

Markdown Tutorial

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9/20/2021

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

What is R Markdown?

Markdown is a lightweight markup language that you can use to add formatting elements to plaintext text documents.

Why Use Markdown?

- Markdown can be used for everything. People use it to create websites, documents, notes, books, presentations, email messages, and technical documentation.
- Markdown is portable.
- Markdown is platform independent. You can create Markdown-formatted text on any device running any operating system.
- Markdown is everywhere. Websites like Reddit and GitHub support Markdown, and lots of desktop and web-based applications support it.

R Markdown is an open-source tool for producing reproducible reports in R. It enables you to keep all of your code, results, plots, and writing in one place. R Markdown provides an authoring framework for data science. You can use a single R Markdown file to both :-

1. save and execute code.
2. generate high quality reports that can be shared with an audience.

R Markdown documents are fully reproducible and support dozens of static and dynamic output formats.

R Markdown is particularly useful when you are producing a document for an audience that is interested in the results from your analysis, but not your code.

With R Markdown, you have the option to export your work to numerous numerous formats including PDF, Microsoft Word, a slideshow, or an HTML document for use in a website.

We'll use the RStudio integrated development environment (IDE) to produce our R Markdown reference guide.

Workflow:

1. Open a new .Rmd File
2. Write/ Edit your document - add tables, figures, citations, etc.
3. Knit document to create report - set output formats and options in the YAML header
4. Save and Render
5. Share your work(if interested)

Installing R Markdown:

```
install.packages("rmarkdown")
```

Install LaTeX (TinyTeX) for PDF reports:

```
tinytex::install_tinytex()
```

To uninstall TinyTeX, run

```
tinytex::uninstall_tinytex()
```

When R Markdown is converted to PDF, Pandoc converts Markdown to an intermediate LaTeX document first. The R package tinytex has provided helper functions to compile LaTeX documents to PDF.

Code Chunks and Inline R Code:-

A code chunk usually starts with “`{`” and ends with “`}`”. You can write any number of lines of code in it. Inline R code is embedded in the narratives of the document using the syntax `r`

Compile an R Markdown Document:-

- The usual way to compile an R Markdown document is to click the Knit button as shown in Figure 2.1, and the corresponding keyboard shortcut is Ctrl + Shift + K (Cmd + Shift + K on macOS).
- RStudio calls the function `rmarkdown::render()` to render the document in a new R session.
- If you want to render a document in the current R session, you can also call `rmarkdown::render()` by yourself, and pass the path of the Rmd file to this function.
- The second argument of this function is the output format, which defaults to the first output format you specify in the YAML metadata (if it is missing, the default is `html_document`).
- When you have multiple output formats in the metadata, and do not want to use the first one, you can specify the one you want in the second argument, e.g., for an Rmd document `foo.Rmd` with the metadata:

You can render it to PDF via:

```
{rmarkdown::render('foo.Rmd', 'pdf_document')}
```

Output Formats:

Output formats in R Markdown can be broadly classified into two categories:

1.Documents 2.Presentations

Some common types of Documents that can be created using R Markdown:

1. word_document
2. pdf_document
3. latex_document
4. html_document
5. github_document

Some common types of Presentations that can be created using R Markdown:

1. powerpoint_presentation
2. beamer_presentation
3. ioslides_presentation
4. slidy_presentation

Common Markdown Features:

1. Text Formats
2. Lists
3. Hyperlinks
4. Mathematical Expressions
5. Images and Tables with Captions
6. Templates
7. Speakers' Notes (Especially when creating presentations)

Document Elements:

A.) Insert page breaks:

- When you want to break a page, you can insert the command `{\newpage}` in the document.
- It is a LaTeX command, but the rmarkdown package is able to recognize it for both LaTeX output formats and a few non-LaTeX output formats including HTML, Word, and ODT.

Note : For HTML output, page breaks only make sense when you print the HTML page, otherwise you will not see the page breaks, because an HTML page is just a single continuous page.

B.) Combine words into a comma separated phrase:

- The function `{knitr::combine_words()}` can be used to concatenate words into a phrase regardless of the length of the character vector.
- Basically, for a single word, it will just return this word; for two words A and B, it returns “A and B”; for three or more words, it returns “A, B, C, . . . , Y, and Z”.
- The function also has a few arguments that can customize the output.

Examples:

```
v <- c("apple", "banana", "cherry") knitr::combine_words(v)
output : apple, banana, and cherry
```

```
knitr::combine_words(v, before = "'", after = "'")
output: 'apple', 'banana', and 'cherry'
```

```
knitr::combine_words(v, and = "")  
output: apple, banana, cherry  
  
knitr::combine_words(v, sep = " / ", and = "")  
output: apple / banana / cherry  
  
knitr::combine_words(v[1]) # a single word  
output: apple  
  
knitr::combine_words(v[1:2]) # two words  
output: apple and banana  
  
knitr::combine_words(LETTERS[1:5])  
output: A, B, C, D, and E
```

Formatting:

We will look at a small task of creating interesting presentations using R Markdown which would give us an overall review of the various formatting and other advanced features offered by R Markdown.

Assignments/Take Home Task:

Create a PDF LaTeX Beamer Presentation OR HTML Ioslides Presentation of about 7 - 10 slides in R Markdown. Please note that you are advised not to create a PowerPoint Presentation since that is already being discussed in the class.

Thank You!

References:

1. <https://bookdown.org/yihui/rmarkdown-cookbook>
2. <https://bookdown.org/yihui/rmarkdown/>
3. R Markdown Cheatsheets (shared in the Google Drive Folder)