Welcome to the Tidy Tools Workshop!

1. Get connected to the wifi:
2. Get the course materials
   `usethis::use_course("rstd.io/tidytools19")`
3. Check you have the needed packages by running `setup.R`
4. Stuck? Please ask for help!

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Preliminaries

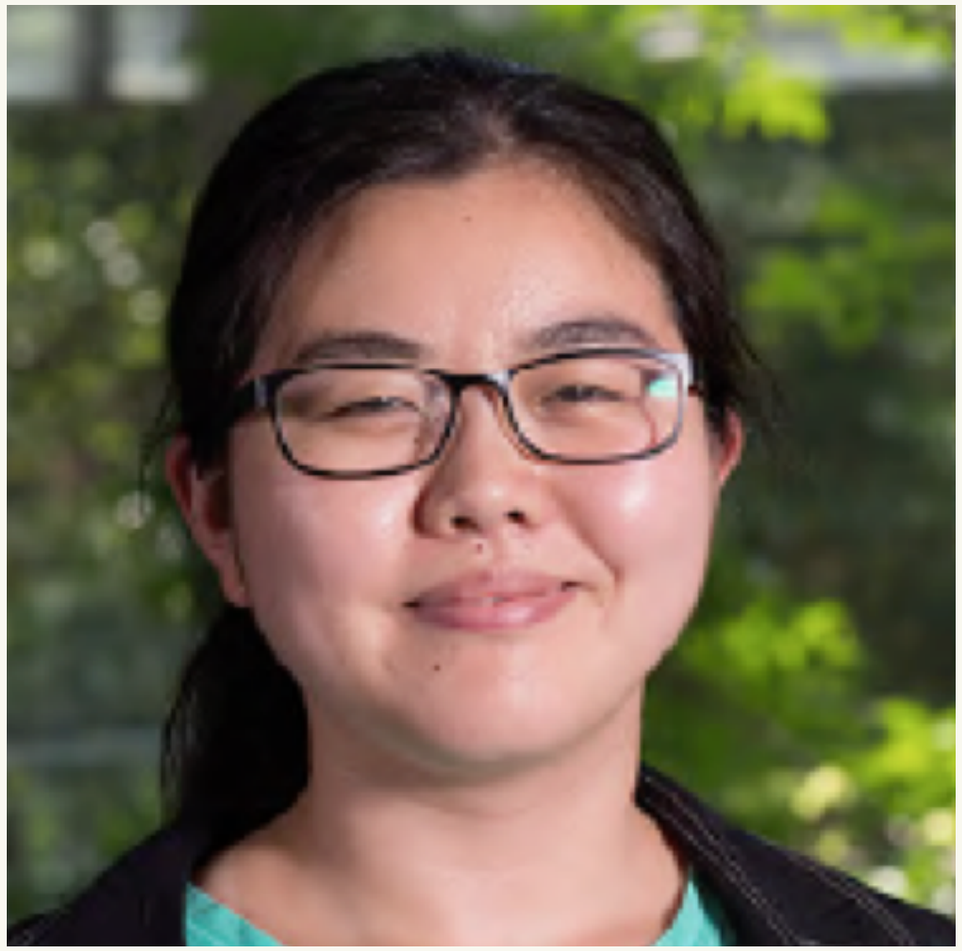
Get materials: `usethis::use_course("rstd.io/tidytools19")`

HELLO my name is

Hadley

data science ⟷ software engineering

Get materials: `usethis::use_course("rstd.io/tidytools19")`



Emi Tanaka
School of Mathematics and Statistics,
The University of Sydney

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Danielle Navarro

School of Psychology, University of New South Wales

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Your turn

This course is very hands on, and while we're here to help you, the best resource is often the person sitting next to you.

This means that you have to work!

Introduce yourself to your neighbours. Who are you and what are you using R for?

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Goal: help build tidy **tools**

Writing functions

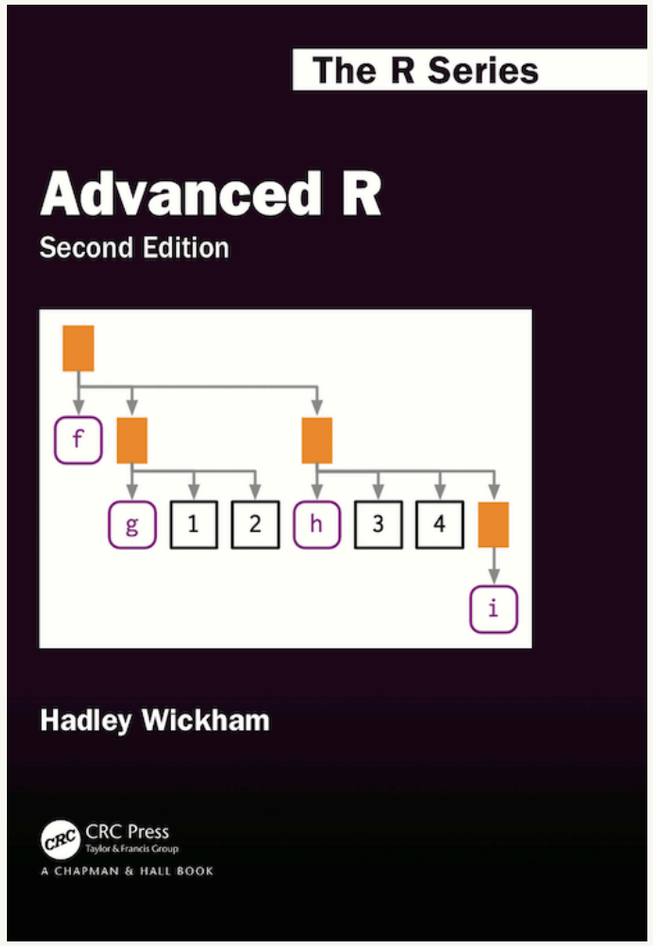
Individual functions to solve individual problems

Designing APIs

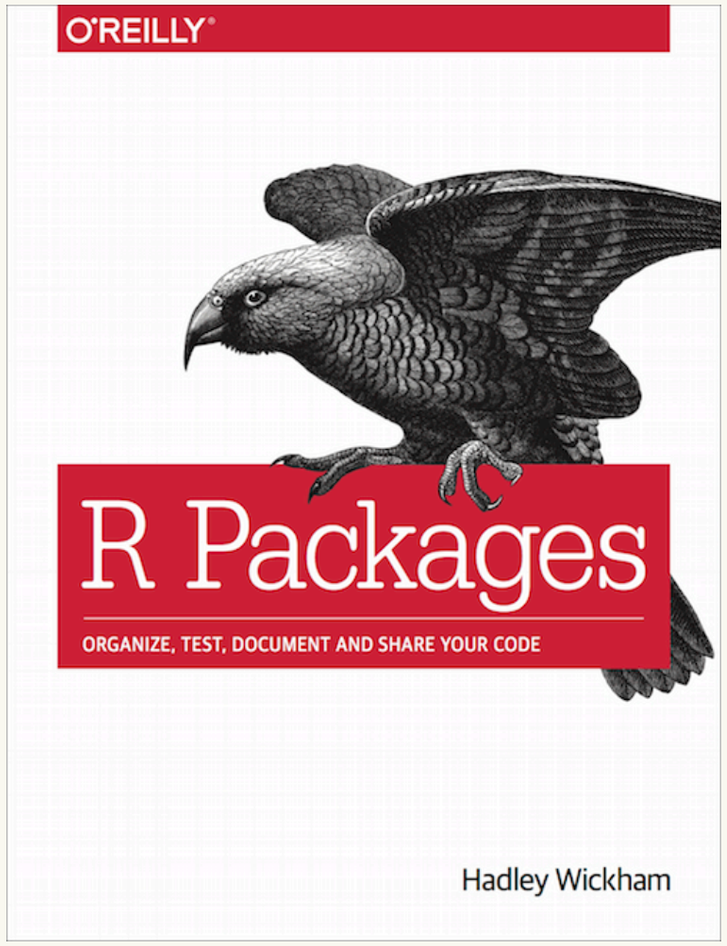
Family of functions that work together to solve family of problems

Get materials: `usethis::use_course("rstd.io/tidytools19")`

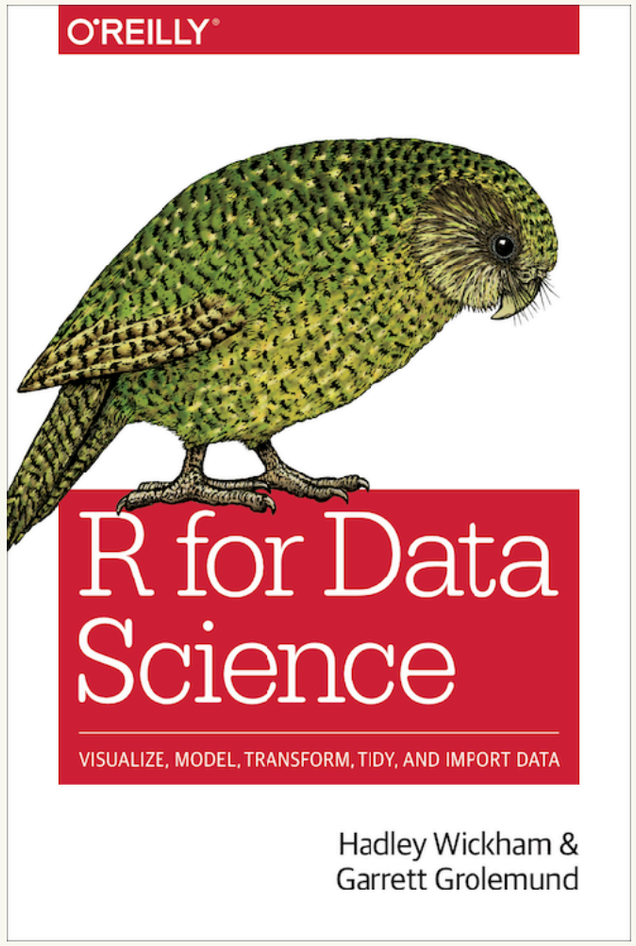
Much of the course is drawn from existing books



http://adv-r.hadley.nz/



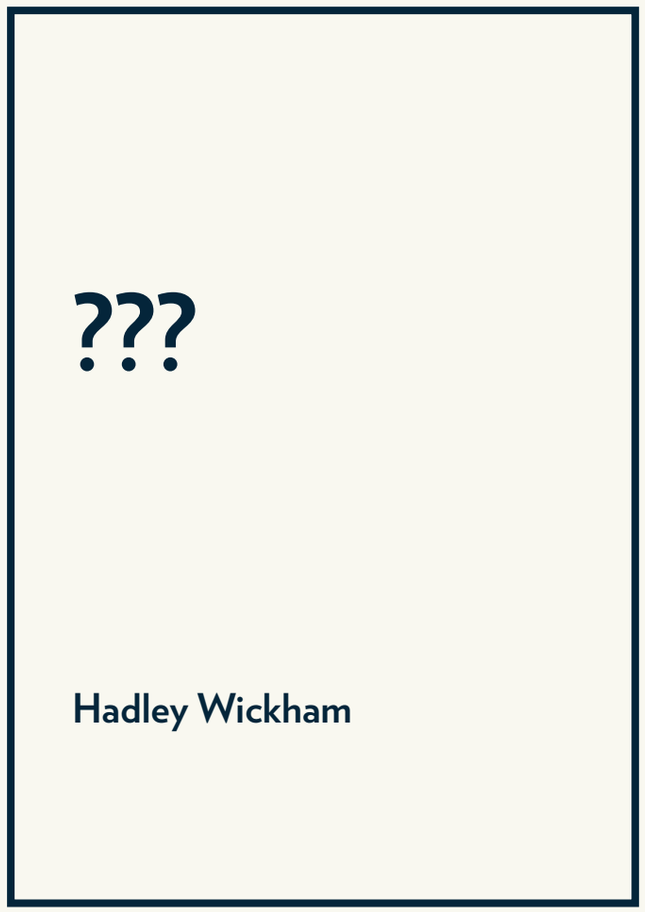
http://r-pkgs.had.co.nz



http://r4ds.had.co.nz

Get materials: `usethis::use_course("rstd.io/tidytools19")`

But the primary book does not yet exist



https://principles.tidyverse.org

How to solve real problems with R

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Schedule

Day 1	Day 2
Package basics	**Errors**
Morning tea	Morning tea
Testing	**Object Oriented Programming**
Lunch	Lunch
API Design	**Tidy Evaluation**
Afternoon tea	Afternoon tea
Functional Programming	**Document/Share**

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Warmups

Don’t expect to know all the answers!

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Your turn

What are the four common types of atomic vectors? (Bonus points for the two uncommon types)

What are the three fundamental properties of a vector?

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Four common types: logical, integer, double, character

```
typeof(TRUE)
typeof(1L)
typeof(1.5)
typeof("a")
```

```
# We'll talk about this (S3) later:
typeof(factor(1:10))
typeof(Sys.Date())
```

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Every vector has three properties:

```
x <- 1:5


# 1. Type:
typeof(x)


# 2. Length
length(x)


# 3. Attributes
attributes(x)
# (we'll come back to those later)
```

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Missing values

What does NA == NA return? Why?

What should you use instead?

Get materials: `usethis::use_course("rstd.io/tidytools19")`

There isn't a single unknown value

```
age_john <- NA
age_mary <- NA
age_john == age_mary

is.na(x)
```

Get materials: `usethis::use_course("rstd.io/tidytools19")`

```
sum(is.na(x))
mean(is.na(x))
```

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Your turn

What are the six types of thing that you can put inside []?

Get materials: `usethis::use_course("rstd.io/tidytools19")`

blank	include all
integer	**+ve**: include **0**: drop all **-ve**: exclude
logical	keep TRUEs
character	lookup by name

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Use character subsetting for simple look ups

```
x <- c("m", "f", "u", "f", "f", "m", "m")
lookup <- c(m = "Male", f = "Female", u = NA)
lookup[x]

unname(lookup[x])
```

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Your turn

```
x <- runif(1e6)
lobstr::obj_size(x)
#> 8,000,040 B
```

https://lobstr.r-lib.org/

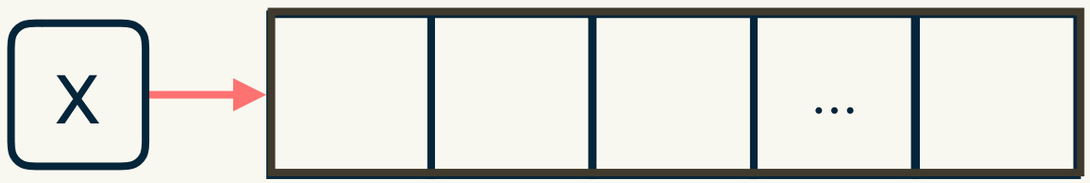
```
y <- list(x, x, x)
lobstr::obj_size(y)
#> ???

y[[1]][[1]] <- NA
lobstr::obj_size(y)
#> ???
```

Get materials: `usethis::use_course("rstd.io/tidytools19")`

A name is a reference to a value

```
x <- runif(1e6)
```



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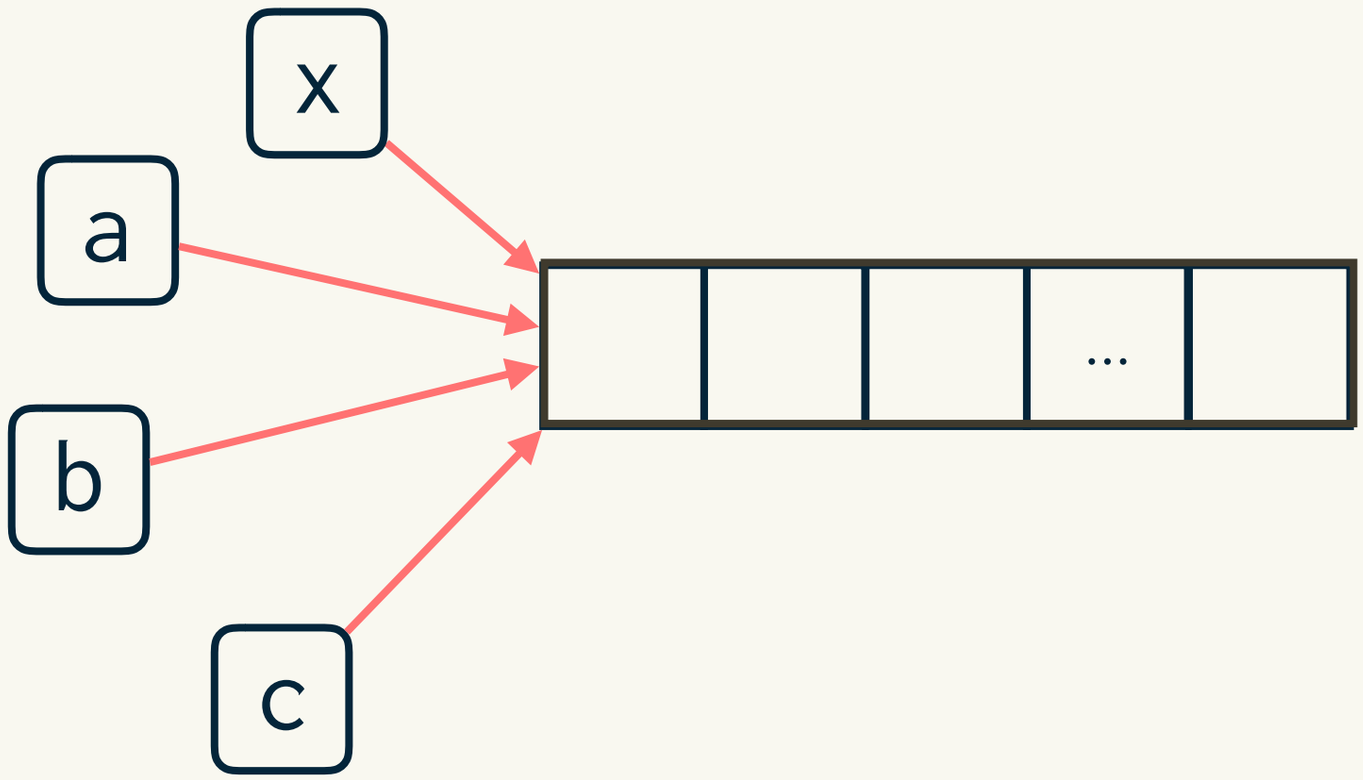
Many references can point to one object

```
a <- b <- c <- x
```



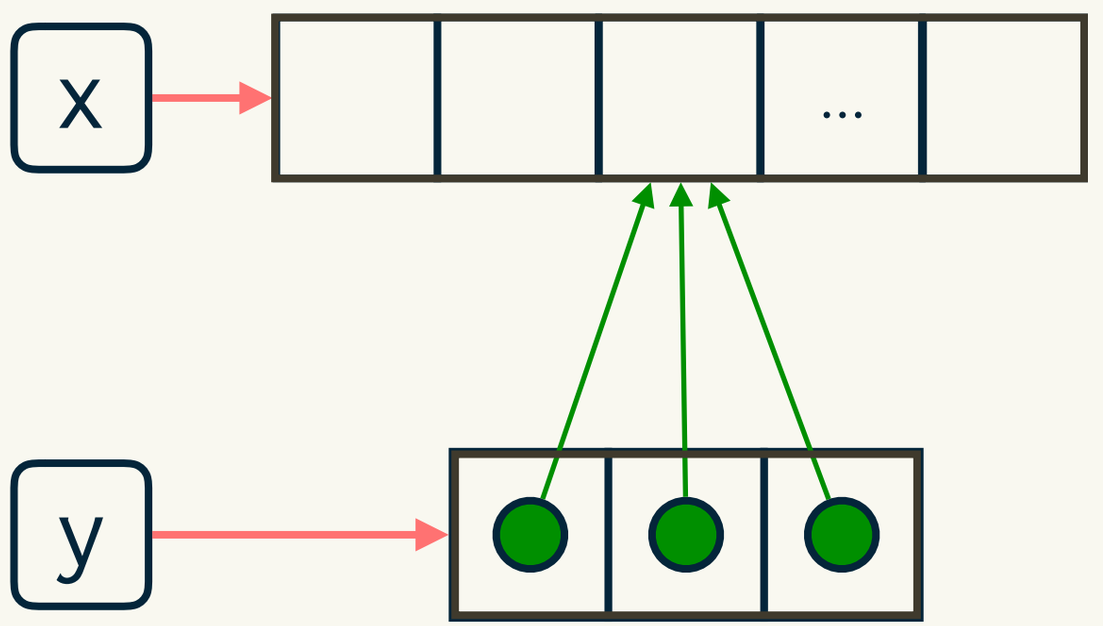
How big is **a**?
How big is **b**?
How big are **a** and **b** together?

Get materials: `usethis::use_course("rstd.io/tidytools19")`

Elements of lists are also references

```
y <- list(x, x, x)
```

How big is **x**? How big is **y**? How big are **x** and **y** together?



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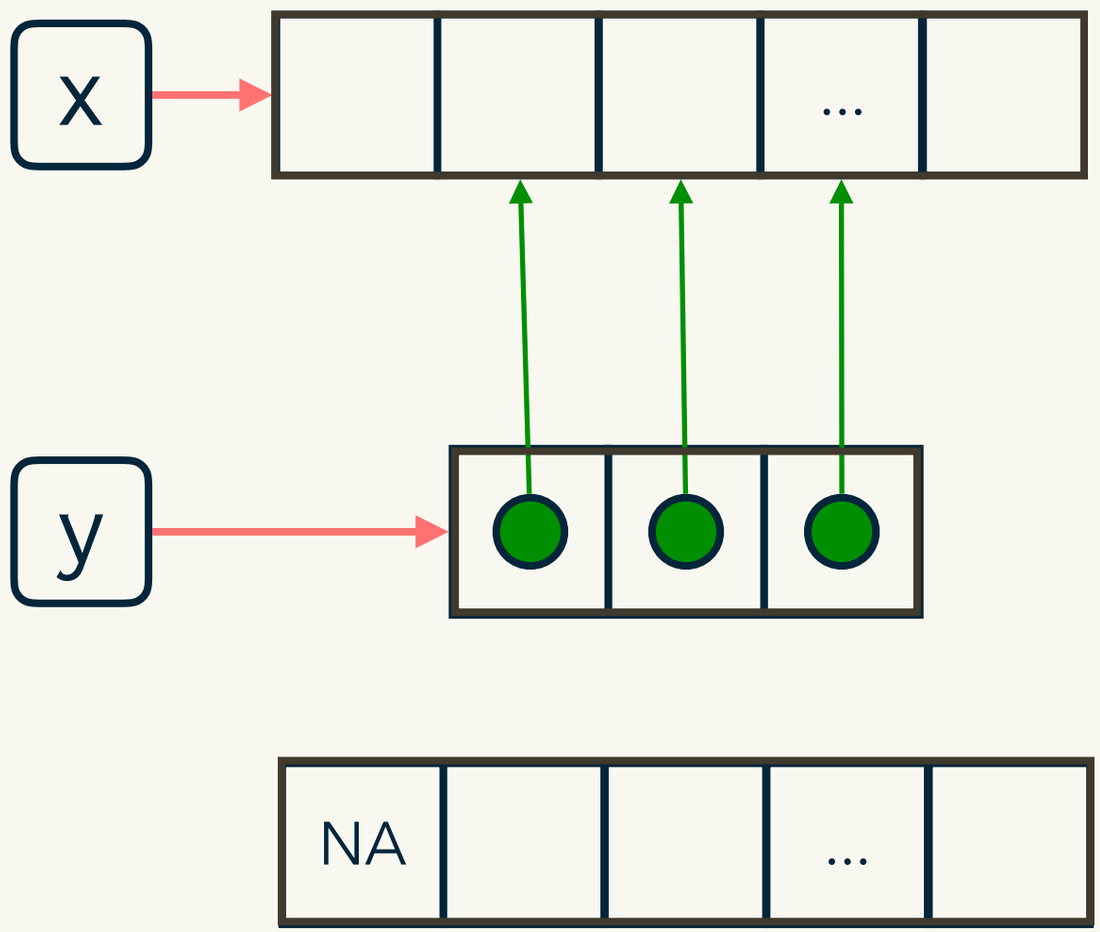
Modifying an object creates a copy

```
y[[1]][[1]] <- NA
```



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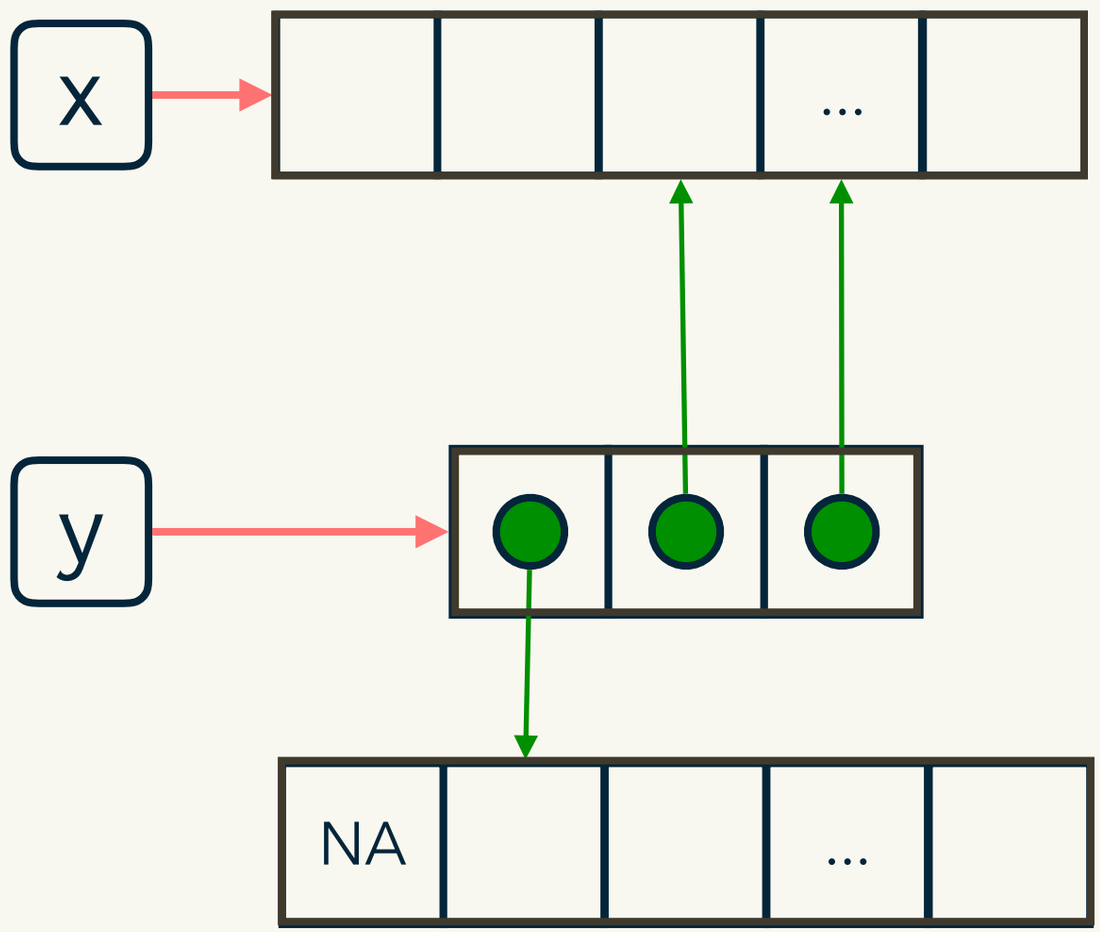

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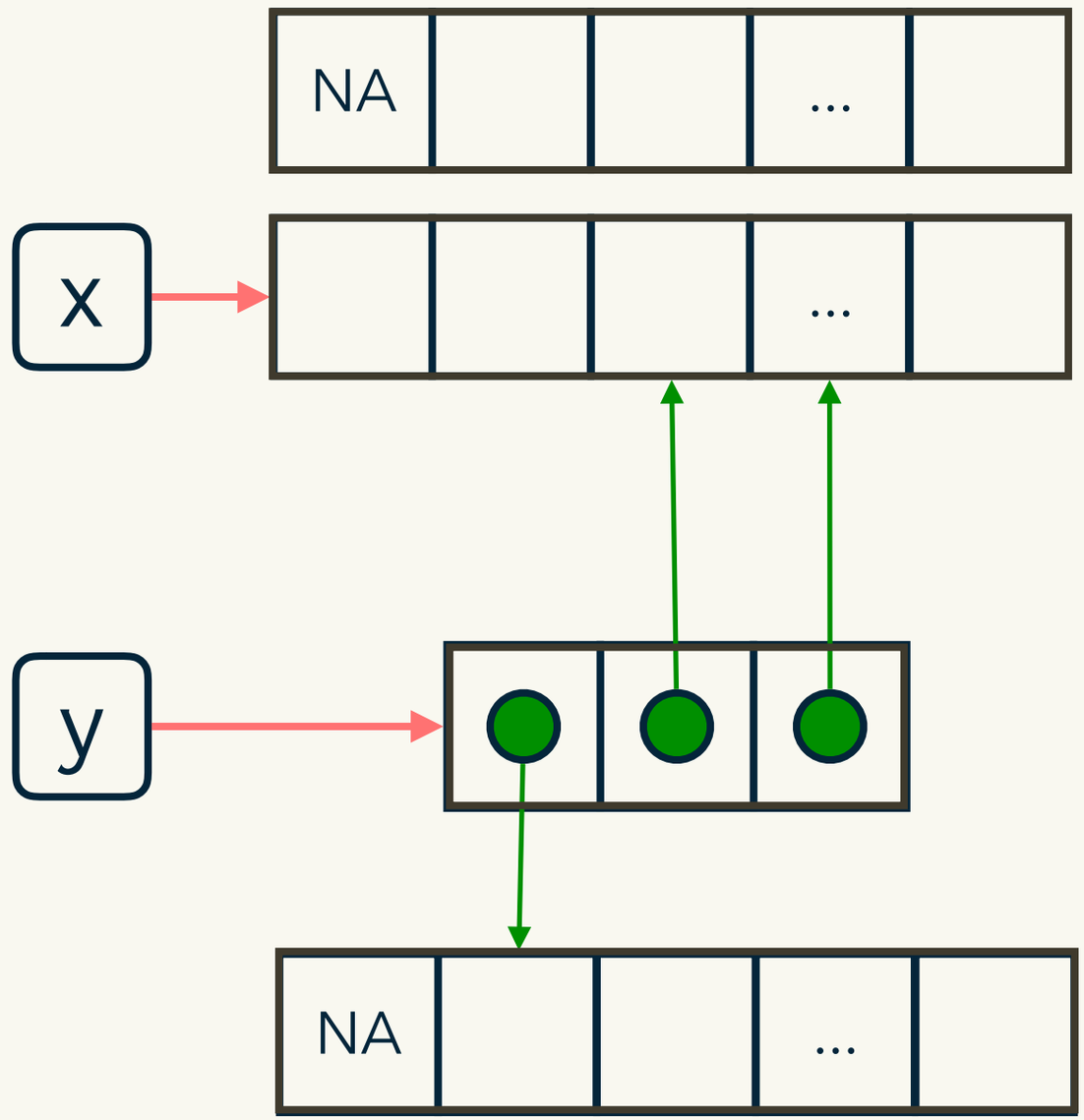

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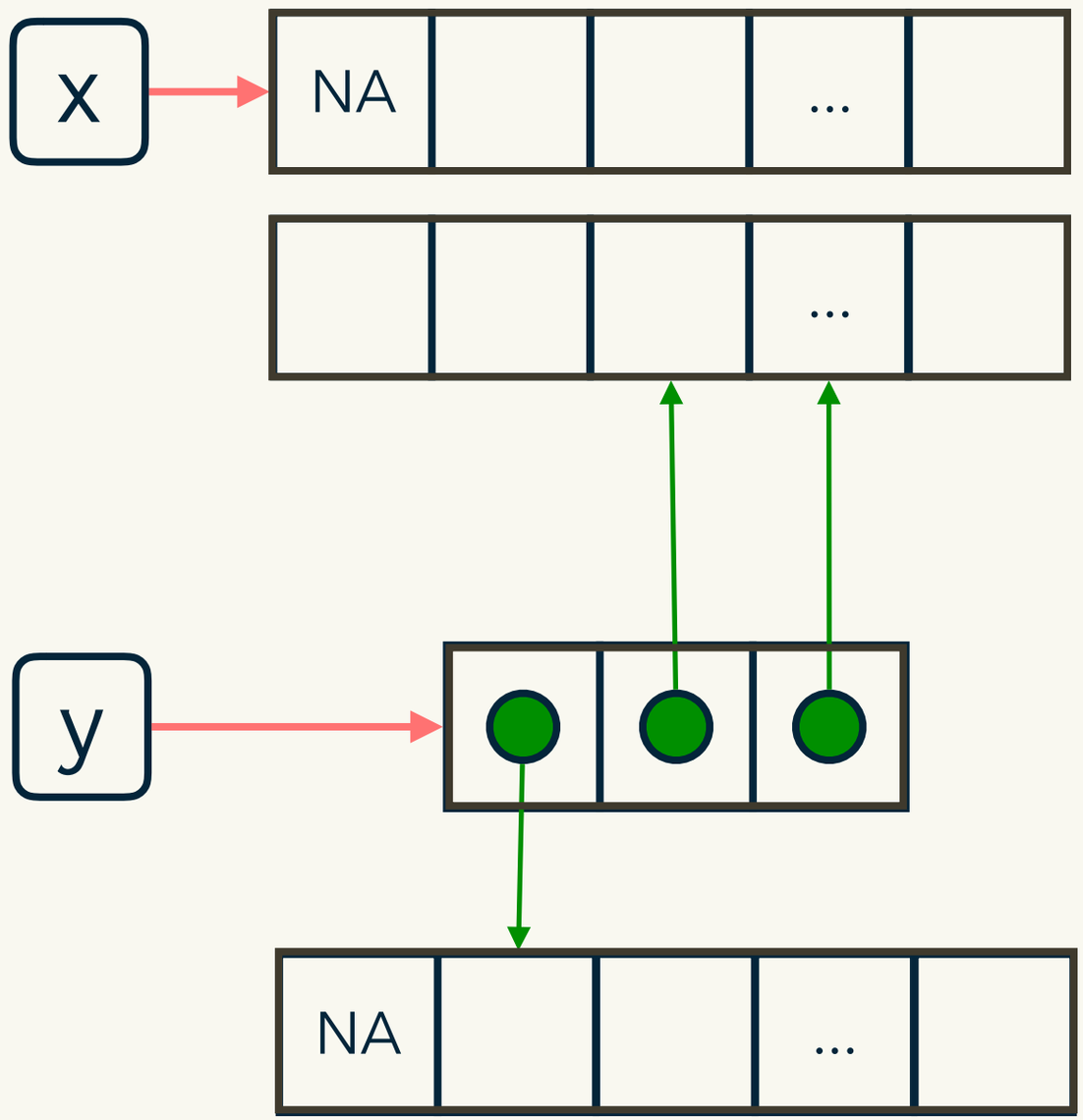

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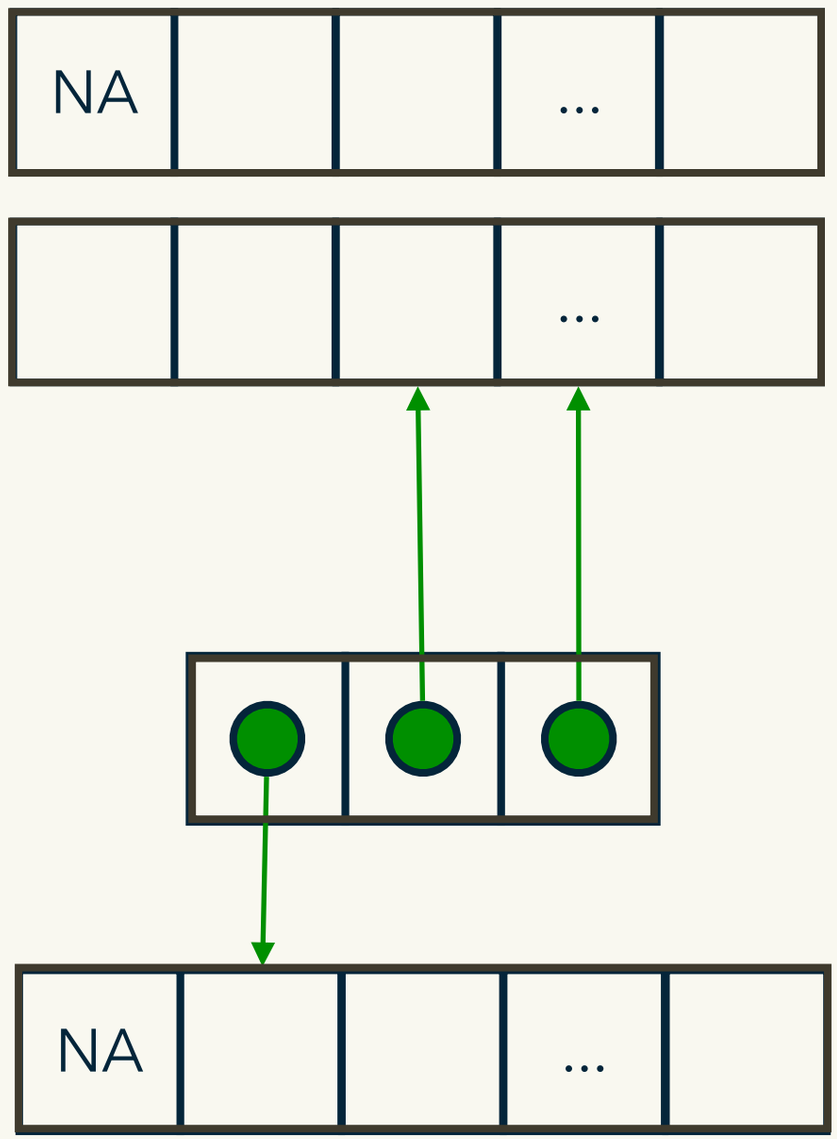
rm() removes references

```
rm(x, y)
```



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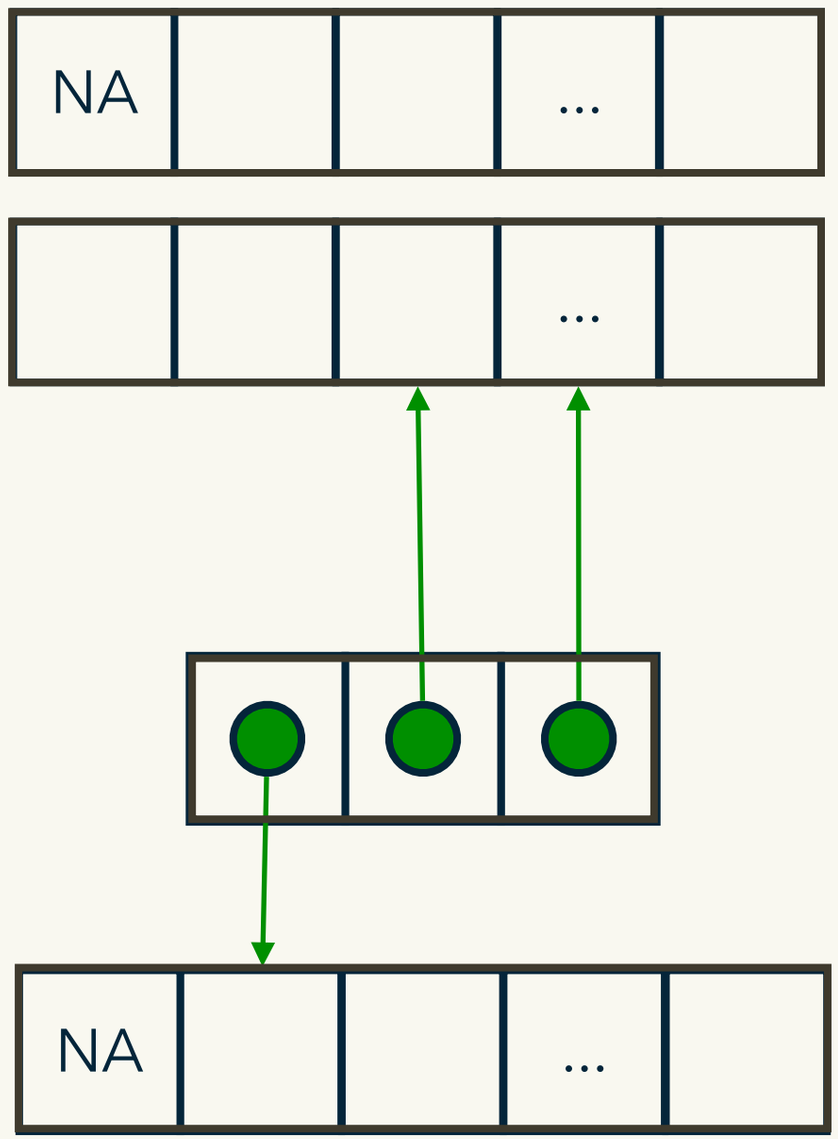
The garbage collector removes values



Get materials: `usethis::use_course("rstd.io/tidytools19")`

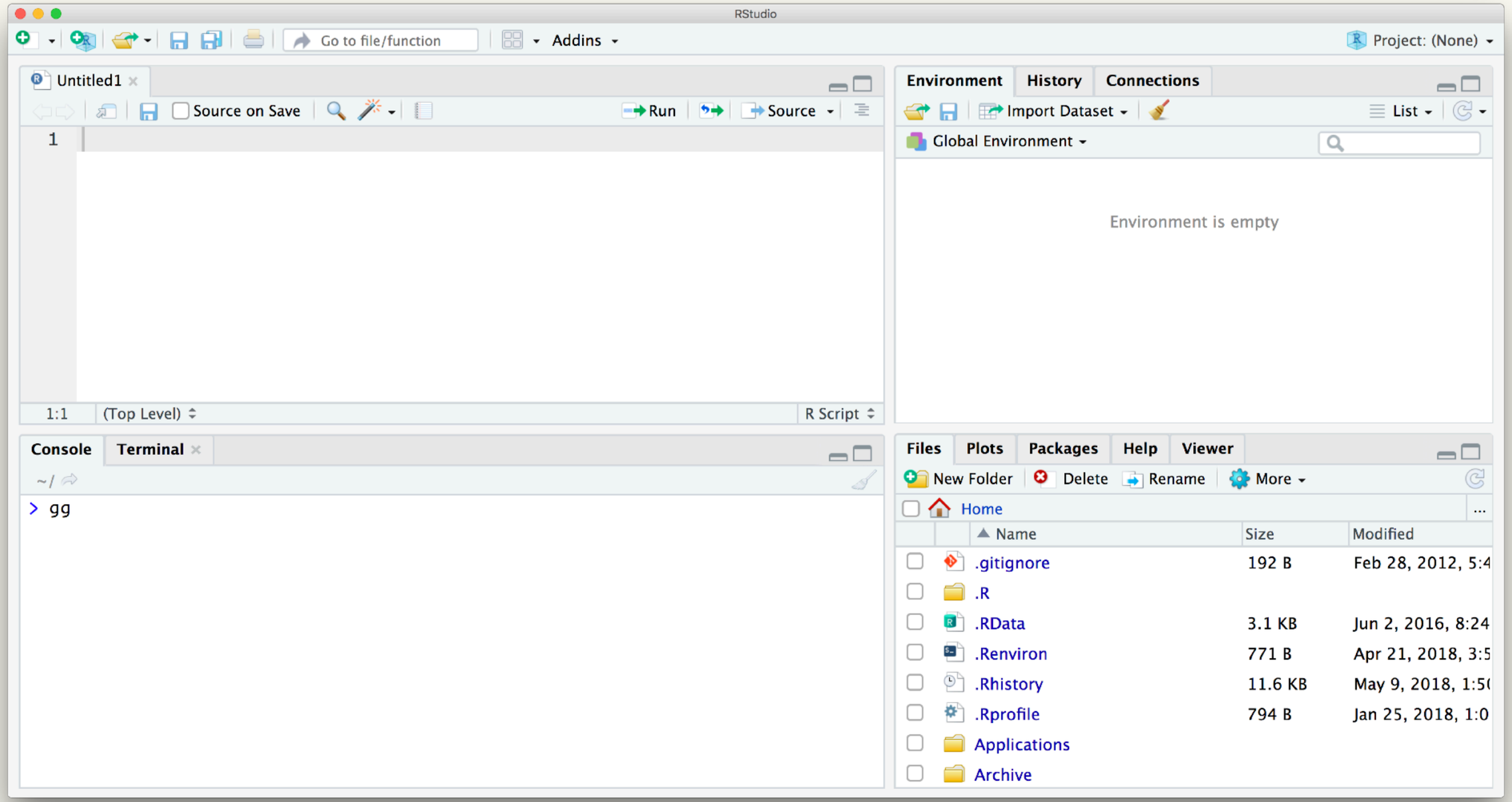
The garbage collector removes values

Get materials: `usethis::use_course("rstd.io/tidytools19")`

RStudio

You don’t have to use RStudio,
but if you do, try to master it!

Get materials: `usethis::use_course("rstd.io/tidytools19")`



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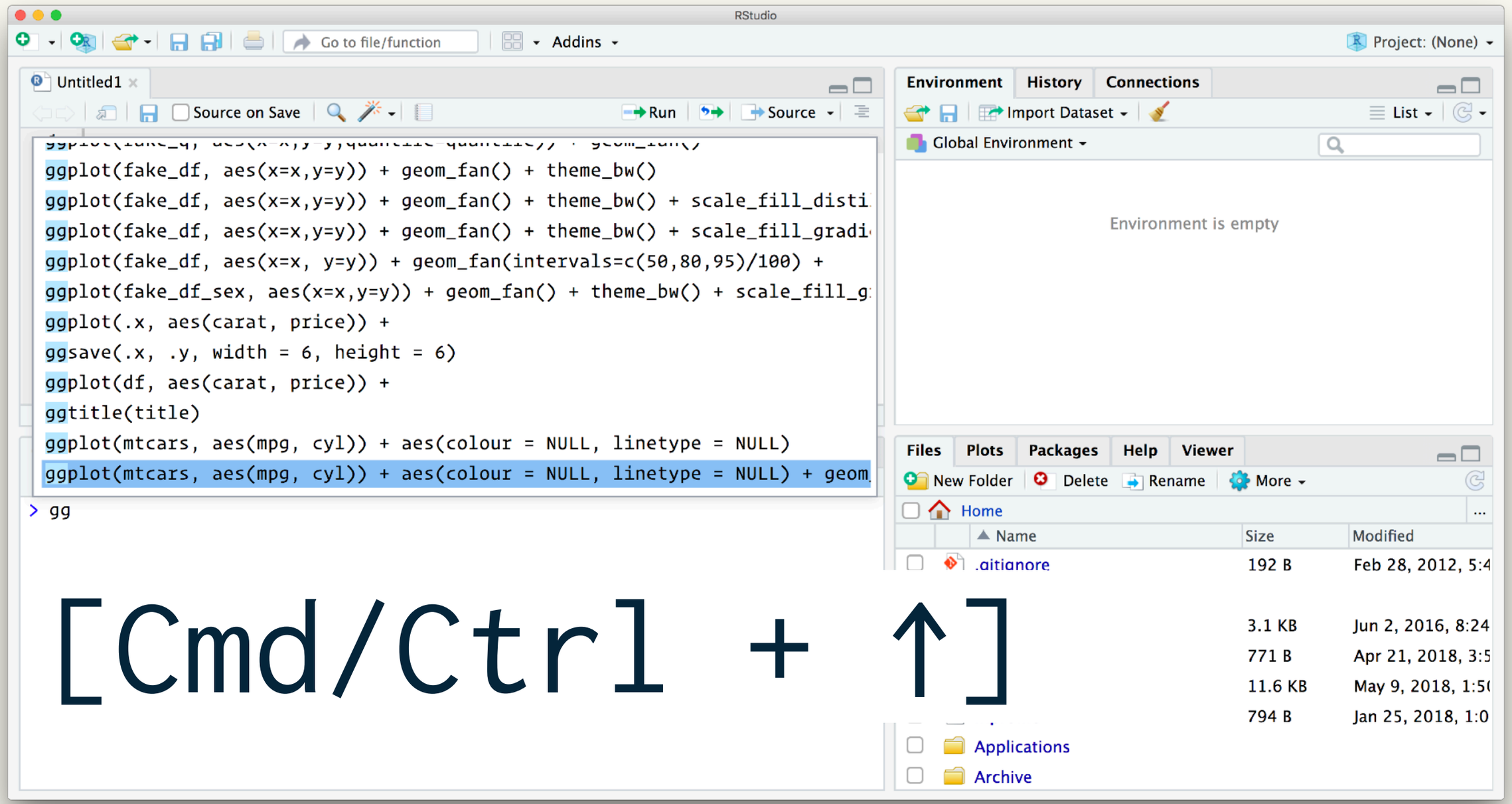

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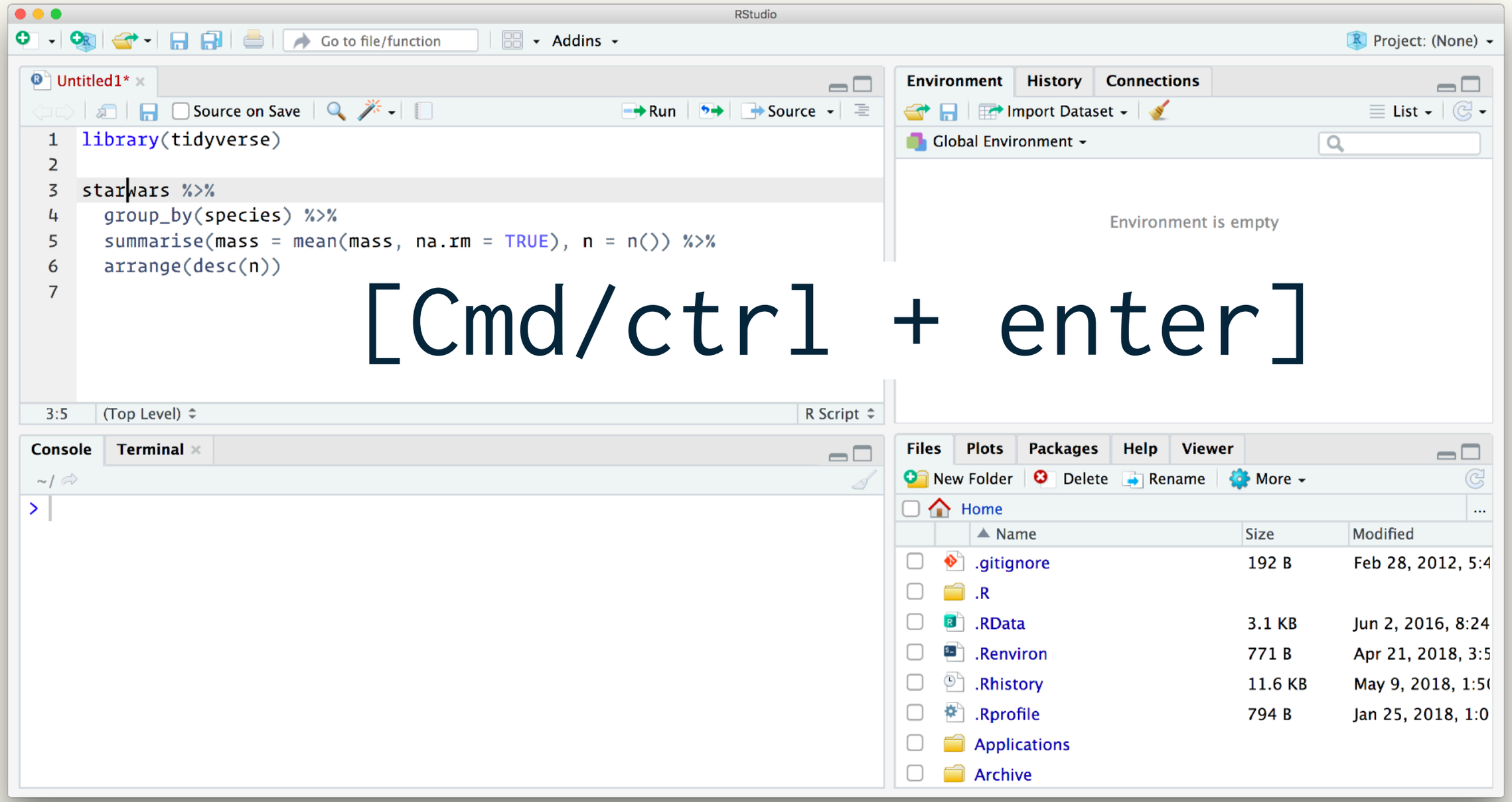

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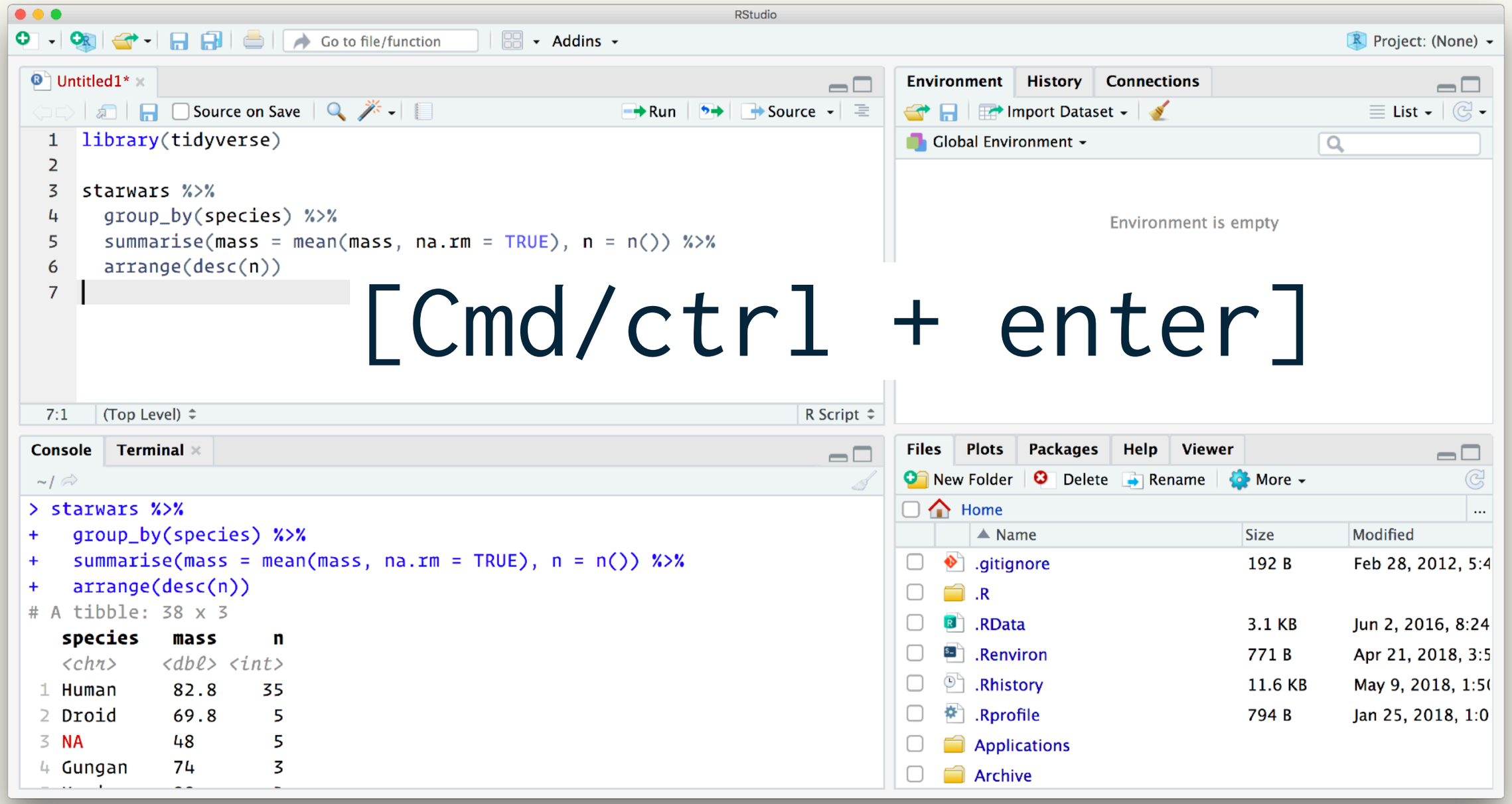

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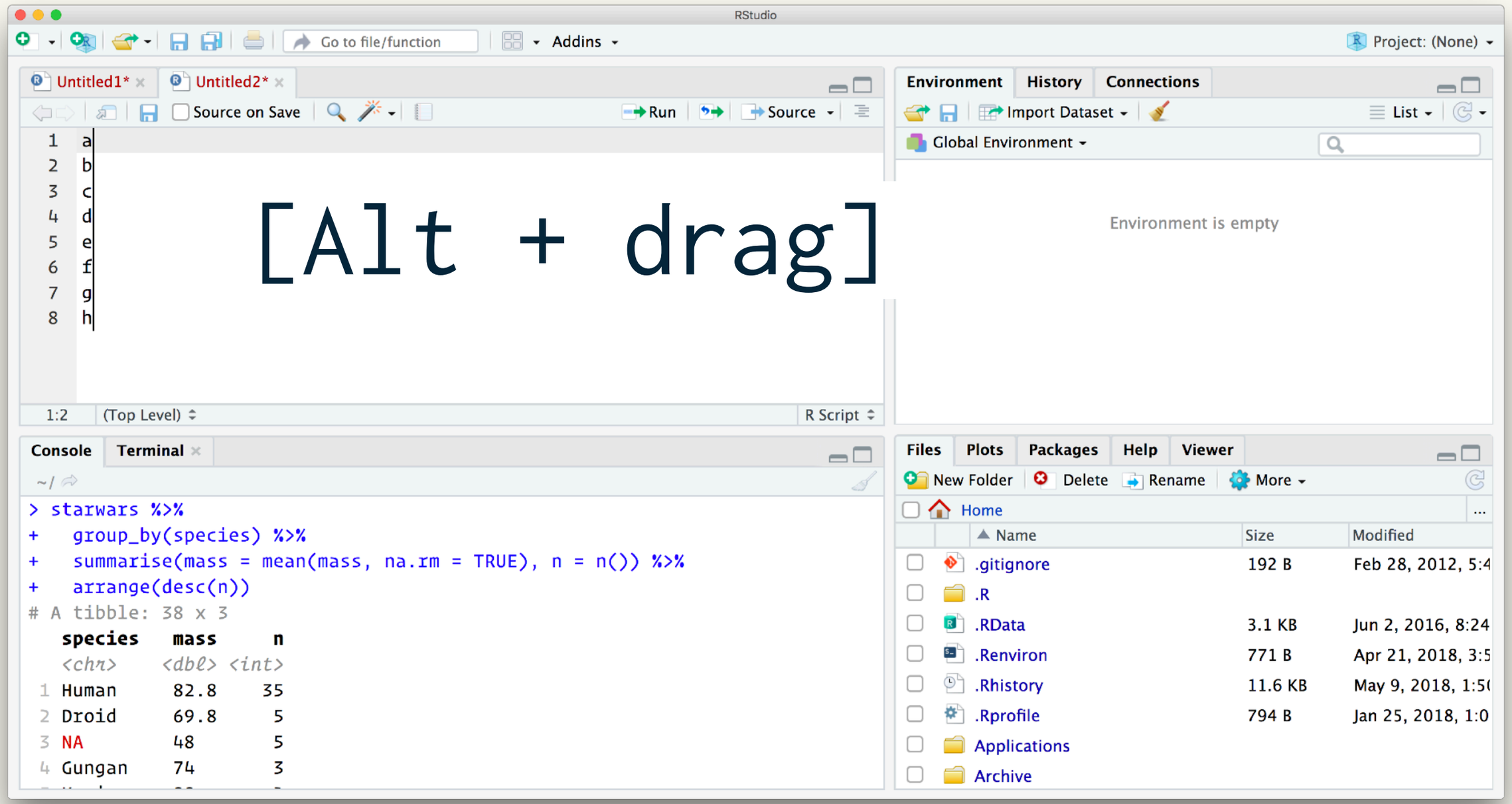

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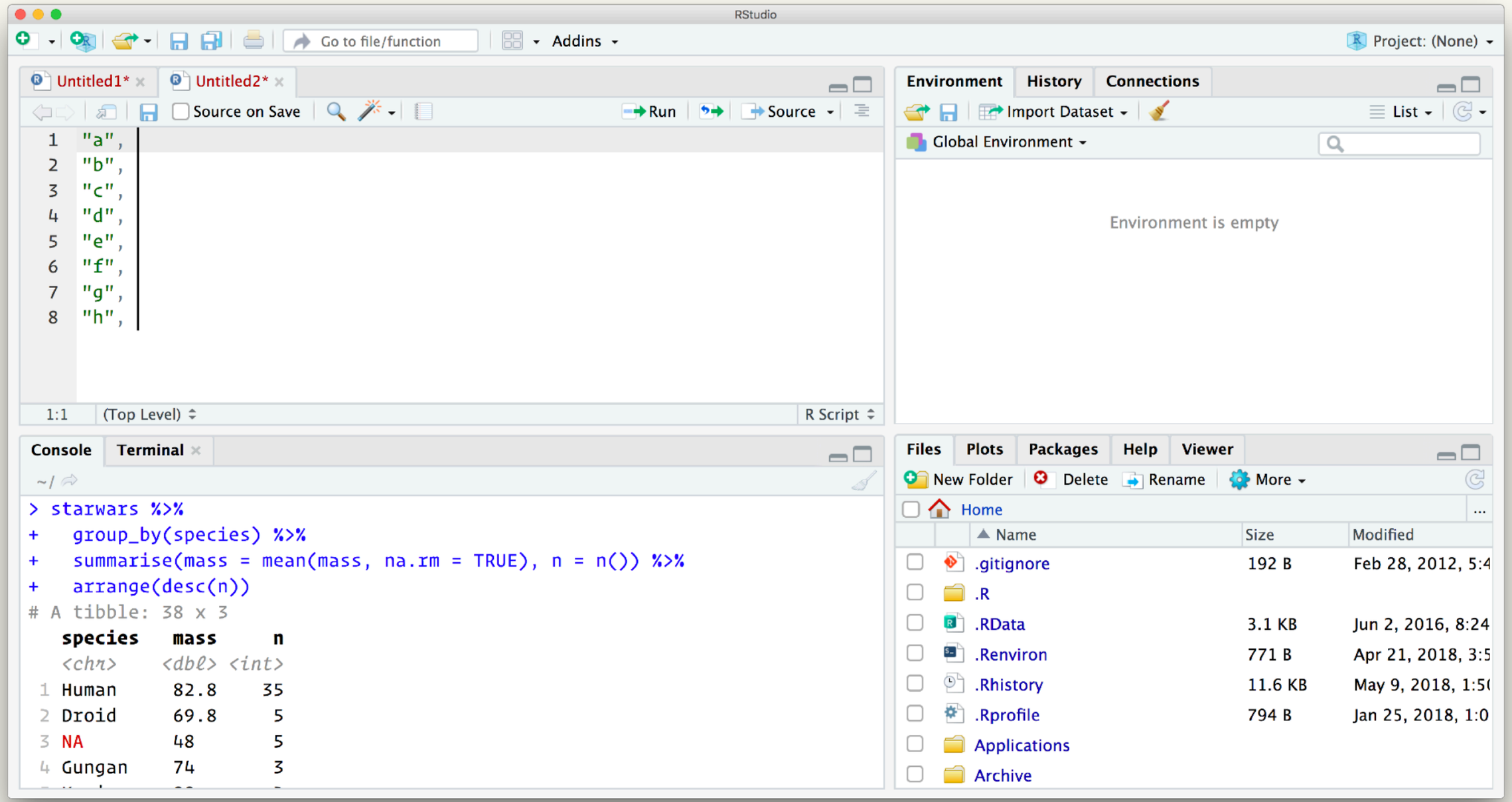

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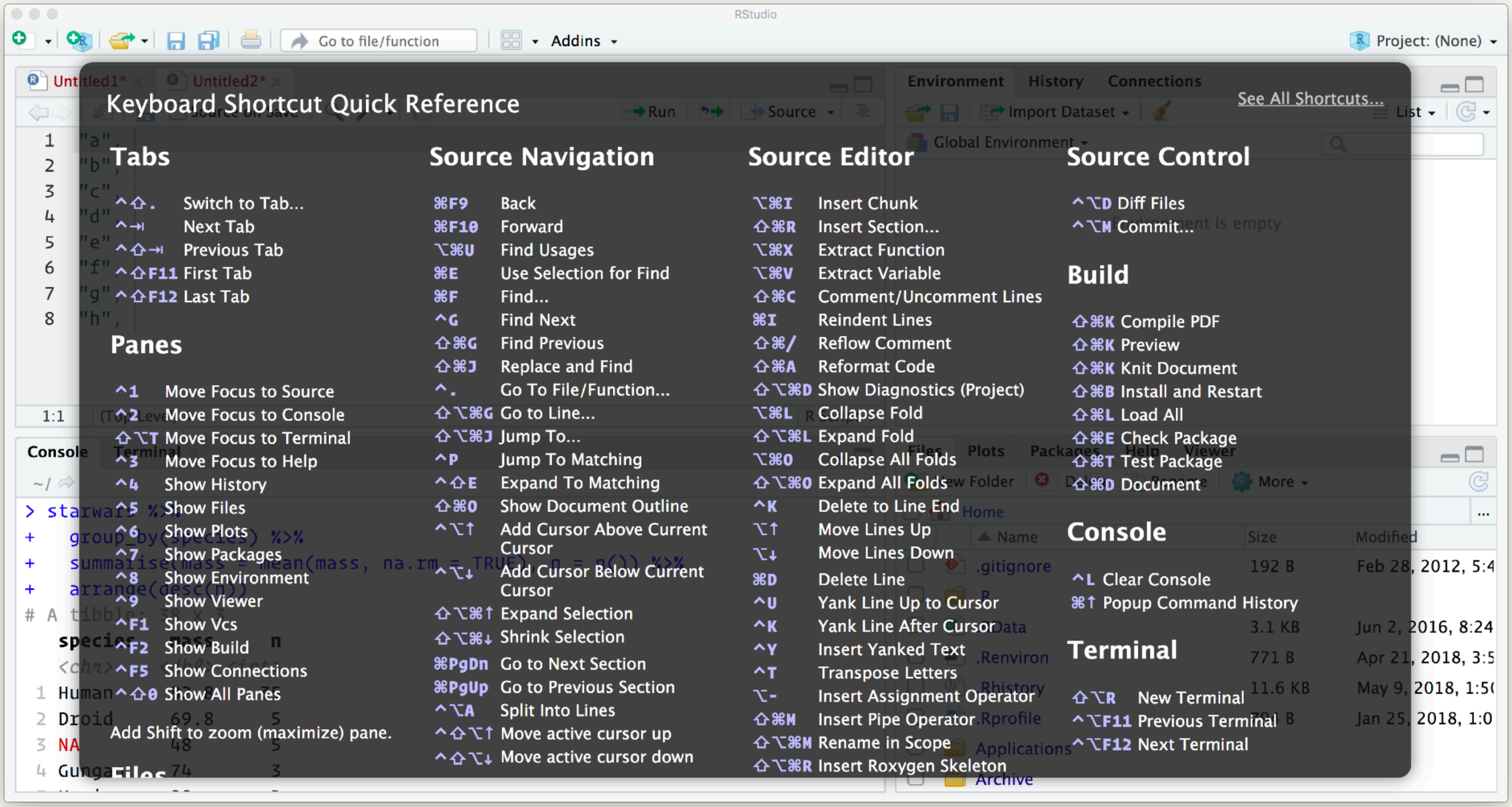

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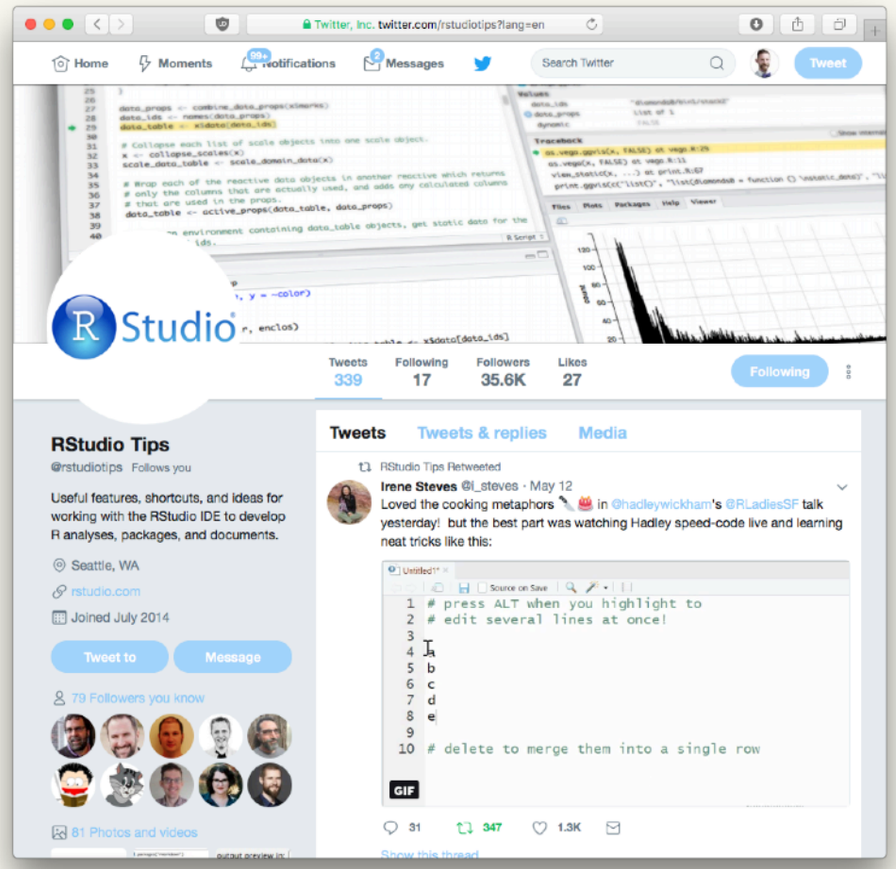
Your turn

What's the shortcut for <- (assignment)?

What about %>% (pipe)?

How can you quickly comment a block of lines?

How do you restart R?



@rstudiotips

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