

# Assignment 5

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## Assignment 5

In this assignment, you will use R (within R-Studio) to:

- Load a built-in data set that comes with R
- Subset and access discrete elements of that data set
- Load a package and use a function from it to manipulate data
- Write edited data set to a new file
- Create and save simple data visualizations to image files

**All file paths should be relative, starting from the Assignment\_5 directory!! (where you found this file)**

**This means that you need to create a new R-Project named “Assignment\_5.Rproj” in your Assignment\_5 directory, and work from scripts within that.**

### For credit...

1. Push a completed version of your Rproj and R-script (details at end of this assignment) to GitHub
2. Your score will also depend on whether any files generated in this workflow are found in your repository
3. Upload a copy of your hp\_maximums.txt file to Canvas (see task 11 below)

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First, we can use the data() function to access and load a data set that comes with R.

```
data("mtcars")
str(mtcars)
```

```
## 'data.frame':   32 obs. of  11 variables:
## $ mpg : num  21 21 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 ...
## $ cyl : num   6  6  4  6  8  6  8  4  4  6 ...
## $ disp: num  160 160 108 258 360 ...
## $ hp  : num  110 110 93 110 175 105 245 62 95 123 ...
## $ drat: num   3.9 3.9 3.85 3.08 3.15 2.76 3.21 3.69 3.92 3.92 ...
## $ wt  : num   2.62 2.88 2.32 3.21 3.44 ...
## $ qsec: num  16.5 17 18.6 19.4 17 ...
## $ vs  : num   0  0  1  1  0  1  0  1  1  1 ...
## $ am  : num   1  1  1  0  0  0  0  0  0  0 ...
## $ gear: num   4  4  4  3  3  3  3  4  4  4 ...
## $ carb: num   4  4  1  1  2  1  4  2  2  4 ...
```

As you might be able to tell from the column names, this data set is all about fuel efficiency. 32 cars' fuel efficiency was measured along with 10 other variables. You can see what these are all about by using ? in front of the dataset name.

```
?mtcars
```

# Motor Trend Car Road Tests

## Description

The data was extracted from the 1974 Motor Trend US magazine, and comprises fuel consumption and 10 aspects of automobile design and performance for 32 automobiles (1973–74 models).

## Format

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x	
Column	Name Description
[, 1]	mpg Miles/(US) gallon
[, 2]	cyl Number of cylinders
[, 3]	disp Displacement (cu.in.)
[, 4]	hp Gross horsepower
[, 5]	drat Rear axle ratio
[, 6]	wt Weight (1000 lbs)
[, 7]	qsec 1/4 mile time
[, 8]	vs V/S
[, 9]	am Transmission (0 = automatic, 1 = manual)
[,10]	gear Number of forward gears
[,11]	carb Number of carburetors

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## Source

Henderson and Velleman (1981), Building multiple regression models interactively. Biometrics, 37, 391–411.

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## Your task is to Write an R script that:

1. loads the mtcars data set
2. subsets the mtcars dataframe to include only **automatic transmissions**
3. saves this new subset as a new file called “automatic\_mtcars.csv” in your Assignment\_5 directory
4. plots the effect of horsepower on miles-per-gallon (update plot to have meaningful labels and title)
5. saves this plot as a png image called “mpg\_vs\_hp\_auto.png” in your Assignment\_5 directory
6. plots the effect of weight on miles-per-gallon (with improved labels, again)
7. saves this second plot as a **tiff** image called “mpg\_vs\_wt\_auto.tiff” in your Assignment\_5 directory
8. subsets the original mtcars dataframe to include only cars with displacements less than or equal to 200 cu.in.
9. saves that new subset as a csv file called mtcars\_max200\_displ.csv
10. includes code to calculate the maximum horsepower for each of the three dataframes (original, automatic, max200)
11. prints these calculations (from task 10) in a readable format to a new plaintext file called hp\_maximums.txt