Tabular data management

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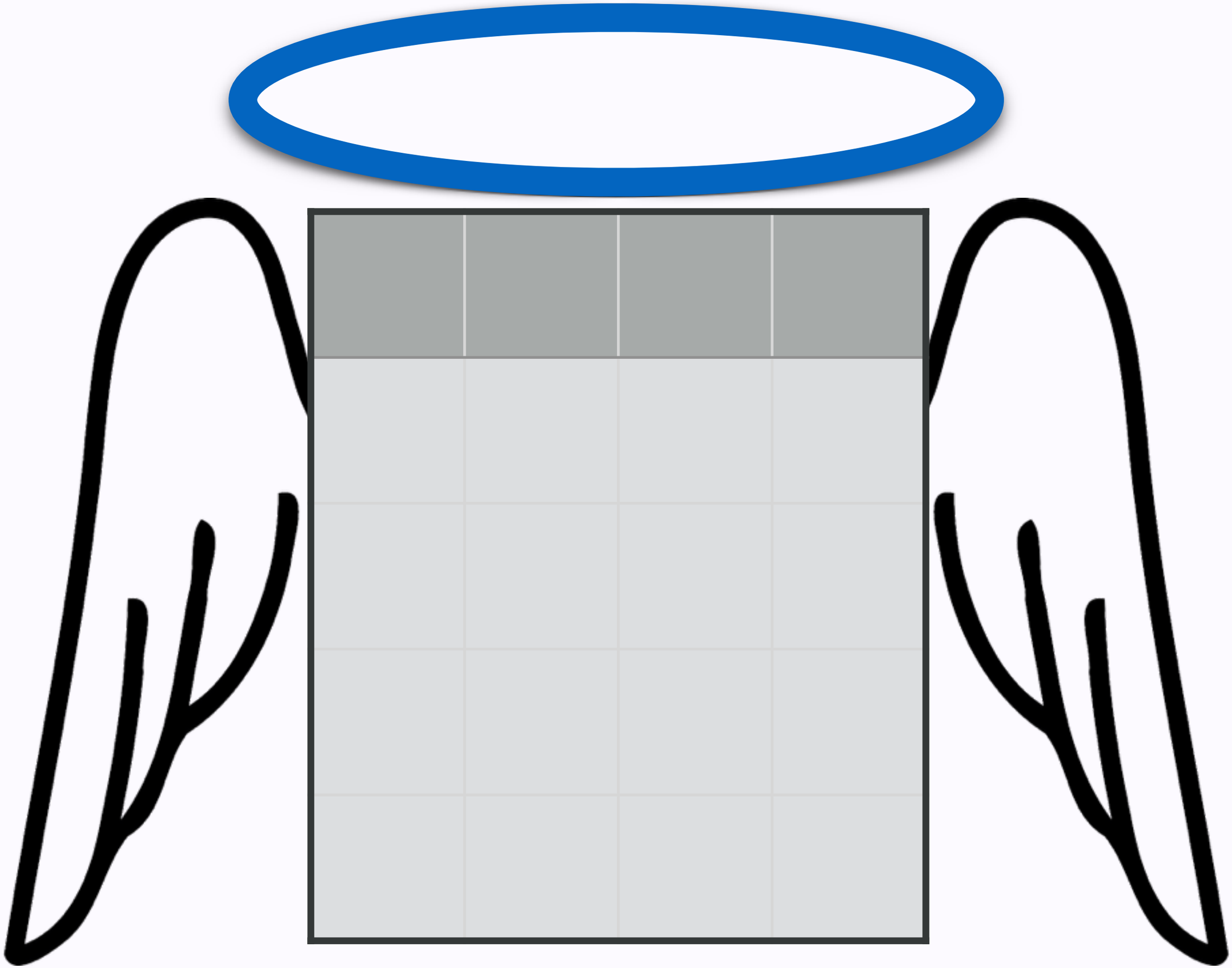


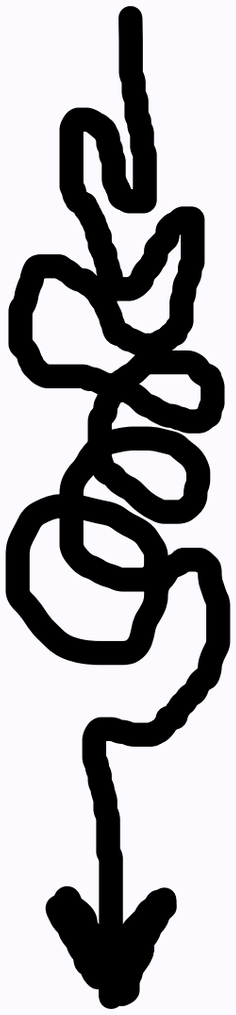
data cleaning

data wrangling

descriptive stats

inferential stats

reporting



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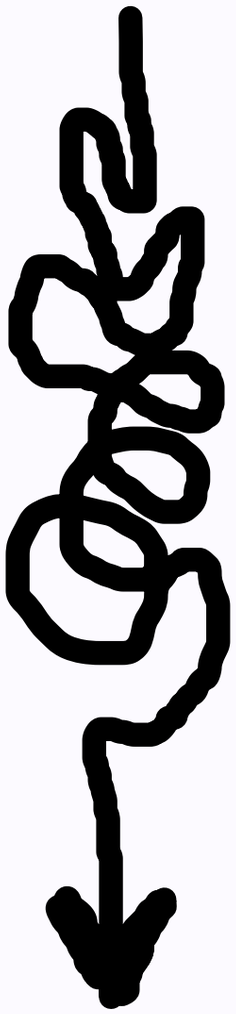
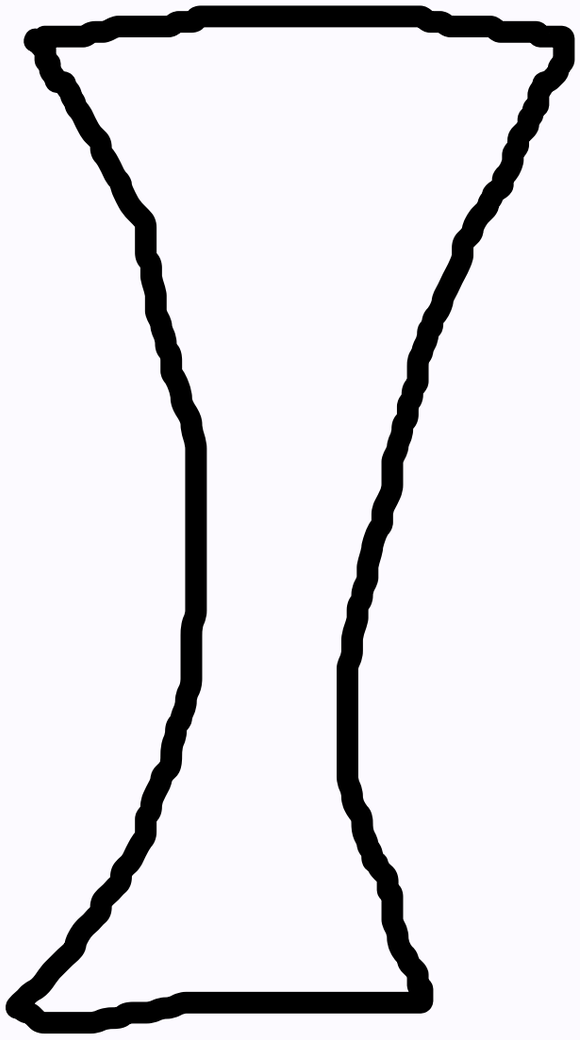


data cleaning
data wrangling
descriptive stats
inferential stats
reporting

programming difficulty



better exp. design → simpler stats

better data model → simpler analysis

decision fatigue
aggravation
cutting corners

mastery
efficiency
safety

decision fatigue
aggravation
cutting corners

mastery
efficiency
safety

I want this for you!

do first bit of pirates vs ninjas live coding

R objects come in a few flavours

a simple view of simple R objects that will get you pretty far

Simple view	Technically correct R view		
	mode	class	typeof
character	character	character	character
logical	logical	logical	logical
numeric	numeric	integer or numeric	integer or double
factor	numeric	factor	integer

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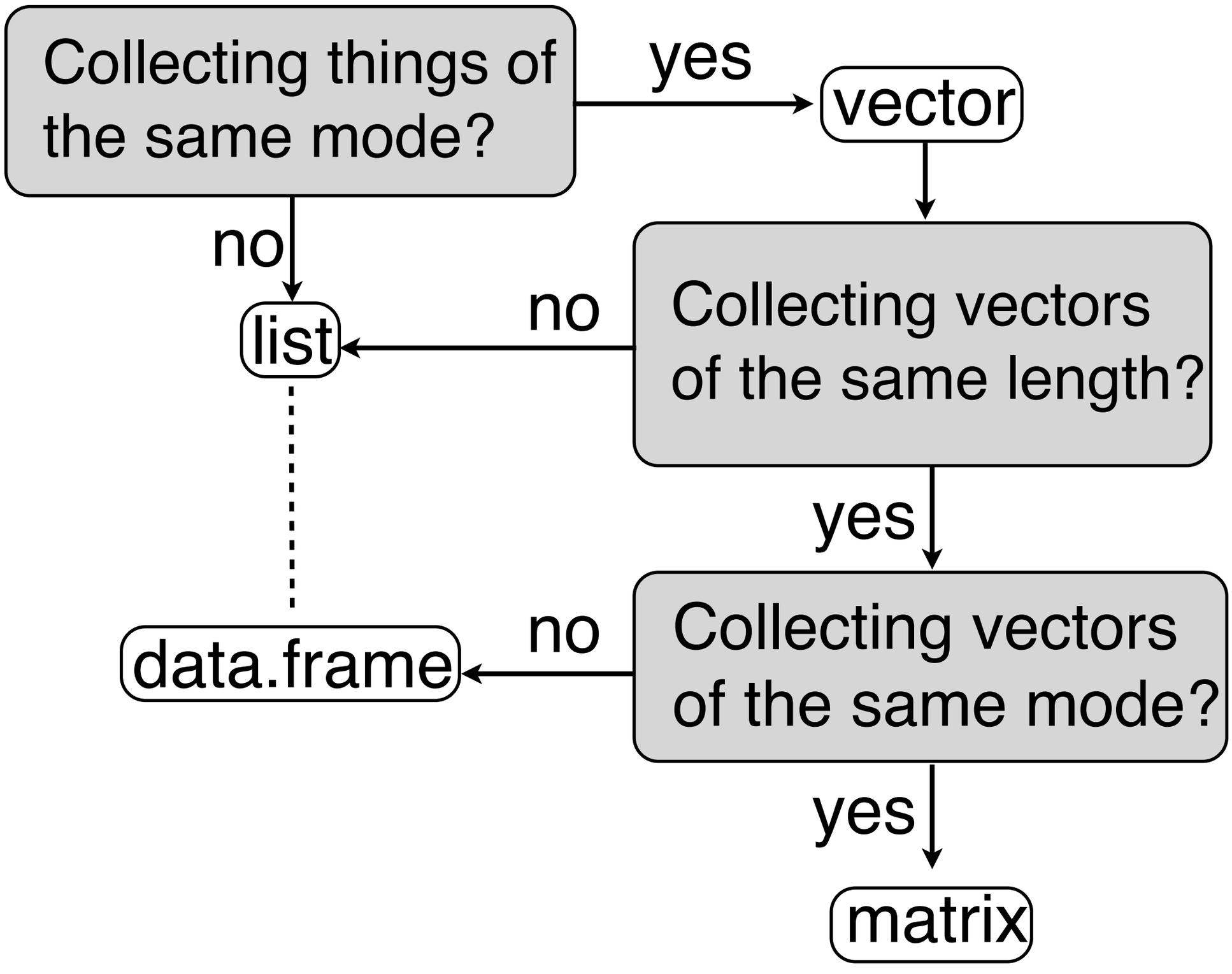
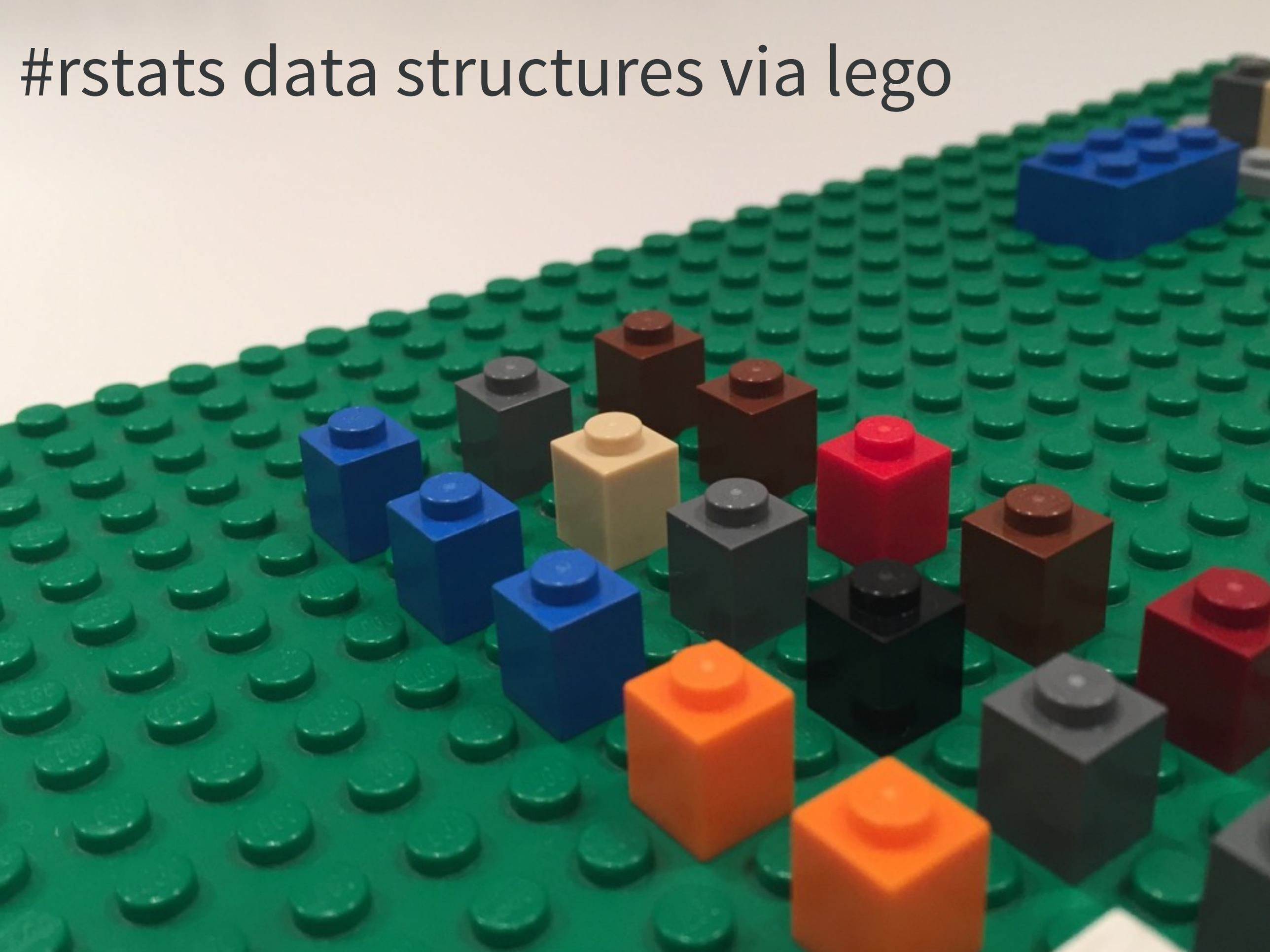
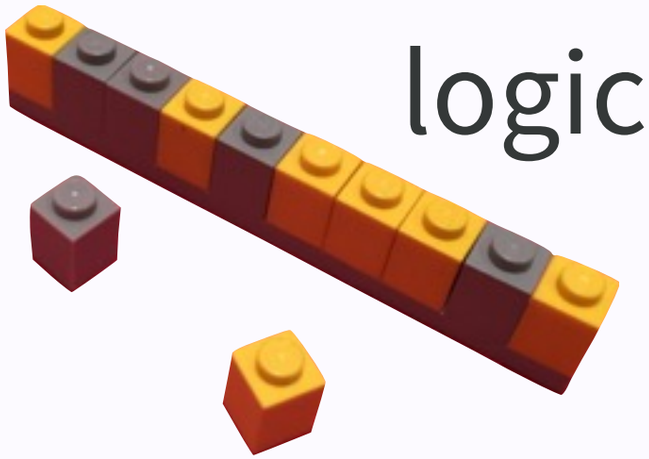

Collecting things of the same mode?
yes
vector
no
list
no
Collecting vectors of the same length?
yes
data.frame
no
Collecting vectors of the same mode?
yes
matrix

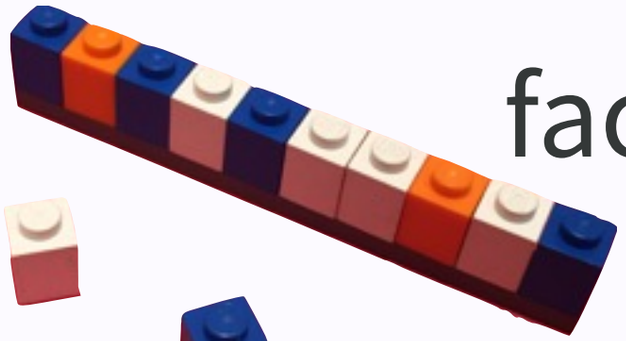
#rstats data structures via lego



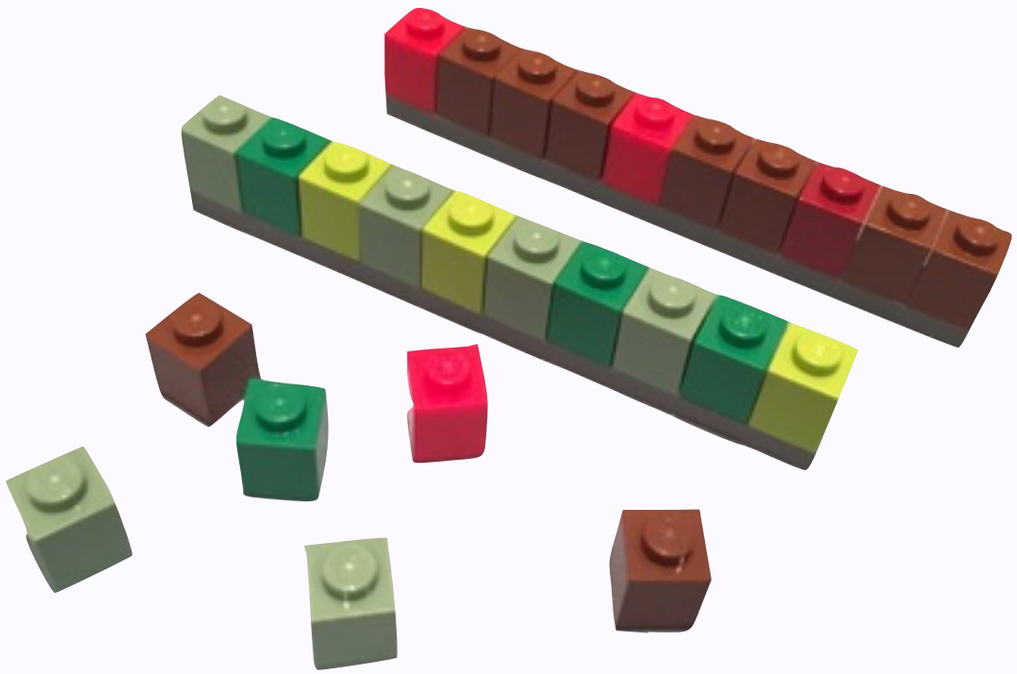
atomic vectors



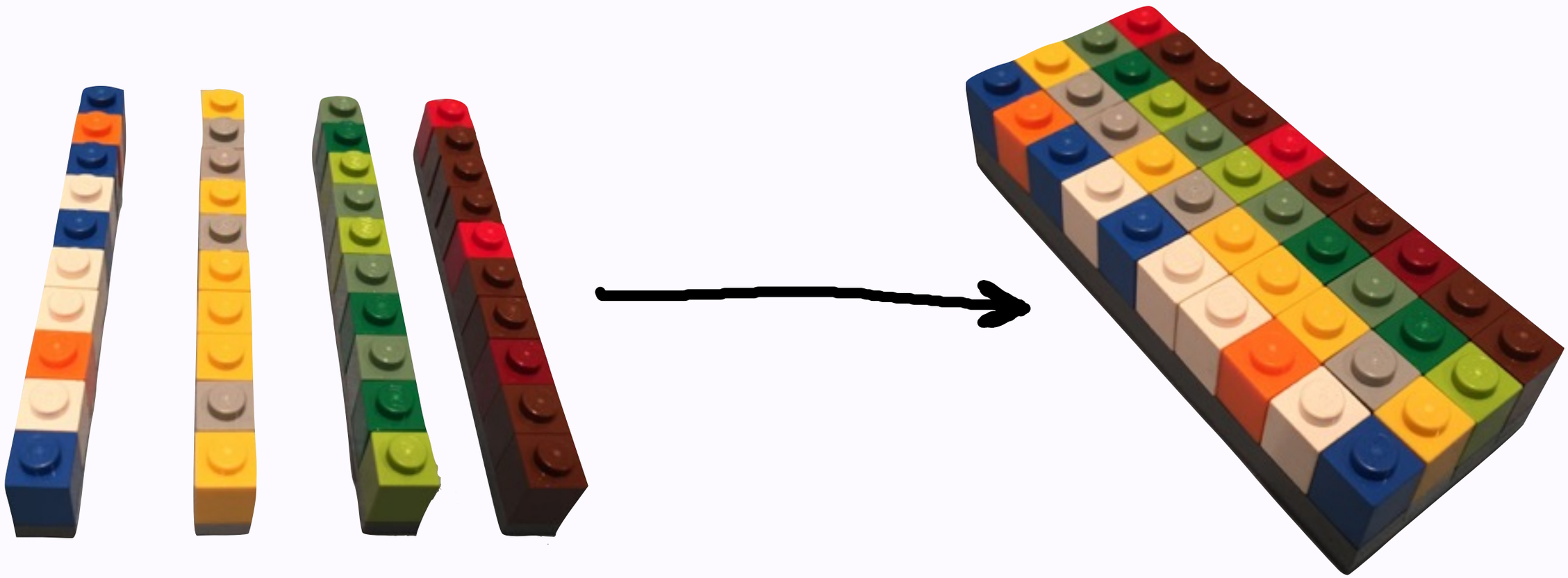
logical



factor



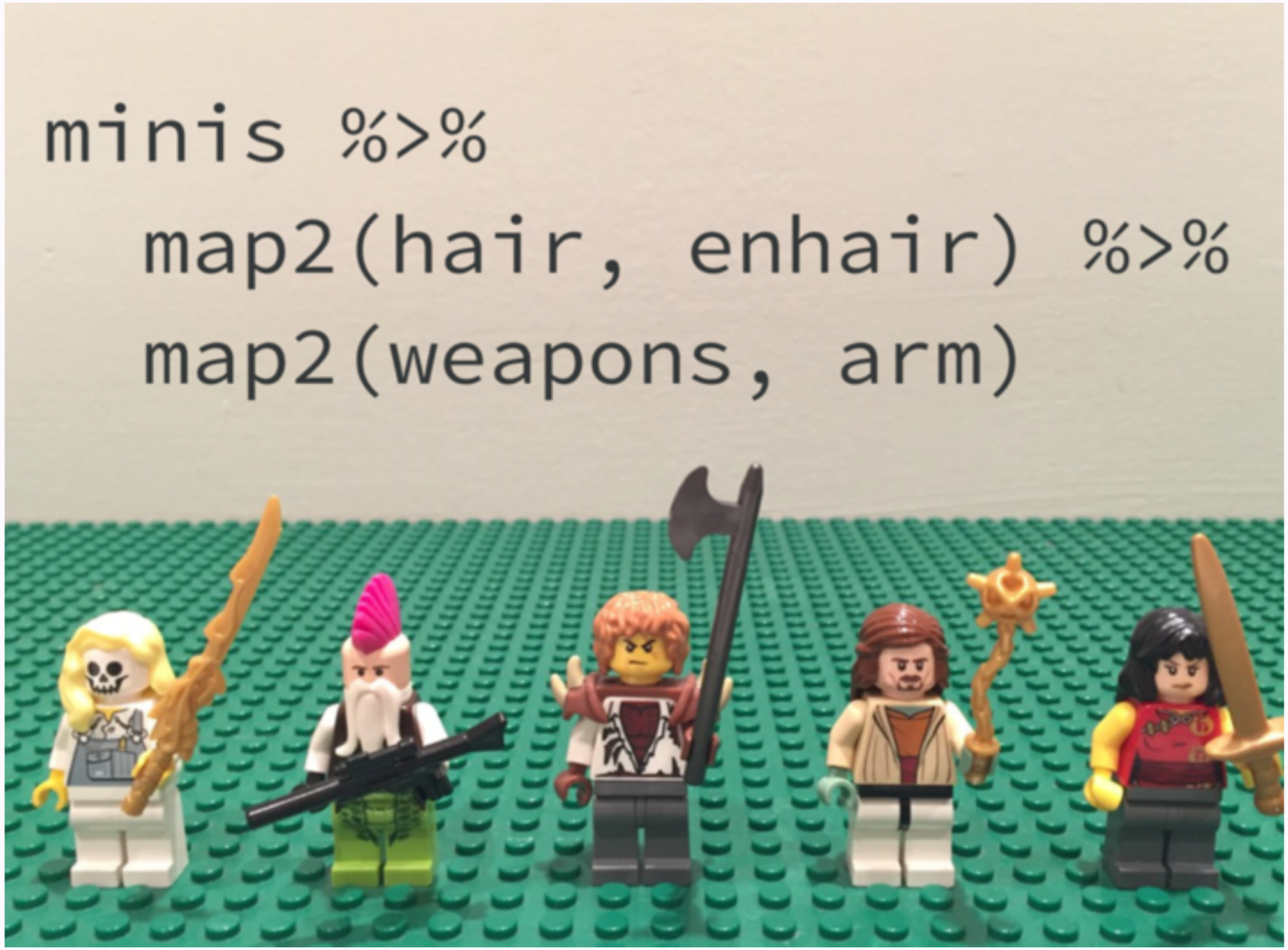
integer, double



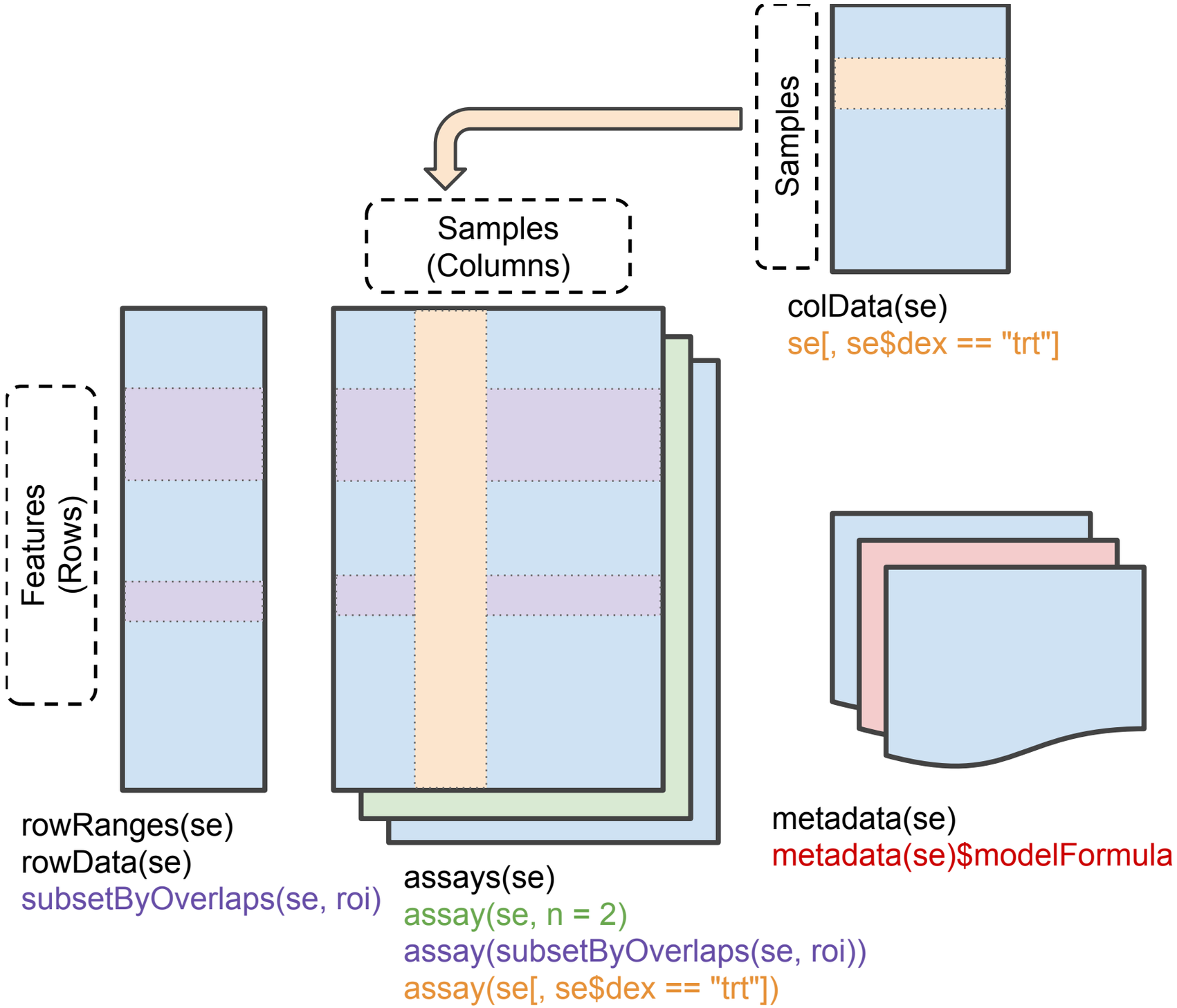
related vectors of same length?

DATA FRAME!

Sidebar: Google “data rectangling”to see more #rstats with lego



https://speakerdeck.com/jennybc/data-rectangling



related data frames for one experiment?

SummarizedExperiment!

http://tidyverse.org

back to pirates vs ninjas live coding but with the tidyverse

If you can put it in a data frame, DO THAT.

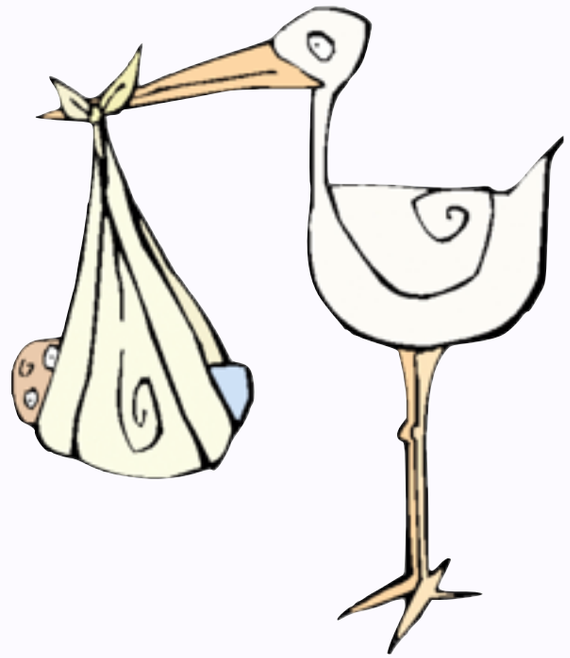
Operate on the data frame holistically.

Pass it to other functions, pref. intact and whole.

Learn how to limit computation to specific rows or columns. Don’t create copies or excerpts lightly.

I recommend tidyverse + tibbles.

Where do tibbles come from?



http://tidyverse.org

Import delimited file

`read_csv()`, `read_delim()`, `read_excel()`…

Coerce from something else

`as_tibble()`

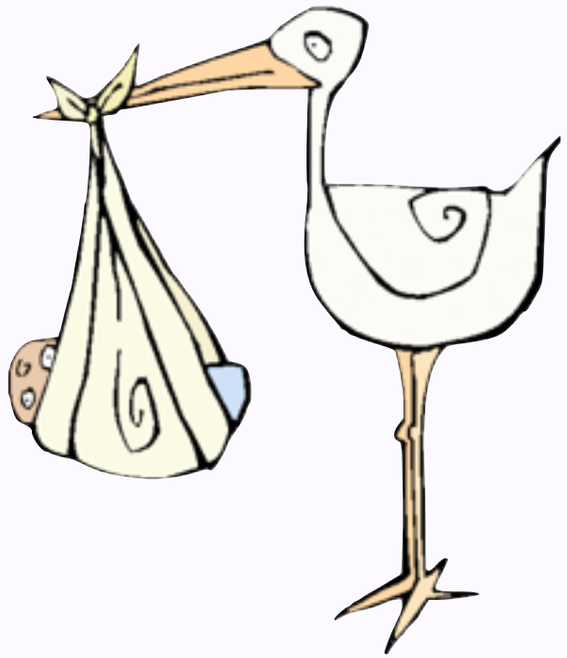
Assemble from vector parts

`tibble(…)`, `enframe(…)`

Grow / modify an existing object

`mutate()`

Where do data frames come from?



base R

Import delimited file

`read.csv()`, `read.delim()`, …

Coerce from something else

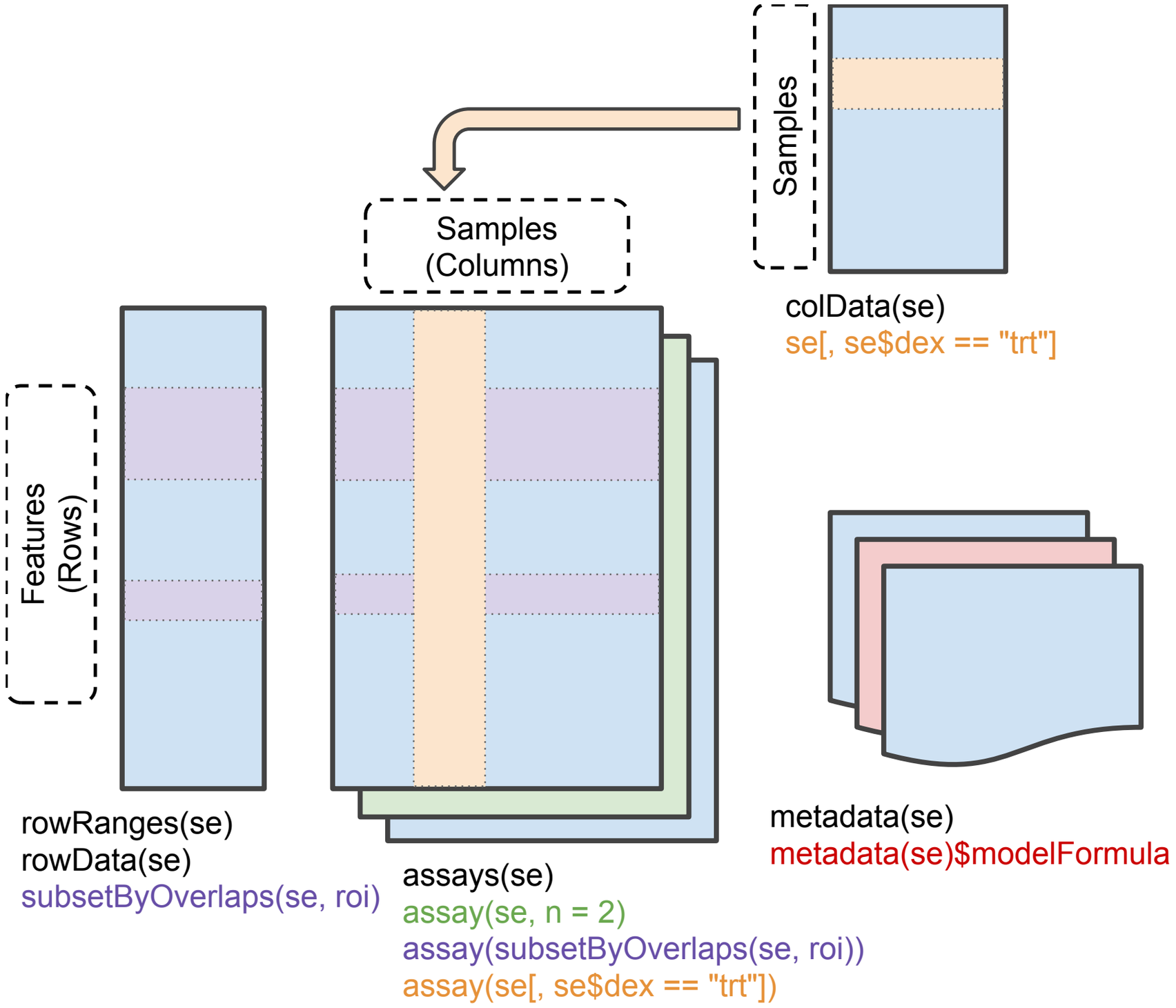
`as.data.frame()`

Assemble from vector parts

`data.frame(…)`

Grow / modify an existing object

`transform()`



BioC's SummarizedExperiment

Common theme between data frames or tibbles and SummarizedExperiment:

Keep related things together!!!

Reduces error and tedium over doing this “by hand”

More specialized scope? Like, genomics?

Congrats, you can have more specialized object classes!

Payoffs: validity checking, receptacles to handle data of disparate type/shape, highly customized methods

Tension between data frames or tibbles and BioC / SummarizedExperiment

Under the hood, implemented with fairly different features of the R language

Different mindset:

general tools, user recombines to fit today's problem

vs

specific tools, developers anticipate the workflows

Not always trivial to move R objects or your brain back and forth

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RStudio

@STAT545

http://stat545.com

Things you need to know about tibbles:

no partial name matching with `$`
stringsAsFactors = FALSE
df[, “X1”] will be a tibble, i.e. drop = FALSE
you can print them with wild abandon
no row names
do not munge variable names
will only recycle input of length 1