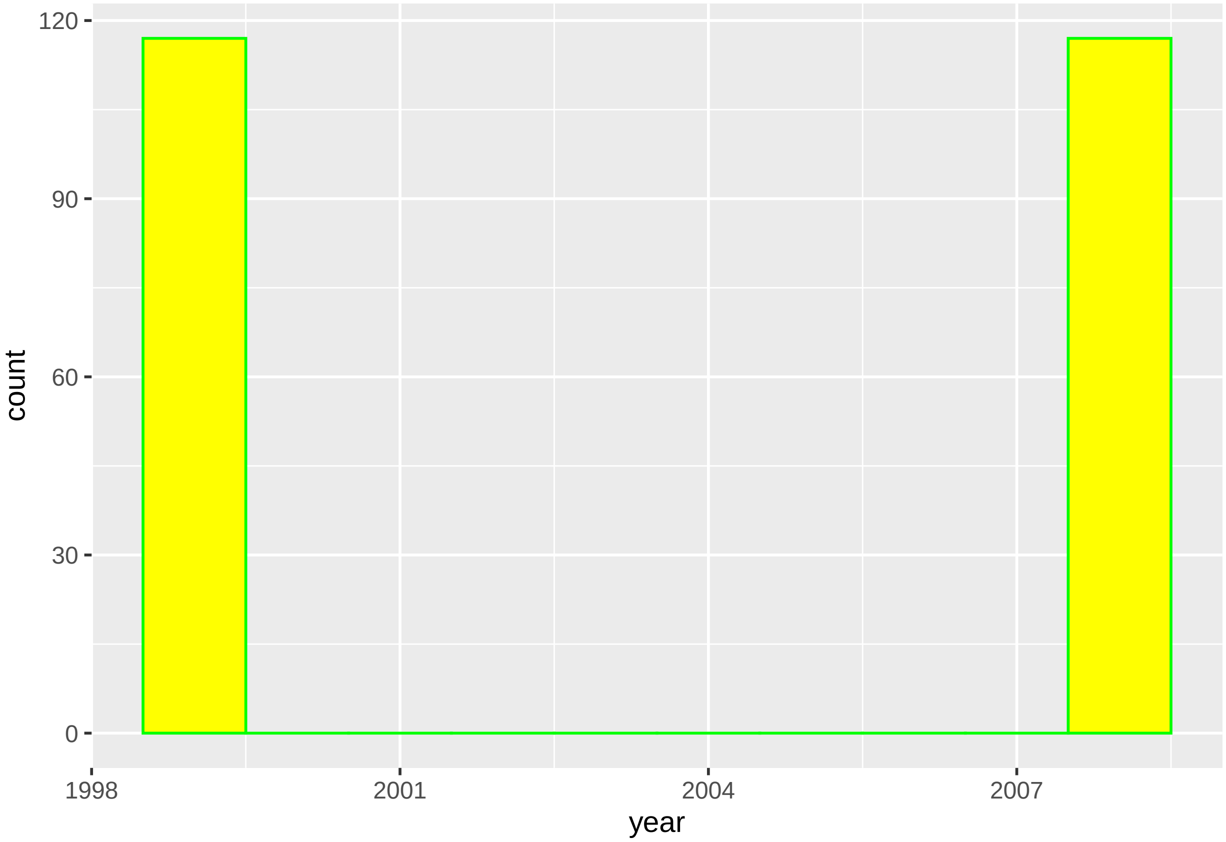
Now, writing a function to plot each column of dataset.If it's a continuous variable (numeric), create a histogram. If it's a categorical variable (character or factor), create a bar plot.

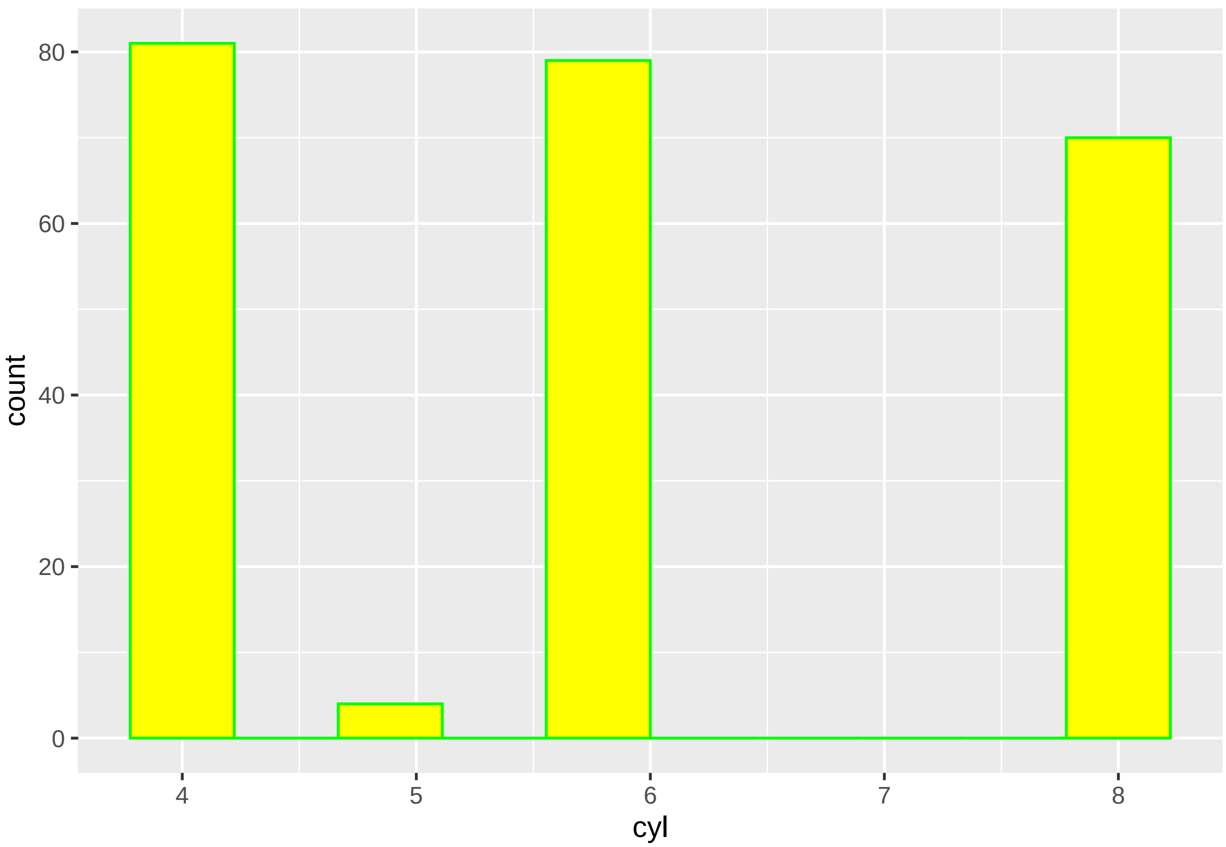
```r
plot <- function(data){
  for(i in names(data)){
    for(x in data[i]){
      if(is.numeric(x)){
        gh <- ggplot(data, mapping = aes(x = x)) + geom_histogram(bins = 10, fill ="yellow" , color ="g

        print(gh)
      }
      else{
        gb <- ggplot(data, mapping = aes(x = x)) + geom_bar(fill = "blue", color = "red") + labs(x=i)
        print(gb)
      }
    }
  }

}

plot(mpg)
```

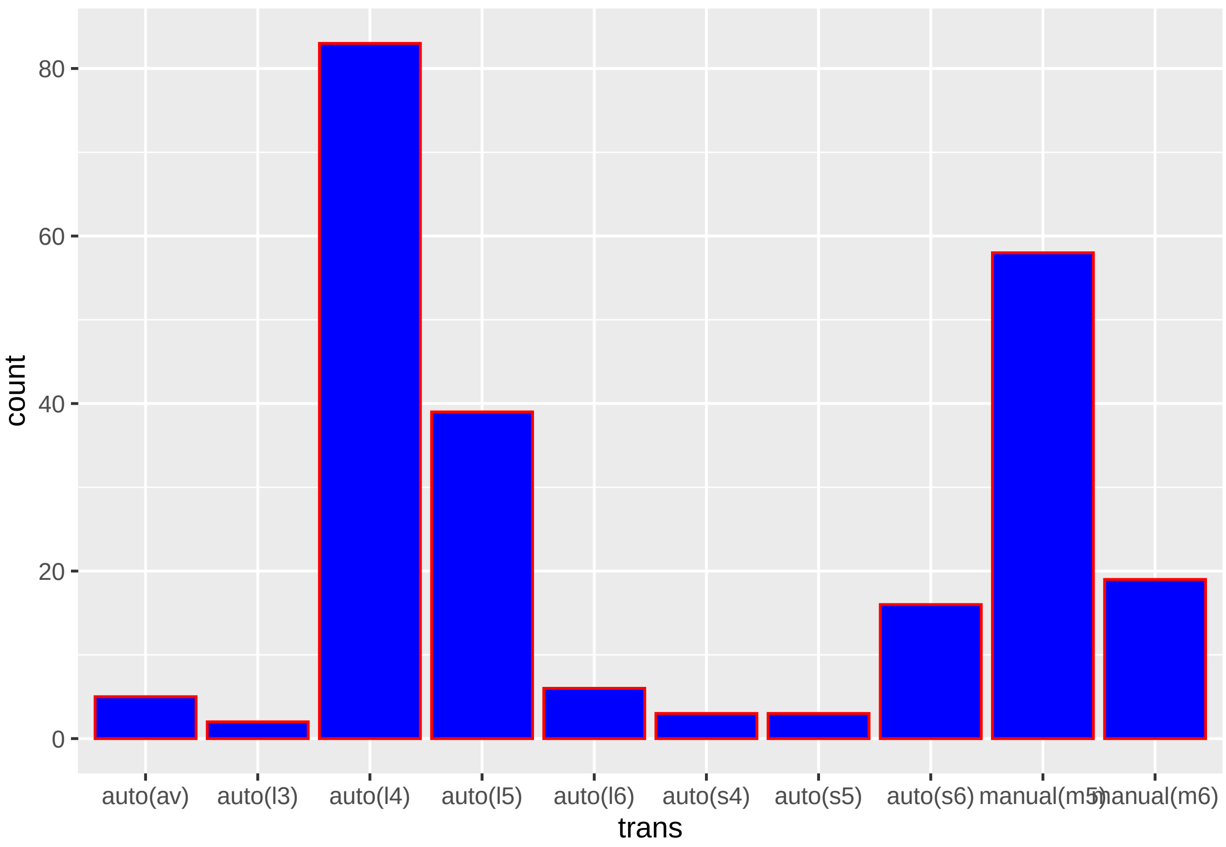


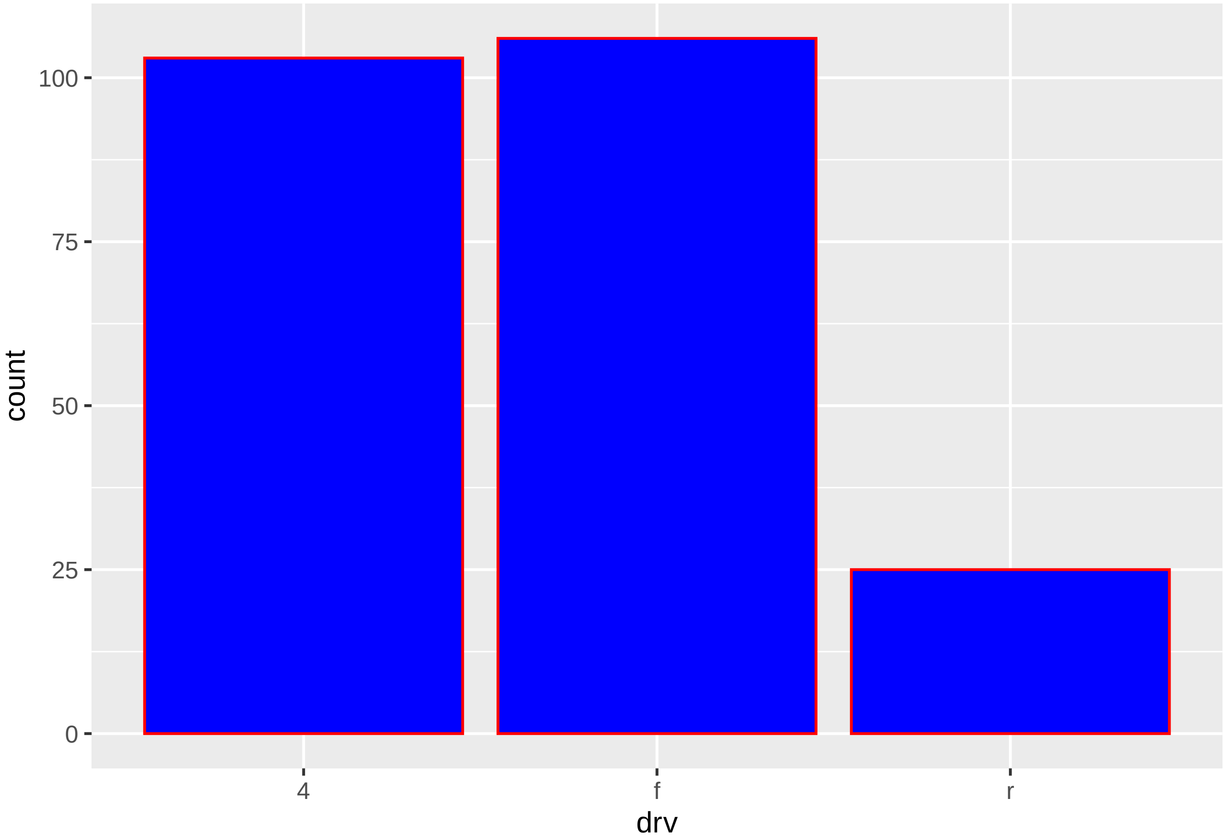

count
9
6
3
0
model

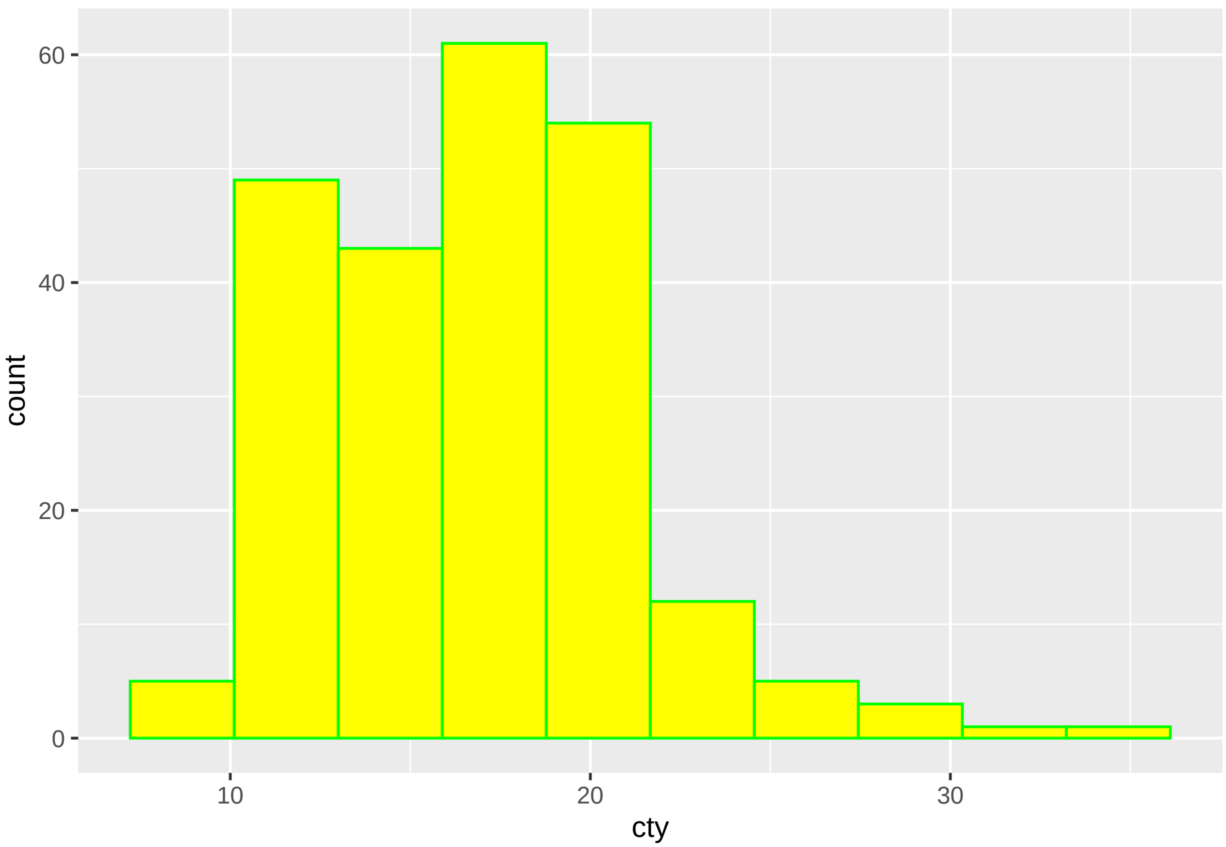

count
40
30
20
10
0
2
4
6
displ

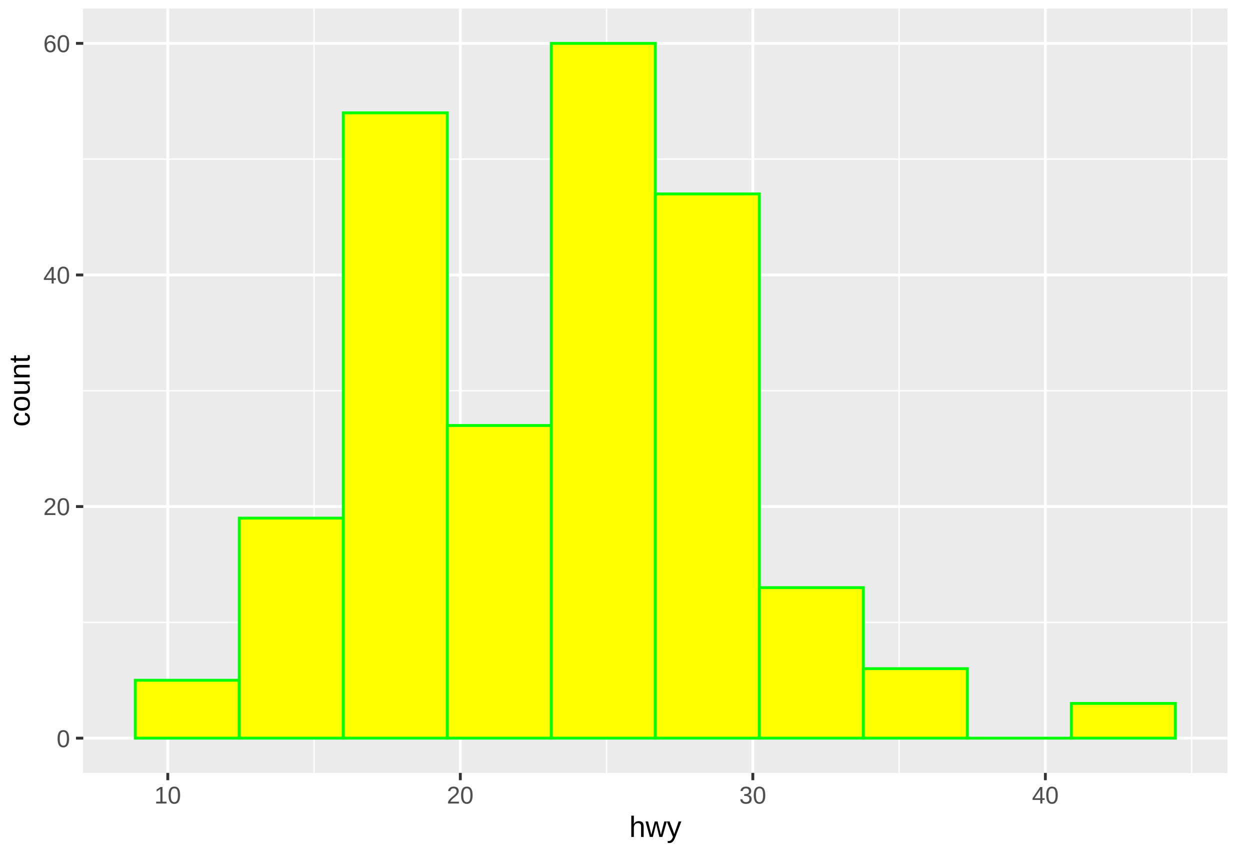

120
90
60
30
0
count
1998
2001
2004
2007
year

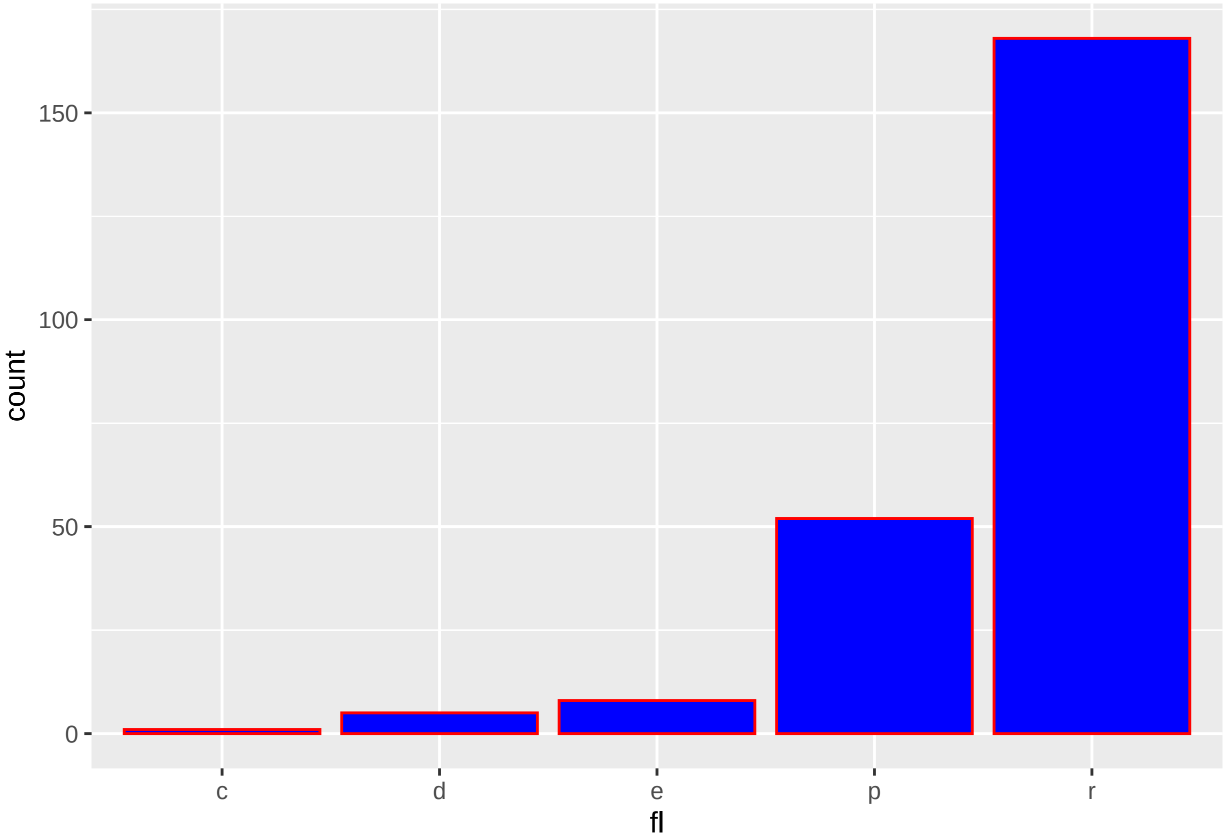

80
60
40
20
0
count
4
5
6
7
8
cyl

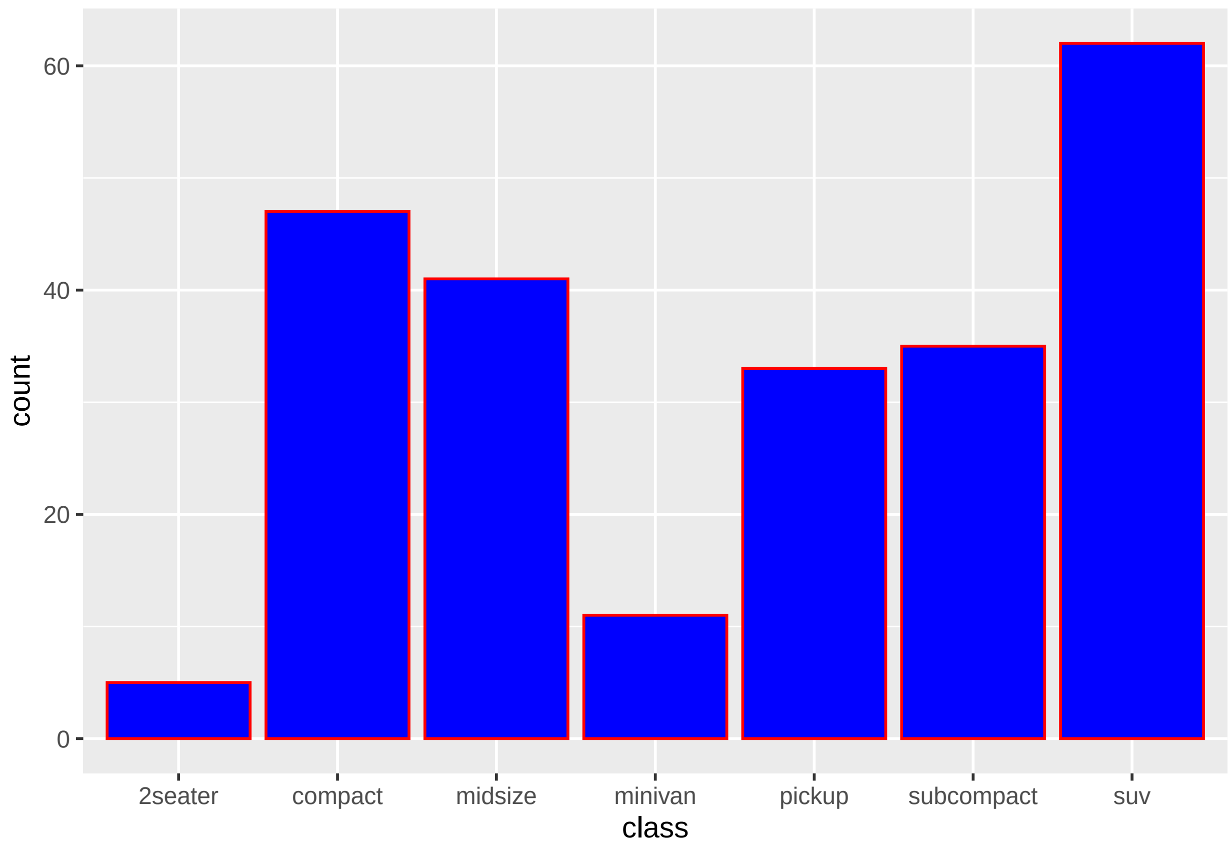

80
60
40
20
0
count
auto(av)
auto(l3)
auto(l4)
auto(l5)
auto(l6)
auto(s4)
auto(s5)
auto(s6)
manual(m5)
manual(m6)
trans


100
75
50
25
0
count
4
f
r
drv


60
40
20
0
count
10
20
30
cty

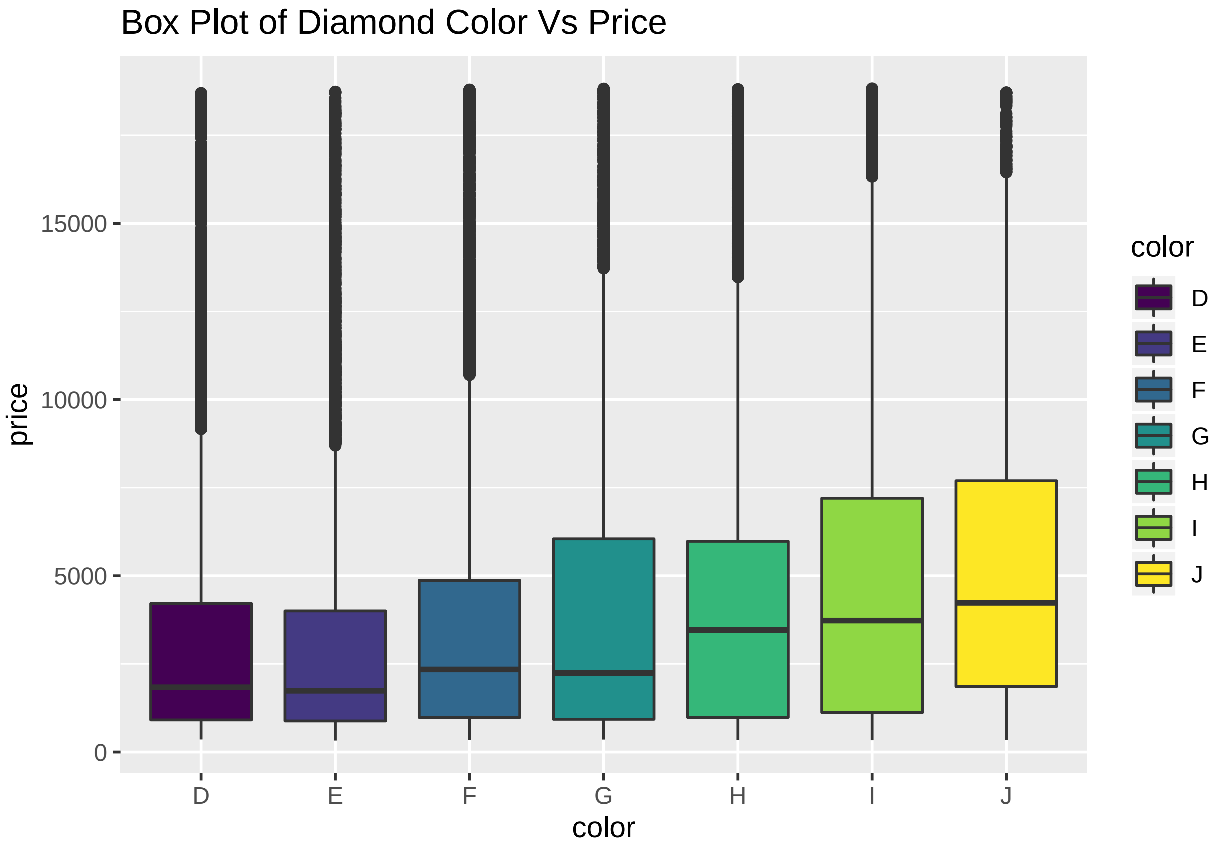

60
40
20
0
count
10
20
30
40
hwy


count
150
100
50
0
c
d
e
p
r
fl



Use side-by-side boxplots to visualize the distribution of price for each level of color.

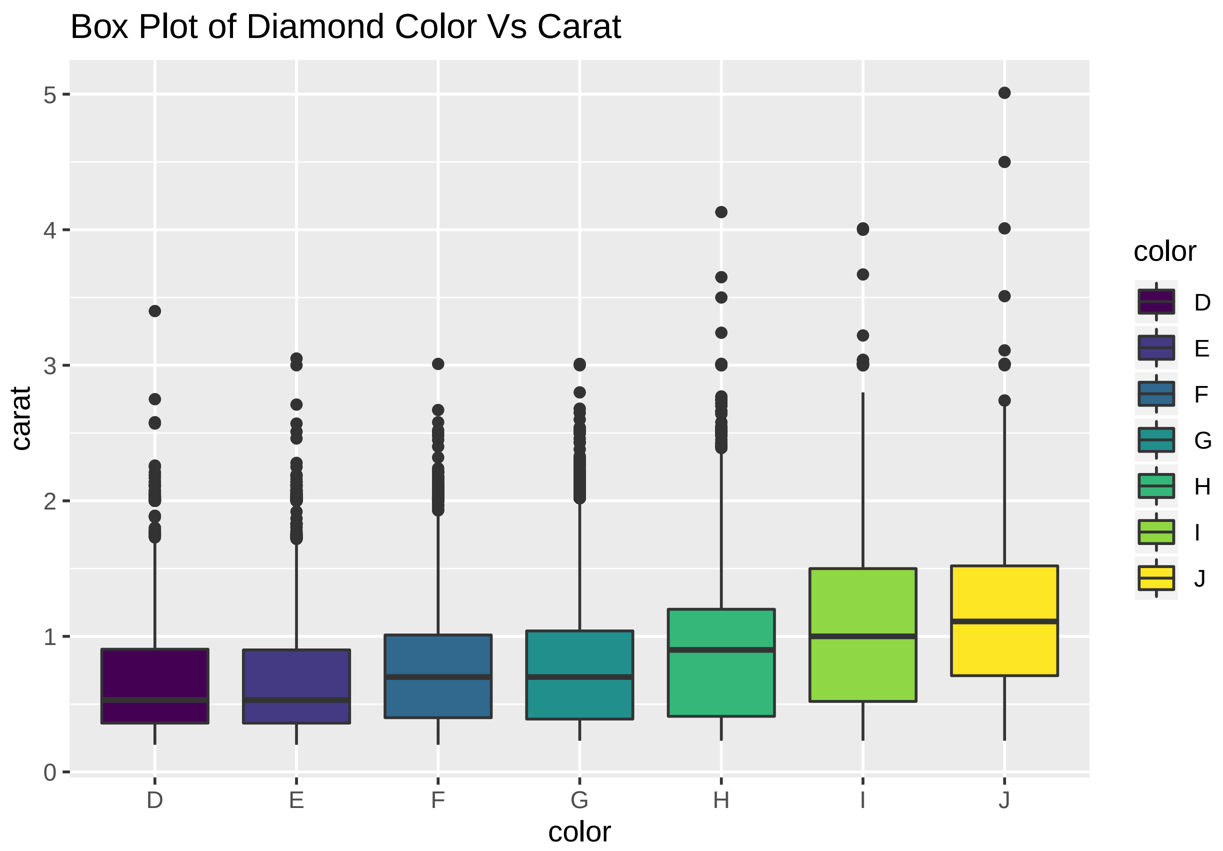
```
ggplot(diamonds, mapping= aes(x = color, y = price)) + geom_boxplot(mapping= aes(fill = color)) +
  ggtitle("Box Plot of Diamond Color Vs Price")
```



We notice that, Worst diamonds have larger spread and less outliers compared to best diamonds. People are paying high for better quality diamonds(G) rather than best(D).

Use side-by-side boxplots to visualize the distribution of carat for each level of color.

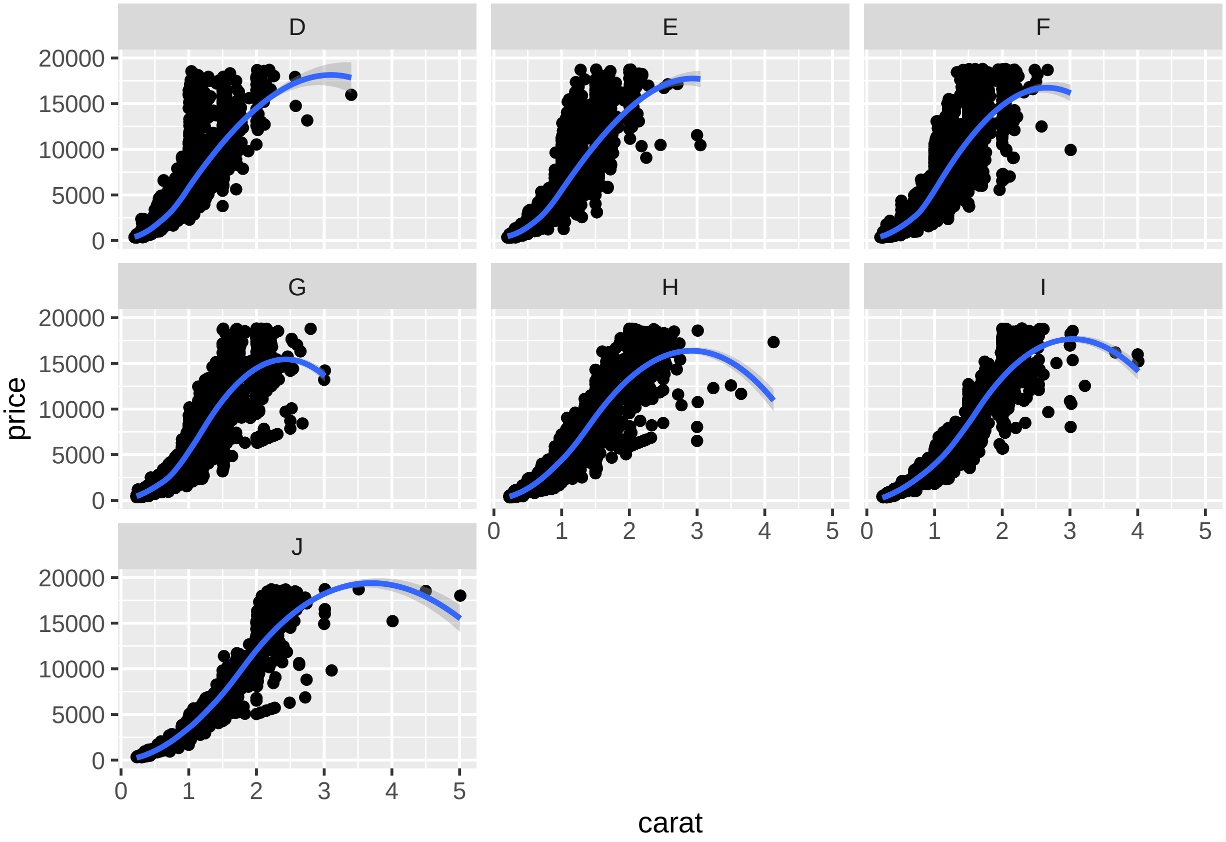
```
ggplot(diamonds, mapping = aes(x = color, y = carat, fill = color)) + geom_boxplot() +
  ggtitle("Box Plot of Diamond Color Vs Carat")
```



Best diamonds has less weight whereas worst are more heavier. From previous plot, people are paying more for Heavier and cheaper diamonds.

scatter plot of carat versus price, using either an additional aesthetic or faceting to visualize the relationship between carat and price for each level of color.

```
ggplot(data = diamonds,
       mapping = aes(x= carat, y= price)) +
  geom_point() + geom_smooth(method = loess) + facet_wrap(~color)
```



It can be said that most of the best diamonds has low weights and are sold at relatively lower prices than the better and worst diamonds. It is strange that none of the best quality diamonds weighs more than 3.5 carats and couldn't cross $16000 whereas even worst diamonds with far lesser weights costs around $18000.