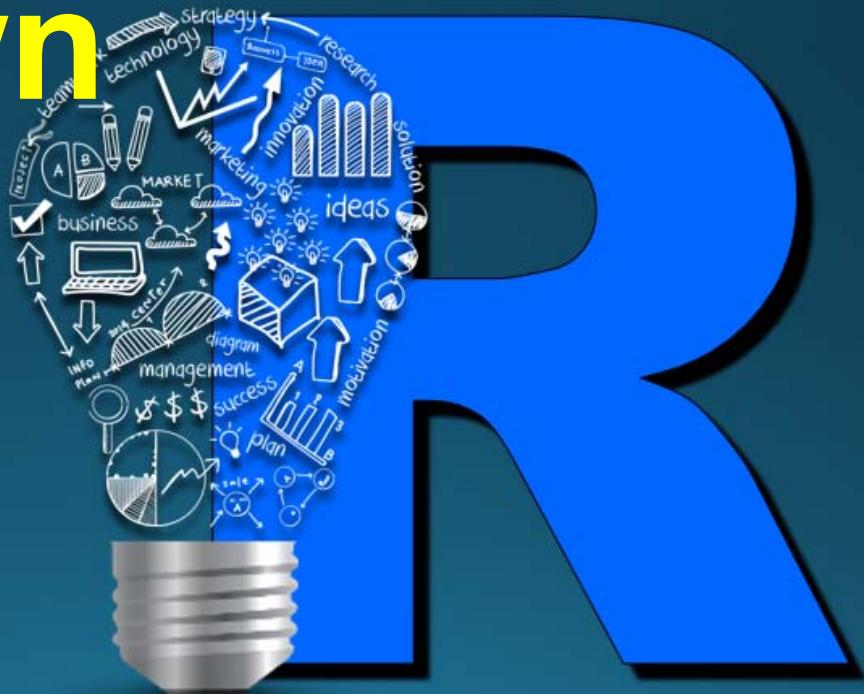


R資料分析 報告文件製作： R Markdown

吳漢銘
國立政治大學 統計學系



<https://hmwu.idv.tw>



- R Markdown provides an authoring framework for data science. You can use a single R Markdown file to both
 - save and execute code
 - 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.

What is R Markdown?

4 years ago | More

RStudio, Inc. BUSINESS + Follow

What is R Markdown?

<https://vimeo.com/178485416>



.Rmd files

An R Markdown (.Rmd) file is a record of your research. It contains the code that a scientist needs to reproduce your work along with the narration that a reader needs to understand your work.

可以在 .Rmd 純文字檔案中同時寫程式與撰寫說明內容，不需要另外將程式碼、輸出與圖形另外複製貼上或匯出至文書編輯軟體中。

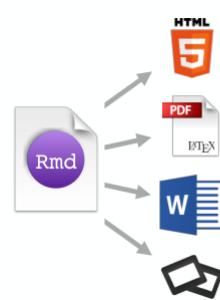


Gallery: outputs and formats you can create using R Markdown

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- **Documents** (e.g., HTML, PDF, Word, Handouts)
- **Interactive Documents** (e.g., HTML Widgets, Shiny).
- **Dashboards** (e.g., Dashboard with gauges and value boxes `htmlwidgets` `storyboard`).
- **Presentations** (e.g, Beamer, Slidy, ioslides, reveal.js).
- **Books** (e.g., R for Data Science, Efficient R Programming).
- **Websites** (e.g., R Markdown, flexDashboard, bookdown, profvis).
- **Templates** (e.g., JSS, R Journal, Skeleton, CV).
- **Package Vignettes** (e.g., httr, rvest).

<https://rmarkdown.rstudio.com/gallery.html>



Dynamic Documents

You can choose to export the finished report as a html, pdf, MS Word, ODT, RTF, or markdown document; or as a html or pdf based slide show.

Reproducible Research

At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.

The screenshot shows the R Markdown from RStudio gallery page. The top navigation bar includes 'Get Started', 'Gallery', 'Formats', and 'Articles'. The main content area is titled 'Gallery' with the sub-instruction 'Check out the range of outputs and formats you can create using R Markdown.' Below this, there are two main sections: 'Documents' and 'Interactive Documents'.

Documents: This section displays examples of different document types:

- Great NYT Interactive – Now Reusable with rCharts**: A Pandoc Markdown Article Starter and Template.
- A Microsoft Word document**: Shows a Microsoft Word document with a table and some text.
- Tufte Handout**: An implementation of a Tufte-style handout.

Interactive Documents: This section displays examples of interactive documents created using R Markdown with htmlwidgets or shiny:

- HTML Widgets**: Examples include a map of Michigan with data points and a shiny leaflet example.
- Shiny**: Examples include a shiny dashboard and a shiny components and htmlwidgets example.



學習資源:

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<https://rmarkdown.rstudio.com/>

R Markdown

from R Studio

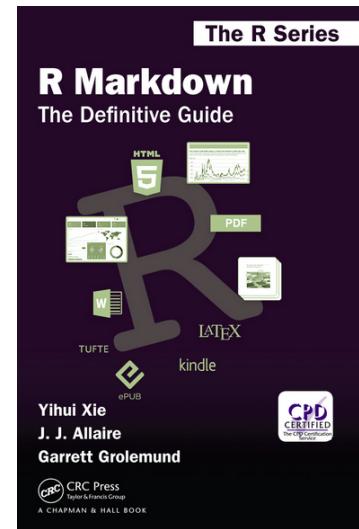
Get Started Gallery Formats Articles Book References

Analyze. Share. Reproduce.

Your data tells a story. Tell it with R Markdown. Turn your analyses into high quality documents, reports, presentations and dashboards.

R Markdown documents are fully reproducible. Use a productive [notebook interface](#) to weave together narrative text and code to produce elegantly formatted output. Use [multiple languages](#) including R, Python, and SQL.

- [Introduction](#)
- [How It Works](#)
- [Code Chunks](#)
- [Inline Code](#)
- [Code Languages](#)
- [Parameters](#)
- [Tables](#)
- [Markdown Basics](#)
- [Output Formats](#)
- [Notebooks](#)
- [Slide Presentations](#)
- [Dashboards](#)
- [Websites](#)
- [Interactive Documents](#)
- [Cheatsheets](#)





Cheatsheet, Reference Guide

- The R Markdown Cheatsheet
<https://rstudio.com/wp-content/uploads/2016/03/rmarkdown-cheatsheet-2.0.pdf>
- The R Markdown Reference Guide
<https://www.rstudio.com/wp-content/uploads/2015/03/rmarkdown-reference.pdf>

R version 4.0.3 (2020-10-10) -- "Bunny-Wunnies ut"
Copyright (C) 2020 The R Foundation for Statistics
Platform: x86_64-w64-mingw32/x64 (64-bit)

R 是免費軟體，不提供任何擔保。
在某些條件下您可以將其自由散布。
用 'license()' 或 'licence()' 來獲得散布的詳細條件。

R 是個合作計劃，有許多人為之做出了貢獻。
用 'contributors()' 來看詳細的情況並且
用 'citation()' 會告訴您如何在出版品中正確地參照 R 或 R 套件。

用 'demo()' 來看一些示範程式，用 'help()' 來檢視線上輔助檔案，
或
用 'help.start()' 透過 HTML 瀏覽器來看輔助檔案。
用 'e()' 來

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

R Help Search R Help Ctrl+Alt+F1

About RStudio Check for Updates

Accessibility

RStudio Docs RStudio Community Forum

Cheatsheets

Keyboard Shortcuts Help Alt+Shift+K

Markdown Quick Reference

Roxygen Quick Reference

Diagnostics

Files Plots Packages Help View

New Folder Delete Rename

Home Name

.Rhistory

Corel

Tutorial

Environment is empty

RStudio IDE Cheat Sheet

Data Transformation with dplyr

Data Visualization with ggplot2

List manipulation with purrr

Package Development with devtools

Web Applications with shiny

Interfacing Spark with sparklyr

R Markdown Cheat Sheet

R Markdown Reference Guide

Browse Cheatsheets...

10:57 PM

學習資源:

Cheatsheet, Reference Guide

R Markdown :: CHEAT SHEET

What is R Markdown?

.Rmd files - An R Markdown (.Rmd) file is a record of your research. It contains the code that a scientist needs to recreate your work along with the narration that a reader needs to understand your work.

Reproducible Research - At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.

Dynamic Documents - You can choose to publish your work in a variety of formats, including html, pdf, MS Word, or RTF documents; html or pdf based slides, Notebooks, and more.

Workflow

- Open a new Rmd file at File > New File > R Markdown. This is the easiest way to populate the file with a template.
- Write document by editing template
- Knit document to create report; use knit button or render() to knit
- Publish Output in IDE window
- Publish (optional) to web server
- Examine build log in R Markdown console
- Use output file that is saved along side .Rmd

Embed code with knitr syntax

INLINE CODE
Insert with '`<code>`'. Results appear as text without code.
Built with `r getRVersion()` Built with 3.2.3

IMPORTANT CHUNK OPTIONS

`cache` - cache results for future knits (default = FALSE)
`cache.path` - directory to save cached results in (default = "cache/")
`child` - file(s) to knit and then include (default = NULL)
`collapse` - collapse all output into single block (default = FALSE)
`comment` - prefix for each line of results (default = "#")

CODE CHUNKS
Options for lines surrounded with ````{r}` and `````. Place chunk options within curly braces, after r. Insert with `getRVersion()`

GLOBAL OPTIONS
Set with `knitr::opts_chunk$set()`, e.g.
````{r echo=TRUE, getRVersion()}````

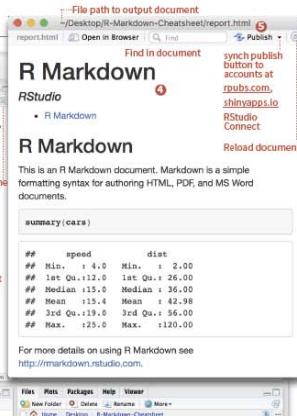
`dependson` - chunk dependencies for caching  
`echo` - Display code in output document (default = TRUE)  
`engine` - code language used in chunk (default = "R")  
`error` - Display error messages in doc (TRUE) or stop render when errors occur (FALSE) (default = FALSE)  
`eval` - Run code in chunk (default = TRUE)  
`options` - Options not listed above: `options(...)`, `autoStop`, `background`, `cache.comments`, `cache.lazy`, `cache.rebuild`, `cache.vars`, `dev.args`, `dpi`, `engine.opts`, `engine.path`, `fig.asp`, `fig.env`, `fig.ext`, `fig.height`, `fig.path`, `fig.procsize`, `fig.retina`, `fig.show`, `fig.showtext`, `fig.subcap`, `interval`, `out.extra`, `out.height`, `out.width`, `prompt`, `purf`, `reflabel`, `render`, `size`, `split`, `tidy.opts`

`fig_align` - 'left', 'right', or 'center' (default = "default")  
`fig_caption` - figure caption as character string (default = NULL)  
`fig_height`, `fig_width` - Dimensions of plots in inches  
`highlight` - highlight source code (default = TRUE)  
`include` - Include chunk in doc after running (default = TRUE)  
`message` - display code messages in document (default = TRUE)  
`results` - (default = "asis")  
`asis` - pass through results  
`hide` - do not display results  
`hold` - put all results below all code  
`tidy` - tidy code for display (default = FALSE)  
`warning` - display code warnings in document (default = TRUE)

**Publish on RStudio**  
Markdown documents, updates, and interact at [www.rstudio.com/publish](http://www.rstudio.com/publish)



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#### .rmd Structure

**VAML Header**  
Optional section of render (e.g. pandoc)  
options written as key-value pairs (YAML)  
At start of file  
Between lines of ---

**Text**  
Narration formatted with `---`

**Code Chunks**  
Chunks of embedded code.  
Begins with ````{r}`  
ends with `````

R Markdown will run the code

It will use the location of the

**Italics**  
Parameterize your document with new inputs (e.g., data, values)

**1. Add parameters** - Create a parameter in the header as values of params

**2. Call parameters** - Call parameter values in code as `params$param`

**3. Set parameters** - Set value directly in the header or in the argument of render

`render("doc.Rmd", params = d = as.Date("2015-01-01"))`

**Plain text**  
End a line with two spaces to start a new paragraph.

**italics and \_italics\_**

**\*\*bold\*\* and \_\_bold\_\_**

**superscript<sup>2</sup>**

**--strikethrough--**

**[link](www.rstudio.com)**

**# Header 1**

**## Header 2**

**### Header 3**

**#### Header 4**

**##### Header 5**

**##### Header 6**

**endash: --**

**emdash: ---**

**ellipsis: ...**

**inline equation:  $A = \pi * r^2$**

**image: **

**horizontal rule (or slide break):**

**\*\*\***

**> block quote**

**\* unordered list**

**\* item 2**  
`+ sub-item 1`  
`+ sub-item 2`

**1. ordered list**

**2. item 2**  
`+ sub-item 1`  
`+ sub-item 2`

**Table Header | Second Header**

**Table Cell | Cell 2**

**Cell 3 | Cell 4**

**Contents:**  
**1. Markdown Syntax**  
**2. Knitr chunk options**  
**3. Pandoc options**

### R Markdown Reference Guide

Learn more about R Markdown at [rmarkdown.rstudio.com](http://rmarkdown.rstudio.com)  
Learn more about Interactive Docs at [shiny.rstudio.com/articles](http://shiny.rstudio.com/articles)

#### Syntax

##### Plain text

Plain text

End a line with two spaces to start a new paragraph.

##### italics and italics

italics and italics

##### **bold** and bold

**bold** and bold

##### superscript<sup>2</sup>

superscript<sup>2</sup>

##### strikethrough

strikethrough

##### link

link

#### Header 1

#### Header 2

#### Header 3

#### Header 4

#### Header 5

#### Header 6

#### endash: --

#### emdash: ---

#### ellipsis: ...

#### inline equation: $A = \pi * r^2$

#### image: 

#### horizontal rule (or slide break):

#### \*\*\*

#### > block quote

#### \* unordered list

#### \* item 2

#### + sub-item 1

#### + sub-item 2

#### 1. ordered list

#### 2. item 2

#### + sub-item 1

#### + sub-item 2

#### Table Header | Second Header

#### Table Cell | Cell 2

#### Cell 3 | Cell 4

# 軟體安裝

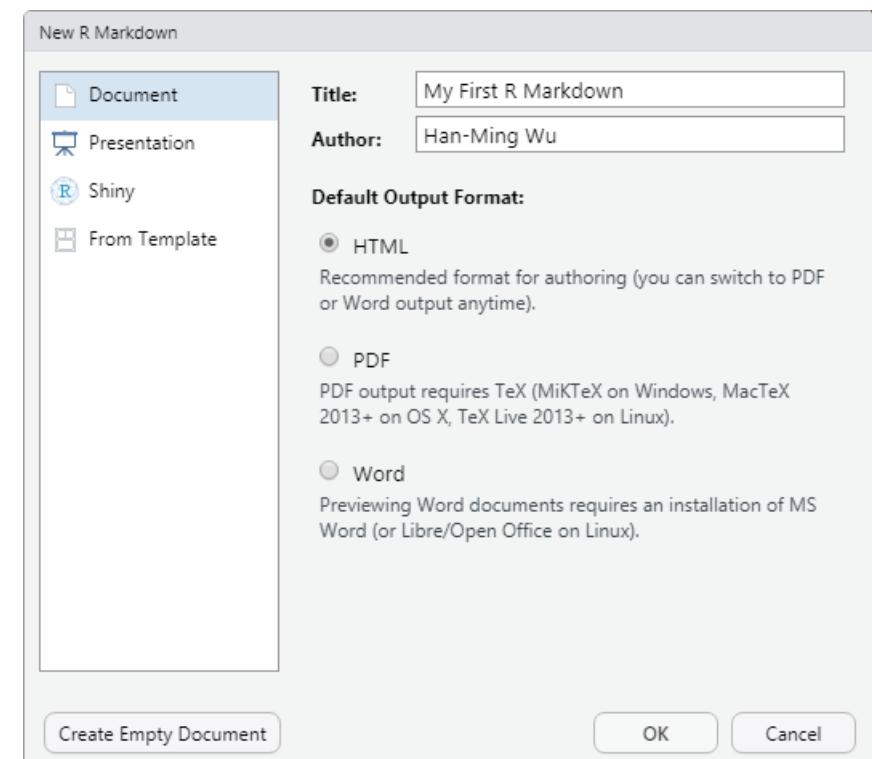


## ■ 必要

- The R Project for Statistical Computing: (檔名: R-4.0.3-win.exe)  
<https://www.r-project.org>
- RStudio Desktop (Open Source Edition) (檔名RStudio-1.3.1093.exe)  
<https://rstudio.com/products/rstudio/download>

## ■ 選要(Windows):

- MikTeX (檔名: basic-miktex-20.12-x64.exe)  
<https://miktex.org>



# Workflow

## How it works



- R Markdown generates a new file that contains selected text, code, and results from the .Rmd file.
- knitr: Elegant, flexible, and fast dynamic report generation with R  
<https://yihui.org/knitr/>
- Pandoc: a universal document converter  
<https://pandoc.org/>
- The new file can be a finished web page, PDF, MS Word document, slide show, notebook, handout, book, dashboard, package vignette or other format.

# Workflow Using RStudio



## R Markdown :: CHEAT SHEET

**1** Open a new .Rmd file at File ► New File ► R Markdown. Use the wizard that opens to pre-populate the file with a template

**2** Write document by editing template

**3** Knit document to create report; use knit button or render() to knit

**4** Preview Output in IDE window

**5** Publish (optional) to web server

**6** Examine build log in R Markdown console

**7** Use output file that is saved along side .Rmd

The screenshot illustrates the RStudio interface for R Markdown. On the left, the R Markdown file 'report.Rmd' is open, showing R code and a preview window. A sidebar on the right provides navigation and execution options for code chunks. On the right, the generated HTML output is displayed, featuring a title 'R Markdown' and a section titled 'RStudio'. Below this, a summary of the 'cars' dataset is shown:

```
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

For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

**6** R Markdown

```
> library(rmarkdown)
> render("report.Rmd", output_file = "report.html")
```

**7** report.Rmd  
report.html

<https://raw.githubusercontent.com/rstudio/cheatsheets/master/rmarkdown-2.0.pdf>



## 維基百科 自由的百科全書

首頁  
分類索引  
特色內容  
新聞動態  
近期變更  
隨機條目  
  
說明  
  
說明  
維基社群  
方針與指引  
互助客棧  
知識問答

## YAML [\[編輯\]](#)

維基百科，自由的百科全書

YAML ([/jæməl/](#)，尾音類似*came*駱駝) 是一個可讀性高，用來表達資料序列的格式。YAML參考了其他多種語言，包括：[C語言](#)、[Python](#)、[Perl](#)，並從[XML](#)、電子郵件的數據格式 ( RFC 2822 ) 中獲得靈感。Clark Evans在2001年首次發表了這種語言<sup>[1]</sup>，另外Ingy döt Net與Oren Ben-Kiki也是這語言的共同設計者<sup>[2]</sup>。目前已經有數種程式語言或腳本語言支援 ( 或者說解析 ) 這種語言。

YAML是"YAML Ain't a Markup Language" ( YAML不是一種標記語言 ) 的遞迴縮寫。在開發的這種語言時，YAML的意思其實是："Yet Another Markup Language" ( 仍是一種標記語言 )<sup>[3]</sup>，但為了強調這種語言以數據做為中心，而不是以標記語言為重點，而用反向縮略語重新命名。

### YAML

副檔名	.yaml, .yml
網路媒體型式	<a href="#">尚未註冊</a>
初始版本	2001年5月11日，17年前
最新版本	1.2 (Third Edition) (2009年10月1日，8年前)
格式類型	Data interchange
自由格式？	是
網站	<a href="http://yaml.org">yaml.org</a>



# 範例：新增R Markdown文件

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myRMD - RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

New File

- New Project...
- Open File... Ctrl+O
- Recent Files
- Open Project...
- Open Project in New Session...
- Recent Projects
- Import Dataset
- Save Ctrl+S
- Save As...
- Save All Ctrl+Alt+S
- Publish...
- Print...
- Close Ctrl+W
- Close All Ctrl+Shift+W
- Close All Except Current Ctrl+Alt+Shift+W
- Close Project
- Quit Session...

R Script Ctrl+Shift+N

R Notebook

R Markdown... (highlighted)

Shiny Web App...

Plumber API...

C File

C++ File

Header File

Markdown File

HTML File

CSS File

JavaScript File

D3 Script

Python Script

Shell Script

SQL Script

Stan File

Environment History Connections Tutorial

Import Dataset

Global Environment

Environment is empty

New R Markdown

Title: My First R Markdown

Author: Han-Ming Wu

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).

Install Required Packages

Creating R Markdown documents requires updated versions of the following packages: Rcpp, base64enc, digest, evaluate, glue, highr, htmltools, jsonlite, knitr, magrittr, markdown, mime, rmarkdown, rprojroot, stringi, stringr, tinytex, xfun, yaml.

Do you want to install these packages now?

Yes No

install.packages(c("knitr", "rmarkdown"))

Create Empty Document OK Cancel

# 直接編譯(knit)範例Rmd檔

先存檔: main.Rmd

```

myRMD - RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
main.Rmd x Knit to HTML Knit to PDF Knit to Word Knit with Parameters... Knit Directory Clear Knitr Cache...
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
1 Knit to HTML
2 Knit to PDF
3 Knit to Word
4 Knit with Parameters...
5 Knit Directory
6 Clear Knitr Cache...
7
8
9
10
11
12 ## R Markdown
13
14 This is an R Markdown document. You can authoring HTML, PDF, and
15 Markdown see <http://rmarkdown.rstudio.com>.
16 When you click the **Knit** button, a HTML file will be created that
17 includes both content as well as any R code that you've written within
18 the document. You can embed an R code chunk like this:
19
20
21
22
23
24 You can also embed plots, for example:
25
26
27
28
29
30 Note that the `echo = FALSE` parameter was added to the code chunk to
31 prevent printing of the R code that generated the plot.

```

Console Terminal R Markdown Jobs

```

~/myRMD/main.Rmd
9%
1 label: setup (with options)
List of 1
$ include: logi FALSE
|
3%
| ordinary text without R code
|
7%
1 label: cars
|
1% ordinary text without R code
|
6%
1 label: pressure (with options)
List of 1
$ echo: logi FALSE
|
0%
| ordinary text without R code
|
output file: main.knit.md

"C:/Program Files/RStudio/bin/pandoc/pandoc" +RTS -K512m -RTS main.utf8.md --to html4 --from markdown+autolink_bare_uris+tex_math_single_backslash --output main.html --lua-filter "C:/Users/hmwu/Documents/R/win-library/4.0/rmarkdown/rmarkdown/lua/pagebreak.lua" --lua-filter "C:/Users/hmwu/Documents/R/win-library/4.0/rmarkdown/rmarkdown/lua/latex-div.lua" --self-contained --standalone --section-divs --template "C:/Users/hmwu/Documents/R/win-library/4.0/rmarkdown/rmd/h/default.html" --no-highlight --variable highlightjs=1 --variable "theme:bootstrap" --include-in-header "C:/Users/hmwu/AppData/Local/Temp/1/RtmpyG0cCP/rmarkdown-str21b8343590e.html" --mathjax --variable "mathjax-url:https://mathjax.rstudio.com/latest/MathJax.js?config=TeX-AMS-MML_HTMLorMML"
Output created: main.html

```

```

library(rmarkdown)
render("main.Rmd")

```

# 如果順利的話，可以看到產生的文件

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My First R Markdown

Han-Ming Wu  
2021/1/7

## 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>.

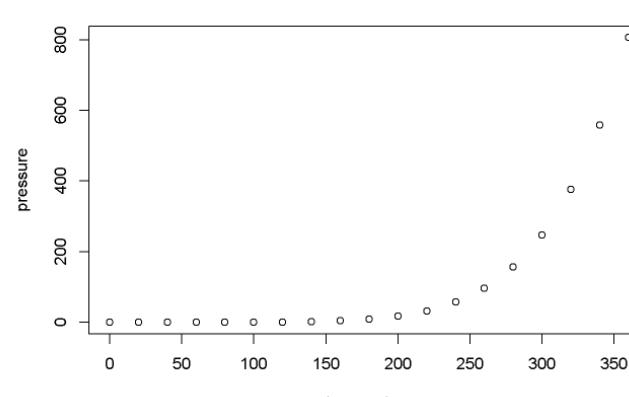
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

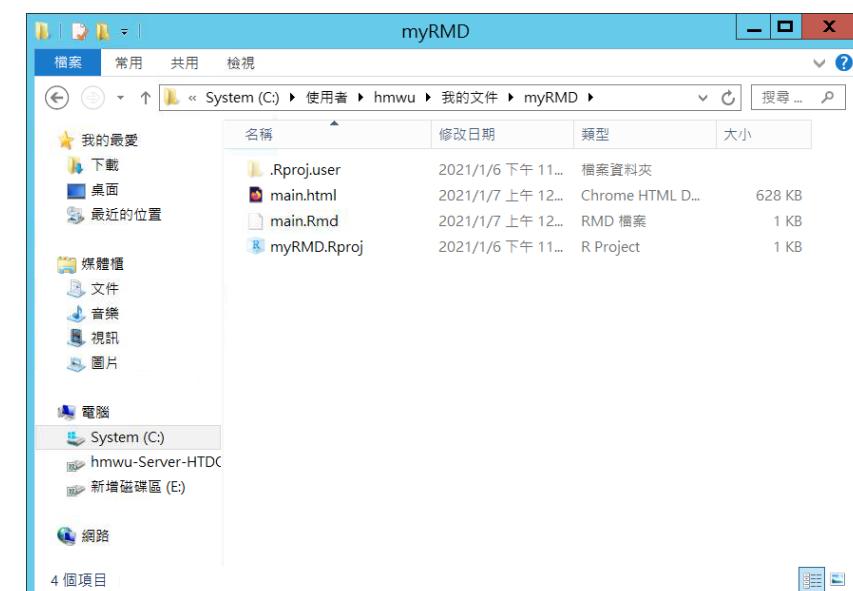
```
speed dist
Min. : 4.0 Min. : 2.00
1st Qu.:12.0 1st Qu.: 26.00
Median :15.0 Median : 36.00
Mean :15.4 Mean : 42.98
3rd Qu.:19.0 3rd Qu.: 56.00
Max. :25.0 Max. :120.00
```

## Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.





# 改成中文試試看! (html)

14/48

```
1 ---
2 title: "My First R Markdown"
3 author: "Han-Ming Wu"
4 date: "2021/1/7"
5 output: html_document
6 ---
7
```

另存新檔: main\_cht.Rmd

```
1 ---
2 title: "我的第一個R Markdown文件"
3 author: "吳漢銘"
4 date: "2021/1/7"
5 output: html_document
6 ---
7
```

~/myRMD/main\_cht.html

main\_cht.html | Open in Browser | Find

# 我的第一個R Markdown文件

吳漢銘  
2021/1/7

## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS 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 within the document. You can embed an R code chunk like this:

# 產生Word文件(英文、中文)

The image displays two side-by-side screenshots illustrating the process of generating Microsoft Word documents from R Markdown files.

**Top Screenshot (RStudio and Microsoft Word):**

- RStudio View:** Shows the RStudio interface with two files open: "main.Rmd" and "main\_cht.Rmd". The "main.Rmd" file contains the following R Markdown code:
 

```
1 ---
2 title: "My First R Markdown"
3 author: "Han-Ming Wu"
4 date: "2021/1/7"
5 output: word_document
6 ---
```

 The line "output: word\_document" is circled with a red dashed oval.
- Microsoft Word View:** Shows the Microsoft Word ribbon with the "版面配置" tab selected. A document titled "main.docx" is displayed, showing the generated Word document content. The content includes the title "My First R Markdown", author "Han-Ming Wu", date "2021/1/7", and a summary of the "cars" dataset. The Word document has a left margin of 0 characters and a top margin of 9 pt.

**Bottom Screenshot (RStudio and Microsoft Word):**

- RStudio View:** Shows the RStudio interface with the same two files open. The "main.Rmd" file contains the same R Markdown code as above.
- Microsoft Word View:** Shows the Microsoft Word ribbon with the "版面配置" tab selected. A document titled "main\_cht.docx" is displayed, showing the generated Word document content. The content includes the title "我的第一個 R Markdown 文件", author "吳漢銘", date "2021/1/7", and a summary of the "cars" dataset. The Word document has a left margin of 0 characters and a top margin of 0 lines, with a bottom margin of 10 pt.

# 產生PDF文件(英文)



myRMD - RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

main.Rmd x main\_cht.Rmd x

```

1 ---
2 title: "My First R Markdown"
3 author: "Han-Ming Wu"
4 date: "2021/1/7"
5 output: pdf_document
6 ---
7
8 ```{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10 ```

10:4 (Top Level) R Markdown
```

Console Terminal R Markdown Jobs

~./myRMD/main.Rmd

```

o latex --from markdown+autolink_bare_uris+tex_math_single_backslash --output
 main.tex --lua-filter "C:/Users/hmwu/Documents/R/win-library/4.0/rmarkdown/rm
arkdown/lua/pagebreak.lua" --lua-filter "C:/Users/hmwu/Documents/R/win-library
/4.0/rmarkdown/rmarkdown/lua/latex-div.lua" --self-contained --highlight-style
 tango --pdf-engine pdflatex --variable graphics --variable "geometry:margin=1
in"
output file: main.knit.md

錯誤: LaTeX failed to compile main.tex. See https://yihui.org/tinytex/r/#debugging for debugging tips.
此外: Warning message:
In system2(..., stdout = if (use_file_stdout()) f1 else FALSE, stderr = f2) :
 "pdflatex" not found
停止執行

No LaTeX installation detected (LaTeX is required to create PDF output). You s
hould install a LaTeX distribution for your platform: https://www.latex-project.org/get/

If you are not sure, you may install TinyTeX in R: tinytex::install_tinytex()
Otherwise consider MiKTeX on Windows - http://miktex.org
MacTeX on macOS - https://tug.org/mactex/
(NOTE: Download with Safari rather than Chrome _strongly_ recommended)
Linux: Use system package manager
```

This website uses cookies to personalize content and ads. [Learn More](#)

**Welcome** <https://miktex.org>

Welcome to the MiKTeX project page!

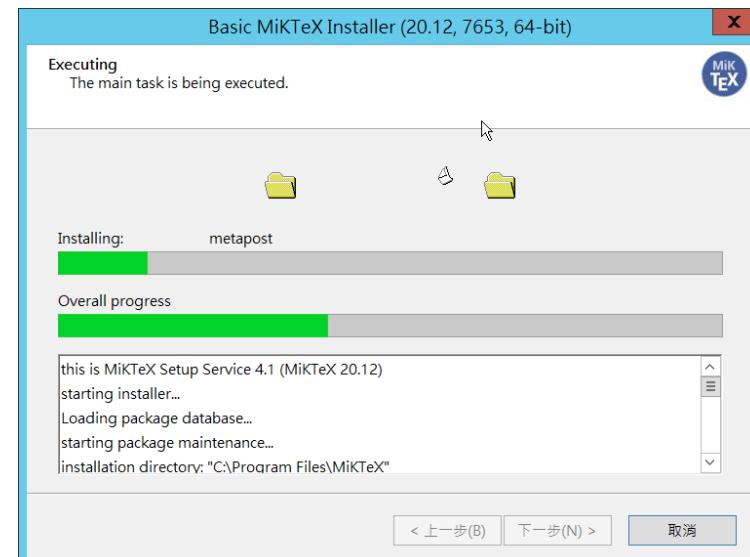
MiKTeX is a modern TeX distribution for Windows, Linux and macOS.

MiKTeX's integrated package manager installs missing components from the Internet, if required. This allows you to keep your TeX installation as minimal as possible ("Just enough TeX").

MiKTeX is open source. You are welcome to redistribute MiKTeX under certain conditions.

[Read more...](#)

(檔名: basic-miktex-20.12-x64.exe)





# 編譯一定不會順利~

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關掉RStudio=>重新開啟 => knit

The screenshot shows the RStudio interface with the 'Console' tab selected. The console output window displays the command run and its results:

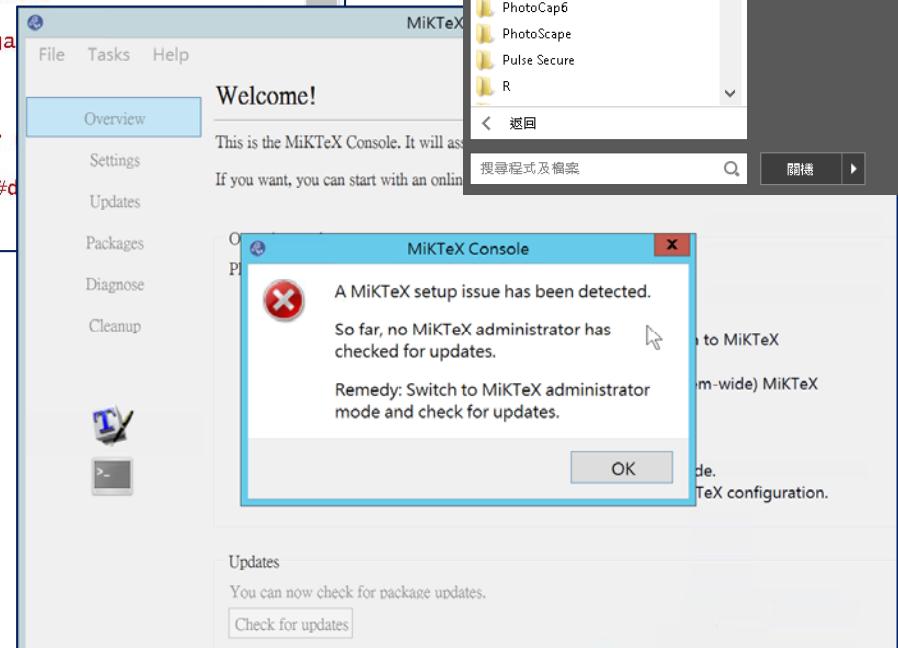
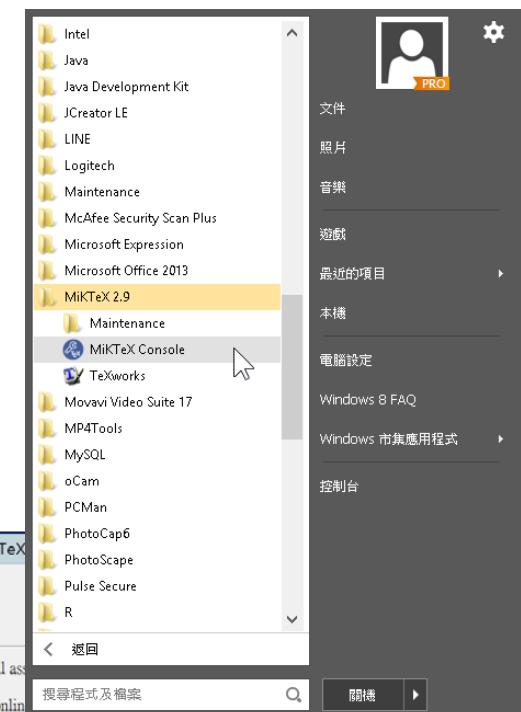
```
ordinary text without R code

"C:/Program Files/RStudio/bin/pandoc/pandoc" +RTS -K512m -RTS main.utf8.md --to latex --from markdown+autolink_bare_uris+tex_math_single_backslash --output main.tex --lua-filter "C:/Users/hmwu/Documents/R/win-library/4.0/rmarkdown/rmarkdown/lua/pagebreak.lua" --lua-filter "C:/Users/hmwu/Documents/R/win-library/4.0/rmarkdown/rmarkdown/lua/latex-div.lua" --self-contained --highlight-style tango --pdf-engine pdflatex --variable graphics --variable "geometry:margin=1in"
output file: main.knit.md

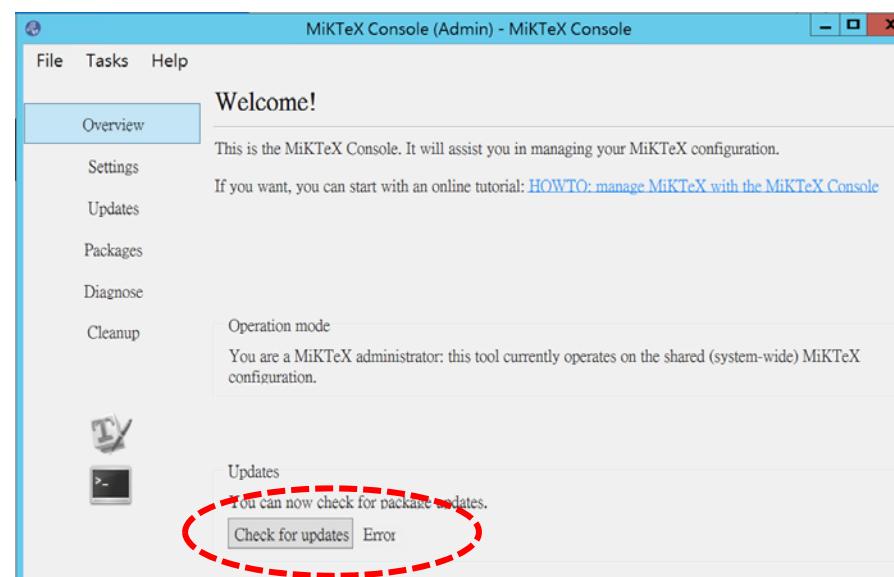
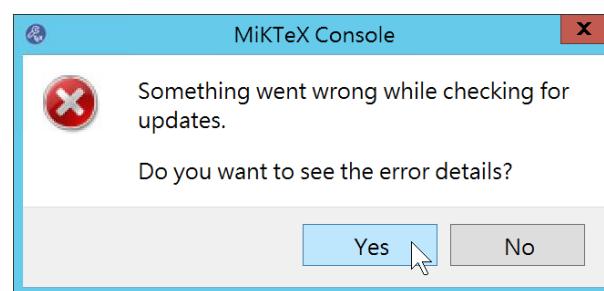
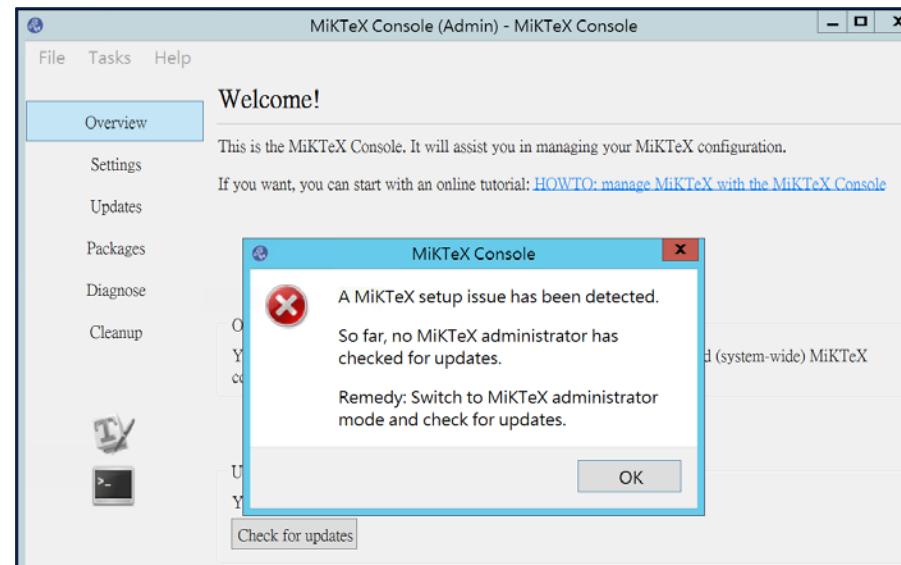
! Sorry, but C:\PROGRA~1\MiKTeX\miktex\bin\x64\pdflatex.exe did not succeed.

! The log file hopefully contains the information to get MiKTeX going again:
! C:\Users\hmwu\AppData\Local\MiKTeX\miktex\log\pdflatex.log

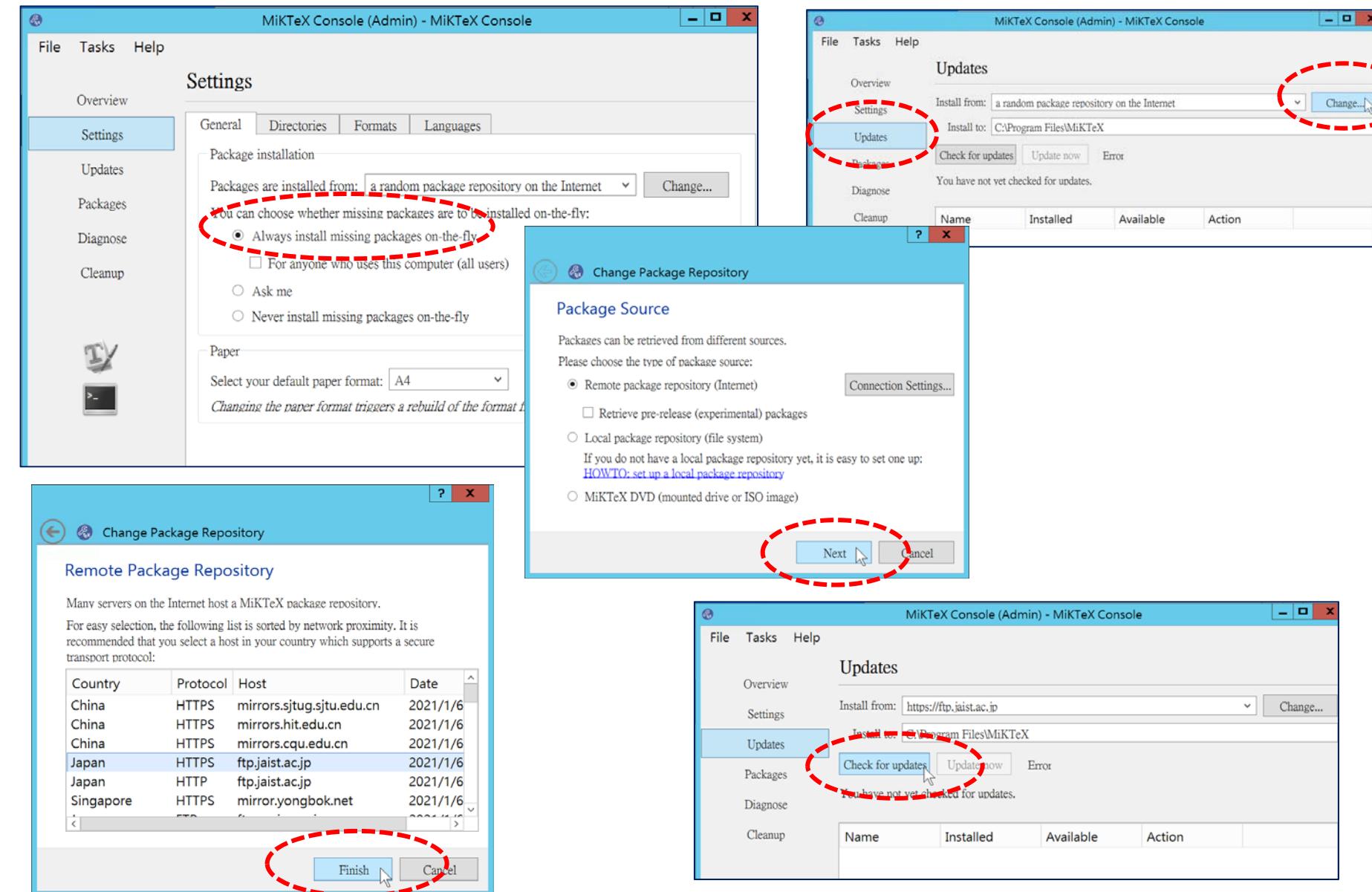
! pdflatex: major issue: So far, no MiKTeX administrator has checked for
錯誤: LaTeX failed to compile main.tex. See https://yihui.org/tinytex/r/#tips. See main.log for more info.
停止執行
```



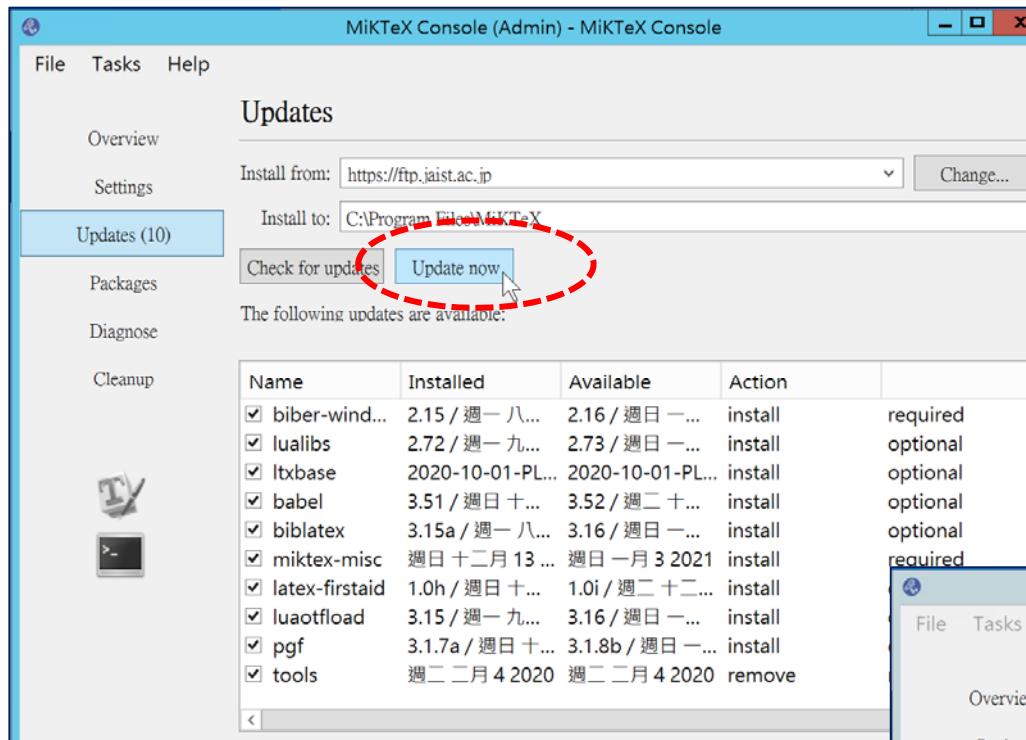
# MiKTeX 更新和設定



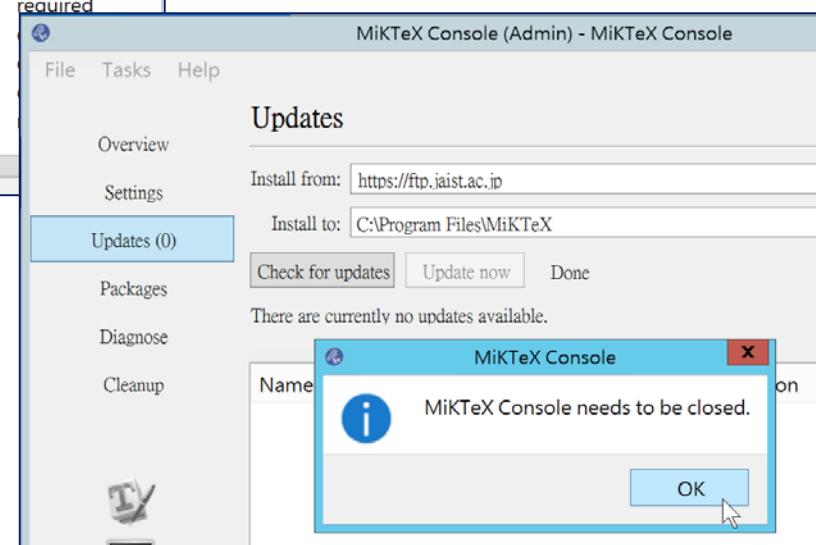
# MiKTeX 更新和設定



# MiKTeX 更新和設定



更新可能要很久!





# 產生PDF文件(英文)終於順利了~

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```
main.Rmd x main_cht.Rmd x
1 ---
2 title: "My First R Markdown"
3 author: "Han-Ming Wu"
4 date: "2021/1/7"
5 output: pdf_document
6 ---
7
```

R myRMD - RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Source

Console Terminal x R Markdown x Jobs x

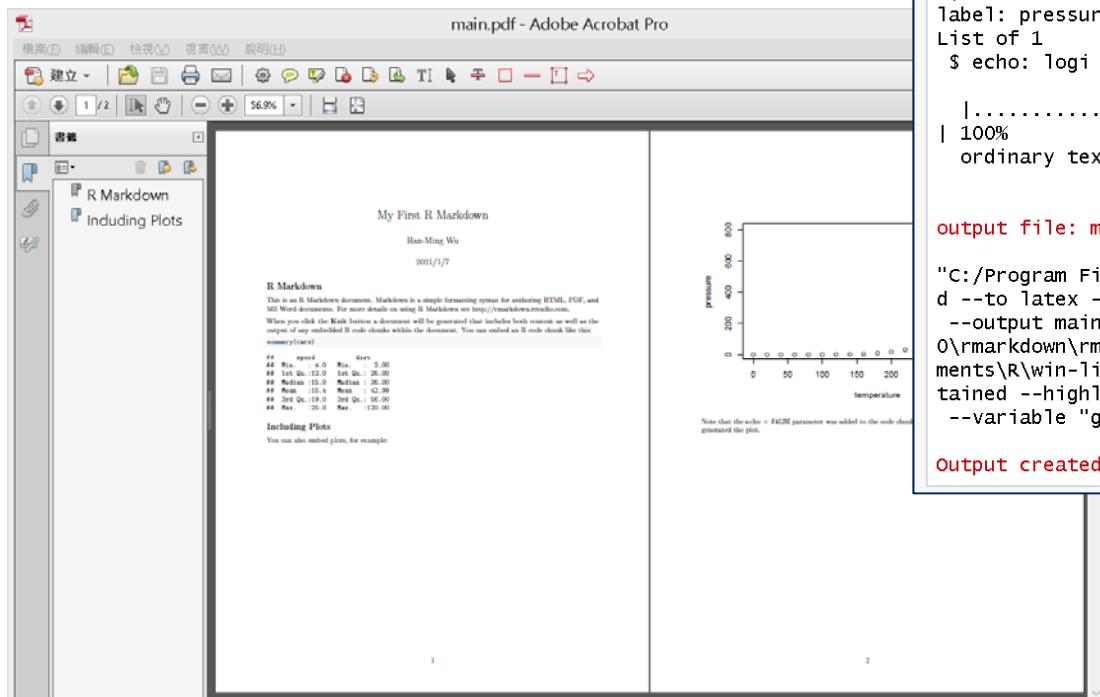
~/myRMD/main.Rmd

```
|
| 57%
label: cars
|
| 71%
ordinary text without R code
|
| 86%
label: pressure (with options)
List of 1
$ echo: logi FALSE
|
| 100%
ordinary text without R code
```

output file: main.knit.md

```
"C:/Program Files/RStudio/bin/pandoc/pandoc" +RTS -K512m -RTS main.utf8.m
d --to latex --from markdown+autolink_bare_uris+tex_math_single_backslash
--output main.tex --lua-filter "C:\Users\hmwu\Documents\R\win-library\4.
0\rmarkdown\rmarkdown\lua\pagebreak.lua" --lua-filter "C:\Users\hmwu\Docu
ments\R\win-library\4.0\rmarkdown\rmarkdown\lua\latex-div.lua" --self-con
tained --highlight-style tango --pdf-engine pdflatex --variable graphics
--variable "geometry:margin=1in"
```

Output created: main.pdf





# 產生PDF文件(中文)，又不順了!!

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The screenshot shows two RStudio windows side-by-side. The left window displays an R Markdown file with the following code:

```
1 ---
2 title: "我的第一個R Markdown文件"
3 author: "吳漢銘"
4 date: "2021/1/7"
5 output: pdf_document
6 ---
```

The right window shows the R Markdown tab in the source editor, with the command \$ echo: logi FALSE followed by a large amount of ordinary text without R code. Below this, the terminal output shows the pandoc command used to convert the R Markdown file to LaTeX, followed by several error messages related to LaTeX encoding and Unicode characters. The errors include:

```
"C:/Program Files/RStudio/bin/pandoc/pandoc" +RTS -K512m -RTS main_cht.utf8.md
--to latex --from markdown+autolink_bare_uris+tex_math_single_backslash --output main_cht.tex --lua-filter "C:\Users\hmwu\Documents\R\win-library\4.0\rmarkdown\lua\pagebreak.lua" --lua-filter "C:\Users\hmwu\Documents\R\win-library\4.0\rmarkdown\rmarkdown\lua\latex-div.lua" --self-contained --highlight-style tango --pdf-engine pdflatex --variable graphics --variable "geometry:margin=1in"
output file: main_cht.knit.md

! Package inputenc Error: Unicode character ??(U+6211)
(inputenc) not set up for use with LaTeX.

! pdflatex: major issue: So far, no MiKTeX administrator has checked for updates.
```

Try other LaTeX engines instead (e.g., xelatex) if you are using pdflatex. See <https://bookdown.org/yihui/rmarkdown-cookbook/latex-unicode.html>

錯誤: LaTeX failed to compile main\_cht.tex. See <https://yihui.org/tinytex/r/#debugging> for debugging tips. See main\_cht.log for more info.

此外: Warning message:  
In grep1("==> Fatal error occurred", x[i], fixed = TRUE) :  
  輸入的字串 1 不適用於此語言環境  
停止執行

<https://bookdown.org/yihui/rmarkdown-cookbook/latex-unicode.html>

<http://www.hmwu.idv.tw>



## 加入LaTeX 設置碼: header-includes

The screenshot shows the RStudio interface with two files open: `main.Rmd` and `main_cht.Rmd`. The `main.Rmd` file contains the following R Markdown code:

```
1 ---
2 header-includes:
3 - \usepackage{xeCJK} % 讓中英文字體分開設置
4 - \usepackage{fontspec} %加這個就可以設定字體
5 - \setCJKmainfont{微軟正黑體} %可以改用「標楷體」、「細明體」
6 - \XeTeXlinebreaklocale "zh"
7 - \XeTeXlinebreakskip = Opt plus 1pt %這兩行一定要加，中文才能自動換行
8
9 title: "我的第一個R Markdown文件"
10 author: "吳漢銘"
11 date: "2021/1/7"
12 output:
13 pdf_document:
14 latex_engine: xelatex
15 ---
```

The `main_cht.Rmd` file contains the same code, with the first seven lines highlighted in red, indicating they are part of the `header-includes` section.

To the right, the generated PDF document titled "main\_cht.pdf" is shown in Adobe Acrobat Pro. The PDF content is:

我的第一個 R Markdown 文件  
吳漢銘  
2021/1/7

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:



## 加入LaTeX 設置碼: in\_header

## MyChtHeader.tex

```
\usepackage{xeCJK}
\usepackage{fontspec}
\setCJKmainfont{微軟正黑體}
\XeTeXlinebreaklocale "zh"
\XeTeXlinebreakskip = 0pt plus 1pt
```

The screenshot shows the RStudio interface. On the left, the file tree shows a new file named 'myRMD' has been created. In the main editor area, a new text file named 'MyChtHeader.tex' is open, containing the LaTeX code provided above.

```

title: "我的第一個R Markdown文件"
author: "吳漢銘"
date: "2021/1/7"
output:
 pdf_document:
 latex_engine: xelatex
 includes:
 in_header: "MyChtHeader.tex"

```

The screenshot shows the RStudio interface again. This time, the main file 'main.Rmd' is open. It contains the R Markdown code with the 'in\_header' setting applied. The 'Knit' button in the toolbar is highlighted, indicating the file is ready to be compiled.

```
1 ---
2 title: "我的第一個R Markdown文件"
3 author: "吳漢銘"
4 date: "2021/1/7"
5 output:
6 pdf_document:
7 latex_engine: xelatex
8 includes:
9 in_header: "MyChtHeader.tex"
10 ---
11
```

# Multiple Output Formats

The image shows three separate RStudio sessions side-by-side, each displaying a different R Markdown file and its associated Knit menu.

**Left Window:** Displays the code for `main.Rmd`. The code includes a YAML front matter section:

```
1 ---
2 title: "My First R Markdown"
3 author: "Han-Ming wu"
4 date: "2021/1/7"
5 output:
6 word_document: default
7 html_document: default
8 ---
```

**Middle Window:** Displays the code for `main_dht_html.Rmd`. The Knit menu is open, showing options: Knit to HTML (highlighted), Knit to PDF, Knit to Word, Knit with Parameters..., Knit Directory, and Clear Knitr Cache... .

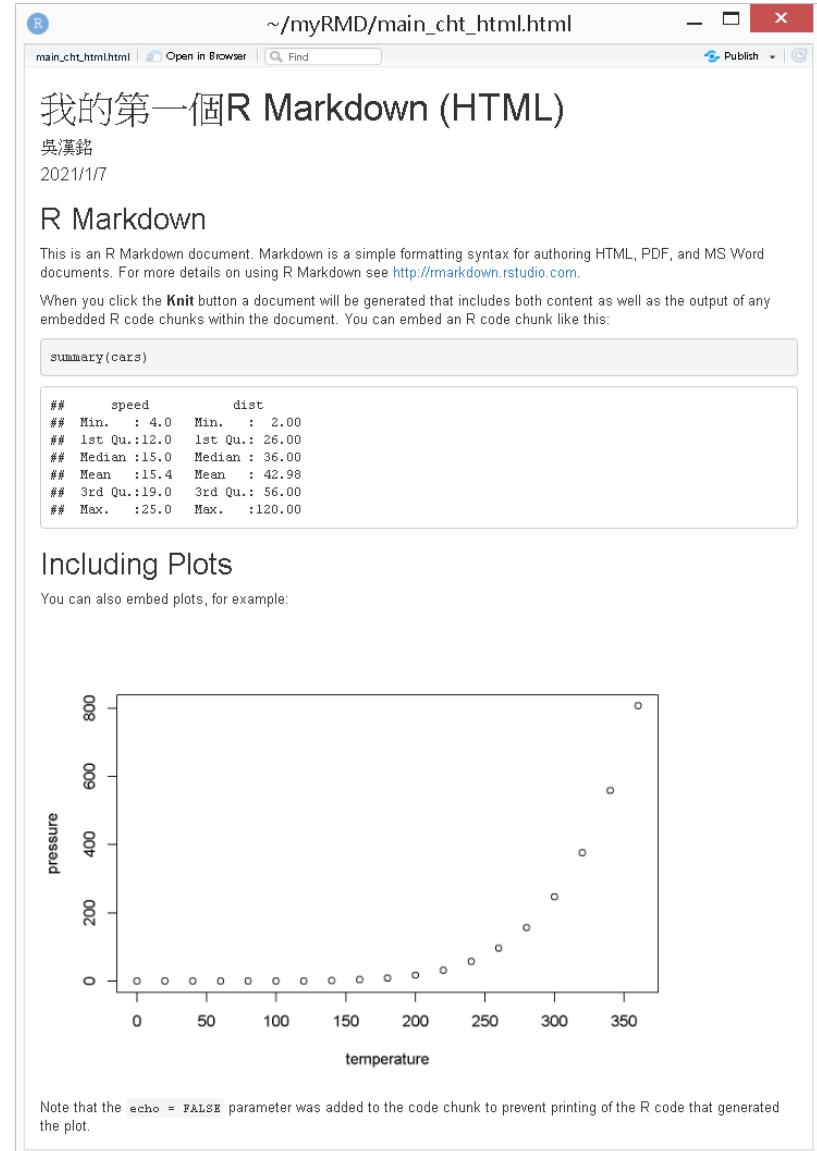
**Right Window:** Displays the code for `main_dht.Rmd`. The Knit menu is also open, showing the same options as the middle window, with Knit to Word highlighted.



# Rmd檔及所編譯出來的html檔

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```
1 ---
2 title: "我的第一個R Markdown文件 (HTML)"
3 author: "吳漢銘"
4 date: "2021/1/7"
5 output: html_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```
21
22 ## Including Plots
23
24 You can also embed plots, for example:
25
26 ```{r pressure, echo=FALSE}
27 plot(pressure)
28```
29
30 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.
31 ===
31:4 # Note that the 'echo = FALSE' parameter was added to the code chunk to prevent printing of the R code that generated the plot.
```





# Code Chunks

## ■ insert chunks:

- the keyboard shortcut **Ctrl + Alt + I** (OS X: **Cmd + Option + I**)
- the Add Chunk command in the editor toolbar
- type the chunk delimiters ````{r}` and `````.

**Global Options:** apply to every chunk in your file, call `knitr::opts_chunk$set`, overwritten in individual chunk headers.

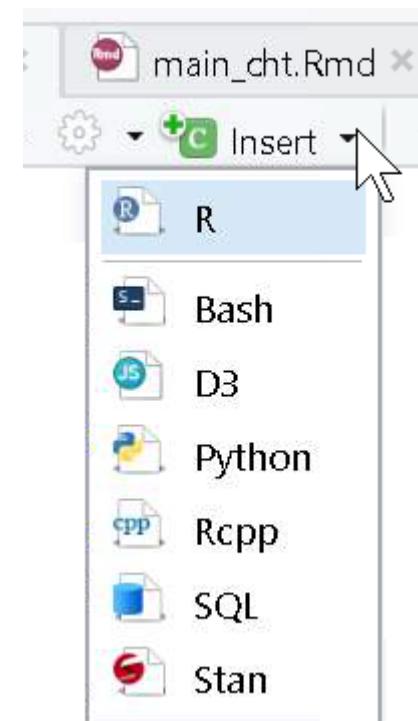
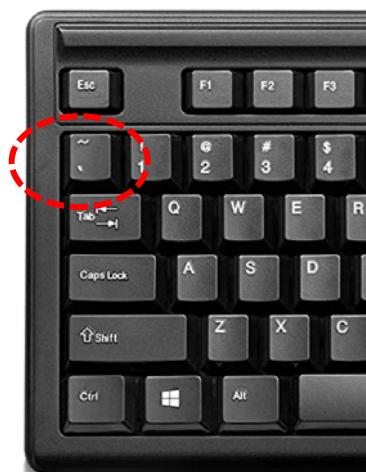
```
8 - ````{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10 - ````
```

```
17
18 - ````{r cars}
19 summary(cars)
20 -
21
22 - ## Including Plots
23
24 You can also embed plots, for example:
25
26 - ````{r pressure, echo=FALSE}
27 plot(pressure)
28 -
29 - ````
```

### Chunk Options

<https://yihui.org/knitr/options/>

Code evaluation, Text output, Code decoration, Cache, Plots, Animation, Code chunk, Child documents, Language engines, Option templates, Extracting source code, Other chunk options.



# A Notebook Interface

The screenshot shows the RStudio interface with the title bar "myRMD - RStudio". The code editor pane contains R Markdown code:

```

16 When you click the **Knit** button a document will be generated that
17 includes both content as well as the output of any embedded R code
18 chunks within the document. You can embed an R code chunk like this:
19
20
21
22 ## Including Plots
23
24 You can also embed plots, for example:
25
26
27 plot(pressure)
28

```

The plot viewer pane shows a line plot of pressure over time.

A context menu is open over the R code editor, specifically over the "summary(cars)" code chunk. The menu items are:

- Run Current Chunk

A secondary context menu is open over the "plot(pressure)" code chunk, showing the following options:

- Chunk Name: pressure
- Output: Show output only
- Show warnings
- Show messages
- Use paged tables
- Use custom figure size
- Chunk options
- Revert
- Apply

- Preview in Window  
Preview in Viewer Pane  
(No Preview)

---

- Preview Images and Equations
- Show Previews Inline

---

- Chunk Output Inline  
**Chunk Output in Console**
- Expand All Output
- Collapse All Output

---

- Clear Output
- Clear All Output

---

- Output Options...



# The R Markdown Reference Guide: Chunk Options

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## Chunk options

```
26 - ``{r pressure, echo=FALSE}
27 plot(pressure)
28 - ````
```

option	default value	description
<b>Code evaluation</b>		
<b>child</b>	NULL	A character vector of filenames. Knitr will knit the files and place them into the main document.
<b>code</b>	NULL	Set to R code. Knitr will replace the code in the chunk with the code in the code option.
<b>engine</b>	'R'	Knitr will evaluate the chunk in the named language, e.g. <code>engine = 'python'</code> . Run <code>names(knitr::knit_engines\$get())</code> to see supported languages.
<input checked="" type="checkbox"/> <b>eval</b>	TRUE	If FALSE, knitr will not run the code in the code chunk.
<b>include</b>	TRUE	If FALSE, knitr will run the chunk but not include the chunk in the final document.
<b>purl</b>	TRUE	If FALSE, knitr will not include the chunk when running <code>purl()</code> to extract the source code.
<b>Results</b>		
<b>collapse</b>	FALSE	If TRUE, knitr will collapse all the source and output blocks created by the chunk into a single block.
<input checked="" type="checkbox"/> <b>echo</b>	TRUE	If FALSE, knitr will not display the code in the code chunk above it's results in the final document.
<input checked="" type="checkbox"/> <b>results</b>	'markup'	If 'hide', knitr will not display the code's results in the final document. If 'hold', knitr will delay displaying all output pieces until the end of the chunk. If 'asis', knitr will pass through results without reformatting them (useful if results return raw HTML, etc.)
<b>error</b>	TRUE	If FALSE, knitr will not display any error messages generated by the code.
<b>message</b>	TRUE	If FALSE, knitr will not display any messages generated by the code.
<b>warning</b>	TRUE	If FALSE, knitr will not display any warning messages generated by the code.
<b>Code Decoration</b>		
<b>comment</b>	'##'	A character string. Knitr will append the string to the start of each line of results in the final document.
<b>highlight</b>	TRUE	If TRUE, knitr will highlight the source code in the final output.
<input checked="" type="checkbox"/> <b>prompt</b>	FALSE	If TRUE, knitr will add > to the start of each line of code displayed in the final document.
<b>strip.white</b>	TRUE	If TRUE, knitr will remove white spaces that appear at the beginning or end of a code chunk.
<b>tidy</b>	FALSE	If TRUE, knitr will tidy code chunks for display with the <code>tidy_source()</code> function in the <code>formatR</code> package.



# The R Markdown Reference Guide: Chunk Options

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Chunks		
<b>opts.label</b>	NULL	The label of options set in <code>knitr:: opts_template()</code> to use with the chunk.
<b>R.options</b>	NULL	Local R options to use with the chunk. Options are set with <code>options()</code> at start of chunk. Defaults are restored at end.
<b>ref.label</b>	NULL	A character vector of labels of the chunks from which the code of the current chunk is inherited.

快取

Cache		
<b>autodep</b>	FALSE	If <code>TRUE</code> , knitr will attempt to figure out dependencies between chunks automatically by analyzing object names.
<b>cache</b>	FALSE	If <code>TRUE</code> , knitr will cache the results to reuse in future knits. Knitr will reuse the results until the code chunk is altered.
<b>cache.comments</b>	NULL	If <code>FALSE</code> , knitr will not rerun the chunk if only a code comment has changed.
<b>cache.lazy</b>	TRUE	If <code>TRUE</code> , knitr will use <code>lazyload()</code> to load objects in chunk. If <code>FALSE</code> , knitr will use <code>load()</code> to load objects in chunk.
<b>cache.path</b>	'cache/'	A file path to the directory to store cached results in. Path should begin in the directory that the .Rmd file is saved in.
<b>cache.vars</b>	NULL	A character vector of object names to cache if you do not wish to cache each object in the chunk.
<b>dependson</b>	NULL	A character vector of chunk labels to specify which other chunks a chunk depends on. Knitr will update a cached chunk if its dependencies change.



# The R Markdown Reference Guide: Chunk Options

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## Plots

<b>dev</b>	'png'	The R function name that will be used as a graphical device to record plots, e.g. <code>dev='CairoPDF'</code> .
<b>dev.args</b>	NULL	Arguments to be passed to the device, e.g. <code>dev.args=list(bg='yellow', pointsize=10)</code> .
<b>dpi</b>	72	A number for knitr to use as the dots per inch (dpi) in graphics (when applicable).
<b>external</b>	TRUE	If TRUE, knitr will externalize tikz graphics to save LaTex compilation time (only for the <code>tikzDevice::tikz()</code> device).
<b>fig.align</b>	'default'	How to align graphics in the final document. One of 'left', 'right', or 'center'.
<b>fig.cap</b>	<input checked="" type="checkbox"/> NULL	A character string to be used as a figure caption in LaTex.
<b>fig.env</b>	'figure'	The Latex environment for figures.
<b>fig.ext</b>	NULL	The file extension for figure output, e.g. <code>fig.ext='png'</code> .
<b>fig.height, fig.width</b>	<input checked="" type="checkbox"/> 7	The width and height to use in R for plots created by the chunk (in inches).
<b>fig.keep</b>	'high'	If 'high', knitr will merge low-level changes into high level plots. If 'all', knitr will keep all plots (low-level changes may produce new plots). If 'first', knitr will keep the first plot only. If 'last', knitr will keep the last plot only. If 'none', knitr will discard all plots.
<b>fig.lp</b>	'fig:'	A prefix to be used for figure labels in latex.
<b>fig.path</b>	'figure/'	A file path to the directory where knitr should store the graphics files created by the chunk.
<b>fig.pos</b>	"	A character string to be used as the figure position arrangement in LaTex.
<b>fig.process</b>	NULL	A function to post-process a figure file. Should take a filename and return a filename of a new figure source.
<b>fig.retina</b>	1	Dpi multiplier for displaying HTML output on retina screens.
<b>fig.scap</b>	NULL	A character string to be used as a short figure caption.
<b>fig.subcap</b>	NULL	A character string to be used as captions in sub-figures in LaTex.
<b>fig.show</b>	'asis'	If 'hide', knitr will generate the plots created in the chunk, but not include them in the final document. If 'hold', knitr will delay displaying the plots created by the chunk until the end of the chunk. If 'animate', knitr will combine all of the plots created by the chunk into an animation.
<b>fig.showtext</b>	NULL	If TRUE, knitr will call <code>showtext::showtext.begin()</code> before drawing plots.
<b>out.extra</b>	NULL	A character string of extra options for figures to be passed to LaTex or HTML.
<b>out.height, out.width</b>	NULL	The width and height to scale plots to in the final output. Can be in units recognized by output, e.g. <code>8\linewidth, 50px</code>
<b>resize.height, resize.width</b>	NULL	The width and height to resize tike graphics in LaTex, passed to <code>\resizebox{}``{}</code> .
<b>sanitize</b>	FALSE	If TRUE, knitr will sanitize tike graphics for LaTex.

```
```{r fig.cap = "The index plot"}  
plot(iris$Sepal.Length)  
```
```



# Comment out text

- Comment out text in the source Rmd document, which will not be displayed in the final output.

- HTML syntax (single line):

```
<!-- your comment -->
```

- HTML syntax (multiple line):

```
<!--
```

```
your comment here
```

```
second line
```

```
-->
```

- RStudio shortcut: **Ctrl + Shift + C**  
(Command + Shift + C, macOS).

The screenshot shows two RStudio sessions. The top session displays the following code:

```
33
34
35 <!-- This line is a comment. -->
36
37 I would like to comment multiple line of text.
38
39 Department of Statist
40 National Taipei Unive
41 151, University Rd.,
42 New Taipei City, 2374
43 |
```

The bottom session shows the result of the RStudio shortcut:

```
33
34
35 <!-- This line is a comment. -->
36
37 <!-- I would like to comment multiple line of text.
-->
38
39 <!-- Department of Statistics -->
40 <!-- National Taipei University -->
41 <!-- 151, University Rd., San Shia District, -->
42 <!-- New Taipei City, 23741 Taiwan -->
43 |
```

The screenshot shows the RStudio interface with the following code:

```
33
34
35 <!-- This line is a comment.
36
37 I would like to comment multiple line of text.
38
39 Department of Statistics
40 National Taipei University
41 151, University Rd., San Shia District,
42 New Taipei City, 23741 Taiwan
43 |
```

The screenshot shows the RStudio interface with the following code:

```
33
34
35 <!-- This line is a comment. -->
36
37 I would like to comment multiple line of text.
38
39 Department of Statistics
40 National Taipei University
41 151, University Rd., San Shia District,
42 New Taipei City, 23741 Taiwan
43 |
```

The screenshot shows the RStudio interface with the following code:

```
33
34
35 <!-- This line is a comment. -->
36
37 <!--
38 I would like to comment multiple line of text.
39
40 Department of Statistics
41 National Taipei University
42 151, University Rd., San Shia District,
43 New Taipei City, 23741 Taiwan
44 -->
45 |
```



# Inline Code

```
45 <!-- Code Chunk -->
46 Here is a simple "Code chunk".
47 ````{r}
48 myname <- "Hank Wu"
49 cat("Hello~ My name is", myname, "\n")
50 paste("Today is ", date())
51 ````
```

```
Hello~ My name is Hank Wu
[1] "Today is Thu Jan 07 13:13:40 2021"
```

```
52
53
54 I would like to introduce myself.
55 My name is `r myname`.
56 Today is `r date()`.
57 The sum of integers from 1 to 100 is `r sum(1:100)` .
58 The `r` command is `sum(1:100)`.
```



R ~ /myRMD/main\_cht\_html.html

main\_cht\_html.html | Open in Browser | Find | Publish | C

Here is a simple "Code Chunk".

```
myname <- "Hank Wu"
cat("Hello~ My name is", myname, "\n")
```

## Hello~ My name is Hank Wu

```
paste("Today is ", date())
```

## [1] "Today is Thu Jan 07 13:13:55 2021"

I would like to introduce myself. My name is Hank Wu. Today is Thu Jan 07 13:13:55 2021. The sum of integers from 1 to 100 is 5050. The `r` command is `sum(1:100)`.

```
<!-- Code Chunk -->
Here is a simple "Code Chunk".
````{r}
myname <- "Hank Wu"
cat("Hello~ My name is", myname, "\n")
paste("Today is ", date())
````
```

I would like to introduce myself.

My name is `r myname`.

Today is `r date()`.

The sum of integers from 1 to 100 is `r sum(1:100)` . The `r` command is `sum(1:100)`.

The sum of integers from 1 to 100 is `r s <- sum(1:100)` .  
The sum is `r s`.

The sum of integers from 1 to 100 is . The sum is 5050.



# 新增R Markdown檔案

## Title及Author不能有中文

34/48

New R Markdown

Document       Title: 我的 R Markdown 密笈

Presentation       Author: 吳漢銘

**Default Output Format:**

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

PDF

PDF output  
2013+       Word

Preview       Word

Create Empty Document

main\_cht\_html.Rmd x main\_cht.Rmd x Untitled1 x

Knit      Insert      Run

```
1 ---
2 ---
3
4 ```{r setup, include=FALSE}
5 knitr::opts_chunk$set(echo = TRUE)
6
7
8 ## R Markdown
9
10 This is an R Markdown document. Markdown is a simple formatting syntax for
11 # Title
```

Console Terminal x Jobs x

~/myRMD/ ↵

Error in substr(val, 1, 1) : 無效的多位元組字串於 '<e6><88><91>?□ Markdown擎貓<bf>□<af>□<ac><88>'  
> |



# 新增R Markdown檔案 先用內建「Title及Author」

35/48

New R Markdown

Title: Untitled

Author: HanK

Default Output Format:

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

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

Word  
Previewing Word documents requires an installed version of Microsoft Word (or Libre/Open Office on Linux).

Create Empty Document      OK

myRMD\_Tips.Rmd

```
1 ---
2 title: "Untitled"
3 author: "HanK"
4 date: "2021/1/7"
5 output: html_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
21
22 ## Including Plots
23
24 You can also embed plots, for example:
25
26 ```{r pressure, echo=FALSE}
27 plot(pressure)
28
29
30 Note that the `echo = FALSE` parameter was added to the code chunk to
prevent printing of the R code that generated the plot.
31
```

5:22 # Untitled R Markdown



# 練習: 我的R Markdown學習密笈

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## 我的R Markdown學習密笈

Department of Statistics, National Taipei University

吳漢銘

08一月 2021

- 1 Markdown Syntax 語法
  - 1.1 標題
- Header 1 標題1(不標號)
  - Header 2 標題2(不標號)
    - Header 3 標題3
  - 1.2 列舉: 項目符號清單
  - 1.3 列舉: 編號清單
- 2 程式碼
  - 2.1 文中程式指令
  - 2.2 內嵌程式碼(code inline)
  - 2.3 code chunk 程式區塊(列出程式碼)
  - 2.4 code chunk 程式區塊(印出提示符號)
  - 2.5 code chunk 程式區塊(不列出程式碼)
  - 2.6 程式碼照印(verbatim)
- 3 表格
  - 3.1 手繪表格
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- 4 圖形
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- 5 數學式
  - 5.1 文中數式
  - 5.2 單獨數式(無編號)
  - 5.3 單獨數式(有編號)
- 6 其它
- 7 引用

```
myRMD_Tips.Rmd x
[File] [New] [Open] [Save] [ABC] [Search] [Knit] [Help]
1 ---
2 title: "我的R Markdown學習密笈"
3 subtitle: "Department of Statistics, National Taipei University"
4 author: "吳漢銘"
5 date: "`r format(sys.time(), '%d %B %Y')`"
6 output:
7 bookdown::html_document2:
8 toc: true
9 toc_depth: 3
10 number_sections: true
11 theme: united
12 highlight: tango
13 ---
14
15 <!-- 全域設定 -->
16 `r setup, include=FALSE}
17 knitr::opts_chunk$set(echo = TRUE)
18`
19
```



# 標題及列舉

## 1 Markdown Syntax 語法

### 1.1 標題

Header 1 標題1 (不標號)

Header 2 標題2 (不標號)

Header 3 標題3

Header 4 標題4

Header 5 標題5

Header 6 標題6

### 1.2 列舉: 項目符號清單

- Plain text 一般文字
  - *italics* and *italics*
  - 斜體和斜體
  - *italics* 斜體
    - **bold** and **bold**
    - 粗體和粗體
- 顏色(html): 這裡是綠色的字。

### 1.3 列舉: 編號清單

1. superscript<sup>2</sup>, 上標<sup>2</sup>
  2. subscript<sub>2</sub>, 下標<sub>2</sub>
    - i. 這裡是RStudio連結。
    - ii. 我的網站: <http://www.hmwu.idv.tw>
- A. endash: – 連接號: –  
B. emdash: — 破折號: —  
C. ellipsis: ... 省略符號: ...  
D. strikethrough, 刪除線

End a line with two spaces to start a new paragraph. 使用兩列空格來結束一行，開始新的的段落。

```
20 <!--
21 #####
22 # 第一章: Markdown Syntax
23 # 這註解是個人風格，也不一定要照著做
24 #####
25 -->
26
27 # Markdown syntax 語法 {#syntax}
28
29 ## 標題
30 # Header 1 標題1 (不標號) {.unnumbered}
31 ## Header 2 標題2 (不標號) {-}
32 ### Header 3 標題3 {-}
33 ##### Header 4 標題4 {-}
34 ##### Header 5 標題5 {-}
35 ##### Header 6 標題6 {-}
36
37
38 ## 列舉: 項目符號清單
39 * Plain text 一般文字
40 + *italics* and _italics_
41 + *斜體* 和 _斜體_
42 + italics 斜體
43 - **bold** and __bold__
44 - **粗體** 和 __粗體__
45 * 顏色(html): 這裡是綠色的字。
46
47
48 ## 列舉: 編號清單
49 1. superscript2, 上標2
50 2. subscript2, 下標2
51 i) 這裡是[RStudio](http://www.rstudio.com)連結。
52 ii) 我的網站: <http://www.hmwu.idv.tw>
53 A. endash: -- 連接號: --
54 B. emdash: --- 破折號: ---
55 C. ellipsis: ... 省略符號: ...
56 D. ~~strikethrough~~, ~~刪除線~~
57
58
59 End a line with two spaces to start a new paragraph.
60 使用兩列空格來結束一行，開始新的的段落。
61
```



# 程式碼

## 2 程式碼

### 2.1 文中程式指令

我最常用的R指令是`str`，最好的用的是`apply`系列指令。

### 2.2 內嵌程式碼 (code inline)

整數1連加到100的總和是5050，R語言的程式碼是`sum(1:100)`。

### 2.3 code chunk 程式區塊 (列出程式碼)

```
paste("Hello", "World!")

[1] "Hello World!"
```

### 2.4 code chunk 程式區塊 (印出提示符號)

```
> paste("Hello", "World!")

[1] "Hello World!"
```

### 2.5 code chunk 程式區塊 (不列出程式碼)

```
[1] "Hello World!"
```

### 2.6 程式碼照印 (verbatim)

```
109-1-R-exam2
ex1(a)
my.inverse <- function(n){
 cat("計算反矩陣\n")
 cat("請輸入", n, " by ", n, "之矩陣:")
 m <- matrix(scan(), ncol=n, nrow=n)
 list(Mat=m, Mat.inverse=solve(m))
}

my.inverse(n=3)
```

```
64 <!--
65 #####
66 # 程式碼
67 #
68 #####
69 -->
70 # 程式碼
71
72
73 ## 文中程式指令
74 我最常用的R指令是`str`，最好的用的是`apply`系列指令。
75
76 ## 內嵌程式碼 (code inline)
77 整數1連加到100的總和是 `r sum(1:100)`，`R`語言的程式碼是`sum(1:100)`。
78
79
80 ## code chunk 程式區塊 (列出程式碼)
81 ``{r}
82 paste("Hello", "World!")
83
84
85 ## code chunk 程式區塊 (印出提示符號)
86 ``{r prompt=TRUE}
87 paste("Hello", "World!")
88
89
90 ## code chunk 程式區塊 (不列出程式碼)
91 ``{r eval=TRUE, echo=FALSE}
92 paste("Hello", "World!")
93
94
95 ## 程式碼照印 (verbatim)
96
97 ``
98 # 109-1-R-exam2
99 # ex1(a)
100 my.inverse <- function(n){
101 cat("計算反矩陣\n")
102 cat("請輸入", n, " by ", n, "之矩陣:")
103 m <- matrix(scan(), ncol=n, nrow=n)
104 list(Mat=m, Mat.inverse=solve(m))
105 }
106
107 my.inverse(n=3)
108
```



# 表格

## 3 表格

### 3.1 手繪表格

| Table Header | Second Header |
|--------------|---------------|
| Table Cell   | Cell 2        |
| Cell 3       | Cell 4        |

### 3.2 原本的資料框(data.frame)表格

```
head(airquality) # don't work in R Markdown

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 N
66 5 6
```

### 3.3 knitr::kable的表格

```
mydata <- airquality[1:4,]
knitr::kable(mydata, caption = "Table with kable")
```

Table 3.1: Table with kable

| Ozone | Solar.R | Wind | Temp | Month |
|-------|---------|------|------|-------|
| 41    | 190     | 7.4  | 67   | 5     |
| 36    | 118     | 8.0  | 72   | 5     |
| 12    | 149     | 12.6 | 74   | 5     |
| 18    | 313     | 11.5 | 62   | 5     |

### 3.4 xtable::xtable的表格

```
install.packages("xtable")
library(xtable)
print(xtable(mydata, caption = "Table with xtable"), type = "html")
```

|   | Ozone | Solar.R | Wind  | Temp | Month | Day |
|---|-------|---------|-------|------|-------|-----|
| 1 | 41    | 190     | 7.40  | 67   | 5     | 1   |
| 2 | 36    | 118     | 8.00  | 72   | 5     | 2   |
| 3 | 12    | 149     | 12.60 | 74   | 5     | 3   |
| 4 | 18    | 313     | 11.50 | 62   | 5     | 4   |

Table with xtable

```
110 <!--
111 #####
112 # 表格
113 #
114 #####
115 -->
116 # 表格
117
118
119 ## 手繪表格
120 Table Header | Second Header
121 ----- | -----
122 Table Cell | Cell 2
123 Cell 3 | Cell 4
124
125
126 ## 原本的資料框(`data.frame`)表格
127 ```{r results = 'asis'}``
128 head(airquality) # don't work in R Markdown
129
130
131 ## knitr::kable的表格
132 ```{r airquality, results = 'asis'}``
133 mydata <- airquality[1:4,]
134 knitr::kable(mydata, caption = "Table with kable")
135
136
137 ## xtable::xtable的表格
138 ```{r results = "asis"}``
139 # install.packages("xtable")
140 library(xtable)
141 print(xtable(mydata, caption = "Table with xtable"), type = "html")
142
143
```



# 圖形

## 4 圖形

### 4.1 基礎圖形(Base Graphics)

```
attach(iris)
par(mfrow=c(1, 2))
plot(Sepal.Length, col=iris$Species, main="Index Plot")
hist(Sepal.Length, main="Histogram")
```

```
145 <!--
146 ######
147 # 圖形
148 #
149 #####
150 -->
151 # 圖形
152
153
154 ## 基礎圖形(Base Graphics)
155 ````{r iris-plot, fig.cap="The iris data."}
156 attach(iris)
157 par(mfrow=c(1, 2))
158 plot(Sepal.Length, col=iris$Species, main="Index Plot")
159 hist(Sepal.Length, main="Histogram")
160 ````
```

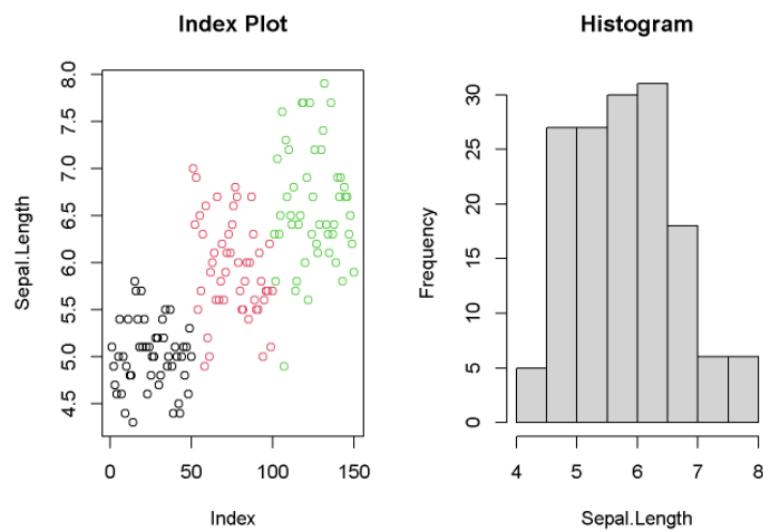


Figure 4.1: The iris data.



# 圖形: 控制大小

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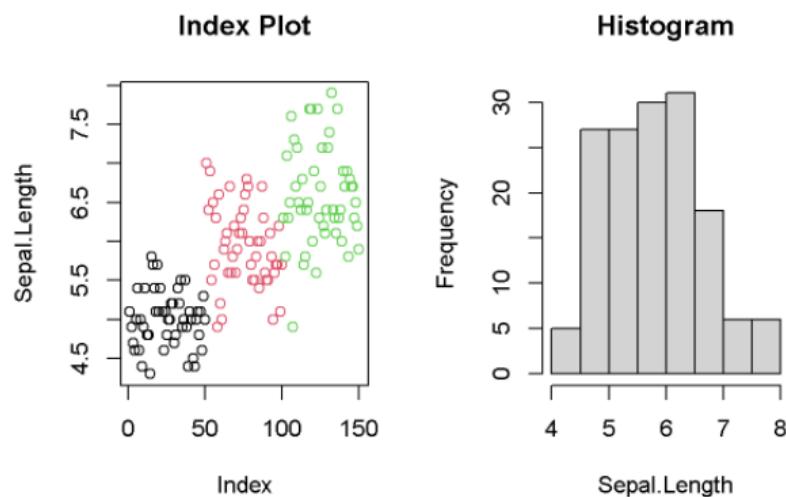
## 4.2 基礎圖形(Base Graphics) (控制大小)

```
attach(iris)
```

```
The following objects are masked from iris (pos = 3):

Petal.Length, Petal.Width, Sepal.Length, Sepal.Width, Species
```

```
par(mfrow=c(1, 2))
plot(Sepal.Length, col=iris$Species, main="Index Plot")
hist(Sepal.Length, main="Histogram")
```



```
162
163 ## 基礎圖形(Base Graphics) (控制大小)
164 ````{r fig.height = 4, fig.width = 6}
165 attach(iris)
166 par(mfrow=c(1, 2))
167 plot(Sepal.Length, col=iris$Species, main="Index Plot")
168 hist(Sepal.Length, main="Histogram")
169 ````
```

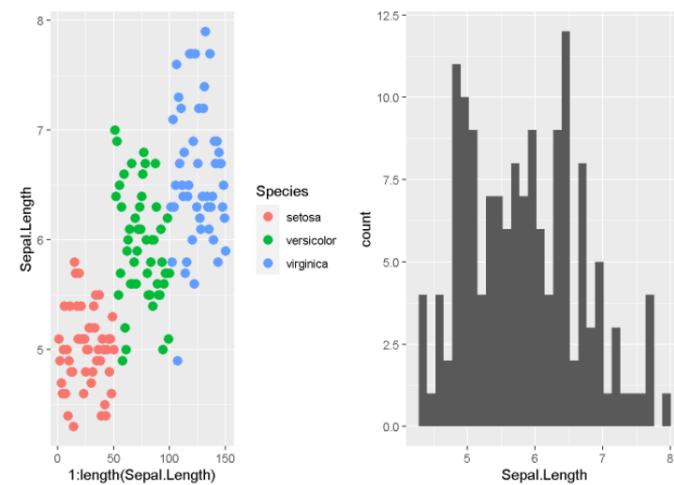
# 圖形: ggplot2



## 4.3 ggplot2圖形(置中)

```
install.packages("ggplot2")
install.packages("gridExtra")
library(ggplot2)
suppressMessages(require(ggplot2))
library(gridExtra)
p1 <- ggplot(iris, aes(x=1:length(Sepal.Length), y=Sepal.Length,
 color=Species)) + geom_point(size=3)
p2 <- ggplot(iris, aes(x=Sepal.Length)) +
 geom_histogram()
grid.arrange(p1, p2, nrow=1, ncol=2)
```

## `stat\_bin()` using `bins = 30`. Pick better value with `binwidth`.



```
170
171 ## ggplot2圖形(置中)
172 ``{r fig.align = "center"}
173 # install.packages("ggplot2")
174 # install.packages("gridExtra")
175 library(ggplot2)
176 suppressMessages(require(ggplot2))
177 library(gridExtra)
178 p1 <- ggplot(iris, aes(x=1:length(Sepal.Length), y=Sepal.Length,
179 color=Species)) + geom_point(size=3)
180 p2 <- ggplot(iris, aes(x=Sepal.Length)) +
181 geom_histogram()
182 grid.arrange(p1, p2, nrow=1, ncol=2)
183
184
```



# 圖片

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```
185
186 ## 圖片
187 image 圖片: ![[這是R語言的官方標誌]](Rlogo.png) {width=30%}
188
189
190 ## 圖片(利用knitr)
191 ``{r, out.width='25%', fig.align="center", fig.cap="R的Logo"}
192 knitr::include_graphics("Rlogo.png")
193 ``
```

## 4.4 圖片



## 4.5 圖片(利用knitr)

```
knitr::include_graphics("Rlogo.png")
```



Figure 4.2: R的Logo



# 數學式

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## 5 數學式

### 5.1 文中數式

圓面積:  $A = \pi \times r^2$ , 平均數  $\bar{X} = \frac{\sum_{i=1}^n x_i}{n}$ .

### 5.2 單獨數式 (無編號)

這是常態分佈的機率密度函數:

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

### 5.3 單獨數式 (有編號)

以下是有數學式編號的範例:

$$\Theta = \begin{pmatrix} \alpha & \beta \\ \gamma & \delta \end{pmatrix}$$
$$E = mc^2$$

```
195 <!--
196 ######
197 # 數學式
198 #
199 #####
200 -->
201 # 數學式
202
203
204 ## 文中數式
205 圓面積: $A = \pi \times r^2$, 平均數$|\bar{x}|=\frac{\sum_{i=1}^n x_i}{n}$.
206
207
208 ## 單獨數式 (無編號)
209 這是常態分佈的機率密度函數:
210 [
211 f(x)=\frac{1}{\sqrt{2\pi}\sigma}e^{-\frac{(x-\mu)^2}{2\sigma^2}}
212]
213
214
215 ## 單獨數式 (有編號)
216
217 以下是有數學式編號的範例:
218 \begin{equation}
219 \Theta =
220 \begin{pmatrix}
221 \alpha & \beta \\
222 \gamma & \delta
223 \end{pmatrix} (\#eq:matrix)
224 \end{equation}
225
226
227 \begin{equation}
228 E=mc^2
229 (\#eq:emc)
230 \end{equation}
231
```



# 其它

## 6 其它

三個以上的連續星號(\*)產生一水平線:

-----

三個以上的連續減號(-)產生一斷頁(Page Break):

block quote 這裡是引用區塊

這是第一句話，以下有二列空白。

這是第二句話，上面有二列空白。

加一條灰色水平線(html碼):

-----

```
235 <!--
236 ######
237 # 其它
238 #
239 #####
240 -->
241 # 其它
242
243
244 三個以上的連續星號(*)產生一水平線:
245 *****
246 -----
247 三個以上的連續減號(-)產生一斷頁(Page Break):
248 -----
249
250 -----
251
252
253 > block quote 這裡是引用區塊
254
255
256
257 這是第一句話，以下有二列空白。
258

259 這是第二句話，上面有二列空白。
260
261
262 加一條灰色水平線(html碼):
263 <hr style="border:1px solid gray"> </hr>
264
265
266 這是需要註解的一句話footnote ^[這裡是註解]
267
```



# 引用

這是需要註解的一句話Footnote<sup>1</sup>

## 7 引用

- 標題引用: Markdown Syntax 語法在第1章。
- 圖形引用: See Figure 4.1
- 表格引用: See Table 3.1
- 數學式引用: See Equation (5.1)

1. 這裡是註解 ↴

```
269 <!--
270 #####
271 # 參考書目 #
272 #
273 #####
274 -->
275 # 引用
276
277 * 標題引用: Markdown Syntax 語法在第 \@ref(syntax) 章。
278 * 圖形引用: See Figure \@ref(fig:iris-plot)
279 * 表格引用: See Table \@ref(tab:airquality)
280 * 數學式引用: See Equation \@ref(eq:matrix)
281
```

# Visual Markdown Editing

<https://rstudio.github.io/visual-markdown-editing>

R Studio

Visual R Markdown

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Visual markdown editing is currently only available in the [preview release](#) of RStudio. You can download the desktop version of the preview release here:

| Platform            | Download                                    | Size | SHA-256     |
|---------------------|---------------------------------------------|------|-------------|
| Windows 10/8/7      | <a href="#">RStudio-1.4.1098.exe</a>        | 150M | 54490b34... |
| MacOS 10.13+        | <a href="#">RStudio-1.4.1098.dmg</a>        | 146M | fd44c159... |
| Ubuntu 18/Debian 10 | <a href="#">rstudio-1.4.1098-amd64.deb</a>  | 116M | 0eb1c160... |
| Fedora 28/Red Hat 8 | <a href="#">rstudio-1.4.1098-x86_64.rpm</a> | 132M | 51e830b8... |

RStudio Desktop 1.3.1093

2021/01/07

source or visual mode.

Filtering joins

Filtering joins match observations in the same way as [mutating joins](#), but affect the observations, not the variables<sup>1</sup>. There are two types:

|                              |                      |                                                        |
|------------------------------|----------------------|--------------------------------------------------------|
| <code>semi_join(x, y)</code> | $x \ltimes y$        | Keeps all observations in $x$ that have a match in $y$ |
| <code>anti_join(x, y)</code> | $x \triangleright y$ | Drops all observations in $x$ that have a match in $y$ |

Graphically, a semi-join looks like this:

```
[r, echo = FALSE, out.width = NULL]
knitr::include_graphics("diagrams/join-semi.png")
```

Only the existence of a match is important; it doesn't matter which observation is matched. This means that filtering joins never duplicate rows like mutating joins do:



# pagedreport Package

- **pagedreport**: pagedreport is an R package to help you make beautiful PDF-based reports from RMarkdown.
- <https://pagedreport.rfortherestofus.com/>
- <https://rfortherestofus.com/2021/01/announcing-pagedreport/>

```
remotes::install_github("rfortherestofus/pagedreport", ref = "main")
```

其它問題:

- 中文目錄問題
- 用R安裝，`install.packages("rmarkdown", dependencies=T)`
- bookdown，ggplot2要裝
- miktex 若是選自己使用
- mac os: mactex
- PDF若不跑不順，可在表頭加「`documentclass:ctexart`」，可不用寫Latex到YAML。