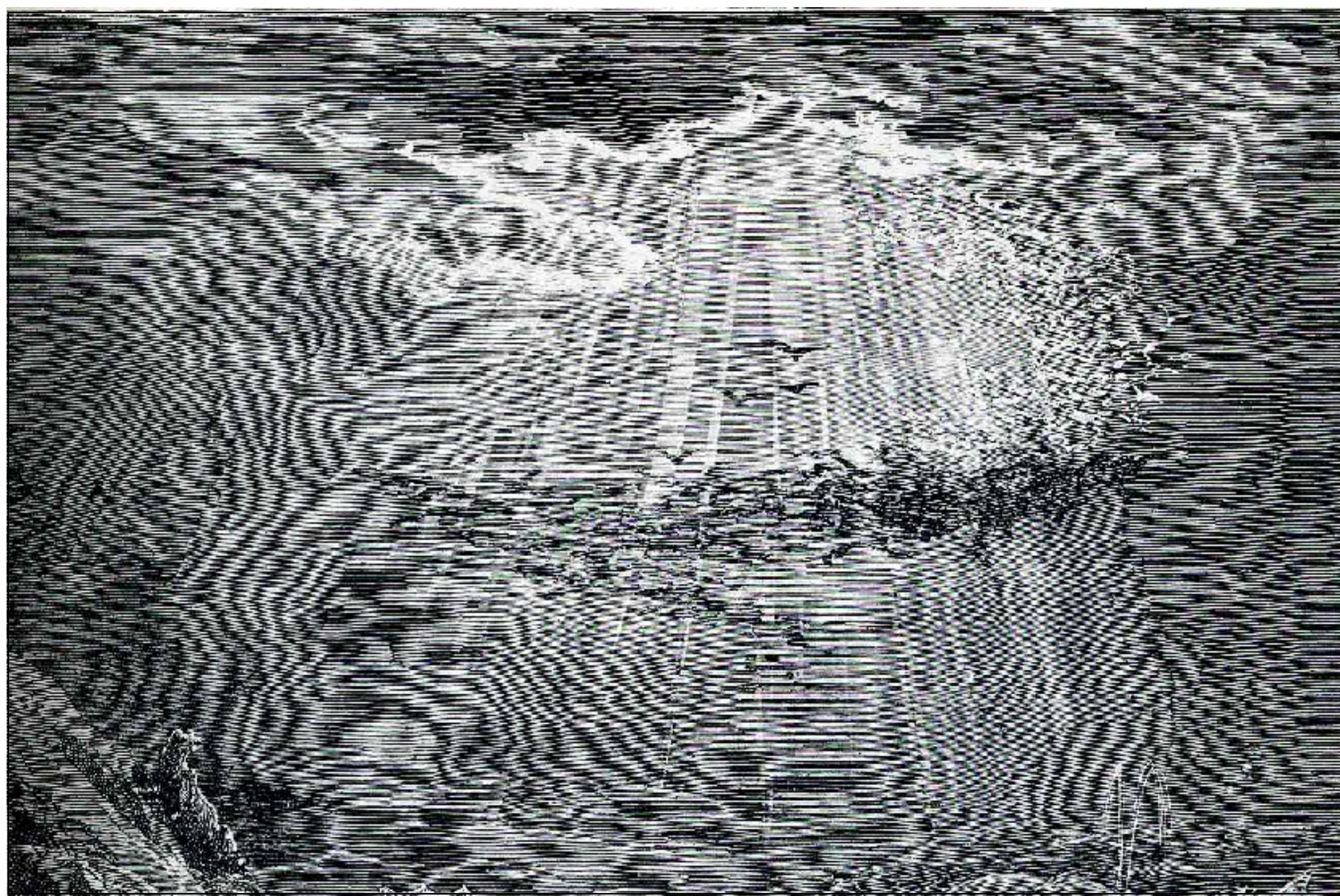


Providing R



I D E



Quiz

Where do you get R?

Quiz

Where do you get R?

cran.r-project.org

Quiz

Where do you get RStudio?

www.rstudio.com/download

Quiz

Where do you get RStudio?

Quiz

Where do you get R Packages?

Quiz

Where do you get R Packages?

cran.r-project.org

github.com

(from R)

Quiz

Should you have students install R?

Your Turn

Should you have students install R?

Think of a couple of good reasons to have students install R and a couple of good reasons to **not** have them install R.

After 2 minutes, debate in your group and vote on one or another.



Installation

Thank you for enrolling in Master the Tidyverse.

Please bring a laptop to class that has the following installed:

1. A recent version of R (~3.4.3), which is available for free at <cran.r-project.org>
2. A recent version of RStudio IDE (~1.1.4), available for free at <www.rstudio.com/download>
3. The R packages we will use, which you can install by connecting to the internet, opening R, and running:

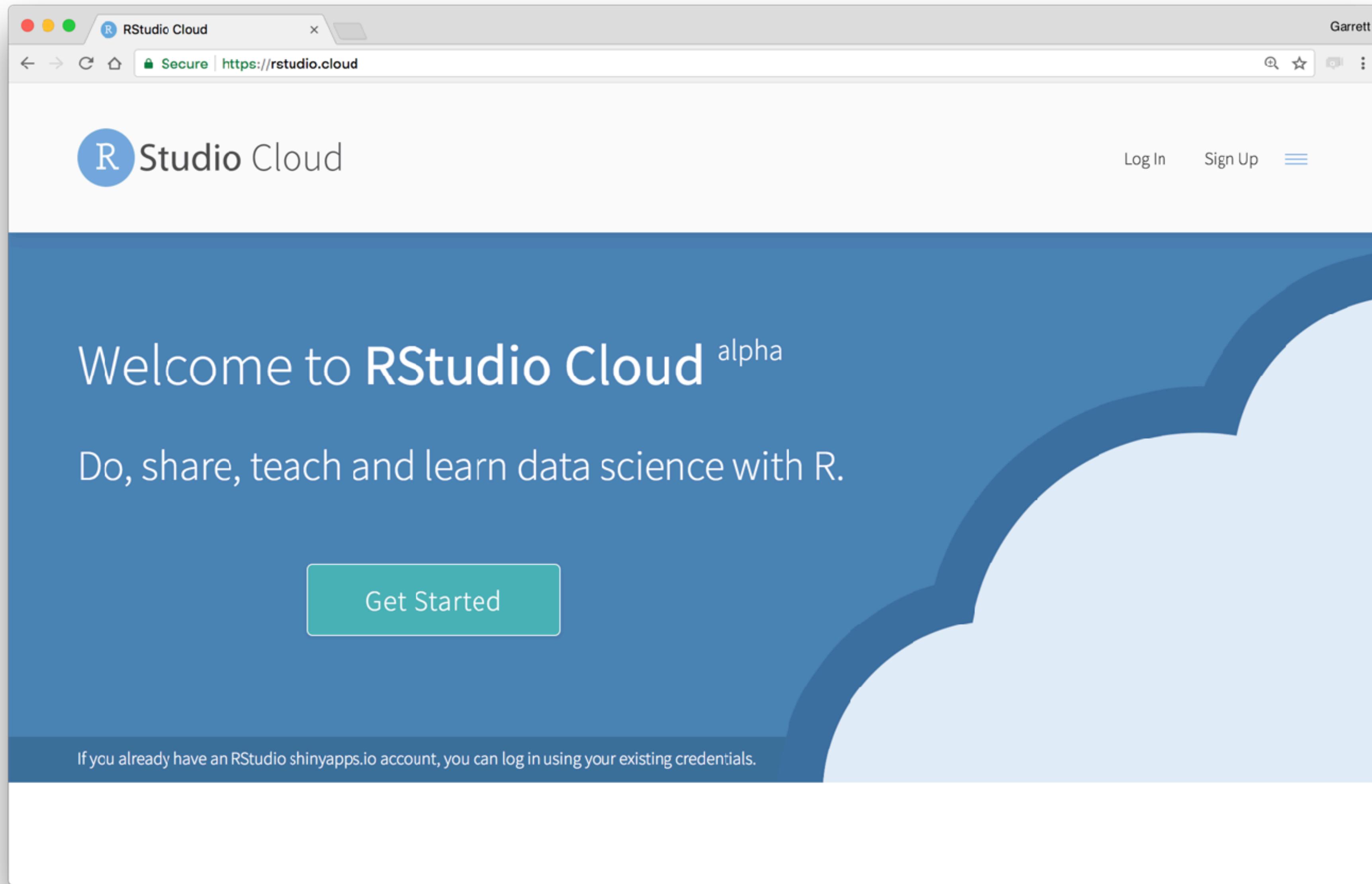
```
install.packages(c("babynames", "formatR", "gapminder", "hexbin", "mgcv", "maps",
"mapproj", "nycflights13", "tidyverse", "viridis"))
```

4. The class materials, which can be downloaded at
<<https://github.com/rstudio/master-the-tidyverse/archive/master.zip>>

And don't forget your power cord!

pre-workshop-instructions.md

<https://rstudio.cloud>



Your Turn

Read the RStudio Cloud guide. Use it to complete the handout challenges.

Notebooks

R

R Notebooks

An authoring format for Data Science.

The screenshot shows the RStudio interface with an R Notebook open. The notebook file is titled "R-Notebook.Rmd". The code editor pane contains the following R Markdown code:

```
1 ---  
2 title: "R Notebook"  
3 output: html_notebook  
4 ---  
5  
6 Text written in **markdown**  
7  
8 ```{r}  
9 # code written in R  
10 (x <- rnorm(7))  
11 ...  
12  
13 Text written in _markdown_  
14  
15 ```{r}  
16 # code written in R  
17 hist(x)  
18 ...  
18:4 (Top Level) ↓  
Console
```

The code editor has three callout boxes with arrows pointing to specific elements:

- A light gray callout box points to the green "Run All" button at the top right of the code editor area, containing the text: "Click to run all code chunks above".
- A medium gray callout box points to the green "Run Current Chunk" button in the toolbar, containing the text: "Click to run code in chunk".
- A dark gray callout box points to the output pane below the code editor, containing the text: "Code result".

The output pane displays the result of the R code execution:

```
[1] -1.2 1.0 -0.5 0.9 -0.6 -1.1 -1.5
```

Your Turn

Open the master the tidyverse project. Then do the same notebook exercise that the students do.

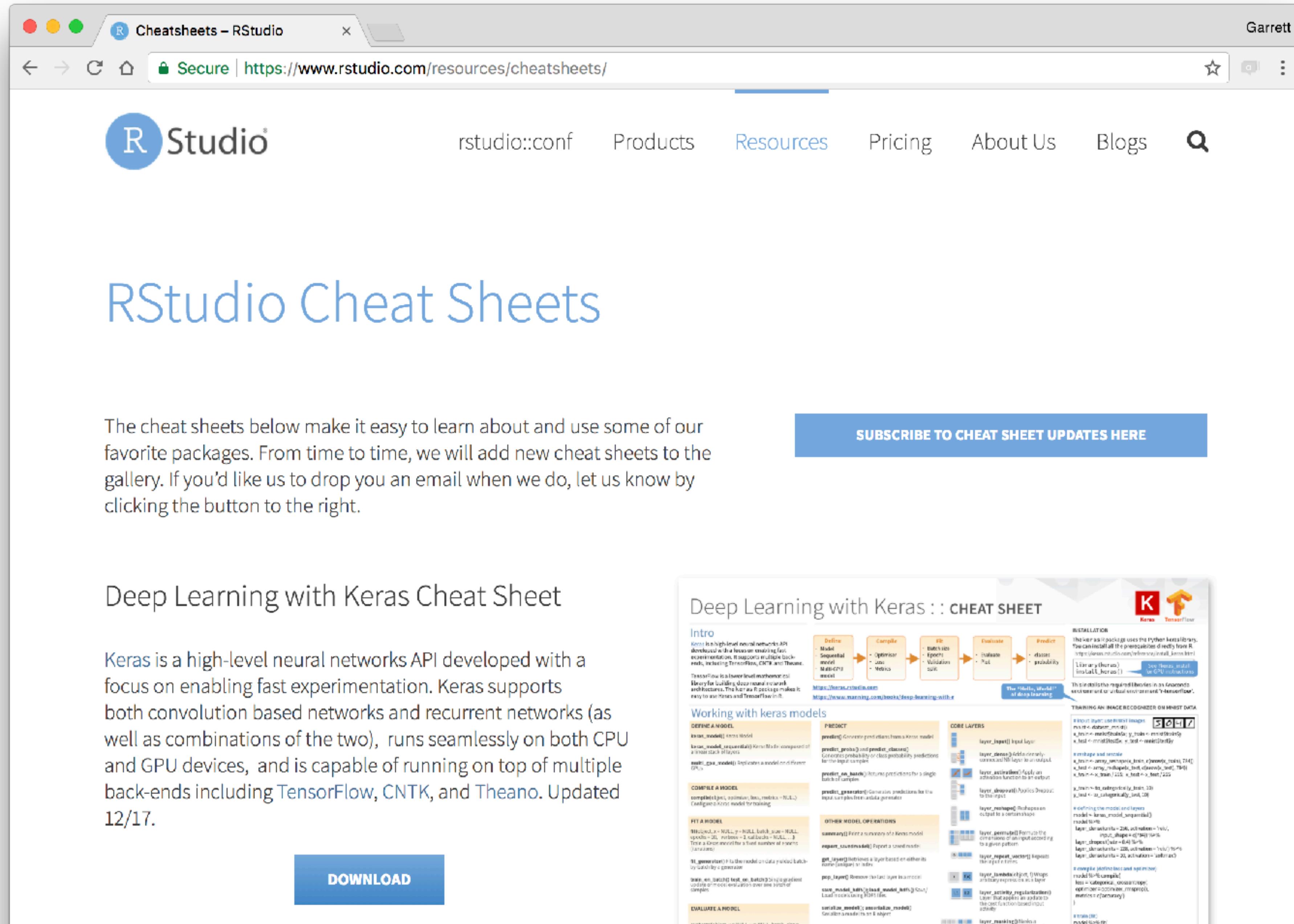
Handouts

R

Quiz

Are there any pre-made handouts for a course on the tidyverse?

www.rstudio.com/resources/cheatsheets



The screenshot shows the RStudio Cheat Sheets page. At the top, there's a navigation bar with links for "rstudio::conf", "Products", "Resources", "Pricing", "About Us", and "Blogs". A search icon is also present. Below the navigation, the title "RStudio Cheat Sheets" is displayed in a large blue font. To the left, a text block says: "The cheat sheets below make it easy to learn about and use some of our favorite packages. From time to time, we will add new cheat sheets to the gallery. If you'd like us to drop you an email when we do, let us know by clicking the button to the right." To the right, there's a blue button labeled "SUBSCRIBE TO CHEAT SHEET UPDATES HERE". Further down, there's a section titled "Deep Learning with Keras Cheat Sheet" with a "DOWNLOAD" button. On the right side, there's a detailed "Deep Learning with Keras :: CHEAT SHEET" document.

The "Deep Learning with Keras :: CHEAT SHEET" document includes sections for "INTRO", "INSTALLATION", "DEFINE A MODEL", "WORKING WITH KERAS MODELS", "COMPILE A MODEL", "FIT A MODEL", "OTHER MODEL OPERATIONS", and "EVALUATE A MODEL". It features various code snippets and diagrams illustrating the usage of Keras and TensorFlow.

INTRO
Keras is a high-level neural networks API developed with a focus on enabling fast experimentation. It supports multiple backends, including TensorFlow, CNTK, and Theano. TensorFlow is a lower-level interface for building deep neural network architectures. The Keras package makes it easy to use TensorFlow in R.

INSTALLATION
The Keras package uses the Python keras library. You can install all the prerequisites directly from R: <https://keras.rstudio.com/reference/install.html>.
Library (R) See [here](#); `install_keras()`

DEFINE A MODEL
`keras_model()` Create a Keras Model composed of a stack of layers.
`multi_gpu_model()` Replicate a model on multiple GPUs.

WORKING WITH KERAS MODELS
`predict()` Generate predictions from a Keras model.
`predict_proba()` Generates probability or class probability predictions for the input samples.
`predict_on_batch()` Returns predictions for a single batch of samples.

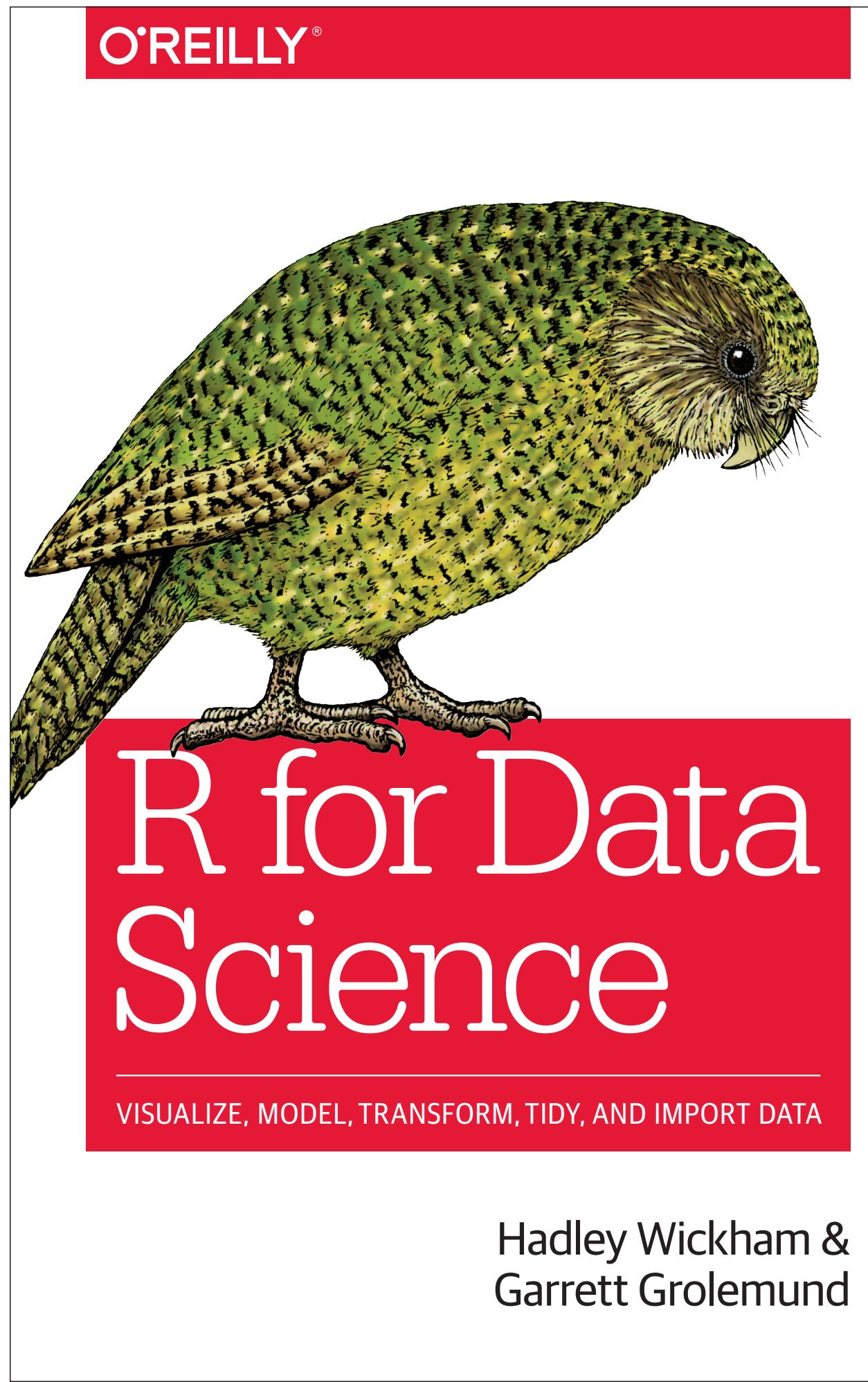
COMPILE A MODEL
`compile(optimizer, loss, metrics = NULL)` Configure a Keras model for training.

FIT A MODEL
`fit(x = NULL, y = NULL, batch_size = NULL, epochs = 10, validation_steps = 1, validation_data = NULL, ...)` Train a Keras model for a fixed number of epochs (iterations).

OTHER MODEL OPERATIONS
`summary()` Print a summary of a Keras model.
`remove_layer(model)` Remove a given layer from a Keras model.
`get_layer(index)` Retrieve a layer based on its index (integer or index).

EVALUATE A MODEL
`evaluate(model, x = NULL, y = NULL, batch_size = 10, verbose = 1, callbacks = NULL, steps = NULL, ...)` Compute model metrics over one batch of samples.

DOWNLOAD



<http://r4ds.had.co.nz>

R for Data Science

Garrett

Welcome

1 Introduction

I Explore

2 Introduction

3 Data visualisation

3.1 Introduction

3.2 First steps

3.3 Aesthetic mappings

3.4 Common problems

3.5 Facets

3.6 Geometric objects

3.7 Statistical transformations

3.8 Position adjustments

3.9 Coordinate systems

3.10 The layered grammar of graphics

4 Workflow: basics

5 Data transformation

6 Workflow: scripts

7 Exploratory Data Analysis

8 Workflow: projects

II Wrangle

9 Introduction

10 Tibbles

11 Data import

12 Tidy data

13 Relational data

3 Data visualisation

3.1 Introduction

"The simple graph has brought more information to the data analyst's mind than any other device."
— John Tukey

This chapter will teach you how to visualise your data using ggplot2. R has several systems for making graphs, but ggplot2 is one of the most elegant and most versatile. ggplot2 implements the **grammar of graphics**, a coherent system for describing and building graphs. With ggplot2, you can do more faster by learning one system and applying it in many places.

If you'd like to learn more about the theoretical underpinnings of ggplot2 before you start, I'd recommend reading "The Layered Grammar of Graphics", <http://vita.had.co.nz/papers/layers-grammar.pdf>.

3.1.1 Prerequisites

This chapter focusses on ggplot2, one of the core members of the tidyverse. To access the datasets, help pages, and functions that we will use in this chapter, load the tidyverse by running this code:

```
library(tidyverse)
#> Loading tidyverse: ggplot2
#> Loading tidyverse: tibble
#> Loading tidyverse: tidyverse
#> Loading tidyverse: readr
#> Loading tidyverse: purrr
#> Loading tidyverse: dplyr
#> Conflicts with tidy packages -----
```

Providing R

