STA 5820 Chapter 2 lab: Introduction to R
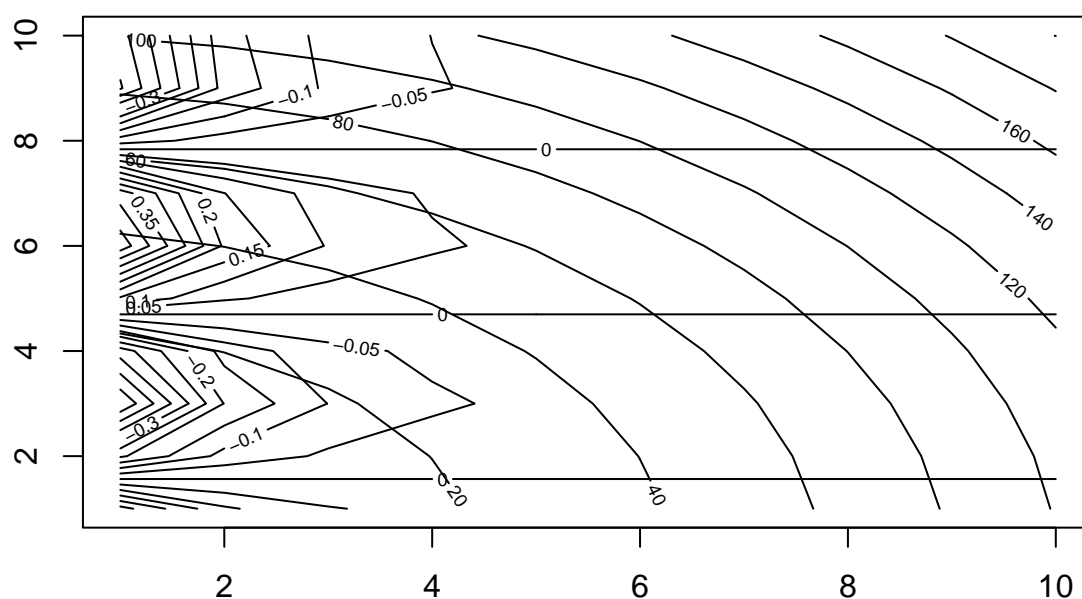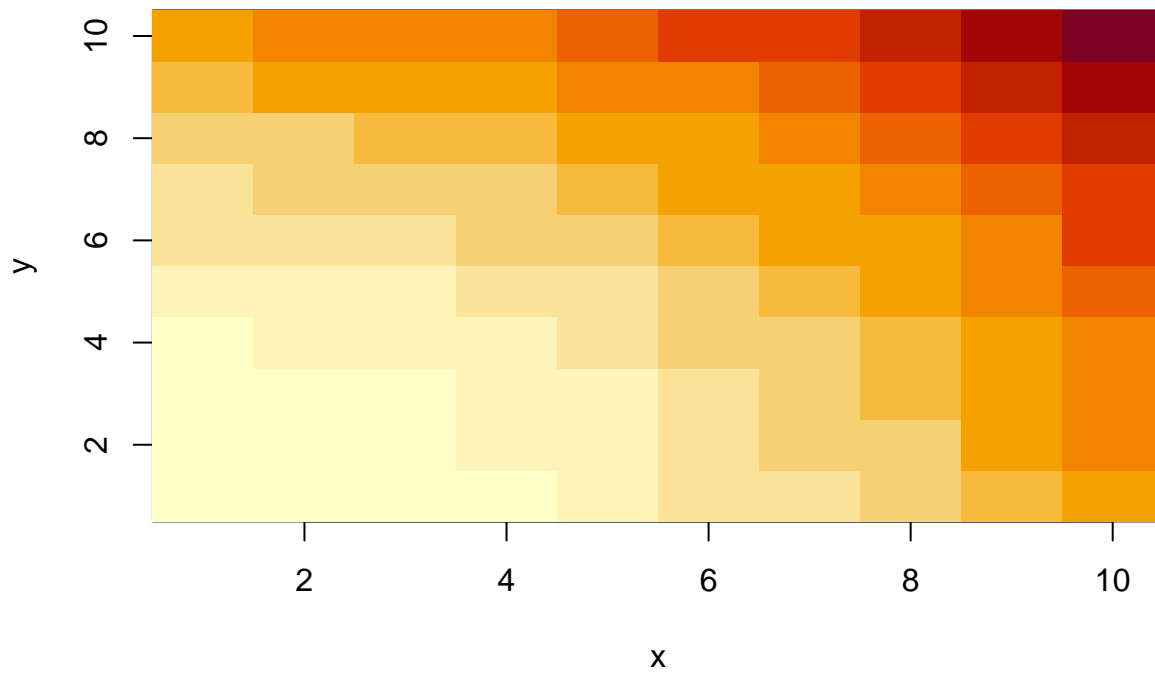
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2023-04-21

contour plots, heat maps, 3D plots, box plots, pairwise scatter plots

```
x <- 1:10
y <- x
f <- function(x,y) x^2+y^2
g <- function(x,y) cos(y)/(1+x^2)
fxy <- outer(x,y,f) # f(x,y) for all pairs of (x,y)
gxy <- outer(x,y,g) # g(x,y) for all pairs of (x,y)


contour(x,y,fxy) # contour plot
contour(x,y,gxy, nlevels=20, add=T) # add to existing plot, 20 lines
```
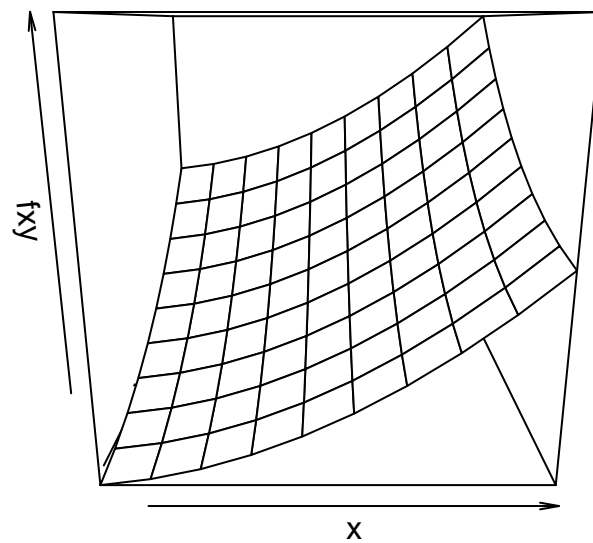
```
image(x,y,fxy) # heat map (e.g., gradation)
```



```
persp(x, y, fxy) # 3D graph
```

```r
library(ISLR) # for "Auto" data
str(Auto)
```

```
## 'data.frame':    392 obs. of  9 variables:
##  $ mpg         : num  18 15 18 16 17 15 14 14 14 15 ...
##  $ cylinders   : num  8 8 8 8 8 8 8 8 8 8 ...
##  $ displacement: num  307 350 318 304 302 429 454 440 455 390 ...
##  $ horsepower  : num  130 165 150 150 140 198 220 215 225 190 ...
##  $ weight      : num  3504 3693 3436 3433 3449 ...
##  $ acceleration: num  12 11.5 11 12 10.5 10 9 8.5 10 8.5 ...
##  $ year        : num  70 70 70 70 70 70 70 70 70 70 ...
##  $ origin      : num  1 1 1 1 1 1 1 1 1 1 ...
##  $ name        : Factor w/ 304 levels "amc ambassador brougham",..: 49 36 231 14 161 14
```
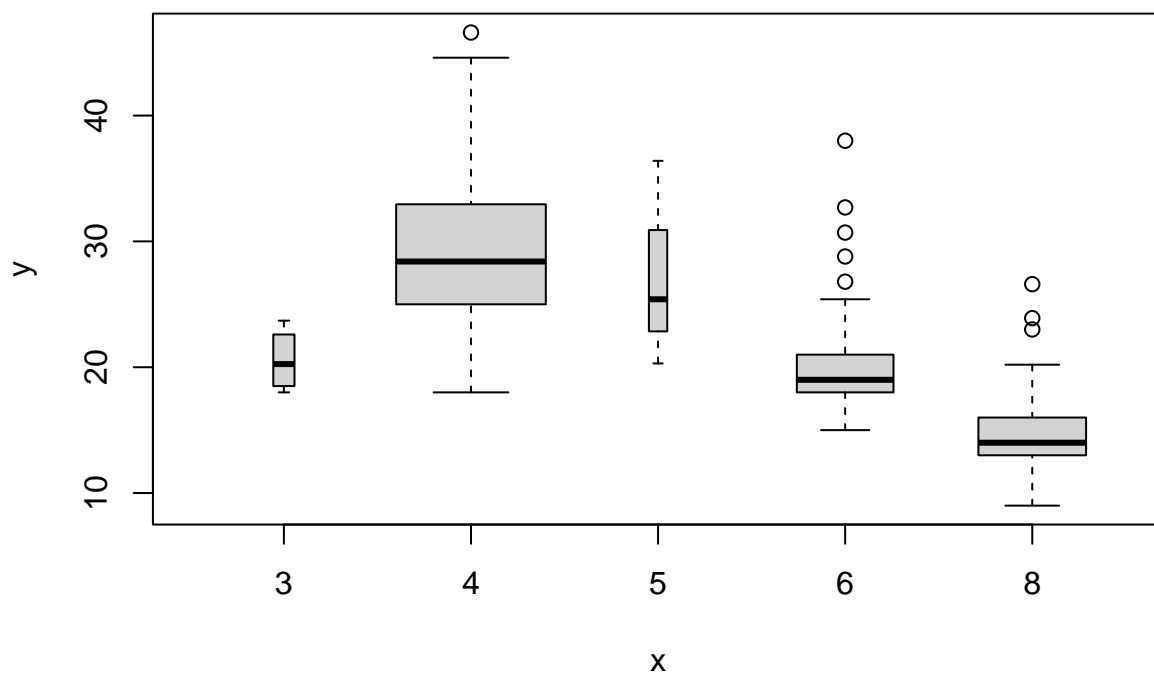
```r
attach(Auto)
plot(cylinders, mpg)
```
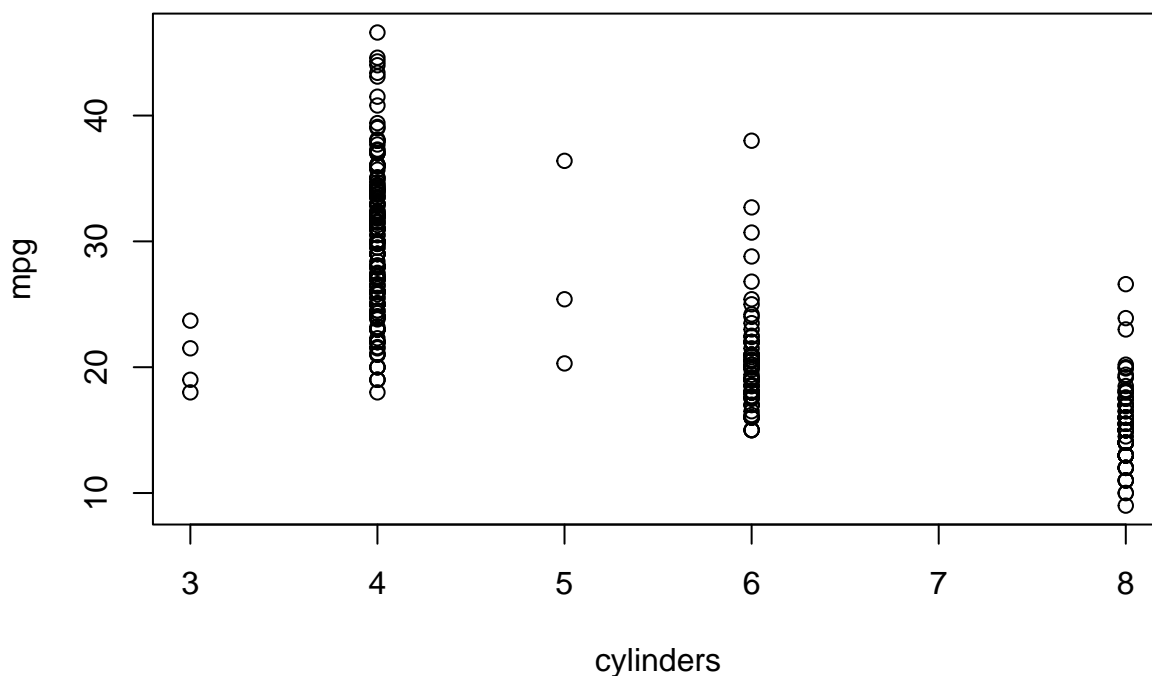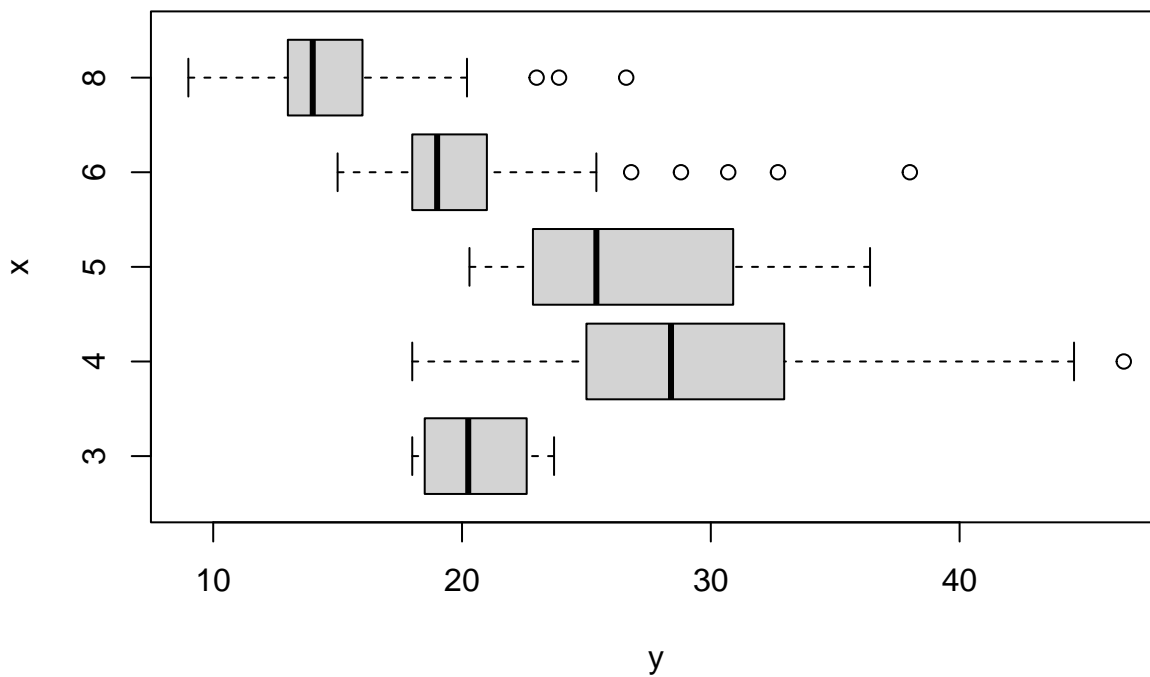


```r
F.cylinders <- as.factor(cylinders)
plot(F.cylinders, mpg) # boxplot
```
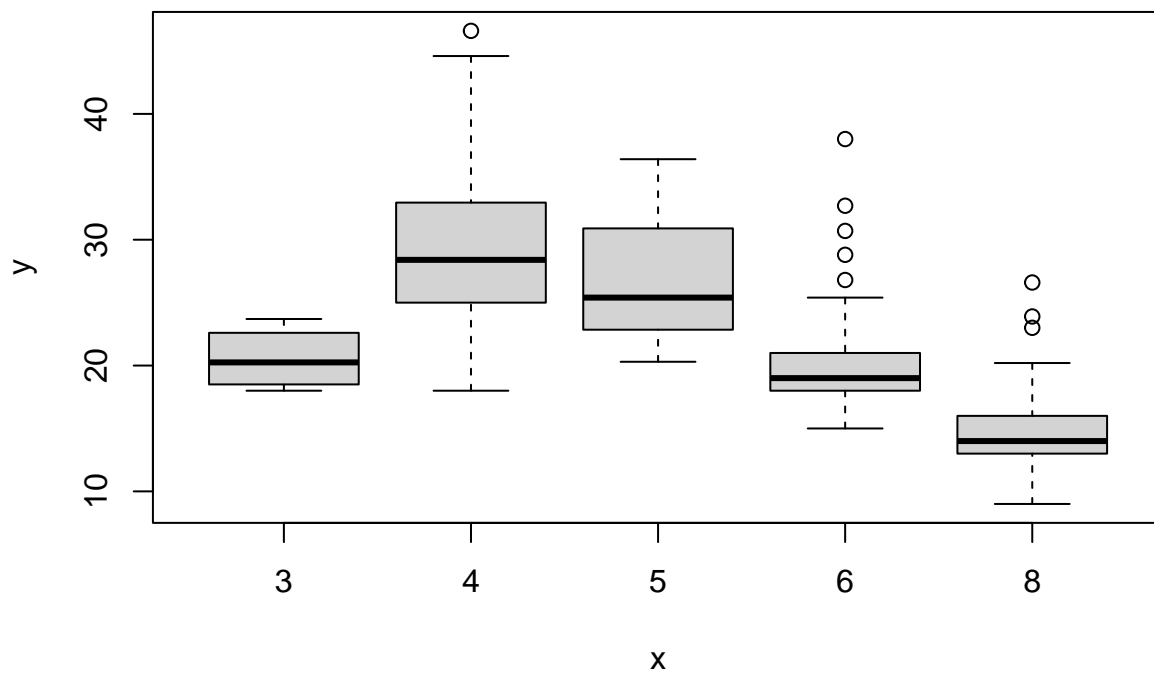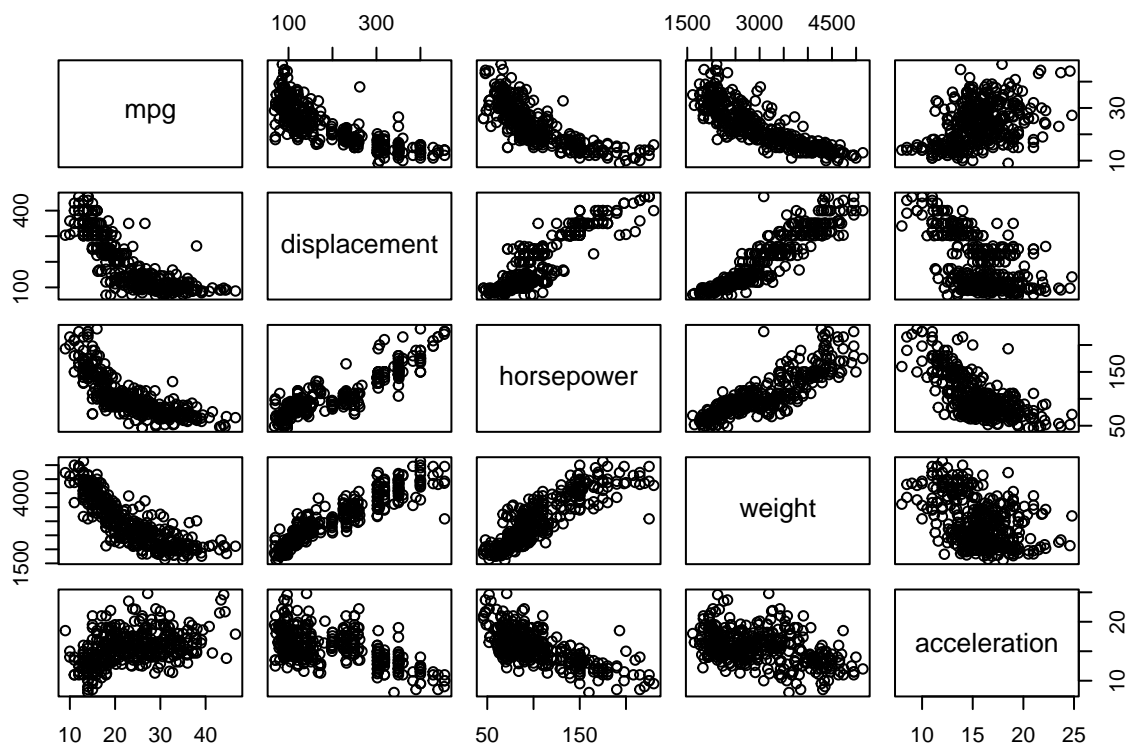
```
plot(F.cylinders, mpg, varwidth=T) # width proportional to num of obs
```
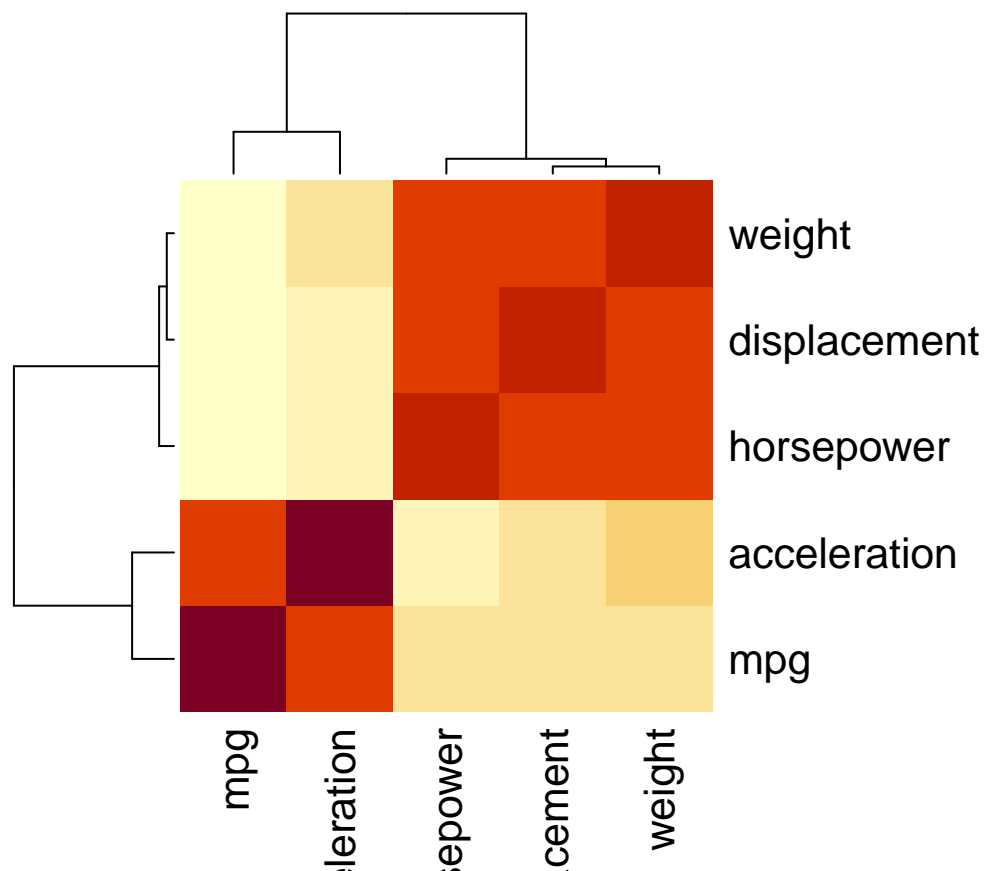
```
plot(F.cylinders, mpg, horizontal=T) # horizontal boxplot
```



```
pairs(~mpg+ displacement+horsepower+weight+acceleration, Auto)
pairs(Auto[,c(1,3,4,5,6)]) # same as above
```
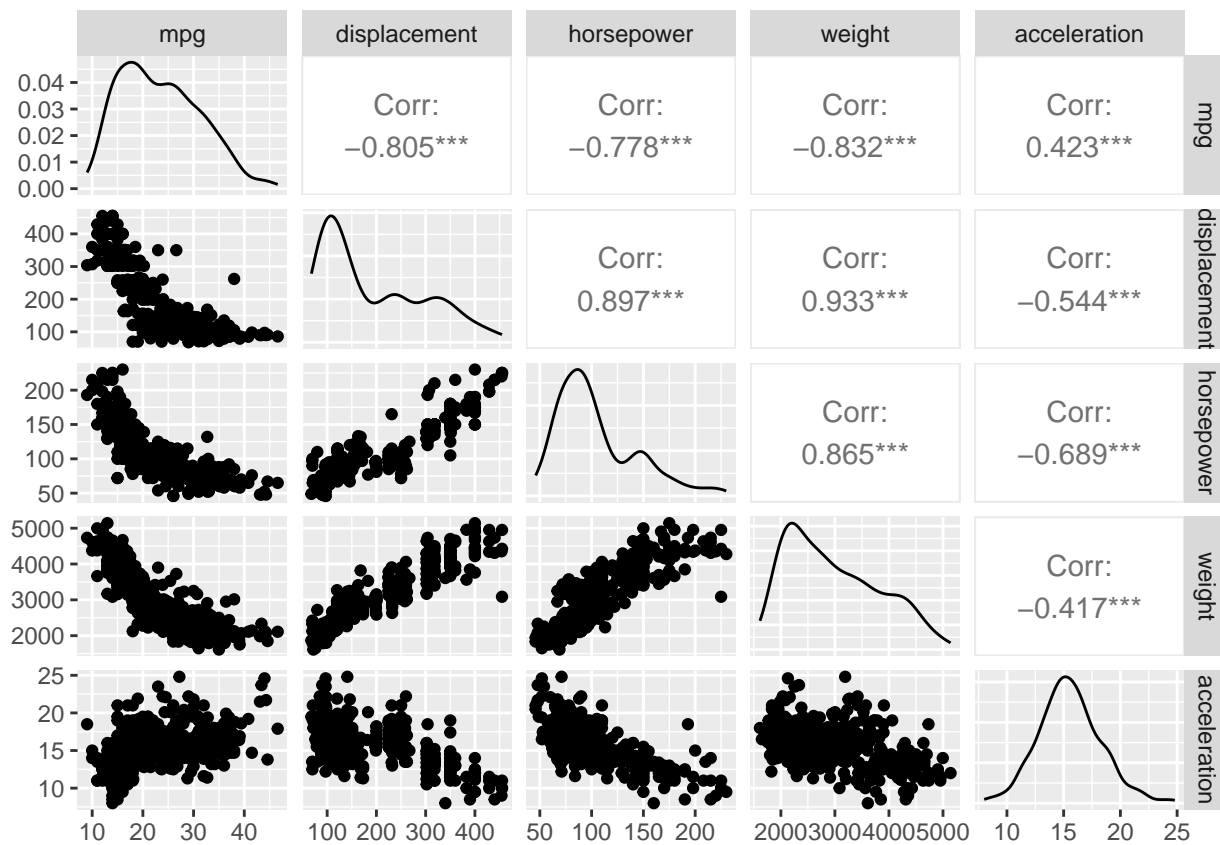
```r
detach(Auto)
heatmap(cor(Auto[,c(1,3,4,5,6)])) # correlogram (= correlation heatmap)
library(ggplot2)
```
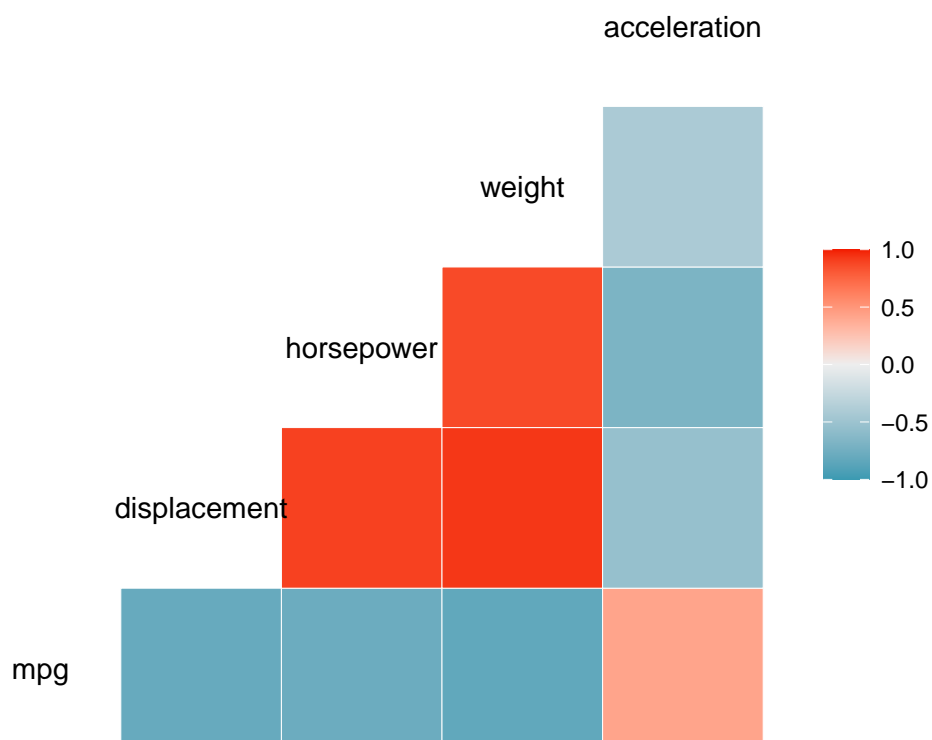


```r
library(GGally) # ggpairs, ggcorr
```

```
## Registered S3 method overwritten by 'GGally':
##   method from
##   +.gg   ggplot2
```

```r
ggpairs(Auto[,c(1,3,4,5,6)]) #pairwise plot
```
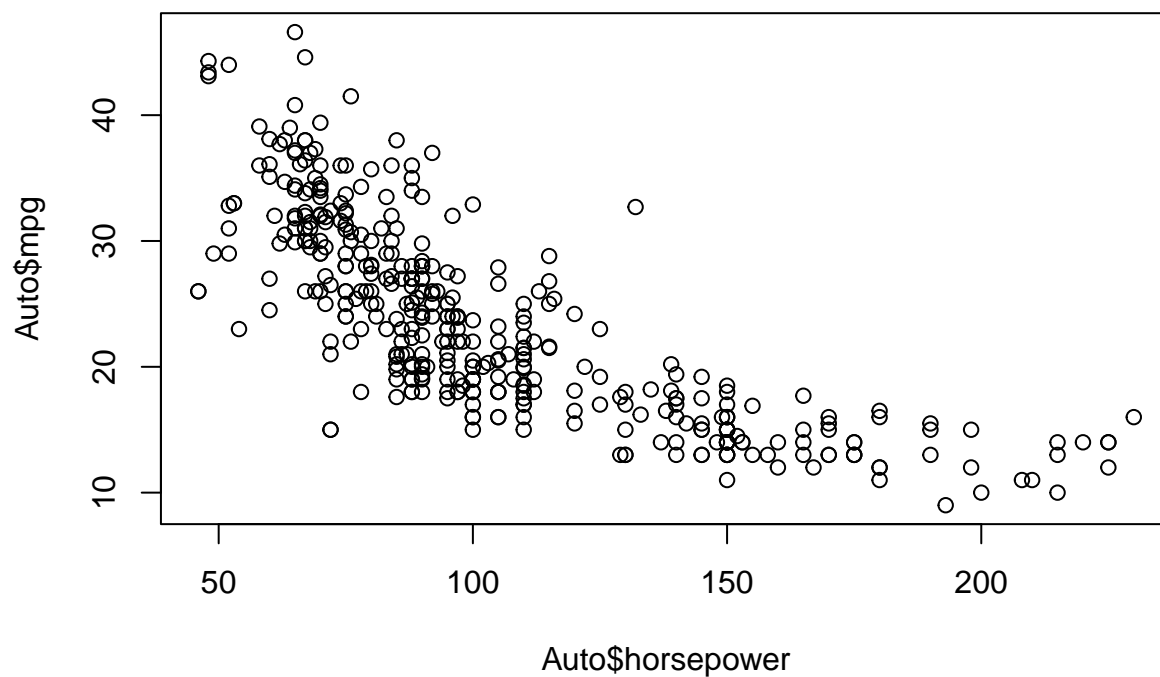
```
ggcorr(Auto[,c(1,3,4,5,6)]) # correlation heatmap
```

```
# type this code in console
plot(Auto$horsepower, Auto$mpg)
identify(Auto$horsepower, Auto$mpg, Auto$name) # show name of clicked obs on plot
```



```
## integer(0)
```

```
# type this code in console
plot(Auto$horsepower, Auto$mpg)
identify(Auto$horsepower, Auto$mpg, Auto$name) # show name of clicked obs on plot
```