

113-1 生物統計學二

R Markdown介紹

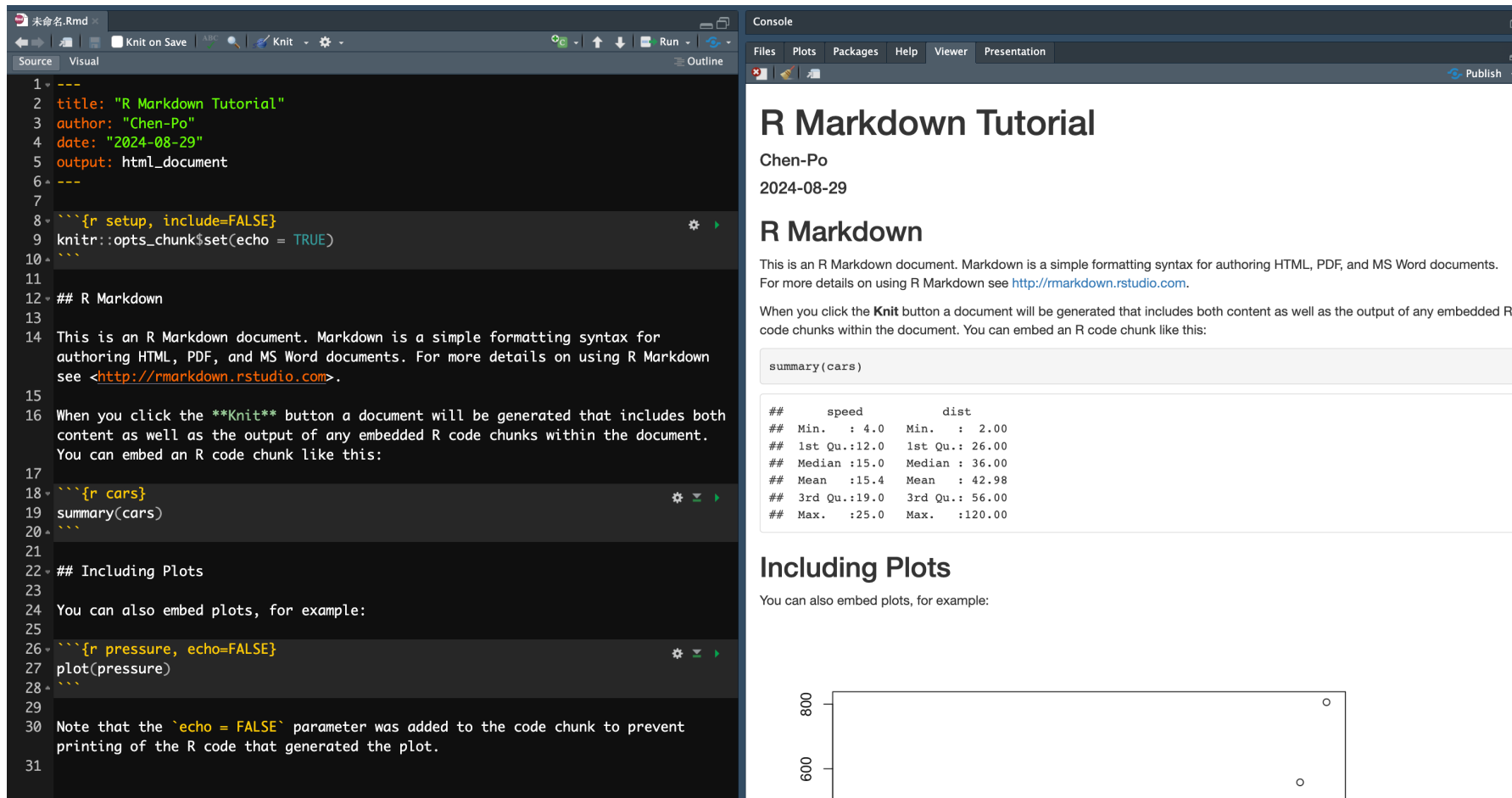
2024/09/05

助教: 廖振博

f09849002@ntu.edu.tw

R Markdown是什麼

- 一種用來整合文字說明、程式碼、結果的工具。以Markdown語法編寫文本，並且允許插入 R 語言程式碼塊，副檔名為.Rmd
- 可輸出pdf, word, html等檔案類型(若要輸出pdf檔，需先執行以下程式碼tinytex::install_tinytex())



The screenshot displays the RStudio interface with an R Markdown document titled "未命名.Rmd". The document is being knitted into HTML, as indicated by the "Knit" button and the "Visual" tab. The source code on the left includes a title "R Markdown Tutorial", author "Chen-Po", date "2024-08-29", and output format "html_document". It also contains two code chunks: one for `summary(cars)` and another for `plot(pressure)`. The rendered HTML output on the right shows the title, author, date, a summary of the cars data, and a plot of pressure.

```
1 ---
2 title: "R Markdown Tutorial"
3 author: "Chen-Po"
4 date: "2024-08-29"
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
15 authoring HTML, PDF, and MS Word documents. For more details on using R Markdown
16 see <http://rmarkdown.rstudio.com>.
17
18 When you click the **Knit** button a document will be generated that includes both
19 content as well as the output of any embedded R code chunks within the document.
20 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 prevent
35 printing of the R code that generated the plot.
```

R Markdown Tutorial

Chen-Po
2024-08-29

R Markdown

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```
summary(cars)
```

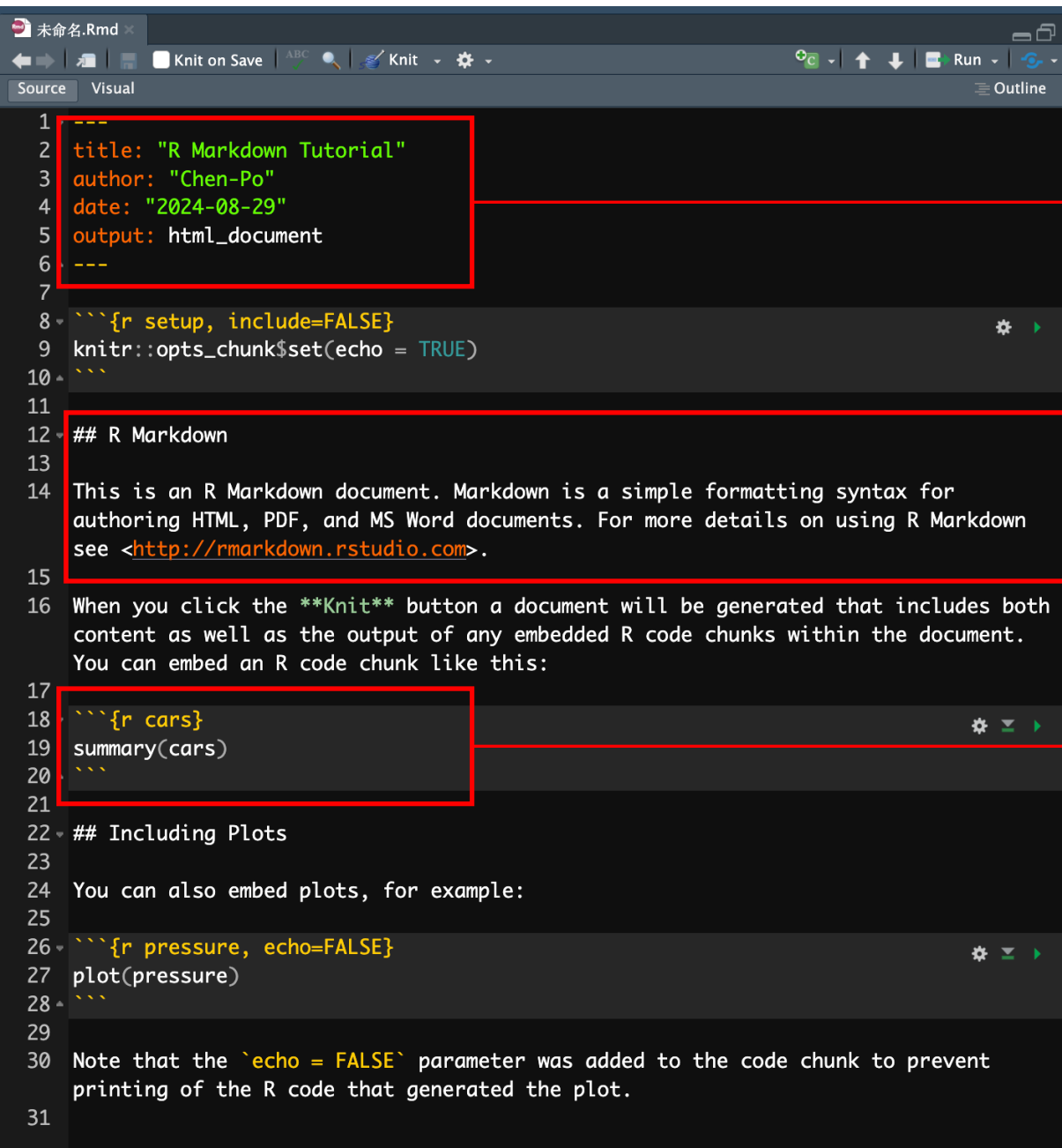
	speed	dist
## Min.	4.0	2.00
## 1st Qu.	12.0	26.00
## Median	15.0	36.00
## Mean	15.4	42.98
## 3rd Qu.	19.0	56.00
## Max.	25.0	120.00

Including Plots

You can also embed plots, for example:



R Markdown基本架構



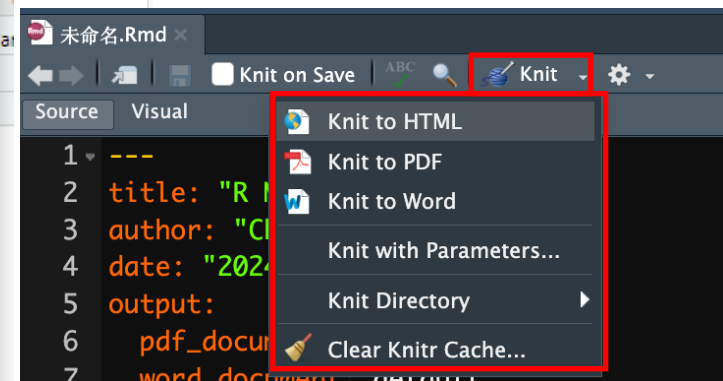
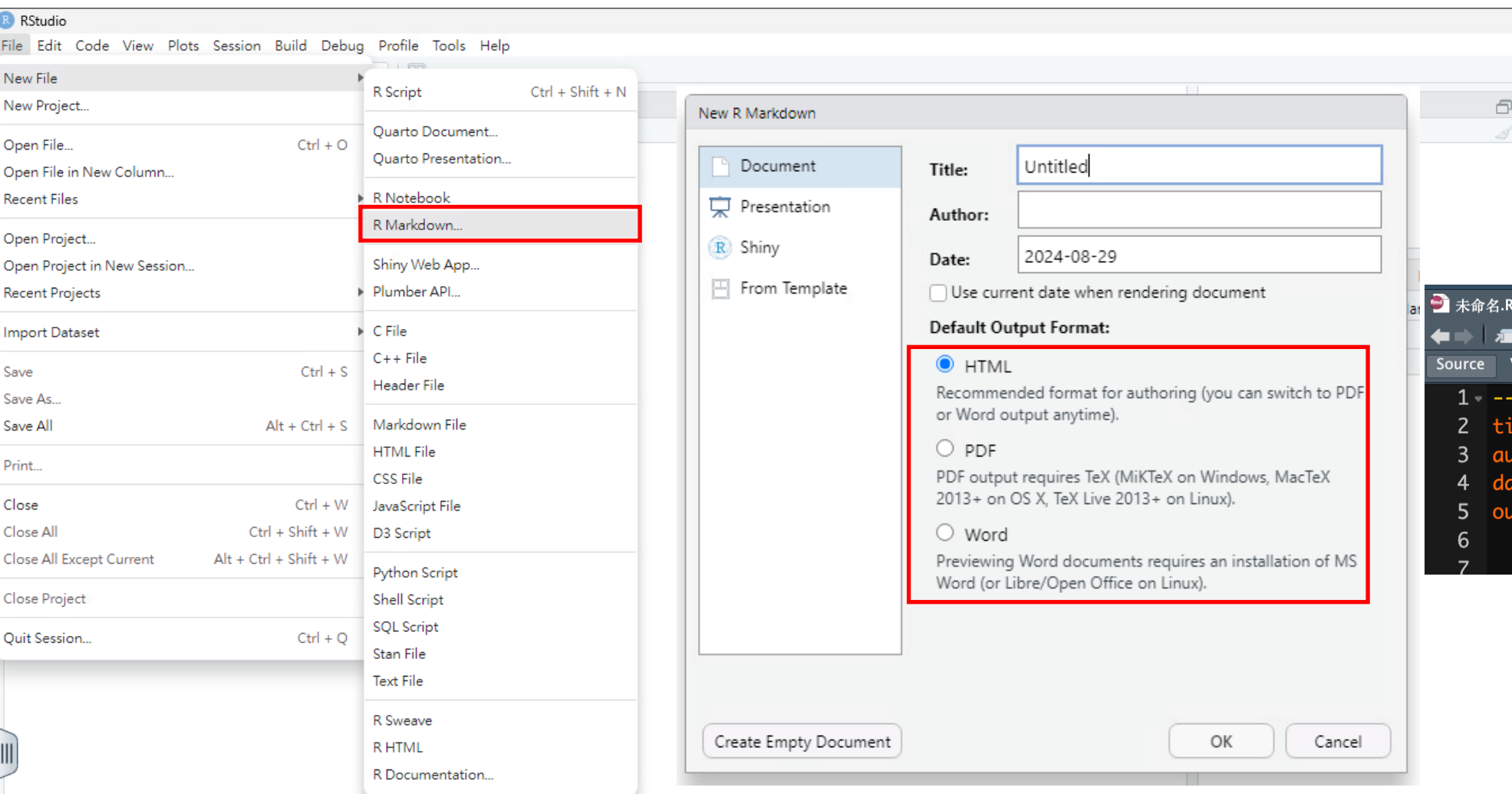
```
1  ---
2  title: "R Markdown Tutorial"
3  author: "Chen-Po"
4  date: "2024-08-29"
5  output: html_document
6  ---
7
8  ```{r setup, include=FALSE}
9  knitr::opts_chunk$set(echo = TRUE)
10 ```
11
12 ## R Markdown
13
14 This is an R Markdown document. Markdown is a simple formatting syntax for
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33
34 Note that the `echo = FALSE` parameter was added to the code chunk to prevent
35 printing of the R code that generated the plot.
```

以---圍住的區域：YAML標頭，設定檔案輸出細節
(Yet Another Markup Language)

以#開頭或純文字的區域：簡單格式文字

以``圍住的區域：R程式碼區塊

從Rstudio來開啟R Markdown



在Rstudio預覽

未命名.Rmd

Knit on Save

Knit

Run

Source

Visual

1 ---

2 title: "R Markdown Tutorial"

3 author: "Chen-Po"

4 date: "2024-08-29"

5 output:

6 pdf_document: default

7 word_document: default

8 html_document: default

9 ---

10

11 {r setup, include=FALSE}

12 knitr::opts_chunk\$set(echo = TRUE)

13 ```

14

15 ## R Markdown

16

17 This is an R Markdown document. Markdown is a simple formatting syntax for

18 authoring HTML, PDF, and MS Word documents. For more details on using R Markdown

19 see <<http://rmarkdown.rstudio.com>>.

20

21 When you click the **Knit** button a document will be generated that includes

22 both content as well as the output of any embedded R code chunks within the

23 document. You can embed an R code chunk like this:

24

25 ```{r cars}

26 summary(cars)

27 ```

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Use Visual Editor

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...

11:1

Chunk 1: setup

R Markdown

Environment

History

Connections

Tutorial

Import Dataset

19 MiB

List

R

Global Environment

Environment is empty

Console

Render

R 4.3.2

done knitting mktxt.r

tlmgr: package log updated: /Users/liaochenpo/Library/TinyTeX/texmf-var/web2c/tlmgr.log

tlmgr: command log updated: /Users/liaochenpo/Library/TinyTeX/texmf-var/web2c/tlmgr-commands.log

tlmgr option repository 'https://ctan.mirror.twds.com.tw/tex-archive/systems/texlive/tlnet'

tlmgr: setting default package repository to https://ctan.mirror.twds.com.tw/tex-archive/systems/texlive/tlnet

tlmgr: updating /Users/liaochenpo/Library/TinyTeX/tlpkg/texlive.tlpdb

tlmgr update --list

tlmgr: package repository https://ctan.mirror.twds.com.tw/tex-archive/systems/texlive/tlnet (verified)

update: texlive-scripts [112k]: local: 72148, source: 72154

Warning message:

In extract(pkg, exdir = path.expand(target)) :

'/usr/bin/tar -xf 'TinyTeX-1.tgz' -C '/Users/liaochenpo/Library/' returned error code 1

>

Files

Plots

Packages

Help

Viewer

Presentation

Publish

R Markdown Tutorial

Chen-Po

2024-08-29

R Markdown

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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

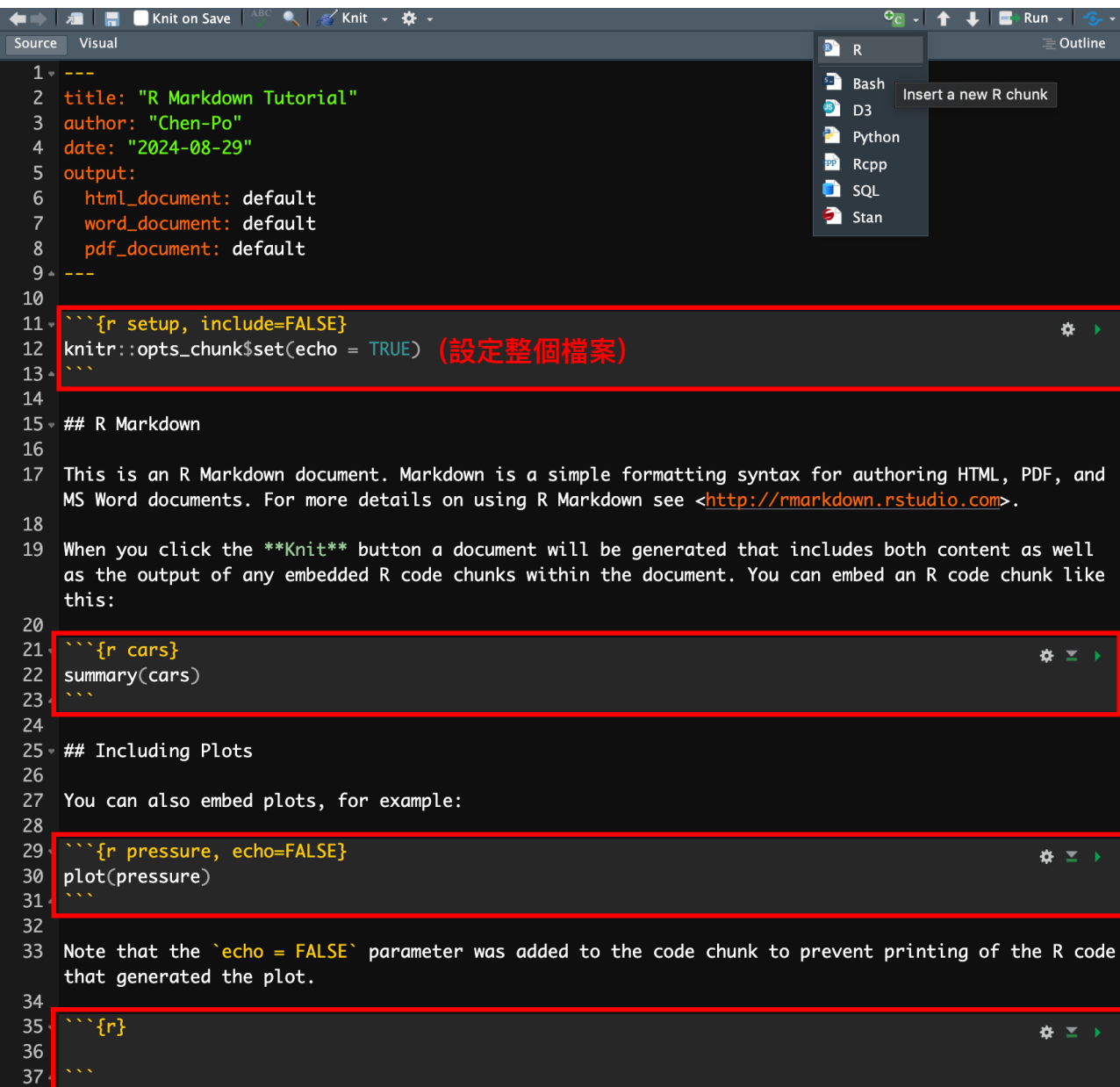
3rd Qu.:19.0 3rd Qu.: 56.00

Max. :25.0 Max. :120.00

Including Plots

You can also embed plots, for example:

R程式碼區塊及設定語法



The screenshot shows an R Markdown document with the following content:

```
1 ---
2 title: "R Markdown Tutorial"
3 author: "Chen-Po"
4 date: "2024-08-29"
5 output:
6   html_document: default
7   word_document: default
8   pdf_document: default
9 ---
10
11 ```{r setup, include=FALSE}
12 knitr::opts_chunk$set(echo = TRUE) (設定整個檔案)
13 ```
14
15 ## R Markdown
16
17 This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and
18 MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.
19
20 When you click the Knit button a document will be generated that includes both content as well
21 as the output of any embedded R code chunks within the document. You can embed an R code chunk like
22 this:
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24 ```{r cars}
25 summary(cars)
26 ```
27
28 ## Including Plots
29
30 You can also embed plots, for example:
31
32 ```{r pressure, echo=FALSE}
33 plot(pressure)
34 ```
35
36 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code
37 that generated the plot.
38
39 ```{r}
40
41 ```
```

The code editor interface includes a top toolbar with icons for navigation and execution, a left sidebar with a file explorer showing 'R', 'Bash', 'D3', 'Python', 'Rcpp', 'SQL', and 'Stan', and a right sidebar with an 'Outline' panel. A context menu is open over the 'R' file, showing 'Insert a new R chunk'.

• 格式:

````{r 註解, 設定選項}`

程式碼

`````

• 常見設定選項:

1. echo: 是否顯示程式碼

- TRUE: 顯示程式碼和執行結果。
- FALSE: 僅顯示執行結果, 不顯示程式碼。

2. eval: 是否執行程式碼

- TRUE: 執行程式碼並顯示結果。
- FALSE: 不執行程式碼, 只顯示程式碼。

3. include: 控制程式碼和結果是否出現在輸出文件中

- TRUE: 顯示程式碼和結果。
- FALSE: 不顯示程式碼和結果, 但程式碼仍然會被執行。

幾個常用的Markdown寫法

- 斜體字：*這是斜體字*
- 粗體字：**這是粗體字**
- 標題：# 第一級標題, ## 第二級標題, ### 第三級標題
- 項目符號：*text
- 行內數學公式：用單個 \$ 符號包圍來插入行內數學公式。\$E = mc^2\$
- 數學公式區塊：使用雙 \$ 符號包圍來插入。 \$\$\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}\$\$
- 註解： <!-- 這是一個註解，將不會顯示在最終輸出中 -->

```
# First-level header
* one item|

## Second-level header
1. the first item
2. the second item
3. the third item

### Third-level header

* This sentence uses `$` delimiters to show math inline:  $\sqrt{3x-1}+(1+x)^2$ 
* To add a math expression as a block, start a new line and delimit the expression with two
dollar symbols  $\\$ .

**The Cauchy-Schwarz Inequality**


$$\left(\sum_{k=1}^n a_k b_k\right)^2 \leq \left(\sum_{k=1}^n a_k^2\right) \left(\sum_{k=1}^n b_k^2\right)$$

```

First-level header

- one item

Second-level header

1. the first item
2. the second item
3. the third item

Third-level header

- This sentence uses \$ delimiters to show math inline: $\sqrt{3x-1}+(1+x)^2$
- To add a *math expression* as a block, start a new line and delimit the expression with two dollar symbols $\\$.

The Cauchy-Schwarz Inequality

$$\left(\sum_{k=1}^n a_k b_k\right)^2 \leq \left(\sum_{k=1}^n a_k^2\right) \left(\sum_{k=1}^n b_k^2\right)$$

.

常見的數學式LaTeX語法

- $\frac{a}{b}$: `\frac{a}{b}`
- x_i^2 : `x_i^2`
- $\sqrt{a^2 + b^2}$: `\sqrt{a^2 + b^2}`
- α, β, γ : `\alpha, \beta, \gamma`
- $\sum_1^n x_i^2$: `\sum_{i=1}^n x_i^2`

輸出檔案進階設定

```
1 ---
2 title: "R Markdown Tutorial"
3 author: "Chen-Po"
4 date: "2024-08-29"
5 output:
6   html_document:
7     toc: yes
8     toc_depth: 2
9   word_document:
10    toc: yes
11    toc_depth: 2
12   pdf_document:
13     toc: yes
14     toc_depth: 2
15 ---
```

是否顯示目錄
顯示到第幾級的標題

Files | Plots | Packages | Help | Viewer | Presentation Publish

R Markdown Tutorial

Chen-Po

2024-08-29

- R Markdown
- Including Plots
- First-level header
 - Second-level header

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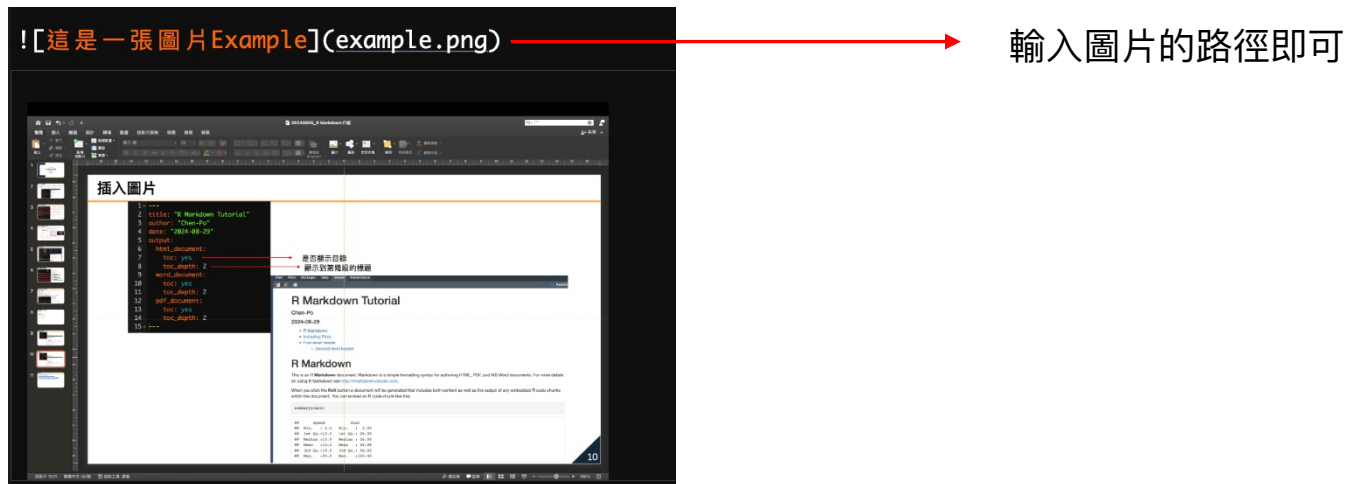
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
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 |

插入圖片

1. 使用 Markdown 語法插入圖片: `![這是一張圖片Example](example.png)`



2. 使用 R 語言插入圖片(可以設定寬度)

```
```${r, echo=FALSE, out.width="50%"}
knitr::include_graphics("example.png")
```
```

R Markdown繁體中文問題 (Windows系統會遇到)

title: "R Markdown Tutorial"

author: "Chen-Po"

date: "2024-09-26"

output:

pdf_document:

latex_engine: xelatex

toc: yes

toc_depth: 2

extra_dependencies: ["fontspec", "xeCJK"]

header-includes:

– \usepackage{xeCJK}

– \setCJKmainfont{KaiTi}

– \setmainfont{Times New Roman}

確保xeCJK被正確加載

設定中文字體

設定英文字體

- <https://bookdown.org/yihui/bookdown/>
- <https://slides.yihui.org/2020-taipei-satrday-rmarkdown.html#1>
- <https://mfb.site.nthu.edu.tw/var/file/387/1387/img/Introduction-RMarkdown.html>
- <https://www.cmor-faculty.rice.edu/~heinken/latex/symbols.pdf> (LaTeX數學式語法)