RWorksheet_Gallenero#4c

2023-11-23

1.Use the dataset mpg a. Show your solutions on how to import a csv file into the environment.

```
library(readr)

dataset_mpg <- read.csv("mpg.csv")
dataset_mpg
```

```
##     manufacturer                 model displ year cyl      trans drv cty hwy
## 1           audi                    a4   1.8 1999   4   auto(l5)   f  18  29
## 2           audi                    a4   1.8 1999   4 manual(m5)   f  21  29
## 3           audi                    a4   2.0 2008   4 manual(m6)   f  20  31
## 4           audi                    a4   2.0 2008   4   auto(av)   f  21  30
## 5           audi                    a4   2.8 1999   6   auto(l5)   f  16  26
## 6           audi                    a4   2.8 1999   6 manual(m5)   f  18  26
## 7           audi                    a4   3.1 2008   6   auto(av)   f  18  27
## 8           audi             a4 quattro   1.8 1999   4 manual(m5)   4  18  26
## 9           audi             a4 quattro   1.8 1999   4   auto(l5)   4  16  25
## 10          audi             a4 quattro   2.0 2008   4 manual(m6)   4  20  28
## 11          audi             a4 quattro   2.0 2008   4   auto(s6)   4  19  27
## 12          audi             a4 quattro   2.8 1999   6   auto(l5)   4  15  25
## 13          audi             a4 quattro   2.8 1999   6 manual(m5)   4  17  25
## 14          audi             a4 quattro   3.1 2008   6   auto(s6)   4  17  25
## 15          audi             a4 quattro   3.1 2008   6 manual(m6)   4  15  25
## 16          audi             a6 quattro   2.8 1999   6   auto(l5)   4  15  24
## 17          audi             a6 quattro   3.1 2008   6   auto(s6)   4  17  25
## 18          audi             a6 quattro   4.2 2008   8   auto(s6)   4  16  23
## 19     chevrolet     c1500 suburban 2wd   5.3 2008   8   auto(l4)   r  14  20
## 20     chevrolet     c1500 suburban 2wd   5.3 2008   8   auto(l4)   r  11  15
## 21     chevrolet     c1500 suburban 2wd   5.3 2008   8   auto(l4)   r  14  20
## 22     chevrolet     c1500 suburban 2wd   5.7 1999   8   auto(l4)   r  13  17
## 23     chevrolet     c1500 suburban 2wd   6.0 2008   8   auto(l4)   r  12  17
## 24     chevrolet               corvette   5.7 1999   8 manual(m6)   r  16  26
## 25     chevrolet               corvette   5.7 1999   8   auto(l4)   r  15  23
## 26     chevrolet               corvette   6.2 2008   8 manual(m6)   r  16  26
## 27     chevrolet               corvette   6.2 2008   8   auto(s6)   r  15  25
## 28     chevrolet               corvette   7.0 2008   8 manual(m6)   r  15  24
## 29     chevrolet        k1500 tahoe 4wd   5.3 2008   8   auto(l4)   4  14  19
## 30     chevrolet        k1500 tahoe 4wd   5.3 2008   8   auto(l4)   4  11  14
## 31     chevrolet        k1500 tahoe 4wd   5.7 1999   8   auto(l4)   4  11  15
## 32     chevrolet        k1500 tahoe 4wd   6.5 1999   8   auto(l4)   4  14  17
## 33     chevrolet                 malibu   2.4 1999   4   auto(l4)   f  19  27
## 34     chevrolet                 malibu   2.4 2008   4   auto(l4)   f  22  30
## 35     chevrolet                 malibu   3.1 1999   6   auto(l4)   f  18  26
## 36     chevrolet                 malibu   3.5 2008   6   auto(l4)   f  18  29
## 37     chevrolet                 malibu   3.6 2008   6   auto(s6)   f  17  26
## 38         dodge           caravan 2wd   2.4 1999   4   auto(l3)   f  18  24
```

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## 39         dodge            caravan 2wd   3.0 1999   6   auto(l4)   f  17  24
## 40         dodge            caravan 2wd   3.3 1999   6   auto(l4)   f  16  22
## 41         dodge            caravan 2wd   3.3 1999   6   auto(l4)   f  16  22
## 42         dodge            caravan 2wd   3.3 2008   6   auto(l4)   f  17  24
## 43         dodge            caravan 2wd   3.3 2008   6   auto(l4)   f  17  24
## 44         dodge            caravan 2wd   3.3 2008   6   auto(l4)   f  11  17
## 45         dodge            caravan 2wd   3.8 1999   6   auto(l4)   f  15  22
## 46         dodge            caravan 2wd   3.8 1999   6   auto(l4)   f  15  21
## 47         dodge            caravan 2wd   3.8 2008   6   auto(l6)   f  16  23
## 48         dodge            caravan 2wd   4.0 2008   6   auto(l6)   f  16  23
## 49         dodge      dakota pickup 4wd   3.7 2008   6 manual(m6)   4  15  19
## 50         dodge      dakota pickup 4wd   3.7 2008   6   auto(l4)   4  14  18
## 51         dodge      dakota pickup 4wd   3.9 1999   6   auto(l4)   4  13  17
## 52         dodge      dakota pickup 4wd   3.9 1999   6 manual(m5)   4  14  17
## 53         dodge      dakota pickup 4wd   4.7 2008   8   auto(l5)   4  14  19
## 54         dodge      dakota pickup 4wd   4.7 2008   8   auto(l5)   4  14  19
## 55         dodge      dakota pickup 4wd   4.7 2008   8   auto(l5)   4   9  12
## 56         dodge      dakota pickup 4wd   5.2 1999   8 manual(m5)   4  11  17
## 57         dodge      dakota pickup 4wd   5.2 1999   8   auto(l4)   4  11  15
## 58         dodge            durango 4wd   3.9 1999   6   auto(l4)   4  13  17
## 59         dodge            durango 4wd   4.7 2008   8   auto(l5)   4  13  17
## 60         dodge            durango 4wd   4.7 2008   8   auto(l5)   4   9  12
## 61         dodge            durango 4wd   4.7 2008   8   auto(l5)   4  13  17
## 62         dodge            durango 4wd   5.2 1999   8   auto(l4)   4  11  16
## 63         dodge            durango 4wd   5.7 2008   8   auto(l5)   4  13  18
## 64         dodge            durango 4wd   5.9 1999   8   auto(l4)   4  11  15
## 65         dodge    ram 1500 pickup 4wd   4.7 2008   8 manual(m6)   4  12  16
## 66         dodge    ram 1500 pickup 4wd   4.7 2008   8   auto(l5)   4   9  12
## 67         dodge    ram 1500 pickup 4wd   4.7 2008   8   auto(l5)   4  13  17
## 68         dodge    ram 1500 pickup 4wd   4.7 2008   8   auto(l5)   4  13  17
## 69         dodge    ram 1500 pickup 4wd   4.7 2008   8 manual(m6)   4  12  16
## 70         dodge    ram 1500 pickup 4wd   4.7 2008   8 manual(m6)   4   9  12
## 71         dodge    ram 1500 pickup 4wd   5.2 1999   8   auto(l4)   4  11  15
## 72         dodge    ram 1500 pickup 4wd   5.2 1999   8 manual(m5)   4  11  16
## 73         dodge    ram 1500 pickup 4wd   5.7 2008   8   auto(l5)   4  13  17
## 74         dodge    ram 1500 pickup 4wd   5.9 1999   8   auto(l4)   4  11  15
## 75          ford         expedition 2wd   4.6 1999   8   auto(l4)   r  11  17
## 76          ford         expedition 2wd   5.4 1999   8   auto(l4)   r  11  17
## 77          ford         expedition 2wd   5.4 2008   8   auto(l6)   r  12  18
## 78          ford           explorer 4wd   4.0 1999   6   auto(l5)   4  14  17
## 79          ford           explorer 4wd   4.0 1999   6 manual(m5)   4  15  19
## 80          ford           explorer 4wd   4.0 1999   6   auto(l5)   4  14  17
## 81          ford           explorer 4wd   4.0 2008   6   auto(l5)   4  13  19
## 82          ford           explorer 4wd   4.6 2008   8   auto(l6)   4  13  19
## 83          ford           explorer 4wd   5.0 1999   8   auto(l4)   4  13  17
## 84          ford        f150 pickup 4wd   4.2 1999   6   auto(l4)   4  14  17
## 85          ford        f150 pickup 4wd   4.2 1999   6 manual(m5)   4  14  17
## 86          ford        f150 pickup 4wd   4.6 1999   8 manual(m5)   4  13  16
## 87          ford        f150 pickup 4wd   4.6 1999   8   auto(l4)   4  13  16
## 88          ford        f150 pickup 4wd   4.6 2008   8   auto(l4)   4  13  17
## 89          ford        f150 pickup 4wd   5.4 1999   8   auto(l4)   4  11  15
## 90          ford        f150 pickup 4wd   5.4 2008   8   auto(l4)   4  13  17
## 91          ford                mustang   3.8 1999   6 manual(m5)   r  18  26
## 92          ford                mustang   3.8 1999   6   auto(l4)   r  18  25
```

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## 93          ford               mustang   4.0 2008   6 manual(m5)   r  17  26
## 94          ford               mustang   4.0 2008   6   auto(l5)   r  16  24
## 95          ford               mustang   4.6 1999   8   auto(l4)   r  15  21
## 96          ford               mustang   4.6 1999   8 manual(m5)   r  15  22
## 97          ford               mustang   4.6 2008   8 manual(m5)   r  15  23
## 98          ford               mustang   4.6 2008   8   auto(l5)   r  15  22
## 99          ford               mustang   5.4 2008   8 manual(m6)   r  14  20
## 100        honda                 civic   1.6 1999   4 manual(m5)   f  28  33
## 101        honda                 civic   1.6 1999   4   auto(l4)   f  24  32
## 102        honda                 civic   1.6 1999   4 manual(m5)   f  25  32
## 103        honda                 civic   1.6 1999   4 manual(m5)   f  23  29
## 104        honda                 civic   1.6 1999   4   auto(l4)   f  24  32
## 105        honda                 civic   1.8 2008   4 manual(m5)   f  26  34
## 106        honda                 civic   1.8 2008   4   auto(l5)   f  25  36
## 107        honda                 civic   1.8 2008   4   auto(l5)   f  24  36
## 108        honda                 civic   2.0 2008   4 manual(m6)   f  21  29
## 109      hyundai               sonata   2.4 1999   4   auto(l4)   f  18  26
## 110      hyundai               sonata   2.4 1999   4 manual(m5)   f  18  27
## 111      hyundai               sonata   2.4 2008   4   auto(l4)   f  21  30
## 112      hyundai               sonata   2.4 2008   4 manual(m5)   f  21  31
## 113      hyundai               sonata   2.5 1999   6   auto(l4)   f  18  26
## 114      hyundai               sonata   2.5 1999   6 manual(m5)   f  18  26
## 115      hyundai               sonata   3.3 2008   6   auto(l5)   f  19  28
## 116      hyundai              tiburon   2.0 1999   4   auto(l4)   f  19  26
## 117      hyundai              tiburon   2.0 1999   4 manual(m5)   f  19  29
## 118      hyundai              tiburon   2.0 2008   4 manual(m5)   f  20  28
## 119      hyundai              tiburon   2.0 2008   4   auto(l4)   f  20  27
## 120      hyundai              tiburon   2.7 2008   6   auto(l4)   f  17  24
## 121      hyundai              tiburon   2.7 2008   6 manual(m6)   f  16  24
## 122      hyundai              tiburon   2.7 2008   6 manual(m5)   f  17  24
## 123         jeep  grand cherokee 4wd   3.0 2008   6   auto(l5)   4  17  22
## 124         jeep  grand cherokee 4wd   3.7 2008   6   auto(l5)   4  15  19
## 125         jeep  grand cherokee 4wd   4.0 1999   6   auto(l4)   4  15  20
## 126         jeep  grand cherokee 4wd   4.7 1999   8   auto(l4)   4  14  17
## 127         jeep  grand cherokee 4wd   4.7 2008   8   auto(l5)   4   9  12
## 128         jeep  grand cherokee 4wd   4.7 2008   8   auto(l5)   4  14  19
## 129         jeep  grand cherokee 4wd   5.7 2008   8   auto(l5)   4  13  18
## 130         jeep  grand cherokee 4wd   6.1 2008   8   auto(l5)   4  11  14
## 131   land rover        range rover   4.0 1999   8   auto(l4)   4  11  15
## 132   land rover        range rover   4.2 2008   8   auto(s6)   4  12  18
## 133   land rover        range rover   4.4 2008   8   auto(s6)   4  12  18
## 134   land rover        range rover   4.6 1999   8   auto(l4)   4  11  15
## 135      lincoln      navigator 2wd   5.4 1999   8   auto(l4)   r  11  17
## 136      lincoln      navigator 2wd   5.4 1999   8   auto(l4)   r  11  16
## 137      lincoln      navigator 2wd   5.4 2008   8   auto(l6)   r  12  18
## 138      mercury    mountaineer 4wd   4.0 1999   6   auto(l5)   4  14  17
## 139      mercury    mountaineer 4wd   4.0 2008   6   auto(l5)   4  13  19
## 140      mercury    mountaineer 4wd   4.6 2008   8   auto(l6)   4  13  19
## 141      mercury    mountaineer 4wd   5.0 1999   8   auto(l4)   4  13  17
## 142       nissan             altima   2.4 1999   4 manual(m5)   f  21  29
## 143       nissan             altima   2.4 1999   4   auto(l4)   f  19  27
## 144       nissan             altima   2.5 2008   4   auto(av)   f  23  31
## 145       nissan             altima   2.5 2008   4 manual(m6)   f  23  32
## 146       nissan             altima   3.5 2008   6 manual(m6)   f  19  27
```

```
## 147       nissan                 altima   3.5 2008   6   auto(av)   f  19  26
## 148       nissan                 maxima   3.0 1999   6   auto(l4)   f  18  26
## 149       nissan                 maxima   3.0 1999   6 manual(m5)   f  19  25
## 150       nissan                 maxima   3.5 2008   6   auto(av)   f  19  25
## 151       nissan          pathfinder 4wd   3.3 1999   6   auto(l4)   4  14  17
## 152       nissan          pathfinder 4wd   3.3 1999   6 manual(m5)   4  15  17
## 153       nissan          pathfinder 4wd   4.0 2008   6   auto(l5)   4  14  20
## 154       nissan          pathfinder 4wd   5.6 2008   8   auto(s5)   4  12  18
## 155      pontiac              grand prix   3.1 1999   6   auto(l4)   f  18  26
## 156      pontiac              grand prix   3.8 1999   6   auto(l4)   f  16  26
## 157      pontiac              grand prix   3.8 1999   6   auto(l4)   f  17  27
## 158      pontiac              grand prix   3.8 2008   6   auto(l4)   f  18  28
## 159      pontiac              grand prix   5.3 2008   8   auto(s4)   f  16  25
## 160       subaru            forester awd   2.5 1999   4 manual(m5)   4  18  25
## 161       subaru            forester awd   2.5 1999   4   auto(l4)   4  18  24
## 162       subaru            forester awd   2.5 2008   4 manual(m5)   4  20  27
## 163       subaru            forester awd   2.5 2008   4 manual(m5)   4  19  25
## 164       subaru            forester awd   2.5 2008   4   auto(l4)   4  20  26
## 165       subaru            forester awd   2.5 2008   4   auto(l4)   4  18  23
## 166       subaru             impreza awd   2.2 1999   4   auto(l4)   4  21  26
## 167       subaru             impreza awd   2.2 1999   4 manual(m5)   4  19  26
## 168       subaru             impreza awd   2.5 1999   4 manual(m5)   4  19  26
## 169       subaru             impreza awd   2.5 1999   4   auto(l4)   4  19  26
## 170       subaru             impreza awd   2.5 2008   4   auto(s4)   4  20  25
## 171       subaru             impreza awd   2.5 2008   4   auto(s4)   4  20  27
## 172       subaru             impreza awd   2.5 2008   4 manual(m5)   4  19  25
## 173       subaru             impreza awd   2.5 2008   4 manual(m5)   4  20  27
## 174       toyota             4runner 4wd   2.7 1999   4 manual(m5)   4  15  20
## 175       toyota             4runner 4wd   2.7 1999   4   auto(l4)   4  16  20
## 176       toyota             4runner 4wd   3.4 1999   6   auto(l4)   4  15  19
## 177       toyota             4runner 4wd   3.4 1999   6 manual(m5)   4  15  17
## 178       toyota             4runner 4wd   4.0 2008   6   auto(l5)   4  16  20
## 179       toyota             4runner 4wd   4.7 2008   8   auto(l5)   4  14  17
## 180       toyota                  camry   2.2 1999   4 manual(m5)   f  21  29
## 181       toyota                  camry   2.2 1999   4   auto(l4)   f  21  27
## 182       toyota                  camry   2.4 2008   4 manual(m5)   f  21  31
## 183       toyota                  camry   2.4 2008   4   auto(l5)   f  21  31
## 184       toyota                  camry   3.0 1999   6   auto(l4)   f  18  26
## 185       toyota                  camry   3.0 1999   6 manual(m5)   f  18  26
## 186       toyota                  camry   3.5 2008   6   auto(s6)   f  19  28
## 187       toyota            camry solara   2.2 1999   4   auto(l4)   f  21  27
## 188       toyota            camry solara   2.2 1999   4 manual(m5)   f  21  29
## 189       toyota            camry solara   2.4 2008   4 manual(m5)   f  21  31
## 190       toyota            camry solara   2.4 2008   4   auto(s5)   f  22  31
## 191       toyota            camry solara   3.0 1999   6   auto(l4)   f  18  26
## 192       toyota            camry solara   3.0 1999   6 manual(m5)   f  18  26
## 193       toyota            camry solara   3.3 2008   6   auto(s5)   f  18  27
## 194       toyota                 corolla   1.8 1999   4   auto(l3)   f  24  30
## 195       toyota                 corolla   1.8 1999   4   auto(l4)   f  24  33
## 196       toyota                 corolla   1.8 1999   4 manual(m5)   f  26  35
## 197       toyota                 corolla   1.8 2008   4 manual(m5)   f  28  37
## 198       toyota                 corolla   1.8 2008   4   auto(l4)   f  26  35
## 199       toyota land cruiser wagon 4wd   4.7 1999   8   auto(l4)   4  11  15
## 200       toyota land cruiser wagon 4wd   5.7 2008   8   auto(s6)   4  13  18
```

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## 201       toyota      toyota tacoma 4wd   2.7 1999   4 manual(m5)   4  15  20
## 202       toyota      toyota tacoma 4wd   2.7 1999   4   auto(l4)   4  16  20
## 203       toyota      toyota tacoma 4wd   2.7 2008   4 manual(m5)   4  17  22
## 204       toyota      toyota tacoma 4wd   3.4 1999   6 manual(m5)   4  15  17
## 205       toyota      toyota tacoma 4wd   3.4 1999   6   auto(l4)   4  15  19
## 206       toyota      toyota tacoma 4wd   4.0 2008   6 manual(m6)   4  15  18
## 207       toyota      toyota tacoma 4wd   4.0 2008   6   auto(l5)   4  16  20
## 208   volkswagen                   gti   2.0 1999   4 manual(m5)   f  21  29
## 209   volkswagen                   gti   2.0 1999   4   auto(l4)   f  19  26
## 210   volkswagen                   gti   2.0 2008   4 manual(m6)   f  21  29
## 211   volkswagen                   gti   2.0 2008   4   auto(s6)   f  22  29
## 212   volkswagen                   gti   2.8 1999   6 manual(m5)   f  17  24
## 213   volkswagen                 jetta   1.9 1999   4 manual(m5)   f  33  44
## 214   volkswagen                 jetta   2.0 1999   4 manual(m5)   f  21  29
## 215   volkswagen                 jetta   2.0 1999   4   auto(l4)   f  19  26
## 216   volkswagen                 jetta   2.0 2008   4   auto(s6)   f  22  29
## 217   volkswagen                 jetta   2.0 2008   4 manual(m6)   f  21  29
## 218   volkswagen                 jetta   2.5 2008   5   auto(s6)   f  21  29
## 219   volkswagen                 jetta   2.5 2008   5 manual(m5)   f  21  29
## 220   volkswagen                 jetta   2.8 1999   6   auto(l4)   f  16  23
## 221   volkswagen                 jetta   2.8 1999   6 manual(m5)   f  17  24
## 222   volkswagen             new beetle   1.9 1999   4 manual(m5)   f  35  44
## 223   volkswagen             new beetle   1.9 1999   4   auto(l4)   f  29  41
## 224   volkswagen             new beetle   2.0 1999   4 manual(m5)   f  21  29
## 225   volkswagen             new beetle   2.0 1999   4   auto(l4)   f  19  26
## 226   volkswagen             new beetle   2.5 2008   5 manual(m5)   f  20  28
## 227   volkswagen             new beetle   2.5 2008   5   auto(s6)   f  20  29
## 228   volkswagen                 passat   1.8 1999   4 manual(m5)   f  21  29
## 229   volkswagen                 passat   1.8 1999   4   auto(l5)   f  18  29
## 230   volkswagen                 passat   2.0 2008   4   auto(s6)   f  19  28
## 231   volkswagen                 passat   2.0 2008   4 manual(m6)   f  21  29
## 232   volkswagen                 passat   2.8 1999   6   auto(l5)   f  16  26
## 233   volkswagen                 passat   2.8 1999   6 manual(m5)   f  18  26
## 234   volkswagen                 passat   3.6 2008   6   auto(s6)   f  17  26
##     fl      class
## 1    p    compact
## 2    p    compact
## 3    p    compact
## 4    p    compact
## 5    p    compact
## 6    p    compact
## 7    p    compact
## 8    p    compact
## 9    p    compact
## 10   p    compact
## 11   p    compact
## 12   p    compact
## 13   p    compact
## 14   p    compact
## 15   p    compact
## 16   p    midsize
## 17   p    midsize
## 18   p    midsize
## 19   r        suv
```

```
## 20   e        suv
## 21   r        suv
## 22   r        suv
## 23   r        suv
## 24   p    2seater
## 25   p    2seater
## 26   p    2seater
## 27   p    2seater
## 28   p    2seater
## 29   r        suv
## 30   e        suv
## 31   r        suv
## 32   d        suv
## 33   r    midsize
## 34   r    midsize
## 35   r    midsize
## 36   r    midsize
## 37   r    midsize
## 38   r    minivan
## 39   r    minivan
## 40   r    minivan
## 41   r    minivan
## 42   r    minivan
## 43   r    minivan
## 44   e    minivan
## 45   r    minivan
## 46   r    minivan
## 47   r    minivan
## 48   r    minivan
## 49   r     pickup
## 50   r     pickup
## 51   r     pickup
## 52   r     pickup
## 53   r     pickup
## 54   r     pickup
## 55   e     pickup
## 56   r     pickup
## 57   r     pickup
## 58   r        suv
## 59   r        suv
## 60   e        suv
## 61   r        suv
## 62   r        suv
## 63   r        suv
## 64   r        suv
## 65   r     pickup
## 66   e     pickup
## 67   r     pickup
## 68   r     pickup
## 69   r     pickup
## 70   e     pickup
## 71   r     pickup
## 72   r     pickup
## 73   r     pickup
```

```
## 74   r     pickup
## 75   r        suv
## 76   r        suv
## 77   r        suv
## 78   r        suv
## 79   r        suv
## 80   r        suv
## 81   r        suv
## 82   r        suv
## 83   r        suv
## 84   r     pickup
## 85   r     pickup
## 86   r     pickup
## 87   r     pickup
## 88   r     pickup
## 89   r     pickup
## 90   r     pickup
## 91   r subcompact
## 92   r subcompact
## 93   r subcompact
## 94   r subcompact
## 95   r subcompact
## 96   r subcompact
## 97   r subcompact
## 98   r subcompact
## 99   p subcompact
## 100  r subcompact
## 101  r subcompact
## 102  r subcompact
## 103  p subcompact
## 104  r subcompact
## 105  r subcompact
## 106  r subcompact
## 107  c subcompact
## 108  p subcompact
## 109  r    midsize
## 110  r    midsize
## 111  r    midsize
## 112  r    midsize
## 113  r    midsize
## 114  r    midsize
## 115  r    midsize
## 116  r subcompact
## 117  r subcompact
## 118  r subcompact
## 119  r subcompact
## 120  r subcompact
## 121  r subcompact
## 122  r subcompact
## 123  d        suv
## 124  r        suv
## 125  r        suv
## 126  r        suv
## 127  e        suv
```

```
## 128  r        suv
## 129  r        suv
## 130  p        suv
## 131  p        suv
## 132  r        suv
## 133  r        suv
## 134  p        suv
## 135  r        suv
## 136  p        suv
## 137  r        suv
## 138  r        suv
## 139  r        suv
## 140  r        suv
## 141  r        suv
## 142  r    compact
## 143  r    compact
## 144  r    midsize
## 145  r    midsize
## 146  p    midsize
## 147  p    midsize
## 148  r    midsize
## 149  r    midsize
## 150  p    midsize
## 151  r        suv
## 152  r        suv
## 153  p        suv
## 154  p        suv
## 155  r    midsize
## 156  p    midsize
## 157  r    midsize
## 158  r    midsize
## 159  p    midsize
## 160  r        suv
## 161  r        suv
## 162  r        suv
## 163  p        suv
## 164  r        suv
## 165  p        suv
## 166  r subcompact
## 167  r subcompact
## 168  r subcompact
## 169  r subcompact
## 170  p    compact
## 171  r    compact
## 172  p    compact
## 173  r    compact
## 174  r        suv
## 175  r        suv
## 176  r        suv
## 177  r        suv
## 178  r        suv
## 179  r        suv
## 180  r    midsize
## 181  r    midsize
```

```
## 182  r    midsize
## 183  r    midsize
## 184  r    midsize
## 185  r    midsize
## 186  r    midsize
## 187  r    compact
## 188  r    compact
## 189  r    compact
## 190  r    compact
## 191  r    compact
## 192  r    compact
## 193  r    compact
## 194  r    compact
## 195  r    compact
## 196  r    compact
## 197  r    compact
## 198  r    compact
## 199  r        suv
## 200  r        suv
## 201  r     pickup
## 202  r     pickup
## 203  r     pickup
## 204  r     pickup
## 205  r     pickup
## 206  r     pickup
## 207  r     pickup
## 208  r    compact
## 209  r    compact
## 210  p    compact
## 211  p    compact
## 212  r    compact
## 213  d    compact
## 214  r    compact
## 215  r    compact
## 216  p    compact
## 217  p    compact
## 218  r    compact
## 219  r    compact
## 220  r    compact
## 221  r    compact
## 222  d subcompact
## 223  d subcompact
## 224  r subcompact
## 225  r subcompact
## 226  r subcompact
## 227  r subcompact
## 228  p    midsize
## 229  p    midsize
## 230  p    midsize
## 231  p    midsize
## 232  p    midsize
## 233  p    midsize
## 234  p    midsize
```

b. Which variables from mpg dataset are categorical?

```
var_mpg <- names(sapply(dataset_mpg, function(x) is.factor(x) || is.character(x)))
var_mpg
```

```
##  [1] "manufacturer" "model"        "displ"        "year"         "cyl"
##  [6] "trans"        "drv"          "cty"          "hwy"          "fl"
## [11] "class"
```

```
# manufacturer, model, displ, year, cyl, trans, drv, cty, hwy, fl, and class are the variables from the
```

c. Which are continuous variables?

```
cont <- sapply(dataset_mpg, is.numeric)
var_cont <- names(dataset_mpg)[cont]
var_cont
```

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

```
# displ, year, cyl, cty, hwy are the continous variables.
```

2. Which manufacturer has the most models in this data set? Which model has the most variations? Show your answer.

```
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
```

```
Most_models <- dataset_mpg %>%
  group_by(manufacturer) %>%
  summarise(number_models = n()) %>%
  filter(number_models == max(number_models))

cat("The manufacturer with the most models is:", Most_models$manufacturer, "\n")
```

```
## The manufacturer with the most models is: dodge
```

```
Most_variations <- dataset_mpg %>%
  group_by(model) %>%
  summarise(number_variations = n()) %>%
  filter(number_variations == max(number_variations))

cat("The model with the most variations is:", Most_variations$model, "\n")
```

```
## The model with the most variations is: caravan 2wd
```

a. Group the manufacturers and find the unique models. Show your codes and result.

```
library(dplyr)

manufacturers_models <- data.frame(Manufacturer = dataset_mpg$manufacturer, Model = dataset_mpg$model)
manufacturers_models
```

```
##     Manufacturer                 Model
## 1           audi                    a4
## 2           audi                    a4
## 3           audi                    a4
## 4           audi                    a4
## 5           audi                    a4
## 6           audi                    a4
## 7           audi                    a4
## 8           audi             a4 quattro
## 9           audi             a4 quattro
## 10          audi             a4 quattro
## 11          audi             a4 quattro
## 12          audi             a4 quattro
## 13          audi             a4 quattro
## 14          audi             a4 quattro
## 15          audi             a4 quattro
## 16          audi             a6 quattro
## 17          audi             a6 quattro
## 18          audi             a6 quattro
## 19     chevrolet     c1500 suburban 2wd
## 20     chevrolet     c1500 suburban 2wd
## 21     chevrolet     c1500 suburban 2wd
## 22     chevrolet     c1500 suburban 2wd
## 23     chevrolet     c1500 suburban 2wd
## 24     chevrolet               corvette
## 25     chevrolet               corvette
## 26     chevrolet               corvette
## 27     chevrolet               corvette
## 28     chevrolet               corvette
## 29     chevrolet        k1500 tahoe 4wd
## 30     chevrolet        k1500 tahoe 4wd
## 31     chevrolet        k1500 tahoe 4wd
## 32     chevrolet        k1500 tahoe 4wd
## 33     chevrolet                 malibu
## 34     chevrolet                 malibu
## 35     chevrolet                 malibu
## 36     chevrolet                 malibu
## 37     chevrolet                 malibu
## 38         dodge            caravan 2wd
## 39         dodge            caravan 2wd
## 40         dodge            caravan 2wd
## 41         dodge            caravan 2wd
## 42         dodge            caravan 2wd
## 43         dodge            caravan 2wd
## 44         dodge            caravan 2wd
## 45         dodge            caravan 2wd
## 46         dodge            caravan 2wd
## 47         dodge            caravan 2wd
## 48         dodge            caravan 2wd
## 49         dodge      dakota pickup 4wd
## 50         dodge      dakota pickup 4wd
## 51         dodge      dakota pickup 4wd
## 52         dodge      dakota pickup 4wd
## 53         dodge      dakota pickup 4wd
```

```
## 54         dodge      dakota pickup 4wd
## 55         dodge      dakota pickup 4wd
## 56         dodge      dakota pickup 4wd
## 57         dodge      dakota pickup 4wd
## 58         dodge            durango 4wd
## 59         dodge            durango 4wd
## 60         dodge            durango 4wd
## 61         dodge            durango 4wd
## 62         dodge            durango 4wd
## 63         dodge            durango 4wd
## 64         dodge            durango 4wd
## 65         dodge    ram 1500 pickup 4wd
## 66         dodge    ram 1500 pickup 4wd
## 67         dodge    ram 1500 pickup 4wd
## 68         dodge    ram 1500 pickup 4wd
## 69         dodge    ram 1500 pickup 4wd
## 70         dodge    ram 1500 pickup 4wd
## 71         dodge    ram 1500 pickup 4wd
## 72         dodge    ram 1500 pickup 4wd
## 73         dodge    ram 1500 pickup 4wd
## 74         dodge    ram 1500 pickup 4wd
## 75          ford         expedition 2wd
## 76          ford         expedition 2wd
## 77          ford         expedition 2wd
## 78          ford           explorer 4wd
## 79          ford           explorer 4wd
## 80          ford           explorer 4wd
## 81          ford           explorer 4wd
## 82          ford           explorer 4wd
## 83          ford           explorer 4wd
## 84          ford        f150 pickup 4wd
## 85          ford        f150 pickup 4wd
## 86          ford        f150 pickup 4wd
## 87          ford        f150 pickup 4wd
## 88          ford        f150 pickup 4wd
## 89          ford        f150 pickup 4wd
## 90          ford        f150 pickup 4wd
## 91          ford                mustang
## 92          ford                mustang
## 93          ford                mustang
## 94          ford                mustang
## 95          ford                mustang
## 96          ford                mustang
## 97          ford                mustang
## 98          ford                mustang
## 99          ford                mustang
## 100        honda                  civic
## 101        honda                  civic
## 102        honda                  civic
## 103        honda                  civic
## 104        honda                  civic
## 105        honda                  civic
## 106        honda                  civic
## 107        honda                  civic
```

```
## 108        honda                 civic
## 109      hyundai                sonata
## 110      hyundai                sonata
## 111      hyundai                sonata
## 112      hyundai                sonata
## 113      hyundai                sonata
## 114      hyundai                sonata
## 115      hyundai                sonata
## 116      hyundai               tiburon
## 117      hyundai               tiburon
## 118      hyundai               tiburon
## 119      hyundai               tiburon
## 120      hyundai               tiburon
## 121      hyundai               tiburon
## 122      hyundai               tiburon
## 123         jeep     grand cherokee 4wd
## 124         jeep     grand cherokee 4wd
## 125         jeep     grand cherokee 4wd
## 126         jeep     grand cherokee 4wd
## 127         jeep     grand cherokee 4wd
## 128         jeep     grand cherokee 4wd
## 129         jeep     grand cherokee 4wd
## 130         jeep     grand cherokee 4wd
## 131   land rover            range rover
## 132   land rover            range rover
## 133   land rover            range rover
## 134   land rover            range rover
## 135      lincoln          navigator 2wd
## 136      lincoln          navigator 2wd
## 137      lincoln          navigator 2wd
## 138      mercury        mountaineer 4wd
## 139      mercury        mountaineer 4wd
## 140      mercury        mountaineer 4wd
## 141      mercury        mountaineer 4wd
## 142       nissan                altima
## 143       nissan                altima
## 144       nissan                altima
## 145       nissan                altima
## 146       nissan                altima
## 147       nissan                altima
## 148       nissan                maxima
## 149       nissan                maxima
## 150       nissan                maxima
## 151       nissan         pathfinder 4wd
## 152       nissan         pathfinder 4wd
## 153       nissan         pathfinder 4wd
## 154       nissan         pathfinder 4wd
## 155      pontiac             grand prix
## 156      pontiac             grand prix
## 157      pontiac             grand prix
## 158      pontiac             grand prix
## 159      pontiac             grand prix
## 160       subaru           forester awd
## 161       subaru           forester awd
```

```
## 162       subaru           forester awd
## 163       subaru           forester awd
## 164       subaru           forester awd
## 165       subaru           forester awd
## 166       subaru            impreza awd
## 167       subaru            impreza awd
## 168       subaru            impreza awd
## 169       subaru            impreza awd
## 170       subaru            impreza awd
## 171       subaru            impreza awd
## 172       subaru            impreza awd
## 173       subaru            impreza awd
## 174       toyota            4runner 4wd
## 175       toyota            4runner 4wd
## 176       toyota            4runner 4wd
## 177       toyota            4runner 4wd
## 178       toyota            4runner 4wd
## 179       toyota            4runner 4wd
## 180       toyota                  camry
## 181       toyota                  camry
## 182       toyota                  camry
## 183       toyota                  camry
## 184       toyota                  camry
## 185       toyota                  camry
## 186       toyota                  camry
## 187       toyota           camry solara
## 188       toyota           camry solara
## 189       toyota           camry solara
## 190       toyota           camry solara
## 191       toyota           camry solara
## 192       toyota           camry solara
## 193       toyota           camry solara
## 194       toyota                corolla
## 195       toyota                corolla
## 196       toyota                corolla
## 197       toyota                corolla
## 198       toyota                corolla
## 199       toyota land cruiser wagon 4wd
## 200       toyota land cruiser wagon 4wd
## 201       toyota      toyota tacoma 4wd
## 202       toyota      toyota tacoma 4wd
## 203       toyota      toyota tacoma 4wd
## 204       toyota      toyota tacoma 4wd
## 205       toyota      toyota tacoma 4wd
## 206       toyota      toyota tacoma 4wd
## 207       toyota      toyota tacoma 4wd
## 208   volkswagen                  gti
## 209   volkswagen                  gti
## 210   volkswagen                  gti
## 211   volkswagen                  gti
## 212   volkswagen                  gti
## 213   volkswagen                jetta
## 214   volkswagen                jetta
## 215   volkswagen                jetta
```

```
## 216   volkswagen                 jetta
## 217   volkswagen                 jetta
## 218   volkswagen                 jetta
## 219   volkswagen                 jetta
## 220   volkswagen                 jetta
## 221   volkswagen                 jetta
## 222   volkswagen             new beetle
## 223   volkswagen             new beetle
## 224   volkswagen             new beetle
## 225   volkswagen             new beetle
## 226   volkswagen             new beetle
## 227   volkswagen             new beetle
## 228   volkswagen                 passat
## 229   volkswagen                 passat
## 230   volkswagen                 passat
## 231   volkswagen                 passat
## 232   volkswagen                 passat
## 233   volkswagen                 passat
## 234   volkswagen                 passat
```

```
Unique_models <- unique(manufacturers_models)
Unique_models
```

```
##     Manufacturer                  Model
## 1           audi                     a4
## 8           audi             a4 quattro
## 16          audi             a6 quattro
## 19     chevrolet     c1500 suburban 2wd
## 24     chevrolet                corvette
## 29     chevrolet        k1500 tahoe 4wd
## 33     chevrolet                 malibu
## 38         dodge            caravan 2wd
## 49         dodge      dakota pickup 4wd
## 58         dodge            durango 4wd
## 65         dodge    ram 1500 pickup 4wd
## 75          ford         expedition 2wd
## 78          ford           explorer 4wd
## 84          ford        f150 pickup 4wd
## 91          ford                mustang
## 100        honda                  civic
## 109      hyundai                 sonata
## 116      hyundai                tiburon
## 123         jeep     grand cherokee 4wd
## 131   land rover            range rover
## 135      lincoln          navigator 2wd
## 138      mercury        mountaineer 4wd
## 142       nissan                 altima
## 148       nissan                 maxima
## 151       nissan         pathfinder 4wd
## 155      pontiac             grand prix
## 160       subaru           forester awd
## 166       subaru            impreza awd
## 174       toyota            4runner 4wd
## 180       toyota                  camry
## 187       toyota           camry solara
```

```
## 194       toyota                corolla
## 199       toyota land cruiser wagon 4wd
## 201       toyota      toyota tacoma 4wd
## 208   volkswagen                   gti
## 213   volkswagen                 jetta
## 222   volkswagen             new beetle
## 228   volkswagen                 passat
```

```
find_unique <- Unique_models %>%
  count(Unique_models$Manufacturer)
find_unique
```

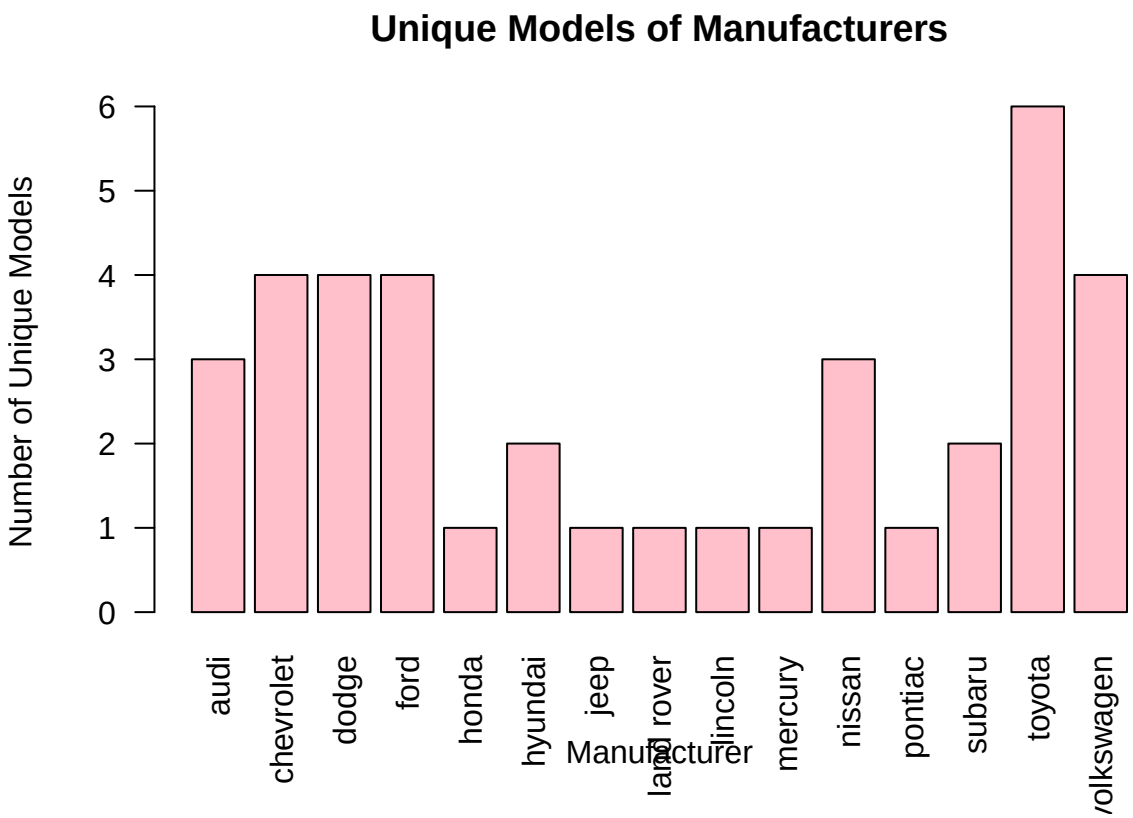
```
##    Unique_models$Manufacturer n
## 1                        audi 3
## 2                   chevrolet 4
## 3                       dodge 4
## 4                        ford 4
## 5                       honda 1
## 6                     hyundai 2
## 7                        jeep 1
## 8            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

```
unique_mods_factor <- factoredManufacturer <- as.factor(Unique_models$Manufacturer)
```

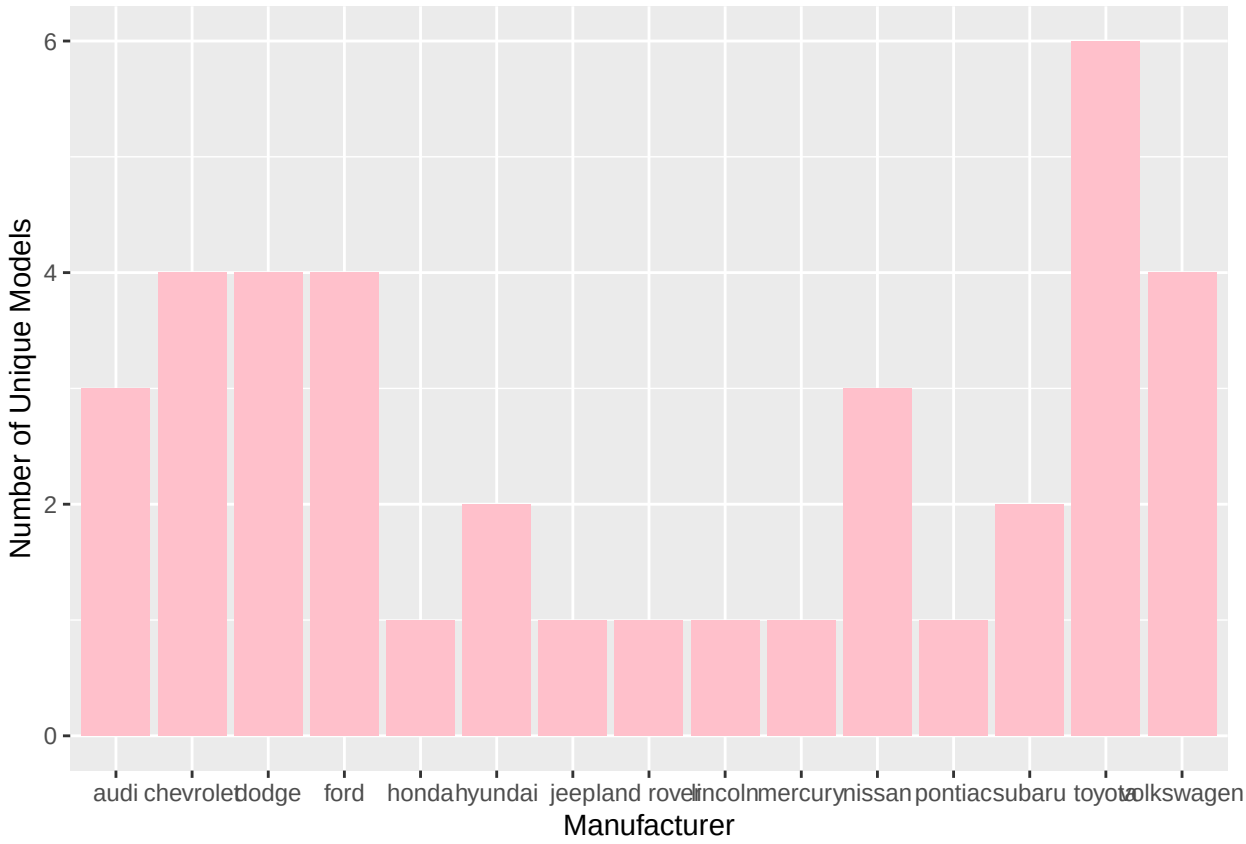
b. Graph the result by using plot() and ggplot(). Write the codes and its result.

```
library(ggplot2)
library(dplyr)

plot(as.factor(factoredManufacturer),
                 main = "Unique Models of Manufacturers",
                 xlab = "Manufacturer",
                 ylab = "Number of Unique Models",
                 col="pink",
                 las = 2)
```

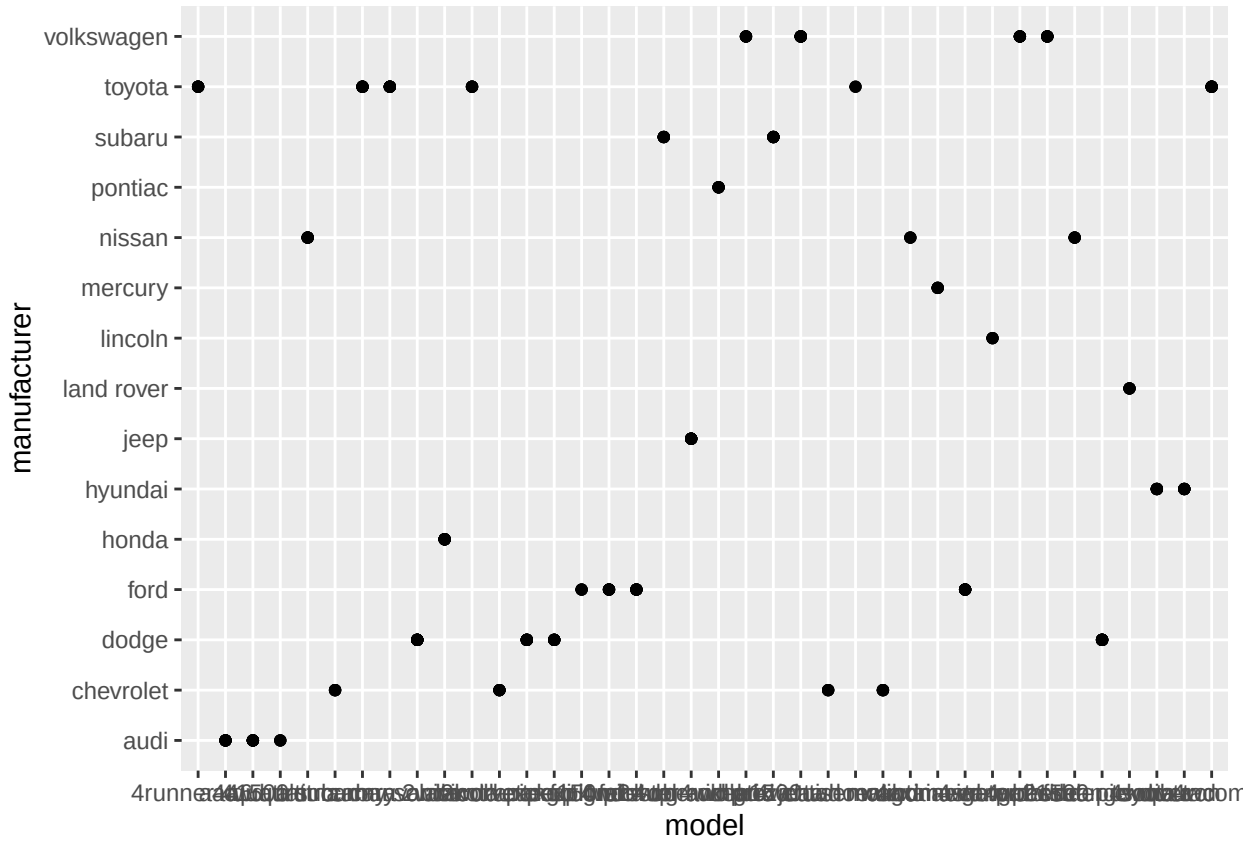



```
ggplot(find_unique, aes(x = `Unique_models$Manufacturer`, y = n)) +
geom_bar(stat = "identity", fill = "pink") +
  labs(x = "Manufacturer", y = "Number of Unique Models")
```



2. Same dataset will be used. You are going to show the relationship of the model and the manufacturer.
a. What does ggplot(mpg, aes(model, manufacturer)) + geom_point() show?

```r
ggplot(dataset_mpg, aes(model, manufacturer)) + geom_point()
```



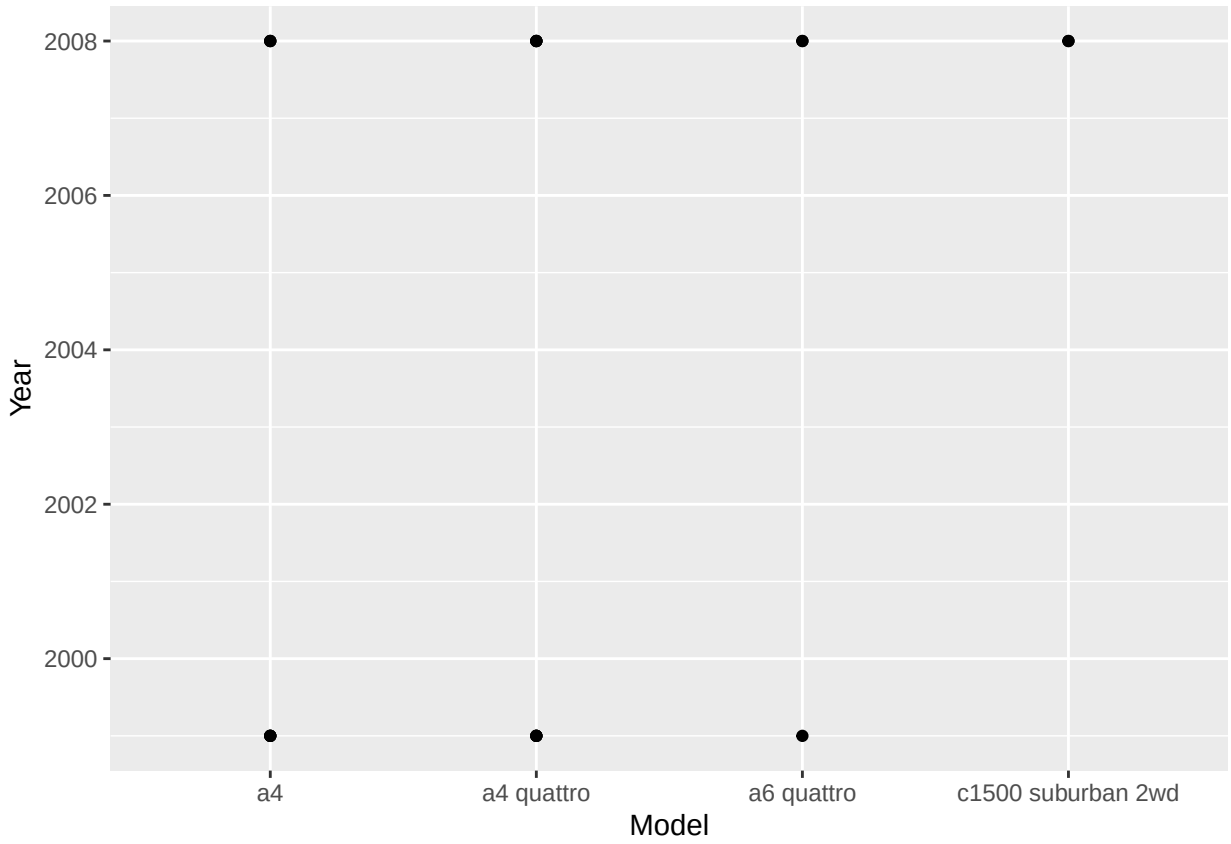

```
# The x-coordinate corresponds to a specific car model.
# The y-coordinate of a spot corresponds to the car model's manufacturer.
# By visualizing this scatter plot, you can see patterns and relationships between car models and manuf
```

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

```
# It is useful for showing the distribution of car models between manufacturers. It can be improved to
```

3. Plot the model and the year using ggplot(). Use only the top 20 observations. Write the codes and its results.

```
top20_obs <- head(dataset_mpg,20)

top20_plot <- ggplot(top20_obs, aes(x = model, y = year)) + geom_point() + labs(x = "Model", y = "Year"
top20_plot
```



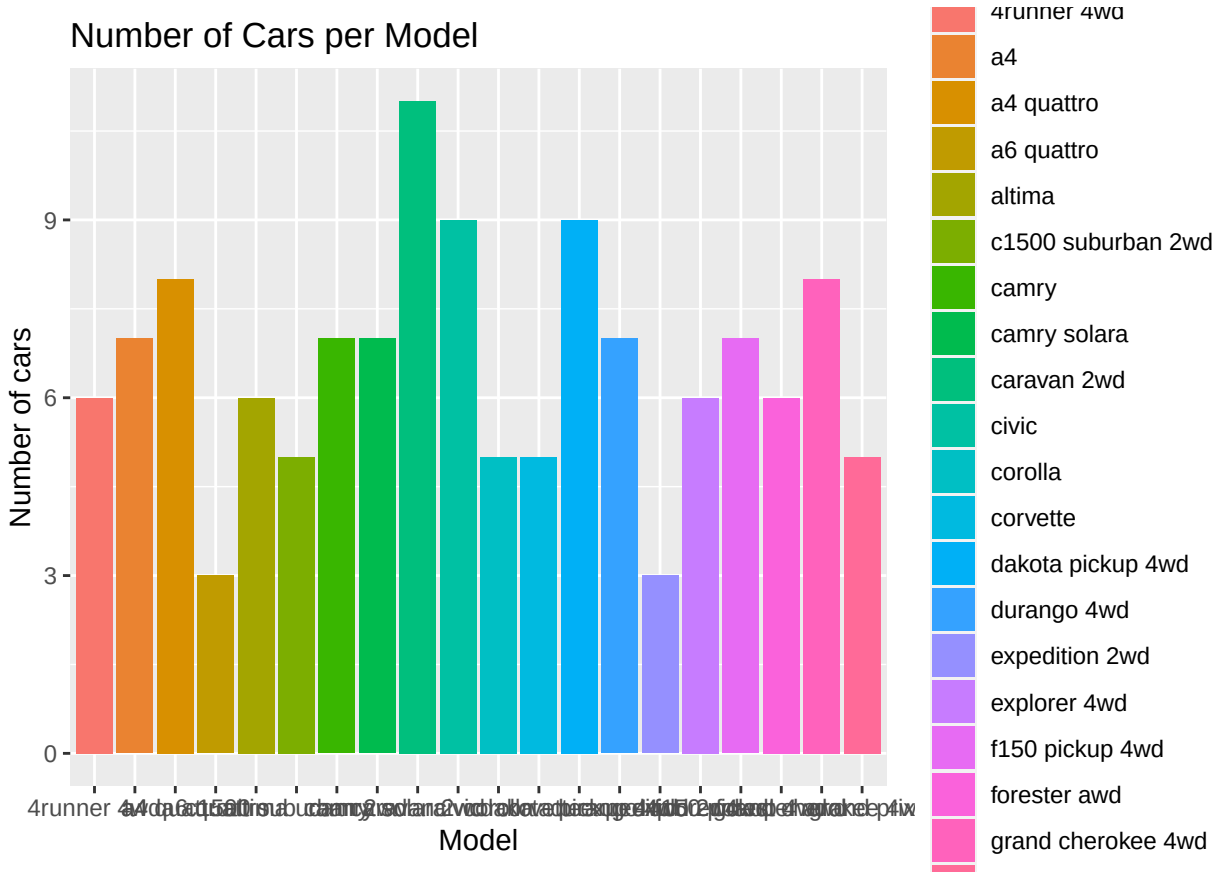
4. Using the pipe (%>%), group the model and get the number of cars per model. Show codes and its result

```
library(dplyr)

model_num_car <- dataset_mpg %>%
  group_by(model) %>%
  summarize(number_cars = n())

model_num_car
```

```
## # A tibble: 38 x 2
##    model              number_cars
##    <chr>                    <int>
##  1 4runner 4wd                  6
##  2 a4                           7
##  3 a4 quattro                   8
##  4 a6 quattro                   3
##  5 altima                       6
##  6 c1500 suburban 2wd           5
##  7 camry                        7
##  8 camry solara                 7
##  9 caravan 2wd                 11
## 10 civic                        9
## # i 28 more rows
```

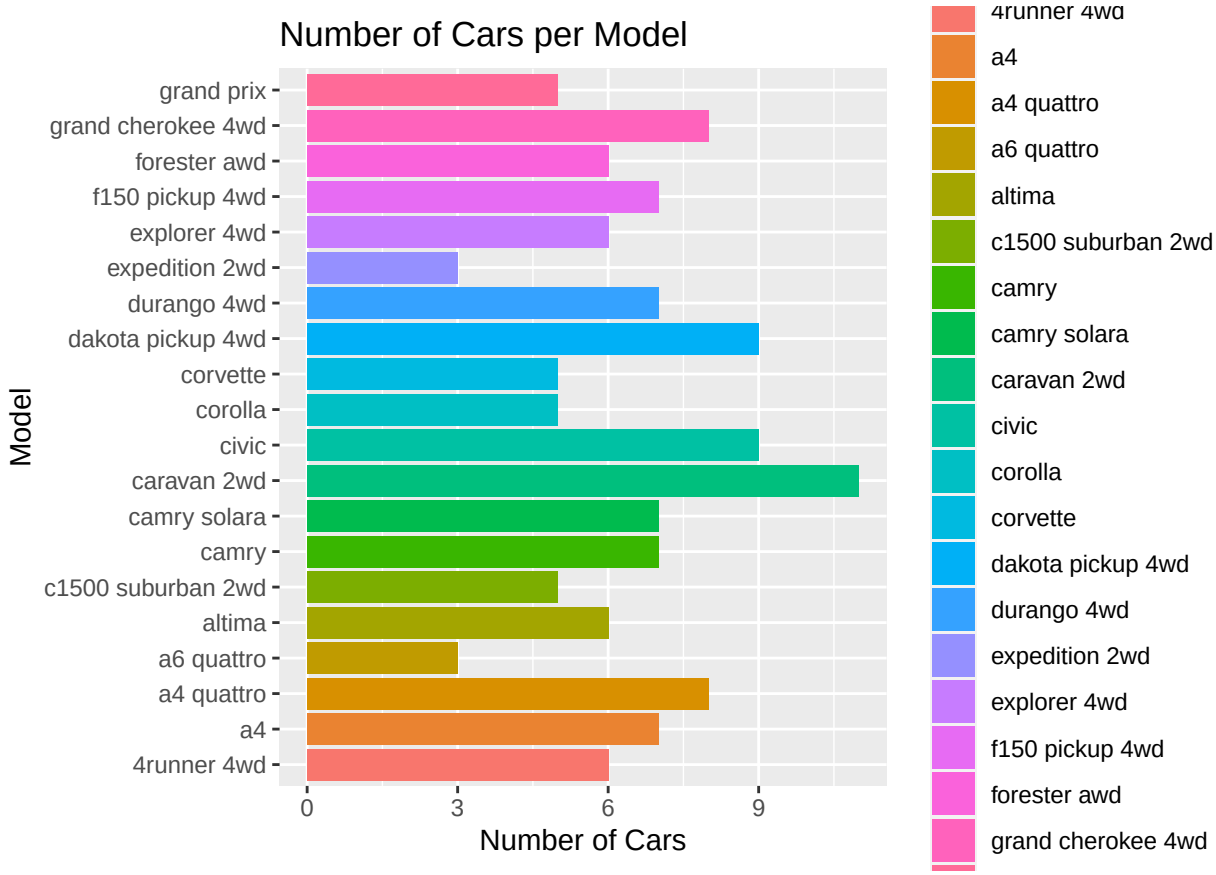
a. Plot using geom_bar() using the top 20 observations only. The graphs shoudl have a title, labels and colors. Show code and results.

```
obs20 <- head(model_num_car, 20)

top20_obs <- ggplot(obs20, aes(x = model, y = number_cars, fill = model)) + geom_bar(stat = "identity")

top20_obs
```



b. Plot using the geom_bar() + coord_flip() just like what is shown below. Show codes and its result.

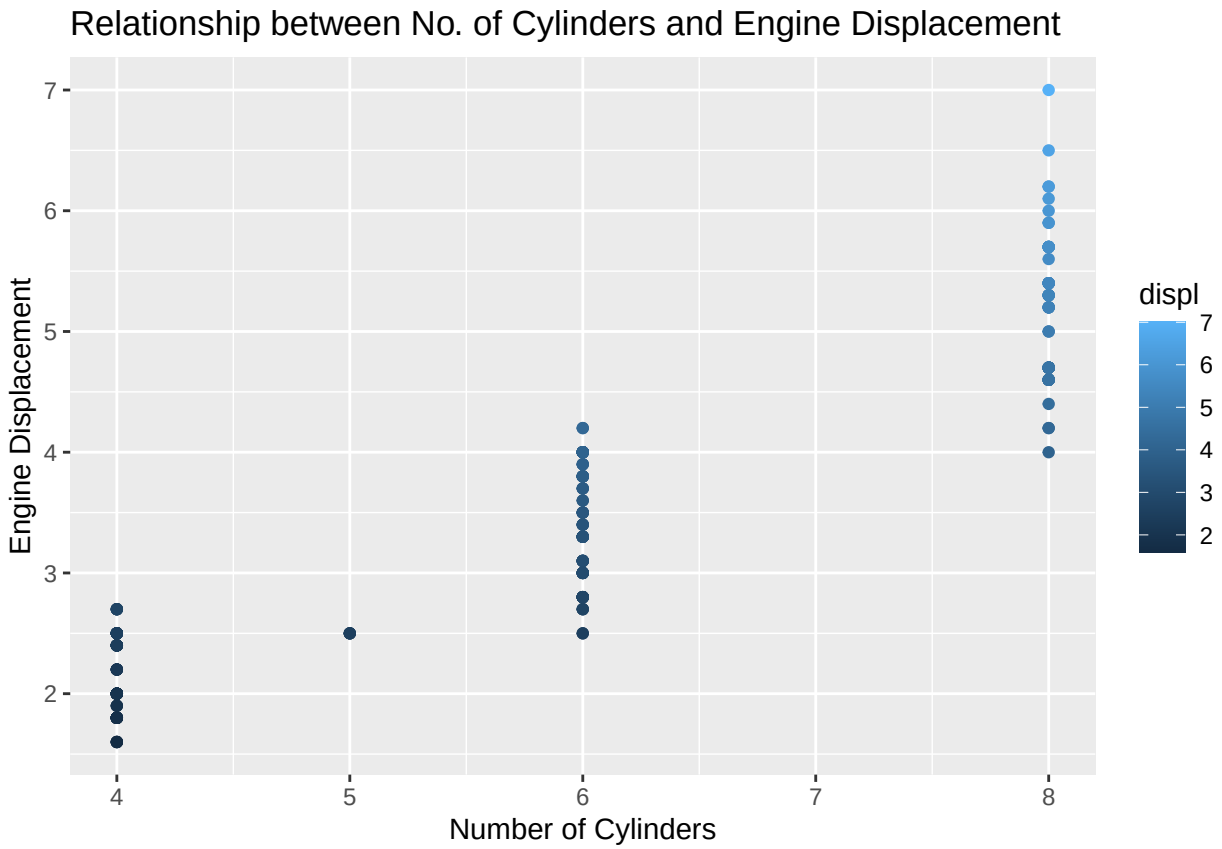
```
top20_flipped <- ggplot(obs20, aes(x = model, y = number_cars, fill = model)) + geom_bar(stat = "identi

top20_flipped
```



5. Plot the relationship between cyl - number of cylinders and displ - engine displacement using geom_point with aesthetic color = engine displacement. Title should be "Relationship between No. of Cylinders and Engine Displacement".

a. How would you describe its relationship? Show the codes and its result.

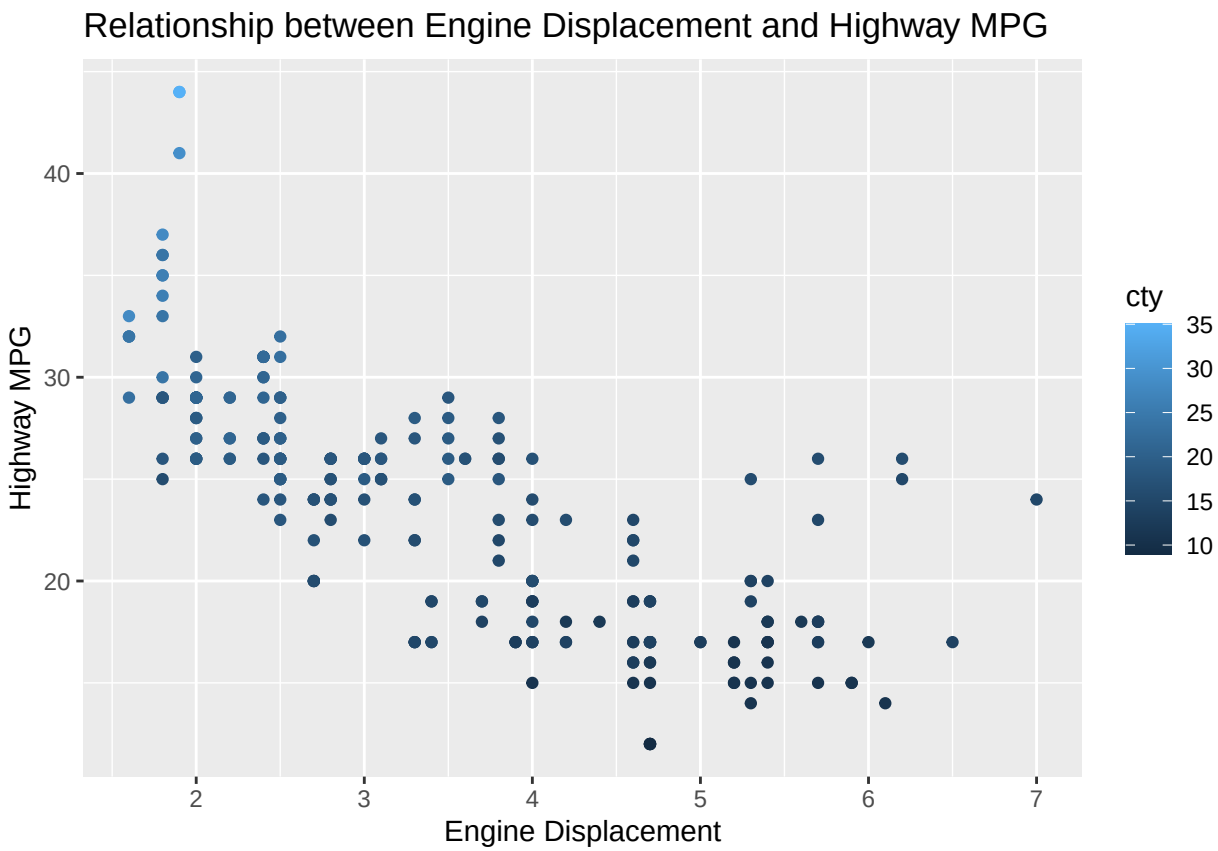
```
plot_cyl_displ <- ggplot(dataset_mpg, aes(x = cyl, y = displ, color = displ)) +
  geom_point() +
  labs(title = "Relationship between No. of Cylinders and Engine Displacement",
       x = "Number of Cylinders",
       y = "Engine Displacement")

plot_cyl_displ
```




```
# It generates a scatter plot illustrating the connection between cylinder count and engine displacemen

# As the number of cylinders increases, so does the displacement of the engine. This shows that larger
```

b. Plot the relationship between displ (engine displacement) and hwy(highway miles per gallon). Mapped it with a continuous variable you have identified in #1-c. What is its result? Why it produced such output?

```
displ_hwy_rel <- ggplot(dataset_mpg, aes(x = displ, y = hwy, color = cty)) +
  geom_point() +
  labs(title = "Relationship between Engine Displacement and Highway MPG",
       x = "Engine Displacement",
       y = "Highway MPG")

displ_hwy_rel
```




```
# Each point in the scatterplot represents a city's fuel efficiency, and it displays the relationship b
```

6. Import the traffic.csv onto your R environment.

a. How many numbers of observation does it have? What are the variables of the traffic dataset the Show your answer.

```
library(readr)
trafficFile <- read.csv("traffic.csv")

num_obs <- nrow(trafficFile)
num_obs
```

```
## [1] 48120
```

```
num_vars <- ncol(trafficFile)
num_vars
```

```
## [1] 4
```

```
vars <- colnames(trafficFile)
vars
```

```
## [1] "DateTime" "Junction" "Vehicles" "ID"
```

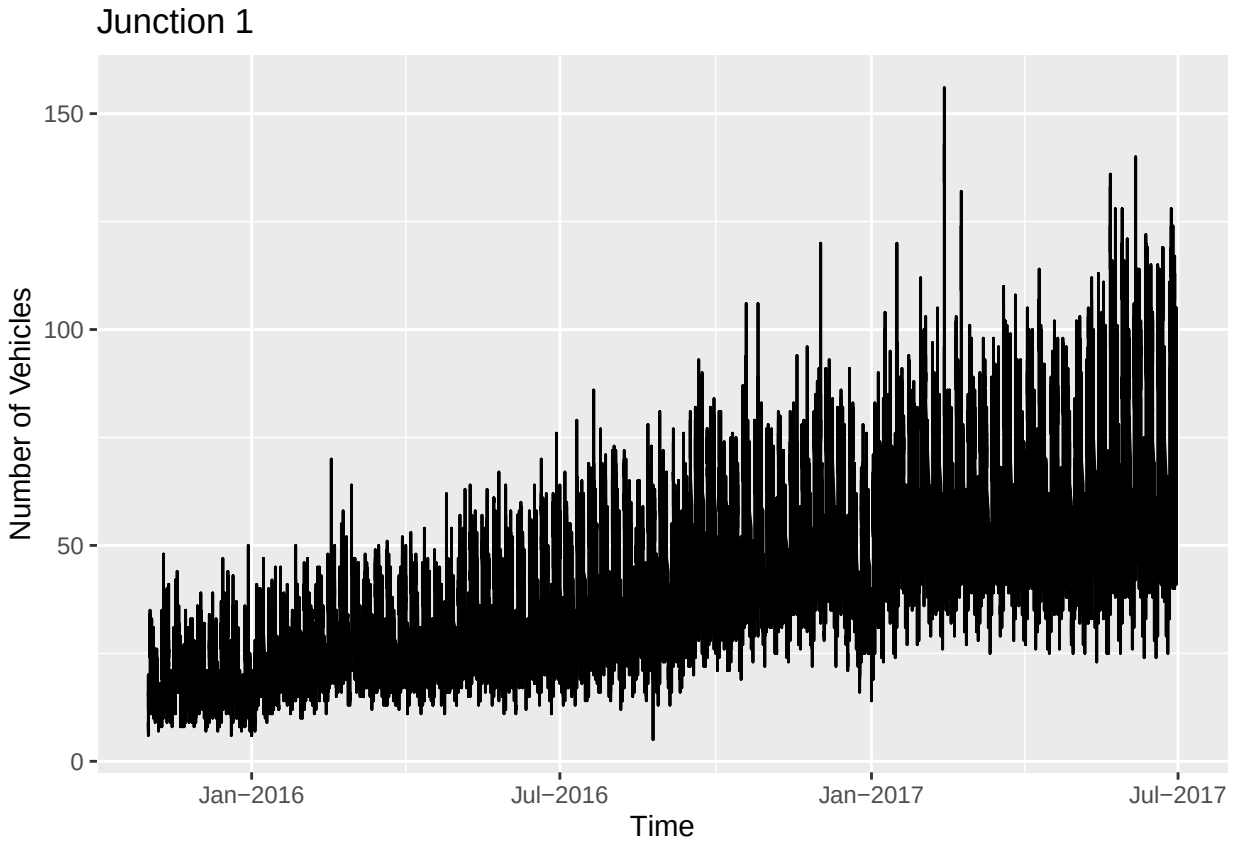
b. subset the traffic dataset into junctions. What is the R codes and its output?

```
subset1_junctions <- subset(trafficFile, Junction == 1)

subset2_junctions <- subset(trafficFile, Junction == 2)
```

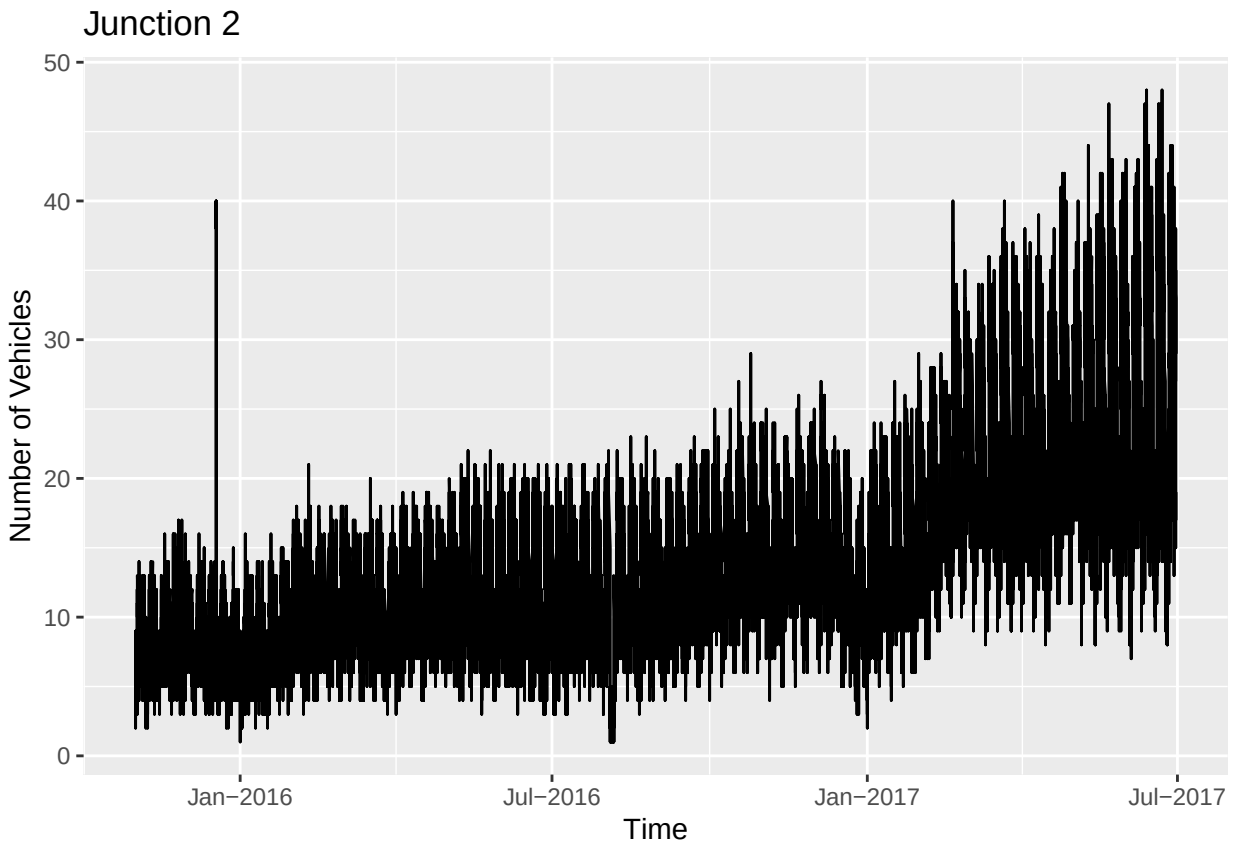
```
subset3_junctions <- subset(trafficFile, Junction == 3)

subset4_junctions <- subset(trafficFile, Junction == 4)
```

c. Plot each junction in a using geom_line(). Show your solution and output.

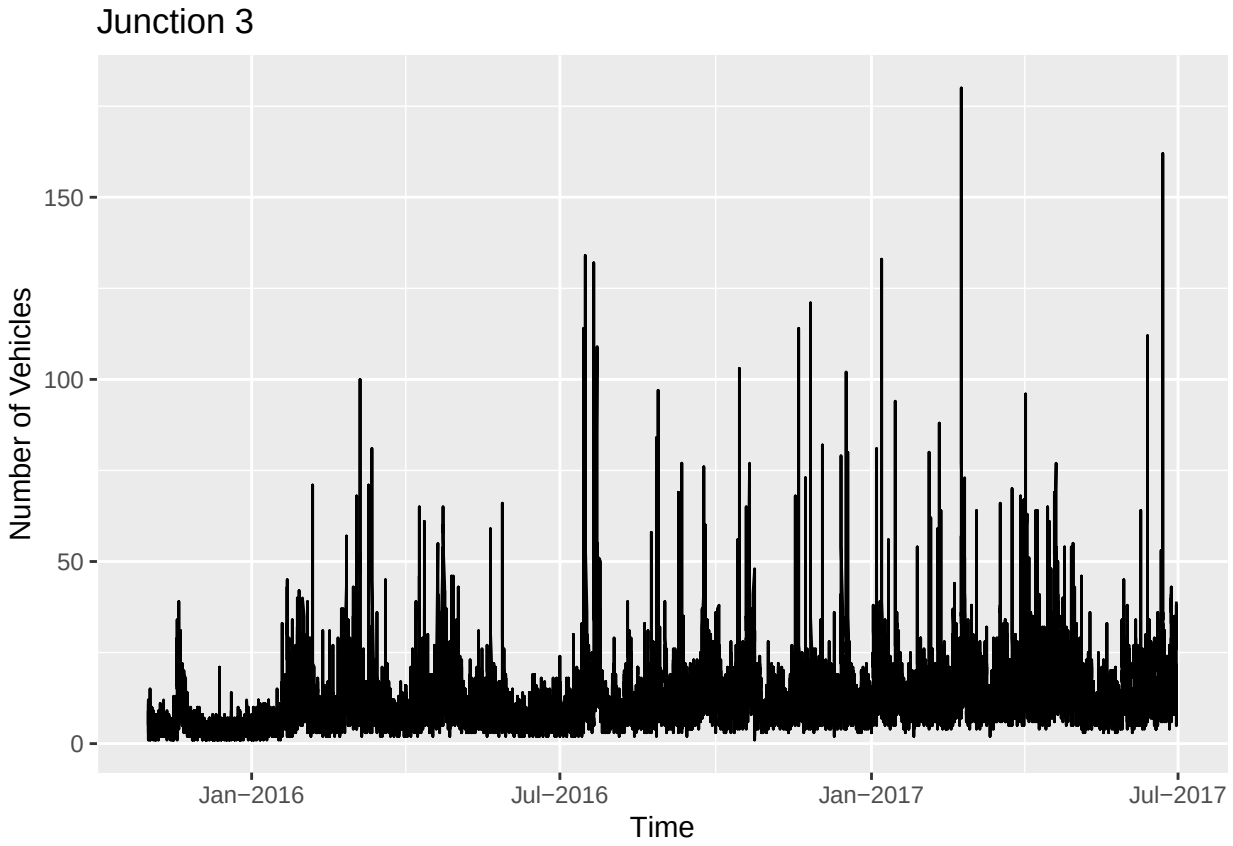
```
junction1_plot <- ggplot(subset1_junctions, aes(x = as.Date(DateTime), y = Vehicles)) +
  geom_line() +
  scale_x_date(date_labels = "%b-%Y") + theme(legend.position = "none") +
  labs(title = "Junction 1", x = "Time", y = "Number of Vehicles")

junction1_plot
```



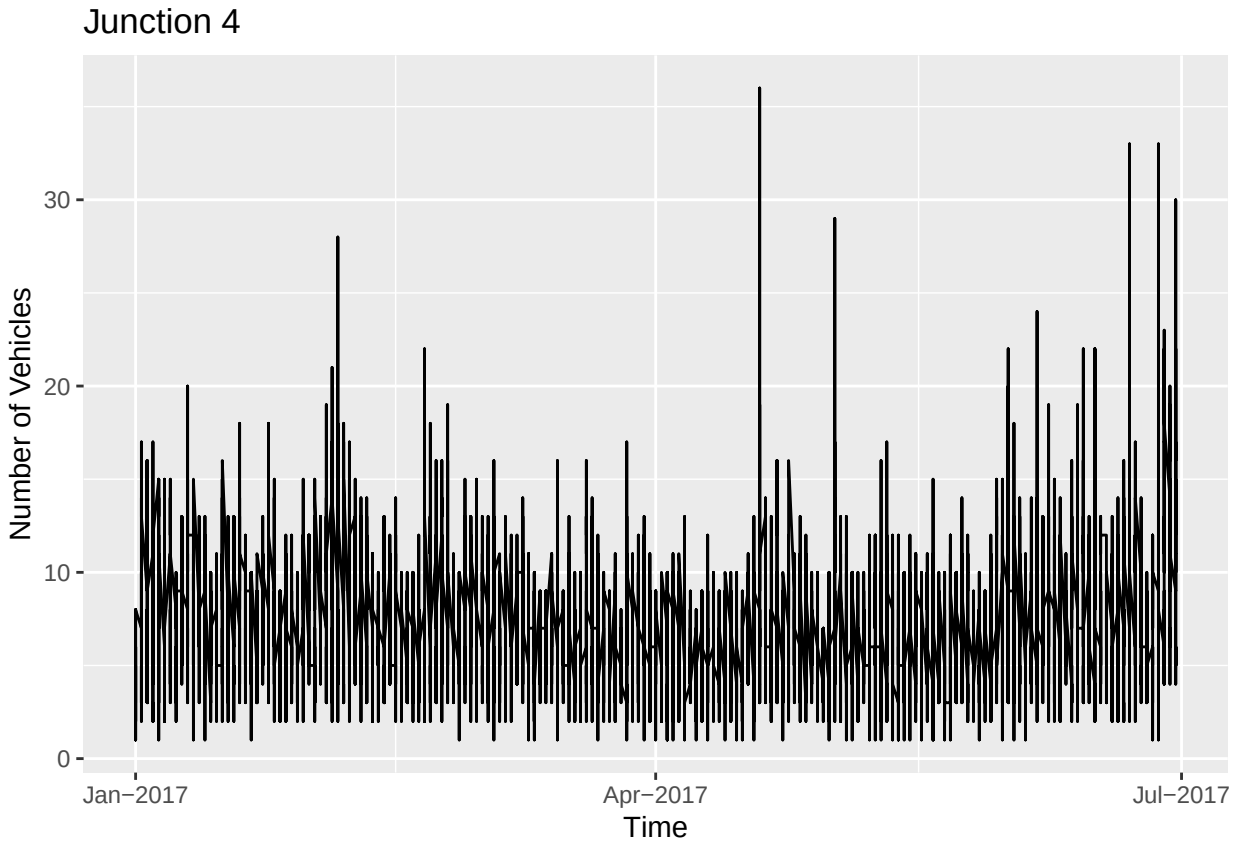

```
junction2_plot <- ggplot(subset2_junctions, aes(x = as.Date(subset2_junctions$DateTime), y = Vehicles))
  geom_line() +
  scale_x_date(date_labels = "%b-%Y") + theme(legend.position = "none") +
  labs(title = "Junction 2", x = "Time", y = "Number of Vehicles")

junction2_plot
```




```
junction3_plot <- ggplot(subset3_junctions, aes(x = as.Date(subset3_junctions$DateTime), y = Vehicles))
  geom_line() +
  scale_x_date(date_labels = "%b-%Y") + theme(legend.position = "none") +
  labs(title = "Junction 3", x = "Time", y = "Number of Vehicles")

junction3_plot
```




```
junction4_plot <- ggplot(subset4_junctions, aes(x = as.Date(subset4_junctions$DateTime), y = Vehicles))
  geom_line() +
  scale_x_date(date_labels = "%b-%Y") + theme(legend.position = "none") +
  labs(title = "Junction 4", x = "Time", y = "Number of Vehicles")

junction4_plot
```



7. From alexa_file.xlsx, import it to your environment

a. How many observations does alexa_file has? What about the number of columns? Show your solution and answer.

```
library(readxl)

alexaFile <- read_excel("/cloud/project/worksheet#4/worksheet4c/alexa_file.xlsx")

alexa_obs <- nrow(alexaFile)
alexa_obs
```

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

```
alexa_cols <- ncol(alexaFile)
alexa_cols
```

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

b. group the variations and get the total of each variations. Use dplyr package. Show solution and answer.

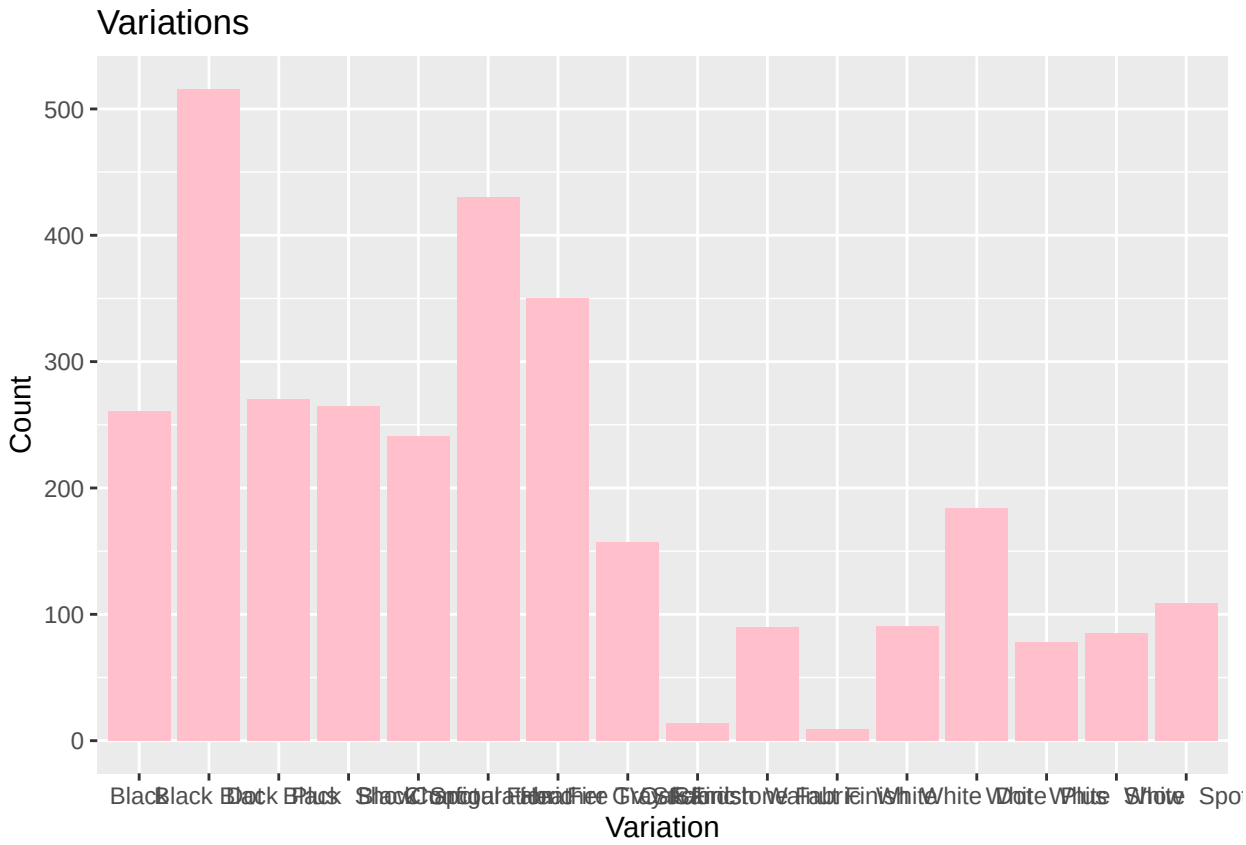
```
var_total <- alexaFile %>%
  count(variation)

var_total
```

```
## # A tibble: 16 x 2
##    variation                         n
##    <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. What did you observe? Complete the details of the graph. Show solution and answer.

```
plot_alexa <- ggplot(alexaFile, aes(x = variation)) +
  geom_bar(fill = "pink") +
  labs(title = "Variations",
       x = "Variation",
       y = "Count")

plot_alexa
```



```
# The graph illustrates the distribution of variations and their counts, with each bar indicating a dif
```

d. Plot a geom_line() with the date and the number of verified reviews. Complete the details of the graphs. Show your answer and solution.

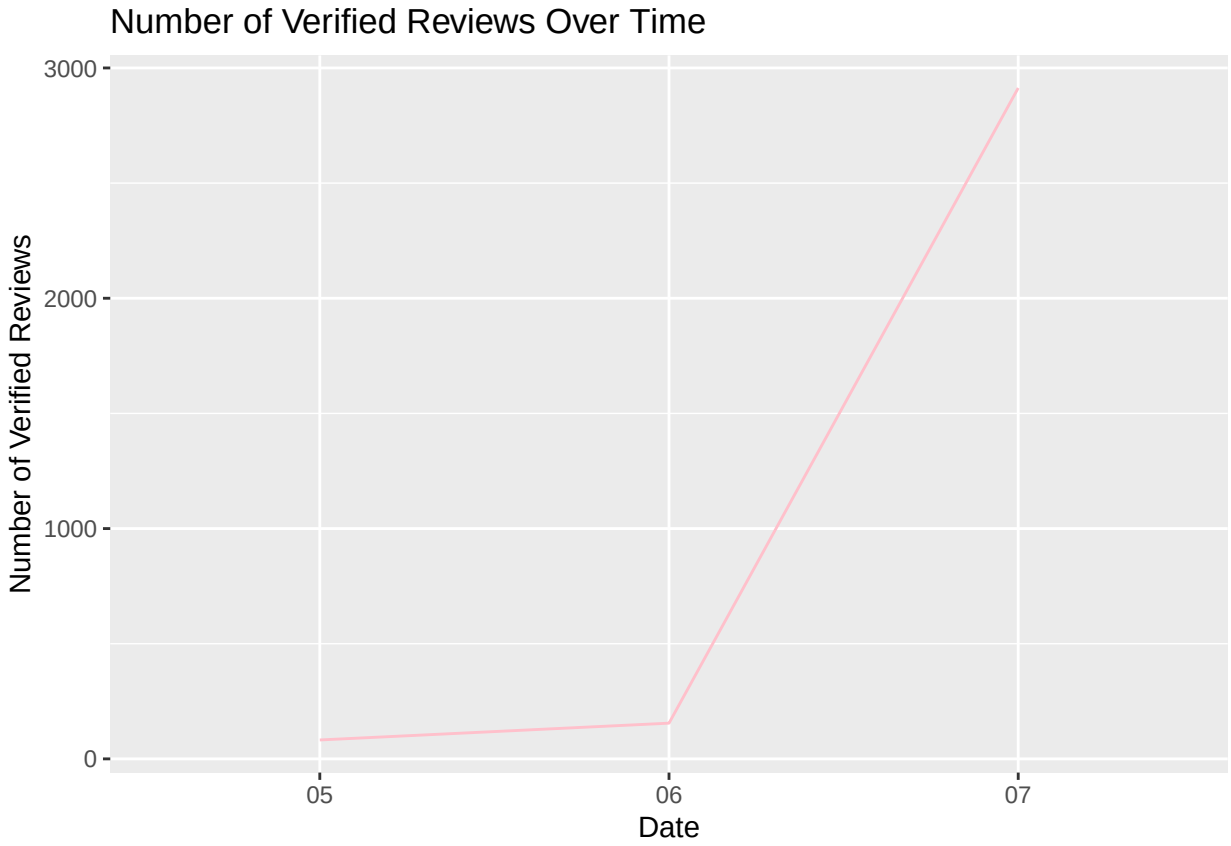
```
library(dplyr)

alexaFile$date <- as.Date(alexaFile$date)

alexaFile$month <- format(alexaFile$date, "%m")

alexa_month <- alexaFile %>%
  count(month)
alexa_month
```

```
## # A tibble: 3 x 2
##   month     n
##   <chr> <int>
## 1 05       82
## 2 06      155
## 3 07     2913
```

```
alexa_rev <- table(alexa_month)
alexa_rev
```

```
##       n
## month 82 155 2913
##    05  1   0    0
##    06  0   1    0
##    07  0   0    1
```

```
gline_alexa <- ggplot(alexa_month, aes(x = month, y = n, group = 1)) +
  geom_line(color = "pink") +
  labs(title = "Number of Verified Reviews Over Time",
       x = "Date",
       y = "Number of Verified Reviews")

gline_alexa
```



e. Get the relationship of variations and ratings. Which variations got the most highest in rating? Plot a graph to show its relationship. Show your solution and answer.

```
alexa_vars_ratings <- alexaFile %>%
  group_by(variation) %>%
  summarise(avg_rating = mean(rating))

alexa_vars_ratings
```

```
## # A tibble: 16 x 2
##    variation                    avg_rating
##    <chr>                             <dbl>
##  1 Black                              4.23
##  2 Black  Dot                         4.45
##  3 Black  Plus                        4.37
##  4 Black  Show                        4.49
##  5 Black  Spot                        4.31
##  6 Charcoal Fabric                    4.73
##  7 Configuration: Fire TV Stick       4.59
##  8 Heather Gray Fabric                4.69
##  9 Oak Finish                         4.86
## 10 Sandstone Fabric                   4.36
## 11 Walnut Finish                      4.89
## 12 White                              4.14
## 13 White  Dot                         4.42
## 14 White  Plus                        4.36
## 15 White  Show                        4.28
## 16 White  Spot                        4.31
```

```r
highest_ratings <- alexa_vars_ratings %>%
  filter(avg_rating == max(avg_rating))

highest_ratings
```

```
## # A tibble: 1 x 2
##   variation     avg_rating
##   <chr>              <dbl>
## 1 Walnut Finish       4.89
```

```r
# The walnut finish variation has the highest rating

ggplot(alexa_vars_ratings, aes(x = variation, y = avg_rating)) +
  geom_bar(stat = "identity", fill = "pink") +
  labs(title = "Average Ratings by Variation",
       x = "Variation",
       y = "Average Rating")
```