RWorksheet#4c

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1. Use the dataset mpg • Download and open the mpg file. Upload it to your OWN environment

a. Show your solutions on how to import a csv file into the environment.

```
library(readr)
mpg_file <- read.csv ("mpg.csv")
mpg_file
```

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

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## 36   36    chevrolet                malibu   3.5 2008   6   auto(l4)   f  18
## 37   37    chevrolet                malibu   3.6 2008   6   auto(s6)   f  17
## 38   38        dodge            caravan 2wd   2.4 1999   4   auto(l3)   f  18
## 39   39        dodge            caravan 2wd   3.0 1999   6   auto(l4)   f  17
## 40   40        dodge            caravan 2wd   3.3 1999   6   auto(l4)   f  16
## 41   41        dodge            caravan 2wd   3.3 1999   6   auto(l4)   f  16
## 42   42        dodge            caravan 2wd   3.3 2008   6   auto(l4)   f  17
## 43   43        dodge            caravan 2wd   3.3 2008   6   auto(l4)   f  17
## 44   44        dodge            caravan 2wd   3.3 2008   6   auto(l4)   f  11
## 45   45        dodge            caravan 2wd   3.8 1999   6   auto(l4)   f  15
## 46   46        dodge            caravan 2wd   3.8 1999   6   auto(l4)   f  15
## 47   47        dodge            caravan 2wd   3.8 2008   6   auto(l6)   f  16
## 48   48        dodge            caravan 2wd   4.0 2008   6   auto(l6)   f  16
## 49   49        dodge      dakota pickup 4wd   3.7 2008   6 manual(m6)   4  15
## 50   50        dodge      dakota pickup 4wd   3.7 2008   6   auto(l4)   4  14
## 51   51        dodge      dakota pickup 4wd   3.9 1999   6   auto(l4)   4  13
## 52   52        dodge      dakota pickup 4wd   3.9 1999   6 manual(m5)   4  14
## 53   53        dodge      dakota pickup 4wd   4.7 2008   8   auto(l5)   4  14
## 54   54        dodge      dakota pickup 4wd   4.7 2008   8   auto(l5)   4  14
## 55   55        dodge      dakota pickup 4wd   4.7 2008   8   auto(l5)   4   9
## 56   56        dodge      dakota pickup 4wd   5.2 1999   8 manual(m5)   4  11
## 57   57        dodge      dakota pickup 4wd   5.2 1999   8   auto(l4)   4  11
## 58   58        dodge            durango 4wd   3.9 1999   6   auto(l4)   4  13
## 59   59        dodge            durango 4wd   4.7 2008   8   auto(l5)   4  13
## 60   60        dodge            durango 4wd   4.7 2008   8   auto(l5)   4   9
## 61   61        dodge            durango 4wd   4.7 2008   8   auto(l5)   4  13
## 62   62        dodge            durango 4wd   5.2 1999   8   auto(l4)   4  11
## 63   63        dodge            durango 4wd   5.7 2008   8   auto(l5)   4  13
## 64   64        dodge            durango 4wd   5.9 1999   8   auto(l4)   4  11
## 65   65        dodge    ram 1500 pickup 4wd   4.7 2008   8 manual(m6)   4  12
## 66   66        dodge    ram 1500 pickup 4wd   4.7 2008   8   auto(l5)   4   9
## 67   67        dodge    ram 1500 pickup 4wd   4.7 2008   8   auto(l5)   4  13
## 68   68        dodge    ram 1500 pickup 4wd   4.7 2008   8   auto(l5)   4  13
## 69   69        dodge    ram 1500 pickup 4wd   4.7 2008   8 manual(m6)   4  12
## 70   70        dodge    ram 1500 pickup 4wd   4.7 2008   8 manual(m6)   4   9
## 71   71        dodge    ram 1500 pickup 4wd   5.2 1999   8   auto(l4)   4  11
## 72   72        dodge    ram 1500 pickup 4wd   5.2 1999   8 manual(m5)   4  11
## 73   73        dodge    ram 1500 pickup 4wd   5.7 2008   8   auto(l5)   4  13
## 74   74        dodge    ram 1500 pickup 4wd   5.9 1999   8   auto(l4)   4  11
## 75   75         ford         expedition 2wd   4.6 1999   8   auto(l4)   r  11
## 76   76         ford         expedition 2wd   5.4 1999   8   auto(l4)   r  11
## 77   77         ford         expedition 2wd   5.4 2008   8   auto(l6)   r  12
## 78   78         ford           explorer 4wd   4.0 1999   6   auto(l5)   4  14
## 79   79         ford           explorer 4wd   4.0 1999   6 manual(m5)   4  15
## 80   80         ford           explorer 4wd   4.0 1999   6   auto(l5)   4  14
## 81   81         ford           explorer 4wd   4.0 2008   6   auto(l5)   4  13
## 82   82         ford           explorer 4wd   4.6 2008   8   auto(l6)   4  13
## 83   83         ford           explorer 4wd   5.0 1999   8   auto(l4)   4  13
## 84   84         ford        f150 pickup 4wd   4.2 1999   6   auto(l4)   4  14
## 85   85         ford        f150 pickup 4wd   4.2 1999   6 manual(m5)   4  14
## 86   86         ford        f150 pickup 4wd   4.6 1999   8 manual(m5)   4  13
## 87   87         ford        f150 pickup 4wd   4.6 1999   8   auto(l4)   4  13
## 88   88         ford        f150 pickup 4wd   4.6 2008   8   auto(l4)   4  13
## 89   89         ford        f150 pickup 4wd   5.4 1999   8   auto(l4)   4  11
```

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## 90   90         ford        f150 pickup 4wd   5.4 2008   8   auto(l4)   4  13
## 91   91         ford                mustang   3.8 1999   6 manual(m5)   r  18
## 92   92         ford                mustang   3.8 1999   6   auto(l4)   r  18
## 93   93         ford                mustang   4.0 2008   6 manual(m5)   r  17
## 94   94         ford                mustang   4.0 2008   6   auto(l5)   r  16
## 95   95         ford                mustang   4.6 1999   8   auto(l4)   r  15
## 96   96         ford                mustang   4.6 1999   8 manual(m5)   r  15
## 97   97         ford                mustang   4.6 2008   8 manual(m5)   r  15
## 98   98         ford                mustang   4.6 2008   8   auto(l5)   r  15
## 99   99         ford                mustang   5.4 2008   8 manual(m6)   r  14
## 100 100        honda                  civic   1.6 1999   4 manual(m5)   f  28
## 101 101        honda                  civic   1.6 1999   4   auto(l4)   f  24
## 102 102        honda                  civic   1.6 1999   4 manual(m5)   f  25
## 103 103        honda                  civic   1.6 1999   4 manual(m5)   f  23
## 104 104        honda                  civic   1.6 1999   4   auto(l4)   f  24
## 105 105        honda                  civic   1.8 2008   4 manual(m5)   f  26
## 106 106        honda                  civic   1.8 2008   4   auto(l5)   f  25
## 107 107        honda                  civic   1.8 2008   4   auto(l5)   f  24
## 108 108        honda                  civic   2.0 2008   4 manual(m6)   f  21
## 109 109      hyundai                 sonata   2.4 1999   4   auto(l4)   f  18
## 110 110      hyundai                 sonata   2.4 1999   4 manual(m5)   f  18
## 111 111      hyundai                 sonata   2.4 2008   4   auto(l4)   f  21
## 112 112      hyundai                 sonata   2.4 2008   4 manual(m5)   f  21
## 113 113      hyundai                 sonata   2.5 1999   6   auto(l4)   f  18
## 114 114      hyundai                 sonata   2.5 1999   6 manual(m5)   f  18
## 115 115      hyundai                 sonata   3.3 2008   6   auto(l5)   f  19
## 116 116      hyundai                tiburon   2.0 1999   4   auto(l4)   f  19
## 117 117      hyundai                tiburon   2.0 1999   4 manual(m5)   f  19
## 118 118      hyundai                tiburon   2.0 2008   4 manual(m5)   f  20
## 119 119      hyundai                tiburon   2.0 2008   4   auto(l4)   f  20
## 120 120      hyundai                tiburon   2.7 2008   6   auto(l4)   f  17
## 121 121      hyundai                tiburon   2.7 2008   6 manual(m6)   f  16
## 122 122      hyundai                tiburon   2.7 2008   6 manual(m5)   f  17
## 123 123         jeep     grand cherokee 4wd   3.0 2008   6   auto(l5)   4  17
## 124 124         jeep     grand cherokee 4wd   3.7 2008   6   auto(l5)   4  15
## 125 125         jeep     grand cherokee 4wd   4.0 1999   6   auto(l4)   4  15
## 126 126         jeep     grand cherokee 4wd   4.7 1999   8   auto(l4)   4  14
## 127 127         jeep     grand cherokee 4wd   4.7 2008   8   auto(l5)   4   9
## 128 128         jeep     grand cherokee 4wd   4.7 2008   8   auto(l5)   4  14
## 129 129         jeep     grand cherokee 4wd   5.7 2008   8   auto(l5)   4  13
## 130 130         jeep     grand cherokee 4wd   6.1 2008   8   auto(l5)   4  11
## 131 131   land rover            range rover   4.0 1999   8   auto(l4)   4  11
## 132 132   land rover            range rover   4.2 2008   8   auto(s6)   4  12
## 133 133   land rover            range rover   4.4 2008   8   auto(s6)   4  12
## 134 134   land rover            range rover   4.6 1999   8   auto(l4)   4  11
## 135 135      lincoln          navigator 2wd   5.4 1999   8   auto(l4)   r  11
## 136 136      lincoln          navigator 2wd   5.4 1999   8   auto(l4)   r  11
## 137 137      lincoln          navigator 2wd   5.4 2008   8   auto(l6)   r  12
## 138 138      mercury        mountaineer 4wd   4.0 1999   6   auto(l5)   4  14
## 139 139      mercury        mountaineer 4wd   4.0 2008   6   auto(l5)   4  13
## 140 140      mercury        mountaineer 4wd   4.6 2008   8   auto(l6)   4  13
## 141 141      mercury        mountaineer 4wd   5.0 1999   8   auto(l4)   4  13
## 142 142       nissan                 altima   2.4 1999   4 manual(m5)   f  21
## 143 143       nissan                 altima   2.4 1999   4   auto(l4)   f  19
```

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## 144 144       nissan                altima   2.5 2008   4   auto(av)   f  23
## 145 145       nissan                altima   2.5 2008   4 manual(m6)   f  23
## 146 146       nissan                altima   3.5 2008   6 manual(m6)   f  19
## 147 147       nissan                altima   3.5 2008   6   auto(av)   f  19
## 148 148       nissan                maxima   3.0 1999   6   auto(l4)   f  18
## 149 149       nissan                maxima   3.0 1999   6 manual(m5)   f  19
## 150 150       nissan                maxima   3.5 2008   6   auto(av)   f  19
## 151 151       nissan         pathfinder 4wd   3.3 1999   6   auto(l4)   4  14
## 152 152       nissan         pathfinder 4wd   3.3 1999   6 manual(m5)   4  15
## 153 153       nissan         pathfinder 4wd   4.0 2008   6   auto(l5)   4  14
## 154 154       nissan         pathfinder 4wd   5.6 2008   8   auto(s5)   4  12
## 155 155      pontiac             grand prix   3.1 1999   6   auto(l4)   f  18
## 156 156      pontiac             grand prix   3.8 1999   6   auto(l4)   f  16
## 157 157      pontiac             grand prix   3.8 1999   6   auto(l4)   f  17
## 158 158      pontiac             grand prix   3.8 2008   6   auto(l4)   f  18
## 159 159      pontiac             grand prix   5.3 2008   8   auto(s4)   f  16
## 160 160       subaru           forester awd   2.5 1999   4 manual(m5)   4  18
## 161 161       subaru           forester awd   2.5 1999   4   auto(l4)   4  18
## 162 162       subaru           forester awd   2.5 2008   4 manual(m5)   4  20
## 163 163       subaru           forester awd   2.5 2008   4 manual(m5)   4  19
## 164 164       subaru           forester awd   2.5 2008   4   auto(l4)   4  20
## 165 165       subaru           forester awd   2.5 2008   4   auto(l4)   4  18
## 166 166       subaru            impreza awd   2.2 1999   4   auto(l4)   4  21
## 167 167       subaru            impreza awd   2.2 1999   4 manual(m5)   4  19
## 168 168       subaru            impreza awd   2.5 1999   4 manual(m5)   4  19
## 169 169       subaru            impreza awd   2.5 1999   4   auto(l4)   4  19
## 170 170       subaru            impreza awd   2.5 2008   4   auto(s4)   4  20
## 171 171       subaru            impreza awd   2.5 2008   4   auto(s4)   4  20
## 172 172       subaru            impreza awd   2.5 2008   4 manual(m5)   4  19
## 173 173       subaru            impreza awd   2.5 2008   4 manual(m5)   4  20
## 174 174       toyota            4runner 4wd   2.7 1999   4 manual(m5)   4  15
## 175 175       toyota            4runner 4wd   2.7 1999   4   auto(l4)   4  16
## 176 176       toyota            4runner 4wd   3.4 1999   6   auto(l4)   4  15
## 177 177       toyota            4runner 4wd   3.4 1999   6 manual(m5)   4  15
## 178 178       toyota            4runner 4wd   4.0 2008   6   auto(l5)   4  16
## 179 179       toyota            4runner 4wd   4.7 2008   8   auto(l5)   4  14
## 180 180       toyota                 camry   2.2 1999   4 manual(m5)   f  21
## 181 181       toyota                 camry   2.2 1999   4   auto(l4)   f  21
## 182 182       toyota                 camry   2.4 2008   4 manual(m5)   f  21
## 183 183       toyota                 camry   2.4 2008   4   auto(l5)   f  21
## 184 184       toyota                 camry   3.0 1999   6   auto(l4)   f  18
## 185 185       toyota                 camry   3.0 1999   6 manual(m5)   f  18
## 186 186       toyota                 camry   3.5 2008   6   auto(s6)   f  19
## 187 187       toyota          camry solara   2.2 1999   4   auto(l4)   f  21
## 188 188       toyota          camry solara   2.2 1999   4 manual(m5)   f  21
## 189 189       toyota          camry solara   2.4 2008   4 manual(m5)   f  21
## 190 190       toyota          camry solara   2.4 2008   4   auto(s5)   f  22
## 191 191       toyota          camry solara   3.0 1999   6   auto(l4)   f  18
## 192 192       toyota          camry solara   3.0 1999   6 manual(m5)   f  18
## 193 193       toyota          camry solara   3.3 2008   6   auto(s5)   f  18
## 194 194       toyota               corolla   1.8 1999   4   auto(l3)   f  24
## 195 195       toyota               corolla   1.8 1999   4   auto(l4)   f  24
## 196 196       toyota               corolla   1.8 1999   4 manual(m5)   f  26
## 197 197       toyota               corolla   1.8 2008   4 manual(m5)   f  28
```

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## 198 198       toyota                corolla   1.8 2008   4   auto(l4)   f  26
## 199 199       toyota land cruiser wagon 4wd   4.7 1999   8   auto(l4)   4  11
## 200 200       toyota land cruiser wagon 4wd   5.7 2008   8   auto(s6)   4  13
## 201 201       toyota      toyota tacoma 4wd   2.7 1999   4 manual(m5)   4  15
## 202 202       toyota      toyota tacoma 4wd   2.7 1999   4   auto(l4)   4  16
## 203 203       toyota      toyota tacoma 4wd   2.7 2008   4 manual(m5)   4  17
## 204 204       toyota      toyota tacoma 4wd   3.4 1999   6 manual(m5)   4  15
## 205 205       toyota      toyota tacoma 4wd   3.4 1999   6   auto(l4)   4  15
## 206 206       toyota      toyota tacoma 4wd   4.0 2008   6 manual(m6)   4  15
## 207 207       toyota      toyota tacoma 4wd   4.0 2008   6   auto(l5)   4  16
## 208 208   volkswagen                   gti   2.0 1999   4 manual(m5)   f  21
## 209 209   volkswagen                   gti   2.0 1999   4   auto(l4)   f  19
## 210 210   volkswagen                   gti   2.0 2008   4 manual(m6)   f  21
## 211 211   volkswagen                   gti   2.0 2008   4   auto(s6)   f  22
## 212 212   volkswagen                   gti   2.8 1999   6 manual(m5)   f  17
## 213 213   volkswagen                 jetta   1.9 1999   4 manual(m5)   f  33
## 214 214   volkswagen                 jetta   2.0 1999   4 manual(m5)   f  21
## 215 215   volkswagen                 jetta   2.0 1999   4   auto(l4)   f  19
## 216 216   volkswagen                 jetta   2.0 2008   4   auto(s6)   f  22
## 217 217   volkswagen                 jetta   2.0 2008   4 manual(m6)   f  21
## 218 218   volkswagen                 jetta   2.5 2008   5   auto(s6)   f  21
## 219 219   volkswagen                 jetta   2.5 2008   5 manual(m5)   f  21
## 220 220   volkswagen                 jetta   2.8 1999   6   auto(l4)   f  16
## 221 221   volkswagen                 jetta   2.8 1999   6 manual(m5)   f  17
## 222 222   volkswagen            new beetle   1.9 1999   4 manual(m5)   f  35
## 223 223   volkswagen            new beetle   1.9 1999   4   auto(l4)   f  29
## 224 224   volkswagen            new beetle   2.0 1999   4 manual(m5)   f  21
## 225 225   volkswagen            new beetle   2.0 1999   4   auto(l4)   f  19
## 226 226   volkswagen            new beetle   2.5 2008   5 manual(m5)   f  20
## 227 227   volkswagen            new beetle   2.5 2008   5   auto(s6)   f  20
## 228 228   volkswagen                passat   1.8 1999   4 manual(m5)   f  21
## 229 229   volkswagen                passat   1.8 1999   4   auto(l5)   f  18
## 230 230   volkswagen                passat   2.0 2008   4   auto(s6)   f  19
## 231 231   volkswagen                passat   2.0 2008   4 manual(m6)   f  21
## 232 232   volkswagen                passat   2.8 1999   6   auto(l5)   f  16
## 233 233   volkswagen                passat   2.8 1999   6 manual(m5)   f  18
## 234 234   volkswagen                passat   3.6 2008   6   auto(s6)   f  17
##     hwy fl      class
## 1    29  p    compact
## 2    29  p    compact
## 3    31  p    compact
## 4    30  p    compact
## 5    26  p    compact
## 6    26  p    compact
## 7    27  p    compact
## 8    26  p    compact
## 9    25  p    compact
## 10   28  p    compact
## 11   27  p    compact
## 12   25  p    compact
## 13   25  p    compact
## 14   25  p    compact
## 15   25  p    compact
## 16   24  p    midsize
```

```
## 17   25  p    midsize
## 18   23  p    midsize
## 19   20  r        suv
## 20   15  e        suv
## 21   20  r        suv
## 22   17  r        suv
## 23   17  r        suv
## 24   26  p    2seater
## 25   23  p    2seater
## 26   26  p    2seater
## 27   25  p    2seater
## 28   24  p    2seater
## 29   19  r        suv
## 30   14  e        suv
## 31   15  r        suv
## 32   17  d        suv
## 33   27  r    midsize
## 34   30  r    midsize
## 35   26  r    midsize
## 36   29  r    midsize
## 37   26  r    midsize
## 38   24  r    minivan
## 39   24  r    minivan
## 40   22  r    minivan
## 41   22  r    minivan
## 42   24  r    minivan
## 43   24  r    minivan
## 44   17  e    minivan
## 45   22  r    minivan
## 46   21  r    minivan
## 47   23  r    minivan
## 48   23  r    minivan
## 49   19  r     pickup
## 50   18  r     pickup
## 51   17  r     pickup
## 52   17  r     pickup
## 53   19  r     pickup
## 54   19  r     pickup
## 55   12  e     pickup
## 56   17  r     pickup
## 57   15  r     pickup
## 58   17  r        suv
## 59   17  r        suv
## 60   12  e        suv
## 61   17  r        suv
## 62   16  r        suv
## 63   18  r        suv
## 64   15  r        suv
## 65   16  r     pickup
## 66   12  e     pickup
## 67   17  r     pickup
## 68   17  r     pickup
## 69   16  r     pickup
## 70   12  e     pickup
```

```
## 71   15  r     pickup
## 72   16  r     pickup
## 73   17  r     pickup
## 74   15  r     pickup
## 75   17  r        suv
## 76   17  r        suv
## 77   18  r        suv
## 78   17  r        suv
## 79   19  r        suv
## 80   17  r        suv
## 81   19  r        suv
## 82   19  r        suv
## 83   17  r        suv
## 84   17  r     pickup
## 85   17  r     pickup
## 86   16  r     pickup
## 87   16  r     pickup
## 88   17  r     pickup
## 89   15  r     pickup
## 90   17  r     pickup
## 91   26  r subcompact
## 92   25  r subcompact
## 93   26  r subcompact
## 94   24  r subcompact
## 95   21  r subcompact
## 96   22  r subcompact
## 97   23  r subcompact
## 98   22  r subcompact
## 99   20  p subcompact
## 100  33  r subcompact
## 101  32  r subcompact
## 102  32  r subcompact
## 103  29  p subcompact
## 104  32  r subcompact
## 105  34  r subcompact
## 106  36  r subcompact
## 107  36  c subcompact
## 108  29  p subcompact
## 109  26  r    midsize
## 110  27  r    midsize
## 111  30  r    midsize
## 112  31  r    midsize
## 113  26  r    midsize
## 114  26  r    midsize
## 115  28  r    midsize
## 116  26  r subcompact
## 117  29  r subcompact
## 118  28  r subcompact
## 119  27  r subcompact
## 120  24  r subcompact
## 121  24  r subcompact
## 122  24  r subcompact
## 123  22  d        suv
## 124  19  r        suv
```

```
## 125  20  r        suv
## 126  17  r        suv
## 127  12  e        suv
## 128  19  r        suv
## 129  18  r        suv
## 130  14  p        suv
## 131  15  p        suv
## 132  18  r        suv
## 133  18  r        suv
## 134  15  p        suv
## 135  17  r        suv
## 136  16  p        suv
## 137  18  r        suv
## 138  17  r        suv
## 139  19  r        suv
## 140  19  r        suv
## 141  17  r        suv
## 142  29  r    compact
## 143  27  r    compact
## 144  31  r    midsize
## 145  32  r    midsize
## 146  27  p    midsize
## 147  26  p    midsize
## 148  26  r    midsize
## 149  25  r    midsize
## 150  25  p    midsize
## 151  17  r        suv
## 152  17  r        suv
## 153  20  p        suv
## 154  18  p        suv
## 155  26  r    midsize
## 156  26  p    midsize
## 157  27  r    midsize
## 158  28  r    midsize
## 159  25  p    midsize
## 160  25  r        suv
## 161  24  r        suv
## 162  27  r        suv
## 163  25  p        suv
## 164  26  r        suv
## 165  23  p        suv
## 166  26  r subcompact
## 167  26  r subcompact
## 168  26  r subcompact
## 169  26  r subcompact
## 170  25  p    compact
## 171  27  r    compact
## 172  25  p    compact
## 173  27  r    compact
## 174  20  r        suv
## 175  20  r        suv
## 176  19  r        suv
## 177  17  r        suv
## 178  20  r        suv
```

```
## 179  17  r        suv
## 180  29  r    midsize
## 181  27  r    midsize
## 182  31  r    midsize
## 183  31  r    midsize
## 184  26  r    midsize
## 185  26  r    midsize
## 186  28  r    midsize
## 187  27  r    compact
## 188  29  r    compact
## 189  31  r    compact
## 190  31  r    compact
## 191  26  r    compact
## 192  26  r    compact
## 193  27  r    compact
## 194  30  r    compact
## 195  33  r    compact
## 196  35  r    compact
## 197  37  r    compact
## 198  35  r    compact
## 199  15  r        suv
## 200  18  r        suv
## 201  20  r     pickup
## 202  20  r     pickup
## 203  22  r     pickup
## 204  17  r     pickup
## 205  19  r     pickup
## 206  18  r     pickup
## 207  20  r     pickup
## 208  29  r    compact
## 209  26  r    compact
## 210  29  p    compact
## 211  29  p    compact
## 212  24  r    compact
## 213  44  d    compact
## 214  29  r    compact
## 215  26  r    compact
## 216  29  p    compact
## 217  29  p    compact
## 218  29  r    compact
## 219  29  r    compact
## 220  23  r    compact
## 221  24  r    compact
## 222  44  d subcompact
## 223  41  d subcompact
## 224  29  r subcompact
## 225  26  r subcompact
## 226  28  r subcompact
## 227  29  r subcompact
## 228  29  p    midsize
## 229  29  p    midsize
## 230  28  p    midsize
## 231  29  p    midsize
## 232  26  p    midsize
```

```
## 233  26  p    midsize
## 234  26  p    midsize
```

b.Which variables from mpg dataset are categorical?

```
is_Cont <- sapply(mpg_file, is.character)
Cont_Vars <- names(mpg_file)[is_Cont]
Cont_Vars
```

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

c. Which are continuous variables?

```
  is_Cont <- sapply(mpg_file, is.numeric)
  Cont_Vars <- names(mpg_file)[is_Cont]
  Cont_Vars
```

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

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

```
manufacturer_AsTablE <- table(mpg_file$manufacturer)
manufacturer_most_models <- names(manufacturer_AsTablE )[which.max(manufacturer_AsTablE)]

manufacturer_most_models
```

```
## [1] "dodge"
```

```
model_AsTablE  <- table(mpg_file$model)
model_most_vars <- names(model_AsTablE )[which.max(model_AsTablE)]

model_most_vars
```

```
## [1] "caravan 2wd"
```

```
## The dodge manufacturer has the most models
## The caravan 2wd has the most variations
```

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

```
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
```

```
manufacturers_models <- data.frame(Manufacturer = mpg_file$manufacturer, Model = mpg_file$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_mods <- unique(manufacturers_models)
unique_mods
```

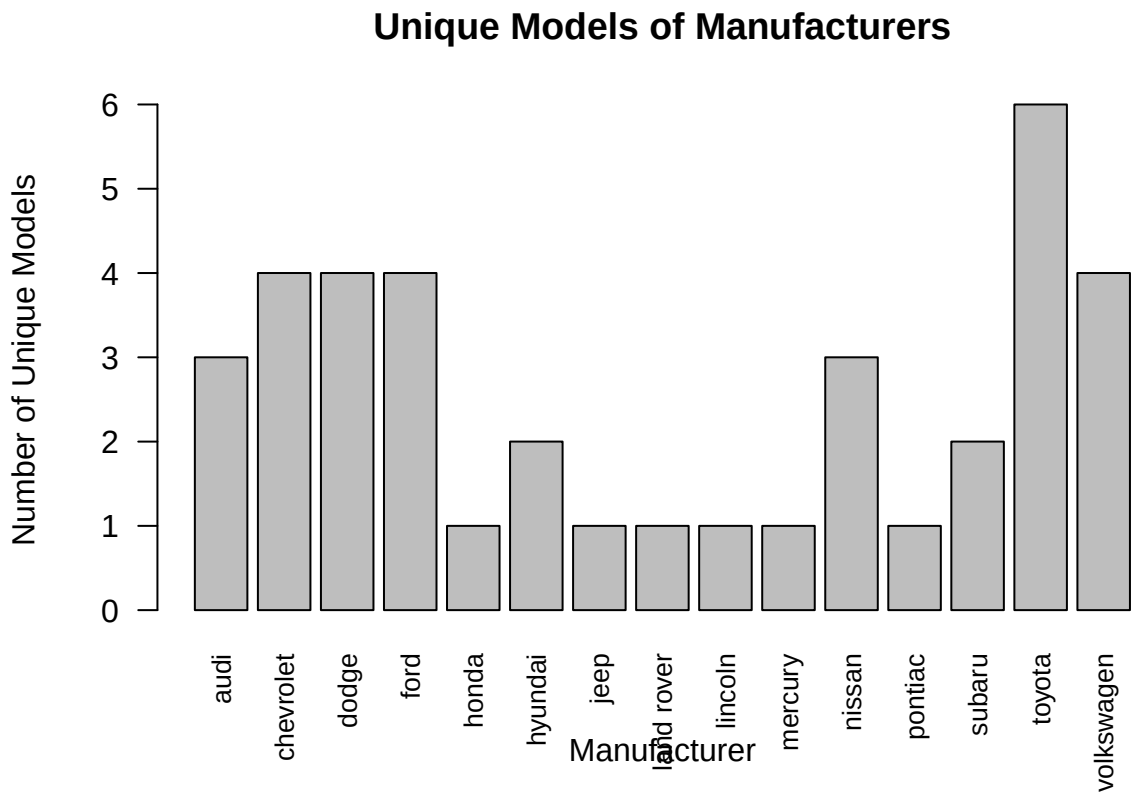
```
##     Manufacturer                  Model
## 1           audi                     a4
## 8           audi             a4 quattro
## 16          audi             a6 quattro
## 19     chevrolet     c1500 suburban 2wd
## 24     chevrolet              corvette
## 29     chevrolet        k1500 tahoe 4wd
## 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
```

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

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

```
library(ggplot2)

library(dplyr)

unique_plot <- plot(as.factor(factoredManufacturer),
                    main = "Unique Models of Manufacturers",
                    xlab = "Manufacturer",
                    ylab = "Number of Unique Models",
                    cex.names = 0.8, las = 2)
```

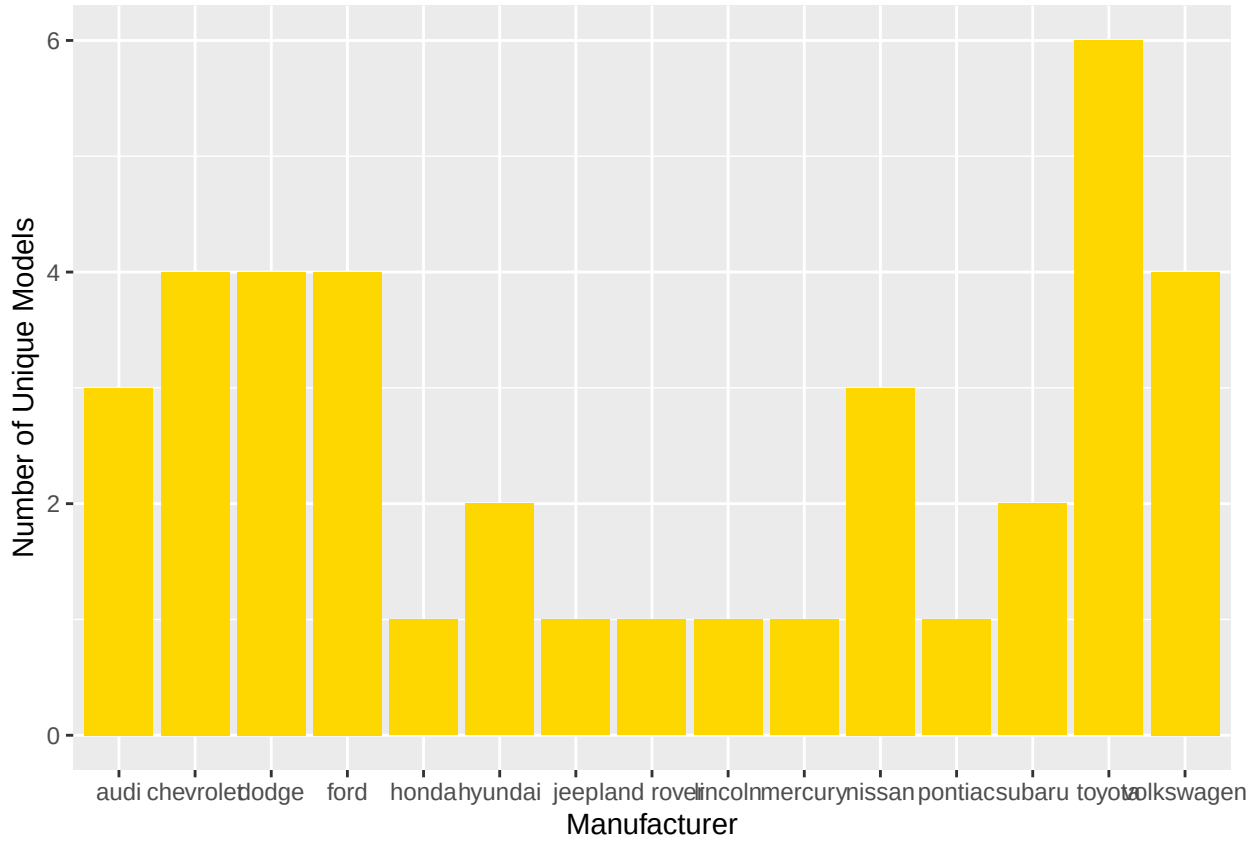



```
unique_count <- unique_mods %>%
  count(unique_mods$Manufacturer)
unique_count
```

```
##    unique_mods$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
```

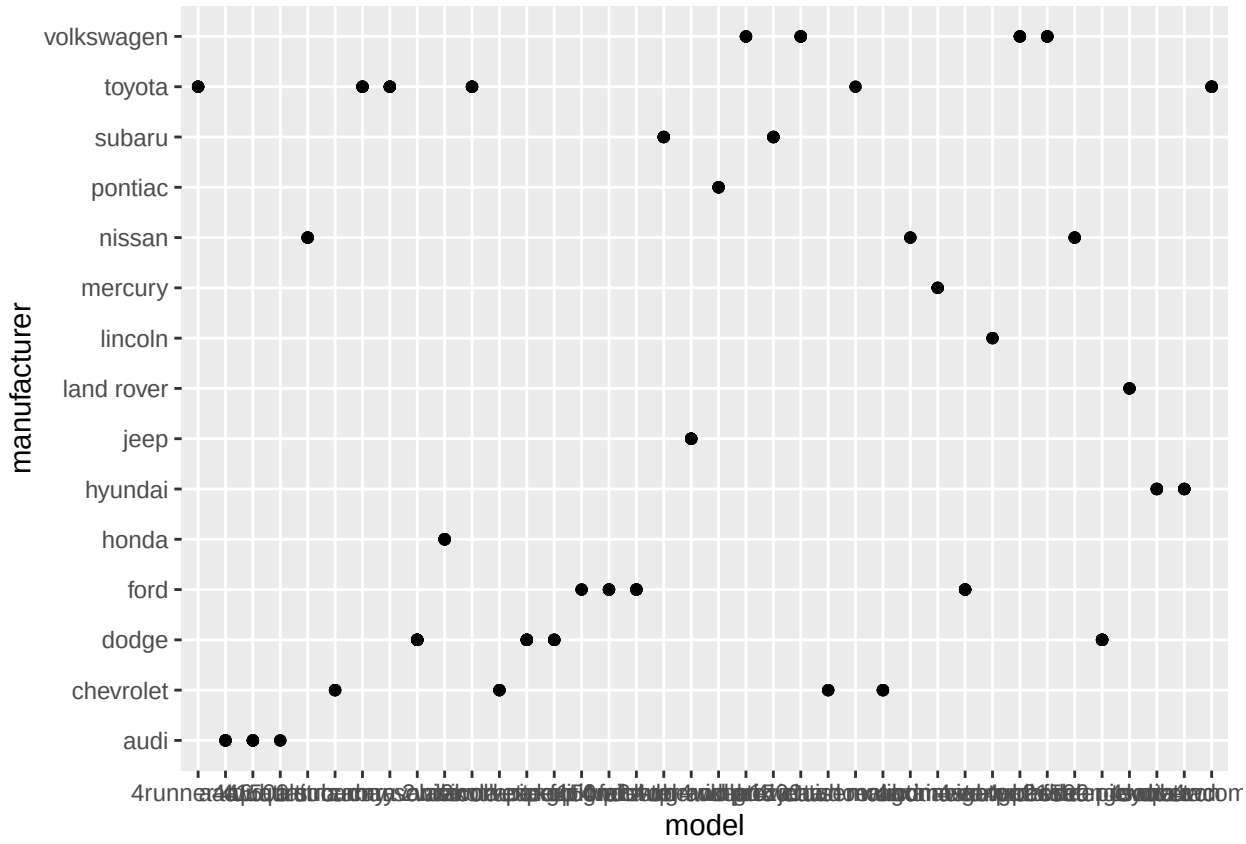
```
ggplot(unique_count, aes(x = `unique_mods$Manufacturer`, y = n)) +
geom_bar(stat = "identity", fill = "gold") +
  labs(x = "Manufacturer", y = "Number of Unique Models")
```



2. Same dataset will be used. You are going to show the relationship of the modeland the manufacturer.

a. What does ggplot(mpg, aes(model, manufacturer)) + geom_point() show?

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



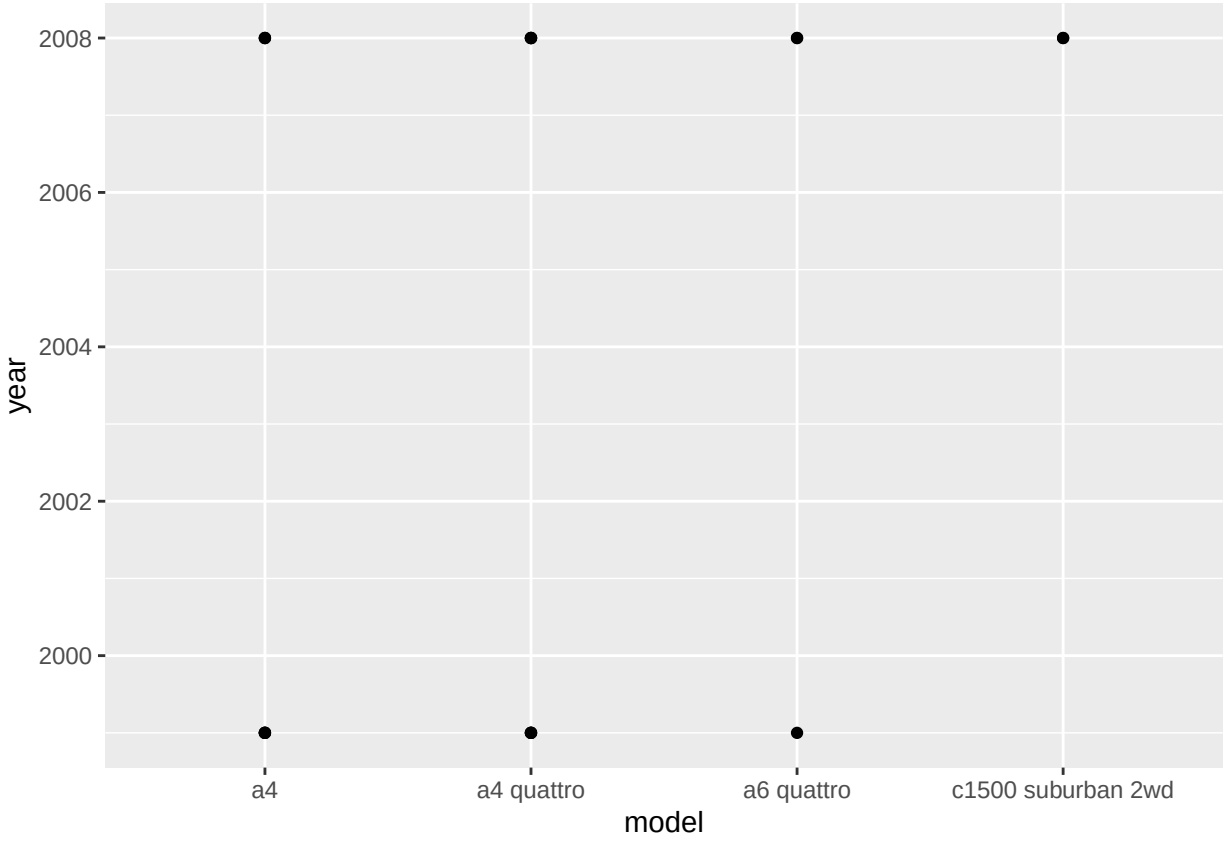

```
## In this plot, where each point corresponds to a specific car model and its manufacturer.
## The x-axis will represent the car model, the y-axis will represent the manufacturer, and each point
```

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

```
##It is useful if you want to know how many models each manufacturer has.
##Absolutely, your proposed modifications sound like excellent ways to make the plot more informative.
```

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

```
ggplot(head(mpg,20), aes(x = model, y = year)) + geom_point()
```



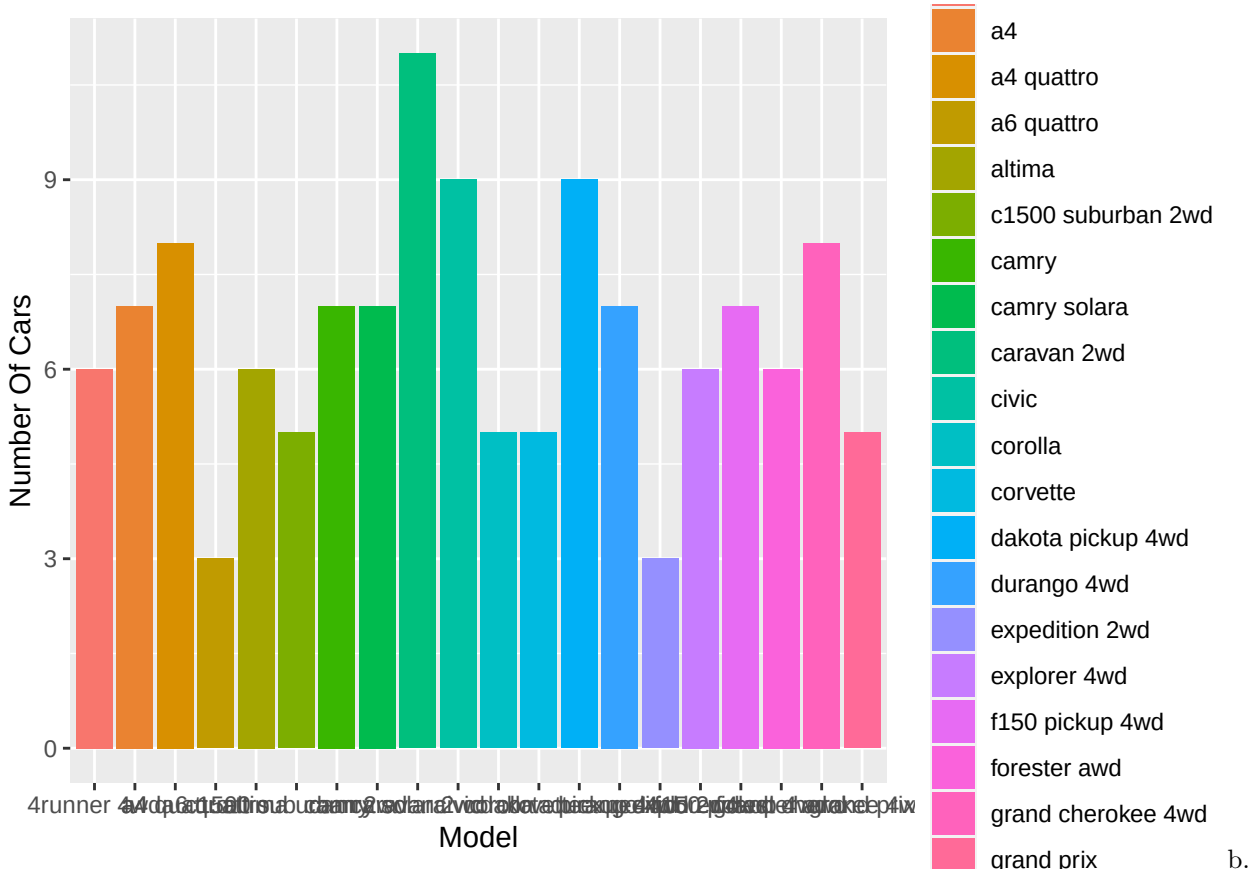
4. Using the pipe (%>%), group the model and get the number of cars per model. Show codes and its result

```
library(dplyr)

Model_car_Count <- mpg %>%
  group_by(model) %>%
  summarize(Number_Of_Cars = n())

Model_car_Count
```

```
## # A tibble: 38 x 2
##    model              Number_Of_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
```

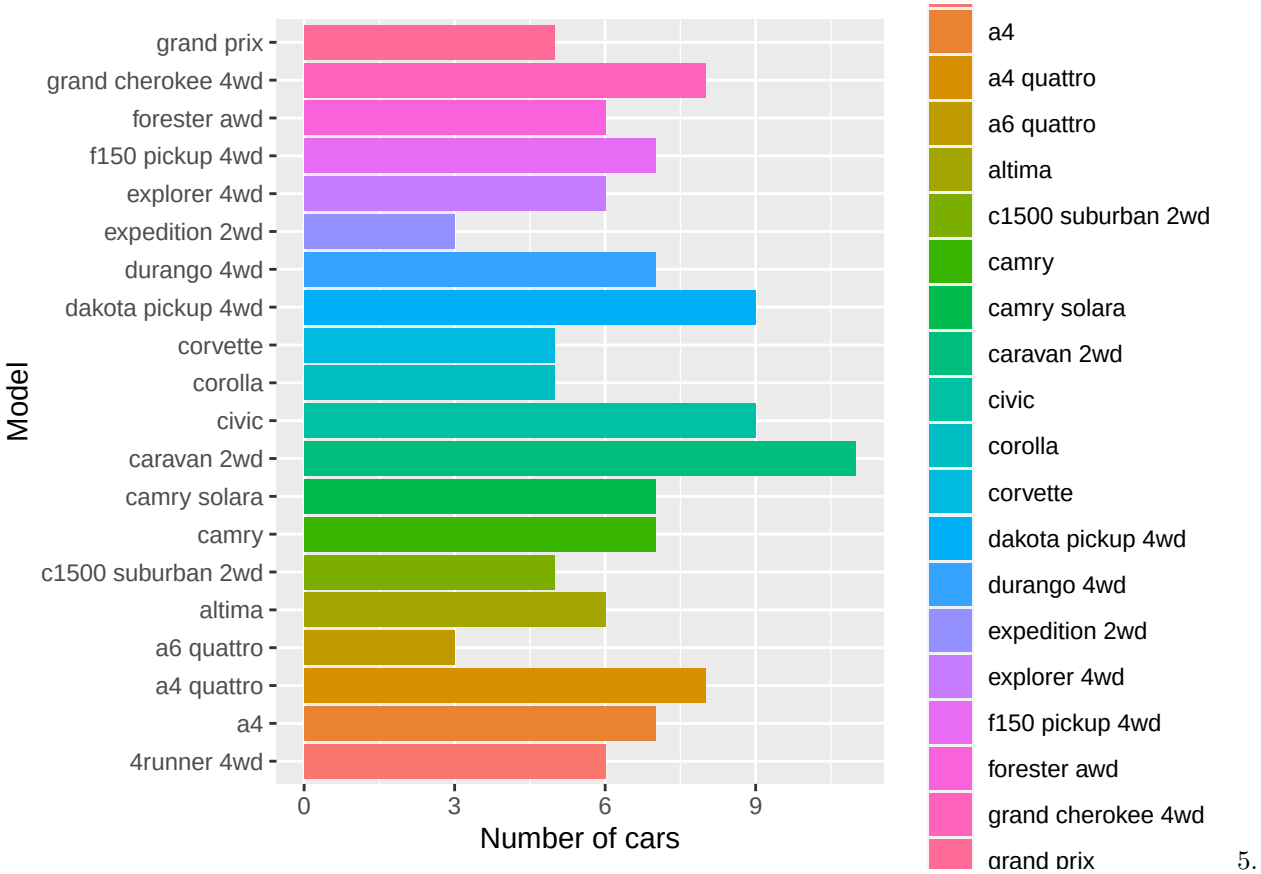
   a. Plot using geom_bar() using the top 20 observations only. The graphs shoudl have a title, labels and colors. Show code and results

```
obs_20 <- head(Model_car_Count, 20)

top_20 <- ggplot(obs_20, aes(x = model, y = Number_Of_Cars, fill = model)) + geom_bar(stat = "identity"

top_20
```



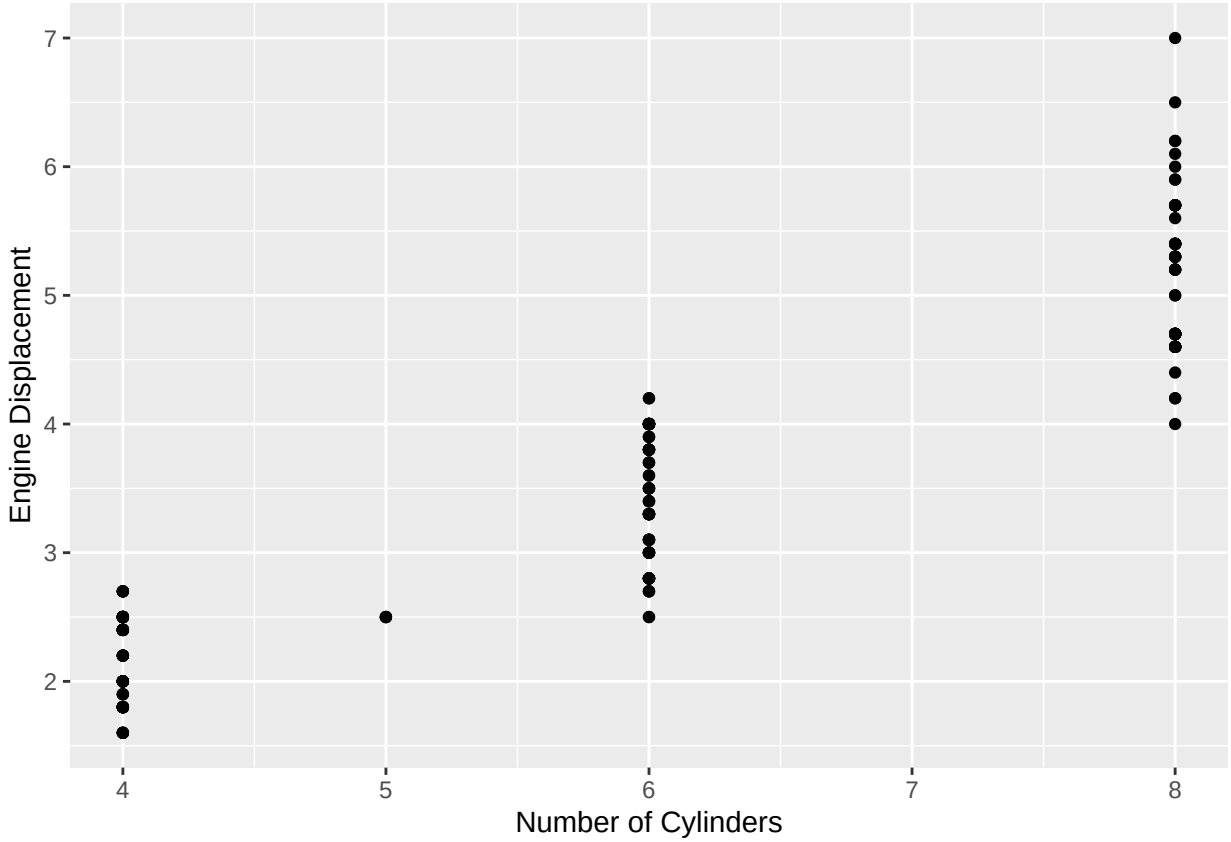
b. Plot using the geom_bar() + coord_flip() just like what is shown below. Show codes and its result.

```
flipped_Top_20 <- ggplot(obs_20, aes(x = model, y = Number_Of_Cars, fill = model)) + geom_bar(stat = "i

flipped_Top_20
```



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".

```
Cyl_Displ_Plot <- ggplot(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")

Cyl_Displ_Plot
```

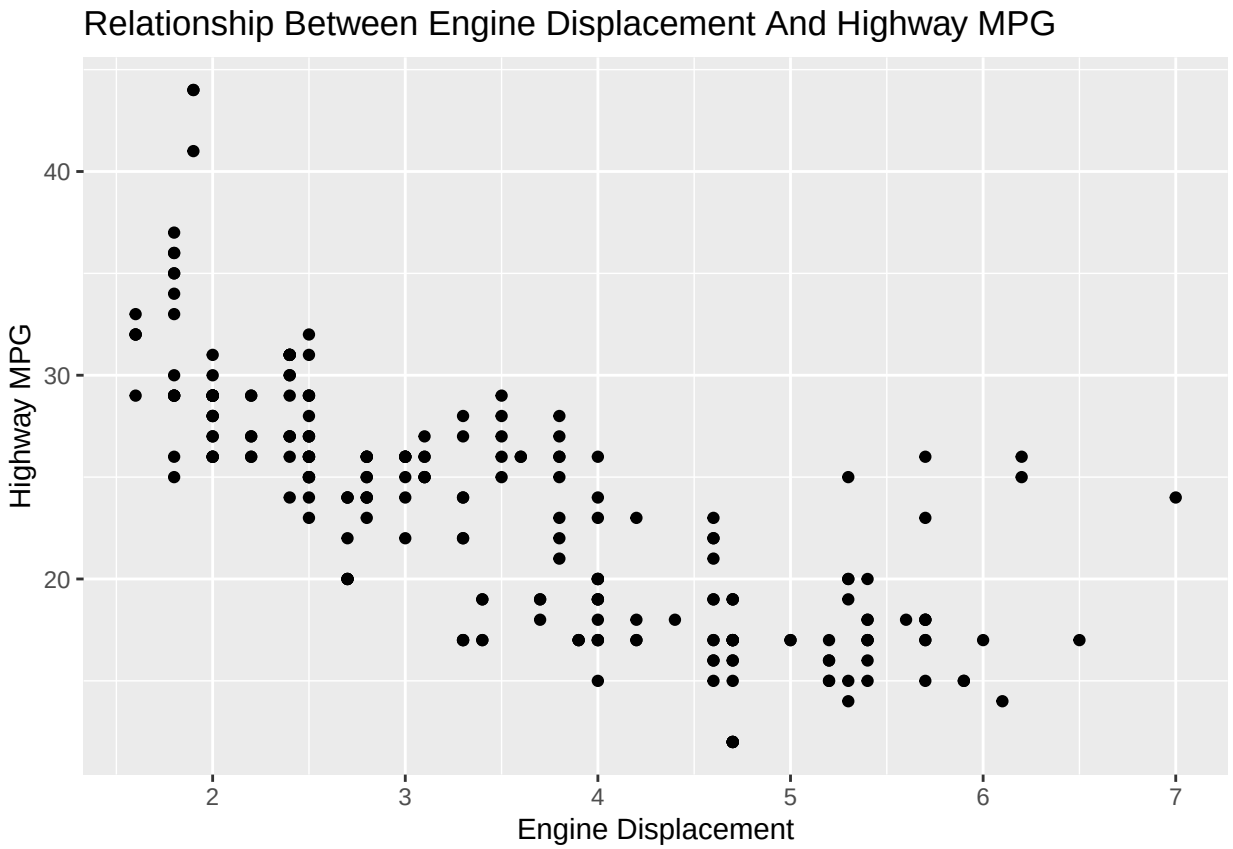


a. How would you describe its relationship? Show the codes and its result.

```
# It will generate a scatter plot showing the relationship between the number of cylinders and engine d

# As the number of cylinders increases, the engine displacement tends to increase as well. This suggest
##The scatter plot with a linear regression line and color-coded points illustrates the relationship be
##It suggests that as cylinder number increases, engine displacement also increases, indicating larger
```

6. 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_plot <- ggplot(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_plot
```




```
## This scatter plot visually illustrates the relationship between engine displacement (displ) and high
```

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)
traffic <- read.csv("Traffic.csv")

Num_obs <- nrow(traffic)
Num_obs
```

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

```
Num_Vars <- ncol(traffic)
Num_Vars
```

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

```
Vars <- colnames(traffic)
Vars
```

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

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

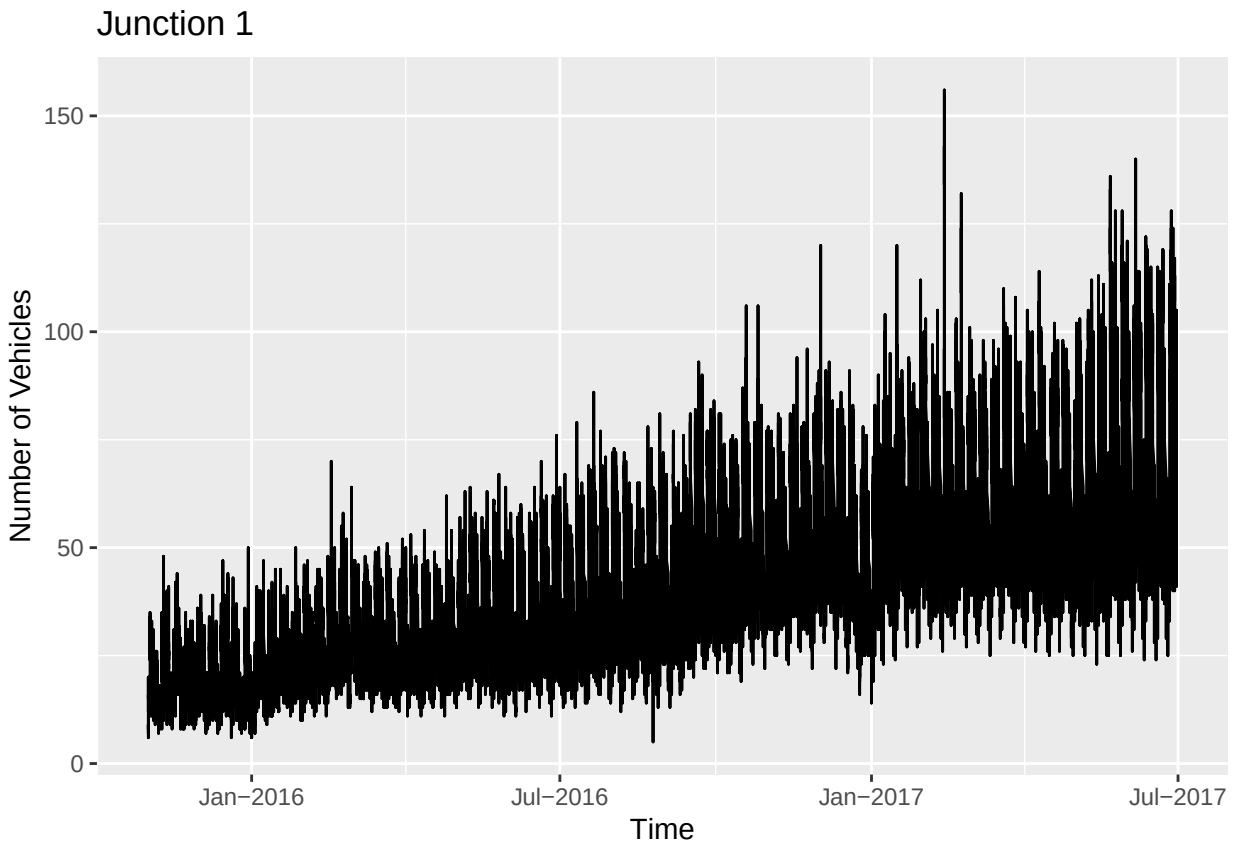
```
Junctions_subset_1 <- subset(traffic, Junction == 1)

Junctions_subset_2 <- subset(traffic, Junction == 2)
```

```
Junctions_subset_3 <- subset(traffic, Junction == 3)

Junctions_subset_4 <- subset(traffic, Junction == 4)
```

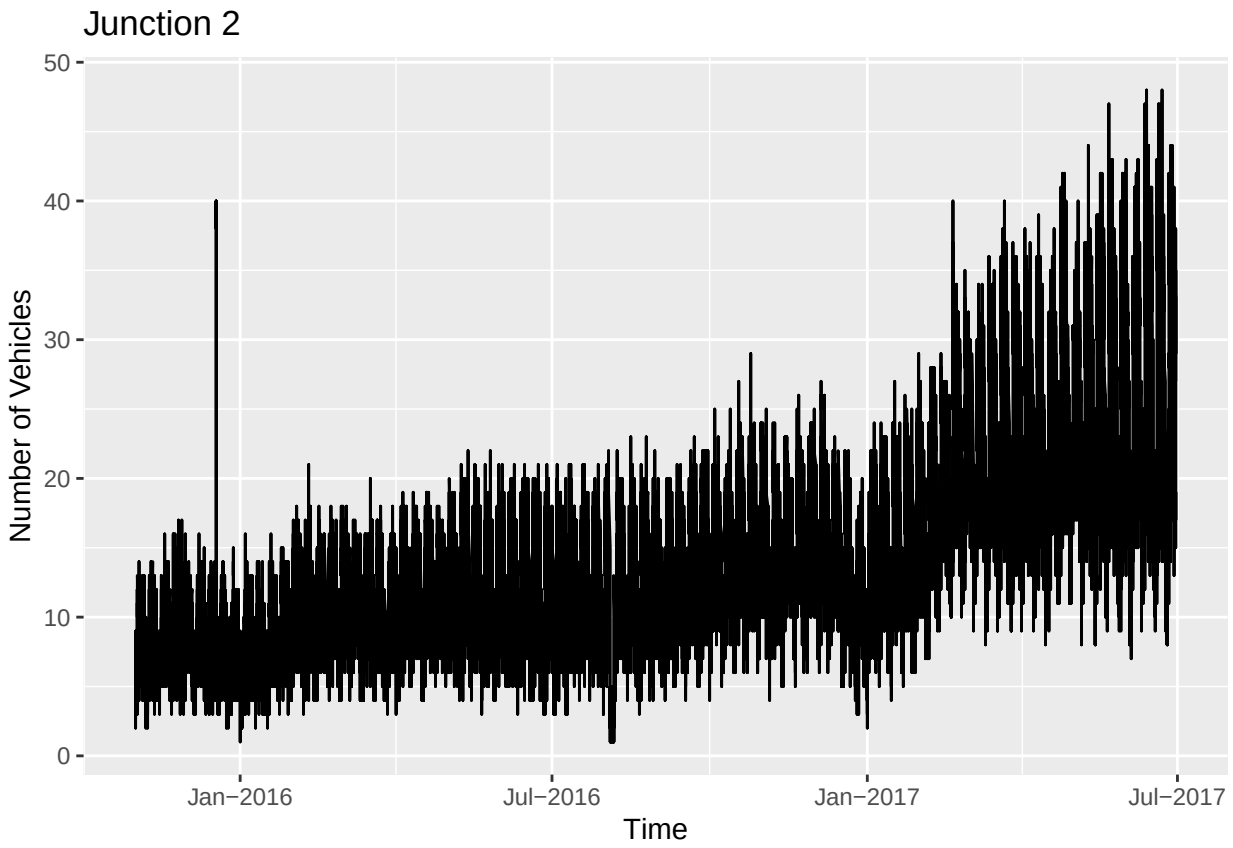
c. Plot each junction in a using geom_line(). Show your solution and output.

```
junction_1_plot <- ggplot(Junctions_subset_1, aes(x = as.Date(Junctions_subset_1$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")

junction_1_plot
```

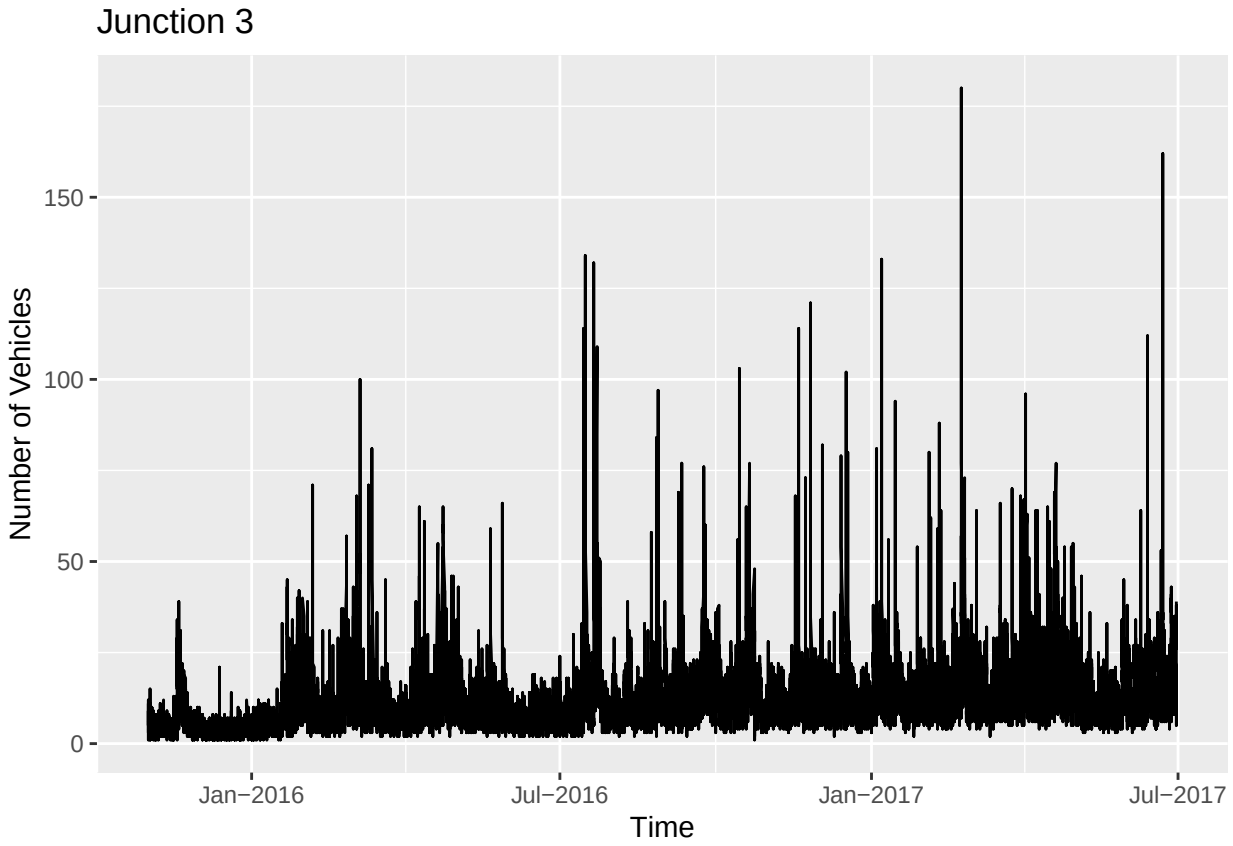
```
## Warning: Use of `Junctions_subset_1$DateTime` is discouraged.
## i Use `DateTime` instead.
```



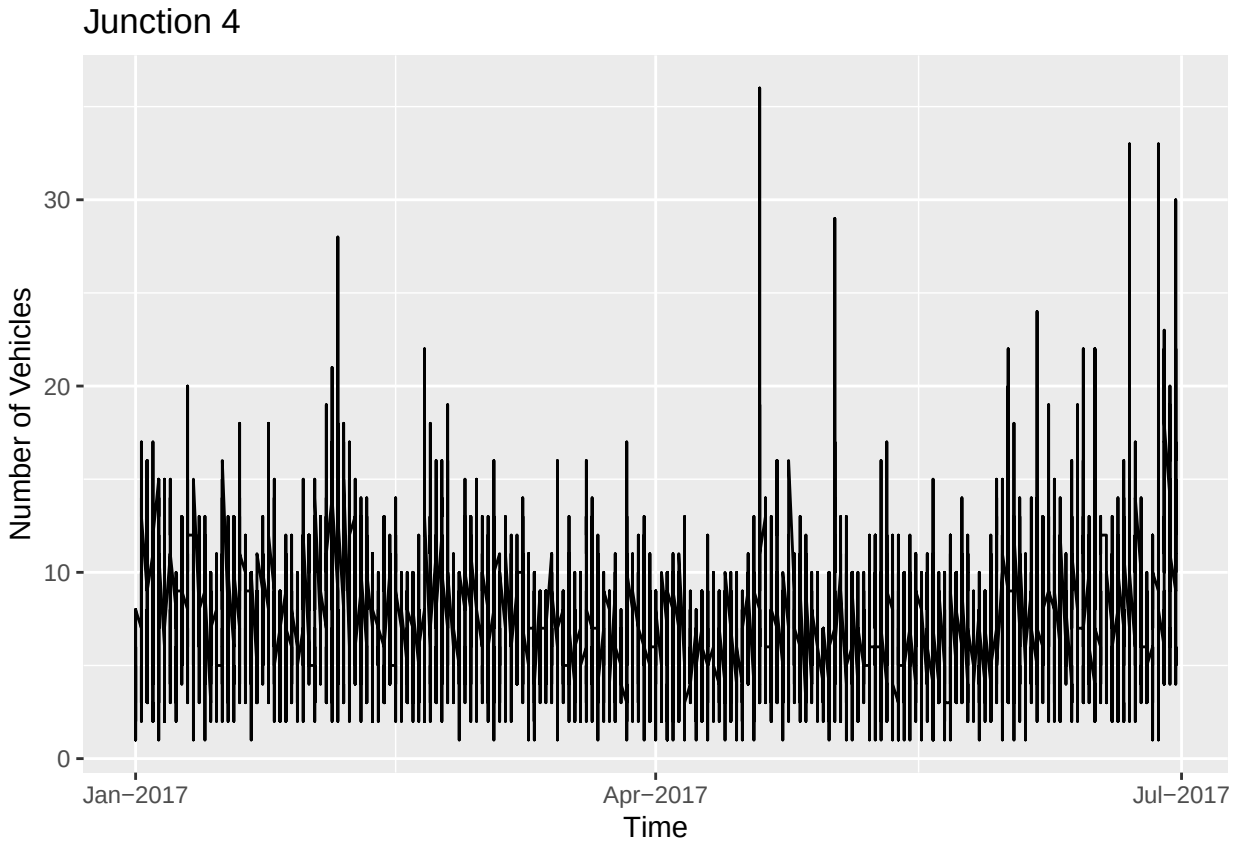

```
junction_2_plot <- ggplot(Junctions_subset_2, aes(x = as.Date(Junctions_subset_2$DateTime), y = Vehicles
  geom_line() +
  scale_x_date(date_labels = "%b-%Y") + theme(legend.position = "none") +
  labs(title = "Junction 2", x = "Time", y = "Number of Vehicles")

junction_2_plot
```




```
junction_3_plot <- ggplot(Junctions_subset_3, aes(x = as.Date(Junctions_subset_3$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")

junction_3_plot
```




```
junction_4_plot <- ggplot(Junctions_subset_4, aes(x = as.Date(Junctions_subset_4$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")

junction_4_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)

Alexa_data <- read_excel("/cloud/project/RWorksheet#4/Worksheet#4c/Alexa_File.xlsx")

num_obs <- nrow(Alexa_data)
num_obs
```

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

```
num_cols <- ncol(Alexa_data)
num_cols
```

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

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

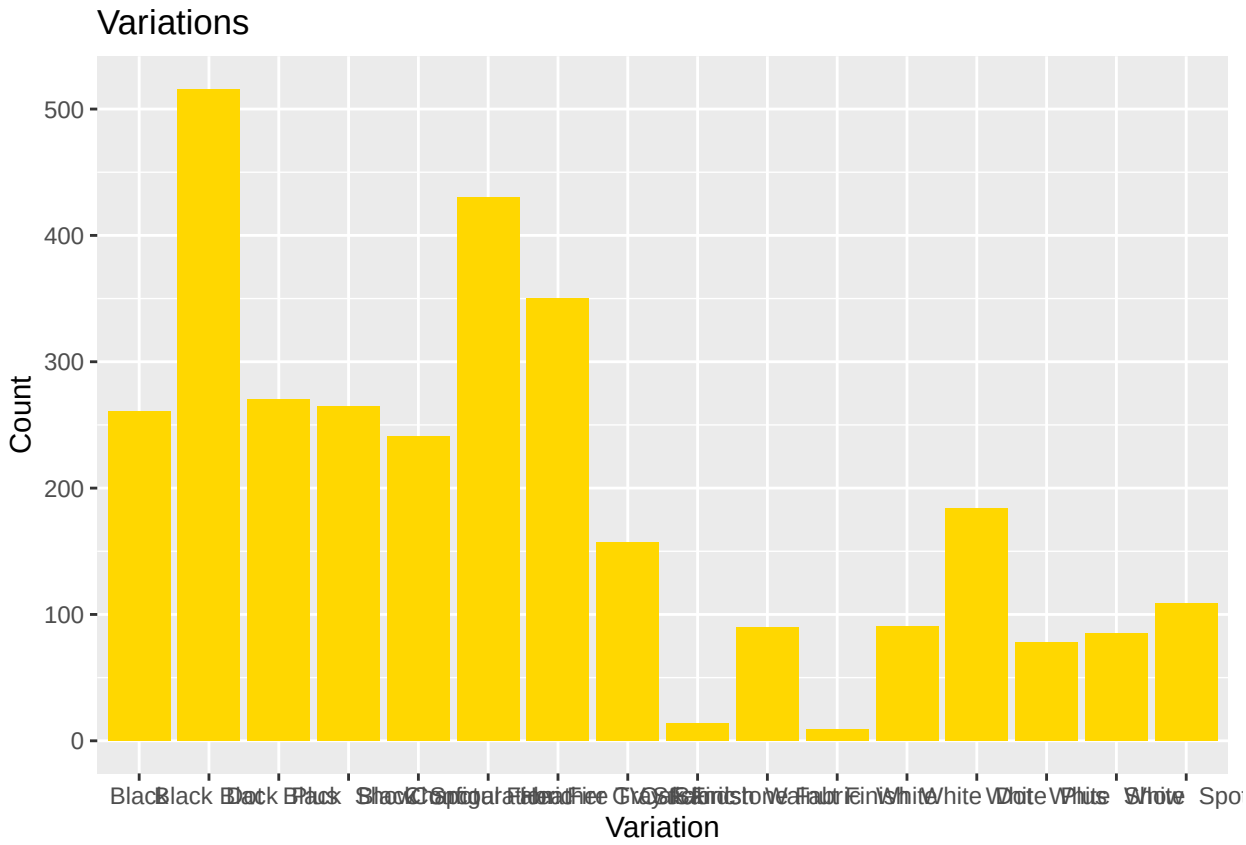
```
Var_counts <- Alexa_data %>%
  count(variation)

Var_counts
```

```
## # 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.

```
Alexa_plot <- ggplot(Alexa_data, aes(x = variation)) +
  geom_bar(fill = "gold") +
  labs(title = "Variations",
       x = "Variation",
       y = "Count")

Alexa_plot
```




```
##  The graph visually displays the distribution of variations in the Alexa_data dataset, with each bar
```

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.

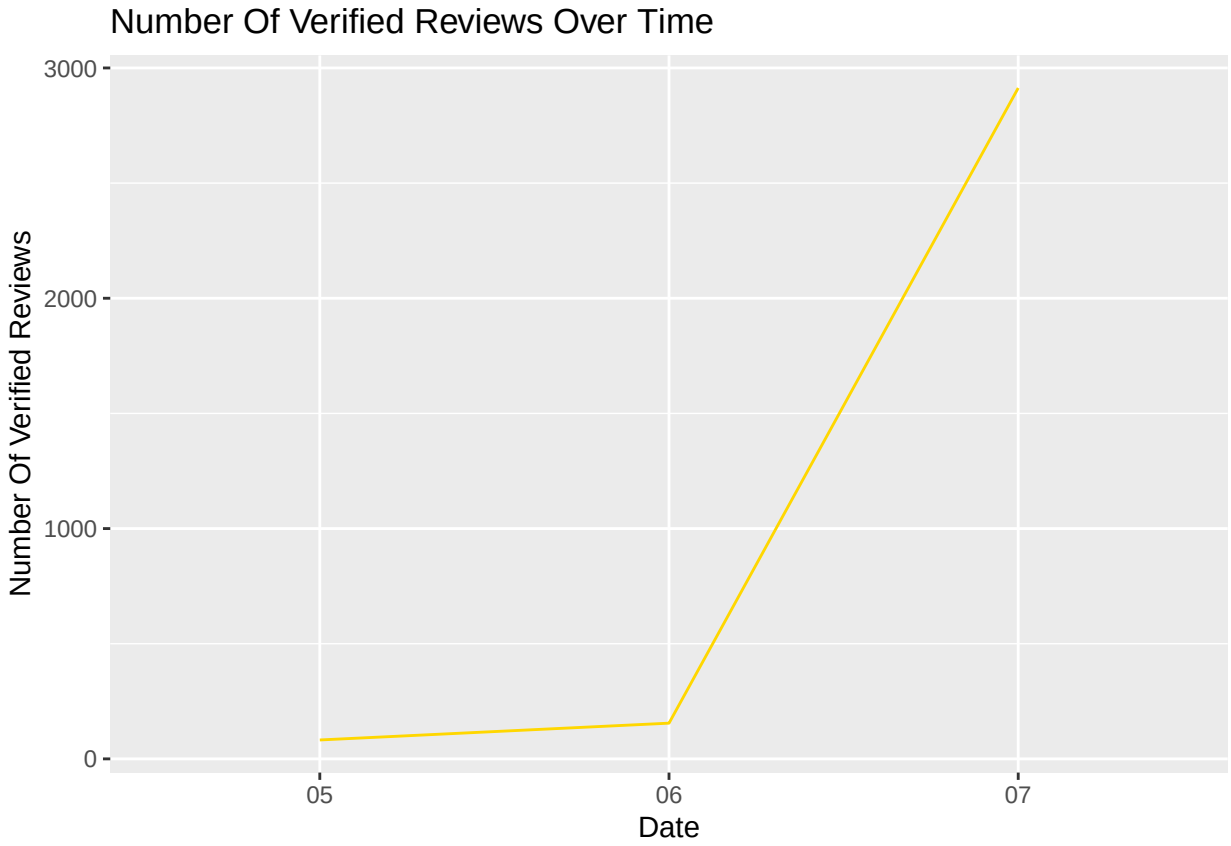
```
library(dplyr)

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

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

countMonth <- Alexa_data %>%
  count(month)
countMonth
```

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

```
monthly_revCount <- table(countMonth)
monthly_revCount
```

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

```
Alexa_line <- ggplot(countMonth, aes(x = month, y = n, group = 1)) +
  geom_line(color = "gold") +
  labs(title = "Number Of Verified Reviews Over Time",
       x = "Date",
       y = "Number Of Verified Reviews")

Alexa_line
```



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.

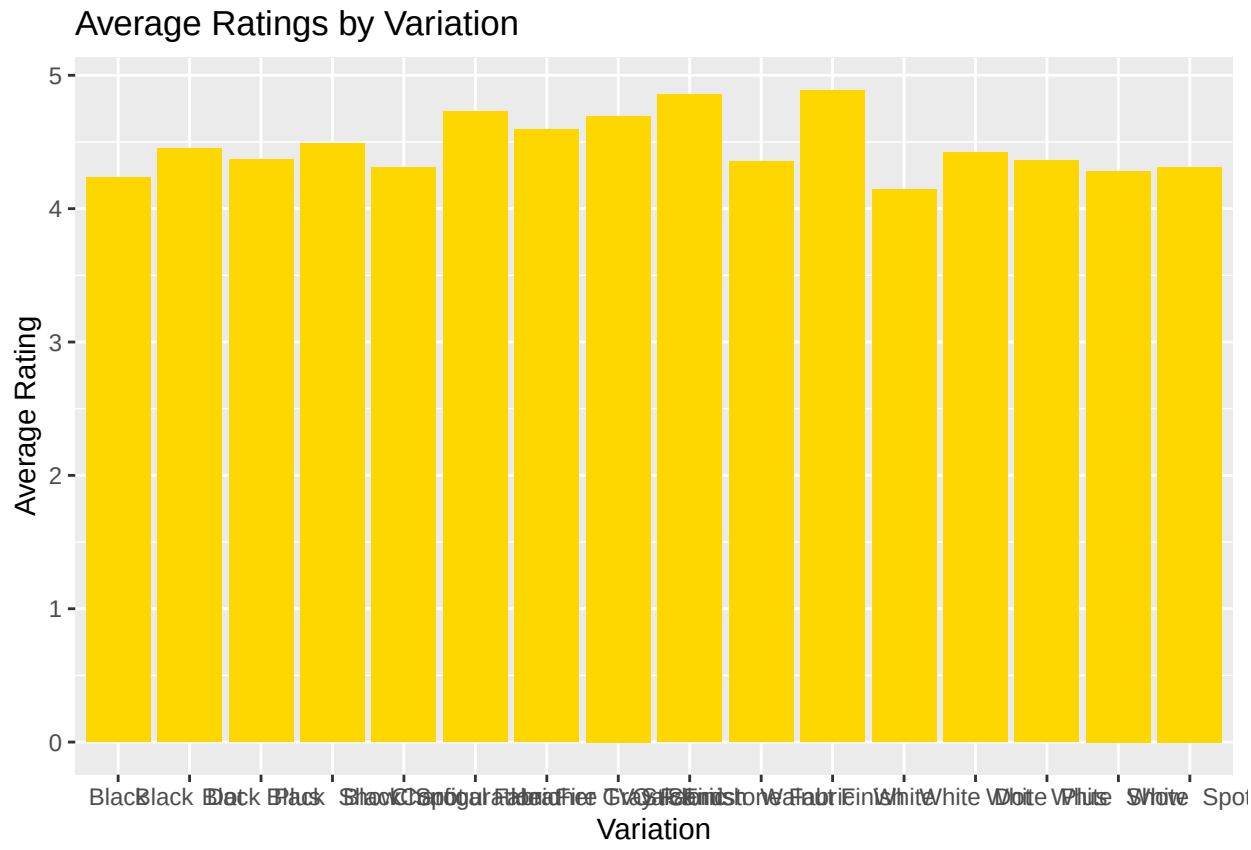
```
variation_ratings <- Alexa_data %>%
  group_by(variation) %>%
  summarise(avg_rating = mean(rating))

variation_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 <- variation_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
ggplot(variation_ratings, aes(x = variation, y = avg_rating)) +
  geom_bar(stat = "identity", fill = "gold") +
  labs(title = "Average Ratings by Variation",
       x = "Variation",
       y = "Average Rating")
```




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

‘‘‘