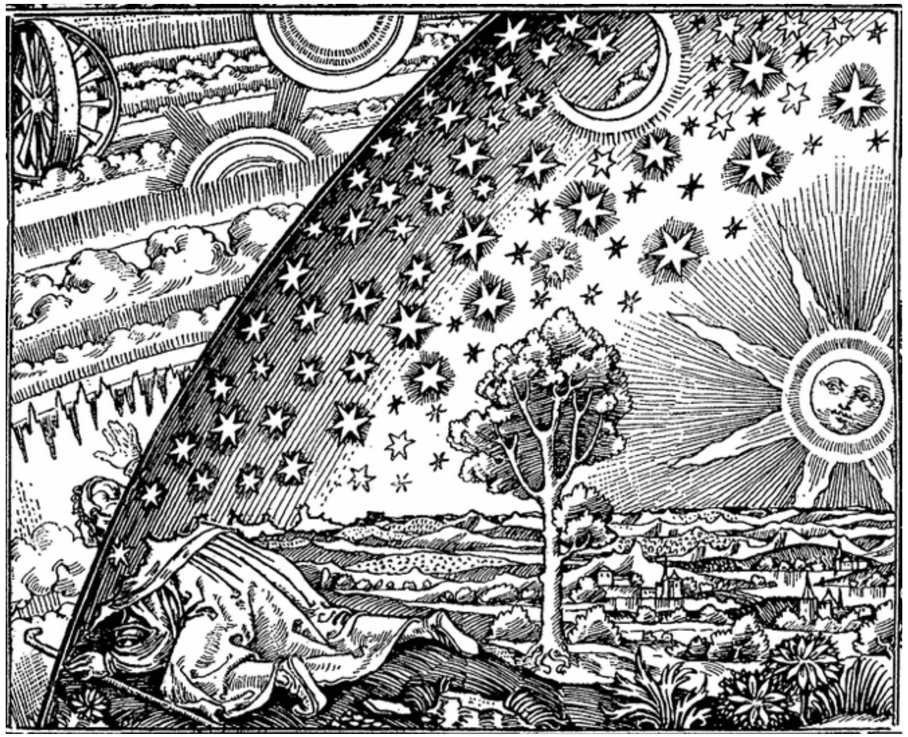
Master the Tidyverse



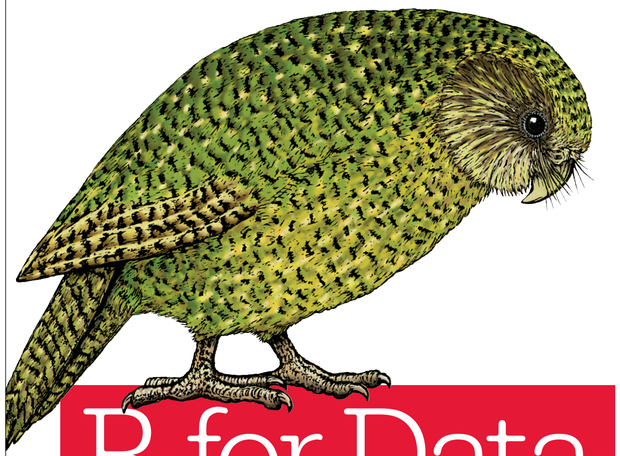
Garrett Grolemund

Data Scientist, Educator

January 2017

@StatGarrett

O'REILLY®



R for Data Science

VISUALIZE, MODEL, TRANSFORM, TIDY, AND IMPORT DATA

Hadley Wickham &
Garrett Grolemund

@lopp_sean

Day 1

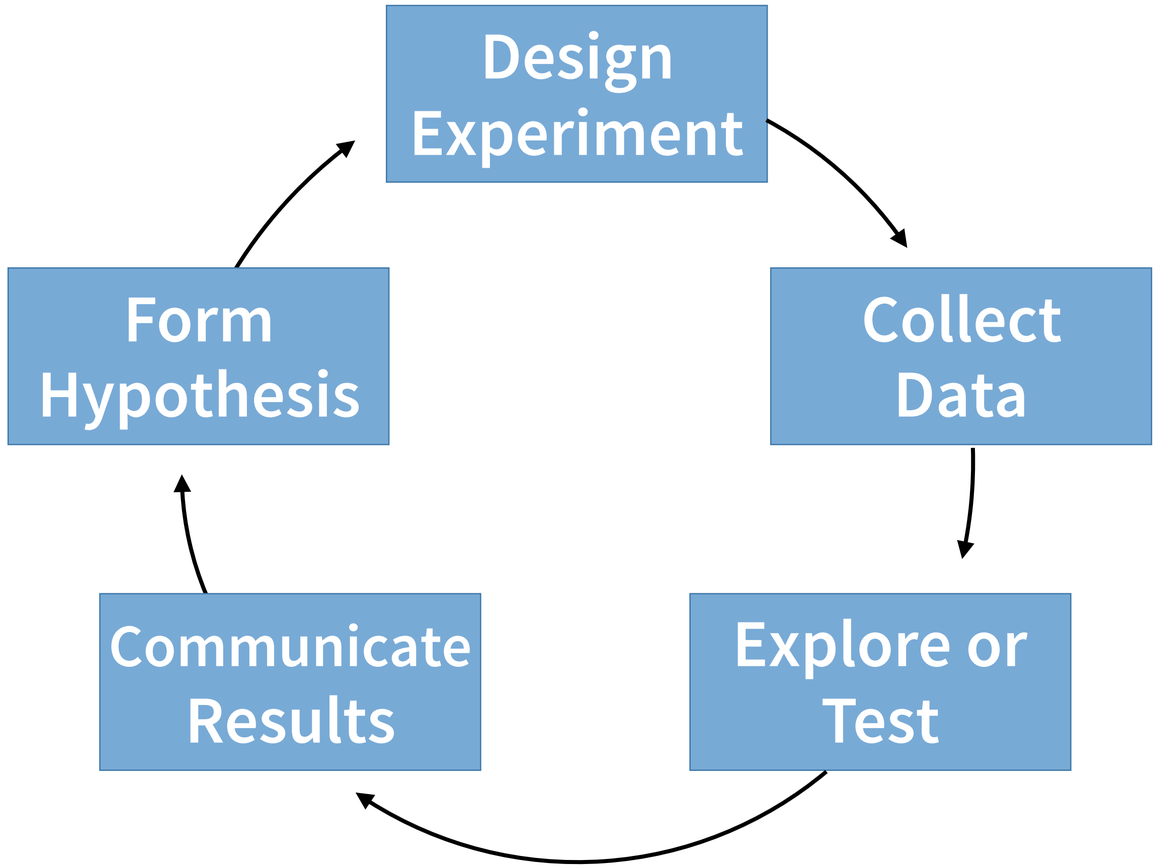
Introduction and Data Visualization	9:00 - 10:30
Morning Break	10:30 - 10:45
Data Visualization	10:45 - 12:00
Lunch	12:00 - 1:00
Transforming Data	1:00 - 3:15
Afternoon Break	3:15 - 3:30
Tidy Data	3:30 - 5:00

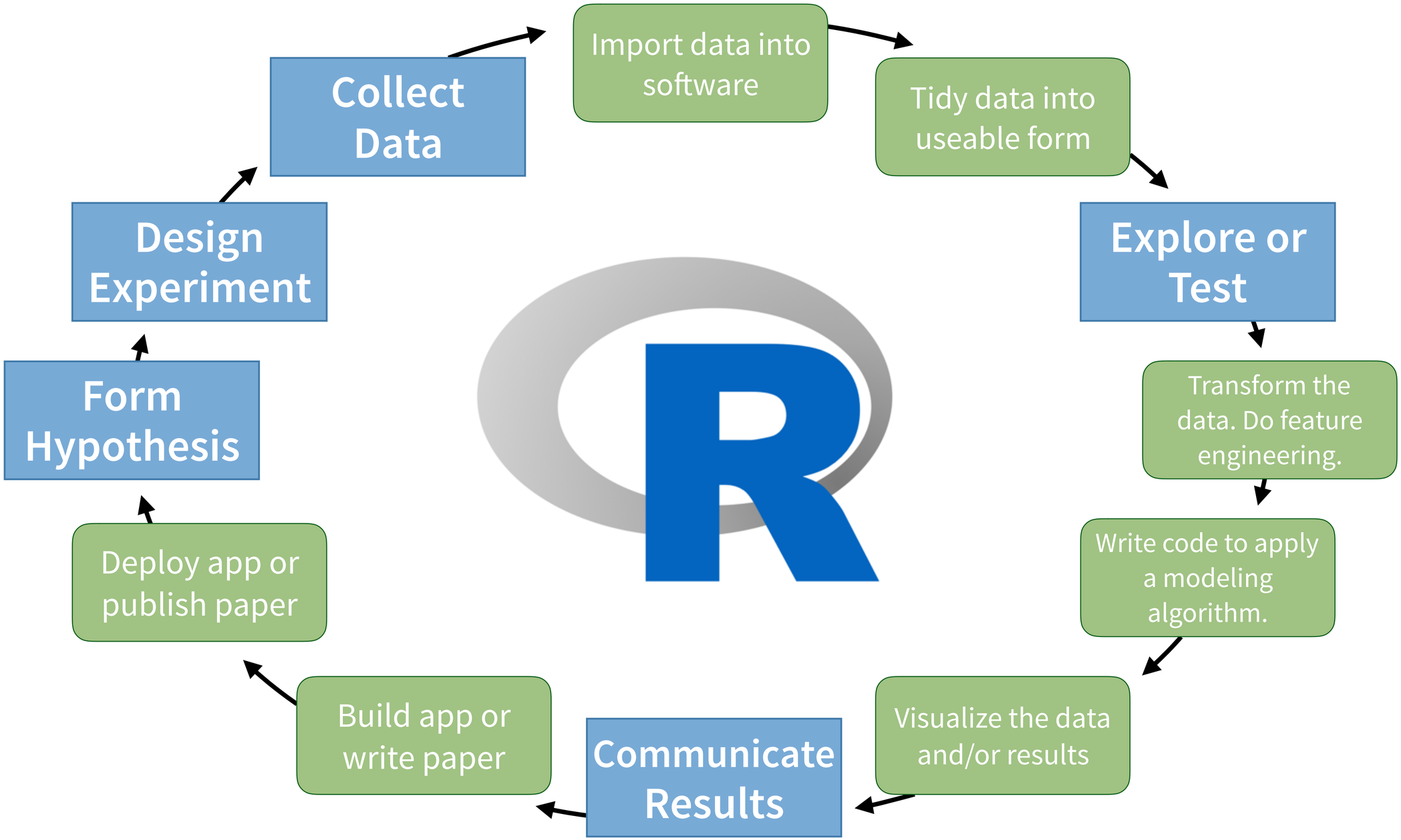
Your Turn

Form groups of 2-4 people. Introduce yourself to your group members. Tell them:

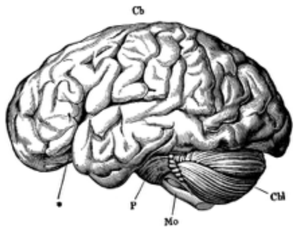
1. Who you are
2. What you do with data
3. How long you have been using R

"Data Science"




Collect Data
Import data into software
Tidy data into useable form
Explore or Test
Transform the data. Do feature engineering.
Write code to apply a modeling algorithm.
Visualize the data and/or results
Communicate Results
Build app or write paper
Deploy app or publish paper
Form Hypothesis
Design Experiment
R

R - A computer language for scientists

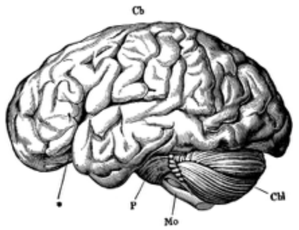


C++

Human language

Machine language

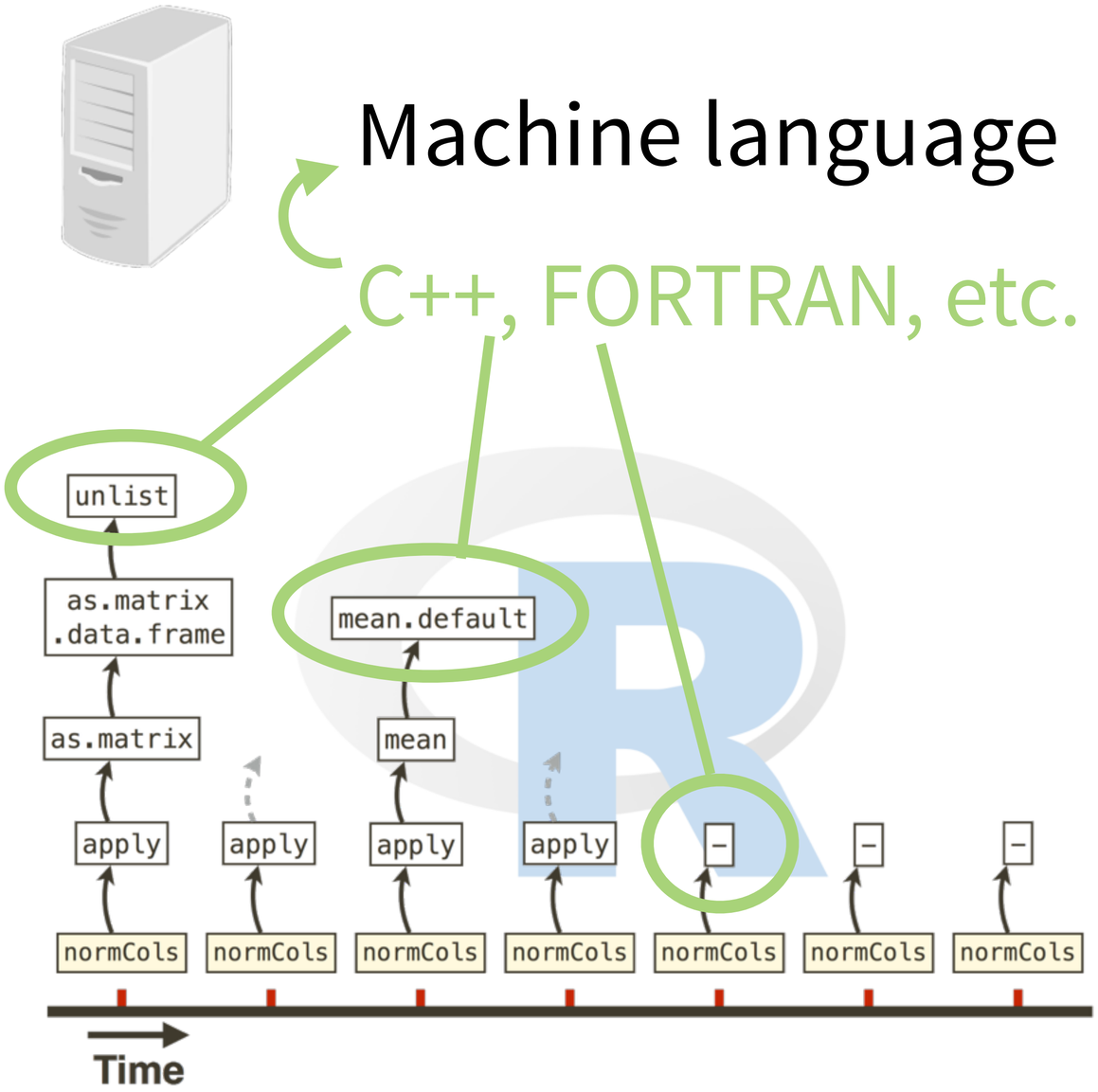
R - A computer language for scientists

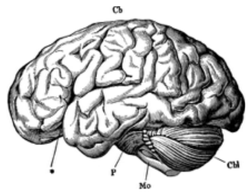


C++

Human language

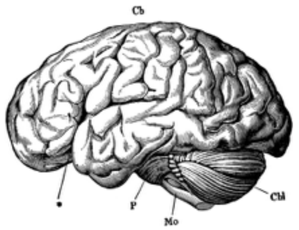
Machine language





Human language

R - A computer language for scientists



Human language

`map()`

`sapply()`

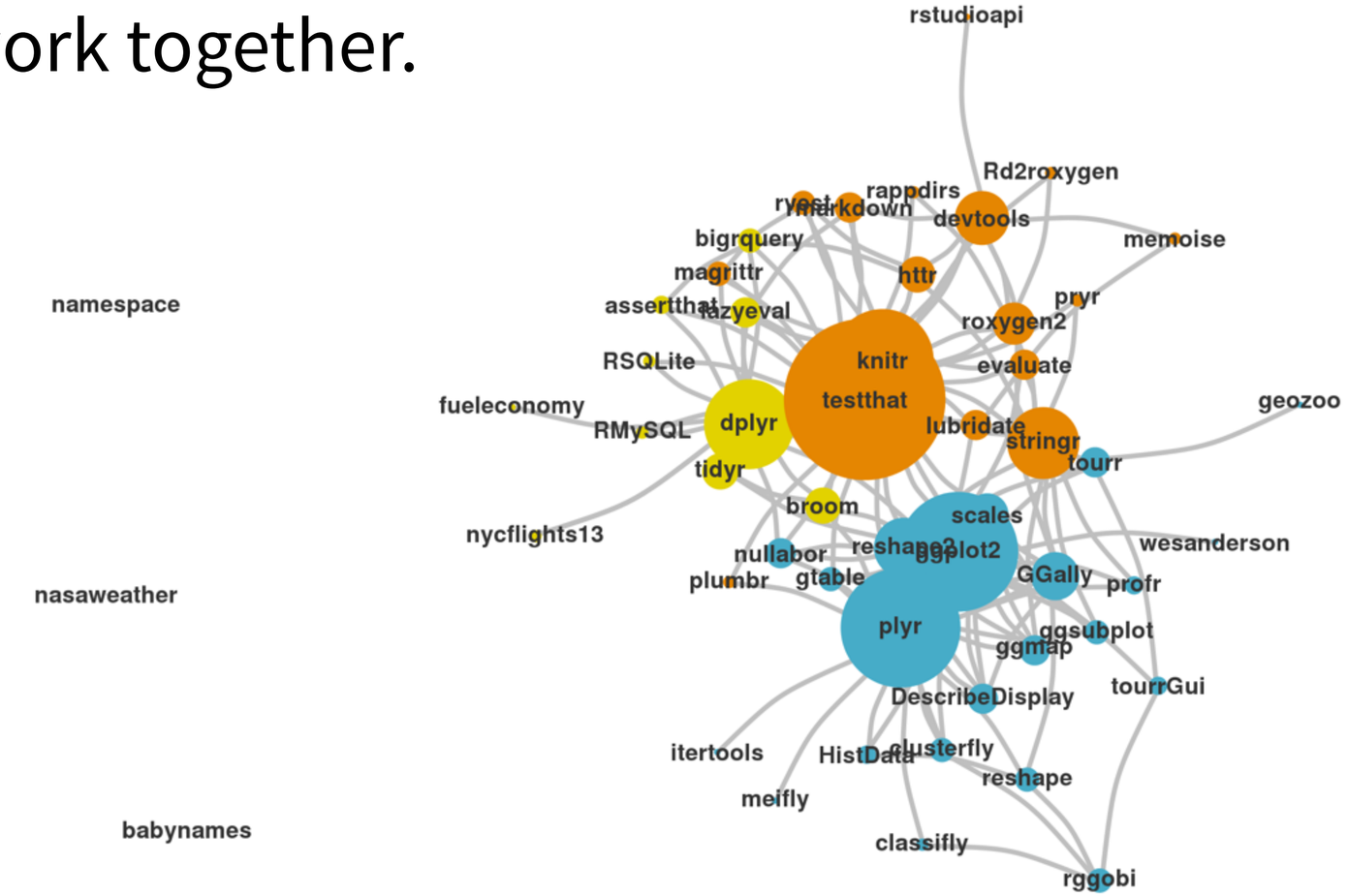
`for()`

C++

Machine language

The Tidyverse

A collection of modern R packages that share common philosophies, embed best practices, and are designed to work together.



Display by Adolfo Álvarez

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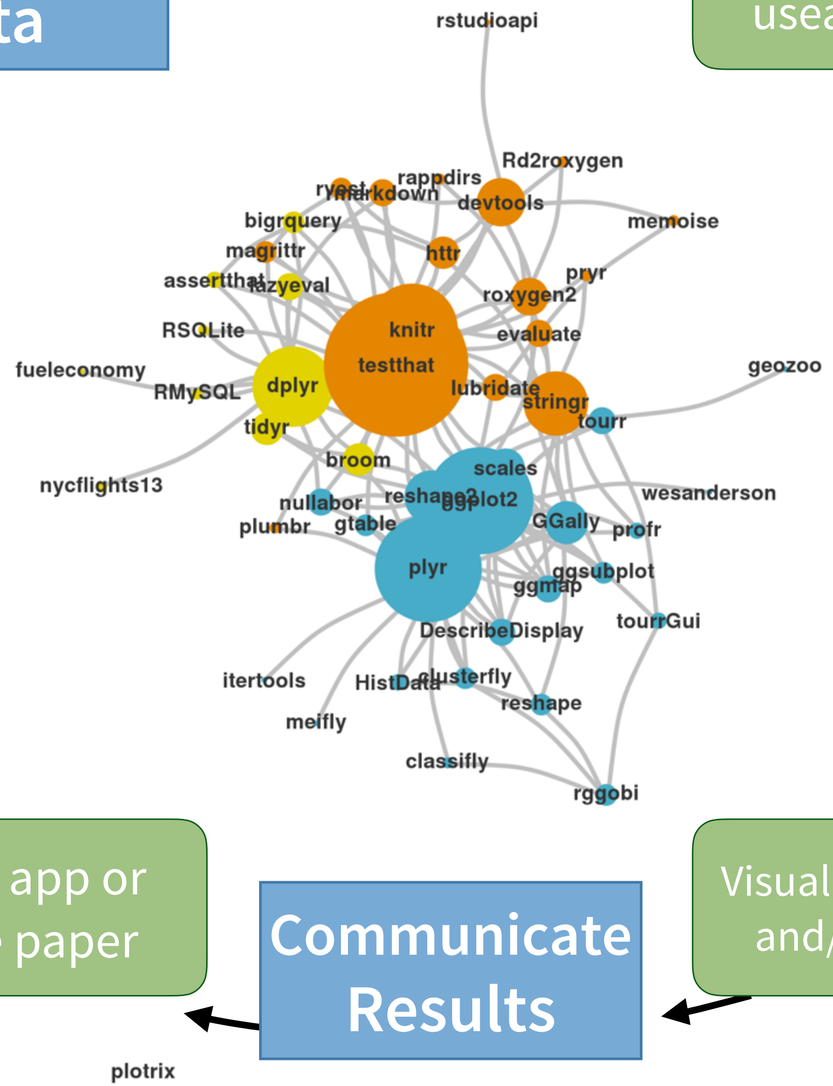


Display by Adolfo Álvarez

Tidy tools

Functions are easiest to use when they are:

1. **Simple** - They do one thing, and they do it well
2. **Composable** - They can be combined with other functions for multi-step operations
3. **Smart** - They can use R objects as input.

Tidy functions do these things in a specific way.

Tidy data

Tidy functions all expect and return the same data structure, known as **tidy data**:

Your Turn

Discuss in your group:

"What is the difference between a number and a piece of data?"

"Data are not just numbers,
they are numbers with a context."

- George Cobb and David Moore (1997)

Subject (car)	**Speed** (mph)	**Distance** (ft)
1	25	85
2	24	120
3	24	93
4	24	92

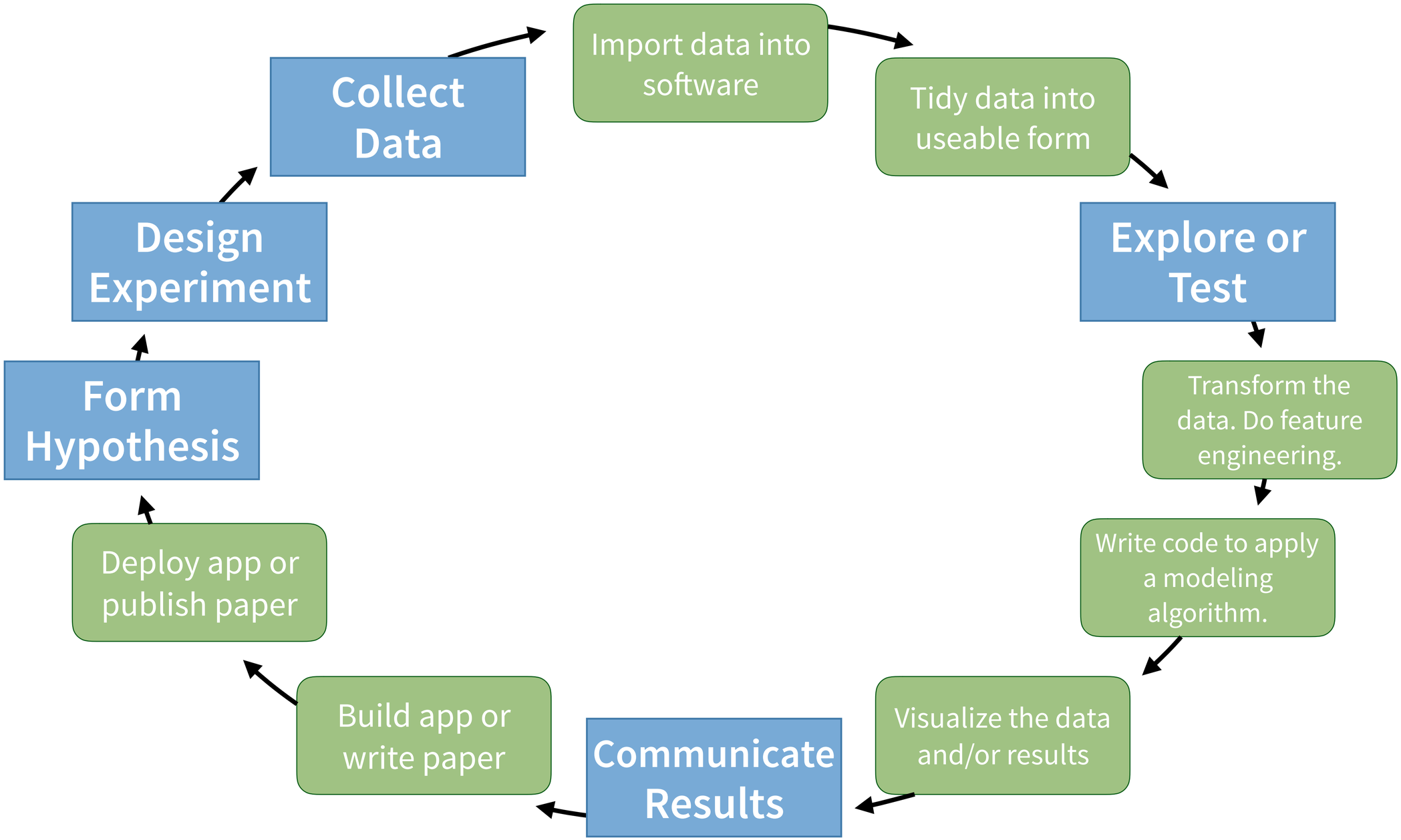
Every value is associated with:

- A variable
- An observation (case)

Tidy data

Tidy functions all expect and return the same data structure, known as **tidy data**:

1. A **data frame** that contains
2. **variables** in the **columns** and
3. **cases** in the **rows**.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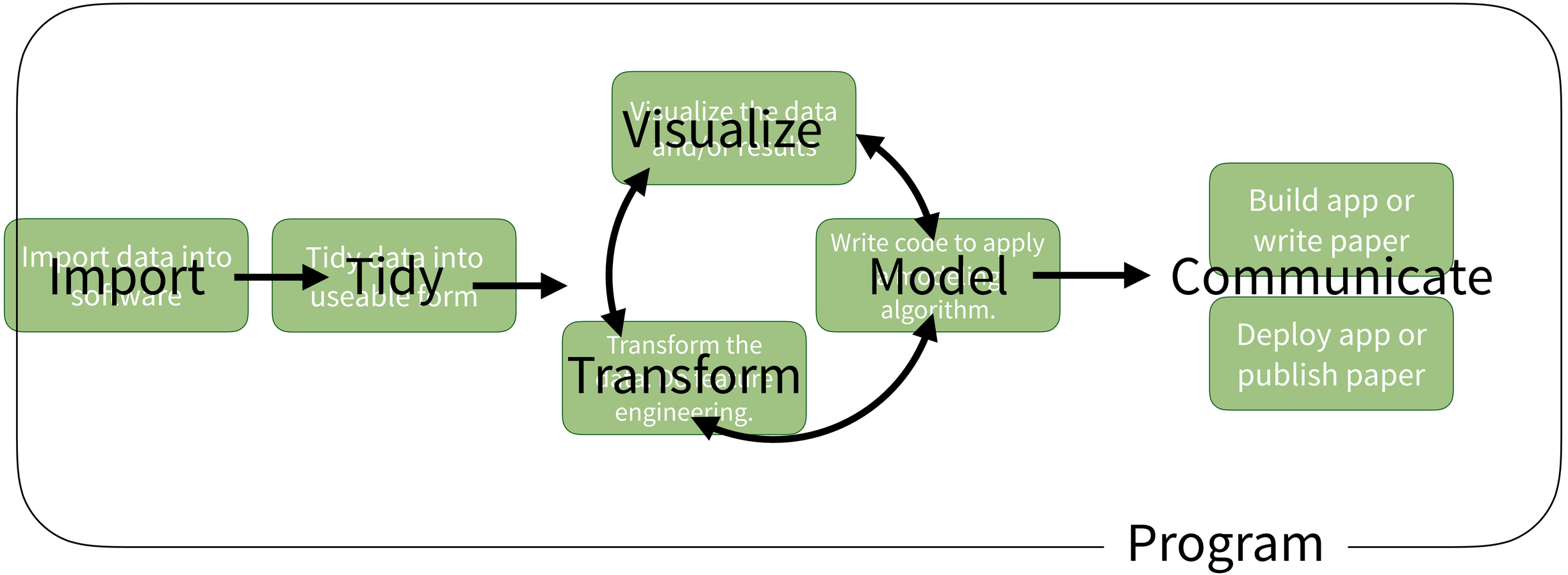
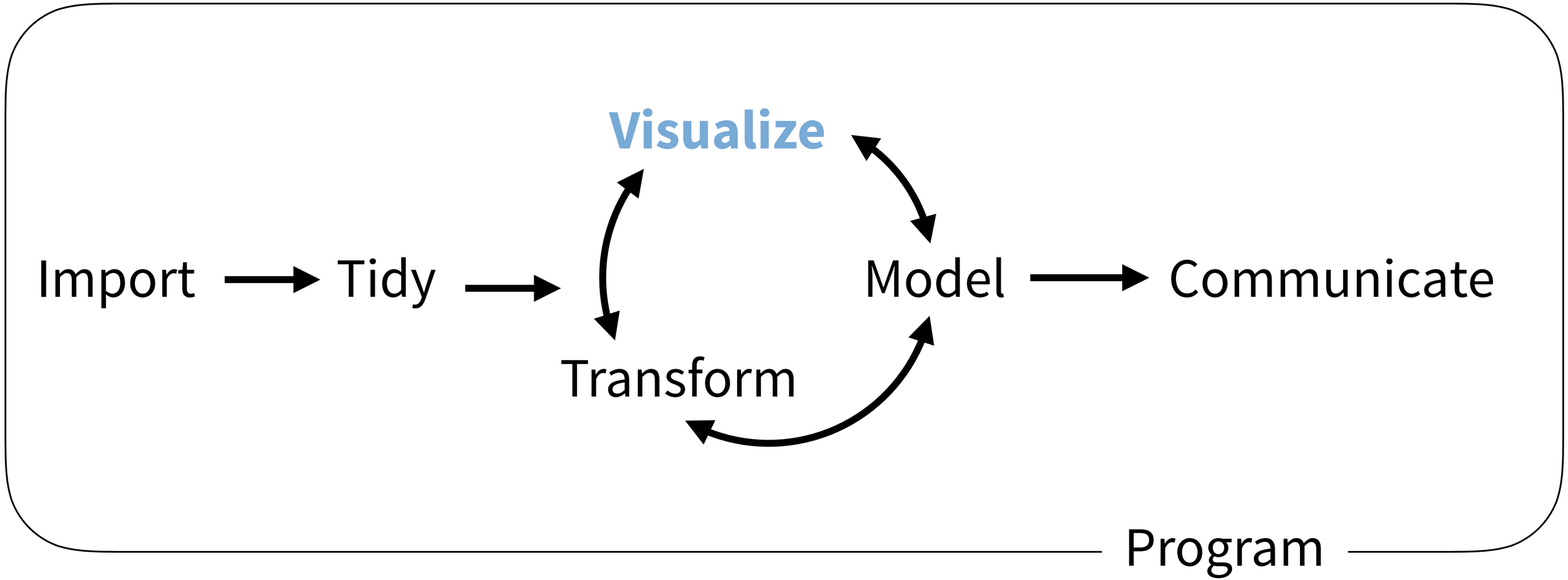
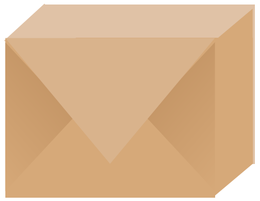
(Applied) **Data Science**



(Applied) **Data Science**



tidyverse



An R package that serves as a short cut for installing and loading the components of the tidyverse.

```
install.packages("tidyverse")
```

does the equivalent of

```
install.packages("ggplot2")
install.packages("dplyr")
install.packages("tidyr")
install.packages("readr")
install.packages("purrr")
install.packages("tibble")
install.packages("hms")
install.packages("stringr")
install.packages("lubridate")
install.packages("forcats")
install.packages("DBI")
install.packages("haven")
install.packages("httr")
install.packages("jsonlite")
install.packages("readxl")
install.packages("rvest")
install.packages("xml2")
install.packages("modelr")
install.packages("broom")
```

```
install.packages("tidyverse")
```

does the equivalent of

```
install.packages("ggplot2")
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install.packages("modelr")
install.packages("broom")
```

```
library("tidyverse")
```

does the equivalent of

```
library("ggplot2")
library("dplyr")
library("tidyr")
library("readr")
library("purrr")
library("tibble")
```

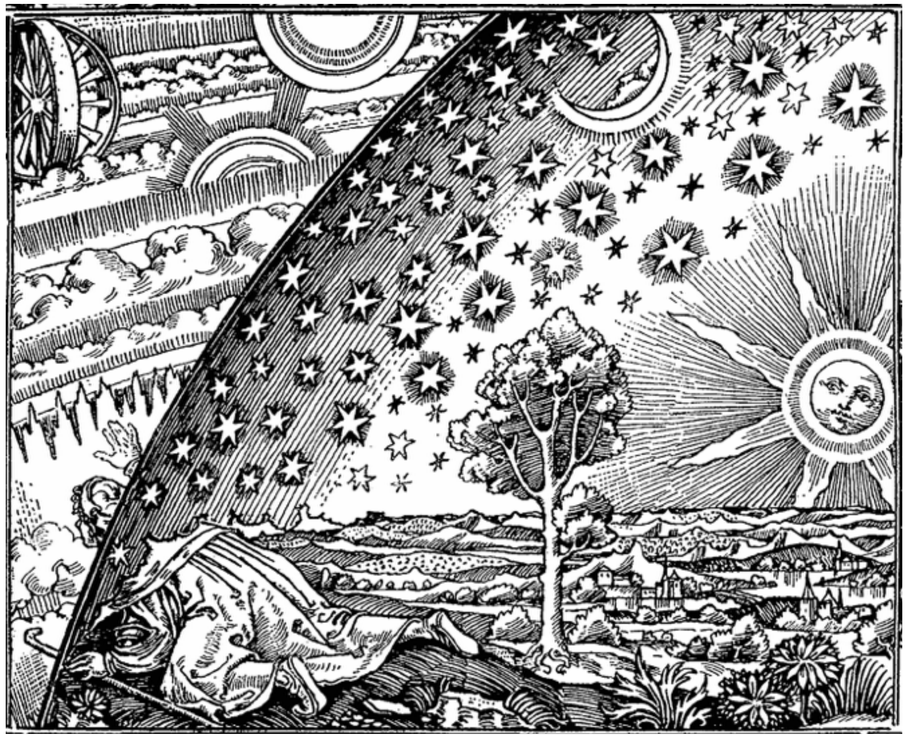
Your Turn

Individually:

Run the code below to load the core tidyverse packages, including ggplot2, dplyr, and tidyr.

```
library(tidyverse)
```

Master the Tidyverse



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