R Module 3

Connor Gibbs*

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Contents

1 Welcome!

Hi, and welcome to the R Module 3 course at Colorado State University!

This course is the third of three 1 credit courses intended to introduce the R programming language, specifically R Markdown.

Through this Module (course), we'll explore how R can be used to do the following:

1. Create reproducible reports so you can explain your work in a narrative form
2. Track, accept, and revert changes through version control
3. Share code and collaborate with others

In addition, you'll also be exposed to broader concepts, including:

1.
2.
3.
4.

1.0.1 How To Navigate This Book

To move quickly to different portions of the book, click on the appropriate chapter or section in the the table of contents on the left. The buttons at the top of the page allow you to show/hide the table of contents, search the book, change font settings, download a pdf or ebook copy of this book, or get hints on various sections of the book. The faint left and right arrows at the sides of each page (or bottom of the page if it's narrow enough) allow you to step to the next/previous section. Here's what they look like:

*Department of Statistics, Colorado State University, connor.gibbs@colostate.edu

Figure 1: Left and right navigation arrows

1.0.2 Associated CSU Course

This bookdown book is intended to accompany the associated course at Colorado State University, but the curriculum is free for anyone to access and use. If you're reading the PDF or EPUB version of this book, you can find the "live" version at https://csu-r.github.io/Module3/, and all of the source files for this book can be found at https://github.com/CSU-R/Module3.

If you're not taking the CSU course, you will periodically encounter instructions and references which are not relevant to you. For example, we will make reference to the Canvas website, which only CSU students enrolled in the course have access to.

1.1 Special Boxes

Because I have a poor memory, I am putting the boxes here as a reference while I write this.

2 R Markdown

> "The success of your presentation will be judged not by the knowledge you send but by what the listener receives." —Lilly Walters, Author

Most scientific disciplines require the investigator to relay her findings through reports or presentations. These reports often consist of human readable text, such as the investigator's description of methods. Tables and figures are often used throughout to support the investigator's description or perhaps to convey the results. Sometimes the investigator may even be required to provide code, perhaps illustrating how her methods can be implemented. Of course, all of these text, graphics, and code are well organized by headers and subheaders where certain information is highlighted by adjusting the placement (e.g. centering figures or spacing paragraphs) or changing the topography (e.g. switching fonts, bolding definitions, or italicizing jargon).

In this chapter, we will introduce R Markdown, an environment allowing you create reports, presentations, and much more from the comfort of RStudio. This allows you to combine information such as text, code, and figures easily and reliably.

Caution Learning R Markdown may feel daunting at first. Unlike Microsoft Office products, you will not be able to click and drag to move items. Instead, the "look" of your R Markdown document are generated by templates and personalized by the syntax of your R Markdown file. With practice, you will learn how to custimize your documents to your liking and integrating information from different mediums (e.g. text and code) will be easier than ever before.

2.1 Background

To understand R Markdown, we first need to tackle Markdown. According to its website, Markdown is a markup language you can use to format virtually any document. Unlike Microsoft Word and other WYSIWYG editors, you make changes to a document by adding syntax to text rather than using buttons and

menus. In essence, Markdown syntax are code which need to be processed before the content can be viewed as HTML. One such markdown processor is pandoc which we will see again soon.

To simplify things, R Markdown is a variant of Markdown created by RStudio to incorporate the functionality of Markdown and R. With R Markdown, you can combine human readable text, code, and figures to create a document. While R Markdown is incredibly robust, allowing you to make reports, presentations, and even dashboards, we will start by focusing on the simplest case: creating a report.

Caution It is easy to confuse R, R Markdown, and RStudio. Try your best to separate these ideas from one another. R is a statistical programming language (proclaimed as a software environment for statistical computing and graphics), whereas R Markdown is a markup language (think of this as an environment for creating a document). RStudio, on the other hand, is the most popular integrated development environment (or IDE, for short) for R. RStudio, like good IDEs should, makes it easier for you to code in R by providing a user friendly landscape to write, run, and debug code.

2.2 Creation

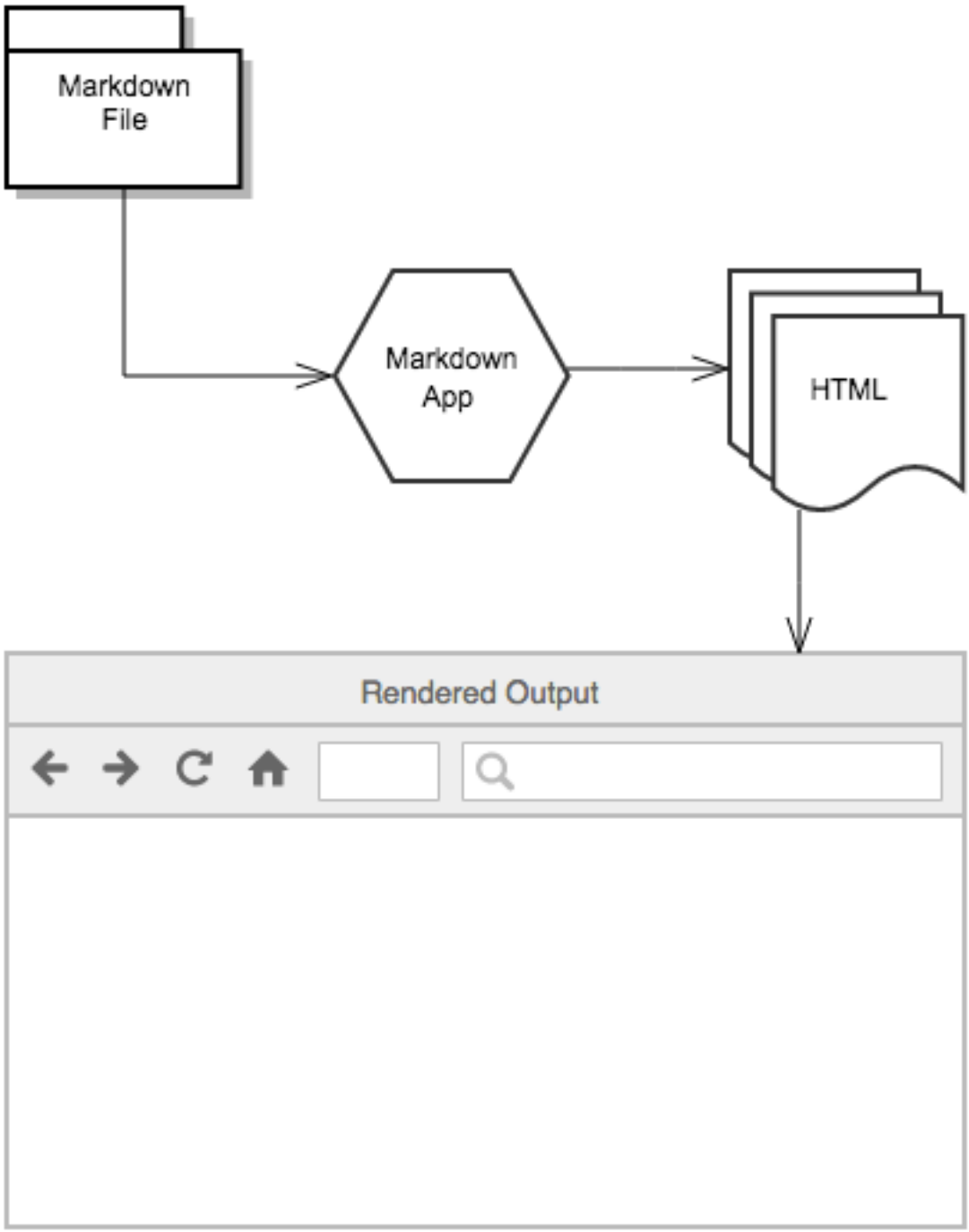

Figure 2: schmatic diagram describing how markdown is rendered