

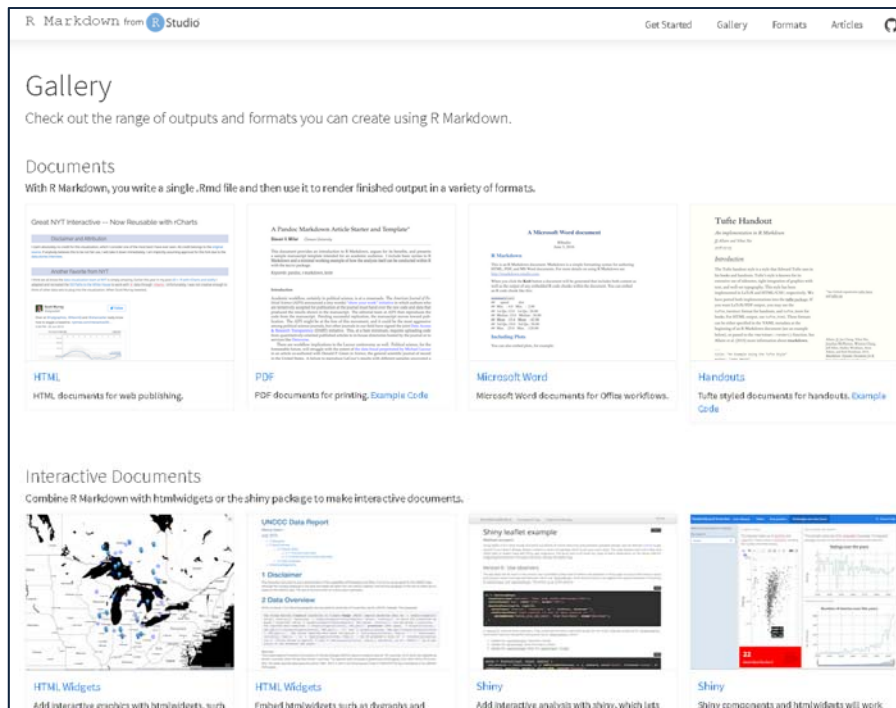


# <https://rmarkdown.rstudio.com/>

- 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.

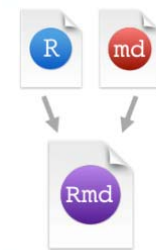
可以在 .Rmd 純文字檔案中同時寫程式與撰寫說明內容，不需要另外將程式、輸出與圖形另外複製貼上或匯出至文書編輯軟體中。

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



## 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.



## Reproducible Research

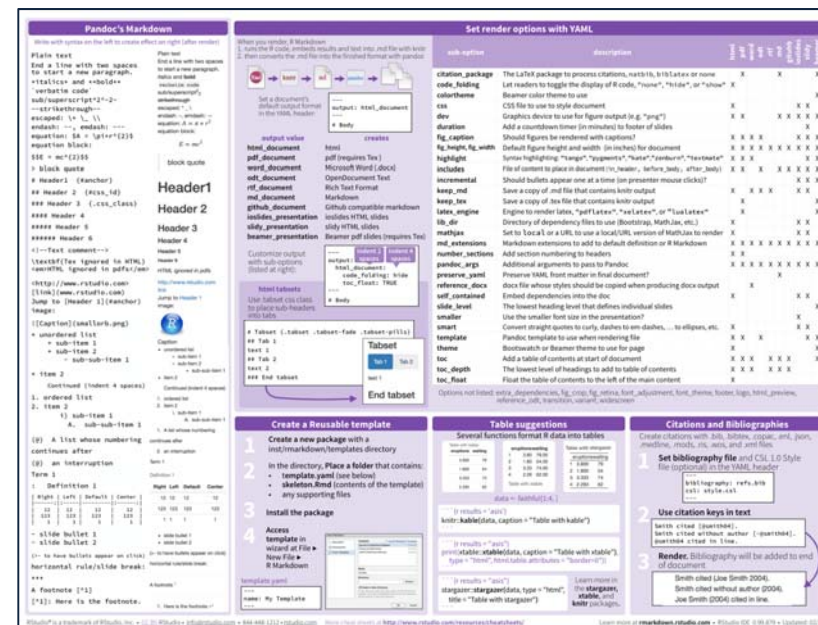
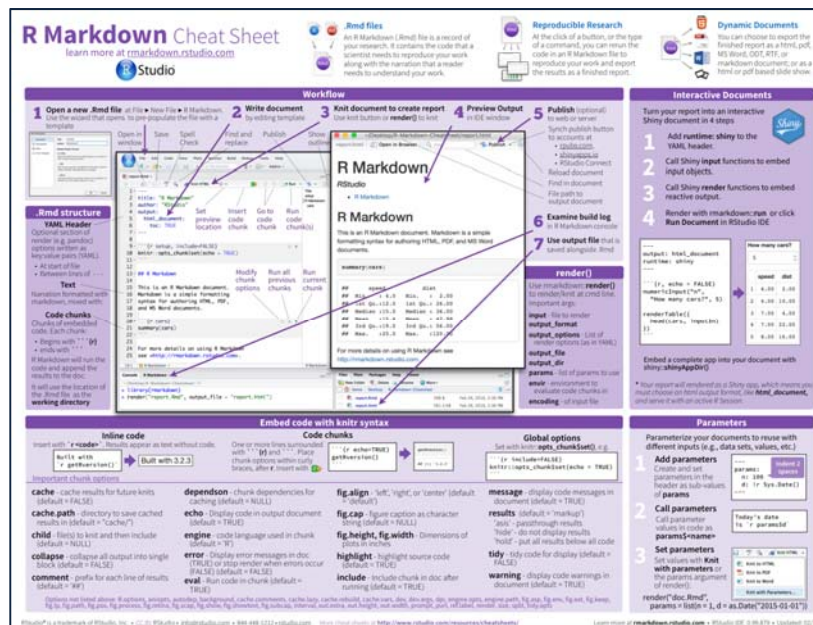
At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.



## Dynamic Documents

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

- Getting Started with R Markdown — Guide and Cheatsheet  
<https://www.dataquest.io/blog/r-markdown-guide-cheatsheet/>
- <https://rmarkdown.rstudio.com/articles.html>
- R Markdown formats from RStudio  
<https://rmarkdown.rstudio.com/formats.html>
- R Markdown: The Definitive Guide , Yihui Xie, J. J. Allaire, Garrett Grolemond, 2020-04-26  
<https://bookdown.org/yihui/rmarkdown/>
- 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>



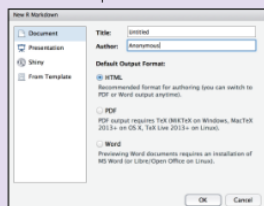


# Workflow

4/18

## Workflow

**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 or server

Synch publish button to accounts at

- [rpubs.com](http://rpubs.com),
- [shinyapps.io](http://shinyapps.io)
- RStudio Connect

Reload document  
Find in document  
File path to output document

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

**7 Use output file** that is saved alongside .Rmd

## render()

Use `rmarkdown::render()` to render/knit at cmd line. Important args:

**input** - file to render

**output\_format**

**output\_options** - List of render options (as in YAML)

**output\_file**

**output\_dir**

**params** - list of params to use

**envir** - environment to evaluate code chunks in

**encoding** - of input file

## .Rmd structure

### YAML 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 markdown, mixed with:

### Code chunks

Chunks of embedded code. Each chunk:

- Begins with ````{r}`
- ends with `````

R Markdown will run the code and append the results to the doc.

It will use the location of the .Rmd file as the **working directory**

Annotations in the RStudio IDE:

- Open in window
- Save
- Spell Check
- Find and replace
- Publish
- Show outline
- Knit HTML
- Run
- Set preview location
- Insert code chunk
- Go to code chunk
- Run code chunk(s)
- Modify chunk options
- Run all previous chunks
- Run current chunk

Annotations in the R Markdown source file:

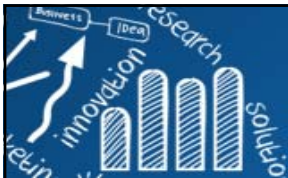
- YAML Header
- Text
- Code chunks

Annotations in the rendered HTML output:

- Open in Browser
- Publish

Annotations in the R Markdown console:

- render()



[關閉]

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
- 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** (/ˈjæməl/，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

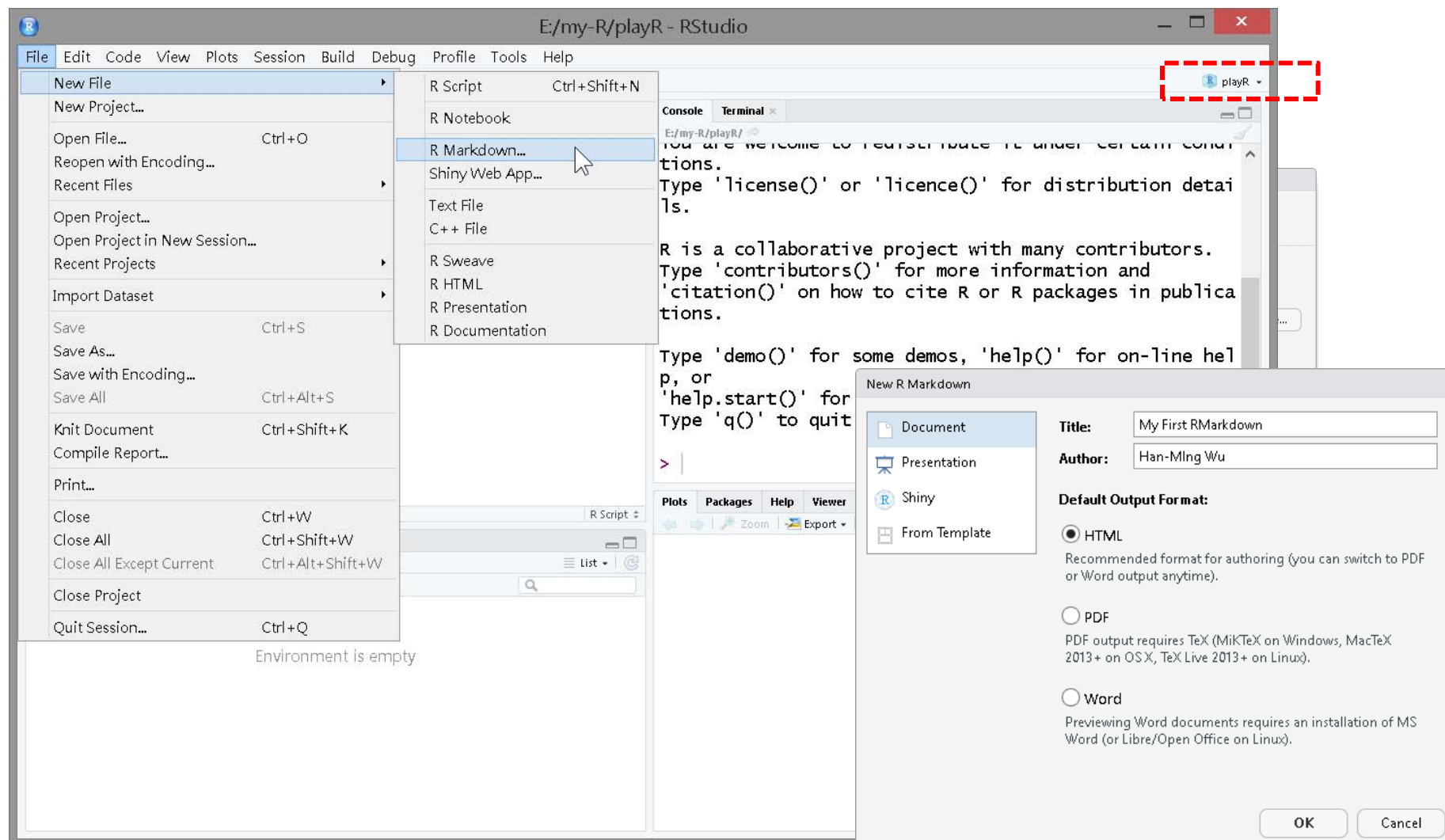
<b>副檔名</b>	<div><div><div><div><div><div></div></div></div><div><div><div><span>.yaml</span>, <span>.yml</span></div></div></div></div></div></div>
<b>網路媒體型式</b>	<div>尚未註冊</div>
<b>初始版本</b>	2001年5月11日，17年前
<b>最新版本</b>	1.2 (Third Edition) (2009年10月1日，8年前)
<b>格式類型</b>	Data interchange
<b>自由格式？</b>	是
<b>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



# 範例：新增RMarkdown文件

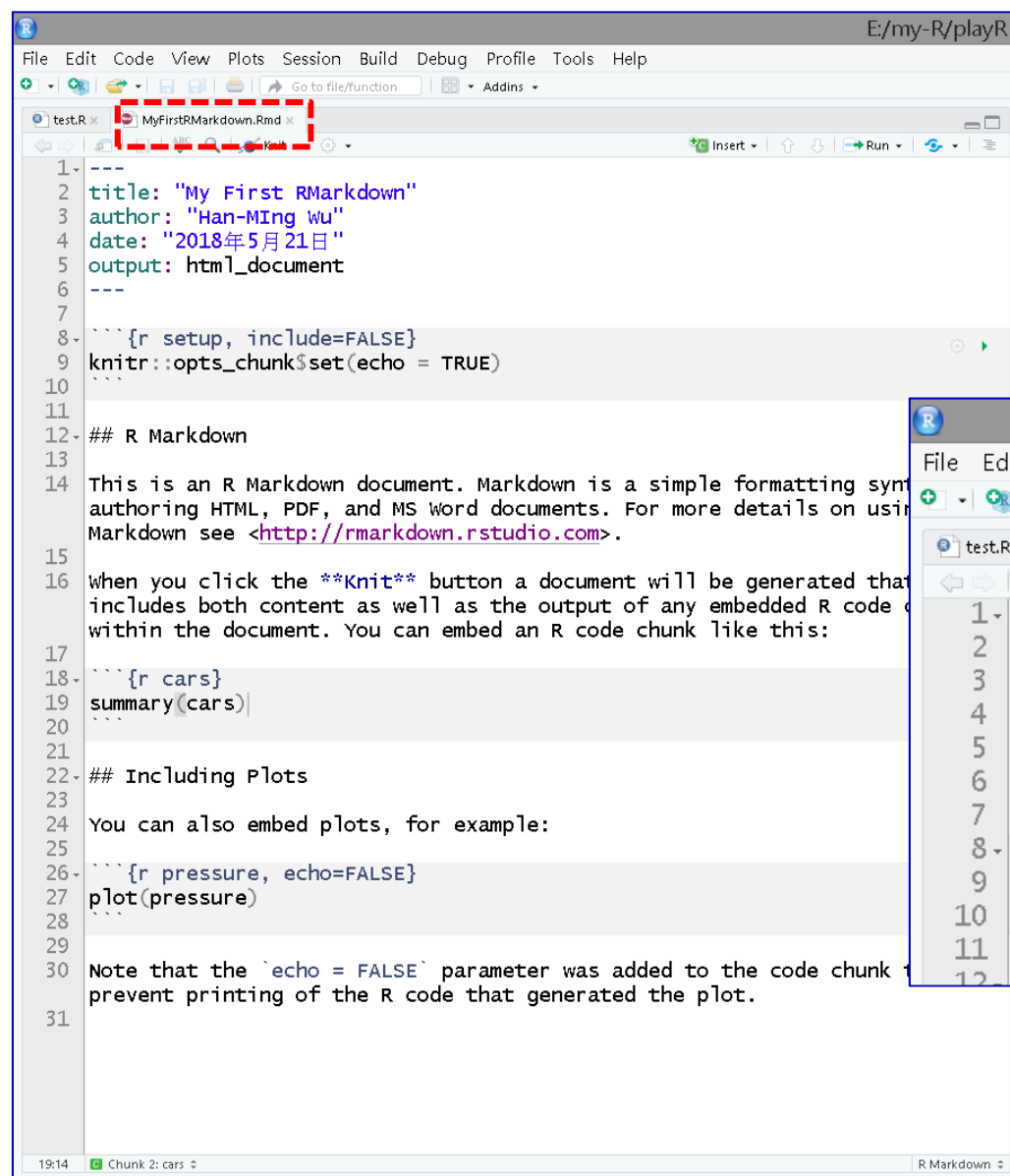
6/18

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

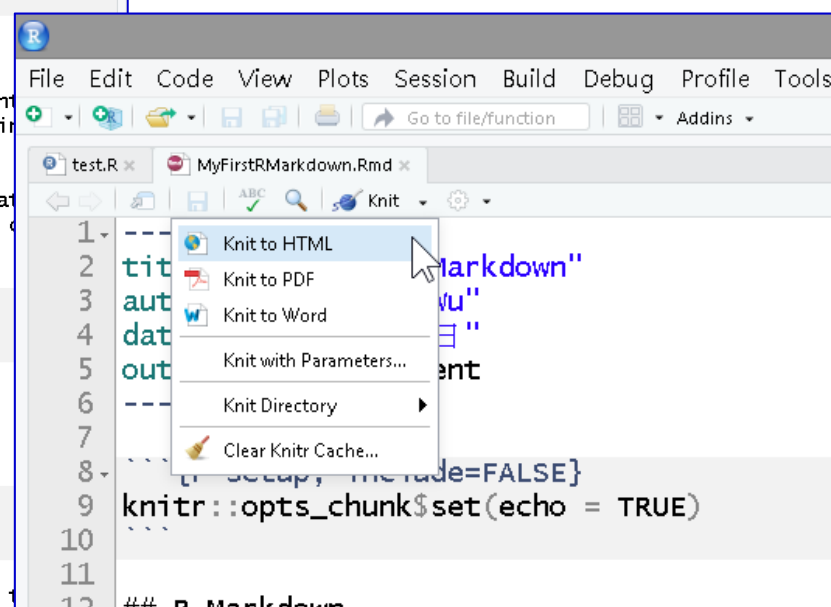


# 產生樣版Markdown，並編譯

7/18



```
1 ---
2 title: "My First RMarkdown"
3 author: "Han-Ming Wu"
4 date: "2018年5月21日"
5 output: htm1_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
15 for authoring HTML, PDF, and MS Word documents. For more details on using
16 Markdown see <http://rmarkdown.rstudio.com>.
17
18 When you click the Knit button a document will be generated that
19 includes both content as well as the output of any embedded R code chunks
20 within the document. You can embed an R code chunk like this:
21
22 ```{r cars}
23 summary(cars)
24 ```
25
26 ## Including Plots
27
28 You can also embed plots, for example:
29
30 ```{r pressure, echo=FALSE}
31 plot(pressure)
32 ```
33
34 Note that the `echo = FALSE` parameter was added to the code chunk to
35 prevent printing of the R code that generated the plot.
```



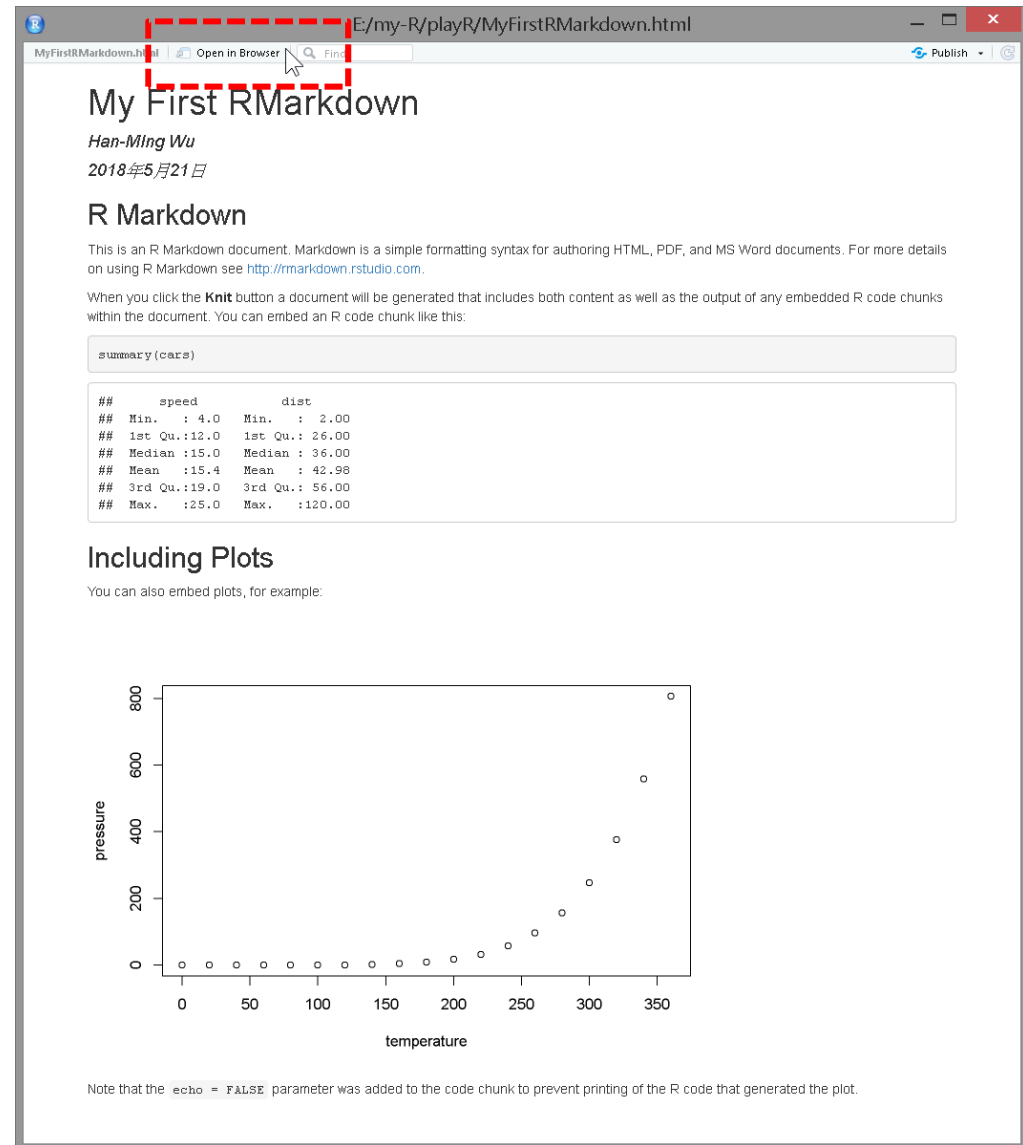
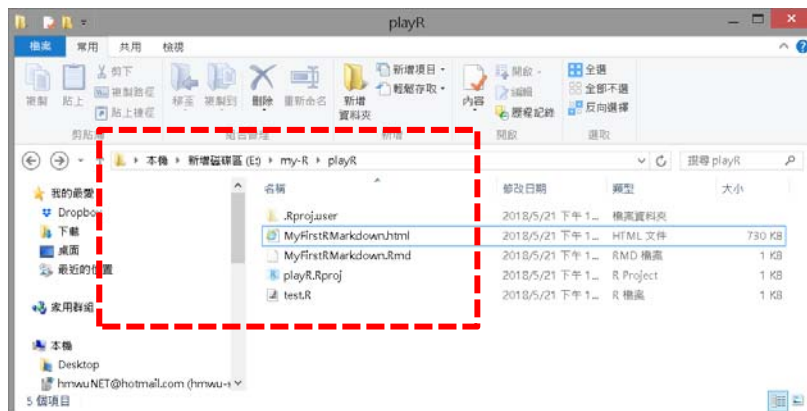
# 產生報告及html檔案

8/18



```
processing file: MyFirstRMarkdown.Rmd
|.....| 14
% ordinary text without R code
|.....| 29
% label: setup (with options)
List of 1
$ include: logi FALSE
|.....| 43
% ordinary text without R code
|.....| 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

"C:/Program Files/RStudio/bin/pandoc/pandoc" +RTS -K512m -RTS MyFirstRMarkdown.utf8.md --to html4 --from markdown+autolink_bare_uris+ascii_identifiers+tex_math_single_backslash --output MyFirstRMarkdown.html --smart --email-obfuscation none --self-contained --standalone --section-divs --temp-late "C:/Users/userpc/Documents/R/win-library/3.4/rmarkdown/rmd/h/default.html" --no-highlight --variable highlightjs=1 --variable "theme:bootstrap" --include-in-header "C:/Users/userpc/AppData/Local/Temp/RtmpKAYNAN/rmarkdown-css-4d407c4b3077.html" --mathjax --variable "mathjax-url:https://ma
```



My First RMarkdown

Han-Ming Wu

2018年5月21日

## 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>.

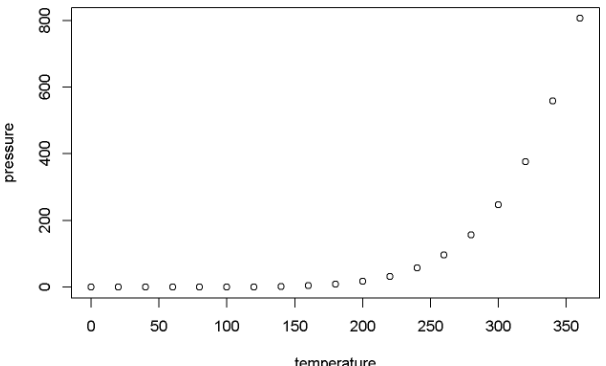
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
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.

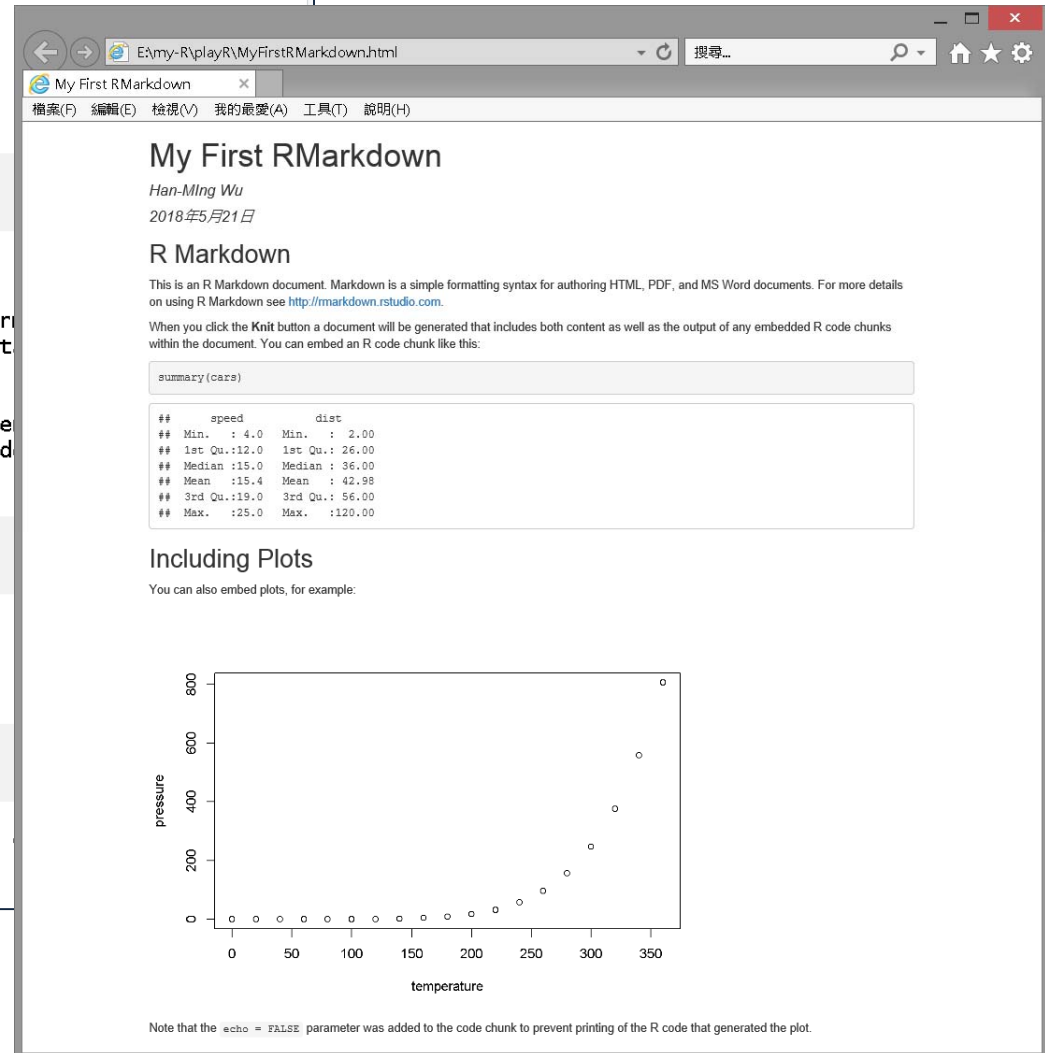


# 於瀏覽器中開啟html檔案

9/18

可透過 global chunk 設置文件裡的所有 chunk 參數，作用如同投影片母片一樣，將這個 global chunk 放在所有其他 chunk 之上即可。

```
1 ---
2 title: "My First RMarkdown"
3 author: "Han-Ming Wu"
4 date: "2018年5月21日"
5 output: html_document
6 ---
7
8 ```{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10
11 ## R Markdown
12
13 This is an R Markdown document. Markdown is a simple format for
14 authoring HTML, PDF, and MS Word documents. For more details on
15 using R Markdown see <http://rmarkdown.rstudio.com>.
16
17 When you click the Knit button a document will be generated that
18 contains both content as well as the output of any embedded R code
19 chunks. You can embed an R code chunk like this:
20
21 ```{r cars}
22 summary(cars)
23
24 ## Including Plots
25
26 You can also embed plots, for example:
27
28 ```{r pressure, echo=FALSE}
29 plot(pressure)
30
31 Note that the `echo = FALSE` parameter was added to the
32 printing of the R code that generated the plot.
```





# Chunk options and package options

Syntax	Becomes
<p>Make a code chunk with three back ticks followed by an <code>r</code> in braces. End the chunk with three back ticks:</p> <pre>```\${r} paste("Hello", "World!") ```</pre>	<p>Make a code chunk with three back ticks followed by an <code>r</code> in braces. End the chunk with three back ticks:</p> <pre>paste("Hello", "World!")  ## [1] "Hello World!"</pre>
<p>Place code inline with a single back ticks. The first back tick must be followed by an <code>R</code>, like this <code>`r paste("Hello", "World!")`</code>.</p>	<p>Place code inline with a single back ticks. The first back tick must be followed by an <code>R</code>, like this Hello World!.</p>
<p>Add chunk options within braces. For example, <code>`echo=FALSE`</code> will prevent source code from being displayed:</p> <pre>```\${r eval=TRUE, echo=FALSE} paste("Hello", "World!") ```</pre>	<p>Add chunk options within braces. For example, <code>echo=FALSE</code> will prevent source code from being displayed:</p> <pre>## [1] "Hello World!"</pre>

程式區塊(Code Chunks):使用 ``` 將行內程式(Inline Code)包起來，或者使用 ````` 將程式區塊包起來。  
``` (tilt): 鍵盤最左上角的按鍵 (在 `tab` 的上方)。

`echo = FALSE`: 只將程式執行後的結果輸出在文件中，但不輸出程式碼。

The R Markdown Reference Guide

<https://www.rstudio.com/wp-content/uploads/2015/03/rmarkdown-reference.pdf>



# Embed code with knitr syntax

## Embed code with knitr syntax

### Inline code


Insert with ``r <code>``. Results appear as text without code.

```
Built with  
`r getRversion()`
```



```
Built with 3.2.3
```

### Code chunks

One or more lines surrounded with ````${r}````. Place chunk options within curly braces, after `r`. Insert with .

```
```${r echo=TRUE}  
getRversion()  
```
```



```
getRversion()  
## [1] '3.2.3'
```

### Global options

Set with `knitr::opts_chunk$set()`, e.g.

```
```${r include=FALSE}  
knitr::opts_chunk$set(echo = TRUE)  
```
```

### 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 = '##')

**dependson** - chunk dependencies for caching (default = NULL)

**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)

**fig.align** - 'left', 'right', or 'center' (default = 'default')

**fig.cap** - 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 = 'markup')

'asis' - passthrough 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)

Options not listed above: R.options, aniopts, autodep, background, cache.comments, cache.lazy, cache.rebuild, cache.vars, dev, dev.args, dpi, engine.opts, engine.path, fig.asp, fig.env, fig.ext, fig.keep, fig.lp, fig.path, fig.pos, fig.process, fig.retina, fig.scap, fig.show, fig.showtext, fig.subcap, interval, out.extra, out.height, out.width, prompt, purl, ref.label, render, size, split, tidy.opts



# Markdown Syntax

Plain text

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

*\*italics\** and **\*\*bold\*\***

``verbatim code``

sub/superscript<sup>2</sup>~

~~strikethrough~~

escaped: \\* \\_ \\

endash: --, emdash: ---

equation:  $\$A = \pi * r^{\{2\}}$

equation block:

$$E = mc^2$$

> block quote

Plain text

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

*italics* and **bold**

`verbatim code`

sub/superscript<sup>2</sup>

strikethrough

escaped: \* \_ \

endash: –, emdash: —

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

equation block:

$$E = mc^2$$

block quote

# Header1 {#anchor}

## Header 2 {#css\_id}

### Header 3 {.css\_class}

#### Header 4

##### Header 5

##### Header 6

<!--Text comment-->

\textbf{Tex ignored in HTML}

<em>HTML ignored in pdfs</em>

## Header1

## Header 2

### Header 3

#### Header 4

##### Header 5

##### Header 6

HTML ignored in pdfs

## 自動產生目錄

---

title: "MY TITLE"

subtitle: "MY SUB-TITLE"

author: "Han-Ming Wu, NTPU"

date: "`r format(Sys.time(), '%d %B %Y')`"

output:

html\_document:

toc: true

toc\_depth: 3

number\_sections: true

theme: united

highlight: tango

---

<<http://www.rstudio.com>>

[link]([www.rstudio.com](http://www.rstudio.com))

Jump to [Header 1](#anchor)

image:

![Caption](smallorb.png)

<http://www.rstudio.com>

link

Jump to [Header 1](#)

image:



Caption



# Markdown Syntax

## \* unordered list

- + sub-item 1
- + sub-item 2
  - sub-sub-item 1

## \* item 2

Continued (indent 4 spaces)

## 1. ordered list

## 2. item 2

- i) sub-item 1
  - A. sub-sub-item 1

## • unordered list

- sub-item 1
- sub-item 2
  - sub-sub-item 1

## • item 2

Continued (indent 4 spaces)

## 1. ordered list

## 2. item 2

- i. sub-item 1
  - A. sub-sub-item 1

(>- to have bullets appear on click) (>- to have bullets appear on click)

horizontal rule/slide break: horizontal rule/slide break:

\*\*\*

A footnote [<sup>1</sup>]

[<sup>1</sup>]: Here is the footnote.

A footnote <sup>1</sup>

1. Here is the footnote. ↩

| Right | Left | Default | Center |
|-------|------|---------|--------|
| 12    | 12   | 12      | 12     |
| 123   | 123  | 123     | 123    |
| 1     | 1    | 1       | 1      |

- slide bullet 1
- slide bullet 2

- slide bullet 1
- slide bullet 2

(@) A list whose numbering continues after

1. A list whose numbering continues after

(@) an interruption

2. an interruption

Term 1

Term 1

: Definition 1

Definition 1

## Table suggestions

Several functions format R data into tables

Table with kable

| eruptions | waiting |
|-----------|---------|
| 3.600     | 79      |
| 1.800     | 54      |
| 3.333     | 74      |
| 2.283     | 62      |

eruptionswaiting

|   |      |       |
|---|------|-------|
| 1 | 3.60 | 79.00 |
| 2 | 1.80 | 54.00 |
| 3 | 3.33 | 74.00 |
| 4 | 2.28 | 62.00 |

Table with xtable

Table with stargazer

|   | eruptionswaiting |    |
|---|------------------|----|
| 1 | 3.600            | 79 |
| 2 | 1.800            | 54 |
| 3 | 3.333            | 74 |
| 4 | 2.283            | 62 |

data <- faithful[1:4, ]

```
```\r results = 'asis'\r\nknitr::kable(data, caption = "Table with kable")\r\n```
```

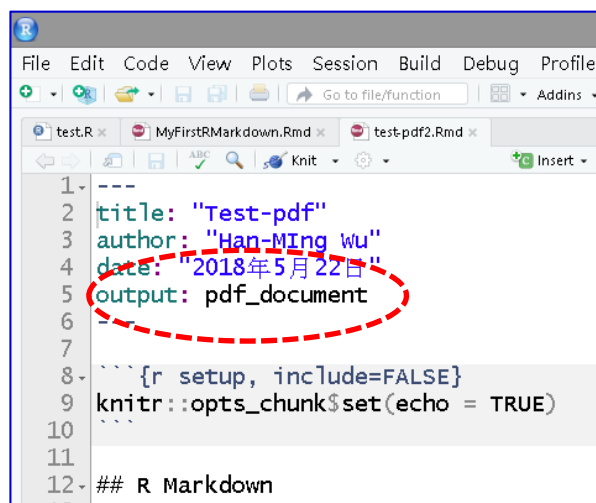
```
```\r results = "asis"\r\nprint(xtable::xtable(data, caption = "Table with xtable"),\r\n      type = "html", html.table.attributes = "border=0")\r\n```
```

```
```\r results = "asis"\r\nstargazer::stargazer(data, type = "html",\r\n                      title = "Table with stargazer")\r\n```
```

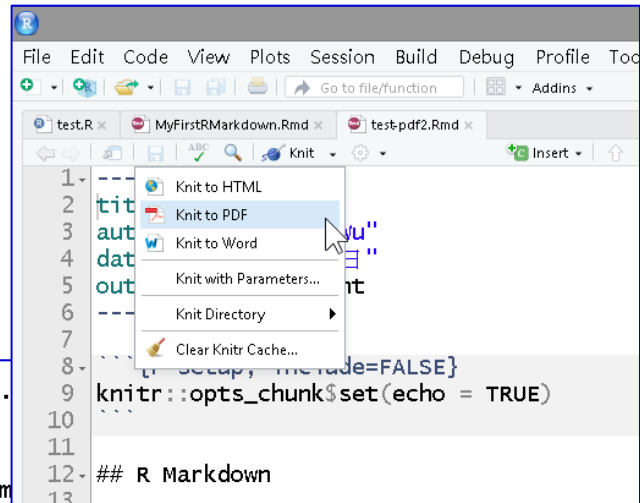
Learn more in the **stargazer**, **xtable**, and **knitr** packages.

# 產生報告及pdf檔案

14/18



```
1 ---
2 title: "Test-pdf"
3 author: "Han-Ming Wu"
4 date: "2018年5月22日"
5 output: pdf_document
6
7
8 {r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10
11
12 ## R Markdown
```



Knit to HTML  
Knit to PDF  
Knit to Word  
Knit with Parameters...  
Knit Directory  
Clear Knitr Cache...

```
m -RTS test-pdf2.utf8.md --to latex -
-from markdown+auto+link_bare_uris+ascii_identifiers+tex_math_single_backslash --output test-
pdf2.tex --template "C:\Users\userpc\Documents\R\win-library\3.4\rmarkdown\rmd\latex\default
-1.17.0.2.tex" --highlight-style tango --latex-engine pdflatex --variable graphics=yes --var
iable "geometry:margin=1in"
output file: test-pdf2.knit.md

You are recommended to install the tinytex package to build PDF.FALSE
This is pdfTeX, version 3.14159265-2.6-1.40.17 (MiKTeX 2.9 64-bit)
entering extended mode

=====
=====

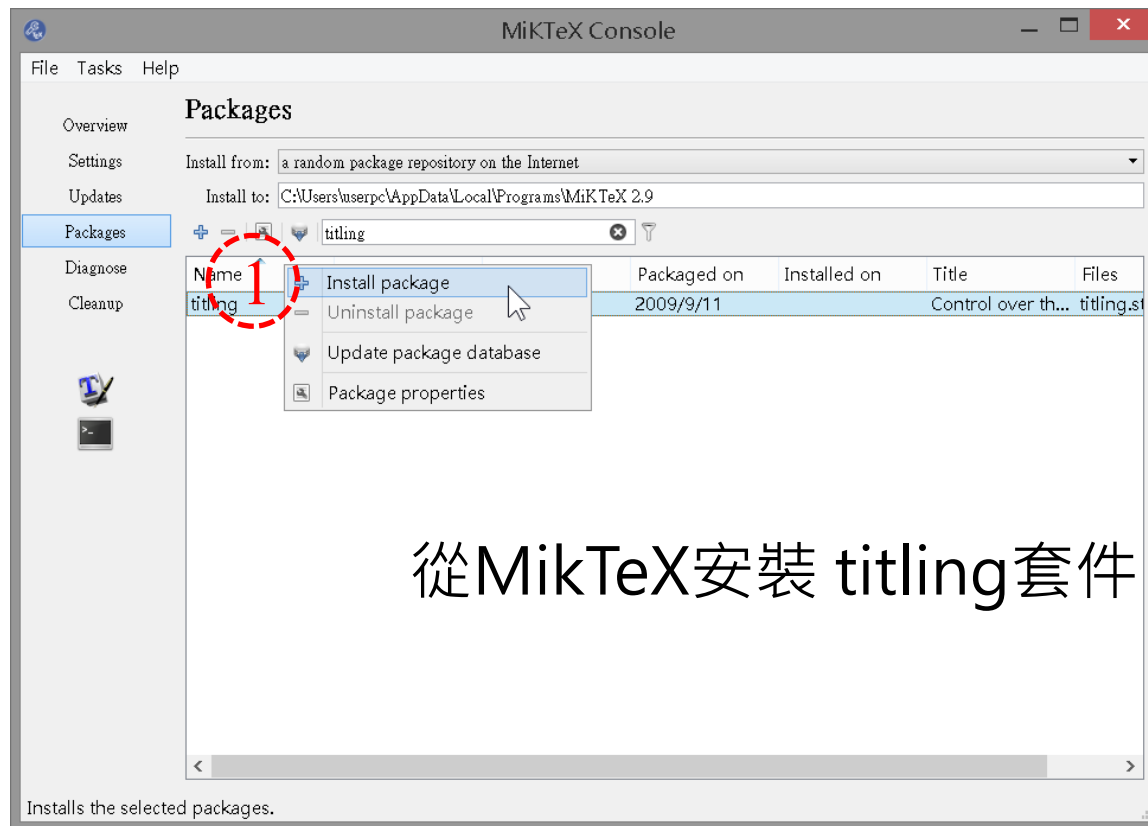
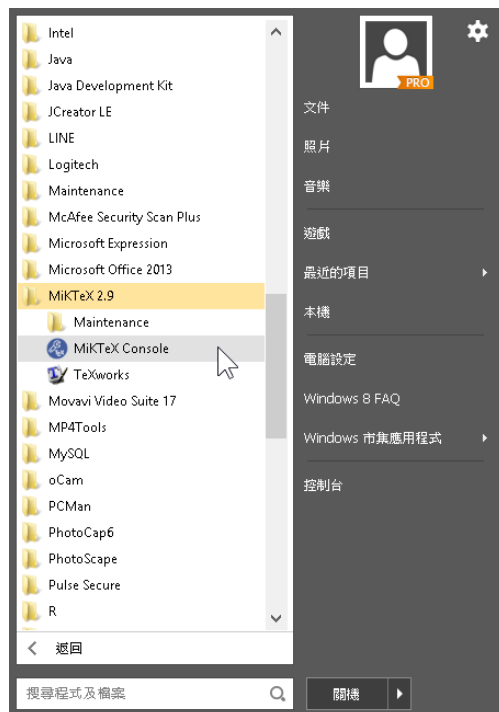
Unfortunately, the package microtype could not be installed.Please check the log file:
C:/Users/userpc/Appdata/Local/MiKTeX/2.9/miktex/log/pdflatex.log
! LaTeX Error: file 'titling.sty' not found.

! Emergency stop.
<read *>

錯誤: Failed to compile test-pdf2.tex. See test-pdf2.log for more info.
此外: Warning messages:
1: 執行中命令 "'pdflatex" -halt-on-error -interaction=batchmode "test-pdf2.tex"' 已有狀態 5
2: 執行中命令 "'pdflatex" -halt-on-error -interaction=batchmode "test-pdf2.tex"' 已有狀態 5
停止執行
```

# 從MikTeX安裝 titling套件

15/18

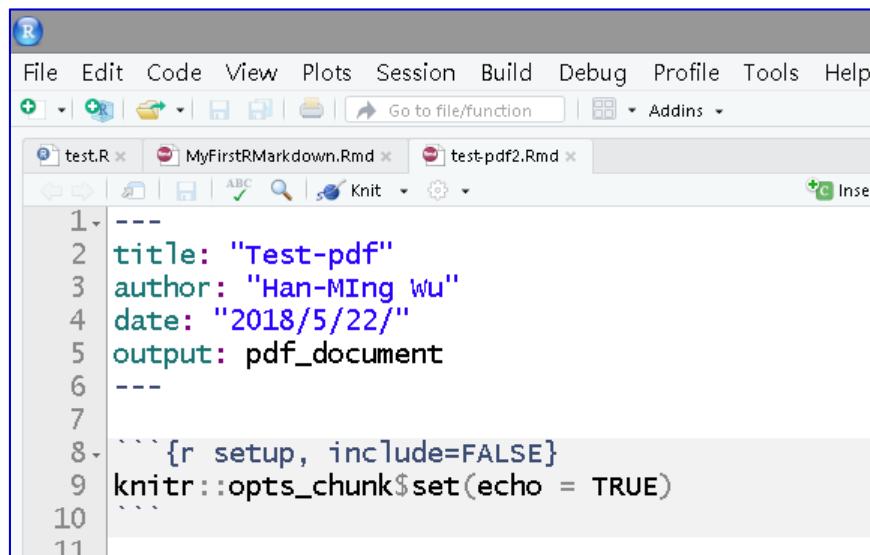


2

```
> install.packages("tinytex")
```

# 正確產生報告及pdf檔案

16/18



```
1 ---
2 title: "Test-pdf"
3 author: "Han-Ming Wu"
4 date: "2018/5/22/"
5 output: pdf_document
6 ---
7
8 {r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10
11
```

改成英文

如何在windows 7中讓rmarkdown可以順利產生出正體中文  
<http://personlin.pixnet.net/blog/post/42153787>

## Test-pdf

Han-Ming Wu

2018/5/22/

### 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>.

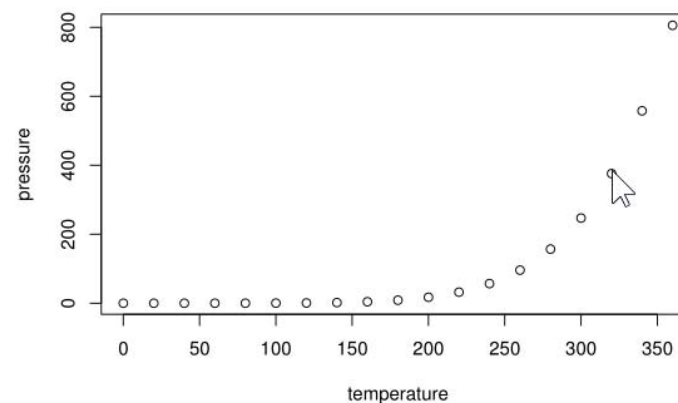
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
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.



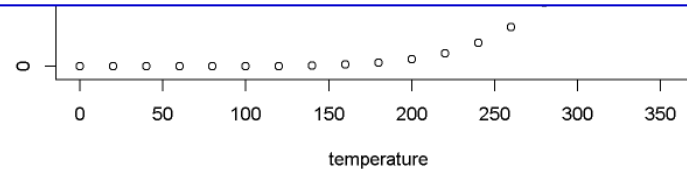


# 加入數學式

17/18

```
32 Note that the `echo = FALSE` parameter was added to the code chunk
33 to prevent printing of the R code that generated the plot.
34
35 ## 數學式
36 文中數式:  $x^3 + 2x^2$ .
37 單獨數式:
38 
$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

39
```

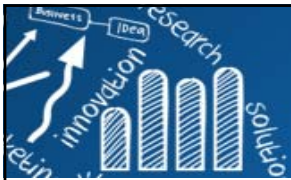


Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

數學式

文中數式:  $x^3 + 2x^2$ . 單獨數式:

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



- knitr PDF, 中文問題

<http://blog.rainy.im/2015/05/16/rmarkdown-in-rstudio/>

- PowerPoint presentation

<https://bookdown.org/yihui/rmarkdown/powerpoint-presentation.html>

- Beamer presentation

<https://bookdown.org/yihui/rmarkdown/beamer-presentation.html>

- Making slides in R Markdown

<https://arm.rbind.io/slides/xaringan.html>