Project 1

Introduction

TODO

Data

TODO

Theory Used

TODO

Application of SLR to the mtcars data set

Making the SLR function: `myslr`

```r
myslr <- function(data,
                  y, yName,
                  x, xName,
                  sizeVar, sizeVarName,
                  colVar, colVarName,
                  titleVar)
{
  # Open Window to View Plot
    windows(title = "Linear Estimation Graph for Y on X")

  # Create Plot
    plot <- ggplot(
                   # Data
                   data,

                   # Aesthetic Mapping
                   aes(x, y,
                       color = colVar,
                       size  = sizeVar)) +

                   # Add Scatter Layer
                   geom_point(alpha = 2/5) +

                   # Add Linear Estimation
                   geom_smooth(method  = "lm",
                               formula = y ~ x,
                               color   = "grey35") +

                   # Titles
                   labs(title    = titleVar,
                        subtitle = " ",
                        x        = xName,
                        y        = yName,
                        col      = colVarName,
                        size     = sizeVarName) +

                   # Theme
                   theme_get()

  # show Plot
    print(plot)

  # Save plot
    ggsave(filename  = paste0(titleVar, ".png"),
           plot      = plot,
           height    = 8,
           width     = 8)
```

```r
# Linear Estimation and Summary Output

## Linear Regression (returned)
  y.lm <- lm(y ~ x)

## Linear Regression Output (void)
  summary(y.lm)

## Confidence Interval at 95% (void)
  ciReg(y.lm)

## Check assumptions and save .png
  png("Normal Interval Check.png", height = 300, width = 500)
  normcheck(y.lm)
  dev.off()

## Check residuals and save .png
  png("Fitted vs. residuals Plot.png", height = 300, width = 500)
  plot(y.lm, which = 1)
  dev.off()

## Linear Estimation
  return(y.lm)
}
```

Invoke SLR function using the `mtcars` dataset

```r
# Call Get Linear Estimation for y on x
  myslr(data = mtcars,
        mtcars$mpg,   "Miles per Gallon",
        mtcars$wt,    "Weight of Vehicle",
        mtcars$disp,  "Displacement (cub. inches)",
        mtcars$cyl,   "Number of Cylinders",
        "The Relationship between MPG and Weight of Vehicle")
```
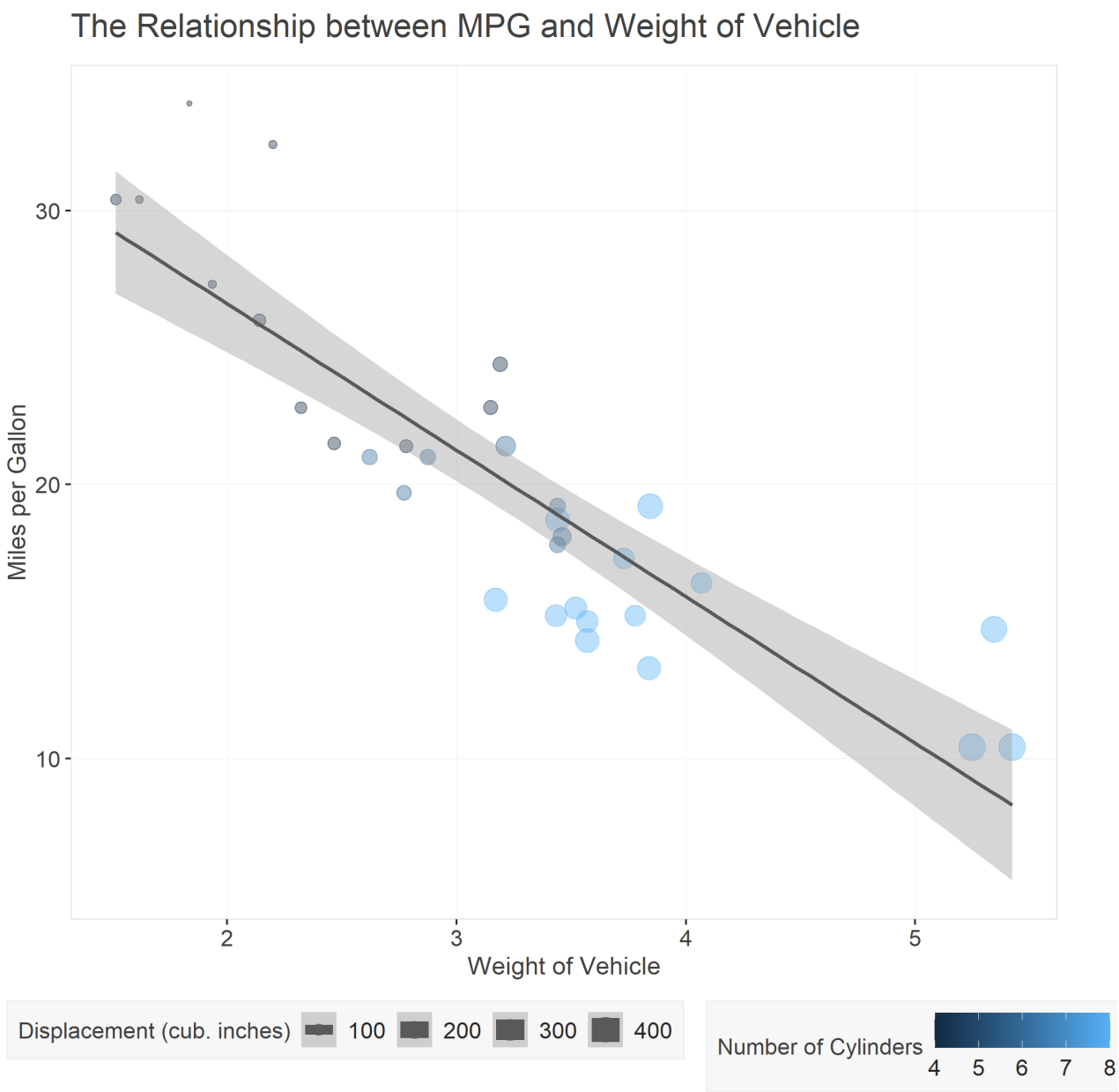
```
##              95 % C.I.lower    95 % C.I.upper
## (Intercept)       33.45050          41.11975
## x                 -6.48631          -4.20263

##
## Call:
## lm(formula = y ~ x)
##
## Coefficients:
## (Intercept)            x
##      37.285       -5.344
```
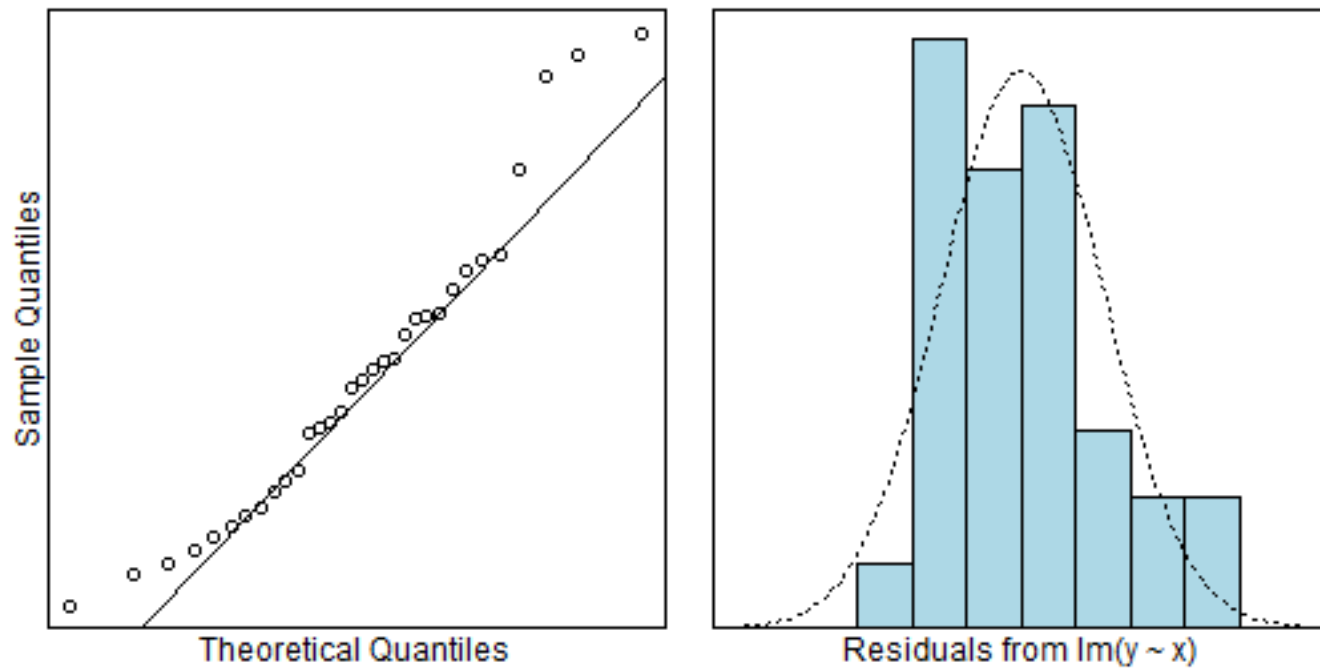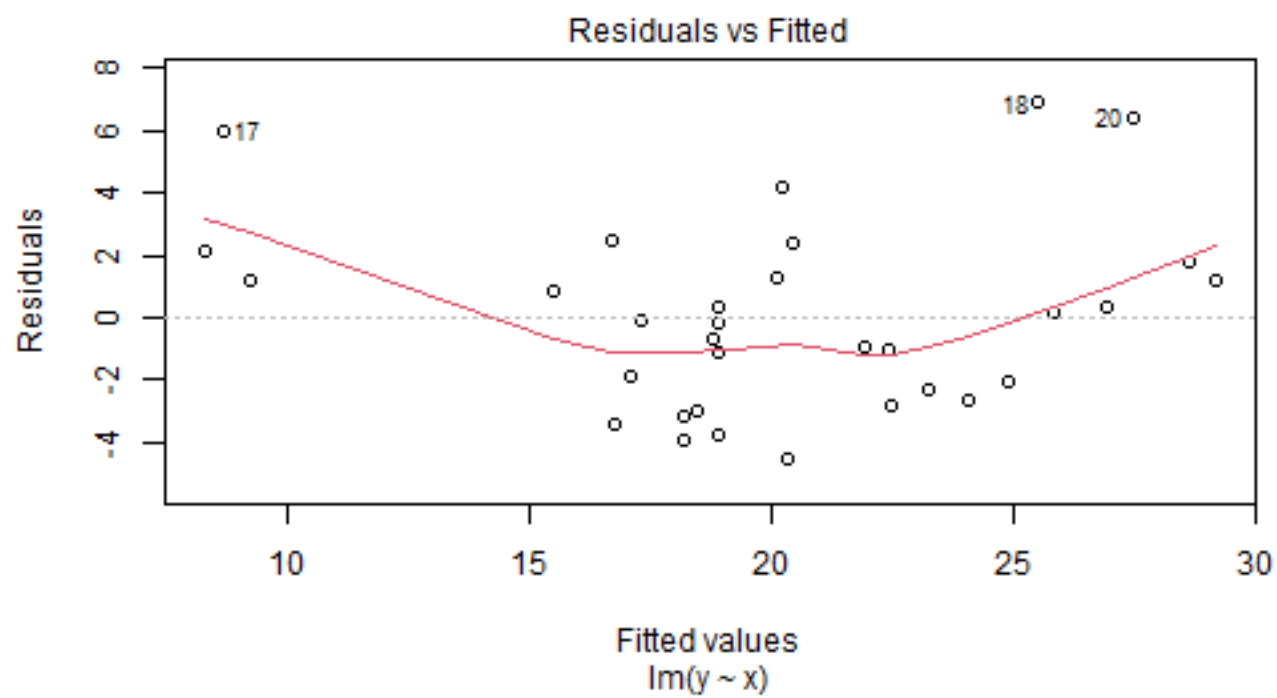
Plot Output

The Relationship between MPG and Weight of Vehicle

Normal Interval Check

Fitted vs. Residuals

Bootstrap ==