

107-1 STATISTICS INTRODUCTION TO R

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THIS WEEK LAB:

1. Brief introduction to R and Rstudio
2. Some examples of R basics and homework this week
3. R markdown

1. R & RSTUDIO



- Program
- Can be used singly



- Integrated Development Environment (IDE)
- Cannot be used singly

RSTUDIO INTERFACE

The screenshot shows the RStudio interface with four panels highlighted by red boxes:

- Code and scripts:** The top-left panel, labeled "Untitled1", contains a single line of code: `1`. The toolbar includes icons for saving, running, and other development actions.
- Data and variables:** The top-right panel, labeled "Environment", shows "Global Environment" and "Environment is empty".
- Command and results:** The bottom-left panel, labeled "Console", shows the R startup message and the prompt `> |`. The text in the console is:

```
R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.  
  
R is a collaborative project with many contributors.  
Type 'contributors()' for more information and  
'citation()' on how to cite R or R packages in publications.  
  
Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.  
  
[workspace loaded from G:/??? 脩垢蜃祉?/O_R05 Graduate School/.RData]  
> |
```
- Files, plots, package and library, help:** The bottom-right panel, labeled "Packages", shows a list of installed and available packages. The table below is a representation of the data shown in the screenshot:

Name	Description	Version
abind	Combine Multidimensional Arrays	1.4-5
acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
alignR	Visualizing Multiple Sequence Alignments with	0.1.1
backports	Reimplementations of Functions Introduced Since R-3.0.0	1.1.2
base64enc	Tools for base64 encoding	0.1-3
BH	Boost C++ Header Files	1.66.0-1
bindr	Parametrized Active Bindings	0.1.1
bindrcpp	An 'Rcpp' Interface to Active Bindings	0.2.2
broom	Convert Statistical Analysis Objects into Tidy Tibbles	0.5.0
caret	Classification and Regression Training	6.0.80

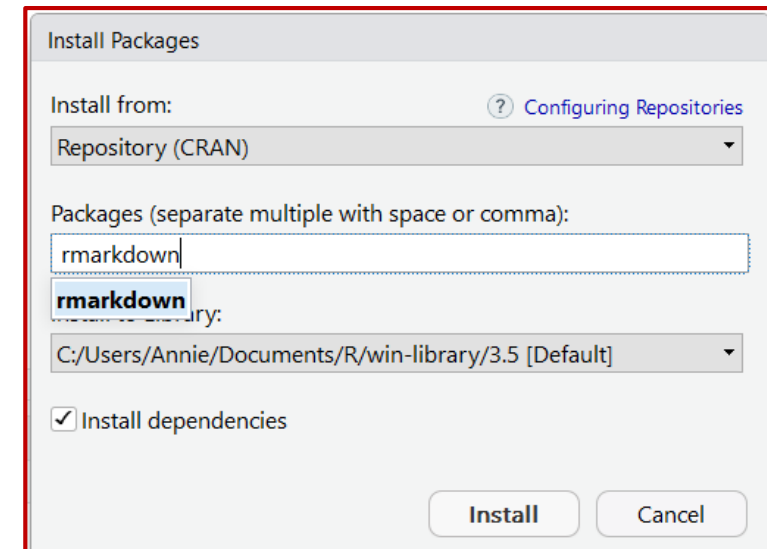
2. SOME EXAMPLES OF R BASICS AND HOMEWORK THIS WEEK

3. R MARKDOWN

- Present codes, outputs and description all in one file
- Simple way to open file (by web browser)
- To begin:

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

or



* Only once!

CREATE A R MARKDOWN FILE

hw1.Rmd

The screenshot shows the RStudio interface. The 'File' menu is open, and 'R Markdown...' is highlighted. A tooltip for 'R Markdown...' says 'Create a new R Markdown document'. The console shows the following output:

```
[1] 3

13
14
15
16

14:1 3.1 ToDo R Markdown

Console R Markdown x
G:/我的雲端硬碟/0_R05 Graduate School/
Restarting R session...

> install.packages("rmarkdown")
Installing package into 'C:/Users/Annie/Documents/R/win-library/3.5'
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/3.5/rmarkdown_1.10.zip'
Content type 'application/zip' length 2868575 bytes (2.7 MB)
downloaded 2.7 MB

package 'rmarkdown' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
C:/Users/Annie/AppData/Local/Temp/RtmpKY0aPs/downloaded_packages
> library(rmarkdown)
>
```

The right-hand pane shows the 'Environment' tab with 'Global Environment' and 'Values' table:

Variable	Value
a	3

The bottom-right pane shows the 'Packages' tab with a list of installed packages:

Name	Description	Version
abind	Combine Multidimensional Arrays	1.4-5
acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
alignfigR	Visualizing Multiple Sequence Alignments with 'ggplot2'	0.1.1
assertthat	Easy Pre and Post Assertions	0.2.0
backports	Reimplementations of Functions Introduced Since R-3.0.0	1.1.2
base64enc	Tools for base64 encoding	0.1-3
BH	Boost C++ Header Files	1.66.0-1
bindr	Parametrized Active Bindings	0.1.1
bindrcpp	An 'Rcpp' Interface to Active Bindings	0.2.2
bitops	Bitwise Operations	1.0-6
broom	Convert Statistical Analysis Objects into Tidy	0.5.0

WORK ON A R MARKDOWN FILE

The screenshot shows the RStudio interface with a file named 'hw1.Rmd' open. The editor window contains the following R Markdown code:

```
1 ---
2 title: "Homework 1"
3 author: "r05228031_廖皓宇"
4 date: "2018年9月14日"
5 output: html_document
6 ---
7
8 # This is my homework for this week.
9 {r}
10 a = 1
11 b = 2
12
13
14
15
16
17
18
```

The code chunk (lines 9-15) is highlighted with a red box and contains the text "Write your code here!". The text area (lines 17-18) is highlighted with a blue box and contains the text "Just like a notebook.". The console window at the bottom shows the following output:

```
Restarting R session...

> install.packages("rmarkdown")
Installing package into 'C:/Users/Annie/Documents/R/win-library/3.5'
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/3.5/rmarkdown_1.10.zip'
Content type 'application/zip' length 2868575 bytes (2.7 MB)
downloaded 2.7 MB

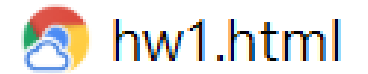
package 'rmarkdown' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
C:\Users\Annie\AppData\Local\Temp\RtmpkYOaPs\downloaded_packages
> library(rmarkdown)
> |
```

The right-hand pane shows the Environment, History, and Connections tabs. The Environment tab is active, showing the Global Environment with a single variable 'a' of type 'numeric' and value '3'. The bottom-right pane shows the Files, Plots, Packages, Help, and Viewer tabs. The Packages tab is active, showing a list of installed packages with their versions.

Name	Description	Version
abind	Combine Multidimensional Arrays	1.4-5
acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
alignR	Visualizing Multiple Sequence Alignments with 'ggplot2'	0.1.1
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broom	Convert Statistical Analysis Objects into Tidy	0.5.0

CREATE A .html FILE THROUGH R MARKDOWN



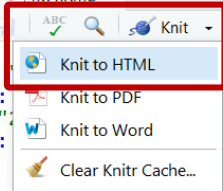
RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

```
1 ---
2 title:
3 author:
4 date:
5 output:
6 ---
7
8 # This is my homework for this week.
9 {r}
10 a = 1
11 b = 2
12
13
14
15
16
17
18
```



Environment History Connections

Global Environment

Values

a	3
---	---

Files Plots Packages Help Viewer

Install Update

Name	Description	Version
<input type="checkbox"/> abind	Combine Multidimensional Arrays	1.4-5
<input type="checkbox"/> acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
<input type="checkbox"/> alignfigR	Visualizing Multiple Sequence Alignments with 'ggplot2'	0.1.1
<input type="checkbox"/> assertthat	Easy Pre and Post Assertions	0.2.0
<input type="checkbox"/> backports	Reimplementations of Functions Introduced Since R-3.0.0	1.1.2
<input type="checkbox"/> base64enc	Tools for base64 encoding	0.1-3
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<input type="checkbox"/> bindr	Parametrized Active Bindings	0.1.1
<input type="checkbox"/> bindrcpp	An 'Rcpp' Interface to Active Bindings	0.2.2
<input type="checkbox"/> bitops	Bitwise Operations	1.0-6
<input type="checkbox"/> broom	Convert Statistical Analysis Objects into Tidy	0.5.0

Console R Markdown

G:/我的雲端硬碟/0_R05 Graduate School/

Restarting R session...

```
> install.packages("rmarkdown")
Installing package into 'C:/Users/Annie/Documents/R/win-library/3.5'
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Content type 'application/zip' length 2868575 bytes (2.7 MB)
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package 'rmarkdown' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
C:\Users\Annie\AppData\Local\Temp\RtmpKYOaPs\downloaded_packages
> library(rmarkdown)
>
```

ONLINE RESOURCES OF R MARKDOWN

- Official website: <http://rmarkdown.rstudio.com/>
- Cheat sheet: <https://www.rstudio.com/wp-content/uploads/2016/03/rmarkdown-cheatsheet-2.0.pdf>
- Reference guide: <http://www.rstudio.com/wp-content/uploads/2015/03/rmarkdown-reference.pdf>
- Writing equation: <https://en.wikibooks.org/wiki/LaTeX/Mathematics>

作業提醒

- 僅需繳交ToDo的習題
 - .html檔中，最上方記得寫上學號、姓名
 - 繳交檔案：一個.html檔 (不用繳交.rmd檔)
 - 繳交方式：ceiba作業區
-
- 截止日期：9/21 (五) 中午12點前