R Markdown

The Johns Hopkins Data Science Lab

Introduction

R Markdown is built into RStudio and allows you to create documents like HTML, PDF, and Word documents from R. With R Markdown, you can embed R code into your documents.

Why use R Markdown?

- Turn work in R into more accessible formats
- Incorporate R code and R plots into documents
- R Markdown documents are reproducible – the source code gets rerun every time a document is generated, so if data change or source code changes, the output in the document will change with it.

Getting Started

- Create a new R Markdown file in RStudio by going to File $>$ New File $>$ R Markdown...
- Click the "presentation" tab
- Enter a title, author, and select what kind of slideshow you ultimately want (this can all be changed later)

Getting Started

The beginning of an R Markdown file looks like this: `---`
`title: "Air Quality"`
`author: "JHU"`
`date: "May 17, 2016"`
`output: html_document`
`---` The new document you've created will contain example text and code below this – delete it for a fresh start.

Making Your First Slide

- Title your first slide using two # signs: `## Insert Title Here`
- To make a slide without a title, use three asterisks: `***`
- You can add subheadings with more # signs: `### Subheading` or `#### Smaller Subheading`
- To add a new slide, just add another Title: `## New Slide Title`

Adding Text

- Add bullet points to a slide using a hyphen followed by a space: `- bullet point`
- Add sub-points using four spaces and a plus sign: `+ sub-point`
- Add an ordered list by typing the number/letter: `1. first point` `a) sub-sub-point`
- Add bullet points that appear one by one (on click) with: `>- iterated bullet point`

Formatting Text

Text	Code in R Markdown
plain text	`plain text`
italics	`*italics*`
bold	`**bold**`
link	`[link](http://www.jhsph.edu)`
`verbatim code`	`` `code here` ``

Embedding R Code

This is a chunk of R code in R Markdown: “‘{r}
`head(airquality)` “‘
The code gets run, and both the input and output are displayed.

```r
head(airquality)
```

```
##   Ozone Solar.R Wind Temp Month Day
## 1    41     190  7.4   67     5   1
## 2    36     118  8.0   72     5   2
## 3    12     149 12.6   74     5   3
## 4    18     313 11.5   62     5   4
## 5    NA      NA 14.3   56     5   5
## 6    28      NA 14.9   66     5   6
```

Embedding R Code

To hide the input code, use `echo=FALSE`. ```{r, echo=FALSE}
head(airquality)
```

```
##   Ozone Solar.R Wind Temp Month Day
## 1    41     190  7.4   67     5   1
## 2    36     118  8.0   72     5   2
## 3    12     149 12.6   74     5   3
## 4    18     313 11.5   62     5   4
## 5    NA      NA 14.3   56     5   5
## 6    28      NA 14.9   66     5   6
```

This can be useful for showing plots.
```

Embedding R Code

To show the input code only, use `eval=FALSE`. ```{r, eval=FALSE}
`head(airquality)` ```

```r
head(airquality)
```

Embedding R Code

To run the code without showing input or output, use `include=FALSE`. ```{r, include=FALSE} `library("ggplot2")` ```

Generating Slideshows

- Click the **Knit** button at the top of the R Markdown document to generate your new document.
  - You may be asked to install required packages if you don't already have them installed
- You can change the type of document generated by changing the `output` line in the header, or by selecting an output from the **Knit** button's pull-down menu.

Generating Slideshows

- HTML: two options with different looks
  - `output: ioslides_presentation`
  - `output: slidy_presentation`
- PDF: `output: beamer_presentation`
- Note: You can specify multiple outputs at the beginning of the R Markdown file if you will need to generate multiple filetypes.

PDFs and LaTeX

- To **knit** a PDF slideshow, you will need to install **LaTeX** on your computer
- LaTeX is a typesetting system that is needed to convert R Markdown into formatted text for PDFs

Downloading and Installing LaTeX

- *LaTeX* is free
- LaTeX takes up a lot of space (almost ~2.6 GB download and takes up ~5 GB when installed)
- Visit `https://www.tug.org/begin.html` to download LaTeX for your operating system
- Depending on your internet connection, it may take a while to download due to its size

Customizing Output Options

- The gear button next to the Knit button opens a settings window
- Depending on the type of document you are planning to generate
  - Change the overall appearance/theme of the document
  - Change figure sizes
  - Add custom CSS
  - Include a logo
  - And more

Conclusion

For more information about R Markdown visit
`http://rmarkdown.rstudio.com/`