

Lab5: RMarkdown 简介 + 操作

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- 1 Review previous lectures
- 2 Why use RMarkdown?
- 3 Getting started
- 4 Basic Syntax in RMarkdown
- 5 Other formats
- 6 RMarkdown for Presentations
- 7 Resources and References

Section 1

Review previous lectures

What we have practiced so far

- Loaded the necessary libraries

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- Loaded the necessary libraries
- Read the data into R

What we have practiced so far

- Loaded the necessary libraries
- Read the data into R
- Cleaned and reorganized data

What we are going to learn next

- Build models to analysis the data

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- Write a *beautiful* report in desirable formats

What we are going to learn next

- Build models to analysis the data
- Write a *beautiful* report in desirable formats
- All steps above constitute a entire **workflow** of data analysis.

Section 2

Why use RMarkdown?

What is Markdown?

- Markdown: 是一种轻量级的标记语言，它允许人们使用**易读易写的纯文本格式编写文档**，然后转换成有效的 XHTML（或者 HTML）文档。（维基百科）。

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- 具有简介的语法、优美的格式以及多种软件的支持, 因此是目前**互联网上最流行的写作程式**。

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- 简单讲: 容易学 + 兼容性强 + 功能强大

Word is far from perfect

- 先看我们最常用的但也无比糟糕的 **Word**

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 - 与其他软件相结合能力差，无法单独生成**动态文档**。

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 - 与其他软件相结合能力差，无法单独生成**动态文档**。
 - 团队协作能力差。

Markdown is more popular in scientific writing?

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- 可以与统计软件相结合，生成**动态文档**。

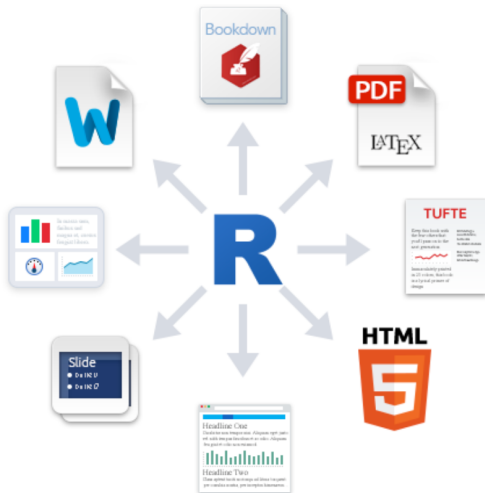
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- 可以与统计软件相结合，生成**动态文档**。
- 与 Github 应用相结合，可以实现版本控制和程式化协作。（What is Github?）

What is RMarkdown?

- 在 RStudio 中, 基于 Markdown 语法, 结合 R 的功能的文档处理套件。



Yihui Xie and knitr package

- Developed by a Chinese leading figure in R field: **Yihui Xie**(谢益辉)



Yihui Xie and knitr package

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- COS 访谈第 20 期: 千秋邈矣独留我, 百战归来再读书: 谢益辉

Section 3

Getting started

Build a Project

- Recall how to creat a project within RStudio

Build a Project

- Recall how to creat a project within RStudio
- Why?

Install and Library Packages

- (if necessary) install packages

```
#install.packages("rmarkdown")  
#install.packages("knitr")  
#library("rmarkdown")  
#library("knitr")
```

Install and Library Packages

- (if necessary) install packages
 - **rmarkdown**

```
#install.packages("rmarkdown")  
#install.packages("knitr")  
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Install and Library Packages

- (if necessary) install packages
 - **rmarkdown**
 - **knitr**

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

Generate a document

- Static

Generate a document

- Static
 - Document: **Html, Word, LaTeX,**

Generate a document

- Static
 - Document: **Html, Word, LaTeX,**
 - Presentation: **Html, Beamer in LaTeX, Powerpoint**

Generate a document

- Static
 - Document: **Html, Word, LaTeX,**
 - Presentation: **Html, Beamer in LaTeX, Powerpoint**
 - Notebook: **html**

Generate a document

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 - Document: **Html, Word, LaTeX,**
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- Dynamic

Generate a document

- Static
 - Document: **Html, Word, LaTeX,**
 - Presentation: **Html, Beamer in LaTeX, Powerpoint**
 - Notebook: **html**
- Dynamic
 - Shiny

Introduction to Rmarkdown

- .Rmd format

Introduction to Rmarkdown

- .Rmd format
- Document:

Introduction to Rmarkdown

- .Rmd format
- Document:
 - Html

Introduction to Rmarkdown

- .Rmd format
- Document:
 - Html
 - Word (requires you install MS Word)

Introduction to Rmarkdown

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- Document:
 - Html
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 - PDF (requires you install LaTeX system)

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Introduction to Rmarkdown

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 - Html
 - Word (requires you install MS Word)
 - PDF (requires you install LaTeX system)
- Presentation
 - Html: ioslides & Slidify

Introduction to Rmarkdown

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- Document:
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 - Word (requires you install MS Word)
 - PDF (requires you install LaTeX system)
- Presentation
 - Html: ioslides & Slidify
 - PDF: beamer of LaTeX system (requires you install LaTeX system)

Introduction to Rmarkdown

- .Rmd format
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 - Html
 - Word (requires you install MS Word)
 - PDF (requires you install LaTeX system)
- Presentation
 - Html: ioslides & Slidify
 - PDF: beamer of LaTeX system (requires you install LaTeX system)
 - Powerpoint: (requires you install MS Powerpoint)

Generate a html file(default)

- small size

Generate a html file(default)

- small size
- easy to compile

Generate a html file(default)

- small size
- easy to compile
- can transfer to Word or PDF later

Section 4

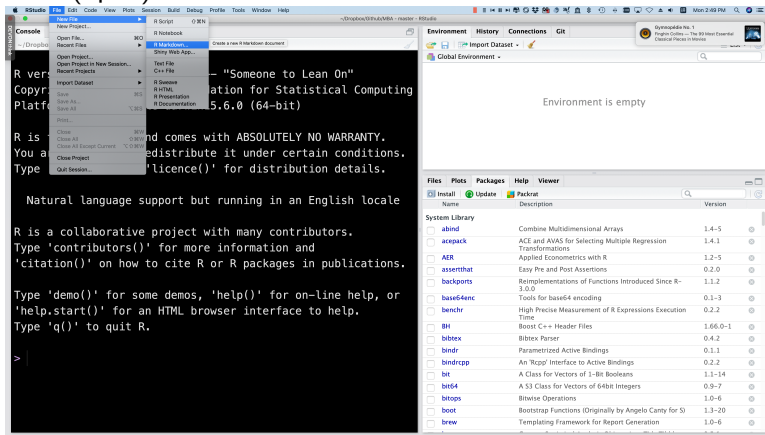
Basic Syntax in RMarkdown

Introduction

- Let's try it by using a default template.

Introduction

- Let's try it by using a default template.
- Creat(open) a RMarkdown file

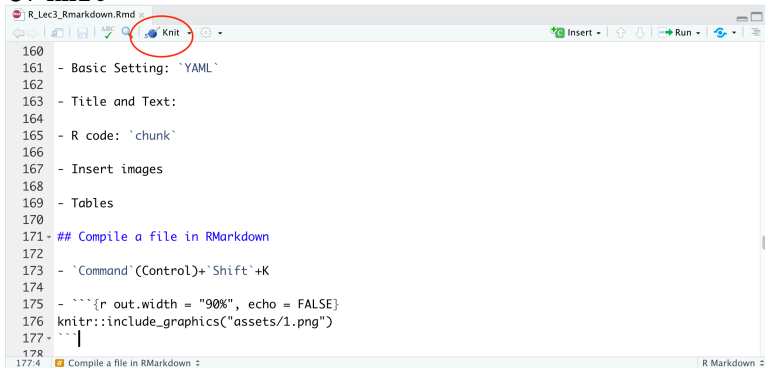


Compile a file in RMarkdown

- `Command(Control)+Shift+K`

Compile a file in RMarkdown

- Command(Control)+Shift+K
- Or knit



```

160
161 - Basic Setting: `YAML`
162
163 - Title and Text:
164
165 - R code: `chunk`
166
167 - Insert images
168
169 - Tables
170
171- ## Compile a file in RMarkdown
172
173 - `Command`(Control)+`Shift`+K
174
175 - ```{r out.width = "90%", echo = FALSE}
176   knitr::include_graphics("assets/1.png")
177- ```
178
177:4  Compile a file in RMarkdown
R Markdown

```

The Structure of a rmarkdown template

- Basic Settings: YAML

The Structure of a rmarkdown template

- Basic Settings: YAML
- Titles and Texts:

The Structure of a rmarkdown template

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- Titles and Texts:
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The Structure of a rmarkdown template

- Basic Settings: YAML
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- Insert images
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- Math expressions

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The Structure of a rmarkdown template

- Basic Settings: YAML
- Titles and Texts:
- R codes: chunk
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- For a quick review, please refer to
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 - RMarkodwn Cheat Sheet

Section 5

Other formats

Forms for document and presentation

- Document:

Forms for document and presentation

- Document:
 - Html

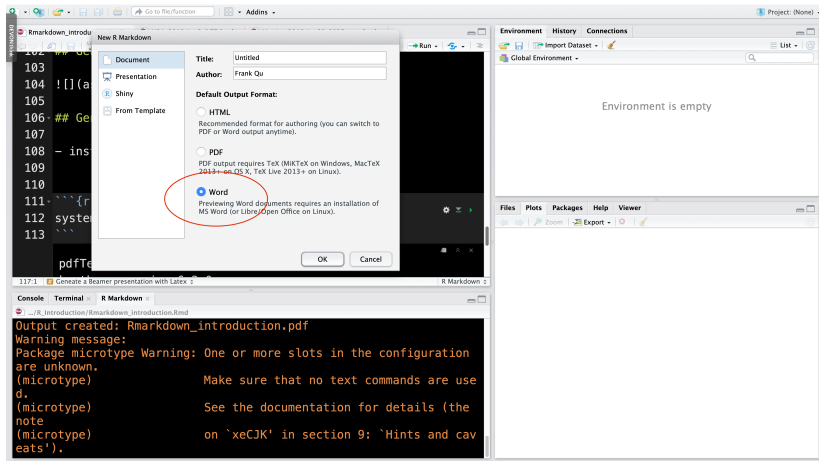
Forms for document and presentation

- Document:
 - Html
 - Word (requires you install word)

Forms for document and presentation

- Document:
 - Html
 - Word (requires you install word)
 - PDF (requires you install LaTeX system)

Generate a .docx file with Word



Generate a .docx file with Word

```
1 ---
2 title: "Test"
3 author: "Frank Qu"
4 date: "4/8/2019"
5 output: word_document
6 ---
7
8 ```{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10 ```
11
12 ## R Markdown
13
```

2:1 # Test ↕

R Markdown ↕

Generate a PDF report with LaTeX

New R Markdown

 Document

 Presentation

 Shiny

 From Template

Title:

Author:

Default Output Format:

☐ HTML

Recommended format for authoring (you can switch to PDF or Word output anytime).

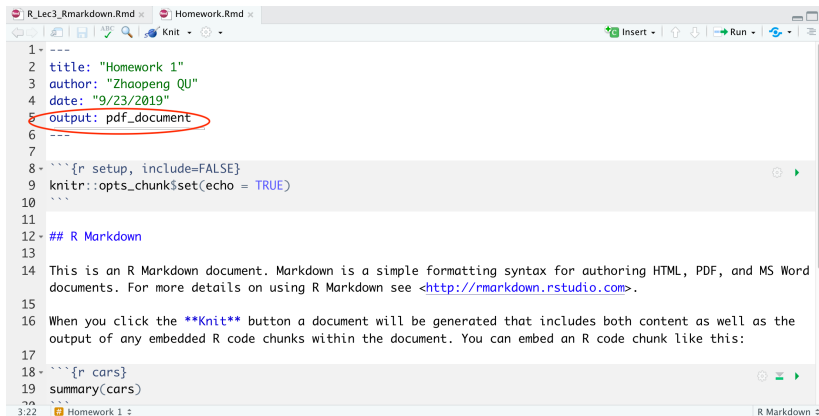
☒ PDF

PDF output requires TeX (MiKTeX on Windows, MacTeX 2013+ on OS X, TeX Live 2013+ on Linux).

☐ Word

Previewing Word documents requires an installation of MS Word (or Libre/Open Office on Linux).

Generate a PDF report with LaTeX



```
1 ---
2 title: "Homework 1"
3 author: "Zhaopeng QU"
4 date: "9/23/2019"
5 output: pdf_document
6 ---
7
8 ```{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10 ```
11
12 ## R Markdown
13
14 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>.
15
16 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:
17
18 ```{r cars}
19 summary(cars)
20 ```
```

Generate a PDF report with LaTeX

Homework 1

Zhaopeng QU

9/23/2019

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>.

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```
summary(cars)
```

```
##      speed      dist
##  Min.   : 4.0    Min.   : 2.00
##  1st Qu.:12.0    1st Qu.: 26.00
##  Median :15.0    Median : 36.00
##  Mean   :15.4    Mean   : 42.98
##  3rd Qu.:19.0    3rd Qu.: 56.00
##  Max.   :25.0    Max.   :120.00
```

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- 想要使用 Latex 必须要学习：
LaTeX“语法”，这其实是一整套的文字和排版编辑的语言，如果想要全部掌握，也没有那么容易。正如虽然几乎每天都使用 word，但 word 里的大部分功能我们都很少使用一样。学习 LaTeX 也可以先从最简单的方式开始，很多复杂的功能等到以后碰到问题需要时再学习应用。在本课程的内容中，大家只需要安装好即可。

Install LaTeX Packages or Full System

- Supported by LaTeX system you have to install it at first.

```
system("pdflatex --version") # 检查一下版本
```

```
## [1] 0
```

Install LaTeX Packages or Full System

- Supported by LaTeX system you have to install it you have to install it at first.
 - install “tinytex” ” package within RStudio(recommanded)

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Install LaTeX Packages or Full System

- Supported by LaTeX system you have to install it you have to install it at first.
 - install “tinytex” ” package within RStudio(recommanded)
 - install full LaTeX system outside RStudio

```
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```
## [1] 0
```

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 - install full LaTeX system outside RStudio
 - Mac: MacTex
 - Win: MikeTex

```
system("pdflatex --version") # 检查一下版本
```

```
## [1] 0
```

Generate a PDF report with LaTeX: 中文支持

- LaTeX 的中文支持需要加载特殊的字体包才能使用。

Generate a PDF report with LaTeX: 中文支持

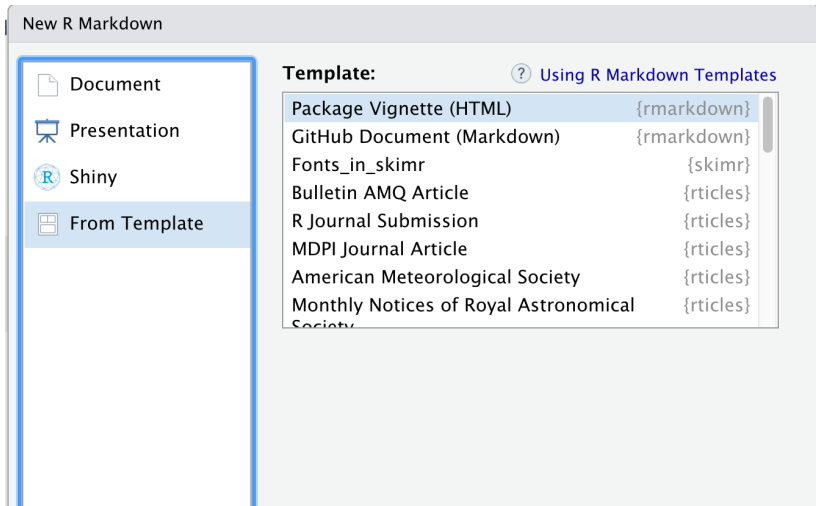
- LaTeX 的中文支持需要加载特殊的字体包才能使用。
 - 使用谢益辉开发的 rticles packages 的模版

Generate a PDF report with LaTeX: 中文支持

- LaTeX 的中文支持需要加载特殊的字体包才能使用。
 - 使用谢益辉开发的 `rticles packages` 的模版
 - 直接在 YAML 里添加 LaTeX 中文包

Generate a PDF report with LaTeX: 中文支持

```
#installed.packages("rticles")
```



Geneate a PDF report with LaTeX: 中文支持

New R Markdown

-  Document
-  Presentation
-  Shiny
-  From Template

Template:

 [Using R Markdown Templates](#)

PLOS Journal Article	{rticles}
Sage Journals Article Template	{rticles}
Taylor & Francis Journal Article	{rticles}
CTeX Documents	{rticles}
ASA Journal Article	{rticles}
Royal Society Open Science Journal Article	{rticles}
American Geophysical Union (AGU) Article Template	{rticles}
Association for Computing Machinery	{rticles}

Generate a PDF report with LaTeX: 中文支持



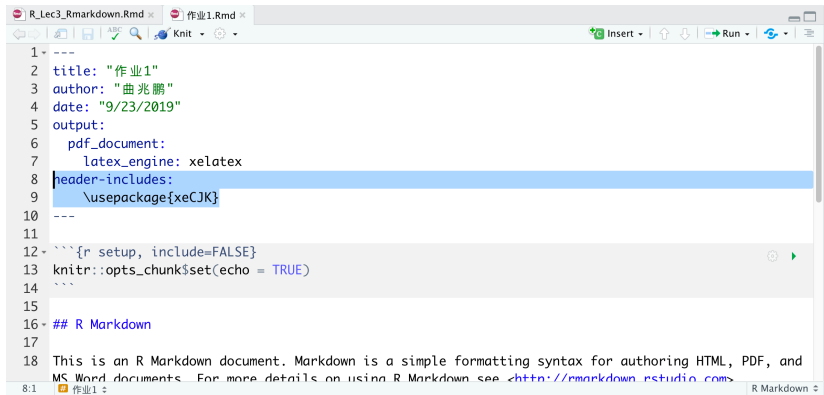
```

1  ---
2  title: "在R Markdown文档中使用中文"
3  author:
4    - 谢益辉
5    - 邱怡轩
6    - 于淼
7  documentclass: ctexart
8  output:
9    rarticles::ctex:
10      fig_caption: yes
11      number_sections: yes
12      toc: yes
13  classoption: "hyperref,"
14  ---
15
16 # 引言
17
18 中文LaTeX文档并非难题。当然这句话得站在巨人 [CTeX](http://ctex.org) 的肩膀上才能说，它让我们只需要一句
19
20 ```latex
21 \documentclass{ctexart} % 或者ctexrep/ctexbook
22 ```
23
1:1 在R Markdown文档中使用中文

```

Generate a PDF report with LaTeX: 中文支持

- 在 YAML 里添加 LaTeX 中文包



```
1 ---
2 title: "作业1"
3 author: "曲兆鹏"
4 date: "9/23/2019"
5 output:
6   pdf_document:
7     latex_engine: xelatex
8   header-includes:
9     \usepackage{xCJK}
10 ---
11
12 ```{r setup, include=FALSE}
13 knitr::opts_chunk$set(echo = TRUE)
14 ```
15
16 ## R Markdown
17
18 This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and
19 MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.
```

Geneate a PDF report with LaTeX: 中文支持

- 在 YAML 里添加 LaTeX 中文包

作业 1

曲兆鹏

9/23/2019

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:

```
summary(cars)
```

```
##           speed           dist
##  Min.   : 4.0   Min.   : 2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

Section 6

RMarkdown for Presentations

Presentation forms

- Html: ioslides & Slidify

Presentation forms

- Html: ioslides & Slidify
- PDF: beamer of LaTeX system (requires you install LaTeX system)

Presentation forms

- Html: ioslides & Slidify
- PDF: beamer of LaTeX system (requires you install LaTeX system)
- Powerpoint: (requires you install Powerpoint)

Basic Forms

- very similar to documents

Basic Forms

- very similar to documents
- try it by yourself

Section 7

Resources and References

Some useful online resources

- RStudio, R Markdown from RStudio

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- RStudio, R Markdown from RStudio
- Cosma Shalizi, (2016), Using R Markdown for Class Reports