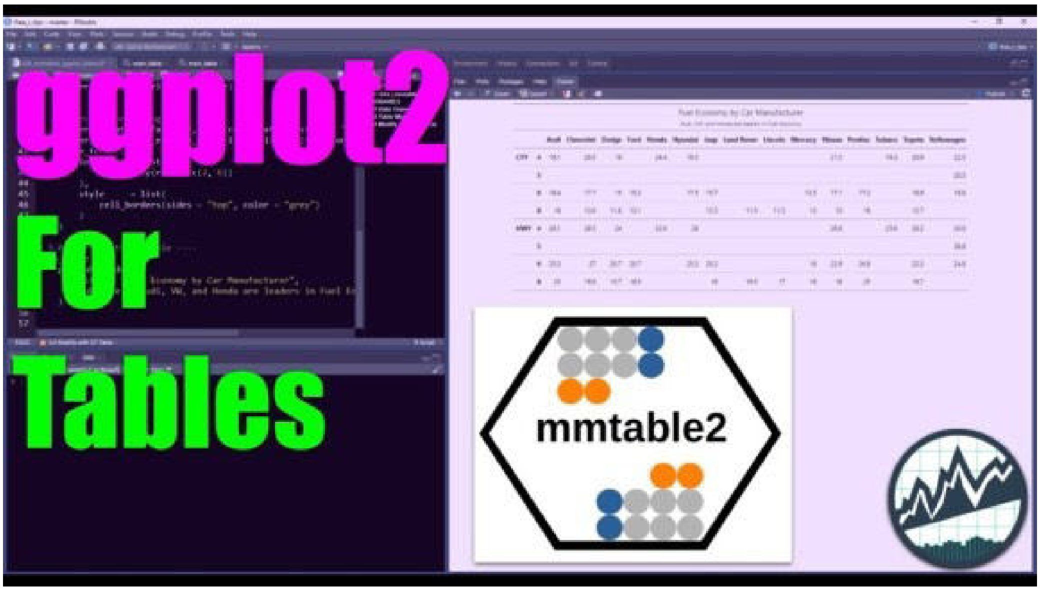
mmtable2
A ggplot2-syntax for making tables



(Click image to play tutorial)

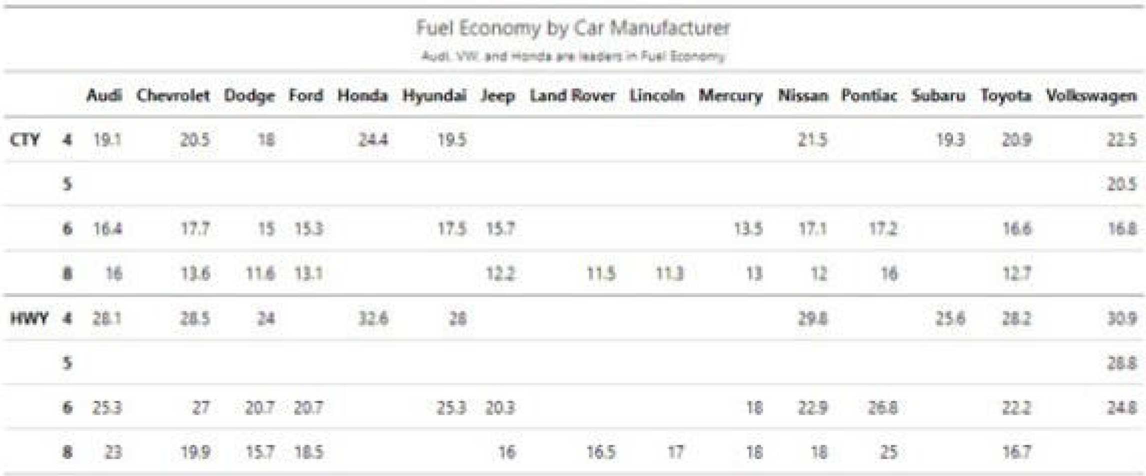
mmtable2
This R package uses **ggplot2 syntax** to create great tables

I love `ggplot2` for plotting. The grammar of graphics allows us to add elements to plots. Tables seem to be forgotten in terms of an intuitive grammar with tidy data philosophy – Until now. `mmtable2` aims to be the ggplot2 for tables, leveraging the awesome GT table package.

The `mmtable2` package aims to make it easy to create tables by:

1. **Using a ggplot2-style syntax for using a grammar of table operations.**
2. **Extends the amazing GT table package.**

Here's what we're making today:



Fuel Economy by Car Manufacturer

Audi, VW, and Honda are leaders in Fuel Economy

		Audi	Chevrolet	Dodge	Ford	Honda	Hyundai	Jeep	Land Rover	Lincoln	Mercury	Nissan	Pontiac	Subaru	Toyota	Volkswagen
CTY	4	19.1	20.5	18		24.4	19.5					21.5		19.3	20.9	22.5
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	8	16	13.6	11.6	13.1			12.2	11.5	11.3	13	12	16		12.7	
HWY	4	28.1	28.5	24		32.6	28					29.8		25.6	28.2	30.9
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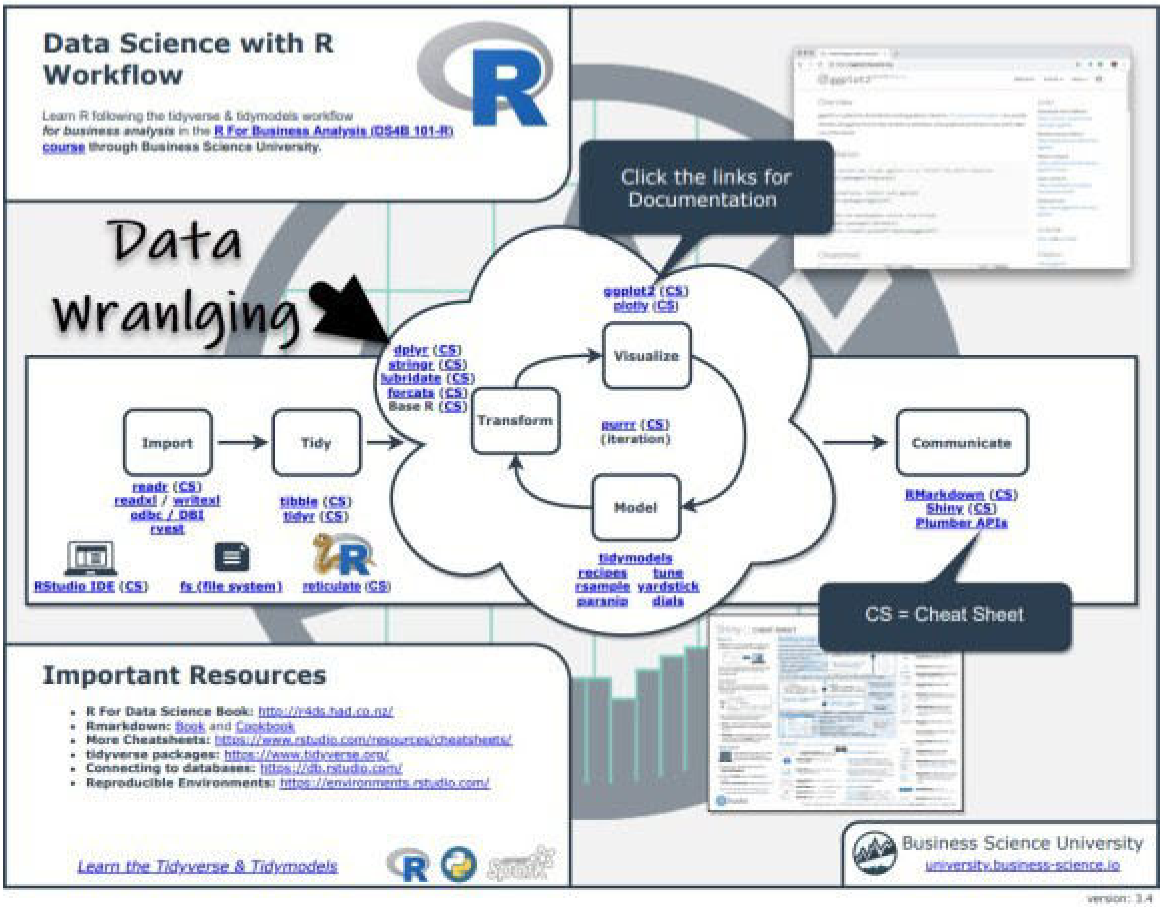
	6	25.3	27	20.7	20.7		25.3	20.3			18	22.9	26.8		22.2	24.8
	8	23	19.9	15.7	18.5			16	16.5	17	18	18	25		16.7	

Make professional tables using a ggplot-syntax

Before we get started, get the Cheat Sheet

`mmtable2` is great for making tables fast. But, you'll still need to learn how to wrangle data. For those topics, I'll use the Ultimate R Cheat Sheet to refer to `dplyr` code in my workflow.

Quick example – Clicking the "CS" next to "dplyr" opens the Data Transformation with Dplyr Cheat Sheet.



Data Science with R Workflow

Learn R following the tidyverse & tidymodels workflow *for business analysis* in the R For Business Analysis (DS4B 101-R) course through Business Science University.

Important Resources

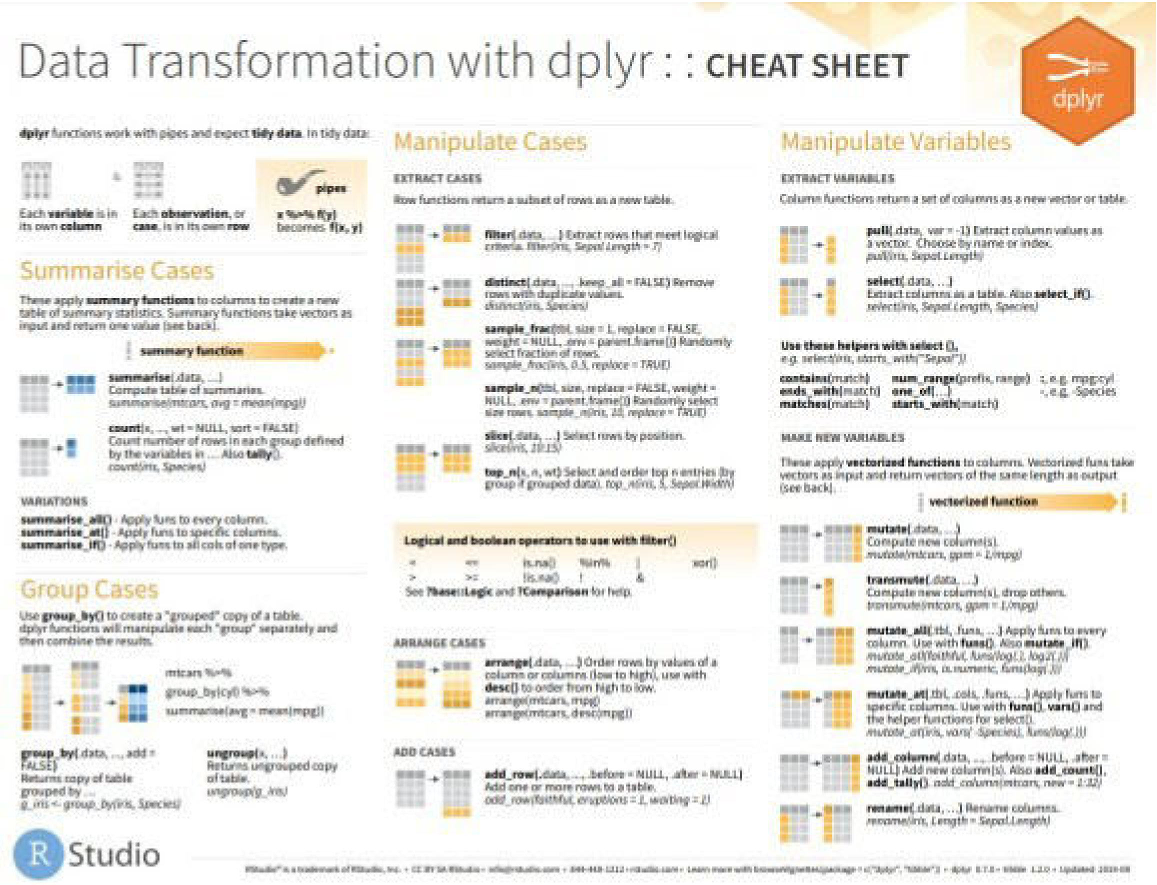
- R For Data Science Book: http://r4ds.had.co.nz/
- Rmarkdown: Book and Cookbook
- More Cheatsheets: https://www.rstudio.com/resources/cheatsheets/
- tidyverse packages: https://www.tidyverse.org/
- Connecting to databases: https://db.rstudio.com/
- Reproducible Environments: https://environments.rstudio.com/

Learn the Tidyverse & Tidymodels

Business Science University
university.business-science.io

version: 3.4

Now you're ready to quickly reference `dplyr` functions. Ok, onto the tutorial.



Data Transformation with dplyr : : CHEAT SHEET

dplyr functions work with pipes and expect **tidy data**. In tidy data:

Each **variable** is in its own **column** & Each **observation**, or **case**, is in its own **row**

pipes

x %>% f(y) becomes f(x, y)

Summarise Cases

These apply **summary functions** to columns to create a new table of summary statistics. Summary functions take vectors as input and return one value (see back).

summary function

summarise(.data, ...)
Compute table of summaries.
summarise(mtcars, avg = mean(mpg))

count(x, ..., wt = NULL, sort = FALSE)
Count number of rows in each group defined by the variables in ... Also **tally**().
count(iris, Species)

VARIATIONS

summarise_all() - Apply funs to every column.
summarise_at() - Apply funs to specific columns.
summarise_if() - Apply funs to all cols of one type.

Group Cases

Use **group_by**() to create a "grouped" copy of a table. dplyr functions will manipulate each "group" separately and then combine the results.

mtcars %>%
group_by(cyl) %>%
summarise(avg = mean(mpg))

group_by(.data, ..., add = FALSE)
Returns copy of table grouped by ...
g_iris <- group_by(iris, Species)

ungroup(x, ...)
Returns ungrouped copy of table.
ungroup(g_iris)

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Manipulate Cases

EXTRACT CASES

Row functions return a subset of rows as a new table.

filter(.data, ...) Extract rows that meet logical criteria. *filter(iris, Sepal.Length > 7)*

distinct(.data, ..., .keep_all = FALSE) Remove rows with duplicate values.
distinct(iris, Species)

sample_frac(tbl, size = 1, replace = FALSE, weight = NULL, .env = parent.frame()) Randomly select fraction of rows.
sample_frac(iris, 0.5, replace = TRUE)

sample_n(tbl, size, replace = FALSE, weight = NULL, .env = parent.frame()) Randomly select size rows. *sample_n(iris, 10, replace = TRUE)*

slice(.data, ...) Select rows by position.
slice(iris, 10:15)

top_n(x, n, wt) Select and order top n entries (by group if grouped data). *top_n(iris, 5, Sepal.Width)*

Logical and boolean operators to use with filter()

<	<=	is.na()	%in%	|	xor()
>	>=	!is.na()	!	&	

See **?base::Logic** and **?Comparison** for help.

ARRANGE CASES

arrange(.data, ...) Order rows by values of a column or columns (low to high), use with **desc**() to order from high to low.
arrange(mtcars, mpg)
arrange(mtcars, desc(mpg))

ADD CASES

add_row(.data, ..., .before = NULL, .after = NULL)
Add one or more rows to a table.
add_row(faithful, eruptions = 1, waiting = 1)

Manipulate Variables

dplyr

EXTRACT VARIABLES

Column functions return a set of columns as a new vector or table.

pull(.data, var = -1) Extract column values as a vector. Choose by name or index.
pull(iris, Sepal.Length)

select(.data, ...)
Extract columns as a table. Also **select_if**().
select(iris, Sepal.Length, Species)

Use these helpers with select (),
e.g. select(iris, starts_with("Sepal"))

contains(match) **num_range**(prefix, range) :, e.g. mpg:cyl
ends_with(match) **one_of**(...) -, e.g. -Species
matches(match) **starts_with**(match)

MAKE NEW VARIABLES

These apply **vectorized functions** to columns. Vectorized funs take vectors as input and return vectors of the same length as output (see back).

vectorized function

mutate(.data, ...)
Compute new column(s).
mutate(mtcars, gpm = 1/mpg)

transmute(.data, ...)
Compute new column(s), drop others.
transmute(mtcars, gpm = 1/mpg)

mutate_all(.tbl, .funs, ...) Apply funs to every column. Use with **funs**(). Also **mutate_if**().
mutate_all(faithful, funs(log(.), log2(.)))
mutate_if(iris, is.numeric, funs(log(.)))

mutate_at(.tbl, .cols, .funs, ...) Apply funs to specific columns. Use with **funs**(), **vars**() and the helper functions for select().
mutate_at(iris, vars(-Species), funs(log(.)))

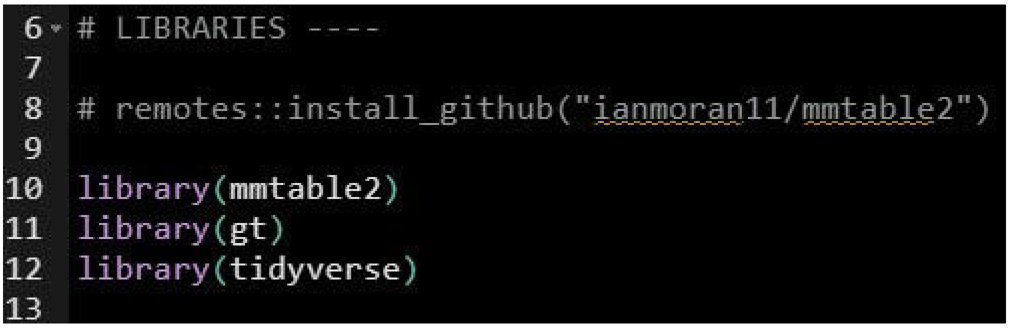
add_column(.data, ..., .before = NULL, .after = NULL) Add new column(s). Also **add_count**(), **add_tally**(). *add_column(mtcars, new = 1:32)*

rename(.data, ...) Rename columns.
rename(iris, Length = Sepal.Length)

RStudio® is a trademark of RStudio, Inc. • CC BY SA RStudio • info@rstudio.com • 844-448-1212 • rstudio.com • Learn more with browseVignettes(package = c("dplyr", "tibble")) • dplyr 0.7.0 • tibble 1.2.0 • Updated: [illegible]

Step 1: Load Libraries

The libraries we'll need today are mmtable2, gt, and tidyverse. As of this post, mmtable2 is not on CRAN so you'll need to install with github.



```
# LIBRARIES ----

# remotes::install_github("ianmoran11/mmtable2")

library(mmtable2)
library(gt)
library(tidyverse)

```

Step 2: Wrangle Data into Long Format

Like `ggplot2, mmtable2` standardizes on the long-format (tidy-data format). According to the tidyr vignette:

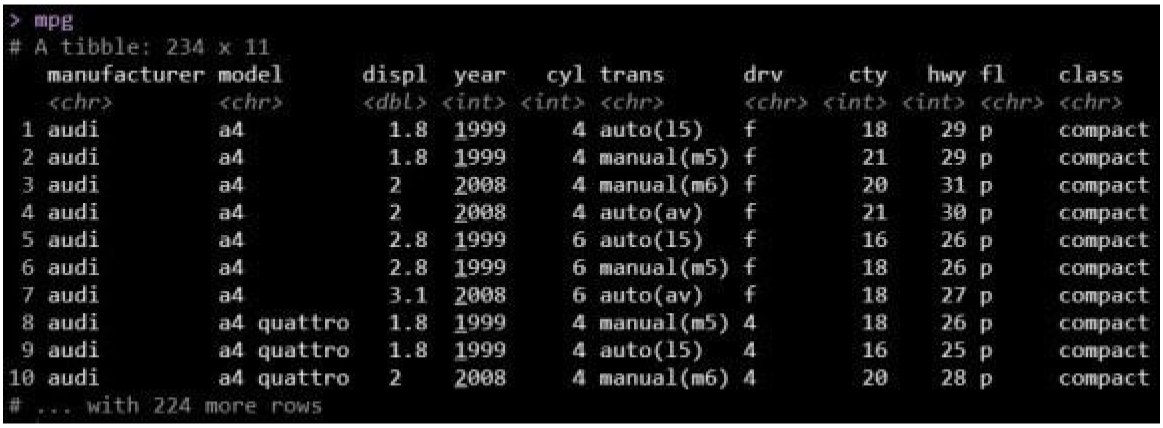
In **tidy data**:

1. Every column is a variable.
2. Every row is an observation.
3. Every cell is a single value.

To achieve the "tidy-data" format we need to leverage dplyr and tidyr (use the Ultimate R Cheatsheet to pull up data wrangling doc's).

A. We start with Raw Data

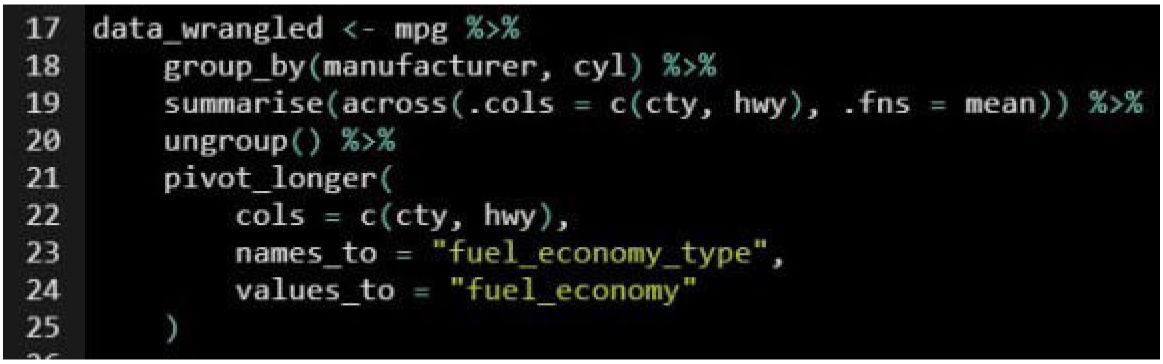
This is the mpg data set, which contains fuel economy and other attributes on a number of automobile manufacturers and car models.



```
> mpg
# A tibble: 234 x 11
   manufacturer model      displ  year   cyl trans      drv     cty   hwy fl    class  
   <chr>        <chr>      <dbl> <int> <int> <chr>      <chr> <int> <int> <chr> <chr>  
 1 audi         a4           1.8  1999     4 auto(l5)   f        18    29 p     compact
 2 audi         a4           1.8  1999     4 manual(m5) f        21    29 p     compact
 3 audi         a4           2    2008     4 manual(m6) f        20    31 p     compact
 4 audi         a4           2    2008     4 auto(av)   f        21    30 p     compact
 5 audi         a4           2.8  1999     6 auto(l5)   f        16    26 p     compact
 6 audi         a4           2.8  1999     6 manual(m5) f        18    26 p     compact
 7 audi         a4           3.1  2008     6 auto(av)   f        18    27 p     compact
 8 audi         a4 quattro   1.8  1999     4 manual(m5) 4        18    26 p     compact
 9 audi         a4 quattro   1.8  1999     4 auto(l5)   4        16    25 p     compact
10 audi         a4 quattro   2    2008     4 manual(m6) 4        20    28 p     compact
# ... with 224 more rows
```

B. We tidy with dplyr and tidyr

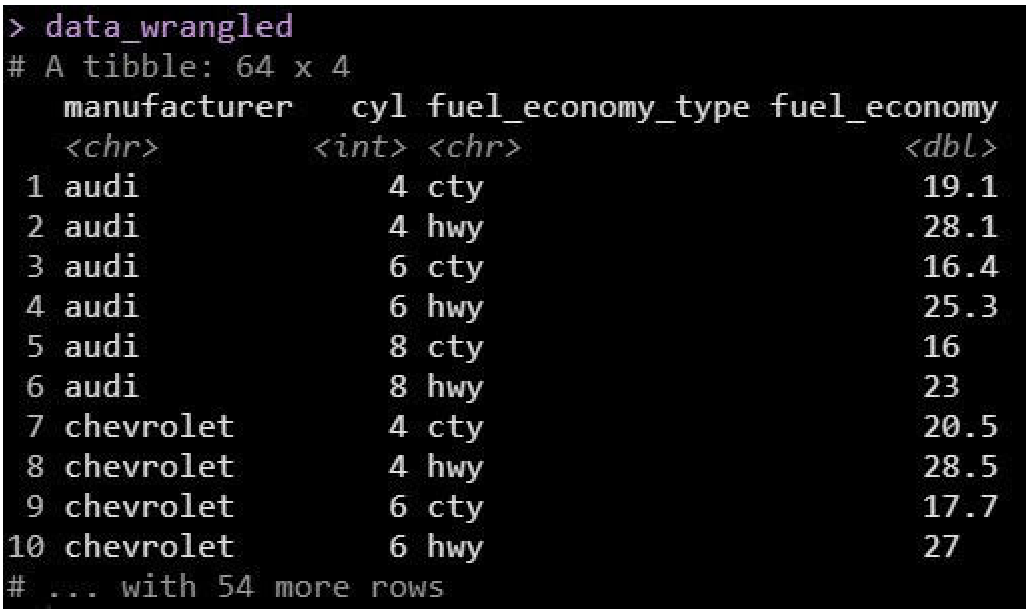
This is a standard data wrangling operation. I teach data wrangling in-depth in the R for Business Analysis course.



```
data_wrangled <- mpg %>%
    group_by(manufacturer, cyl) %>%
    summarise(across(.cols = c(cty, hwy), .fns = mean)) %>%
    ungroup() %>%
    pivot_longer(
        cols = c(cty, hwy),
        names_to = "fuel_economy_type",
        values_to = "fuel_economy"
    )
```

C. And we output “tidy data”

The data is now in “tidy” format, ready for making a table. Every column is a variable, every row is an observation, every cell is a single value.



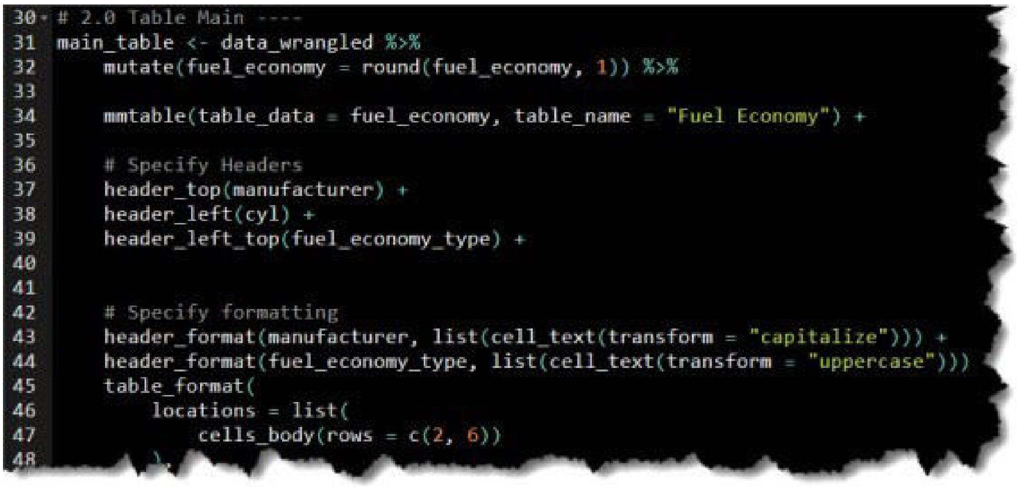
```
> data_wrangled
# A tibble: 64 x 4
   manufacturer   cyl fuel_economy_type fuel_economy
   <chr>        <int> <chr>                    <dbl>
 1 audi             4 cty                       19.1
 2 audi             4 hwy                       28.1
 3 audi             6 cty                       16.4
 4 audi             6 hwy                       25.3
 5 audi             8 cty                       16  
 6 audi             8 hwy                       23  
 7 chevrolet        4 cty                       20.5
 8 chevrolet        4 hwy                       28.5
 9 chevrolet        6 cty                       17.7
10 chevrolet        6 hwy                       27  
# ... with 54 more rows
```

Get the Code

Step 3: Make the table with mmtable2

The data is now wrangled into the tidy format. We can use `mmtable2` to make the plot. To see mmtable2 in action, I have a full-tutorial on YouTube. The important points are:

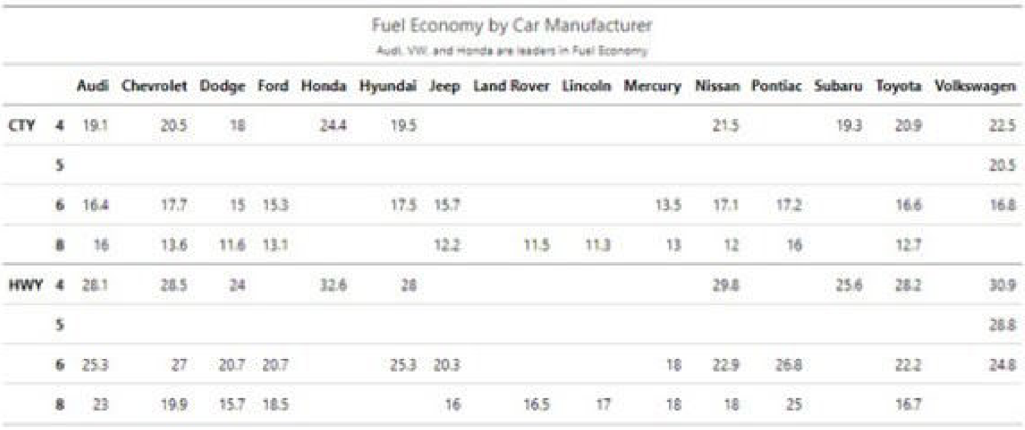
- **mmtable()** – The main argument (other than the incoming data) is our value column. In our case it's fuel_economy, the measure of average vehicle fuel efficiency.
- **Header Top and Header Top Left** – These add column headers from features.
- **Head Left and Header Left Top** – These add row headers from features.
- **Header Format and Table Format** – These allow you to apply GT formatting functions.



```
# 2.0 Table Main ----
main_table <- data_wrangled %>%
    mutate(fuel_economy = round(fuel_economy, 1)) %>%

    mmtable(table_data = fuel_economy, table_name = "Fuel Economy") +

    # Specify Headers
    header_top(manufacturer) +
    header_left(cyl) +
    header_left_top(fuel_economy_type) +


    # Specify formatting
    header_format(manufacturer, list(cell_text(transform = "capitalize"))) +
    header_format(fuel_economy_type, list(cell_text(transform = "uppercase")))
    table_format(
        locations = list(
            cells_body(rows = c(2, 6))
        ),
```

Get the Code

And here is the professional table that was created, perfect for reports.



Fuel Economy by Car Manufacturer

Audi, VW, and Honda are leaders in Fuel Economy

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	8	23	19.9	15.7	18.5			16	16.5	17	18	18	25		16.7	

Code available in our Free R-Tips Github Repository

In Summary

You just quickly made a professional table using the ggplot2-style table package, **mmtable2**. This is an amazing accomplishment!!

You should be proud.