Rmarkdown

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```
library(tidyverse)
```

```
## Warning: package 'tidyverse' was built under R version 4.1.1

## -- Attaching packages -------------------------------------- tidyverse 1.3.1 --

## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.3     v dplyr   1.0.7
## v tidyr   1.1.3     v stringr 1.4.0
## v readr   2.0.1     v forcats 0.5.1

## Warning: package 'ggplot2' was built under R version 4.1.1

## Warning: package 'tidyr' was built under R version 4.1.1

## Warning: package 'readr' was built under R version 4.1.1

## Warning: package 'purrr' was built under R version 4.1.1

## Warning: package 'dplyr' was built under R version 4.1.1

## Warning: package 'forcats' was built under R version 4.1.1

## -- Conflicts ------------------------------------------- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
#package needs to be installed on someone's local machine in order for this to work
# call built-in data mtcars.
data(mtcars)
#loads the mtcars data
```

```
# Select only car models where mpg<20
mtcars_mpg2 <- mtcars[mtcars$mpg < 20,]

nrow(mtcars_mpg2)
```

```
## [1] 18
```

```
#We learned that there are 18 cars where mpg is <20
```

```
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#package needs to be installed on someone's local machine in order for this to work
# call built-in data mtcars.
data(mtcars)
#loads the mtcars data
```

```
# Reduce the variables to mpg, cyl, disp, hp, gears
mtcars_mpg2 <- mtcars_mpg2[, c(1,2,3,4,10)]
```

```r
# read the R file hand_functions.R so that it can be used
# notice that with echo = TRUE
source(file = "hand_functions.R", echo = TRUE)

##
## > sum_special <- function(df_x) {
## +     try(if (!is.data.frame(df_x))
## +         stop("Input data must be a data frame."))
## +     sp_means <- apply(df_ .... [TRUNCATED]
# read the R file hand_functions.R so that it can be used
# notice that with echo = TRUE
source(file = "hand_functions.R", echo = TRUE)

##
## > sum_special <- function(df_x) {
## +     try(if (!is.data.frame(df_x))
## +         stop("Input data must be a data frame."))
## +     sp_means <- apply(df_ .... [TRUNCATED]
# Now use the function from hand_functions.R
#Need to make sure this is also in the project file for this to run

sp_out <- sum_special(mtcars_mpg2)

sp_out

## $sp_means
##        mpg         cyl        disp          hp        gear
##  15.900000    7.555556  313.811111  191.944444    3.444444
##
## $sp_var
##         mpg         cyl        disp          hp        gear
##   7.5258824    0.7320261 9438.7645752 3253.5849673   0.6143791
##
## $sp_cov
##              mpg         cyl       disp          hp        gear
## mpg     7.5258824  -1.3176471 -188.79529   -75.81176   0.6352941
## cyl    -1.3176471   0.7320261   64.71111    28.44444  -0.2614379
## disp -188.7952941  64.7111111 9438.76458  2679.60065 -34.1934641
## hp    -75.8117647  28.4444444 2679.60065  3253.58497  15.2026144
## gear    0.6352941  -0.2614379  -34.19346    15.20261   0.6143791
##
## $sp_cor
##             mpg         cyl        disp          hp        gear
## mpg   1.0000000  -0.5613802  -0.7083614  -0.4844811   0.2954459
## cyl  -0.5613802   1.0000000   0.7784989   0.5828450  -0.3898406
## disp -0.7083614   0.7784989   1.0000000   0.4835389  -0.4490217
## hp   -0.4844811   0.5828450   0.4835389   1.0000000   0.3400314
## gear  0.2954459  -0.3898406  -0.4490217   0.3400314   1.0000000
#The highest positively correlated variables are disp and cyl

#library(esquisse)
#
#esquisser(data = mtcars_mpg2, viewer = "browser")
```
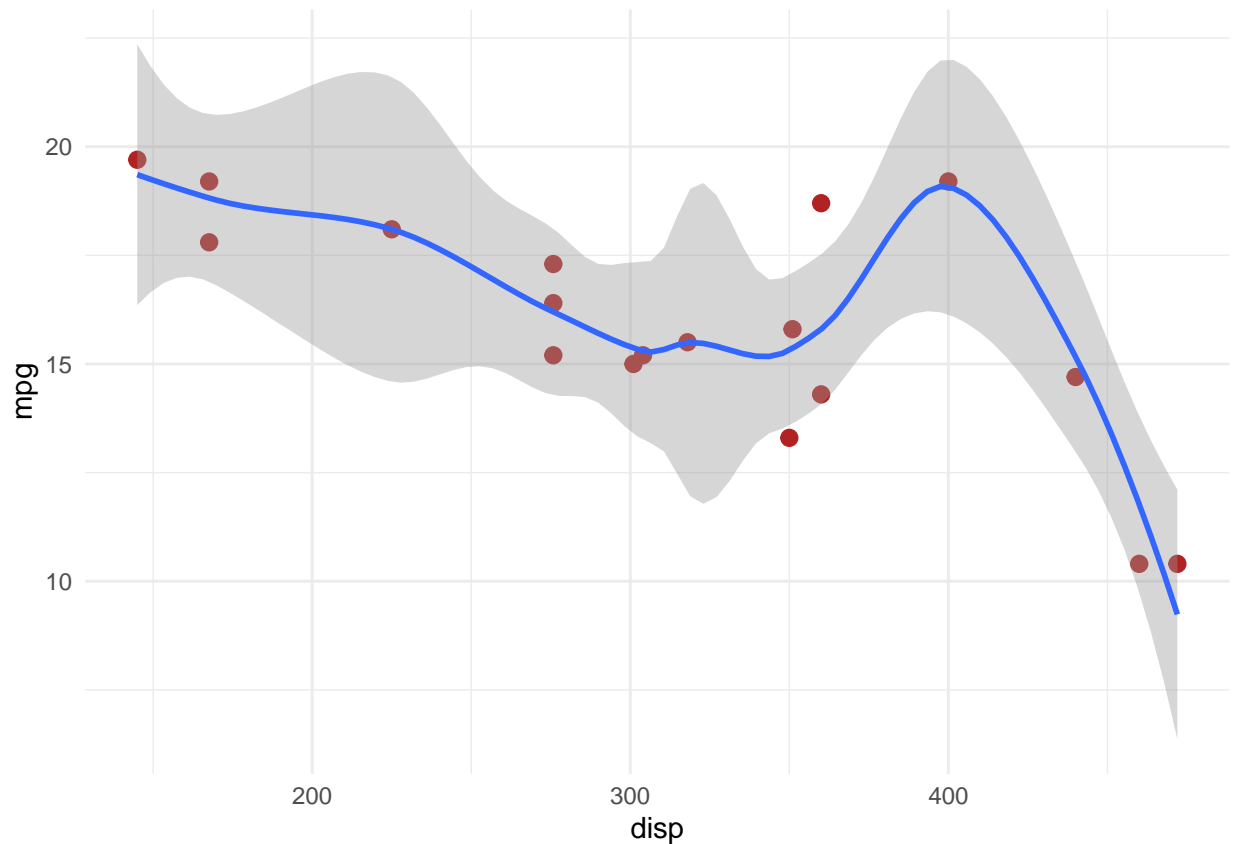
```
#This will also not work if someone doesn't have esquisse installed
```

```
ggplot(mtcars_mpg2) +
  aes(x = disp, y = mpg) +
  geom_point(shape = "bullet", size = 4L, colour = "#B22222") +
  geom_smooth(span = 0.5) +
  theme_minimal()
```
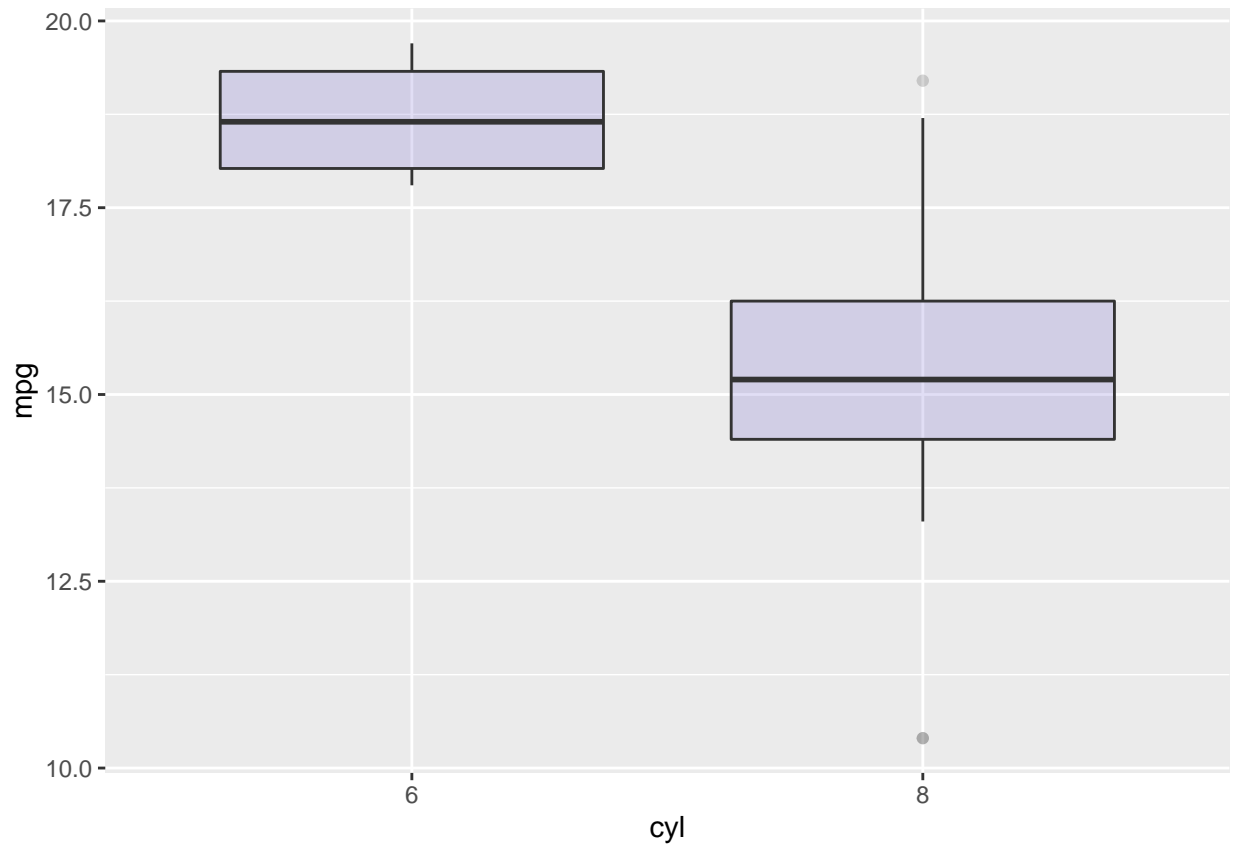
```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```



```
#mpg seems to trend downward as disp increases.
```

```
# note that this boxplot cannot be made with esquisse() unless
# the data is adjusted.  What adjustment is needed?
```

```
ggplot(mtcars_mpg2, aes(x=as.factor(cyl), y=mpg)) +
  geom_boxplot(fill="slateblue", alpha=0.2) +
  xlab("cyl")
```

#cylinders needs to be treated as a factor for this to work in esquisse