NZSSN Courses: Introduction to R

Session 8 – R markdown

Statistical Consulting Centre

consulting@stat.auckland.ac.nz
The Department of Statistics
The University of Auckland

20 July, 2017

SCIENCE
DEPARTMENT OF STATISTICS

R Markdown

Combination of Markdown and `knitr` `R` package:
- Markdown another programming language allows you to write report/comments. - `knitr` R package compiles the `R` code for plots, tables, ouputs.
- Reproducibility
- Allow you re-do the analysis with a different set of data.

R Markdown

Types of output:

- HTML
- Word document (MS Word to view)
- PDF (require LaTex to be installed)

Markdown

A simple way to write HTML. Almost like a plain English.

Input:

```
Markdown is
- *easy* to use
- **simple**
- fun?
```

Output:

Markdown is

- *easy* to use
- **simple**
- fun?

Header

Use # to create headers.
Multiple #'s create lower level headers.

```
# Header
## Header
### Header
#### Header
```

Text

Text is rendered as plain text. Use undersores (_) or asterisk * to make italics, two undersores (__) or asterisk ** to make bold.

Input:

```
*italic*   **bold**

_italic_   __bold__
```

Output:

italic **bold**
italic **bold**

Lists

Use asterisks (*), hyphen (-) or plus (+) to make bullet points.
Use numbers to make numbeered lists.

Input:

```
* Item 1
* Item 2
    + Item 2a
    + Item 2b
```

Output:

- Item 1
- Item 2
    - Item 2a
    - Item 2b

Lists

Use numbers to make numbeered lists.

Input:

```
1. Item 1
2. Item 2
3. Item 3
    (a) Item 3a
    (b) Item 3b
```

Output:

1. Item 1
2. Item 2
3. Item 3
    1. Item 3a
    2. Item 3b

Hyperlinks

Use square brackets to denote a link. Place the URL in the parentheses.

Input:

```
This is a [link](https://cran.r-project.org/)
```

Output:

This is a link

Equations

Equations can be presented using latex command and surround them in $'s

Input:

```
Accoring to Einstein, $E = mc^2$
```

Output:

Accoring to Einstein, $E = mc^2$

Equation blocks

Use two $'s to make a centered equation block.

Input:

```
Accoring to Einstein, $$E = mc^2$$
```

Output:

Accoring to Einstein,

$$E = mc^2$$

External Images

Same format as Hyperlinks, with ! in the front. You can also use URL of the image, provding that you have internet connection.

Input:

```
![](https://www.r-project.org/Rlogo.png)
```

Output:

Code

Insert a chunk of R code with

```
```{r}
#some code
```
```

When you compile, R markdown will run the code and include its results.

inline code

Place code in a sentence with `` `r #code` ``. R markdown will replace the code with its results.

Input:

Today is `` `r Sys.Date()` ``

Output

Today is 2017-07-17

Chuck options

By default, R markdown includes both the code and its results

Input:

````
```{r}
dim(iris)
```
````

Output

```
dim(iris)
```

```
## [1] 150   5
```

echo

Add `echo = FALSE` to hide the code.

Input:

````
```{r, echo=FALSE}
dim(iris)
```
````

Output

```
## [1] 150   5
```

eval

Add `eval = FALSE` to prevent the code to run.

Input:

````
```{r, eval = FALSE}
dim(iris)
```
````

Output

```
dim(iris)
```

fig.height, fig.width

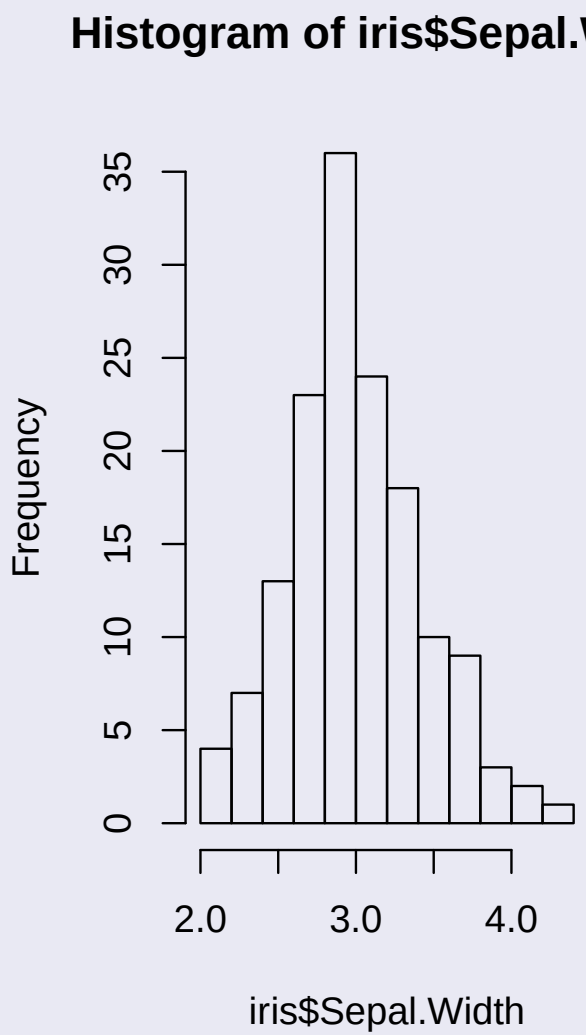
To sepcify the dimentsion of plots (in inches) with `fig.height` and `fig.width`.

Input:

````
```{r, echo = FALSE, fig.width = 3, fig.height = 5}
hist(iris$Sepal.Width)
```
````

fig.height, fig.width

Output



kable()

`kable()` in `knitr` R package allows you to present tables.

Note the option `results='asis'`, which will pass through results without reformatting them.

Input:

````
```{r, results='asis'}
knitr::kable(head(iris))
```
````

kable()

`kable()` in `knitr` R package allows you to present tables.

Note the option `results='asis'`, which will pass through results without reformatting them.

Output:

```
knitr::kable(head(iris))
```

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa

Knitr R package

- The working directory is the where the document is placed.
- For each document, Knitr complie the R code as a new R session. Thus, you need to load the required libraries for that document.
- Any object made in one code chunk will be availbale to code in the later code chunk.

YAML

A section of key:value pairs seperated by dash lines ---

```
---
title: "title"
author: "You"
date: "20 July, 2017"
output: html_document
---
```

Output Formats

- html_notebook - Interactive R Notebooks
- html_document - HTML document w/ Bootstrap CSS
- pdf_document - PDF document (via LaTeX template)
- word_document - Microsoft Word document (docx)
- odt_document - OpenDocument Text document
- rtf_document - Rich Text Format document
- md_document - Markdown document (various flavors)

Any question?